Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 1

Notice of Preparation (NOP) and Initial Study
NOP Mailing List
Letters Received in Response to the NOP
Revised Format Initial Study Checklist

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Notice of Preparation and Initial Study

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Los Angeles County
Department of Regional Planning

Planning for the Challenges Ahead

NOTICE OF PREPARATION

Bruce W. McClendon FAICP
Director of Planning

DATE: **December 12, 2007**

PROJECT TITLE: **Big Rock Creek Surface Mine Project**
Project Number R2007-00670

PROJECT APPLICANT(S): **Lebata, Inc.**
4621 Teller Avenue, Suite 130
Newport Beach, CA 92660
(949) 253-2800

1.0 INTRODUCTION

The Los Angeles County Department of Regional Planning (County) will be the Lead Agency pursuant to the requirements of the California Environmental Quality Act (CEQA), and will prepare an Environmental Impact Report (EIR) for an application submitted by Lebata, Inc. (Applicant) for the installation and operation of the following:

- Aggregate Surface Mining and Processing Facilities
- Ready-Mixed Concrete Plant
- Asphalt Mixing Plant
- Raw Cement Transfer and Aggregate Distribution Facility

The Applicant is requesting a Conditional Use Permit (CUP) and Surface Mining Permit (SMP) for a new surface mining operation and the facilities listed below in Section 3.3.

This Project Description, attached figures and the attached CEQA Initial Study prepared by the County of Los Angeles constitute the Notice of Preparation (NOP) required by CEQA (Guidelines Section 15082[a]).

2.0 LOCATION

The Project site is located in the Antelope Valley, off Avenue T, in unincorporated Los Angeles County, east of the City of Palmdale, near the community of Pearblossom (Figure 1 – Site Location Map). The Project site is located immediately south of Avenue T and is bound by 136th East to the east, Avenue U to the south, and 126th East to the west. The property is currently in an undeveloped condition.

3.0 PROJECT DESCRIPTION

3.1 Land Use

The Applicant seeks approval to mine aggregate within an approximately 284.5-acre area, and process the mined materials onsite. The total Project area is comprised of approximately 310 acres. The Project's primary objective is to produce marketable Portland Cement Concrete-grade (PCC) aggregate and related construction material products.

The California Department of Conservation Division of Mines and Geology has classified the Project area as MRZ-2 (source: *Open File Report 94-14: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California, Part II – Los Angeles County.* Miller, R.V., *1994*).

3.2 Surrounding Land Uses

The Project site is located in a relatively remote and undisturbed area of the Antelope Valley. The property is bisected by an existing railroad track and is surrounded by vacant undeveloped properties on the north, west and south sides. Properties along the eastern boundary are mostly undeveloped, although there are a few residences, outbuildings and well houses. The nearest residence is immediately south of the railroad tracks, approximately 200 feet east of the Project's eastern boundary of the South Parcel.

3.3 Major Components of the Proposed Project

The Applicant proposes to:

- Conduct aggregate surface mining and processing operations to produce marketable Portland Cement Concrete-grade (PCC) aggregate and related products over approximately 50 years;
- Mine aggregate within an approximately 284.5-acre area;
- Mining will occur within three distinct phases, divided into several mining sub-phases;
- Install and operate a ready-mixed concrete plant;
- Install and operate an asphalt mixing plant;
- Install and operate a raw cement and aggregate transfer and distribution facility;
- Supply primarily the greater Los Angeles, San Fernando Valley and the Saugus/Palmdale and San Bernardino/Riverside market areas with Portland Cement Concrete-grade (PCC) aggregate (e.g., rock, sand and gravel), specialty sand, ready-mix concrete, mortar, road base, asphalt and raw cement; and
- Provide for the environmentally sound and economically viable closure of the site.

Refer to Figure 2 – Facilities Site Plan.

3.3.1 Surface Mining and Processing

Initially, material will be excavated by dozers and shovels, either placed directly into the jaw crusher, or placed into articulating trucks for transport to the jaw crusher. As the mining pit deepens, material will be excavated by shovel and transported by articulating trucks for

transport to the jaw crusher. From the jaw crusher, material will be conveyed out of the mining pit to the Aggregate Processing Facilities. A grader will be used to maintain the Project's interior roads. Mining will occur within three distinct phases (Phases), divided into several mining sub-phases (Blocks). These phases are described as follows and are illustrated in Figure 3 – Mine Phasing Plan:

Phase 1 (North Pit) will begin in the North Parcel, which is located between Avenue T and the Southern Pacific Railroad, and will involve approximately 96.8 acres. In Phase 1, mining will start at the southeast quarter of the Project site and progress toward the north. The first Block within Phase 1 is larger than most to provide room at the bottom of the pit for the energy dissipaters, and to be able to continue mining to the north. Block 1 will take approximately 16 months to complete.

The remainder of Phase 1 will involve the excavation of a series of Blocks of approximately 1,000,000 gross tons each. It is projected that each of the Blocks will take approximately one year to complete. Floodwater interceptors and down drains will be added as mining progresses.

A five-foot berm will be constructed on three sides of the Phase 1 pit because of its proximity to vehicles and personnel to those slopes. On the east side, a three-foot berm will be built in compliance with the proposed Drainage Concept, prepared by Stetson Engineers. The Drainage Concept can be found in the Surface Mining and Reclamation Plan.

- ***Phase 2*** (South Pit) will involve the South Parcel where excavated materials will be conveyed out of the Mining Pit through a tunnel under the railroad tracks to the Aggregate Processing Facilities site. The mined area will involve approximately 161.1 acres.

  Phase 2 is divided into a series of Blocks of approximately 1,000,000 gross tons (nominal) each. Each Block will take approximately one year to mine. Again, interceptors and down-drains will be sequenced as the respective Blocks are mined.

- ***Phase 3*** may be divided into two sub-phases.
  - ***Phase 3a*** (Processing Facilities Site) will involve the excavation of materials under the area occupied by the various plants and facilities, on approximately 16.9 acres. In advance of Phase 3 excavation, the facilities occupying that location will be relocated into the bottom of the North Pit area excavated during Phase 1.
  - ***Phase 3b*** (Raw Cement and Aggregate Transfer and Distribution Facility Area). The Applicant proposes the option to include within this Phase, the excavation of materials underlying the Raw Cement and Aggregate Transfer and Distribution Facility.

Peak daily aggregate production will be limited to the physical capabilities of the aggregate processing equipment, which is capable of processing 5,200 tons per day (650 tons per hour). Actual production levels will vary over time and are a direct function of the rate of development within the Project's market area, the number and type of contracts obtained, the overall economy, equipment downtime, as well as hours and days of operation. Initial testing indicates that the deposit is comprised of:

- ~ 26.73 percent Gravel
- ~ 52.52 percent Sand
- ~ 20.75 percent Fines

Gross and net volumes of the material proposed to be excavated from the mining area and processed for sale are estimated to be:

- 46.52 million tons gross volume (assumes 1.5 tons per cubic yard, a total of 31.02 million cubic yards); and
- 36.87 million tons net volume of PCC-grade aggregate (assumes approximately 20.75 percent of the material will be unsuitable for sale as aggregate).

At the proposed gross extraction rate of approximately 1,000,000 gross tons per year, this resource could last about 47 years. The Applicant is requesting a 50-year permit.

Finished products will be PCC-grade aggregate and aggregate using products, such as concrete and asphalt. Processing also creates scalped fines as a byproduct, some of which may be used as a soil amendment onsite in association with revegetation activities. The remainder of the fines will be sold as slurry or used in nonstructural concrete.

Water will be used on site for washing of aggregate, for the production of the ready-mixed concrete for dust control and for irrigation. A water well will be drilled at the processing facilities site after appropriate permits have been obtained.

Phased/Concurrent Reclamation

It is estimated that the mine site will be in operation for approximately 50 years. The Antelope Valley Areawide General Plan designates the Project site as "Open Space" and it is reasonable to predict that the open space nature of the Project area and surrounding land will not have changed significantly during the intervening years. Other potential post-mining uses include groundwater recharge or storm water retention basins.

The Reclamation Plan anticipates that upon completion of the operation, two depressions of approximately 80 feet will remain. Upon reclamation, the exterior slopes of the mine pits will be 2:1 horizontal: vertical finished grade, which is considered a stable condition. No backfilling is proposed.

The Revegetation Plan was developed to restore indigenous vegetation within the mine pits and otherwise disturbed areas of the proposed Big Rock Creek surface mine as required by the California Surface Mining and Reclamation Act (SMARA) of 1975, as amended (Public Resources Code § 2719 et. seq.) and per the Performance Standards for Revegetation (Public Resources Code § 3705) and for Topsoil Salvage, Maintenance and Redistribution (Public Resources Code § 3711).

The special status wildlife species that have the potential of being on the site are the desert tortoise, the Mojave ground squirrel and the burrowing owl. Further investigations are planned and mitigation will be developed during the preparation of the EIR.

Financial Assurance

The Applicant recognizes its responsibility for ensuring the successful and timely completion of the reclamation of the Project site. Both, the County of Los Angeles, in Chapter 22.56 of the Los Angeles Zoning Code and SMARA, require the Applicant develop a Financial Assurance Calculation representing the costs of site reclamation, should the operator be unable to fulfill its obligation. The Applicant has prepared a draft Financial Assurance Calculation and is prepared to enter into a mutually acceptable agreement to cover the reclamation costs as a condition of the SMP.

3.3.2 Ready-Mixed Concrete Plant

The Applicant proposes to install and operate a Ready-Mixed Concrete Plant to manufacture and deliver 150,000 cubic yards per year of ready mixed concrete on an average annual basis. The actual quantity will depend upon market demand and may be as much as 225,000 cubic yards per year during peak demand.

Concrete ingredients include aggregate (sand and gravel), Portland cement, fly ash, small amounts of admixtures and water. Although the relative proportion of ingredients in any batch is subject to change based upon the final use of the concrete, a typical mixture will contain the following approximate materials and amounts by weight:

- Aggregate (sand and gravel) – 78 percent
- Portland Cement – 12 percent
- Fly Ash – 2 percent
- Admixtures – less than 1 percent
- Water – 8 percent

Ready-Mixed Concrete, as a process, uses a central concrete mixer dual-drum and/or dry drum batch plant. Concrete ingredients are added to the large, enclosed rotating drums where they are thoroughly mixed. The wet concrete mixture is then transferred into concrete mix trucks for delivery to various job sites for placement. The control of the batching operations is accomplished from a portable control building located onsite. The mixing drums are fitted with a required bag-house and a vacuum that captures dust and emissions that emanate from the drums.

In addition to the dual drum central mixer and loading facility, the batch plant includes aggregate storage areas, two cement silos, one fly ash silo, a water tank, and conveyors. The silos are completely enclosed and the air exchanged during filling is vented through filters that remove dust particles. The tallest silo is approximately 59 feet high. The conveyors, mixing drums, and other machinery at the Project are powered by electric motors.

All trucks will exit the Project by driving over a vibrating grate to remove any loose materials. Trucks returning to the Project with unused concrete, or at the end of the workday, will wash their drums clean of concrete at the truck washout area. Wash water and left over concrete are collected and reclaimed in lined basins for use onsite. Approximately every three days, the built-up silts and sediments (i.e., fine material) will be removed from the lined basins and transferred to a stockpile for eventual use offsite as landfill cover, among other uses. A similar maintenance process would be employed to maintain the traditional open pond water recycling system, should that alternative be approved and utilized.

3.3.3 Asphalt Mixing Plant

The Applicant proposes to install and operate an Asphalt Mixing Plant to manufacture and deliver 200,000 tons of asphalt per year on an average annual basis. The actual quantity will depend upon market conditions and may be as much as 300,000 tons per year during peak demand.

The plant will be capable of utilizing both RAP and ground crumb rubber. The Project consists mainly of the drying drum with baghouse and mixing drum. Utilizing a combination of the "continuous mix" and "counterflow drum mix" processes, aggregate, which has been proportioned by size gradations, is introduced into the drying drum at the end opposite the burner. As the drum rotates, aggregates are mixed and hot air is blown in a direction "counter" to the aggregate's movement through the drying drum. Hot dry aggregate is then transferred to the adjacent mixing drum where it is blended with pre-heated asphalt oil to form asphalt. The resulting asphalt mixture is discharged at the end of the mixing drum, and then conveyed to one of three 180-ton heated storage silos, where it is loaded into transport trucks. When RAP is being used, the RAP materials are mixed with the aggregate at the end of the Drying Drum, and the mixture is transferred to the mixing drum where asphalt oil is introduced.

When rubberized asphalt (RAC) is being produced, ground crumb rubber is blended with pre-heated asphalt oil which is pumped into a point approximately midway in the mixing drum unit where it is mixed with the hot, dry aggregate that has just come from the drying drum.

The asphalt mixing plant will employ the latest generation of combustion technology. The burner is fuel-efficient, reduces emissions of NOx and VOCs, and keeps CO to a minimum. Natural Gas will be used to achieve the Best Available Control Technology (BACT) Guidelines for NOx, VOCs, CO and SOx. Furthermore, a fabric filter collector (baghouse) with 99.96 percent efficiency will be used to vent the rotary aggregate dryer. This will achieve the BACT guidelines for PM_{10}.

Of concern to permitting agencies, "blue smoke" contains tiny oil droplets that carry much of the characteristic asphalt odor. Air pollution control agencies are becoming more concerned with blue smoke, especially as RAP, rubberized asphalt and polymer blends are more routinely specified in asphalt materials contracts. Without the proper controls, these specialty mixes can produce an increased amount of blue smoke. To control this form of emission, the Project includes a Blue Smoke Control Unit, which utilizes a filtration system providing a control efficiency of 98 percent (1.8 microns or greater) to collect fugitive emissions from the mixing drum, conveyors delivering asphalt to the silos, and the silos themselves.

The Asphalt Mixing Plant is of modular construction with pre-wiring and distributed controls for fast and easy plant setup and subsequent relocation. In this instance, the Applicant is proposing to install a plant that affords:

- Precise computerized cold feed and batching controls to ensure good mix quality.
- Control of burner and mix temperatures to produce consistent asphalt mix.
- Highly efficient plant design and pollution control equipment that exceeds environmental protection requirements.

3.3.4 Raw Cement and Aggregate Transfer and Distribution Facility

The Applicant currently has no rail transport option to deliver raw cement or aggregate materials from the Project to the Los Angeles Basin. The rail carrier has little available rail capacity and currently does not consider either type of commodity a "preferred cargo" for rail shipment. Moreover, the Applicant, despite an intensive three year search, has been unable to locate a suitable rail receiver site in the Los Angeles Basin.

Approximately 9.7 acres of the North Parcel will be used for a Raw Cement and Aggregate Transfer and Distribution Facility. This area is directly north of, and adjacent to the railroad tracks that bisect the North and South Parcels. The raw cement portion of the facility will be able to receive and accommodate 17 railcars, in which raw cement will be delivered from the Sacramento area. The raw cement will be transferred pneumatically from the rail cars into two adjacent silos. The Project will receive approximately 300,000 tons of raw cement annually.

Raw cement will be used onsite at the Ready-Mixed Concrete Plant and the remainder will be pneumatically loaded from the silos located in the Raw Cement and Aggregate Transfer and Distribution Facility into raw cement haul trucks for transport by truck to third parties or operator-owned concrete plants in the Greater Los Angeles, and the San Bernardino and Riverside areas. Under average operating conditions, the Ready-Mixed Concrete Facility will produce 150,000 cubic yards per year, with each cubic yard weighing approximately 4,000 pounds. Of this, raw cement comprises 12 percent by weight, or 480 pounds per cubic yard. This means the onsite Ready-Mixed Concrete Plant will use 36,000 tons of raw cement per year (i.e., 150,000 cubic yards x 480 pounds per cubic yard / 2,000 pounds = 36,000 tons of raw cement).

At an annual production rate of 150,000 cubic yards, raw cement is expected to be used for concrete production as follows:

- Onsite Use by Operator – 12 percent
- Greater Los Angeles area by Operator – 88 percent

At a peak production rate of 225,000 cubic yards, raw cement is expected to be used for concrete production as follows:

- Onsite Use by Operator – 18 percent
- Exported to the Greater Los Angeles area by Operator – 82 percent

If and when rail capacity becomes available, the aggregate portion of the facility will be able to ship Project materials by rail to the Los Angeles Basin, and will be able to receive aggregate mined and processed elsewhere for further shipment by rail to the Los Angeles Basin. Since there is little opportunity to ship aggregate from the Project by rail, the Applicant may find the need to receive aggregate by rail on occasion to supplement the project's supply of aggregate. Such aggregate would provide certain grades of material the project cannot produce in sufficient quantity to support operations at the Ready-Mixed Concrete Plant or Asphalt Mixing Plant. Such rail deliveries will serve to avoid the use of trucks to transport these supplemental materials to the Project.

In the future, if rail capacity becomes available and contracts are executed with the rail carrier, the Applicant will then be in a position to make fuller use of the Raw Cement and Aggregate Transfer and Distribution Facility to transport raw cement and aggregate materials to the Los Angeles basin via rail.

3.3.5 Spill Prevention, Control, and Countermeasure Plan

A Spill Prevention, Control, and Countermeasure Plan (SPCC) will be prepared to meet the requirements of the following:

- Title 40, Code of Federal Regulations (CFR), Part 112
- California H&S Code, Chapter 6.67, §25270 - Aboveground Petroleum Storage Act (1989)

The purpose of the SPCC is to identify procedures and controls to prevent accidental releases of petroleum products and to minimize the impact if a release occurs.

3.3.6 Storm Water Pollution Prevention Plan

In 1987, Congress enacted the Water Quality Act, amending the Federal Water Pollution Control Act to include regulation of the discharge of storm water from industrial and certain municipal sources. EPA issued final regulations establishing permit application requirements for storm water in the November 16, 1990 Federal Register (55 CFR 47990). The regulations provide for individual and group applications and for the issuance of individual and general permits.

In California, the State Water Resources Control Board (SWRCB) elected to issue a statewide General Permit that applies to all industrial storm water discharges requiring a permit except those from construction activities. The SWRCB adopted the General Permit and Fact Sheet on November 19, 1991, which was reissued on April 17, 1997. The General Permit requires that the Project:

- Eliminate unauthorized non-storm water discharges.
- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP).
- Monitor discharges of storm water.

A Storm Water Pollution Prevention Plan (SWPPP) will be developed to comply with the requirements set forth in Industrial Storm Water General Permit Order 97-03-DWQ, which pertains to the General Permit No. CAS000001, the purpose of which is to fulfill two major objectives:

- Identify sources of pollution that may contaminate industrial storm water discharges.
- Describe and ensure the implementation of practices to reduce pollutants in storm water discharges.
- File Notice of Intent (NOI).

3.3.7 Operating Hours

The Project will operate up to 303 days per year, employing 156 people working three shifts. Employees include sales and management staff, plant operators, and concrete and asphalt truck drivers during the day shifts. The night shift will employ seven persons for plant operations and maintenance.

3.3.8 Product Transportation

The Project will generate an average of 217 truck roundtrips and a maximum of 301 truck roundtrips during operations per day. This includes outgoing product trips and incoming materials trucks. Approximately 80 percent of the outgoing product trucks will travel to plants in the greater Los Angeles area while about 20 percent are anticipated to deliver material to plants in the San Bernardino and Riverside area. Employee trips are estimated to be 156 roundtrips per day for average and peak operations. A *Traffic Impact Analysis* was prepared by Austin-Foust Associates, Inc. to evaluate the impact of truck traffic on the existing road system.

3.3.9 Administration, Security, and Public Safety

The Project will include an administration office and dispatch/operations building for normal everyday business. Night time and weekend security will be provided by perimeter fencing around the Aggregate Processing Facilities and Plant areas and around the active mining pit, locked gates, lighting, and security trailer. The office area may be alarmed. Equipment will be disabled daily at the end of the shift. A six-foot high perimeter fence, using cyclone fence materials, will be installed.

3.4 Additional Permits Required for Operation

A variety of permits, plans, licenses and certificates may be required by other agencies. Actual permitting requirements will be determined by the permitting agencies during application processing, the more significant of which will involve the following agencies:

Antelope Valley Air Quality Management District

- Permit to Construct
- Permits to Operate (PTO)

Lahontan Regional Water Quality Control Board

- NPDES Permit (General)
- Spill Prevention, Control, and Countermeasure Plan (refer to 3.3.1 below)
- Storm Water Pollution Prevention Plan (refer to 3.3.2 below)
- Clean Water Act Section 401 Certification

California Department of Fish and Game

- Section 1605 (long-term) Streambed Alteration Agreement

County of Los Angeles, Department of Health Services

- Business Plan

- Hazardous Materials Inventory
- Above-Ground Storage Tank (diesel)

County of Los Angeles, Fire Department, Fire Prevention Division

- Welding Permit
- Hazardous Materials Storage and Use

4.0 POTENTIAL ENVIRONMENTAL EFFECTS

The EIR will evaluate the environmental impacts of the Project, after having first established the environmental setting, or baseline, for the environmental analysis. In the Project Initial Study prepared by the County of Los Angeles Department of Regional Planning, the following potentially significant impacts were identified for further evaluation, the results of which will be disclosed in a focused EIR. In each instance, the significance of potential Project impacts, cumulative impacts, and appropriate mitigation measures will be disclosed in the EIR.

- Geotechnical Hazards
- Flood Hazards
- Noise
- Water Quality
- Air Quality
- Biological Resources – Sensitive Species Habitat/Loss of Habitat
- Visual Quality
- Traffic/Access
- Environmental Safety – Hazardous Materials

5.0 ALTERNATIVES

The EIR will evaluate alternative means to implement the Project. Issues and concerns identified during agency and public scoping and through subsequent environmental evaluation will be used to develop and refine Project alternatives. Development of potential alternatives will be made in conjunction with the local community and state and federal agencies involved in the process. As required by CEQA, the County will also analyze the "no project" alternative as a baseline for gauging the impacts of the Project.

6.0 CUMULATIVE IMPACTS

Due to the scope and longevity of this Project, the EIR will evaluate impacts that are individually not significant but that may be cumulatively significant when viewed in connection with existing conditions and probable future projects. The potential cumulative impacts from other existing surface mining operations in the same vicinity will be assessed. The significance of potential impacts and appropriate mitigation measures will be disclosed in the EIR.

7.0 DIRECT AND INDIRECT EFFECTS

The CEQA Guidelines require an evaluation of the direct physical changes in the environment and reasonably foreseeable indirect physical changes in the environment which may be caused by the Project. For example, it will be necessary to evaluate the growth-inducement resulting

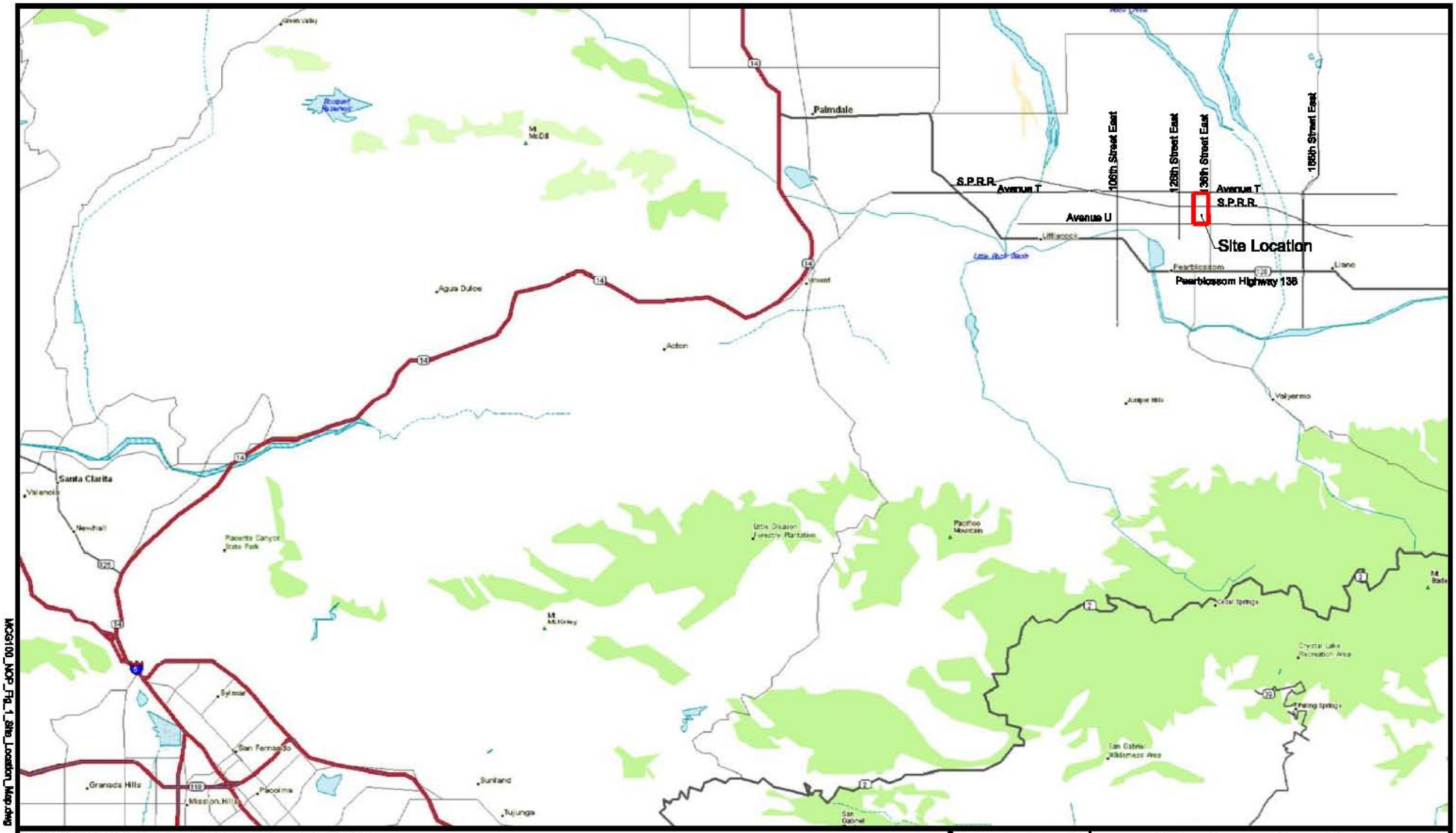
from the Project. The significance of potential impacts and appropriate mitigation measures will be disclosed in the EIR.

8.0 REVIEW PERIOD

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but no later than 30 calendar days after formal issuance date of this notice. Please submit comments no later than the close of business January 11, 2008. In submitting comments, please include the commenter's name, telephone number, and e-mail address in the event it is necessary to further clarify the comments being offered.

Please send your written comments to:

Impact Analysis Section
Department of Regional Planning
320 West Temple Street, Room 1348
Los Angeles, CA 90012
Attn.: Anthony Curzi
Tel: (213) 974-6461
Fax: (213) 626-0434
E-mail: acurzi@planning.lacounty.gov



SOURCE: DeLorme, 3-D TopoQuads (c) 2005

LEGEND:

Project Boundary

N

0 6 12 24

Approximate Scale In Miles

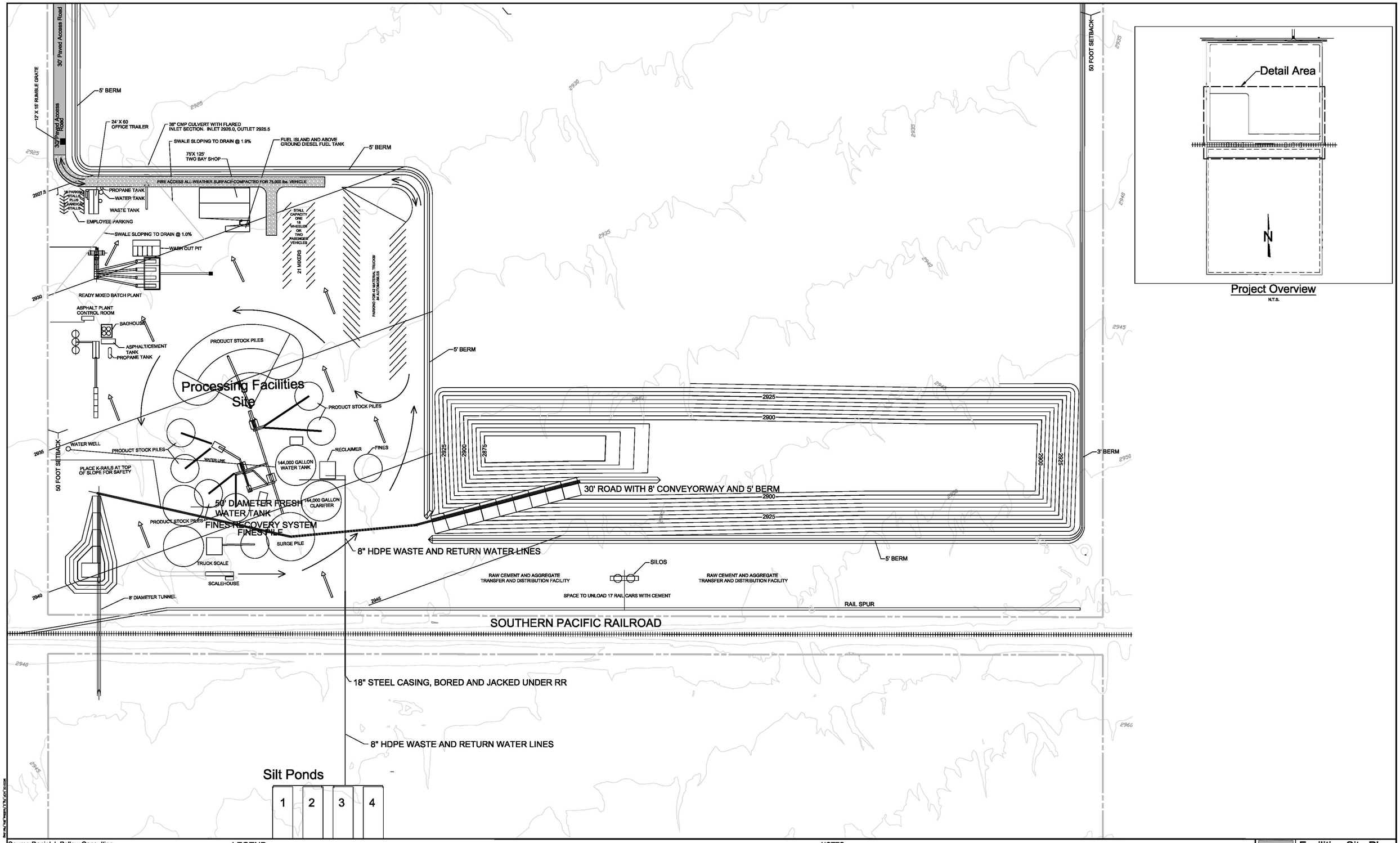
WEST COAST ENVIRONMENTAL AND ENGINEERING

Site Location Map

Big Rock Creek Site
Antelope Valley, California

PROJECT: MCG100-001-06		FIGURE 1
DRAWN BY: GOZ	DATE: 12/26/06	REVISION: 12/07/07 GOZ
APPROVED BY: IE	DATE: 12/26/06	PRINTED: 12/07/07

MCG100_NOP_Fig_1_Site_Location_Map.dwg



Source: Daniel J. Pellow Consulting
Mine Design
07-17-2007

Topo: Inland Aerial Surveys Inc.
Date of Flight- 05/02/2006

LEGEND:

- CUP Boundary
- Surface Drainage
- Traffic Flow
- 2925 Proposed Contours
- Existing Contours
- Conveyors

NOTES:

1. Property secured by 6' high chainlink fencing.
2. Facilities pad placed at 50' depth to assure water table avoidance.
3. Processing facility parking and access areas (other than fire access) naturally compacted by equipment.
4. Fire access will be maintained appropriate to phase build out.

N

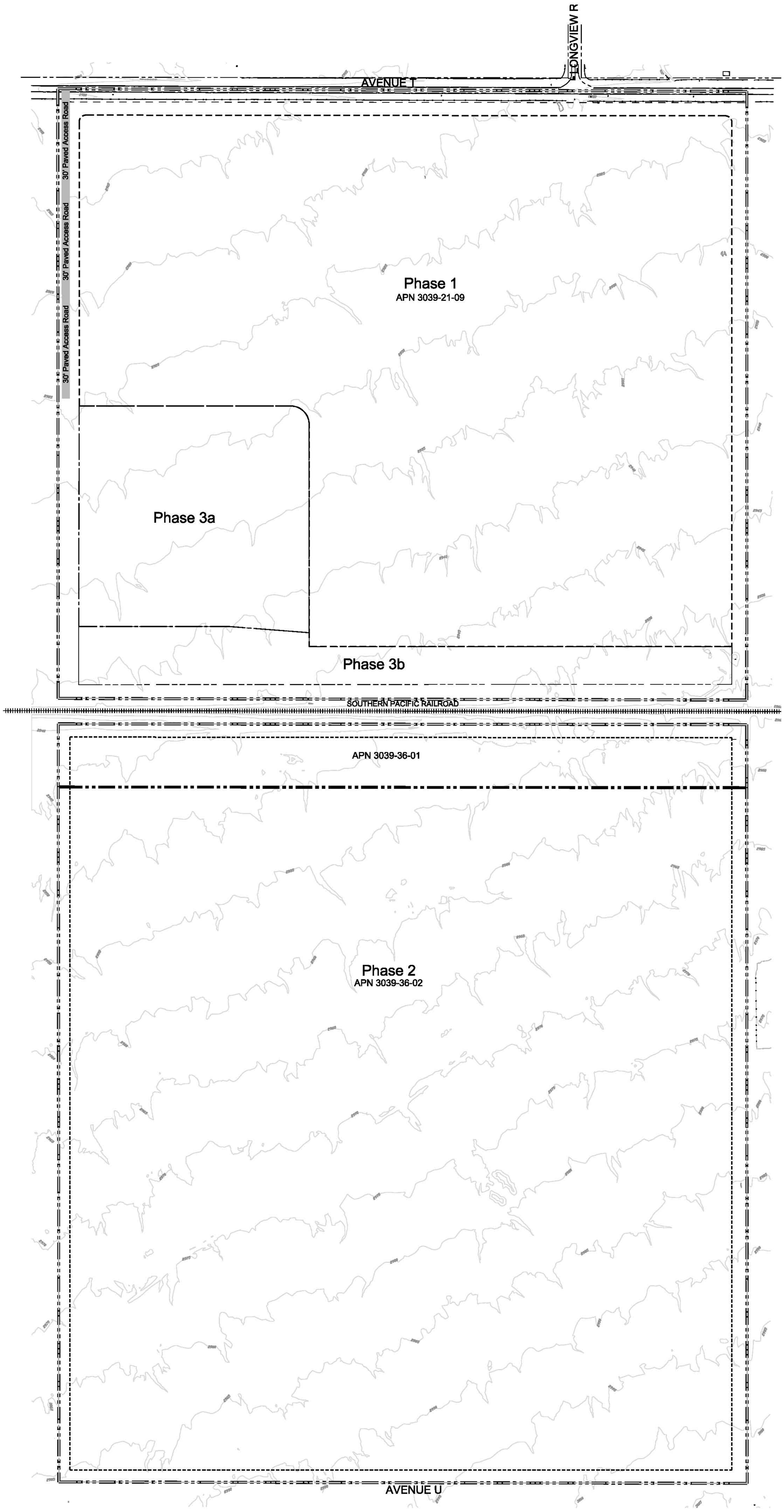
0 50 100 200
Approximate Scale In Feet

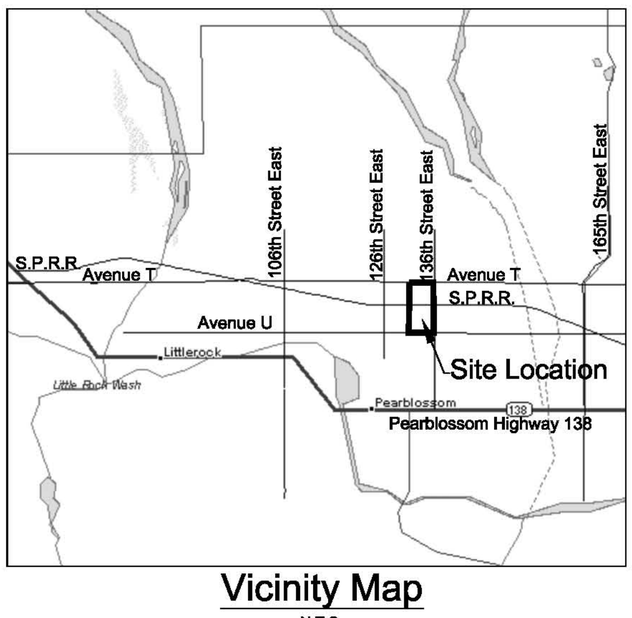
WEST COAST ENVIRONMENTAL AND ENGINEERING

Facilities Site Plan

Big Rock Creek Site
Antelope Valley California

Project: MCG100-001-06		Figure 2
Drawn By: GOZ	Date: 02/15/07	Revised: 12/10/07 GOZ
Approved By: JAH	Date: 08/09/07	Printed: 12/10/07





Vicinity Map

N.T.S.

LEGEND:

- Assessors Parcel Boundaries
- CUP Boundary
- Phase 1 Mining Boundary (See Figure 3)
- Phase 2 Mining Boundary (See Figure 4)
- Phase 3 Mining Boundary (See Figure 5 & 6)
- Existing Contours

Source: Daniel J. Pellow Consulting
Mine Design
07-17-2007

Topo: Inland Aerial Surveys Inc.
Date of Flight- 05/02/2006

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0 100 200 400
Approximate Scale In Feet

West Coast Environmental and Engineering

Mine Phasing Plan

Big Rock Creek Site
Antelope Valley California

Project: MCG100-001-05		Figure 3
Drawn By: GOZ	Date: 02/14/07	Revised: 12/10/07 GOZ
Approved By: JAH	Date: 08/09/07	Printed: 12/10/07

STAFF USE ONLY

PROJECT NUMBER: *R2007-00670*
CASES: *RENV200700053*
RSM200700001

*** * * * INITIAL STUDY * * * ***

COUNTY OF LOS ANGELES
DEPARTMENT OF REGIONAL PLANNING

GENERAL INFORMATION

I.A. Map Date: *March 3, 2007* Staff Member: *Anthony Curzi*

Thomas Guide: *4288 J6 & J7 and Page G* USGS Quad: *Littlerock*

Location: *On Avenue T between 121st Street East and 136th Street in the Antelope Valley*

Description of Project: *The proposed project is a request for a surface mine permit to allow the excavation of 48,674,200 tons of aggregate; operation of a rock processing plant; a concrete ready mix plant; an asphalt mixing plant; and a raw cement and aggregate transfer and distribution facility. The duration of the project is estimated to be 50 years.*

Aggregate will be excavated from two pits set back from the property line 50 feet. The north pit will be located on the northern portion of parcel 3039-021-009. Berms will be used to prevent run-off and erosion. A three foot high berm will be constructed on the east side of the pit and a five foot high berm will be constructed on the other sides of the pit. The south pit will be located on parcel 3039-036-002. Processing and transfer/distribution facilities will be located on the southern portion of parcel 3039-021-009. A tunnel under the railroad tracks that bisects the project site will be constructed so that excavated aggregate from the south pit can be conveyed to the processing and distribution facilities.

Mining operations will be implemented in three (3) phases. Phase 1 consists of the excavation of the north pit. The south pit will be excavated during Phase 2 and Phase 3 consists of the relocation of the processing and distribution facilities to the excavated Phase 1 area, followed by the excavation of the southern portion of parcel 3039-021-009.

The mining site will be reclaimed in accordance with the Surface Mining and Reclamation Act. Two 80 foot deep post-operation depressions will remain. Reclamation measures include; the distribution of banked project site topsoil, re-vegetation with native species and temporary irrigation.

Gross Acres: *284.5 acres.*

Environmental Setting: *The project site is located north of Highway 138, west of 87th Street, east of 165th Street East and South of Palmdale Boulevard in the Antelope Valley. The adjacent property is vacant land except for two residences west of the project site. A railroad right-of-way bisects the subject property. The project site is relatively flat and vegetated with native Mojave Creosote Bush Scrub.*

Zoning: *A-2-5 Heavy Agriculture*

Community Standards District: *NA*

General Plan: *R Non-urban*

Community/Area wide Plan: *N1 Non-urban*

Major projects in area:

PROJECT NUMBER	DESCRIPTION & STATUS
There are no projects located in the immediate vicinity of the project site.	

NOTE: For EIRs, above projects are not sufficient for cumulative analysis.

REVIEWING AGENCIES

Responsible Agencies

- ☐ None
- ☐ LA Regional Water Quality Control Board
- ☒ Lahontan Regional Water Quality Control Board
- ☐ Coastal Commission
- ☐ Army Corps of Engineers
- ☐

Trustee Agencies

- ☐ None
- ☒ State Fish and Game
- ☒ Department of Conservation, Office of Mine Reclamation
- ☒ Department of Conservation, State Mining & Geology Board
- ☐ State Parks
- ☒ Native American Heritage Commission

Special Reviewing Agencies

- ☒ None
- ☐ National Parks
- ☐ National Forest
- ☐ Edwards Air Force Base
- ☐ Santa Monica Mountains Conservancy
- ☐ High School District
- ☐ Elementary School District
- ☐
- ☐ Town Council
- ☐ Water District

Regional Significance

- ☐ None
- ☐ SCAG Criteria
- ☒ Antelope Valley Air Quality Management District
- ☐ Water Resources
- ☐ Santa Monica Mountains Area
- ☐

County Reviewing Agencies

- ☒ EHS
- ☒ DPW: Geotechnical and Materials Engineering Division
- ☒ DPW: Traffic and Lighting Division
- ☒ Fire Dept.: Forestry, Environmental Review Unit
- ☒ Fire Dept.: Hazardous Materials Division

IMPACT ANALYSIS MATRIX		ANALYSIS SUMMARY (See individual pages for details)				
			Less than Significant Impact/No Impact			
				Less than Significant Impact with Project Mitigation		
					Potentially Significant Impact	
CATEGORY	**FACTOR**	Pg				Potential Concern
HAZARDS	1. Geotechnical	5	☐	☐	☒	*Extensive excavation*
	2. Flood	6	☐	☐	☒	*Drainage course and flood zone*
	3. Fire	7	☒	☐	☐	
	4. Noise	8	☐	☐	☒	*Railway; equipment and engine noise*
RESOURCES	1. Water Quality	9	☐	☐	☒	*Excavation below water table & hazardous materials.*
	2. Air Quality	10	☐	☐	☒	*Dust; equipment and truck exhaust*
	3. Biota	11	☐	☐	☒	*Sensitive specie habitat*
	4. Cultural Resources	12	☒	☐	☐	
	5. Mineral Resources	13	☒	☐	☐	
	6. Agriculture Resources	14	☒	☐	☐	
	7. Visual Qualities	15	☐	☐	☒	*Excavated pit*
SERVICES	1. Traffic/Access	16	☐	☐	☒	*Truck trips*
	2. Sewage Disposal	17	☒	☐	☐	
	3. Education	18	☒	☐	☐	
	4. Fire/Sheriff	19	☒	☐	☐	
	5. Utilities	20	☒	☐	☐	
OTHER	1. General	21	☒	☐	☐	
	2. Environmental Safety	22	☐	☐	☒	*Hazardous materials*
	3. Land Use	23	☒	☐	☐	
	4. Pop/Hous./Emp./Rec.	24	☒	☐	☐	
	5. Mandatory Findings	25	☐	☐	☒	

ENVIRONMENTAL FINDING

FINAL DETERMINATION: On the basis of this Initial Study, the Department of Regional Planning finds that this project qualifies for the following environmental document:

☐ NEGATIVE DECLARATION, inasmuch as the proposed project will not have a significant effect on the environment.

An Initial Study was prepared on this project in compliance with the State CEQA Guidelines and the environmental reporting procedures of the County of Los Angeles. It was determined that this project will not exceed the established threshold criteria for any environmental/service factor and, as a result, will not have a significant effect on the physical environment.

☐ MITIGATED NEGATIVE DECLARATION, in as much as the changes required for the project will reduce impacts to insignificant levels (see attached discussion and/or conditions).

An Initial Study was prepared on this project in compliance with the State CEQA Guidelines and the environmental reporting procedures of the County of Los Angeles. It was originally determined that the proposed project may exceed established threshold criteria. The applicant has agreed to modification of the project so that it can now be determined that the project will not have a significant effect on the physical environment. The modification to mitigate this impact(s) is identified on the Project Changes/Conditions Form included as part of this Initial Study.

☒ ENVIRONMENTAL IMPACT REPORT*, inasmuch as there is substantial evidence that the project may have a significant impact due to factors listed above as "significant".

☐ At least one factor has been adequately analyzed in an earlier document pursuant to legal standards, and has been addressed by mitigation measures based on the earlier analysis as described on the attached sheets (see attached Form DRP/IA 101). The Addendum EIR is required to analyze only the factors changed or not previously addressed.

Reviewed by: *Anthony Curzi* Anthony Curzi Date: 12-10-07

Approved by: *Paul McCarthy* Paul McCarthy Date: 12-6-07

☐ Determination appealed -- see attached sheet.

*NOTE: Findings for Environmental Impact Reports will be prepared as a separate document following the public hearing on the project.

HAZARDS - 1. Geotechnical

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project located in an active or potentially active fault zone, Seismic Hazards Zone, or Alquist-Priolo Earthquake Fault Zone? *Source: The California Geological Survey.*
b.	☐	☒	☐	Is the project site located in an area containing a major landslide(s)? *The project site is not located in a landslide zone. Source: The California Geological Survey.*
c.	☐	☒	☐	Is the project site located in an area having high slope instability? *The project site is not located in a landslide zone. Source: The California Geological Survey.*
d.	☐	☒	☐	Is the project site subject to high subsidence, high groundwater level, liquefaction, or hydrocompaction? *The project site is not located in a liquefaction zone. Sources: General Plan Plate 3 & California Department of Conservation Division of Mines and Geology.*
e.	☐	☒	☐	Is the proposed project considered a sensitive use (school, hospital, public assembly site) located in close proximity to a significant geotechnical hazard?
f.	☒	☐	☐	Will the project entail substantial grading and/or alteration of topography including slopes of over 25%? *48,674,200 tons of excavated aggregate is proposed.*
g.	☐	☒	☐	Would the project be located on expansive soil, as defined in Table 18-1-B of Uniform Building Code (1994), creating substantial risks to life or property?
h.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Building Code, Title 26 - Sections 110.2, 111 & 113
(Geotechnical Hazards, Engineering Geology and Soils Engineering Report, Earthquake Fault)

☐ **MITIGATION MEASURES**

☐ Lot Size ☐ Project Design

☐ **OTHER CONSIDERATIONS**

☐ Approval of Geotechnical Report by DPW

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by, **geotechnical** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

HAZARDS - 2. Flood

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	*Is the major drainage course, as identified on USGS quad sheets by a dashed line, located on the project site?*
b.	☒	☐	☐	*Is the project site located within or does it contain a floodway, floodplain, or designated flood hazard zone?* *The northeast portion of the project site is located in FEMA Flood Zone A which has a one percent chance of flooding annually. Source: Federal Emergency Management Agency.*
c.	☐	☒	☐	*Is the project site located in or subject to high mudflow conditions?*
d.	☐	☒	☐	*Could the project contribute or be subject to high erosion and debris deposition from run-off?* *Berms and down drains will be constructed.*
e.	☒	☐	☐	Would the project substantially alter the existing drainage pattern of the site or area? *The mining pits and installed drainage systems would alter the existing drainage pattern of the site.*
f.	☐	☐	☐	*Other factors (e.g., dam failure)?*

STANDARD CODE REQUIREMENTS

☐ Building Code, Title 26 – Section 110.1 (Flood Hazard)
☒ Health and Safety Code, Title 11 – Chapter 11.60 (Floodways)

☐ **MITIGATION MEASURES**

☐ Lot Size ☐ Project Design

☐ **OTHER CONSIDERATIONS**

☒ Approval of Drainage Concept by DPW

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by **flood (hydrological)** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

HAZARDS - 3. Fire

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site located in a Very High Fire Hazard Severity Zone (Fire Zone 4)? *Source: Los Angeles County Fire Department.*
b.	☐	☒	☐	Is the project site in a high fire hazard area and served by inadequate access due to lengths, width, surface materials, turnarounds or grade?
c.	☐	☒	☐	Does the project site have more than 75 dwelling units on a single access in a high fire hazard area? *No residences are proposed.*
d.	☐	☒	☐	Is the project site located in an area having inadequate water and pressure to meet fire flow standards? *A new well is proposed.*
e.	☐	☒	☐	Is the project located in close proximity to potential dangerous fire hazard conditions/uses (such as refineries, flammables, explosives manufacturing)?
f.	☐	☒	☐	Does the proposed use constitute a potentially dangerous fire hazard?
g.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Utilities Code, Title 20 – Section 20.16.060 (Fire Flow & Fire Hydrants Requirements)
☐ Fire Code, Title 32 – Sections 902.2.1 & 902.2.2.1 (Access & Dimensions)
☐ Fire Code, Title 32 – Sections 1117.2.1 (Fuel Modification Plan, Landscape Plan & Irrigation Plan)

☐ **MITIGATION MEASURES**

☐ Project Design

☐ **OTHER CONSIDERATIONS**

☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be impacted by **fire hazard** factors?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

HAZARDS - 4. Noise

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the project site located near a high noise source (airports, railroads, freeways, industry)? *A railway bisects the project site.*
b.	☐	☒	☐	Is the proposed use considered sensitive (school, hospital, senior citizen facility) or are there other sensitive uses in close proximity? *An aggregate surface mine is proposed.*
c.	☒	☐	☐	Could the project substantially increase ambient noise levels including those associated with special equipment (such as amplified sound systems) or parking areas associated with the project? *Mining equipment and truck engines would increase the ambient noise level of the area.*
d.	☒	☐	☐	Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels without the project? *Mining equipment and truck engines would increase the ambient noise level of the area.*
e.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Environmental Protection Code, Title 12 – Chapter 12.08 (Noise Control)
☐ Building Code, Title 26 – Sections 1208A (Interior Environment – Noise)

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be adversely impacted by **noise**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

RESOURCES - 1. Water Quality

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☐	☒	Is the project site located in an area having known water quality problems and proposing the use of individual water wells? *A well is proposed. The Lahontan Regional Water Quality Control Board will identify water quality problems.*
b.	☐	☒	☐	Will the proposed project require the use of a private sewage disposal system? *Portable sanitation facilities will be used.*
	☐	☐	☐	If the answer is yes, is the project site located in an area having known septic tank limitations due to high groundwater or other geotechnical limitations *or* is the project proposing on-site systems located in close proximity to a drainage course?
c.	☐	☐	☒	Could the project's associated construction activities significantly impact the quality of groundwater and/or storm water runoff to the storm water conveyance system and/or receiving water bodies? *The ground water table of the project site is at an approximate depth of 70 feet. Source: Slope Stability Evaluation - Fugro West - September 2006). The proposed depth of the mine pits is 80 feet. Mining activities could degrade the quality of the ground water.*
d.	☐	☐	☒	Could the project's post-development activities potentially degrade the quality of storm water runoff and/or could post-development non-storm water discharges contribute potential pollutants to the storm water conveyance system and/or receiving bodies? *Two 80 foot depression will remain after mining activities, which have a potential use as storm water catch basins.*
e.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Health & Safety Code, Title11 – Chapter 11.38 (Water & Sewers)
☐ Environmental Protection,Title 12 – Chapter 12.80 (Storm-water & Runoff Pollution Control)
☐ Plumbing Code, Title 28 – Chapter 7; Appendices G(a), J & K (Sewers & Septic Systems)

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Compatible Use ☐ Septic Feasibility Study
☐ Industrial Waste Permit ☐ National Pollutant Discharge Elimination System (NPDES) Permit

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be adversely impacted by, **water quality** problems?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

RESOURCES - 2. Air Quality

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Will the proposed project exceed the State's criteria for regional significance (generally (a) 500 dwelling units for residential users or (b) 40 gross acres, 650,000 square feet of floor area or 1,000 employees for non-residential uses)?
b.	☐	☒	☐	Is the proposal considered a sensitive use (schools, hospitals, parks) and located near a freeway or heavy industrial use?
c.	☐	☐	☒	Will the project increase local emissions to a significant extent due to increased traffic congestion or use of a parking structure or exceed AQMD thresholds of potential significance?
d.	☒	☐	☐	Will the project generate or is the site in close proximity to sources that create obnoxious odors, dust, and/or hazardous emissions? *Mining activities will create dust.*
e.	☐	☐	☒	Would the project conflict with or obstruct implementation of the applicable air quality plan? *AVAQMD will provide determination.*
f.	☐	☐	☒	Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation? *AVAQMD will provide determination.*
g.	☐	☐	☒	Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under applicable federal or state ambient air quality standard (including releasing emission which would exceed quantitative thresholds for ozone precursors)? *AVAQMD will provide determination.*
h.	☒	☐	☐	Other factors? *Exhaust from 829 daily truck trips will likely degrade air quality.*

STANDARD CODE REQUIREMENTS

☒ State of California Health and Safety Code – Section 40506 (Air Quality Management District Permit)

☐ **MITIGATION MEASURES**

☐ Project Design

☐ **OTHER CONSIDERATIONS**

☒ Air Quality Report

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, or be adversely impacted by, **air quality**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

RESOURCES - 3. Biota

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Is the project site located within a Significant Ecological Area (SEA), SEA Buffer, or coastal Sensitive Environmental Resource (ESHA, etc.), or is the site relatively undisturbed and natural? *The project site is relatively undisturbed. Sources: General Plan & Malibu Land Use Plan.*
b.	☒	☐	☐	Will grading, fire clearance, or flood related improvements remove substantial natural habitat areas? *Mining activities will remove natural habitat.*
c.	☒	☐	☐	Is a drainage course located on the project site that is depicted on USGS quad sheets by a dashed blue line or that may contain a bed, channel, or bank of any perennial, intermittent or ephemeral river, stream, or lake? *A blue line drainage course is located on the project site.*
d.	☐	☒	☐	Does the project site contain a major riparian or other sensitive habitat (e.g. coastal sage scrub, oak woodland, sycamore riparian, woodland, wetland, etc.)? *The project site is vegetated with native Mojave Creosote Bush Scrub.*
e.	☒	☐	☐	Does the project site contain oak or other unique native trees (specify kinds of trees)? *Joshua trees.*
f.	☒	☐	☐	Is the project site habitat for any known sensitive species (federal or state listed endangered, etc.)? *Desert Tortoise, Mohave Ground Squirrel and Burrowing Owl. Source: Desert Tortoise & Burrowing Owl Surveys – 03/08/2007 and West Coast Environmental & Engineering Project Description - 02-20-2007.*
g.	☒	☐	☐	Other factors (e.g., wildlife corridor, adjacent open space linkage)? *The project site is habitat for thirty animal species.*

☐ **MITIGATION MEASURES**

☐ Lot Size

☐ ERB/SEATAC Review

☐ Project Design

☐ **OTHER CONSIDERATIONS**

☐ Oak Tree Permit

☐ Biological Constraints Analysis

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on, **biotic** resources?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

RESOURCES - 4. Archaeological/Historical/Paleontological

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site in or near an area containing known archaeological resources or containing features (drainage course, spring, knoll, rock outcroppings, or oak trees) that indicate potential archaeological sensitivity? *There is a low probability that cultural resources are located in the project area. Source Phase 1 report - page 9.*
b.	☐	☒	☐	Does the project site contain rock formations indicating potential paleontological resources?
c.	☐	☒	☐	Does the project site contain known historic structures or sites? *Source: California Historical Resources Inventory.*
d.	☐	☒	☐	Would the project cause a substantial adverse change in the significance of a historical or archaeological resource as defined in 15064.5?
e.	☐	☒	☐	Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
f.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES**

☐ Lot Size

☐ Cultural Resources Records Search (Quick Check)

☐ **OTHER CONSIDERATIONS**

☐ Project Design

☒ Phase 1 Archaeology Report

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **archaeological, historical**, or **paleontological** resources?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

RESOURCES - 5. Mineral Resources

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? *48,674,200 tons of aggregate will be recovered by the proposed project.*
b.	☐	☒	☐	Would the project result in the loss of availability of a locally important mineral resource discovery site delineated on a local general plan, specific plan or other land use plan? *A Mineral Recovery Zone which is indicated by a point feature on the General Plan Special Management Areas map is located 1.91 miles southwest of the project site.*
c.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES**

☐ Lot Size

☐ **OTHER CONSIDERATIONS**

☐ Project Design

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **mineral** resources?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

RESOURCES - 6. Agriculture Resources

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use? *The project site is designated "Other Land".*
b.	☐	☒	☐	Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract? *The project site is zoned Heavy Agriculture.*
c.	☐	☒	☐	Would the project involve other changes in the existing environment that due to their location or nature, could result in conversion of Farmland, to non-agricultural use? *Two eighty foot deep depressions will be left by the proposed project.*
d.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES**

☐ Lot Size

☐ **OTHER CONSIDERATIONS**

☐ Project Design

Although the project site is zoned Heavy Agriculture, it is not designated as prime, unique or important farmland by the Farmland Mapping and Monitoring Program of the California Resources Agency.

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **agriculture** resources?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

RESOURCES - 7. Visual Qualities

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site substantially visible from or will it obstruct views along a scenic highway (as shown on the Scenic Highway Element), or is it located within a scenic corridor or will it otherwise impact the viewshed?
b.	☐	☒	☐	Is the project substantially visible from or will it obstruct views from a regional riding or hiking trail?
c.	☐	☒	☐	Is the project site located in an undeveloped or undisturbed area that contains unique aesthetic features?
d.	☒	☐	☐	Is the proposed use out-of-character in comparison to adjacent uses because of height, bulk, or other features? *The surrounding property is vacant except for two residences located west of the project site.*
e.	☐	☒	☐	Is the project likely to create substantial sun shadow, light or glare problems?
f.	☒	☐	☐	Other factors (e.g., grading or landform alteration)? *Mining activities will leave two 80 foot deep depressions.*

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Visual Simulation ☐ Compatible Use

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **scenic** qualities?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

SERVICES - 1. Traffic/Access

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Does the project contain 25 dwelling units or more and is it located in an area with known congestion problems (roadway or intersections)?
b.	☐	☐	☒	Will the project result in any hazardous traffic conditions? *The proposed project will generate 862 trips daily. Trucks leaving and arriving at the project site could cause result in hazardous traffic conditions on Avenue T. Source: Traffic Impact Analysis – March 2007.*
c.	☐	☒	☐	Will the project result in parking problems with a subsequent impact on traffic conditions?
d.	☐	☒	☐	Will inadequate access during an emergency (other than fire hazards) result in problems for emergency vehicles or residents/employees in the area?
e.	☐	☐	☒	Will the congestion management program (CMP) Transportation Impact Analysis thresholds of 50 peak hour vehicles added by project traffic to a CMP highway system intersection or 150 peak hour trips added by project traffic to a mainline freeway link be exceeded? *At the intersections of 106th Street East / Avenue T and 106th Street East / Pearblossom Highway, 69 trips will be generated during the AM and PM peak hours. The LOS at the intersections will not diminish with the project. Source: Traffic Impact Analysis – March 2007.*
f.	☐	☒	☐	Would the project conflict with adopted policies, plans, or program supporting alternative transportation (e.g., bus, turnouts, bicycle racks)?
g.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES**

☐ Project Design ☐ Traffic Report

☐ **OTHER CONSIDERATIONS**

☒ Consultation with DPW Traffic & Lighting Division

CONCLUSION

Considering the above information, could the project leave a significant impact (individually or cumulatively) on **traffic/access** factors?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

SERVICES - 2. Sewage Disposal

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	If served by a community sewage system, could the project create capacity problems at the treatment plant? *Portable septic systems will be used.*
b.	☐	☒	☐	Could the project create capacity problems in the sewer lines serving the project site? *Portable septic systems will be used.*
c.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Utilities Code, Title 20 – Division 2 (Sanitary Sewers and Industrial Waste)
☐ Plumbing Code, Title 28 – Chapter 7 (Sanitary Drainage)
☐ California Health Safety Code – Section 5474 (Sewer connection mitigation fee)

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **sewage disposal** facilities?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

SERVICES - 3. Education

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project create capacity problems at the district level?
b.	☐	☒	☐	Could the project create capacity problems at individual schools that will serve the project site?
c.	☐	☒	☐	Could the project create student transportation problems?
d.	☐	☒	☐	Could the project create substantial library impacts due to increased population and demand?
e.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ State of California Government Code – Section 53080 (School Facilities Fee)
☐ Planning & Zoning Code, Title 22 - Chapter 22.72 (Library Facilities Mitigation Fee)

☐ **MITIGATION MEASURES**

☐ Site Dedication

☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **educational** facilities/services?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

SERVICES - 4. Fire/Sheriff Services

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project create staffing or response time problems at the fire station or sheriff's substation serving the project site? *The project site is served by Fire Station 79 which is located approximately 2.4 miles away and by the Palmdale Sheriff station which is located approximately 15 miles away.*
b.	☐	☒	☐	Are there any special fire or law enforcement problems associated with the project or the general area? *The project site is served by the Antelope Valley CHP office which is located in Lancaster.*
c.	☐	☒	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Revenue & Finance Code, Title 4 – Chapter 4.92 (Fire Protection Facilities Fee)

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **fire/sheriff** services?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

SERVICES - 5. Utilities/Other Services

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Is the project site in an area known to have an inadequate public water supply to meet domestic needs or to have an inadequate ground water supply and proposes water wells? *A well is proposed.*
b.	☐	☒	☐	Is the project site in an area known to have an inadequate water supply and/or pressure to meet fire fighting needs?
c.	☐	☒	☐	Could the project create problems with providing utility services, such as electricity, gas, or propane?
d.	☐	☒	☐	Are there any other known service problem areas (e.g., solid waste)?
e.	☐	☒	☐	Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services or facilities (e.g., fire protection, police protection, schools, parks, roads)?
f.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☐ Plumbing Code, Title 28 – Chapters 3, 6 & 12
☐ Utilities Code, Title 20 – Divisions 1, 4 & 4a (Water, Solid Waste, Garbage Disposal Districts)

☐ **MITIGATION MEASURES**

☐ Lot Size ☐ Project Design

☐ **OTHER CONSIDERATIONS**

☐ Water Purveyor Will-serve Letter

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) relative to **utilities** services?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

OTHER FACTORS - 1. General

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Will the project result in an inefficient use of energy resources?
b.	☐	☒	☐	Will the project result in a major change in the patterns, scale, or character of the general area or community? *There are other aggregate mines located in the area.*
c.	☐	☒	☐	Will the project result in a significant reduction in the amount of agricultural land?
d.	☐	☐	☐	Other factors?

STANDARD CODE REQUIREMENTS

☒ California State Administrative Code, Title 24, Part 5, T-20 (Energy Conservation)

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

☐ Lot Size ☐ Project Design ☐ Compatible Use

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to any of the above factors?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

OTHER FACTORS - 2. Environmental Safety

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☒	☐	☐	Are any hazardous materials used, transported, produced, handled, or stored on-site? *Calcium nitrate, Solvent dewaxed residual oil, Calcium oxide, Triethanolamine, Hydrochloric acid, Sodium hydroxide, Sulfuric acid lead, Naphthalene, Acetylene, Petroleum distillates, hydrotreated heavy paraffinic, Petroleum lubricating oil, Sodium nitrate, Oxygen, Calcium chloride, Calcium compounds, Copolymer mixture, Carbon dioxide argon, Nitrogen, Calcium nitrate, Carbon black, Petroleum distillates, hydrotreated light paraffinic, Ethylene glycol, Dimethylmethane, Polyacrylamide (polymer)and Hydrocarbon*
b.	☐	☐	☐	Are any pressurized tanks to be used or any hazardous wastes stored on-site? *There are no tanks proposed for the project site.*
c.	☒	☐	☐	Are any residential units, schools, or hospitals located within 500 feet and potentially adversely affected? *There are two residential units within 500 feet.*
d.	☐	☒	☐	Have there been previous uses that indicate residual soil toxicity of the site or is the site located within two miles downstream of a known groundwater contamination source within the same watershed? *No evidence of recognized environmental conditions or historical environmental conditions which are likely to impact the subject property was found. Source: Phase 1 Environmental Site Assessment; 05/11/07; page 15.*
e.	☐	☐	☒	Would the project create a significant hazard to the public or the environment involving the accidental release of hazardous materials into the environment? *Improper storage and handling of hazardous materials could result in the accidental release of hazardous materials into the environment.*
f.	☐	☒	☐	Would the project emit hazardous emissions or handle hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
g.	☐	☒	☐	Would the project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or environment? *The project site is not listed in the Department of Toxic Substances Control EnviroStor Database.*
h.	☐	☒	☐	Would the project result in a safety hazard for people in a project area located within an airport land use plan, within two miles of a public or public use airport, or within the vicinity of a private airstrip?
i.	☐	☒	☐	Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
j.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES**

☐ Phase 1 Environmental Assessment

☐ **OTHER CONSIDERATIONS**

☐ Toxic Clean-up Plan

CONCLUSION

Considering the above information, could the project have a significant impact relative to **public safety**?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

OTHER FACTORS - 3. Land Use

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Can the project be found to be inconsistent with the plan designation(s) of the subject property? *Uses appropriate for remote locations are suitable for Non-residential uses in non-urban areas.*
b.	☐	☒	☐	Can the project be found to be inconsistent with the zoning designation of the subject property? *Surface mining is allowed in the Heavy Agriculture zone as a "use subject to permit."*
c.				Can the project be found to be inconsistent with the following applicable land use criteria:
	☐	☒	☐	Hillside Management Criteria?
	☐	☒	☐	SEA Conformance Criteria?
	☐	☐	☐	Other?
d.	☐	☒	☐	Would the project physically divide an established community?
e.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **land use** factors?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

OTHER FACTORS - 4. Population/Housing/Employment/Recreation

SETTING/IMPACTS

	Yes	No	Maybe	
a.	☐	☒	☐	Could the project cumulatively exceed official regional or local population projections?
b.	☐	☒	☐	Could the project induce substantial direct or indirect growth in an area (e.g., through projects in an undeveloped area or extension of major infrastructure)?
c.	☐	☒	☐	Could the project displace existing housing, especially affordable housing?
d.	☐	☒	☐	Could the project result in substantial job/housing imbalance or substantial increase in Vehicle Miles Traveled (VMT)?
e.	☐	☒	☐	Could the project require new or expanded recreational facilities for future residents?
f.	☐	☒	☐	Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?
g.	☐	☐	☐	Other factors?

☐ **MITIGATION MEASURES** ☐ **OTHER CONSIDERATIONS**

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the physical environment due to **population, housing, employment,** or **recreational** factors?

☐ Potentially significant ☐ Less than significant with project mitigation ☒ Less than significant/No Impact

MANDATORY FINDINGS OF SIGNIFICANCE

Based on this Initial Study, the following findings are made:

	Yes	No	Maybe	
a.	☒	☐	☐	Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory? *Sensitive species & loss of wildlife habitat,*
b.	☐	☒	☐	Does the project have possible environmental effects that are individually limited but cumulatively considerable? "Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
c.	☒	☐	☐	Will the environmental effects of the project cause substantial adverse effects on human beings, either directly or indirectly? *Hazardous materials, geotechnical, flooding , noise, air quality, water quality, traffic & visual.*

CONCLUSION

Considering the above information, could the project have a significant impact (individually or cumulatively) on the environment?

☒ Potentially significant ☐ Less than significant with project mitigation ☐ Less than significant/No Impact

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Letters Received in Response

to the Notice of Preparation

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Antelope Valley Air Quality Management District
43301 Division St., Suite 206
Lancaster, CA 93535-4649

661.723.8070
Fax 661.723.3450

Eldon Heaston, Executive Director

RECEIVED

December 18, 2007

Anthony Curzi
Los Angeles County Impact Analysis Section, Department of Regional Planning
320 West Temple Street, Room 1348`
Los Angeles, CA 90012

Project Title: Big Rock Creek

Dear Mr. Curzi:

The Antelope Valley Air Quality Management District (District) has reviewed the Initial Study for Big Rock Creek, a project including the following components: Aggregate Surface Mining and Processing Facilities, Ready-Mixed Concrete Plant, Asphalt Mixing Plant, and Raw Cement Transfer and Aggregate Distribution Facility located in the unincorporated area of Antelope Valley. As the proposed project includes components that will require an authority to construct from the District, the District recommends that the County of Los Angeles require the submission of applicable permit applications and the associated application and permit fees to the District as a condition of approval.

We have reviewed the project and, based on the information available to us at this time, we have no comments.

Thank you for the opportunity to review this planning document. If you have any questions regarding this letter, please contact me at (760) 245-1661, extension 6726, or Tracy Walters at extension 6122.

Sincerely,

Alan J. De Salvio
Supervising Air Quality Engineer

TW/AJD LA County CUP Big Rock Creek

Clean Cities
Antelope Valley

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, REGIONAL PLANNING
IGR/CEQA BRANCH
100 MAIN STREET, MS # 16
LOS ANGELES, CA 90012-3606
PHONE: (213) 897-3747
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Be energy efficient!

IGR/CEQA No. 071224AL, NOP
Big Rock Creek Surface Mine Project
Project Number R2007-00670
Vic. LA-14 / PM R54.47, LA-138 / PM 49.97

December 18, 2007

Mr. Anthony Curzi
Los Angeles County
Impact Analysis Section
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

RECEIVED
DEC 19 2007

Dear Mr. Curzi:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project. The project proposes a 50-year permit to conduct surface mining operations within an approximately 284.5-acre area, and process the mined materials onsite. The total affected area is comprised of approximately 310 acres.

To assist us in our efforts to evaluate the impacts of this project on State transportation facilities, a truck traffic study in advance of the DEIR should be prepared. We wish to refer the project's traffic consultant to our traffic study guideline Website:

http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

and we list here some elements of what we generally are expecting in the traffic study:

1. Presentations of assumptions and methods used to develop trip generation, trip distribution, choice of travel mode, and assignments of trips to State Route 14 and 138.

2. Consistency of project travel modeling with other regional and local modeling forecasts and with travel data. The IGR/CEQA office may use indices to check results. Differences or inconsistencies must be thoroughly explained.

3. Analysis of ADT, AM and PM peak-hour volumes for both the existing and future

conditions in the affected area. This should include freeways, interchanges, and intersections, and all HOV facilities. Interchange Level of Service should be specified (HCM2000 method requested). Utilization of transit lines and vehicles, and of all facilities, should be realistically estimated. Future conditions would include build-out of all projects (see next item) and any plan-horizon years.

4. Inclusion of all appropriate traffic volumes. Analysis should include traffic from the project, cumulative traffic generated from all specific approved developments in the area, and traffic growth other than from the project and developments. That is, include: existing + project + other projects + other growth.

5. Discussion of mitigation measures appropriate to alleviate anticipated traffic impacts. These mitigation discussions should include, but not be limited to, the following:

   - Description of Transportation Infrastructure Improvements
   - **Financial Costs, Funding Sources and Financing**
   - Sequence and Scheduling Considerations
   - Implementation Responsibilities, Controls, and Monitoring

   Any mitigation involving transit, HOV, or TDM must be rigorously justified and its effects conservatively estimated. Improvements involving dedication of land or physical construction may be favorably considered.

6. Specification of developer's percent share of the cost, as well as a plan of realistic mitigation measures under the control of the developer. The following ratio should be estimated: additional traffic volume due to project implementation is divided by the total increase in the traffic volume (see Appendix "B" of the Guidelines). That ratio would be the project equitable share responsibility.

   We note for purposes of determining project share of costs, the number of trips from the project on each traveling segment or element is estimated in the context of forecasted traffic volumes which include build-out of all approved and not yet approved projects, and other sources of growth. Analytical methods such as select-zone travel forecast modeling might be used.

   The Department as commenting agency under CEQA has jurisdiction superceding that of MTA in identifying the freeway analysis needed for this project. Caltrans is responsible for obtaining measures that will off-set project vehicle trip generation that worsens Caltrans facilities and hence, it does not adhere to the CMP guide of 150 or more vehicle trips added before freeway analysis is needed. MTA's Congestion Management Program in acknowledging the Department's role, stipulates that Caltrans must be consulted to identify specific locations to be analyzed on the State Highway System. Therefore State Route(s) mentioned in item #1 and its facilities must be analyzed per the Department's Traffic Impact Study Guidelines.

We look forward to reviewing the traffic study. We expect to receive a copy from the State Clearinghouse when the DEIR is completed. However, to expedite the review process, and clarify any misunderstandings, you may send a copy in advance to the undersigned.

If you have any questions, please feel free to contact me at (213) 897-3747 or Alan Lin the project coordinator at (213) 897-8391 and refer to IGR/CEQA No. 071224AL.

Sincerely,

for Alan Lin
CHERYL J. POWELL
IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

California Regional Water Quality Control Board
Lahontan Region

Linda S. Adams
Secretary for Environmental Protection

Victorville Office
14440 Civic Drive, Suite 200, Victorville, California 92392
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Arnold Schwarzenegger
Governor

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DEC 24 2007

December 20, 2007

File: Environmental Doc Review
Los Angeles County

Anthony Curzi
Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

COMMENTS ON THE NOTICE OF PREPARATION FOR THE ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED AGGREGATE SURFACE MINING AND PROCESSING FACILITIES, READY MIXED CONCRETE, ASPHALT MIXING PLANT AND AGGREGATE DISTRIBUTION FACILITY, LOCATED ON THE SOUTHEAST CORNER OF AVENUE "T" AND 136TH STREET EAST, IN THE ANTELOPE VALLEY AREA

California Regional Water Quality Control Board, Lahontan Region (Water Board) staff has reviewed the Notice of Preparation dated December 12, 2007 for an Environmental Impact Report (EIR) on the above-referenced Project.

Site Specific Comment

The Facility Site Plan attached to the proposal package submitted indicates that there are several ponds proposed within this project. Please be advised that any pond intended for discharge and storage requires obtaining a "Report of Waste Discharge" permit from the Lahontan Regional Water Quality Control Board. You may obtain additional information by visiting the State Board's Homepage at http://www.waterboards.ca.gov/lahontan/

General Comments

The Regional Board has adopted a Water Quality Control Plan for the Lahontan Region (Basin Plan), which contains prohibitions, water quality standards, and policies for implementation of those standards. The Basin Plan is available on line at the Regional Board's Internet site at http//:www.waterboards.ca.gov/lahontan/. The Project must comply with all applicable water quality standards and prohibitions of the Basin Plan.

Our comments are submitted in compliance with California Environmental Quality Act (CEQA) Guidelines §15096, which requires CEQA responsible agencies to specify the scope and content of the environmental information germane to their statutory responsibilities and lead agencies to include that information in the environmental document for their project. The State Water Resources Control Board (SWRCB) and the Water Board regulate discharges which could affect the quality of water of the State in order to protect the chemical, physical, biological, bacteriological, radiological, and other properties and characteristics of water which affects its

use.[1] A number of activities associated with the project will apparently require permits issued by the SWRCB. The required entitlements may include:

- Discharge of fill material - Clean Water Act (CWA) §401 water quality certification for federal waters; or Waste Discharge Requirements for non-federal waters, and
- Land disturbance - CWA § 402(p) stormwater permit (Construction Stormwater Permit)

Hydrology and Water Quality

The proposed Project involves the development of commercial on currently vacant and undeveloped land. This development will alter the existing drainage patterns of rainfall absorption and surface water runoff, causing an increase in rates of stormwater discharge.

Urban development degrades water quality through a complex of interrelated causes and effects, which, unmanaged, ultimately destroy the physical, chemical, and biological integrity of the watersheds in which they occur. The primary potential adverse impacts of urban development projects on water quality are:

- the direct physical impacts to aquatic, wetland, and riparian habitat and other beneficial uses;
- generation of construction-related and post-construction urban pollutants;
- alteration of flow regimes and groundwater recharge as a result of impervious surfaces and storm drain collector systems; and
- disruption of watershed level aquatic functions, including pollutant removal, floodwater retention, and habitat connectivity.

These factors have historically resulted in a cycle of destabilized stream channels, poor water quality, and engineered solutions to disrupted flow patterns, culminating in loss of natural functions and societal values in the affected basins. The number and variability of the pathways through which water quality degradation can occur complicates analysis, but understanding how these pathways operate within the specific circumstances of this project is essential to effectively mitigating the adverse effects.

In order to evaluate the project regarding the above potential impacts, the Project must describe how it will avoid or minimize each potential cause of water quality degradation, what effects will remain unmitigated through project design, and the magnitude of the remaining adverse effects.

It must also address how hydromodification may result in substantial additional sources of polluted runoff, and promote recharge of poorer quality water or otherwise substantially degrade groundwater quantity or quality. Drainage channels should be avoided to minimize impacts, and any unavoidable impacts to these waters of the State must be mitigated. Mitigation must be identified in the EIR including timing of construction. Mitigation must replace functions and values of drainages lost. It is not sufficient to state that mitigation will be accomplished through permits acquired and that appropriate governmental agencies will be notified.

Additionally, please be sure that the EIR completely evaluates the potential cumulative impacts of the project considering other existing and potential projects.

[1] Water Code section 13050(g)

Effective Stormwater Management

The EIR for this project must specifically identify features for both the short-term (construction) and the post-construction periods that will control stormwater on-site or prevent pollutants from non-point sources from entering and degrading groundwater. The foremost method of reducing impacts to watersheds from urban development is "Low Impact Development" (LID), the goals of which are maintaining a landscape functionally equivalent to predevelopment hydrologic conditions and minimal generation of nonpoint source pollutants. LID results in less surface runoff and less pollution routed receiving waters. Principles of LID include:

- Maintaining natural drainage paths and landscape features to slow and filter runoff and maximize groundwater recharge,
- Reducing the impervious cover created by development and the associated transportation network, and
- Managing runoff as close to the source as possible.

We understand that LID development practices that would maintain aquatic values could also reduce local infrastructure requirements and could benefit energy conservation, air quality, open space, and habitat. Many planning tools exist to implement the above principles, and a number of recent reports and manuals provide specific guidance regarding LID. These principles can be incorporated into the proposed project design.

Natural drainage patterns must be maintained and/or restored to the extent feasible. Designs that use vegetated areas for stormwater management and infiltration on-site are preferable and are the most effective means of filtering sediment and pollution, and regulating the volume of runoff from land surfaces to adjacent washes.

Minimum-disturbance activities (such as preservation of vegetation and grade) protect and preserve the natural drainage system. They emulate and preserve the natural hydrologic cycle, moving stormwater slowly over large permeable surfaces to allow it to percolate into the ground. In addition, preservation and minimum-disturbance activities may be more cost effective than revegetation practices or structural controls, especially long-term. Design features of future development should be incorporated to ensure that runoff is not concentrated by the proposed project, thereby causing downstream erosion. Storm drain systems do not promote the same beneficial uses as a natural ecosystem.

Thank you for the opportunity to comment on your project. If you have any questions regarding our comments, please contact me at (760) 241-7376, or e-mail me at mhakakian@waterboards.ca.gov.

Sincerely,

Mack Hakakian

Mack Hakakian, PG
Engineering Geologist

MH/rc/CEQA comments/Antelope Valley Big Rock Creek Surface Mine

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
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ds_nahc@pacbell.net

RECEIVED
DEC 31 2007

December 26, 2007

Mr. Anthony Curzi
Los Angeles County Department of Regional Planning
320 W. Temple Street
Los Angeles, CA 90012

Re: SCH# 2007121054; CEQA Notice of Preparation (NOP) draft Environmental Impact Report (DEIR) for the Big Rock Creek Aggregate Surface Mining and Processing Facilities: Ready-Mix Concrete and Asphalt Batch Plants Project; Los Angeles County, California

Dear Mr. Curzi:

Thank you for the opportunity to comment on the above-referenced document. The Native American Heritage Commission is the state agency designated for the protection of California's Native American cultural resources. The California Environmental Quality Act (CEQA) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR per the California Code of Regulations § 15064.5(b)(c) (CEQA Guidelines). In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE),' and if so, to mitigate that effect. To adequately assess the project-related impacts on historical resources, the Commission recommends the following action:

√ Contact the appropriate California Historic Resources Information Center (CHRIS). Contact information for the 'Information Center' nearest you is available from the State Office of Historic Preservation in Sacramento (916/653-7278). The record search will determine:

- If a part or the entire (APE) has been previously surveyed for cultural resources.
- If any known cultural resources have already been recorded in or adjacent to the APE.
- If the probability is low, moderate, or high that cultural resources are located in the APE.
- If a survey is required to determine whether previously unrecorded cultural resources are present.

√ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
- The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

√ Contact the Native American Heritage Commission (NAHC) for:

* A Sacred Lands File (SLF) search of the project area and information on tribal contacts in the project vicinity who may have information on cultural resources in or near the APE. Please provide us site identification as follows: USGS 7.5-minute quadrangle citation with name, township, range and section. This will assist us with the SLF.

- Also, we recommend that you contact the Native American contacts on the attached list to get their input on the effect of potential project (e.g. APE) impact. In many cases a culturally-affiliated Native American tribe or person will be the only source of information about the existence of a cultural resource.

√ Lack of surface evidence of archeological resources does not preclude their subsurface existence.

- Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f)of the California Code of Regulations (CEQA Guidelines). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
- Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.

√ Lead agencies should include provisions for discovery of Native American human remains or unmarked cemeteries in their mitigations plans.

- CEQA Guidelines §15064.5(d) requires the lead agency to work with the Native Americans identified by this Commission if the Initial Study identifies the presence or likely presence of Native American human remains within the APE. CEQA Guidelines provide for agreements with Native American groups, identified by the NAHE, to ensure the appropriate and dignified treatmentof Native American human remains and any associated grave goods.
- Health and Safety Code §7050.5, Public Resources Code §5097.98 and CEQA Guidelines §15064.5(d) mandate procedures to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

√ Lead agencies should consider avoidance, as defined in CEQA Guidelines §15370 when significant cultural resources are discovered during the course of project planning or execution.

Please feel free to contact me at (916) 653-6251 if you have any questions.

Sincerely,

Dave Singleton
Program Analyst

Attachment: Native American Contact List

Cc: State Clearinghouse

Native American Contacts
.os Angeles County
December 26, 2007

Fernandeno Tataviam Band of Mission Indians
Randy Guzman-Folkes, Cultural/Environ Depart
601 South Brand Boulevard, Suite 102
San Fernando , CA 91340
ced@tataviam.org
(818) 837-0794 Office
(805) 501-5279 Cell
(818) 837-0796 Fax

Fernandeno Tataviam

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838
Newhall , CA 91322
tsen2u@msn.com
(661) 753-9833 Office
(760) 885-0955 Cell
(760) 949-1604 Fax

Fernandeño Tataviam Serrano Vanyume Kitanemuk

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th Street, Rm. 403
Los Angeles , CA 90020
(213) 351-5324
(213) 386-3995 FAX

Gabrieleno/Tongva San Gabriel Band of Mission Indians - Anthony Morales, Chairperson
PO Box 693
San Gabriel , CA 91778
ChiefRBwife@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 Fax

Gabrielino Tongva

Ti'At Society
Cindi Alvitre
6515 E. Seaside Walk, #C
.ong Beach , CA 90803
calvitre@yahoo.com
714) 504-2468 Cell

Gabrielino

Gabrielino/Tongva Council / Gabrielino Tongva Nation
Sam Dunlap, Tribal Secretary
761 Terminal Street; Bldg 1, 2nd floor
Los Angeles , CA 90021
office @tongvatribe.net
(213) 489-5001 - Officer
(909) 262-9351 - cell
(213) 489-5002 Fax

Gabrielino Tongva

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Adminstrator
712 Admiralty Way, Suite 172
Marina Del Rey , CA 90292
310-570-6567

Gabrielino Tongva

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Tribal Chair/Cultural Resources
5450 Slauson, Ave, Suite 151 PMB
Culver City , CA 90230
gtongva@verizon.net
562-761-6417 - voice
562-925-7989 - fax

Gabrielino Tongva

his list is current only as of the date of this document.

stribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and afety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

his list is only applicable for contacting local Native American with regard to cultural resources for the proposed CH#2007121054; CEQA Notice of Preparation (NOP); Draft Environmental Impact Report (DEIR) for Big Rock Creek ggregate Surface Mining and Processing FAcilities; including Ready-Mix Cement And Asphalt Batch Plant; Los Angeles ounty, California.

DEPARTMENT OF TRANSPORTATION
DISTRICT 7, REGIONAL PLANNING
IGR/CEQA BRANCH
100 MAIN STREET, MS # 16
LOS ANGELES, CA 90012-3606
PHONE: (213) 897-3747
FAX: (213) 897-1337

Flex your power!
Be energy efficient!

IGR/CEQA No. 071231AL, NOP
Big Rock Creek-Aggregate Mining Plant
Vic. LA-14 / PM R58.17
SCH # 2007121054

December 28, 2007

RECEIVED
JAN 9 2008

Mr. Anthony Curzi
Department of Regional Planning
Los Angeles County
320 W. Temple Street
Los Angeles, CA 90012

Dear Mr. Curzi:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project.

To assist us in our efforts to evaluate the impacts of this project on State transportation facilities, a traffic study in advance of the DEIR should be prepared. We wish to refer the project's traffic consultant to our traffic study guideline Website:

http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

and we list here some elements of what we generally are expecting in the traffic study:

1. Presentations of assumptions and methods used to develop trip generation, trip distribution, choice of travel mode, and assignments of trips to State Route 14.

2. Consistency of project travel modeling with other regional and local modeling forecasts and with travel data. The IGR/CEQA office may use indices to check results. Differences or inconsistencies must be thoroughly explained.

3. Analysis of ADT, AM and PM peak-hour volumes for both the existing and future conditions in the affected area. This should include freeways, interchanges, and intersections, and all HOV facilities. Interchange Level of Service should be specified (HCM2000 method requested). Utilization of transit lines and vehicles, and of all facilities, should be realistically estimated. Future conditions would include build-out of all projects (see next item) and any plan-horizon years.

4. Inclusion of all appropriate traffic volumes. Analysis should include traffic from the project, cumulative traffic generated from all specific approved developments in the area, and traffic growth other than from the project and developments. That is, include: existing + project + other projects + other growth.

5. Discussion of mitigation measures appropriate to alleviate anticipated traffic impacts. These mitigation discussions should include, but not be limited to, the following:

    - Description of Transportation Infrastructure Improvements
    - **Financial Costs, Funding Sources and Financing**
    - Sequence and Scheduling Considerations
    - Implementation Responsibilities, Controls, and Monitoring

    Any mitigation involving transit, HOV, or TDM must be rigorously justified and its effects conservatively estimated. Improvements involving dedication of land or physical construction may be favorably considered.

6. Specification of developer's percent share of the cost, as well as a plan of realistic mitigation measures under the control of the developer. The following ratio should be estimated: additional traffic volume due to project implementation is divided by the total increase in the traffic volume (see Appendix "B" of the Guidelines). That ratio would be the project equitable share responsibility.

    We note for purposes of determining project share of costs, the number of trips from the project on each traveling segment or element is estimated in the context of forecasted traffic volumes which include build-out of all approved and not yet approved projects, and other sources of growth. Analytical methods such as select-zone travel forecast modeling might be used.

    The Department as commenting agency under CEQA has jurisdiction superceding that of MTA in identifying the freeway analysis needed for this project. Caltrans is responsible for obtaining measures that will off-set project vehicle trip generation that worsens Caltrans facilities and hence, it does not adhere to the CMP guide of 150 or more vehicle trips added before freeway analysis is needed. MTA's Congestion Management Program in acknowledging the Department's role, stipulates that Caltrans must be consulted to identify specific locations to be analyzed on the State Highway System. Therefore State Route(s) mentioned in item #1 and its facilities must be analyzed per the Department's Traffic Impact Study Guidelines.

We look forward to reviewing the traffic study. We expect to receive a copy from the State Clearinghouse when the DEIR is completed. However, to expedite the review process, and clarify any misunderstandings, you may send a copy in advance to the undersigned.

If you have any questions, please feel free to contact me at (213) 897-3747 or Alan Lin the project coordinator at (213) 897-8391 and refer to IGR/CEQA No. 071231AL.

Sincerely,

Alan Lin

for CHERYL J. POWELL
IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, *Governor*

PUBLIC UTILITIES COMMISSION
320 WEST 4TH STREET, SUITE 500
LOS ANGELES, CA 90013

RECEIVED
JAN 3 2008

December 31, 2007

Anthony Curzi
Los Angeles County Department of Regional Planning
320 W. Temple Street
Los Angeles, CA 90012

Dear Mr. Curzi:

Re: SCH# 2007121054; Big Rock Creek: Aggregate Surface Mining and Processing Facilities, Ready-Mixed Concrete Plant, Asphalt

The California Public Utilities Commission (Commission) has jurisdiction over the safety of highway-rail crossings (crossings) in California. The California Public Utilities Code requires Commission approval for the construction or alteration of crossings and grants the Commission exclusive power on the design, alteration, and closure of crossings.

The Commission Rail Crossings Engineering Section (RCES) is in receipt of the *Notice of Completion & Environmental Document Transmittal- NOP* from the State Clearinghouse. RCES staff is concerned that the new development at 136th Street and Avenue T (lat= 34.542784, long=-117.893372) may increase traffic volumes not only on streets and at intersections, but also at the nearby crossings. This includes considering pedestrian circulation patterns/destinations with respect to Union Pacific Railroad Company and Metrolink's Valley Line right-of-way. Commission staff is particularly concerned with increased congestion at the nearby grade crossings at 106th Street (DOT# 750710G), 116th Street (DOT# 750709M), and 165th Street (DOT# 750726D).

Mitigation Measures to consider include, but are not limited to, the planning for grade separations for major thoroughfares, improvements to existing at-grade highway-rail crossings due to increase in traffic volumes and continuous vandal resistant fencing or other appropriate barriers to limit the access of trespassers onto the railroad right-of-way.

Please advise us on the status of the project. If you have any questions in this matter, please contact me at (213) 576-7078 or at rxm@cpuc.ca.gov.

Sincerely,

Rosa Muñoz, PE
Utilities Engineer
Rail Crossings Engineering Section
Consumer Protection & Safety Division

C: Dan Miller, UP

DEPARTMENT OF CONSERVATION

OFFICE OF MINE RECLAMATION

801 K STREET • MS 09-06 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 323-9198 • **FAX** 916 / 445-6066 • **TDD** 916 / 324-2555 • **WEBSITE** conservation.ca.gov

January 7, 2008

RECEIVED JAN 9 2008

Anthony Curzi
Los Angeles County
Department of Regional Planning
Impact Analysis Section
320 West Temple Street, Room 1348
Los Angeles, CA 90012

Dear Mr. Curzi:

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE BIG ROCK CREEK MINING, PROCESSING AND DISTRIBUTION FACILITY; PROJECT NUMBER R2007-2800

The Department of Conservation's Office of Mine Reclamation (OMR) has reviewed the Initial Study checklist and Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Big Rock Creek Surface Mine ("Mining, Processing and Distribution Facility"). The applicant, Lebata, Inc., is proposing to mine and process aggregate on 284.5 acres of a 310-acre project site for a period of 50 years. The applicant estimates that approximately 1,000,000 tons of material will be removed annually. The proposed project site is located in Antelope Valley east of the City of Palmdale, near the community of Pearblossom.

The Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code section 2710 et seq.) and the State Mining and Geology Board Regulations (California Code of Regulations (CCR) Title 14, Division 2, Chapter 8, Subchapter 1) require that specific items be addressed or included in reclamation plans. SMARA Section 2770 (a) states "... no person shall conduct a surface mining operation unless a permit is obtained from, a reclamation plan has been submitted to and approved by, and financial assurances for reclamation have been approved by, the lead agency for the operation pursuant to this article." Since a reclamation plan is considered a project under the California Environmental Quality Act (CEQA), OMR recommends that the reclamation plan be included in the project description for environmental review. The project could be titled "Big Rock Creek Mining and Reclamation Plan." Mitigation measures may be incorporated into the reclamation plan to prevent or minimize many of the adverse effects of mining.

If you have any questions on these comments or require any assistance with other mine reclamation issues, please contact me at (916) 323-8565.

Sincerely,

Leah Miller
for Jim Pompy

James S. Pompy, Manager
Reclamation Unit

State of California – The Resources Agency ARNOLD SCHWARZENEGGER, *Governor*

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
South Coast Region
4949 Viewridge Avenue
San Diego, CA 92123
(858) 467-4201

Flex your POWER

January 10, 2008

Mr. Anthony Curzi
County of Los Angeles
Department of Regional Planning
320 W. Temple Street
Los Angeles, CA 90012

Notice of Preparation of a
Draft Environmental Impact Report for the
Big Rock Creek Surface Mine Project
SCH # 2007121054, Los Angeles County

Dear Mr. Curzi:

The Department of Fish and Game (Department) has reviewed the above-referenced Notice of Preparation (NOP), for a Draft Environmental Impact Report relative to impacts to biological resources. The project proponent is seeking a 50-year Conditional Use Permit and Surface Mining Permit for a new surface mining operation and associated facilities including a ready mix concrete plant, asphalt mixing plant, raw cement and aggregate transfer/distribution facility, . The project proposes to conduct aggregate mining within an approximately 284.5-acre area, and proposes to process the mined materials on-site. The project is located in the Antelope Valley, south of Avenue T, bounded by 136th Street to the east, Avenue U to the south, and 126th Street to the west.

To enable Department staff to adequately review and comment on the proposed project we recommend the following information, where applicable, be included in the Draft Environmental Impact Report:

1. A complete, recent assessment of flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats (Attachment 1). This should include a complete floral and faunal species compendium of the entire project site, undertaken at the appropriate time of year.

    a. A thorough recent assessment of rare plants and rare natural communities, following the Department's Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities.

    b. A complete, recent assessment of sensitive fish, wildlife, reptile, and amphibian

species. Seasonal variations in use of the project area should also be addressed. Recent, focused, species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and U.S. Fish and Wildlife Service.

c. Rare, threatened, and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, Section 15380).

d. The Department's Wildlife Habitat Data Analysis Branch in Sacramento should be contacted at (916) 322-2493 to obtain current information on any previously reported sensitive species and habitats, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code. Also, any Significant Ecological Areas (SEAs) or Environmentally Sensitive Habitats (ESHs) or any areas that are considered sensitive by the local jurisdiction that are located in or adjacent to the project area must be addressed.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts. This discussion should focus on maximizing avoidance, and minimizing impacts.

a. CEQA Guidelines, Section 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

b. Project impacts should also be analyzed relative to their effects on off-site habitats and populations. Specifically, this should include nearby public lands, open space, adjacent natural habitats, and riparian ecosystems. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas are of concern to the Department and should be fully evaluated and provided. The analysis should also include a discussion of the potential for impacts resulting from such effects as increased vehicle traffic, outdoor artificial lighting, noise and vibration.

c. A cumulative effects analysis should be developed as described under CEQA Guidelines, Section 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

d. Impacts to migratory wildlife affected by the project should be fully evaluated including proposals to removal/disturb native and ornamental landscaping and other nesting habitat for native birds. Impact evaluation may also include such elements as migratory butterfly roost sites and neo-tropical bird and waterfowl stop-over and staging sites. All migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Sections 3503, 3503.5 and 3513 of the California Fish and Game Code prohibit take of birds and their active nests, including raptors and other migratory nongame birds as listed under the MBTA.

e. Impacts to all habitats from City or County required Fuel Modification Zones (FMZ). Areas slated as mitigation for loss of habitat shall not occur within the FMZ.

f. Proposed project activities (including disturbances to vegetation) should take place outside of the breeding bird season (February 1- September 1) to avoid take (including disturbances which would cause abandonment of active nests containing eggs and/or young). If project activities cannot avoid the breeding bird season, nest surveys should be conducted and active nests should be avoided and provided with a minimum buffer as determined by a biological monitor (the Department recommends a minimum 500-foot buffer for all active raptor nests).

3. A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources including wetlands/riparian habitats, alluvial scrub, coastal sage scrub, Joshua tree woodlands, etc. should be included. Specific alternative locations should also be evaluated in areas with lower resource sensitivity where appropriate.

   a. Mitigation measures for project impacts to sensitive plants, animals, and habitats should emphasize evaluation and selection of alternatives which avoid or otherwise minimize project impacts. Compensation for unavoidable impacts through acquisition and protection of high quality habitat elsewhere should be addressed with offsite mitigation locations clearly identified.

   b. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from project-related impacts (Attachment 2).

   c. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful.

4. A California Endangered Species Act (CESA) Permit must be obtained, if the project has the potential to result in "take" of species of plants or animals listed under CESA, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to the proposed project and mitigation measures may be required in order to obtain a CESA Permit. Revisions to the Fish and Game Code, effective January 1998, require that the Department issue a separate CEQA document for the issuance of a CESA permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a CESA permit. For these reasons, the following information is requested:

   a. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

   b. A Department-approved Mitigation Agreement and Mitigation Plan are required for plants listed as rare under the Native Plant Protection Act.

5. The Department opposes the elimination of watercourses (including concrete channels) and/or the canalization of natural and manmade drainages or conversion to subsurface drains. All wetlands and watercourses, whether intermittent, ephemeral, or perennial,

must be retained and provided with substantial setbacks which preserve the riparian and aquatic habitat values and maintain their value to on-site and off-site wildlife populations. The Department recommends a minimum natural buffer of 100 feet from the outside edge of the riparian zone on each side of a drainage.

a. The Department requires a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant prior to any direct or indirect impact to a lake or stream bed, bank or channel or associated riparian resources. The Department's issuance of a SAA may be a project that is subject to CEQA. To facilitate our issuance of the Agreement when CEQA applies, the Department as a responsible agency under CEQA may consider the local jurisdiction's (Lead Agency) document for the project. To minimize additional requirements by the Department under CEQA the document should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the Agreement. Early consultation is recommended, since modification of the proposed project may be required to avoid or reduce impacts to fish and wildlife resources.

Thank you for this opportunity to provide comment. Please contact Ms. Kelly Schmoker, Staff Environmental Scientist, at (626) 335-4369 if you should have any questions and for further coordination on the proposed project.

Sincerely,

Kelly Schmoker for

Terri Dickerson
Senior Environmental Scientist

Attachments

cc: Mr. Michael Mulligan, San Diego
Ms. Terri Dickerson, Laguna Niguel
Mr. Scott Harris, Pasadena
HabCon-Chron
Department of Fish and Game

State Clearinghouse, Sacramento

Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities

State of California
THE RESOURCES AGENCY
Department of Fish and Game
December 9, 1983
Revised May 8, 2000

The following recommendations are intended to help those who prepare and review environmental documents determine **when** a botanical survey is needed, **who** should be considered qualified to conduct such surveys, **how** field surveys should be conducted, and **what** information should be contained in the survey report. The Department may recommend that lead agencies not accept the results of surveys that are not conducted according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all rare, threatened, and endangered plants and plant communities. Rare, threatened, and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare, threatened, and/or endangered under the following definitions:

A species, subspecies, or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is "threatened" when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

Rare natural communities are those communities that are of highly limited distribution. These communities may or may not contain rare, threatened, or endangered species. The most current version of the California Natural Diversity Database's List of California Terrestrial Natural Communities may be used as a guide to the names and status of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or to the extent that, rare, threatened, or endangered plants will be affected by a proposed project when:

a. Natural vegetation occurs on the site, it is unknown if rare, threatened, or endangered plants or habitats occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
b. Rare plants have historically been identified on the project site, but adequate information for impact assessment is lacking.

3. Botanical consultants should possess the following qualifications:

a. Experience conducting floristic field surveys;
b. Knowledge of plant taxonomy and plant community ecology;
c. Familiarity with the plants of the area, including rare, threatened, and endangered species;
d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
e. Experience with analyzing impacts of development on native plant species and communities.

4. Field surveys should be conducted in a manner that will locate any rare, threatened, or endangered species that may be present. Specifically, rare, threatened, or endangered plant surveys should be:

a. Conducted in the field at the proper time of year when rare, threatened, or endangered species are both evident and identifiable. Usually, this is when the plants are flowering.

When rare, threatened, or endangered plants are known to occur in the type(s) of habitat present in the project

area, nearby accessible occurrences of the plants (reference sites) should be observed to determine that the species are identifiable at the time of the survey.

b. Floristic in nature. A floristic survey requires that every plant observed be identified to the extent necessary to determine its rarity and listing status. In addition, a sufficient number of visits spaced throughout the growing season are necessary to accurately determine what plants exist on the site. In order to properly characterize the site and document the completeness of the survey, a complete list of plants observed on the site should be included in every botanical survey report.

c. Conducted in a manner that is consistent with conservation ethics. Collections (voucher specimens) of rare, threatened, or endangered species, or suspected rare, threatened, or endangered species should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit requirements. A collecting permit from the Habitat Conservation Planning Branch of DFG is required for collection of state-listed plant species. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a thorough coverage of potential impact areas.

e. Well documented. When a rare, threatened, or endangered plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5 minute topographic map with the occurrence mapped, should be completed and submitted to the Natural Diversity Database. Locations may be best documented using global positioning systems (GPS) and presented in map and digital forms as these tools become more accessible.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations and mitigated negative declarations, Timber Harvesting Plans (THPs), EIR's, and EIS's, and should contain the following information:

a. Project description, including a detailed map of the project location and study area.
b. A written description of biological setting referencing the community nomenclature used and a vegetation map.
c. Detailed description of survey methodology.
d. Dates of field surveys and total person-hours spent on field surveys.
e. Results of field survey including detailed maps and specific location data for each plant population found. Investigators are encouraged to provide GPS data and maps documenting population boundaries.
f. An assessment of potential impacts. This should include a map showing the distribution of plants in relation to proposed activities.
g. Discussion of the significance of rare, threatened, or endangered plant populations in the project area considering nearby populations and total species distribution.
h. Recommended measures to avoid impacts.
i. A list of all plants observed on the project area. Plants should be identified to the taxonomic level necessary to determine whether or not they are rare, threatened or endangered.
j. Description of reference site(s) visited and phenological development of rare, threatened, or endangered plant(s).
k. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.
l. Name of field investigator(s).
m. References cited, persons contacted, herbaria visited, and the location of voucher specimens.

Sensitivity of Top Priority Rare Natural Communities in Southern California

Sensitivity rankings are determined by the Department of Fish and Game, California Natural Diversity Data Base and based on either number of known occurrences (locations) and/or amount of habitat remaining (acreage). The three rankings used for these top priority rare natural communities are as follows:

S1.# Fewer than 6 known locations and/or on fewer than 2,000 acres of habitat remaining.

S2.# Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining.

S3.# Occurs in 21-100-known locations and/or 10,000-50,000 acres of habitat remaining.

The number to the right of the decimal point after the ranking refers to the degree of threat posed to that natural community regardless of the ranking. For example:

S1.1 = very threatened
S2.2 = threatened
S3.3 = no current threats known

Sensitivity Rankings (February 1992)

Rank	Community Name
S1.1	Mojave Riparian Forest
	Sonoran Cottonwood Willow Riparian
	Mesquite Bosque
	Elephant Tree Woodland
	Crucifixion Thorn Woodland
	Allthorn Woodland
	Arizonan Woodland
	Southern California Walnut Forest
	Mainland Cherry Forest
	Southern Bishop Pine Forest
	Torrey Pine Forest
	Desert Mountain White Fir Forest
	Southern Dune Scrub
	Southern Coastal Bluff Scrub
	Maritime Succulent Scrub
	Riversidean Alluvial Fan Sage Scrub
	Southern Maritime Chaparral
	Valley Needlegrass Grassland
	Great Basin Grassland
	Mojave Desert Grassland
	Pebble Plains
	Southern Sedge Bog
	Cismontane Alkali Marsh

S1.2	Southern Foredunes Mono Pumice Flat Southern Interior Basalt Flow Vernal Pool
S2.1	Venturan Coastal Sage Scrub Diegan Coastal Sage Scrub Riversidean Upland Coastal Sage Scrub Riversidean Desert Sage Scrub Sagebrush Steppe Desert Sink Scrub Mafic Southern Mixed Chaparral San Diego Mesa Hardpan Vernal Pool San Diego Mesa Claypan Vernal Pool Alkali Meadow Southern Coastal Salt Marsh Coastal Brackish Marsh Transmontane Alkali Marsh Coastal and Valley Freshwater Marsh Southern Arroyo Willow Riparian Forest Southern Willow Scrub Modoc-Great Basin Cottonwood Willow Riparian Modoc-Great Basin Riparian Scrub Mojave Desert Wash Scrub Engelmann Oak Woodland Open Engelmann Oak Woodland Closed Engelmann Oak Woodland Island Oak Woodland California Walnut Woodland Island Ironwood Forest Island Cherry Forest Southern Interior Cypress Forest Bigcone Spruce-Canyon Oak Forest
S2.2	Active Coastal Dunes Active Desert Dunes Stabilized and Partially Stabilized Desert Dunes Stabilized and Partially Stabilized Desert Sandfield Mojave Mixed Steppe Transmontane Freshwater Marsh Coulter Pine Forest Southern California Fellfield White Mountains Fellfield
S2.3	Bristlecone Pine Forest Limber Pine Forest

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

DONALD L. WOLFE, Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE REFER TO FILE: LD-0

February 12, 2008

TO: Paul McCarthy
Department of Regional Planning

Attention Anthony Curzi

FROM: Steve Burger
Department of Public Works
Land Development Division

RESPONSE TO NOTICE OF CONSULTATION
LEBATA, INC. SURFACE MINE PROJECT R2007-00670
UNINCORPORATED ANTELOPE VALLEY

We reviewed the Notice of Consultation for the above-mentioned project. The following comments are for your consideration. These comments relate to the environmental document only, and the project should not be set for hearing until the issues raised in this letter are resolved to the satisfaction of the Department of Public Works. Additional comments on the Conditional Use Permit should be solicited from Public Works and all issues resolved before the project is brought to public hearing.

Road Maintenance

Avenue T is a rural major highway on the Master Plan of Highways. Based on the Department's Road Inventory, Avenue T is in fair condition with longitudinal and transverse pavement cracking. The structural section of the roadway should be evaluated by Geotechnical and Materials Engineering and may need to be increased due to the anticipated increase of heavy truck traffic.

Road Improvement Contract RDC0013966, on Avenue T between BE/UPRR/1615 to 800 feet east of Longview Road, is scheduled to be awarded in September 2009. The environmental document should analyze any possible conflicts with this project.

Storm Drain and Hydrology

Prior to setting a hearing date for the project, the applicant shall provide, and Public Works shall approve, a drainage study with the reclamation plans to address how the drainage will be affected by construction of berms, pits, two 80-foot-deep post-operation depressions, etc. That study will require a drainage acceptance covenant from the down stream property owner accepting the anticipated impact to the offsite property due to the operation and reclamation final products. Additionally, the applicant shall provide soil/geology report to address existing and proposed conditions with required mitigations.

Watershed Management

In Section 3.1, on page 2, a majority of the total project area will be used to mine aggregate. Additionally, in the Phase I discussion of Section 3.3.1 on page 3, the report states floodwater interceptors and down drains will be added as mining progresses. If the project's intention is to send water downstream, the project will need to adhere to our Department's interim peak-flow runoff criteria for new development, which requires a Q based on Delta Q and Delta V retained on-site for post-development conditions. Additionally, there is a potential for portions of the surrounding area and the watershed to develop. Consider the use of the County General Plan to estimate upstream future impervious areas to develop accurate off-site flows to the proposed site.

As on-site flows collect and remain on-site, the areas downstream will no longer receive these flows. What mitigation is proposed for the downstream impacts?

In Section 3.3, on page 2, how does the applicant plan on providing for the environmentally sound and economically viable closure of the site? Once the site closure occurs, does the site have any intended land use?

In Phase I of Section 3.3.1, on page 3, the report states that a 5-foot berm will be constructed on three sides of the Phase I pit. What will be the berm be made of? The report here also states floodwater interceptors and down drains will be added as mining progresses and that the Drainage Concept can be found in the Surface Mining and Reclamation Plan. We need a copy of the Drainage Concept to review and approve. Assuming the proposed drainage facilities are constructed, who will maintain the facilities and for how long?

In Section 3.3.1, on page 4, the report here states that water will be used on site for washing of aggregate, for production of the ready-mixed concrete for dust control, and for irrigation. Consider the use of reclaimed/non-potable water for these purposes.

In the Phased/Concurrent Reclamation portion of Section 3.3.1, on page 4, the report states other potential post-mining uses include groundwater recharge or stormwater retention basins. Will on-site waters and pollutions be kept from entering these facilities? Over the course of time, the facilities will receive sediment deposit and will require appropriate maintenance. The proposed project should implement water quality devices to prevent degradation of the water bodies and groundwater (i.e., structural BMPs, vegetative swales, treatment wetlands). On-site minerals, equipment, and any potential source of contamination should be placed in a roofed structure and bermed to prevent pollution runoff.

In the event shallow groundwaters rise to the surface of the project site, is the proposed project equipped to handle or adjust to such a scenario? What measures will be taken to prevent contamination of the groundwater?

In Section 3.3.2, on page 5, the report states that a similar maintenance process would be employed to maintain the traditional open pond water recycling system, should that alternative be approved and utilized. Please describe the water recycling system further.

Per Section 3.3.6, on page 8, please provide a copy of the Stormwater Pollution Prevention Plan once developed.

Determine if the project area is within FEMA Flood Zone A. If the project is located within FEMA Flood Zone A, show that increases in the water surface are within limits.

Traffic

We generally agree with the Notice of Preparation and Initial Study that the proposed project has the potential to significantly impact the County and County/City roadways and intersections in the area. We would like the opportunity to review the Environmental Impact Report including the traffic impact studies on a project-by-project basis upon its completion. The County's methodology shall be used when evaluating the County and/or County/City intersections. The study shall also address the cumulative impacts generated by this and nearby developments and include the level of service analysis for the affected intersections. If traffic signals or other mitigation measures are warranted at the affected County intersections, the developer shall

determine the proportionate share of traffic signal or other mitigation costs and submit this information to Public Works for review and approval. A copy of our Traffic Impact Analysis Report Guidelines may be obtained on our website at http://ladpw.org/Traffic.

We also believe that the project may have a significant impact on the pavement integrity within the area and specifically along the major travel routes. The traffic study shall include an analysis of the impact to the pavement caused by the additional truck traffic from the project.

If you have any questions or require additional information, please contact me at (626) 458-4907.

CDM:ca
P:\ldpub\CEQA\CDM\DRP - Lebata Surface Mining NOP.doc

ROOSEVELT RURAL TOWN COUNCIL

President: *Barbara Firsick* Vice President: *Ron Ferrell* Secretary: *Gayleen McGarry*
Treasurer: *Doris Hoeppner* Board Members: *Myrle McLernon, Justin Self, Mary Carreon*

48157 70th Street East, Lancaster, California 93535 (661) 946-1323

January 25, 2008

Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

REF: BIG ROCK CREEK SURFACE MINE PROJECT
PROJECT NUMBER R2007-00670

To Whom It May Concern:

The Roosevelt Rural Town Council has received and reviewed the NOTICE OF PREPARATION on the above referenced project. While the Board does not directly oppose this project, there is a significant concern regarding the possible degradation of the groundwater due to this project.

Please inform the Roosevelt Rural Town Council regarding the Environmental Impact Report for this project.

Sincerely,

Gayleen McGarry

Gayleen McGarry
Secretary, Roosevelt Rural Town Council

cc Lebata, Inc.

RECEIVED
JAN 29 2008

DEPARTMENT OF CONSERVATION

OFFICE OF MINE RECLAMATION

801 K STREET • MS 09-06 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 323-9198 • FAX 916 / 445-6066 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

February 22, 2008

Anthony Curzi
Los Angeles County
Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Dear Mr. Curzi:

BIG ROCK CREEK MINING AND RECLAMATION PLAN SCH#2007121054

The Department of Conservation's Office of Mine Reclamation (OMR) has reviewed the mining and reclamation plan for Big Rock Creek dated July 17, 2007. The applicant, Lebata, Inc., is proposing to mine and process aggregate on 284.5 acres of a 310-acre project site for a period of 50 years. The applicant estimates that approximately 1,000,000 tons of material will be removed annually. The proposed project site is located in Antelope Valley east of the City of Palmdale, near the community of Pearblossom. OMR staff conducted a site visit on February 20, 2008 to discuss reclamation issues.

The Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code section 2710 et seq.) and the State Mining and Geology Board Regulations (California Code of Regulations (CCR) Title 14, Division 2, Chapter 8, Subchapter 1) require that specific items be addressed or included in reclamation plans. The following comments prepared by Leah Gardner Miller, Restoration Ecologist, and John Wesling, Engineering Geologist, are offered to assist in your review of this project. We recommend that the reclamation plan be supplemented to fully address these items.

Mining Operation and Closure

(Refer to SMARA sections 2770, 2772, 2773, CCR sections 3502, 3709, 3713)

SMARA section 2772(c)(3) requires that the reclamation plan include a specific termination date. If a 50-year permit is granted, the termination date would be December 31, 2058.

SMARA section 2772(c)(4) requires that the maximum anticipated depth of the surface mining operation be indicated in the reclamation plan. The depth is given as "80 feet below ground surface." OMR recommends that the maximum anticipated depth of mining also be stated as an elevation tied to a verifiable benchmark, such as mean sea level, that can be referenced in the field for compliance monitoring.

SMARA section 2772(c)(5) requires that the reclamation plan include maps with information pertinent to the reclamation of the site. Maps and plot plans should clearly show boundaries of active and future mining areas, topographic details, geology, streams, utilities, haul roads, and stockpile areas (topsoil and material) to scale. Maps and cross sections should also depict the site during each phase of mining and at the end of reclamation. The amended reclamation plan includes excellent site maps, plans and cross sections, although minor modifications should be made prior to approval. Any existing and proposed water wells, the fiber optics cable along the railroad, and any other utilities should be shown on the maps and plans.

CCR section 3713(a) requires that drill holes, water wells, and monitoring wells be completed or abandoned in accordance with all applicable laws, unless they are needed for the end use. The reclamation plan indicates that water for the mining operation will be obtained from one or more onsite wells. During the site visit, it was indicated that a water well exists on site, and another well may be drilled. The presence of water wells is inconsistent with stated end use of open space. The wells should be abandoned in accordance with applicable federal, state, and local laws.

Hydrology and Water Quality

(Refer to SMARA sections 2772, 2773, CCR sections 3502, 3503, 3706, 3710, 3712)

CCR Sections 3706 and 3710 require that surface and ground water be protected in accordance with the Porter-Cologne and Clean Water Acts as implemented by the Regional Water Quality Control Board and the State Water Resources Control Board. Regulations approved by the State Water Resources Control Board require that a mine site which discharges storm waters that may have contacted any overburden, raw material, intermediate products, by-products, or waste products on the mine site obtain a general industrial activities storm water permit and submit a Storm Water Pollution Prevention Plan (SWPPP).

The reclamation plan indicates that a SWPPP will be obtained for this operation. The required information, monitoring requirements and water quality standards for the SWPPP can be used to satisfy the erosion control requirements of SMARA if they are incorporated into the reclamation plan. Erosion control measures employed on site should be designed to handle runoff from not less than the 20 year, 1 hour intensity storm event. Evaluation of the effectiveness of the erosion control plan should be done as part of the SMARA annual inspection.

CCR section 3706(b) states that water quality, recharge potential, and storage capacity of ground water aquifers that are the source of water for domestic, agricultural, or other

uses dependent on the water, shall not be diminished, except as allowed by the approved reclamation plan. Although regional ground water studies and some water well data indicate that the ground water should be deeper than 80 feet below the ground surface, available data from some water wells and borings indicate that ground water may be relatively shallow and could be intercepted by the pit. OMR recommends that the reclamation plan include a statement that groundwater will not be intercepted by the quarry operation and include a plan of action if ground water is inadvertently intercepted in the quarry.

CCR Section 3706(e) states that where natural drainages are altered by mining activity, mitigation measures shall be proposed and specifically approved in the reclamation plan to insure that runoff shall not cause increased erosion or sedimentation. The reclamation plan indicates that small ephemeral drainages will be intercepted and cut off by the quarrying operation. A three- to five-foot-high soil berm and interceptor drains will be constructed around the perimeter of the quarry pits. The berm and interceptor drains apparently will remain as part of final reclamation. The drains may need periodic maintenance to function properly. It is unclear if discharge from the ephemeral drainages will be diverted around the quarry or they may be allowed to flow into the quarry if interceptor drains are overloaded during a high-magnitude runoff event. If water from the drainages discharges over the quarry wall, some means to protect the quarry slopes from head-cut gullying will be needed so that erosion does not affect adjacent lands. If discharge from the drainages will be intercepted and diverted around the quarry, the plan should include provisions for diverting this watering. Additionally, the reclamation plan should be modified to clarify the need for the berm and interceptor drains as part of final reclamation.

CCR Section 3706(f)(1) states that when stream diversions are required, they shall be constructed in accordance with the Department of Fish and Game. The plan indicates that Fish and Game will be contacted about a Streambed Alteration Agreement (SAA) that may be needed for the some of the larger ephemeral drainages that traverses the site and will be disrupted by mining, especially the blue line drainage shown on the U.S Geological Survey 7-½ minute quadrangle. Requirements from the SAA, if required, should be incorporated into the reclamation plan. The SAA should be appended to the reclamation plan.

Environmental Setting and Protection of Fish and Wildlife Habitat

(Refer to CCR sections 3502, 3503, 3703, 3704, 3705, 3710, 3713)

Potential adverse effects from the mining operation will be identified and mitigation will be proposed during the environmental review process. Due to the fact that the project is in the early stage of environmental review under CEQA, it is recommended that the reclamation plan not be finalized or approved until mitigation is determined, since mitigation measures recommended under CEQA may substantially change the manner in which mining and reclamation are accomplished.

Resoiling and Revegetation

(Refer to SMARA section 2773, CCR sections 3503, 3704, 3705, 3707, 3711)

According to CCR 3705(a), the vegetative density, cover and species richness of naturally occurring habitats shall be documented in baseline studies carried out *prior to* the initiation of mining activities. This forms the basis for developing *quantitative* performance standards that are proposed in the reclamation plan, as described in CCR 3705(m). The reclamation plan fails to meet these requirements, saying on page 19 that the baseline data will be collected and analyzed at a later date, prior to revegetation. Revegetation performance criteria are given on page 28 as "similar cover, density and composition as nearby undisturbed area". These must be changed to specific numeric values for percent cover, density, and species richness.

OMR recommends setting absolute targets for performance criteria that are not tied to any number of years. In arid ecosystems, it may take longer – up to 10 years - to reach these target values. The shrub layer and the "smaller shrubs, grasses and herbs" layer may be combined to simplify monitoring.

The Joshua trees can remain separate. Since the current density is 3-4 per acre, the density performance criteria could be 2. Note that % survival can be converted to density. If you plant 4 per acre and expect 50% mortality, the result is 2 per acre. No other performance criteria would be necessary for Joshua trees.

Under "Reclamation Monitoring" on page 29, it states that monitoring will be conducted semi-annually for 5 years. OMR recommends that this be revised to provide for *monitoring annually until performance criteria are achieved.*

Example performance criteria to summarize these comments:

Shrubs and forbs:

Percent cover	16% (40% of baseline, if baseline is 40% cover)
Density	12 native perennials per 100 meter transect (just made up as an example)
Species Richness	15 (since there are 23 species in the seed mix, this is 65%)

Joshua trees: Density	2 per acre

Administrative Requirements

(Refer to SMARA sections 2772, 2773, 2774, 2776, 2777, PRC section 21151.7)

Recent legislation (Senate Bill 668, Chapter 869, Statutes of 2006) amended PRC section 2774 with respect to lead agency approvals of reclamation plans, plan amendments, and financial assurances. These new requirements are applicable to this reclamation plan. Once OMR has provided comments on the reclamation plan, a proposed response to the comments listed above must be submitted to the

Department at least 30 days prior to lead agency approval. The proposed response must describe whether you propose to adopt the comments. If you do not propose to adopt the comments, the reason(s) for not doing so must be specified in detail. At least 30 days prior notice must be provided to the Department of the time, place, and date of the hearing at which the reclamation plan is scheduled to be approved. If no hearing is required, then at least 30 days notice must be given to the Department prior to its approval. Finally, within 30 days following approval of the reclamation plan, a final response to these comments must be sent to the Department. Please ensure that the County allows adequate time in the approval process to meet these new SMARA requirements.

If you have any questions on these comments or require any assistance with other mine reclamation issues, please contact me at (916) 324-0744.

Sincerely,

John Wesling, Acting Manager
Reclamation Unit

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

February 25, 2008

Mr. Anthony Curzi, Regional Planning Assistant II
LOS ANGELES COUNTY DEPARTMENT OF REGIONAL PLANNING
320 Temple Street
Los Angeles, CA 90012

Sent by FAX to: 213-626-0434
Number of Pages: 2

Re: Request for a Sacred Lands File records search for the proposed **Big Rock Creek Surface Mine Project Project**; located in Los Angeles County, California

Dear Mr. Curzi:

The Native American Heritage Commission was able to perform a record search of its Sacred Lands File (SLF) for the affected project area. The SLF failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any project area. This project site is in close proximity to previously discovered prehistoric burial sites and is believed to hold numerous cultural resources.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed is the name of the nearest tribes that may have knowledge of cultural resources in the project area. A list of Native American contacts is attached to assist you. It is advisable to contact the persons listed; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area.

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, as defined in Section 15370 of the California Environmental Quality Act (CEQA) when significant cultural resources could be affected by a project. Also, Public Resources Code Section 15064.5(f) and Section 15097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Discussion of these should be included in your environmental documents, as appropriate.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton, Program Analyst

Attachment: Native American Contact List

Native American Contacts
Los Angeles County
February 25, 2008

Charles Cooke
32835 Santiago Road
Acton , CA 93510
(661) 733-1812 - cell
suscol@intox.net

Chumash
Fernandeno
Tataviam
Kitanemuk

Kitanemuk & Yowlumne Tejon Indians
Delia Dominguez
981 N. Virginia
Covina , CA 91722
(626) 339-6785

Yowlumne
Kitanemuk

Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand Oaks , CA 91362
805 492-7255

Chumash
Tataviam
Fernandeño

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838
Newhall , CA 91322
tsen2u@msn.com
(661) 753-9833 Office
(760) 885-0955 Cell
(760) 949-1604 Fax

Fernandeño
Tataviam
Serrano
Vanyume
Kitanemuk

Fernandeno Tataviam Band of Mission Indians
Randy Guzman-Folkes, Cultural/Environ Depart
601 South Brand Boulevard, Suite 102
San Fernando , CA 91340
ced@tataviam.org
(818) 837-0794 Office
(805) 501-5279 Cell
(818) 837-0796 Fax

Fernandeno
Tataviam

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th Street, Rm. 403
Los Angeles , CA 90020
(213) 351-5324
(213) 386-3995 FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American with regard to cultural resources for the proposed Big Rock Creek Rock Surface Mining Project (CEQA SCH#2007121054) located in Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

DEPARTMENT OF CONSERVATION

OFFICE OF MINE RECLAMATION

801 K STREET • MS 09-06 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 323-9198 • FAX 916 / 445-6066 • TDD 916 / 324-2555 • WEB SITE conservation.ca.gov

RECEIVED MAR 24 2008

March 21, 2008

Mr. Anthony Curzi
Impact Analysis Section
Department of Regional Planning
County of Los Angeles
320 West Temple Street
Los Angeles, CA 90012

Dear Mr. Curzi:

FINANCIAL ASSURANCE COST ESTIMATE FOR BIG ROCK CREEK MINE (CA MINE #91-19-0021), COUNTY OF LOS ANGELES

The Office of Mine Reclamation (OMR) received a financial assurance cost estimate (cost estimate) in the amount of $240,984 for the Big Rock Creek mine on February 7, 2008. This mine is operated by Calmat Company. The County of Los Angeles is the Surface Mining and Reclamation Act (SMARA) lead agency for this surface mining operation. The lead agency submitted this cost estimate pursuant to Public Resources Code (PRC) Section 2774. That section provides that the Department of Conservation has 45 days from receipt of the cost estimate to prepare written comments. The purpose of this letter is to provide comments pursuant to PRC Section 2774.

OMR Review and Comments

OMR has reviewed the annual submittal and found the methodology used in preparing the cost estimate appears appropriate. The Department has no further comments on the adequacy of the cost estimate at this time.

While OMR has no further comments on the adequacy of the cost estimate amount in its entirety, OMR notes the cost estimate contains insufficient details. Some of the unit costs have equipment costs and labor costs combined into a single cost. The cost estimate should specify the equipment type and rates, and labor categories and rates used to determine these unit costs. Please provide this detail in the next annual revision of this cost estimate.

Status of Financial Assurance

Review of OMR records indicates the current financial assurance on file for this mine is $53,529. This is significantly lower than the current cost estimate of $240,984. When the lead agency receives an updated financial assurance, please forward a copy to OMR within 30 days at the address below.

Department of Conservation
Attn: Roger Le-Hinds
Office of Mine Reclamation
801 K Street, MS 09-06
Sacramento, CA 95814-3529

If you have any questions, I can be reached at arthur.reed@conservation.ca.gov or at (916) 327-0798.

Sincerely,

Arthur Reed, M.S.
Engineering Geologist
Compliance Section

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294

(323) 890-4330

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

RECEIVED
APR 7 2008

March 25, 2008

Mr. Anthony Curzi
Department of Regional Planning
Impact Analysis Section
320 West Temple Street
Los Angeles, CA 90012

Dear Mr. Curzi:

NOTICE OF PREPARATION, NOTICE OF PREPARATION, LEBATA, INC. SURFACE MINE PROJECT, BIG ROCK CREEK, PROJECT NUMBER R2007-00670 (ANTELOPE VALLEY), (FFER #200700282)

The Notice of Preparation has been reviewed by the Planning Division, Land Development Unit, and Forestry Division of the County of Los Angeles Fire Department. The following are their comments:

LAND DEVELOPMENT UNIT:

1. The development of this project must comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows and fire hydrants. These issues will be addressed during the building and fire plan check phase.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

1. The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation,

fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts in these areas should be addressed in the final Environmental Impact Report.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

JOHN R. TODD, CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

JRT:lj

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

DEAN D. EFSTATHIOU, Acting Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

April 3, 2008

IN REPLY PLEASE REFER TO FILE: LD-1

TO: Mark Child, AICP
Zoning Permits I Section
Department of Regional Planning

Attention James Bell

FROM: Steve Burger
Land Development Division

SURFACE MINING (RSM) AND RECLAMATION REVIEW AND COMMENT
LEBATA, INC.
RSM NO. 200700001
PROJECT NO. R2007-00670
AVENUE T, UNINCORPORATED ANTELOPE VALLEY

☐ Public Works recommends approval of this CUP.

☒ Public Works does **NOT** recommend approval of this CUP.

We reviewed the proposed surface mining and reclamation plan to conduct aggregate surface mining. The project consists of onsite ready-mix concrete plant, asphalt concrete plant, raw transfer station and distribution facility (railroad load-out area), office trailer, two-bay equipment maintenance shop, 63 trucks parking spaces, 6 standard parking spaces, and 1 handicapped space. The development is located in the unincorporated Palmdale area near Avenue T and 136th Street East. Approximately 80 percent of the materials will be directed to the Greater Los Angeles Area and approximately 20 percent of the materials will be directed to the San Bernardino and Riverside Counties.

Prior to Department of Regional Planning approval of the site plan, the following items need to be addressed, submitted, or shown on the revised site plan:

A. Geotechnical Engineering

The geotechnical engineer should address the depth and extent of soils subject to hydroconsolidation and recommend mitigation in areas of proposed construction, as applicable. For questions regarding geotechnical issues, please contact Mark A. Steuer at (626) 458-4972

B. Drainage

1. Submit two (2) revised sets of the drainage concept, and the *hydrologic model input/output file(s) on disk* (if applicable) for further consideration. Additional changes maybe required as determined by further review.

2. The submitted Drainage Concept/ Hydrology / SUSMP is unsatisfactory. Note the reasons stated herein or shown on returned map:

   a. The reclamation plans must be prepared in a reasonable scale to show all required drainage devices.

   b. All drainage devices must be designed to provide self cleaning velocities.

   c. Hydraulic calculations must be submitted to support proposed drainage system.

   d. Depth of accumulated runoff at the bottom of the pit must be shown on the plan.

   e. The proposed berm must be engineered and detailed with supporting calculations to withstand the erosion and scouring.

   f. Detailed hydrology study must be submitted showing the tributary area, preoperation hydrology and conditions, and post reclamation plans hydrology and conditions. Such information must be shown on maps and plans.

   g. Proposed grading and drainage of the facility areas must be included in the study and plans.

   h. Soil/Geotechnical recommendation must be incorporated in the submitted plans and report for the operation, mining phases, and reclamation plans.

   i. All sheets of the set of plans must be signed by the civil/soil/geotechnical engineer.

   j. Show and call out on plans all overexcavation requirements as required by the soil/geotechnical report.

k. Address required mitigations for portions of the project site that are located within FEMA Flood Zone A.

l. Provide a flood hazard analysis for the existing watercourse.

m. Provide a copy of the hydrologic map and model. Map must show subarea breakups for on-site and off-site tributary areas.

n. Allowable percolation rate for ΔQ basins in the Antelope Valley is 1" per day. The basin should be sized to drain completely in 7 days.

o. Address potential vector concerns from inundated mine pits.

p. Address debris potential to the mine pits. Provide further discussion for impacts on infiltration rates and loss of storage due to debris accumulation in mine pits.

q. Provide calculations for debris production in accordance with Public Works debris criteria.

r. Address the impacts to downstream properties, if any, from retaining the entire tributary flows from the Capital Storm.

s. The hydrology study and reclamation plans must be prepared and detailed properly for our review and comments.

t. More comments to follow upon receiving the mentioned requirements.

For questions regarding the drainage requirements above, contact Nazem Said at (626) 458-4921.

C. California Environmental Quality Act (CEQA)

Comply with all mitigation requirements and/or address all issues from the CEQA document dated February 12, 2008. For questions regarding CEQA requirements, contact Conal McNamara at (626) 458-4921.

D. Right of Way and Road Improvement Requirements

1. The proposed mining project and reclamation plan is neither consistent nor compatible with the County Highway Plan, specifically with the proposed southerly extension of Longview Road as a major highway. Dedicate right of way consistent with the rural highway section along Longview Road 54-feet from centerline (per CSB-2568-2) from Avenue T to Avenue U. Additional right of way is/may be required for a grade separation at the Southern Pacific Railroad crossing. Submit a design concept for the grade separation.

2. The development may impact the proposed Avenue P-8 corridor, please discuss with Caltrans whether right of way dedication is required.

3. An approved traffic study is required. The traffic study shall include an analysis of the impact to the pavement caused by the additional truck traffic from the project. The traffic study shall be submitted directly to Public Works for review and approval and a review fee is also required. Based on the approved traffic study, a revised site plan and/or conceptual striping plan may be required. For additional information, please contact Jeff Pletyak at (626) 300-4867 of our Traffic and Lighting Division.

4. Address road improvement drainage issues in the drainage concept and/or hydrology.

5. Revise the site plan to show the following:

   a. Dedicate or offer right of way and show all proposed improvements as indicated in Conditions 2.1 to 2.6 below. Provide typical sections for all streets showing existing/proposed improvements and right of way.

   b. Revise grading footprints to accommodate proposed right of way and street improvements.

   c. Resubmit a detailed site plan for review and approval.

For questions regarding right of way and road improvement requirements above, contact Andy Narag at (626) 458-4921.

Upon approval of the site plan, we recommend the following conditions:

1. Drainage

   1.1. Submit a drainage concept/Standard Urban Stormwater Mitigation Plan to Public Works for review and approval and comply with all mitigation requirements from the approved drainage concept if any.

   For questions regarding the drainage requirements above, contact Nazem Said at (626) 458-4921.

2. Right of way and Road Improvement Requirements

   2.1. Dedicate right of way 54-feet from centerline along Longview Road per CSB 2568-2 or latest Interdepartmental Engineering Committee approved alignment to the satisfaction of Public Works. Also dedicate or offer additional right of way for a grade separation over the Southern Pacific Railroad as well as any additional slope, drainage, and maintenance easements to the satisfaction of Public Works. Contact Thu Truong from our Mapping and Property Management Division, Engineering Section for requirements and procedures at (626) 458-7106 regarding any dedication or offer of right of way. In order to avoid delays in the issuance of permits or occupancy, the applicant should initiate this process as soon as possible.

   2.2. Dedicate right of way 54-feet from centerline along Avenue T to the satisfaction of Public Works.

   2.3. Make an offer of future right of way 32 feet from the centerline along the property frontage on 136th Street and Avenue U to the satisfaction of Public Works.

   2.4. Make an offer of future right of way for a cul-de-sac bulb on Avenue T-4 and Avenue T-10 to the satisfaction of Public Works.

   2.5. Make an offer of future right of way for corner cut off at the intersections of Avenue T and 136th Street East; at Avenue T and Longview Road; and at Longview Road and Avenue U to the satisfaction of Public Works.

   2.6. If applicable, dedicate or offer variable width right of way for the proposed Avenue P-8 corridor freeway/expressway (90-feet to 150 feet from centerline) to the satisfaction of Caltrans and Public Works. Additional right of way may be required for any proposed grade separation.

2.7. Whenever there is an offer of a future street or a private and future street, provide slope and drainage easements to the satisfaction of Public Works.

2.8. Whenever there is an offer of a future street or a private and future street, provide a drainage statement/letter.

2.9. Submit detailed signing and striping plan to the satisfaction of Public Works.

2.10. Construct left-turn pocket and transition pavement along Avenue T at the project entrance to the satisfaction of Public Works.

2.11. Construct street improvements commensurate with our major highway rural section along the frontage of Avenue T and along Longview Road.

2.12. Provide drainage solutions and construct drainage improvements as applicable per the approved drainage concept and/or hydrology to the satisfaction of Public Works.

2.13. Construct transition pavement commensurate with the approved signing and striping plan.

2.14. On site grading shall be compatible with all future streets and dedicated streets.

2.15. Comply with any additional requirements, if any, as a means of mitigating any traffic impacts as identified in the traffic study approved by Public Works.

For questions regarding the street requirements above, contact Andy Narag at (626) 458-4921.

If you have any other questions or require additional information, please contact Simin Agahi at (626) 458-4910.

SA:ca
P:/LDPUB/SUBMGT/CUP/ Backup of Project R2007-00670 RSM 2007-00001_Lebata Surface Mining Avenue T.DOC

cc: Department of Regional Planning (Paul McCarthy, Anthony Curzi)

Revised Format Initial Study Checklist

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Environmental Checklist Form (Initial Study)

County of Los Angeles, Department of Regional Planning

Project Title: Big Rock Creek Surface Mining Project / Project Number R2007-00670 / Cases RENV200700053 and RSM20071J000l

Lead Agency Name and Address: Los Angeles County
Department of Regional Planning
320 West Temple Street,
Los Angeles, CA 90012

Contact Person and Phone Number: Anthony Curzi (213) 974-6461 acurzi@planning.lacounty.gov

Project Sponsor's Name and Address: Lebata, Inc.
4621 Teller Avenue Suite 130
Newport Beach, CA 92660

Project Location: On and immediately south of Avenue T and is bound by 136th Street East to the east and Avenue U to the south, with 126th Street East lying further to the west.

APN: 3039-021-009, 3039-036-001 and 3039-036-002 *USGS Quad*: Littlerock

Gross Acreage: 310.06 acres

General Plan Designation: Non-Urban and Agricultural, Mineral Resource Area

Community/Areawide Plan Designation: Non-Urban (Antelope Valley Areawide General Plan)

Zoning: APNs 3039-021-009 and 3039-036-002 are zoned A-2-5. APN 3039-036-001 is zoned A-2-1. None of the parcels are located within a Community Services District.

Description of Project: The applicant, Lebata, Inc. (Lebata), is proposing to establish and operate new sand and gravel mining facilities (Project) in the Antelope Valley area of unincorporated Los Angeles County, California. The Project involves mining a total of 46.48 million gross tons of sand and gravel over a period of approximately 47 years. The total Project area is comprised of approximately 310 acres, of which approximately 282.4 acres are proposed for excavation. The Project would extract aggregate from newly created pits in three distinct phases (Mining Phases). Although production would vary with market conditions, the extraction rate of unprocessed material over the life of the Project is expected to range between 1,000,000 to 2,500,000 tons per year. Annual sales would not exceed 2,000,000 tons per year. The Project would include the following major components:

- Aggregate Surface Mining and Processing Facilities;
- Ready-Mixed Concrete Plant;
- Vac-Lite Plant (producing lightweight concrete);
- Asphalt Mixing Plant;
- Raw Cement and Aggregate Transfer and Distribution Facility;

- 24-foot by 60-foot office trailer (handicapped accessible); and
- 80-foot by 125-foot two-story building, which would include an equipment maintenance shop area, parts room, office, locker room, and restrooms (handicapped accessible).

Phase I consists of the excavation of the north pit. The south pit will be excavated during Phase 2 and Phase 3 consists of the relocation of the processing and distribution facilities to the excavated Phase I area, followed by the excavation of the southern portion of parcel 3039-021-009.

The mining site will be reclaimed in accordance with the Surface Mining and Reclamation Act. Two 80-foot deep post-operation depressions will remain. Reclamation measures include; the distribution of banked Project site topsoil, revegetation with native species and temporary irrigation.

Surrounding Land Uses and Setting: The Project site is currently in an undeveloped condition and is located in a relatively remote and undisturbed area of the Antelope Valley. The property is bisected by an existing Union Pacific railroad track and is surrounded by vacant undeveloped properties on the north, west and south sides. Properties along the eastern boundary are mostly undeveloped, although there are a few residences, outbuildings and well houses. The nearest residence is immediately south of the railroad tracks, approximately 200 feet east of the Project's eastern boundary of the South Parcel. The Project site is relatively flat and vegetated with native Mojave Creosote Bush Scrub.

Other public agencies whose approval may be required (e.g., permits, financing approval, or participation agreement):

Public Agency	***Approval Required***
Antelope Valley Air Quality Management District	Permit to Construct Permits to Operate (PTO)
Lahontan Regional Water Quality Control Board	NPDES Permit (General) Spill Prevention, Control, and Countermeasure Plan Storm Water Pollution Prevention Plan Clean Water Act Section 401 Certification
California Dept. of Conservation, Division of Mines and Geology, Office of Mine Reclamation	Review of Surface Mining and Reclamation Plan Review of Financial Assurance Plan
California Dept. of Fish and Game	Section 1605 (long-term) Streambed Alteration Agreement
Co. of LA, Dept. of Health Services	Business Plan Hazardous Materials Inventory Above-Ground Storage Tank (diesel) Hazardous Materials Handler Permit
Co. of LA, Fire Dept., Fire Prevention Division	Welding Permit Hazardous Materials Storage and Use
Co. of LA, Dept. of Public Works	Drainage Concept Approval
Co. of LA, Dept. of Transportation	Encroachment Permit

Major Projects in the Area: There are no projects located in the immediate vicinity of the Project site.

Project/Case No.	*Description and Status*

Reviewing Agencies:

Responsible Agencies

- ☐ None
- Regional Water Quality Control Board:
  - ☐ Los Angeles Region
  - ☒ Lahontan Region
- ☐ Coastal Commission
- ☐ Army Corps of Engineers

Special Reviewing Agencies

- ☒ None
- ☐ Santa Monica Mountains Conservancy
- ☐ National Parks
- ☐ National Forest
- ☐ Edwards Air Force Base
- ☐ Resource Conservation District of Santa Monica Mountains Area
- ☐

Regional Significance

- ☐ None
- ☐ SCAG Criteria
- ☒ Air Quality
- ☐ Water Resources
- ☐ Santa Monica Mtns. Area
- ☐

Trustee Agencies

- ☐ None
- ☒ State Dept. of Fish and Game
- ☐ State Dept. of Parks and Recreation
- ☐ State Lands Commission
- ☐ University of California (Natural Land and Water Reserves System)
- ☒ State Dept. of Conservation, Office of Mine Reclamation
- ☒ State Dept. of Conservation, State Mining & Geology Board
- ☒ Native American Heritage Commission

County Reviewing Agencies

- ☒ DPW:
  - Geotechnical & Materials Engineering Division
  - Watershed Management Division (NPDES)
  - Traffic and Lighting Division
- ☒ Fire Department
  - Forestry, Environmental Division
  - Health Hazmat
- ☐ Sanitation District
- ☒ Public Health/Environmental Health Division: Bureau of Toxicology and Environmental Assessment (Environmental Hygiene Program)
- ☐ Sheriff Department
- ☐ Parks and Recreation
- ☐ Subdivision Committee
- ☒ Antelope Valley Air Quality Management District

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project.

■ Aesthetics	■ Greenhouse Gas Emissions	Population/Housing
Agriculture/Forest	■ Hazards/Hazardous Materials	Public Services
■ Air Quality	■ Hydrology/Water Quality	Recreation
■ Biological Resources	Land Use/Planning	■ Transportation/Traffic
Cultural Resources	Mineral Resources	Utilities/Services
Energy	■ Noise	Mandatory Findings of Significance
■ Geology/Soils		

DETERMINATION: (To be completed by the Lead Department.)
On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____
Signature (Prepared by) Date

_____ _____
Signature (Approved by) Date

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources the Lead Department cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the Lead Department has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level. (Mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced.)

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA processes, an effect has been adequately analyzed in an earlier EIR or negative declaration. (State CEQA Guidelines § 15063(c)(3)(D).) In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of, and adequately analyzed in, an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures, which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

7) The explanation of each issue should identify: the significance threshold, if any, used to evaluate each question, and; mitigation measures identified, if any, to reduce the impact to less than significance. Sources of thresholds include the County General Plan, other County planning documents, and County ordinances. Some thresholds are unique to geographical locations.

8) Climate Change Impacts: When determining whether a project's impacts are significant, the analysis should consider, when relevant, the effects of future climate change on : 1) worsening hazardous conditions that pose risks to the project's inhabitants and structures (e.g., floods and wildfires), and 2) worsening the project's impacts on the environment (e.g., impacts on special status species and public health).

1. AESTHETICS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Be visible from or obstruct views from a regional riding or hiking trail?	☐	☐	☒	☐
c) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
d) Substantially degrade the existing visual character or quality of the site and its surroundings because of height, bulk, pattern, scale, character, or other features?	☒	☐	☐	☐

The surrounding property is vacant except for two residences located west of the Project site. The nearest residence is immediately south of the railroad tracks, approximately 200 feet east of the Project's eastern boundary of the South Parcel. Mining activities will leave two 80-foot deep depressions. Project facilities will be visible within the immediate area.

e) Create a new source of substantial shadows, light, or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

2. AGRICULTURE / FOREST

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
The Project site is designated "Other Land".				
b) Conflict with existing zoning for agricultural use, with a designated Agricultural Opportunity Area, or with a Williamson Act contract?	☐	☐	☒	☐
Although the Project site is zoned Heavy Agriculture. it is not designated as prime. unique or important farmland by the Farmland Mapping and Monitoring Program of the California Resources Agency.				
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code § 12220 (g)), timberland (as defined in Public Resources Code § 4526), or timberland zoned Timberland Production (as defined in Government Code § 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

Mining activities will leave two 80-foot deep depressions. Although the Project site is zoned Heavy Agriculture. it is not designated as prime, unique or important farm land by the Farmland Mapping and Monitoring Program of the California Resources Agency.

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Conflict with or obstruct implementation of applicable air quality plans of either the South Coast AQMD (SCAQMD) or the Antelope Valley AQMD (AVAQMD)?	☒	☐	☐	☐

Studies prepared for the Project will be reviewed and AVAQMD will provide determination.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐

Studies prepared for the Project will be reviewed and AVAQMD will provide determination.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐

Studies prepared for the Project will be reviewed and AVAQMD will provide determination.

d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐

The few nearby residences may be exposed to Project-related fugitive dust and emissions. The nearest residence is immediately south of the railroad tracks, approximately 200 feet east of the Project's eastern boundary of the South Parcel.

e) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐

Mining activities may generate fugitive dust and will generate emissions.

4. BIOLOGICAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or U.S. Fish and Wildlife Service (USFWS)?	☒	☐	☐	☐

Desert Tortoise, Mohave Ground Squirrel and Burrowing Owl. Source: Desert Tortoise & Burrowing Owl Surveys - 0310812007 and West Coast Environmental & Engineering Project Description - 02-20-2007.

b) Have a substantial adverse effect on any sensitive natural communities (e.g., riparian habitat, coastal sage scrub, oak woodlands, non-jurisdictional wetlands) identified in local or regional plans, policies, regulations or by CDFG or USFWS?	☒	☐	☐	☐

The Project site is vegetated with native Mojave Creosote Bush Scrub. Mining activities will remove natural habitat.

c) Have a substantial adverse effect on federally or state protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, and drainages) or waters of the United States, as defined by § 404 of the federal Clean Water Act or California Fish & Game code § 1600, et seq. through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐

A blue line drainage course is located on the Project site.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐

The Project site is habitat for thirty animal species.

e) Convert oak woodlands (as defined by the state, oak woodlands are oak stands with greater than 10% canopy cover with oaks at least 5 inch in diameter	☒	☐	☐	☐

measured at 4.5 feet above mean natural grade) or otherwise contain oak or other unique native trees (junipers, Joshuas, southern California black walnut, etc.)?

The Project site is populated with a number of Joshua trees.

f) Conflict with any local policies or ordinances protecting biological resources, including Wildflower Reserve Areas (L.A. County Code, Title 12, Ch. 12.36), the Los Angeles County Oak Tree Ordinance (L.A. County Code, Title 22, Ch. 22.56, Part 16), the Significant Ecological Areas (SEAs) (L.A. County Code, Title 22, § 22.56.215), and Sensitive Environmental Resource Areas (SERAs) (L.A. County Code, Title 22, Ch. 22.44, Part 6)?	☐	☐	☐	☒
g) Conflict with the provisions of an adopted state, regional, or local habitat conservation plan?	☐	☐	☐	☒

5. CULTURAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines § 15064.5?	☐	☐	☐	☒
Source: California Historical Resources Inventory.				
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5?	☐	☐	☒	☐
The records search indicated that no archaeological or historical resources have been documented in the vicinity of the project area and established a low probability of cultural resources in the project area. Source: Greenwood and Associates, Phase 1 report - page 9.				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or contain rock formations indicating potential paleontological resources?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

6. ENERGY

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Conflict with Los Angeles County Green Building Ordinance (L.A. County Code Title 22, Ch. 22.52, Part 20 and Title 21, § 21.24.440) or Drought Tolerant Landscaping Ordinance (L.A. County Code, Title 21, § 21.24.430 and Title 22, Ch. 22.52, Part 21)?	☐	☐	☐	☒
b) Involve the inefficient use of energy resources (see Appendix F of the CEQA Guidelines)?	☐	☐	☒	☐

7. GEOLOGY AND SOILS

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known active fault trace? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
Source: Division of Mines and Geology Special Publication 42.				
ii) Strong seismic ground shaking?	☐	☐	☒	☐
Source: The California Geological Survey.				
iii) Seismic-related ground failure, including liquefaction and lateral spreading?	☐	☐	☒	☐
The Project site is not located in a liquefaction zone. Sources: General Plan Plate 3 & California Department of Conservation Division of Mines and Geology.				
iv) Landslides?	☐	☐	☒	☐
The Project site is not located in a landslide zone. Source: The California Geological Survey.				
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
Topsoil could be lost in that 48,674,200 tons of excavated aggregate is proposed. The Reclamation Plan includes measures requiring the banking of topsoil for use in site reclamation and revegetation.				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
The Project site is not located in a liquefaction zone. Sources: General Plan Plate 3 & California Department of Conservation Division of Mines and Geology. The Project site is not located in a landslide				

zone. Source: The California Geological Survey. However, there is the potential for onsite landslides as a result of excavation. As such, the Project will be subject to implementation of a DPW-approved Drainage Concept, which is designed to maintain slope stability. The EIR should include additional analysis to determine whether slope stability related mitigation measures are needed beyond those developed as part of the DPW-approved Drainage Concept.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of onsite wastewater treatment systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Use of an onsite wastewater treatment system is not proposed.

f) Conflict with the Hillside Management Area Ordinance (L.A. County Code, Title 22, § 22.56.215) or hillside design standards in the County General Plan Conservation and Open Space Element?	☐	☐	☐	☒

8. GREENHOUSE GAS EMISSIONS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Generate greenhouse gas (GHGs) emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐

Studies prepared for the Project will be reviewed and AVAQMD will provide determination.

b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

Studies prepared for the Project will be reviewed and AVAQMD will provide determination.

9. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Create a significant hazard to the public or the environment through the routine transport, storage, production, use, or disposal of hazardous materials?	☒	☐	☐	☐

A wide variety of chemicals, commonly used for this type of project, will be used. Included are: Calcium nitrate, Solvent dewaxed residual oil, Calcium oxide, Triethanolamine, Hydrochloric acid, Sodium hydroxide, Sulfuric acid lead, Naphthalene, Acetylene, Motor oil (Petroleum distillates, hydrotreated heavy paraffinic), Petroleum lubricating oil, Sodium nitrate, Oxygen, Calcium chloride, Calcium compounds, Copolymer mixture, Carbon dioxide argon, Nitrogen, Calcium nitrate, Carbon black, Industrial oil (Petroleum distillates, hydrotreated light paraffinic), Ethylene glycol, Dimethylmethane, Polyacrylamide (polymer)and Hydrocarbon.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials or waste into the environment?	☒	☐	☐	☐

Improper storage and handling of hazardous materials could result in the accidental release of hazardous materials into the environment. The Project will be required to obtain approval, and properly implement the provisions, of a Spill Prevention, Control, and Countermeasure Plan.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of sensitive land uses?	☐	☐	☐	☒

_____

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒

The Project site is not listed in the Department of Toxic Substances Control EnviroStor Database. No evidence of recognized environmental conditions or historical environmental conditions, which are likely to impact the subject property was found. Source: Phase I Environmental Site Assessment; 05/11/07; page 15.

e) For a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for	☐	☐	☐	☒

people residing or working in the project area?

_____

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒

_____

g) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

The Project site is served by Fire Station 79, which is located approximately 2.4 miles away and by the Palmdale Sheriff station, which is located approximately 15 miles away. The Project site is served by the Antelope Valley CHP office, which is located in Lancaster.

h) Expose people or structures to a significant risk of loss, injury or death involving fires, because the project is located:

i) within a Very High Fire Hazard Severity Zones (Zone 4)?	☐	☐	☐	☒

Source: Los Angeles County Fire Department.

ii) within a high fire hazard area with inadequate access?	☐	☐	☐	☒

_____

iii) within an area with inadequate water and pressure to meet fire flow standards?	☐	☐	☒	☐

Water will be provided onsite and fire flow standards will be met.

iv) within proximity to land uses that have the potential for dangerous fire hazard?	☐	☐	☐	☒

_____

i) Does the proposed use constitute a potentially dangerous fire hazard?	☐	☐	☐	☒

_____

10. HYDROLOGY AND WATER QUALITY

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐

The Project will be required to obtain approval, and properly implement the provisions, of a Storm Water Pollution Prevention Plan.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☒	☐	☐	☐

The Project site has an onsite well, but no history of onsite groundwater use has been found. Currently there is ongoing groundwater adjudication in the court-determined Antelope Valley Area of Adjudication (AVAA), which includes the area of the proposed Project. It is expected the adjudication will not be resolved for some time and, as yet, there has been no adjudicated groundwater yield or allocation of groundwater rights.

Once allocations of groundwater rights are made, it is likely that any project seeking to extract groundwater in excess of its allocation, will be considered to have a significant impact upon groundwater quantities. Until such time, the proposed Project must be considered to have a potentially significant impact, even though County thresholds of significance have yet to be developed.

A Water Supply Assessment is not required. However, the Applicant, has decided to prepare a Water Supply Assessment to demonstrate that future water supplies are available to meet the proposed water demands of the proposed Project.

An analysis is needed to evaluate the Project effects upon pre-existing nearby wells.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☒	☐	☐

The mining pits and installed drainage systems would alter the existing drainage pattern of the site. Berms and down drains will be constructed. The Project will be subject to implementation of a DPW-approved Drainage Concept. The Project will be required to obtain approval, and properly implement the provisions, of a Storm Water Pollution Prevention Plan and a Spill Prevention, Control, and Countermeasure Plan.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☒	☐	☐	☐

The northeast portion of the Project site is located in FEMA Flood Zone A, which has a one percent chance of flooding annually. Source: Federal Emergency Management Agency. The Project will be subject to implementation of a DPW-approved Drainage Concept.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐

Improper storage and handling of hazardous materials could result in the accidental release of hazardous materials into the environment. (Refer to Section 9. Hazards and Hazardous Materials above.) The Project will be required to obtain approval, and properly implement the provisions, of a Spill Prevention, Control, and Countermeasure Plan. The Project will be subject to implementation of a DPW-approved Drainage Concept.

f) Generate construction or post-construction runoff that would violate applicable stormwater NPDES permits or otherwise significantly affect surface water or groundwater quality?	☒	☐	☐	☐

Two 80-foot depressions will remain after mining activities, which have a potential use as storm water catch basins. The Project will be subject to implementation of a DPW-approved Drainage Concept.

g) Conflict with the Los Angeles County Low Impact Development Ordinance (L.A. County Code, Title 12, Ch. 12.84 and Title 22, Ch. 22.52)?	☐	☐	☐	☒

h) Result in point or nonpoint source pollutant discharges into State Water Resources Control Board-designated Areas of Special Biological Significance?	☐	☐	☐	☒

i) Use onsite wastewater treatment systems in areas with known geological limitations (e.g. high groundwater) or in close proximity to surface water (including, but not limited to, streams, lakes, and drainage course)?	☐	☐	☐	☒

Portable sanitation facilities will be used.

j) Otherwise substantially degrade water quality?	☒	☐	☐	☐

Mining activities could degrade the quality of the groundwater. Improper storage and handling of hazardous materials could result in the accidental release of hazardous materials into the environment. (Refer to Section 9. Hazards and Hazardous Materials above.) The Project will be required to obtain approval, and properly implement the provisions, of a Spill Prevention, Control, and Countermeasure Plan.

k) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, or within a floodway or floodplain?	☐	☐	☐	☒
l) Place structures, which would impede or redirect flood flows, within a 100-year flood hazard area, floodway, or floodplain?	☐	☐	☐	☒
m) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
n) Place structures in areas subject to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

11. LAND USE AND PLANNING

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Physically divide an established community?	☐	☐	☐	☒
b) Be inconsistent with the applicable County plans for the subject property including, but not limited to, the General Plan, specific plans, local coastal plans, area plans, and community/neighborhood plans?	☐	☐	☐	☒

Uses appropriate for remote locations are suitable for Non-residential uses in non-urban areas.

c) Be inconsistent with the County zoning ordinance as applicable to the subject property?	☐	☐	☐	☒

Surface mining is allowed in the Heavy Agriculture zone as a "use subject to permit."

d) Conflict with Hillside Management criteria, Significant Ecological Areas conformance criteria, or other applicable land use criteria?	☐	☐	☐	☒

12. MINERAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐

48,674,200 tons of aggregate will be recovered by the Project.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

A Mineral Recovery Zone, which is indicated by a point feature on the General Plan Special Management Areas map, is located 1.91 miles southwest of the Project site.

13. NOISE

Would the project result in:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Exposure of persons to, or generation of, noise levels in excess of standards established in the County General Plan or noise ordinance (Los Angeles County Code, Title 12, Chapter 12.08), or applicable standards of other agencies?	☒	☐	☐	☐
Mining equipment and truck engines may increase the ambient noise level of the area.				
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
No blasting would occur.				
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from parking areas?	☒	☐	☐	☐
Mining equipment and truck engines may increase the ambient noise level of the area.				
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from amplified sound systems?	☒	☐	☐	☐
Mining equipment and truck engines may increase the ambient noise level of the area.				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

14. POPULATION AND HOUSING

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, especially affordable housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
d) Cumulatively exceed official regional or local population projections?	☐	☐	☐	☒

15. PUBLIC SERVICES

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Would the project create capacity or service level problems, or result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐

The Project site is served by Fire Station 79, which is located approximately 2.4 miles away.

Sheriff protection?	☐	☐	☒	☐

The Project site is served by the Palmdale Sheriff station, which is located approximately 15 miles away. The Project site is served by the Antelope Valley CHP office, which is located in Lancaster.

Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Libraries?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

16. RECREATION

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include neighborhood and regional parks or other recreational facilities or require the construction or expansion of such facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒
c) Would the project interfere with regional open space connectivity?	☐	☐	☐	☒

17. TRANSPORTATION/TRAFFIC

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program (CMP), including, but not limited to, level of service standards and travel demand measures, or other standards established by the CMP for designated roads or highways?	☒	☐	☐	☐

At the intersections of 106th Street East/Avenue T and 106th Street East/Pearblossom Highway, 69 trips will be generated during the AM and PM peak hours. The LOS at the intersections will not diminish with the project. Source: Traffic Impact Analysis March 2007.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐

The Project will generate 862 trips daily. Trucks leaving and arriving at the Project site could cause result in hazardous traffic conditions on Avenue T. Source: Traffic Impact Analysis - March 2007.

e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

18. UTILITIES AND SERVICE SYSTEMS

Would the project:	*Potentially Significant Impact*	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Exceed wastewater treatment requirements of either the Los Angeles or Lahontan Regional Water Quality Control Boards?	☐	☐	☐	☒
b) Create water or wastewater system capacity problems, or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Create drainage system capacity problems, or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☒	☐	☐

The Project will be subject to implementation of a DPW-approved Drainage Concept. (Refer to Section 10. Hydrology and Water Quality above.)

d) Have sufficient reliable water supplies available to serve the project demands from existing entitlements and resources, considering existing and projected water demands from other land uses?	☒	☐	☐	☐

The Project site has an onsite well, but no history of onsite groundwater use has been found. Currently there is ongoing groundwater adjudication in the court-determined Antelope Valley Area of Adjudication (AVAA), which includes the area of the proposed Project. It is expected the adjudication will not be resolved for some time and, as yet, there has been no adjudicated groundwater yield or allocation of groundwater rights.

Once allocations of groundwater rights are made, it is likely that any project seeking to extract groundwater in excess of its allocation, will be considered to have a significant impact upon groundwater quantities. Until such time, the proposed Project must be considered to have a potentially significant impact, even though County thresholds of significance have yet to be developed.

A Water Supply Assessment is not required. However, the Applicant, has decided to prepare a Water Supply Assessment to demonstrate that future water supplies are available to meet the water demands of the proposed Project.

(This topic should be addressed within the context of Section 10. Hydrology and Water Quality.)

An analysis is needed to evaluate the Project effects upon pre-existing nearby wells.

e) Create energy utility (electricity, natural gas, propane) system capacity problems, or result in the construction of new energy facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

19. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
Effects upon sensitive species and loss of wildlife habitat.				
b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?	☐	☐	☒	☐
c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
Groundwater quantity.				
d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Hazardous materials, geotechnical, flooding, noise, air quality, water quality, water supply/quantity, traffic and visual.

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 2

Reclamation Plan

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SESPE
CONSULTING, INC.

468 Poli Street, Suite 2E • Ventura, California 93001

Reclamation Plan

Big Rock Creek
Aggregate Surface Mine and Processing Facilities
Lebata, Inc.

Antelope Valley, California

October 14, 2013

Prepared for:
Lebata, Inc.
c/o McGee & Associates
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Reclamation Plan
Big Rock Creek

Aggregate Surface Mine and Processing Facilities
Lebata, Inc.

Antelope Valley, California

October 14, 2013

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- Figure 11 Mining Phase 2 – South Pit (refer to EIR Figure 10)
- Figure 12 Mining Phase 3a – North Pit (refer to EIR Figure 11)
- Figure 13 Mining Phase 3a – South Pit (refer to EIR Figure 12)
- Figure 14 Mining Phase 3b – North Pit (refer to EIR Figure 13)
- Figure 15 Final Reclamation – North Pit (refer to EIR Figure 14)
- Figure 16 Final Reclamation – South Pit (refer to EIR Figure 15)

Attachment B Policy of Title Insurance
Attachment C Statement of Responsibility
Attachment D Draft Financial Assurance Cost Estimate
Attachment E Streambed Alteration Agreement (pending)

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BIG ROCK CREEK

Aggregate Surface Mine and Processing Facility
Ready-Mixed Concrete Plant
Vac-Lite Plant
Asphalt Mixing Plant
Cement Transfer and Aggregate Distribution Facility

Reclamation Plan

October 14, 2012

Note: Recent legislation (Senate Bill 668, Chapter 869, Statutes of 2006) amended PRC Section 2774 with respect to lead agency approvals of reclamation plans, plan amendments, and financial assurances. These new requirements are applicable to this Reclamation Plan. Once the Department of Conservation - Office of Mine Reclamation (OMR) has provided comments on the Reclamation Plan, a proposed response to the comments must be submitted to the OMR at least 30 days prior to lead agency approval. The proposed response must describe whether, or not, OMR comments have been adopted. If not, the reason(s) for not doing so must be specified in detail. At least 30 days prior notice must be provided to the OMR of the time, place, and date of the hearing at which the Reclamation Plan is scheduled to be approved. If no hearing is required, then at least 30 days notice must be given to the OMR prior to its approval. Finally, within 30 days following approval of the Reclamation Plan, a final response to these comments must be sent to the OMR. The County needs to ensure there is adequate time in the approval process to meet these new SMARA requirements.

This version of the Reclamation Plan is to be considered a draft that will be reviewed during the review of the Draft Environmental Impact Report (EIR), in which this Reclamation Plan appears as Appendix 2. This Reclamation Plan will be revised in response to the comments received. It may also be revised in response to County adopted Condition of Approval and/or Mitigation Measures, during the approval process. Lastly, some aspects of this Reclamation Plan will be further revised in response to new information developed through the implementation of Mitigation Measures and as part of the development of the Streambed Alteration Agreement.

Because this Reclamation Plan is not yet a stand-alone document, all references to figures below are to the figures contained in the EIR. Prior to its approval, the Reclamation Plan will be revised to include all listed figures, as they may have been revised and/or developed, and resubmitted to the OMR for review and comment.

1.0 INTRODUCTION

This Reclamation Plan addresses the operation and reclamation of the proposed Big Rock Creek surface mining project (Project), including aggregate processing facilities, Ready-Mixed concrete plant, Vac-Lite plant, asphalt mixing plant, cement transfer and aggregate distribution facility and reclamation of the

site. This Reclamation Plan is designed to ensure compliance with the 14 CCR § 3700-3713 Reclamation Standards of the Surface Mining and Reclamation Act of 1975, as amended (SMARA) and the County of Los Angeles Zoning Code Part 9, Surface Mining Permits, Section 22.56.

1.1 Description of the Project

Lebata, Inc. (Lebata), is proposing to establish and operate a new sand and gravel mining operation (Project) in the Antelope Valley area of unincorporated Los Angeles County, California (refer to Attachment A, Figure 1 – Regional Map) (refer to EIR Figure 1). The Project involves mining a total of 46.48 million gross tons of sand and gravel over a period of approximately 47 years. The total Project area is comprised of approximately 310 acres, of which approximately 282.4 acres are proposed for excavation. The Project will extract aggregate from newly-created pits in three distinct phases (Mining Phases). Although production will vary with market economies, the extraction rate of unprocessed material over the life of the Project is expected to range between 500,000 and 2,500,000 tons per year. Sales will not exceed 2,000,000 tons of processed material per year. The Project will include the following major components:

- Aggregate Processing Facilities;
- Ready-Mixed Concrete Plant;
- Vac-Lite Plant (producing lightweight concrete);
- Asphalt Mixing Plant;
- Water Reclamation and Fines Recovery Facilities;
- 24-foot by 60-foot office trailer (handicapped accessible);
- 80-foot by 125-foot two-story building, which will include an equipment maintenance shop area, parts room, office, locker room, and restrooms; and
- Raw Cement and Aggregate Transfer and Distribution Facility.

The Project site is located in the Antelope Valley, off Avenue T, in an unincorporated area of Los Angeles County. The Project area involves two separate undeveloped parcels, referred to herein as the North and South Parcels, which are bisected by the Union Pacific Railroad (refer to Attachment A, Figure 2 – Vicinity Map [refer to EIR Figure 2]).

1.2 Purpose and Intent

In preparing this Reclamation Plan, it is the intent of the operator to ensure that adverse environmental effects are prevented or minimized and that the mined land is reclaimed to a natural condition. This Reclamation Plan was also prepared to provide the County of Los Angeles and reviewing agencies with general information and specific data regarding the proposed mine site. Studies, analyses and reports are included to describe the conditions of the project site prior to the commencement of excavation activities. This Reclamation Plan provides guidelines for the surface mining and concurrent reclamation of the various Mining Phases.

Based upon the information provided by various experts, the proposed mining operation was designed to avoid or minimize potentially significant adverse environmental impacts, and to return the site to a usable condition which is readily adaptable to alternative land uses.

1.3 Review Procedures

Part 9 of the Los Angeles County's Planning and Zoning Ordinance lists surface mining operations among the uses subject to permits within the A-2 zone. Uses authorized by a surface mining permit include the following specific uses:

> *The stockpiling of rock, sand and gravel and other minerals, including the installation, maintenance or operation of rock-crashing plants and batching plants or mixing plants for either Portland cement or asphalt, except where specifically prohibited as a condition of the permit.*

The Project requires County of Los Angeles approval of a Conditional Use Permit (CUP), Surface Mining Permit, Reclamation Plan and Financial Assurance Cost Estimate. Also required by the County are the submittal of a Zoning and Subdivision Application and the completion of the County's Initial Study Questionnaire.

The CUP approval is needed to provide the land use entitlement required by the County of Los Angeles Zoning Code (Section 22.56 Part 1). The Surface Mining Permit, Reclamation Plan and Financial Assurance Cost Estimate approvals are required to ensure compliance with the:

- California Surface Mining and Reclamation Act (SMARA) of 1975, as amended (Public Resources Code Section 2719 et. seq.);
- California Code of Regulations (CCR), Title 14, Division 2, Chapter 8, Subchapter 1, Article 9; and
- County of Los Angeles Zoning Code, Section 22.56 Part 9.

Additionally, the Reclamation Plan and Financial Assurance Cost Estimate must be reviewed and approved by the California Department of Conservation, Office of Mine Reclamation, pursuant to the requirements of SMARA.

2.0 PROJECT DETAILS

2.1 Operator, Owner, Representative and Lead Agency Information

Mine Name	Big Rock Creek
California Mine ID Number	Not yet assigned
Operator	Lebata, Inc. c/o McGee & Associates 23 Corporate Plaza, Suite 230 Newport Beach, CA 92660 (949) 640-0500 (949) 640-4015 fax Contact Person: Mr. James F. McGee
Property Owner and Owner of Mineral Rights	Lebata, Inc. 4621 Teller Avenue, Suite 130 Newport Beach, CA 92660
Representative	SESPE Consulting, Inc. 468 Poli Street, Suite 2E Ventura, CA 93001 (805) 275-1515 (805) 667-8104 fax Contact Person: Mr. John Hecht
Lead Agency Information	County of Los Angeles Department of Regional Planning 320 West Temple Street Los Angeles, CA 90012 (213) 974-6461 (213) 626-0434 fax

2.2 Project Location

The Project site is located in the Antelope Valley, off Avenue T, in unincorporated Los Angeles County, east of the City of Palmdale, near the community of Pearblossom. The Project site is located immediately south of Avenue T and is bound by 136th Street East to the east, Avenue U to the south, and 126th Street East to the west. The Project is shown on the Littlerock USGS 7.5 Minute Topographic Quadrangle (refer to Attachment A, Figure 3 – Site Plan) (refer to EIR Figure 3). Refer to Attachment B – Policy of Title Insurance for a legal description of the Project site.

Section: 11
Township: 5 North
Range: 10 West
Baseline: San Bernardino
Meridian: San Bernardino

Schedule C of the Policy of Title Insurance, issued on January 30, 2006 by First American Title Insurance Company (Order Number: LPA-2137043) provides the following legal description:

The land referred to in this policy is described as follows:

Real property in the unincorporated area of the County of Los Angeles, State of California, described as follows:

THE EAST HALF OF SECTION 11, TOWNSHIP 5 NORTH, RANGE 10 WEST, SAN BERNARDINO BASE AND MERIDIAN, ACCORDING TO THE OFFICIAL PLAT OF SAID LAND APPROVED BY THE SURVEYOR GENERAL MARCH 19, 1856.

EXCEPT A STRIP OF LAND 100.00 FEET WIDE, CONVEYED TO SOUTHERN PACIFIC COMPANY BY GRANT DEED RECORDED MAY 2, 1958 AS INSTRUMENT NO. 1550 IN BOOK D-89 PAGE 249 OF OFFICIAL RECORDS.

ALSO EXCEPT AN UNDIVIDED ONE-HALF INTEREST IN AND TO ALL THE OIL, GAS, AND OTHER HYDROCARBONS AND MINERALS NOW OR AT ANY TIME HEREAFTER SITUATED UPON, WITHIN OR UNDERLYING SAID LAND OR PRODUCIBLE THEREFROM PROVIDED, HOWEVER THAT THIS RESERVATION SHALL NOT BE CONSIDERED AS PERMITTING THE GRANTOR TO LEASE SAID LAND FOR OIL, GAS OR MINERAL EXPLORATION OR DEVELOPMENT WITHOUT SUCH LEASE BEING JOINED IN BY THE GRANTEE, HIS HEIRS OR ASSIGNS, AS RESERVED BY HELEN HOUSTON, A SINGLE WOMAN, IN DEED RECORDED SEPTEMBER 28, 1955 IN BOOK 49074 PAGE 133 OF OFFICIAL RECORDS.

BY A QUITCLAIM DEED RECORDED AUGUST 28, 1970 AS INSTRUMENT NO. 894, HELEN HOUSTON RELEASED THE RIGHT OF ENTRY TO A DEPTH OF 200 FEET BENEATH THE SURFACE OF SAID LAND FOR THE PURPOSE OF DEVELOPING AND EXPLORING FOR OIL, GAS AND OTHER HYDROCARBONS AND MINERALS NOW OR AT ANY TIME HEREAFTER SITUATED THEREON.

APN: 3039-021-009 and 3039-036-001 and 3039-021-002

2.3 Assessor Parcel Map Numbers, General Plan and Zoning

Assessor's Parcels are noted in Table 1, which provides the size of the parcels as determined by a survey as well as the size listed in the Assessor's Book, the County of Los Angeles General Plan Designation, Antelope Valley Area Plan Designation, and Zoning. Refer to Attachment A, Figures 4 and 5 – Assessor's Parcel Maps 1 and 2 (refer to EIR Figures 4 and 5).

Table 1 Assessor's Parcel Numbers, General Plan and Zoning

APN	APN Acres	Surveyed Acres	County of Los Angeles General Plan Designation	Antelope Valley Area Plan Designation	Zoning
3039-021-009	140.17	136.10	Non-Urban and Agricultural Mineral Resource Area	Non-Urban	A-2-5
3039-036-001	10.79	14.27	Non-Urban and Agricultural Mineral Resource Area	Non-Urban	A-2-1
3039-036-002	160.00	159.10	Non-Urban and Agricultural Mineral Resource Area	Non-Urban	A-2-5

As noted above in Table 1, the County of Los Angeles designates the Project area as "Non-Urban and Agricultural Mineral Resource Area" in the Land Use Element of the County General Plan and "Non-Urban" on the Antelope Valley Area Plan. APNs 3039-021-009 and 3039-036-002 are currently zoned "A-2-5" (Heavy Agriculture, 5-acre minimum) and APN 3039-036-001 is zoned "A-2-1" (Heavy Agriculture, 1-acre minimum).

2.4 Size of Project Area

The total Project area is comprised of approximately 310 acres, of which approximately 282 acres are proposed for excavation. Within the Project area, approximately 30 acres will be occupied by the Aggregate Processing Facilities, Ready-Mixed and Asphalt Mixing Plants, and accessory structures. In addition, approximately 9 acres will be used by the Raw Cement and Aggregate Transfer and Distribution Facility. Refer to Attachment A, Figure 6 – Facilities Site Plan (refer to EIR Figure 6).

2.5 Site Access

The Project is accessible from Avenue T in the Antelope Valley. Approximately 80 percent of the truck traffic will be directed from Avenue T west to 106th Street East south toward State Route 138 (Pearblossom Highway), to State Route 14 and onto Interstate 5 towards the greater Los Angeles area. The remaining 20 percent will travel east on Avenue T to 165th Street East south to State Route 138, and east toward the San Bernardino and Riverside area. Refer to Attachment A, Figure 7 – Aerial Site Plan (refer to EIR Figure 7).

2.6 Maximum Anticipated Depth

SMARA Section 2772(c) requires:

> *The reclamation plan shall include all of the following information and documents:*
>
> *(4) The maximum anticipated depth of the surface mining operation.*

The maximum anticipated depth of surface mining is 80 feet below ground surface with final slopes no

steeper than 2:1 horizontal:vertical overall. The final elevations are expressed in terms of elevation above mean sea level (MSL). Given the southeast-to-northwest down gradient of the finished mining pits, final mining elevations will range from approximately 2,900 to 2,830 feet above MSL in the mining pit north of the railroad tracks and from 2,920 to 2,870 feet above MSL in the mining pit south of the railroad tracks.

However, it is likely that wash fines and a portion of the processed sand will not be sold and will be placed back into the excavated area. A portion of this material will be blended with other material needed to reconstruct the road prism underlying the Longview Road Extension, if required, to DPW standards.

2.7 Dates of Initiation and Termination

SMARA Section 2772(c) requires:

> *The reclamation plan shall include all of the following information and documents:*
>
> *(3) The proposed dates for the initiation and termination of surface mining operation.*

The operator has requested a 50-year permit from the County of Los Angeles, a term that will commence upon approval by the final decision-making body. Assuming that approval is made December 1, 2012, mining will commence upon completion of any preliminary permit requirements and mining activities will cease no later than November 30, 2062. Reclamation activities, although concurrent with mining activities, may continue beyond that date as will the necessary monitoring to ensure reclamation performance standards described below in Section 5.2 are achieved.

2.8 End Use

Disturbed areas will be reclaimed reclaim to an end use of open space or preparation for use as groundwater recharge and/or stormwater retention basins.

3.0 PROJECT SETTING

The Project site is currently in an undeveloped condition and is located in a relatively remote and undisturbed area of the Antelope Valley. The property is bisected by an existing Union Pacific railroad track and is surrounded by vacant undeveloped properties on the north, west and south sides. Properties along the eastern boundary are mostly undeveloped, although there are a few residences, outbuildings and well houses. The nearest residence is immediately south of the railroad tracks, approximately 200 feet east of the Project's eastern boundary of the South Parcel.

The Antelope Valley is approximately 3,000 square miles in size and is located within a transitional area between the foothills of the San Gabriel and Sierra Pelona Mountains on the south and the Mojave Desert to the north and east. The valley is separated on the northwest from the San Joaquin Valley by the Tehachapi Mountains. On the south and southwest, it is separated from the Los Angeles Basin by the San Gabriel Mountains. The north and east boundaries of the Antelope Valley are distinguished by isolated buttes.

The Project is located on an alluvial fan associated with the Big Rock Creek Wash, within the southwestern portion of the Mojave Desert Geomorphic Province. The Mojave Desert is bounded on the southwest by the San Andreas Fault and the Transverse Ranges and on the northeast by the Garlock fault. The Mojave Desert is an ancient feature formed in response to the inception of movement on the San Andreas and Garlock faults. The region is characterized by broad alluviated basins that are burying the previously mountainous topography.

3.1 Geologic Setting

The *Report of Geotechnical/Geologic Study* was prepared by Hilltop Geotechnical Inc. (EIR Appendix 5). This Report describes how the project site is situated near the southwest margin of the Mojave Desert Geomorphic Province, one of 11 provinces recognized in California. The Mojave Desert Geomorphic Province is a distinctive geological and physiographic region encompassing much of southeastern California, extending from the Tehachapi Mountains on the west to an arbitrary boundary at the Colorado River on the east. The southern edge of the province abuts the east-west trending Transverse Ranges (combined San Gabriel, San Bernardino, Little San Bernardino and Eagle Mountains), while the northern boundary is generally recognized to be the Garlock fault zone. Characteristic landforms of the province include relatively narrow, elongated ranges separated by wider, intervening valleys.

The Province contains a diverse array of rock types. Mesozoic-age igneous intrusive granitic rocks are predominant in the western and southern portions of the province, and are widely observed in the remainder. Quaternary and Holocene extrusive igneous rocks and volcanic formations may be observed throughout this province, though they are most common in the southern and western portions. Parts of the central and northern portions of the province include thick sequences of meta-volcanic rocks as well as a number of Paleozoic-age, sedimentary formations that can be correlated to similar formational units in Arizona and Nevada. Tertiary and Quaternary-age alluvial and lacustrine sediments fill basins and occasionally form low hills. The sediments often host economically significant deposits of gravel, clay, and evaporites including salts and borates. Limited areas of the Mojave Province contain large active aeolian deposits, generally in the form of large, shifting sand dunes.

The area surrounding the subject property is underlain by a thick sequence of Quaternary and older alluvial sediments resulting from weathering, erosion, transport, and subsequent deposition of materials

from the San Gabriel Mountains, located to the south of the Project area. Source rocks within nearby mountains include Mesozoic-age granitic igneous rocks and various metamorphic rock formations.

3.2 Soils

The Project site lies on a broad bajada extending north from the lower slopes of the San Gabriel Mountains. Elevations at the site range from approximately 870 to 896 meters (2,850 to 2,940 feet) above MSL (Mean Sea Level) and topography slopes downward from the southeast toward the northwest. Soils on the site have been mapped by the Natural Resources Conservation Service (NRCS) as Arizo gravelly, loamy sand with 0 to 5 percent slopes, and Arizo loamy, fine sand with 0 to 2 percent slopes. Soil on the Project site was observed to be sand with gravel and scattered rocks and boulders. The Project site includes braided tributaries that are historically associated with Big Rock Wash, which lies approximately 2.5 miles to the east.

3.3 Land Use Setting

Land uses in the Project area consist primarily of undeveloped lands, with widely scattered residential units and intermittent agricultural, mining, and industrial uses. Adjacent land to the north, south, northeast, and west consists of smaller parcels, largely of undeveloped open space vegetated with desert scrub. There are four (4) single-family residences within 1,000 feet of the Project's eastern-most boundary. Land use on the Project site consists of undeveloped native habitat with some disturbance associated with on-site unimproved roads and trash dumping. The nearest residence is immediately south of the railroad tracks, approximately 200 feet east of the Project's eastern boundary. A Union Pacific Railroad line traverses the center of the Project site from east to west. Refer to Attachment A, Figure 7 – Aerial Site Plan for an aerial photograph of the Project site and surrounding area (refer to EIR Figure 7). The Los Angeles County affiliated Jackrabbit Flats Wildlife Sanctuary occurs approximately one mile west of the Project site on Avenue T.

3.4 Biologic Assessment and Special-Status Plant Survey Report

The 2013 review of the CNDDB and CNPS databases (Littlerock USGS 7.5 Minute Topographic Quadrangle), as well as the *Biological Assessment* (EIR Appendix 13) and *Sensitive Plant Survey Report* and *Addendum* (EIR Appendix 14 and Addendum), identified 24 special-status plant species that have been recorded in the vicinity of the Project site:

- *Abronia villosa* var. *aurita* (chaparral sand-verbena)
- *Arctostaphylos glandulosa* ssp. *gabrielensis* (San Gabriel manzanita)
- *Astragalus lentiginosus* var. *antonius* (San Antonio milk-vetch)
- *Astragalus preusii* var. *laxiflorus* (Lancaster milk-vetch)
- *Calochortus palmeri* var. *palmeri* (Palmer's mariposa-lily)
- *Calochortus striatus* (alkali mariposa lily),
- *Calystegia peirsonii* (Peirson's morning-glory)
- *Canbya candida* (white pygmy-poppy)
- *Castilleja gleasoni* (Mount Gleason Indian paintbrush)
- *Chorizanthe parryi* var. *parryi* (Parry's spineflower)
- *Clarkia xantiana* ssp. *parviflora* (Kern Canyon clarkia)
- *Layia heterotricha* (pale-yellow layia)
- *Lilium parryi* (lemon lily)
- *Linanthus concinnus* (San Gabriel linanthus)

- *Loeflingia squarrosa* var. *artemisiarum* (sagebrush loeflingia)
- *Lupinus peirsonii* (Peirson's lupine)
- *Muhlenbergia californica* (California muhly)
- *Muilla coronata* (crowned muilla)
- *Nemacladus secundiflorus* var. *robbinsii* (Robbins' nemacladus)
- *Opuntia basilaris* var. *brachyclada* (short-joint beavertail cactus)
- Oreonana vestita (woolly mountain-parsley)
- *Orobanche valida* ssp. *valida* (Rock Creek broomrape)
- *Plagiobothrys parishii* (Parish's popcorn-flower)
- *Symphyotrichum (Aster) greatae* (Greata's aster)

The *Biological Assessment* concludes there is no potential for these species to occur onsite, with one exception, the short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*), a CNPS list 1B.2 plant species. This was the only special-status plant species found onsite. The CNPS is an authority recognized by the California Department of Fish and Game (CDFG) on the status of rare or threatened plant species in California, and the criteria for placement on List 1 or List 2 of the CNPS lists is similar to criteria that CDFG and the U.S. Fish and Wildlife Service (USFWS) use for species considered as candidates for listing as Threatened or Endangered. Short-joint beavertail was observed in two locations on the Project site. (Refer to EIR Figure 39 – Vegetation Communities.)

Subsequent to the surveys conducted for the *Biological Assessment,* the Project site experienced an unusually wet winter, which provided an opportunity to conduct a floristic survey of the Project site. ECORP Consulting, Inc. (ECORP) was contracted to conduct a literature review and focused survey on the site for the presence or absence of listed and/or sensitive plant species. This survey was intended to supplement the information contained in the *Biological Assessment* prepared by Pacific Southwest Biological Services, Inc. Prior to conducting the focused survey, the literature review was conducted in order to identify the potential for occurrence of plant species based on the habitat types present on the Project site, which resulted in an expanded list of 20 potential species. The Project site is dominated by creosote bush scrub that is interspersed with smaller patches of rubber rabbitbrush scrub and some disturbed areas. Based on the results of the literature review, one species considered rare in California and nineteen other special-status plant species were identified during the literature search as potentially occurring in the vicinity of the site. Based on the habitats present on the Project site, it was determined that suitable habitat was present on the site for six of the plant species. In April 2008, ECORP's botanists conducted a sensitive plant survey in the Project area and documented the findings in the *Sensitive Plant Survey Report* (EIR Appendix 14). In July 2010, ECORP's botanists conducted a variety of database searches to determine if any new sensitive plant species occurrences had been reported in the vicinity of the Project site. No new sensitive plant species occurrences were reported in any of the databases. The results of these searches are documented the findings in the *Sensitive Plant Survey Report Addendum* (EIR Appendix 14, Addendum).

The primary findings in the *Biological Assessment*, *and Sensitive Plant Survey Report*, and *Sensitive Plant Survey Report Addendum* are summarized below.

3.4.1 Special-Status California Desert Native Plants

Joshua trees (*Yucca brevifolia*) are neither listed nor are they candidate species for either state or federal programs. They are, however, considered sensitive California Desert Native Plants and are

protected by the California Desert Native Plants Act of 1981. During the April 27, 2007 site visit with CDFG personnel (Scott Harris and Jamie Jackson), it was observed that the population of Joshua trees onsite was sparse and not representative of a Joshua tree community. The *Biological Assessment* prepared by Impact Sciences, Inc. noted that roughly 200 individuals of this species were observed.

The CDFG recognizes habitat with Joshua trees as sensitive, due to the presence of Joshua trees, which are considered a biologically and aesthetically valuable, as well as declining, plant species. The value of Joshua trees as important biological and aesthetic resources is recognized by many desert communities, including the nearby City of Palmdale, which states that protection of desert vegetation, particularly Joshua trees, is important to retain the unique natural desert aesthetics of the area. In addition, Joshua trees are known to provide habitat for a variety of desert wildlife species, including desert woodrat (*Neotoma lepida*), ladder-backed woodpecker (*Picoides scalaris*), Scott's oriole (*Icterus parisorum*), night snake (*Hypsiglena torquata*), desert night lizard (*Xantusia vigilis*), and yucca moth (*Tegeticula maculata*). Joshua trees, which are endemic to the Mojave Desert, face a population decline, due largely to habitat loss.

3.4.2 Special-Status Plant Species

The field surveys conducted for the Project consisted of:

- Walking the entire Project site including a 100-ft buffer and transects spaced 10 meters apart;
- Characterizing plant communities present on site;
- Recording and/or later identifying observed species using taxonomic keys;
- Taking GPS coordinates of any sensitive plant species observed on site;
- Taking digital site reference photographs throughout the Project site; and
- Recording weather data during surveys, including time, temperature, and wind speed for each day surveys were conducted.

Only two special-status plant species were observed during the focused surveys conducted in April 2008. Individual beavertail cactus plants with some characteristics of the sensitive variety (*Opuntia basilaris* var. *brachyclada*) were recorded at numerous locations on site. In addition, crowned muilla (*Muilla coronata*), which was not identified as being previously reported in the area, was also found during the survey of the Project area. EIR Figure 40 shows the locations of beavertail cactus and the crowned muilla that were found in the Project area.

The majority of species previously documented in the vicinity of the site are presumed absent based on the lack of suitable habitat and/or non-detection during the focused surveys.

EIR **Mitigation Measure BIO-4** prescribes the measures to be implemented to avoid the accidental take of sensitive native plants.

No state- or federally-listed plant species were observed during focused surveys of the Project area.

3.4.3 Special-Status Wildlife Species

The following sensitive wildlife species are known to occur in the general vicinity of the Project site, although no evidence of these species has been noted within the Project boundaries.

Desert Tortoise (*Gopherus agassizii*) – The Desert Tortoise a federally Threatened and a California Threatened species. This species likely historically occurred on the Project site, but has not been reported in the Project vicinity for many years. Current isolation of the site (due to railroad tracks, roads and human disturbances) from known populations of the tortoise makes it unlikely that this species will re-colonize the site. A protocol desert tortoise presence/absence survey was conducted in February 2006. The survey resulted in negative findings for the species or any sign of the species. According to the report presenting the findings of the survey (Pacific Southwest Biological Services, Inc.'s March 2006 report, titled *Longview Road, Pearblossom Area, Los Angeles County, California Desert Tortoise Presence/Absence Survey, and Burrowing Owl Survey Phase I (Habitat Assessment) and Phase II (Burrow Survey*) (EIR Appendix 12), "the probability of recolonization of the area by this species is nonexistent." However, during an April 2007 field meeting with CDFG representatives on the Project site, it was indicated that future desert tortoise protocol surveys on the site may be appropriate to ensure that individuals of the species do not move back onto the site prior to Project implementation.

EIR **Mitigation Measure BIO-1** prescribes the measures to be implemented to avoid the accidental take of desert tortoises.

Mohave Ground Squirrel (Xero*speromophilus mohavensis*) – There is the potential for this species to occur on site. State listed as Threatened, this species has been reported from 21 locations in the Project area. Although not sighted in the vicinity of the Project site in recent years, the Mohave ground squirrel may have historically occurred on the Project site. Because suitable habitat occurs on the project site, this species cannot be ruled out.

EIR **Mitigation Measure BIO-2** prescribes the protocol survey, avoidance and minimization efforts to be implemented to avoid the accidental take of Mohave ground squirrels.

Burrowing Owl (*Athene cunicularia*) – This species is a USFWS Bird of Conservation Concern and a California Species of Special Concern and a Bird of Conservation Concern. Surveys for burrowing owl were conducted on the site in February 2006. The surveys resulted in negative findings for the species or sign of the species on the Project site. However, an individual of this species was observed exiting a burrow on a property adjacent to the site, approximately 400 feet to the west. Small mammal burrows were observed scattered throughout the Project site, and suitable burrows sites were observed on the Project site, both in small mammal burrows and dumped trash/soil piles. Therefore, the potential for this species to utilize the Project site both for burrowing and foraging is high, and individuals of this species could move onto the Project site prior to implementation of future proposed surface mining activities. This species has the potential to burrow/nest on the Project site or within 500 feet of the site.

EIR **Mitigation Measure BIO-3** prescribes the measures to be implemented to avoid the accidental take of native nesting birds.

Coast (San Diego) Horned Lizard (*Phrynosoma blainvillii* population) – This is a California Species of Special Concern. This species has been reported to the CDFG from 14 locations in the Project vicinity. Onsite friable soils, especially within drainage channels, provide potentially suitable habitat. The main food source for this species, harvester ants, was observed onsite.

EIR **BIO Condition 1** prescribes that a qualified biological monitor should be present onsite during the clearing of vegetation from each mining phase to identify and relocate sensitive wildlife species that are encountered.

Le Conte's Thrasher (*Toxostoma lecontei*) – This species is a USFWS Bird of Conservation Concern and a California Species of Special Concern and a Bird of Conservation Concern. This species could occur within onsite scrub habitat. This species has the potential to burrow/nest on the Project site or within 300 feet of the site.

EIR **Mitigation Measure BIO-3** prescribes the measures to be implemented to avoid the accidental take of native nesting birds.

Southern Grasshopper Mouse (*Onychomys Torridus ramona*) – This is a California Species of Special Concern. This species has been reported from a location approximately six miles to the east of the Project site. Onsite scrub with friable soils provides suitable habitat.

EIR **BIO Condition 1** prescribes that a qualified biological monitor be present should onsite during the clearing of vegetation from each mining phase to identify and relocate sensitive wildlife species that are encountered.

American Badger (*Taxidea taxus*) – This is a California Species of Special Concern. Onsite scrub habitat with friable soils provides suitable habitat.

EIR **BIO Condition 1** prescribes that a qualified biological monitor should be present onsite during the clearing of vegetation from each mining phase to identify and relocate sensitive wildlife species that are encountered.

3.5 Groundwater Setting

The Antelope Valley Groundwater Basin (the Basin) is currently non-adjudicated, although a legal adjudication process has been underway since the late-1990s. It is anticipated that water rights will be quantified and assigned as part of the Basin adjudication process. Lawsuits were filed against various Antelope Valley water districts and government agencies seeking priority water rights to water beneath their farmland. Several property owners and public water suppliers, including Waterworks District No. 40, also initiated legal proceedings, including a cross complaint, to determine the respective rights of existing and potential users of groundwater in the Basin. The lawsuits were filed separately in Riverside, Kern, and Los Angeles County Superior Courts and were transferred and consolidated into one coordinated proceeding currently before the Honorable Jack Komar who is presiding by special assignment.

The underlying dispute revolves around the priority/superior right to pump groundwater and the protection of the Basin. The parties have asserted multiple claims to be adjudicated, including claims for declaratory relief, prescriptive rights, quiet title to water rights, and claims that portions of the Basin should be treated as a separate area for management purposes if a physical solution for the Basin is established, among other claims. The resolution of many of these claims is likely to be affected by the nature and extent of the hydrologic connectivity of water within various portions of the aquifer.

Lebata proposes to drill an onsite water well and annually extract approximately 312 acre-feet of water to meet Project needs, if so allocated through the Basin adjudication process. However, in light of the Basin adjudication process described in EIR sub-chapter 4.12.2.4, the need for an alternative source of water became evident. It is likely the Basin adjudication will result in future limitations being placed upon existing groundwater users, and those proposing new or increased levels of groundwater extraction. The details of such an allocation process are as yet unknown and the process may take years

to resolve. There and alternative sources have been identified. Refer to 4.3.4 for a discussion of the Proposed and Alternative Water Sources.

3.5.1 Local Water Wells

State and County databases indicate there are active water wells located within approximately two miles of the Project. The location of these water wells is shown in Attachment A, Figure 8 – Local Water Wells (refer to EIR Figure 16) and summarized in Table 2.

Table 2 Local Water Wells

Well Name	Lowest Groundwater Depth from Surface (feet)	Highest Groundwater Depth from Surface (feet)	Measurement Period	Last Reported Depth from Surface (feet/year)
05N10W03L001S	107.9	85.6	1961 – 1998	85.6 in 1999
05N10W10E001S	140.0	90.0	1960 – 1964	120.9 in 1964
05N10W10E002S	175.0	100.0	1960 – 1965	138.8 in 1965
05N10W12M002S	77.8	55.4	1982 – 1999	59.4 in 1999

Bulletin 118 notes the following regarding groundwater recharge:

> *Recharge to the basin is primarily accomplished by perennial runoff from the surrounding mountains and hills. Most recharge occurs at the foot of the mountains and hills by percolation through the head of alluvial fan systems. The Big Rock and Little Rock Creeks, in the southern part of the basin, contribute about 80 percent of runoff into the basin (Durbin 1978). Other minor recharge is from return of irrigation water and septic system effluent (Duell 1987).*

The Project has been specifically designed as a dry surface mining operation with a maximum depth of 80 feet BGS. Although Table 2 indicates groundwater levels in a nearby well at 55.4 feet BGS, Fugro West, Inc. (Fugro) prepared a *Pit Slope Stability Evaluation* (EIR Appendix 4), which indicated otherwise. During this evaluation, Fugro drilled two sampling holes on August 15, 2006. The first of these wells (DH-1) encountered a static water depth at about 70 feet, while the second well (DH-2) did not encounter static water depth at its termination depth of 80 feet BGS. Therefore, it is believed that groundwater is considerably deeper than the 55.4 feet reported in 1985 for Well 05N10W12M002S.

To ensure groundwater is protected, surface mining operations will be curtailed at a final mining depth of 80 feet bgs, or at a depth that is 5 feet above static groundwater levels, should groundwater be encountered. Within the first few years of Project operations, the static groundwater level will have been determined and the final mining depth defined accordingly at 5 feet above that level.

In advance of Mining Phase 3a and 3b excavations, late in the life of the Project, the Processing Facilities Site will be relocated within the North Pit. Phase 1 mining will excavate the North Pit to a depth of 80 feet bgs, unless static groundwater level has been determined to be shallower. Prior to placement of the Processing Facilities Site into the North Pit, a pad of refill material will be constructed to a depth of 50 feet bgs. Placement of the Processing Facilities Site on the resulting pad will ensure they are kept above Capital Flood inundation levels within the North Pit.
The *Drawdown Assessment of Proposed Water Supply Well* (EIR Appendix 19) concludes the impact of a potential 312 afy water supply well located at the Project site will be relatively minor. Only a handful of nearby wells would see a measurable impact in water level, and the drawdown is not considered to be

sufficient to effect capacity of these wells to supply water. When taking into consideration the background water level fluctuations (several tens of feet), it is unlikely that the impact on nearby wells would be discernible from background variations.

Refer to 4.3.4 for a discussion of the Proposed and Alternative Water Sources.

3.6 Surface Water Setting

Permanent surface water is not present in the Project area. Intermittent surface runoff, however, may occur after major precipitation events. Storms of small magnitude do not result in significant runoff and quickly percolate to groundwater. Larger storms however, can produce surface runoff sufficient to warrant the installation of culvert systems under a variety of transportation facilities and bridges over some of the larger washes.

The Union Pacific Railroad tracks bisecting the Project, include a 10- to 12-foot high railroad embankment that runs nearly perpendicular to the direction of surface runoff. To accommodate surface runoff, several Corrugated Metal Pipe (CMP) culverts pass under the railroad embankment. Three culverts would convey flows from upstream of the railroad (south), which would then continue downstream and into the north parcel of the mine site. Two culverts are located inside the Project boundary. Surface flows conveyed through the culverts would initially concentrate then dissipate by flowing through the area downstream of the railroad as sheetflow. The area does not exhibit well-defined channels.

To address LACDPW comments, the *Drainage Concept* (EIR Appendix 3) was developed to ensure the mine pits would intercept the entire discharge of the Capital Flood via a system of interceptor-drains, which would be located along the top of the pits to collect sheetflow and braid flow and deliver these flows to the down-drains, which convey the flow down the averaged 2h:1v side slope to the bottom of the mine pit. The locations of down drains are generally at the downstream point of the sub-watersheds. Additional down drains are provided along the drainage terrace to capture the runoff generated by the pit slope to prevent soil erosion in accordance with the County's Grading Guidelines (January 2008).

Note: The method and system components for capturing and conveying offsite runoff into the mine pits is similar to that adopted by the adjacent Vulcan Materials Company (VMC) mine, which was previously approved by the Los Angeles County Department of Public Works (LACDPW).

Two down-drains would also be placed to handle the culvert flows from the existing culverts through the rail road embankment, which are within the boundaries of the Project site (CMP 17 and CMP 18). Because the railroad culvert flows would pass through the location of the Raw Cement and Aggregate Transfer and Distribution Facility, it is proposed to convey these flows in below-ground culverts through the facility for discharge into the North Pit. This is considered more practical than diverting flows around the facility. These culverts would convey flows only during Phase 1 mining. During and after Phase 2 mining, the railroad CMPs would become defunct as all flows that previously conveyed by these culverts in Mining Phase 1 would instead be captured by the South Pit. Erosion protection will be provided on the pit floor at the outlet of the down-drains illustrated in Attachment A - Figures 16 and 17 (refer to EIR Figures 14 and 15).

The mining pits would be aligned slightly obliquely to the general fall of the land. The high point of the site is at the southeastern corner. Hence drainage structures would only be required on the southern

and eastern sides of the mining pits to capture the offsite Capital Flood flows. Onsite runoff generated in the Processing Facilities Site in the North Pit during Mining Phase 1 would be collected by a catch basin at the northwest corner on the North Pit and drained into the bottom of the North Pit by an underground 18-inch steel pipe. This is illustrated in EIR Figure 24 (Capital Flood Inundation – Mining Phase 1 North Pit) in EIR sub-chapter 4.4.7.2.1.

Note: Since completion of the *Drainage Concept* (EIR Appendix 3), Caltrans completed improvements to Pearblossom Highway that serve to reduce flood flows reaching the Project site. These improvements serve to intercept and reduce the amount of Capital Flood flow entering the Project site. As a result, the carrying capacity of the designed drainage facilities and the estimated pit emptying time presented below for the Project are considered to be conservative. (*Refer to the 2010 Drainage Concept*, EIR Appendix 3, Addendum.)

With regard to flooding, the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Panel 410 for the Littlerock, CA area, indicates the eastern portion of the Project lies within an area designated as "Zone A." This zone is defined as an "*area(s) of 100-year flood; base flood elevations and flood hazard factors not determined*." The remainder of the Project lies within an area designated as "Zone C," which is defined as an "*area(s) of minimal flooding*." Refer to Attachment A, Figure 9 – FEMA Map (refer to EIR Figure 19).

The U.S. Army Corps of Engineers (CORPS) has determined that the Project site is not subject to the CORPS's jurisdiction under Section 404 of the Clean Water Act and a Section 404 permit is not required. The CORPS letter, dated June 1, 2006, exempts the Project site (EIR Appendix 7).

3.7 Climate

The Mojave Desert province has a typical continental arid climate where years to decades may pass in which little or no precipitation falls, separated by brief episodes of locally torrential rain.

The Project lies within the High Desert Climate Zone, where the summers are very hot and dry, and winters are cool and windy. Palmdale has over 300 days of sunshine per year. The same weather pattern that brings the marine layer stratus and afternoon sea breeze to the Los Angeles Basin brings gusty winds to the Antelope Valley, especially near the foothills on the south side. Except during Santa Ana (northeast) wind events (which usually occur in the fall and winter), gusty southwest winds blow over the Antelope Valley in the afternoons and evenings throughout the year.

Winter is relatively cold, wet, and windy with temperatures dipping into the single digits at times. Winter is the Antelope Valley's rainy season and, on occasion, snow will occur at higher elevations. Typical daytime high temperatures range from 50°F to 70°F; typical nighttime low temperatures range from 30°F to 40°F.

Spring temperatures are moderate; daytime highs are in the 70°F to 85°F range with overnight lows usually ranging from 40°F to 55°F. The transitional period from winter to summer temperatures is very short.

Summer provides very hot, dry heat with little or no precipitation. Temperatures in the area are frequently above 100°F. However, the high desert location of Antelope Valley allows for the temperatures to cool down somewhat at night. Typical daytime high temperatures are above 90°F and

drop to the 70°F range at night. Despite the hot temperature, it is common to experience "summer storms" in which temperatures are consistent but there is heavy rain and thunderstorms.

Fall provides moderate temperatures with little or no precipitation. The transitional period from summer to winter temperatures is very short. Typical daytime highs are in the 70°F to 85°F range, dropping into the 40°F to 55°F range at night.

4.0 SURFACE MINING PLAN

4.1 Proposed Starting Date and Duration

The operator anticipates to start construction of the proposed facility and to mine PCC-grade aggregate in late 2013, which assumes approval of the Surface Mining Permit and Reclamation Plan. The facilities may be in operation as soon as mid-2014. The operator will install and use the following major facilities, which are depicted in Attachment A, Figure 6 – Facilities Site Plan (refer to EIR Figure 6):

- Aggregate Processing Facilities;
- Ready-Mixed Concrete Plant;
- Vac-Lite Plant;
- Asphalt Mixing Plant;
- 24-foot by 60-foot office trailer;
- 80-foot by 125-foot two-story building, which will include an equipment maintenance shop area, parts room, office, locker room, and restrooms (handicapped accessible); and
- Raw Cement and Aggregate Transfer and Distribution Facility.

4.2 Proposed Surface Mining Operation

4.2.1 Amount and Type of Material to be Mined and Processed

Although production would vary with market conditions, the extraction rate of unprocessed material over the life of the Project is expected to range between 500,000 to 2,500,000 tons per year. Peak daily sales would be limited to the physical capabilities of the processing equipment, stockpiles of processed materials onsite, and product demand. Peak annual sales would be further limited by daily truck trips. If all such trips were allocated to the delivery of aggregate materials processed onsite, annual sales will not exceed 2,000,000 net tons of processed materials. Actual sales levels would vary over time and are a direct function of the rate of development within the Project's market area, the number and type of contracts obtained (e.g., Caltrans), the overall economy, equipment downtime, as well as hours and days of operation. Initial testing indicates that the deposit is comprised of:

- ≈ 26.73 percent Gravel
- ≈ 52.52 percent Sand
- ≈ 20.75 percent Fines

A 50-foot setback from all property lines and rights-of-way was assumed. Additionally, Assessor Parcel Number 3039-021-009 includes setbacks required by the County Department of Public Works, including 54 feet from the centerline of Longview Road, a 50-foot setback on either side of the Union Railroad right-of-way, a 32-foot right-of-way from the centerline along the property frontage on 136th Street East and Avenue U, a right-of-way for a cul-de-sac bulb on Avenue T-4 and Avenue T-10, and rights-of way for corner cutoffs at the intersections of Avenue T and 136th Street East, at Avenue T and Longview Road, and at Longview Road and Avenue U. In addition, a right-of-way for the proposed Avenue P-8 corridor freeway (90 to 150 feet from centerline) has been required. All known rights-of-way have been considered in the calculations of acres and volumes. The volume calculations are based on mining the approximately 282.4 acres to a depth of 80 feet below ground surface (bgs) at slopes no steeper than 2:1 horizontal:vertical (h:v) overall.

Gross volume of the material proposed to be excavated from the mining area is estimated to be approximately 30.98 million cubic yards. At an assumed density of 1.5 tons per cubic yard, this equates to a total of 46.48 million gross tons. Assuming that approximately 20.75 percent of the material would be unsuitable for sale as PCC-grade aggregate, the net reserves are estimated at 36.84 million tons.

Finished products would be PCC-grade aggregate and aggregate-using products, such as concrete and asphalt. Processing also creates scalped fines as a byproduct, some of which may be used as a soil amendment onsite in association with revegetation activities. The remainder of the fines would be sold as slurry used in nonstructural concrete or as miscellaneous fill material.

The assumed material composition and quantities are based on limited data. As the deposit is mined, Lebata may encounter material that does not match these assumptions. While this may result in a different market, the operating parameters of the Project would not change.

Because this resource could last about 47 years, Lebata is requesting a 50-year permit. Table 3 provides a Mining Phase summary.

Table 3 Mining Phase Summary

Mining Phase	Mined Material (Total material, in tons)	Finished Aggregate (Net material, in tons)	Fines/Silt (tons)	Area (acres)	Duration [1] (years)
Phase 1	6,608,200	5,237,000	1,371,200	49.3	7
Phase 2	25,131,100	19,916,400	5,214,700	150.5	25
Phase 3a	12,224,000	9,687,500	2,536,500	73.4	12
Phase 3b	2,519,100	1,996,400	522,700	9.2	3
TOTAL	46,482,400	36,837,300	9,645,100	282.4	47

[1] The estimated duration is based on an average production of 1.0 million tons per year.

4.2.2 Mining Method

The Project would extract aggregate from newly created pits in three distinct phases (Mining Phases). Mined materials would be excavated by dozers and shovels, either placed directly into the jaw crusher, or, during the initial part of each mining phase, placed into haul trucks for transport to the jaw crusher. As the mining pit deepens, material would be excavated by shovel and transported by articulating trucks for transport to the jaw crusher. From the jaw crusher, material would be conveyed out of the mining pit to the Processing Facilities Site (Attachment A Figure 3). At the Processing Facilities Site, materials would be mechanically crushed, sorted by size and type using triple-deck and double-deck dry scalping screens. Sand would be washed to remove fine material. Finished products would be stockpiled, and products would be transported offsite via haul trucks.

To preclude erosion of the slope faces, floodwater interceptors and down drains would be installed as mining progresses. This is described in detail and illustrated in EIR sub-chapter 4.4 and is illustrated in Attachment A Figures 11 through 17 (refer to EIR Figures 9 through 15).

Final mining slopes will be at a 2:1 h:v overall inclination with County required benching at 30-foot vertical intervals (1.85:1 h:v incremental slope) and no backfilling. Slope stability at the site was

evaluated by Fugro West, Inc. Refer to Section 5.2.3 below regarding the factor of safety for static and pseudostatic conditions.

4.2.3 Mining Phases

Mining will be phased as described below and illustrated in the following figures in Attachment A:

Figure 10 – Mining Phase 1 – North Pit (refer to EIR Figure 9)

Figure 11 – Mining Phase 2 – South Pit (refer to EIR Figure 10)

Figure 12 – Mining Phase 3a – North Pit (refer to EIR Figure 11)

Figure 13 – Mining Phase 3a – South Pit (refer to EIR Figure 12)

Figure 14 – Mining Phase 3b – North Pit (refer to EIR Figure 13)

Note about Figures:

The source topographic map underlying the figures was developed prior to Union Pacific Railroad's acquisition of the Southern Pacific Railroad. Therefore, the railroad bisecting the Project is labeled Southern Pacific Railroad, rather than Union Pacific Railroad. In addition, a fiber optic cable lies within the railroad right-of-way, approximately 30 feet north of and parallel to the northernmost rail. This cable will be unaffected by the Project.

Mining Phase 1

Mining will begin in the North Parcel, which is located between Avenue T and the Union Pacific Railroad, and will involve approximately 49.3 acres. In Mining Phase 1, mining will start at the northeast quarter of the Project site and progress toward the south and southwest up to, but not including, the road prism of the Longview Road Extension right-of-way.

Minimum two-foot-high Mine Safety and Health Administration (MSHA)-required safety berms will be installed along the top of the mine pit slope around the entire northern, eastern, southern, and western rims of the mine pits. Pit entrance/exit ramps will prevent storm water temporarily impounded by the berms from creating a public safety hazard. A grader would be used to maintain the Project's interior roads.

Note: EIR **Mitigation Measure NO-1** requires the installation of a seven (7) foot tall berm with sufficient length to break the line-of-site between the facility processing plants and one of the sensitive noise receptors (R4) along the Project's eastern property line. In addition, EIR sub-chapter 4.8.4.1.2 describes how the Project boundaries will be flanked by earthen berms of varying heights, including an eight (8) foot berm on the western boundary, five (5) foot berm on the southern boundary, three (3) foot berm on the eastern boundary, and a five (5) foot berm on the northern boundary to minimize impacts upon visual resources. The *Drainage Concept* (EIR Appendix 3 and its Addendum) describes how berms along all of the top slopes will be used to direct surface flow toward a permanent system of interceptor drains and terraces.

Mining Phase 2

Mining in this Phase will involve the South Parcel where excavated materials will be conveyed out of the Mining Pit under the railroad tracks to the Processing Facilities Site via a tunnel. The mined area will involve approximately 150 acres and will include all of the South Parcel, except for that portion

comprising the road prism of the Longview Road Extension right-of-way, and the Raw Cement and Aggregate Transfer and Distribution Facility.

Mining Phases 3a and 3b

Mining Phase 3a will involve the excavation of materials occupied by the Processing Plant Area, which would be relocated to the floor of the Mining Phase 1 area, as well as the road prism of the Longview Road Extension right-of-way, both in the North and South Parcel. This will involve approximately 73 acres.

Mining Phase 3b will involve the area underlying the Raw Cement and Aggregate Transfer and Distribution Facility Area, which will involve approximately 9 acres. Regarding Mining Phase 3b, the Applicant proposes the following options:

1. If it is decided to mine the area underlying the Raw Cement and Aggregate Transfer and Distribution Facility, the Facility will be relocated into the Mining Phase 1 pit and operated there. The removal of the material from this area will occur during Mining Phase 3 excavation.

2. If it is decided not to mine the area underlying the Raw Cement and Aggregate Transfer and Distribution Facility, the Facility will operate at that location during the life of the Project.

Note: The Project has been specifically designed as a dry surface mining operation with a maximum depth of 80 feet BGS. As a result, groundwater interception is not proposed. The operator has developed information from onsite borings indicating groundwater is deeper than the 55.4 feet indicated by data from an adjacent well. To ensure groundwater is protected, surface mining operations will be curtailed at a final mining depth of 80 feet BGS, or at a depth that is 5 feet above static groundwater levels, should groundwater be encountered. If groundwater is encountered and the final excavation depth reduced, the volume of material excavated and processed, and the life of the Project will be reduced accordingly. Within the first few years of Project operations, the static groundwater level will have been determined and the final mining depth defined accordingly at five (5) feet above that level.

In advance of Mining Phase 3a and 3b excavations, late in the life of the Project, the Processing Facilities Site will be relocated within the North Pit. Phase 1 mining will excavate the North Pit to a depth of 80 feet BGS, unless static groundwater level has been determined to be shallower. Prior to placement of the Processing Facilities Site into the North Pit, a pad of refill material will be constructed to a depth of 50 feet BGS. Placement of the Processing Facilities Site on the resulting pad will ensure they are kept above Capital Flood inundation levels within the North Pit.

4.3 Operational Considerations

4.3.1 Water Use and Wash Water Recycling

Annually water use at the Aggregate Processing Facilities is estimated to be approximately 88.8 million gallons (MG) (approximately 272.4 acre-feet), with the water truck using approximately 7.5 MG (approximately 23 acre-feet) for fugitive dust control along haul roads and around the plant site. Annually, the Ready Mixed Concrete Plant is estimated to use approximately 5.4 MG (approximately 16.6 acre-feet). Total annual water use is estimated to be 101.7 MG (approximately 312 acre-feet). (Note: One acre-foot equals 325,851 gallons.)

Aggregate processing wash water would be returned to the 45-foot diameter Fresh Water Tank and the used water from the Sand Washer and Dewatering Screen is pumped to a fines recovery system then it is pumped to the 45-foot diameter Thickener Tank. The Thickener tank separates whatever solids that are left and the clean water gravity flows back to the Fresh Water Tank. Fines are recovered and conveyed onto the Fines stockpile for subsequent sale. These recovery processes may also include the use of an open pond system. Fines are recovered and conveyed onto the Fines stockpile for subsequent sale. If this initial process does not recover the intended level of fines, Lebata would also use a traditional open pond system to settle out/recover fines. The use of an open pond system would be subject to approval by the Regional Water Quality Control Board.

This system would be comprised of three to four basins approximately 80 feet x 130 feet and 10 feet deep (depicted as Silt Ponds in Figure 6 – Facilities Site Plan). Wash water from Aggregate Processing Facility would be collected, and would flow by gravity in a drainage system back to the Silt Ponds. To that water, a flocculant, comprised of organic polymers, would be added to cause the fine material to "settle out" from the water column. Settled fines would be removed and deposited on the Fines stockpile by a front-end loader. These and other fine materials produced during processing would be marketed for use as soil amendments, slurry used in nonstructural concrete, landfill top cover, miscellaneous fill material, among other uses; used as a soil amendment onsite in association with revegetation activities; or placed within the mine pit after being blended with surplus sand to ensure permeability is maintained. Only EPA-approved, non-toxic flocculant would be used to ensure there are no adverse impacts to water quality. To facilitate fines removal, the ends of each basin would be sloped, approximately 3:1 (h:v), to permit the entry and exit of equipment.

The operator proposes to drill an onsite water well, the water from which will be used primarily for:

- Dust control using spray bar nozzles on the conveyors to wet aggregate materials being transported to the surge pile;
- Dust control by ground watering the area where loaders operate within the Aggregate Processing Facilities and between the mining pit and the crusher;
- Dust control using sprayers at the three-deck and two-deck dry scalping screens;
- Ready-mixed concrete production; and
- Aggregate Processing Facility.

<u>Note</u>: Refer to 4.3.4 for a discussion of the Proposed and Alternative Water Sources.

In accordance with the requirements of CCR section 3713(a), drill holes and water wells will be abandoned in accordance with all applicable federal, state and local laws.

Trucks exiting the Project will drive over rumble plates to remove debris from fenders, running boards and tires.

4.3.2 Project Traffic

The Project will generate an average of 217 truck roundtrips and a maximum of 301 truck roundtrips per day during operations. This includes outgoing product trips and incoming material delivery trucks. Approximately 80 percent of the haul trucks will deliver materials to third parties or owner-operated plants in the greater Los Angeles area, while 20 percent will travel to the third parties or owner-

operated plants in the Riverside/San Bernardino market area. Employee trips are estimated to be 156 roundtrips per day for average and peak operations. A *Traffic Impact Analysis* (EIR Appendix 9) was prepared by Austin-Foust Associates, Inc. to evaluate the impact of truck traffic on the existing road system. Subsequent analyses were prepared by Stantec Consulting Services Inc., both of which are addenda to EIR Appendix 9.

4.3.3 Hours and Days of Operation and Employment

The Project will operate up to 303 days per year, employing 156 people, including plant operators and truck drivers, working two or three shifts per day, six days per week depending on the type of facility. The maximum number of employees working per shift will be 88. The number of employees, by shift and type of facility operations, are as follows:

- Surface Mining and Aggregate Processing Facilities (19 employees; 2 production shifts, followed by a third maintenance shift)
- Ready-Mixed Concrete Plant (26 employees, 2 shifts)
- Vac-Lite Plant (no additional employees, 2 shifts)
- Asphalt Mixing Plant (5 employees, one shift)
- Raw Cement and Aggregate Transfer and Distribution Facility (90 employees, 3 shifts)
- Shop, Maintenance and Sales (16 employees, 2 shifts)

Proposed operating hours are noted in Table 4 below.

Table 4 Days and Hours of Operation

Activity	Days of the Week [1]	Normal Hours of Operation
Mining Excavation	Mon.-Sat.	4:00 am to 10:00 pm depending on time of year (no nighttime mining)
Aggregate Processing	Mon.-Sat.	24 hours per day
Ready-Mixed Concrete Plant operations	Mon.-Sat.	24 hours per day
Vac-Lite Plant operations	Mon.-Sat.	24 hours per day
Asphalt Mixing Plant operations	Mon.-Sat.	24 hours per day
Cement Transfer Station operations	Mon.-Sat.	24 hours per day
Raw Cement Distribution operations	Mon.-Sat.	24 hours per day
Equipment Fueling and Maintenance	7 Days	24 hours per day
Loading, Trucks Entering or Departing	Mon.-Sat.	24 hours per day

[1] Contracts often require that the suppliers of PCC-grade aggregate provide materials on a 24-hour basis. In addition, these projects may necessitate County approval of Sunday operations on a project-specific basis. These contracts involve large-scale projects, such as highway resurfacing by Caltrans, major public works road projects, and U.S. Army Corps of Engineer projects, among others.

To minimize traffic impacts in the AM and PM peak travel hours (i.e., 7:00 to 9:00 AM and 4:00 to 6:00 PM), work shifts will begin at 5:30 AM and 3:30 PM.

The Project will provide a source for PCC-grade aggregate throughout Southern California and it is important to note that 24-hour/day construction projects will derive material from whatever sources are available, even if long distance hauling is required. Providing a regional source for PCC-grade aggregate serves to reduce haul distances and the associated impacts. It is expected that up to 30 percent of deliveries from the Project will occur at night to provide the PCC-grade aggregate needed for Caltrans and public works projects, night paving, and industrial and commercial building construction.

4.3.4 Proposed and Alternative Water Sources

Lebata proposes to drill an onsite water well and annually extract approximately 312 acre-feet of water to meet Project needs, if so allocated through the Basin adjudication process. However, in light of the Basin adjudication process, the need for an alternative source of water became evident. It is likely the Basin adjudication will result in future limitations being placed upon existing groundwater users, and those proposing new or increased levels of groundwater extraction. The details of such an allocation process are as yet unknown and the process may take years to resolve.

Based on the results of the Basin adjudication, Lebata could pursue groundwater via one or more processes including, but not limited to, the following: direct use of groundwater rights, purchase of available local groundwater, and lease available local groundwater. Once the Project receives approval for construction, Lebata will evaluate the potential to legally pump groundwater via one or more processes noted above. This evaluation will include an analysis of, but not limited to, the following: applicable source of groundwater, potential location(s) of wells, annual volume of groundwater to be pumped, short-term and long-term costs, and an estimate of the sustainability of the groundwater to meet future Project water demands. If groundwater is determined to be a viable water supply for the Project, Lebata will pursue construction of a new well(s) within the Project site and/or purchase/lease groundwater from a local source.

In the likely event the Basin adjudication process does not allocate sufficient groundwater to meet Project needs, Lebata has pursued alternative water sources, the preferred source being the purchase of permanent entitlement of surface water from outside the Antelope Valley basin. In addition, Lebata has obtained an alternative or backup water source via agreement with Antelope Valley-East Kern Water Agency (AVEK) to supply supplemental water for the Project. These potential water sources are summarized below and include:

- Permanent Entitlement - Imported Surface Water via State Water Project
- Supplemental Water - Antelope Valley-East Kern Water Agency
- Banked Water - Antelope Valley-East Kern Water Agency
- Banked Water - Tejon Valley Water Bank
- Banked Water - Central Valley Water Bank
- Banked Water - AquaHelio Resources Water Bank
- Lebata Purchase from another Water Bank
- Recycled Water
- Hauled Water - Railroad or Truck

4.3.5 Administration, Security, and Public Safety

The Project will include an administration office and dispatch/operations building for everyday business. Night time and weekend security will be provided by 6-foot high cyclone perimeter fencing around the

Aggregate Processing Facilities and Plant areas, locked gates, lighting, and a security trailer. The active mining area will also be fenced with 6-foot high cyclone material.

4.3.6 Onsite Hazardous Materials

The Project will require the use and onsite storage of the various hazardous materials such as fuel, lubricating oils, and other vehicle and equipment fluids. These materials will be stored on the Fueling and Maintenance Pad, or within secondary containment structures located in the Processing Facilities Site. The Fueling and Maintenance Pad will be constructed of concrete and include a curbed containment berm. The fuel storage tank which also be provided with secondary containment. These precautionary measures are designed to minimize the potential for fueling and maintenance activities to be discharge or adversely affect the environment.

4.3.7 Spill Prevention, Control, and Countermeasure Plan

As required by federal (Title 40, Code of Federal Regulations, Part 112) and state (California Health and Safety Code, Chapter 6.67, §25270 – Aboveground Petroleum Storage Act) the facility will prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan if more than 1,320 gallons of oil is stored at the site.

The purpose of an SPCC Plan is to identify procedures and controls to prevent accidental releases of petroleum products and to minimize the impact if a release occurs.

4.3.8 Storm Water Pollution Prevention Plan

In 1987, Congress enacted the Water Quality Act, amending the Federal Water Pollution Control Act to include regulation of the discharge of storm water from industrial and certain municipal sources. EPA issued final regulations establishing permit application requirements for storm water in the November 16, 1990 Federal Register (55 CFR 47990). The regulations provide for individual and group applications and for the issuance of individual and general permits.

In California, the State Water Resources Control Board (SWRCB) elected to issue a statewide General Permit that applies to all industrial storm water discharges requiring a permit except those from construction activities. The SWRCB adopted the General Permit and Fact Sheet on November 19, 1991, which was reissued on April 17, 1997.

The General Permit requires that the Project:

- Eliminate unauthorized non-storm water discharges.
- Develop and implement a Storm Water Pollution Prevention Plan.
- Monitor storm water discharges.

A site-specific Storm Water Pollution Prevention Plan (SWPPP) will be developed to comply with the requirements set forth in current General Permit for Storm Water Discharges from Industrial Activity. The purpose of the SWPPP is to:

- Identify sources of pollution that may contaminate industrial storm water discharges; and
- Describe and ensure the implementation of practices to reduce pollutants in storm water discharges.

5.0 RECLAMATION PLAN

5.1 Subsequent Use

It is estimated that the mine site will be in operation for approximately 47 years. The Antelope Valley Areawide General Plan designates the Project site as "Open Space" and it is reasonable to predict that the open space nature of the Project area and surrounding land will not have changed significantly during the intervening years. Other potential post-mining uses include groundwater recharge or storm water retention basins.

When completed, mining activities will result in depressions of approximately 80 feet, as illustrated in Attachment A, Figure 15 (Final Reclamation – North Pit) and Figure 16 (Final Reclamation – South Pit) (refer to EIR Figures 14 and 15).

However, it is likely that wash fines and a good portion of the processed sand will not be sold, resulting in their placement back into the excavated area. A portion of this material will be blended with the other material needed to reconstruct the road prism underlying the Longview Road Extension to DPW standards.

5.2 Reclamation Standards

Reclamation activities must comply with 14 CCR §3700-3713 Reclamation Standards. The following is a discussion of how the Project will comply with each of these standards.

5.2.1 Performance Standards for Financial Assurances (California Resources Code § 3702)

Sections 2770 and 2773.1 of the Surface Mining and Reclamation Act of 1975 (SMARA, Public Resources Code Section 2710 et seq.) require surface mining operators to obtain lead agency approved Financial Assurances for reclamation.

The operator recognizes its responsibility to ensure the successful and timely completion of the reclamation of the Project site. Both, the County of Los Angeles, in Chapter 22.56 of the Los Angeles Zoning Code and SMARA, require the operator establish some type of financial assurance that covers the cost of site reclamation, should the operator be unable to fulfill its obligation. The operator is prepared to enter into a mutually-acceptable agreement to cover the reclamation costs as a condition of the Surface Mining Permit or as a condition to be met prior to the permit becoming effective. Refer to the *Statement of Responsibility* in Attachment C.

Estimated reclamation costs for the site after the first year of site activities are presented in the Draft Financial Assurance Cost Estimate (presented in Appendix D). Subsequent Financial Assurance Cost Estimates will be prepared and submitted to the Lead Agency as required by SMARA.

5.2.2 Performance Standards for Wildlife Habitat (California Resources Code § 3703)

Existing biological conditions are described in Section 3.4 of this Reclamation Plan (Biologic Assessment and Sensitive Plant Survey Report), the *Biological Assessment*, prepared by Pacific Southwest Biological Services, Inc., and the *Sensitive Plant Survey Report*, prepared by ECORP (EIR Appendices 14 and 15). No State- or Federally-listed plant species were observed during focused surveys of the Project area.

The special status wildlife species that have the potential of being on the site are the desert tortoise, the Mohave ground squirrel and the burrowing owl. Further investigations are planned via protocol surveys in advance of land disturbing activities via Mitigation Measures BIO-1, BIO-2, and BIO-3, which require surveys to determine species presence or absence, and specifies the additional measures needed to avoid accidental take of these species.

The special status plant species that have the potential of being on the site are the Short-joint beavertail (*Opuntia basilaris var. brachyclada*) and the Crowned muilla (*Muilla coronata*). Further investigations are planned via protocol surveys in advance of land disturbing activities via Mitigation Measure BIO-5, which requires sensitive plant surveys be conducted during the appropriate blooming periods in the year prior to clearing of each mining phase. Results of surveys, including negative findings, will be submitted to CDFG within 90 days of their conclusion. If any of these species are present onsite, the Permittee will develop and implement a plan for the protection of these species, to be approved by CDFG.

Note: The information developed during these surveys will be used to update this Reclamation Plan with regard to sub-chapter 5.2.4 (Performance Standards for Revegetation), most notably the discussion of Vegetation Density, Cover and Species Richness and the information presented in Table 6 (preliminary Seed Mix for Test Plot), and Table 7 (Revegetation Performance Criteria).

Upon reclamation of the mine site, the area will again be available for use by these special status wildlife species.

5.2.3 Performance Standards for Backfilling, Regrading, Slope Stability, and Recontouring (California Resources Code § 3704)

Cut and fill slopes for the development of the aggregate production facility area on the site are not anticipated to exceed 80 feet in vertical height and will not be steeper than 2:1 horizontal:vertical overall. No backfilling is proposed, except to restore the road prism underlying the Longview Road Extension, which will be done in accordance with the requirements of the Los Angeles County Department of Public Works (LACDPW). Down-drains and floodwater interceptors will be built as mining progresses to capture and deliver floodwater to the bottom of the mining pit, thereby minimizing erosion and ensuring the maintenance of slope stability (refer to discussion of the *Drainage Concept* in EIR sub-chapter 4.3.4.2).

Slope stability evaluations were performed by Fugro West, Inc., using a proposed slope configuration for static conditions and pseudostatic conditions with a horizontal acceleration coefficient of 0.15g. (Refer to the *Pit Slope Stability Evaluation* in EIR Appendix 4.) The gross stability of the proposed final slopes inclined at 1.85:1 horizontal:vertical incremental, and 2:1 horizontal:vertical overall was analyzed under both static and pseudostatic conditions. Slopes with a calculated factor of safety greater than 1.0 can be considered safe without further analysis.

The two main cases analyzed were a dry slope and a slope with 30 feet of water. The estimated factors of safety are as follows:

- Dry slope, static, Fs=1.58
- Dry slope, seismic (kh=0.15g), Fs=1.16
- Slope with 30 ft of water, static, Fs=1.56

- Slope with 30 ft of water, seismic (kh=0.15g), Fs=1.14

Note: kh = horizontal seismic coefficients

The proposed excavation was assessed for stability and it was determined it will be stable and safe as designed. In addition, the relatively massive alluvial deposits have a low susceptibility to landsliding or lateral spreading due to the lack of geologic structures such as joints, contacts, and bedding, which may present preferred shear surfaces.

5.2.4 Performance Standards for Revegetation (California Resources Code § 3705) (Revegetation Plan)

This section addresses the restoration of indigenous vegetation within the mine pits and otherwise disturbed areas of the Project as required by SMARA (Public Resources Code Section 2719 et. seq.) and per the Performance Standards for Revegetation (California Resources Code § 3705) and for Topsoil Salvage, Maintenance and Redistribution (California Resources Code § 3711).

The objectives of the Revegetation Plan are to salvage a portion of the Joshua trees, provide immediate erosion control following phased mining completion, and increase habitat value by reintroducing native species to the mine site. Plant density varies over the Project site; overall plant cover is approximately 40 to 50 percent. Where Joshua trees are present, there are approximately three to five trees per acre, with an estimated total population of 200, while creosote shrubs are abundant.

Design Overview

Young Joshua trees will be transplanted prior to soil disturbance. Topsoil and sub-soil will be salvaged and stored separately. Upon completion of mining phases, and in compliance with the phased Reclamation Plan prepared for this site, plants will be reintroduced by seeding native species and transplanting Joshua trees. A Test Plot will enable the refinement of the seeding mixtures presented below, if necessary. Temporary irrigation will enable species to establish. A Monitoring Plan provides performance criteria designed to determine the success or failure of revegetation. Contingency measures are suggested in the event that revegetation goals are not met. Refer to the Monitoring Plan discussion below and Table 7 – Revegetation Performance Criteria.

The estimated mining duration is approximately 47 years. However, through the use of phased mining and reclamation, the amount of time some locations are exposed prior to revegetation will be significantly shorter. Due to the length of time between the preparation and the implementation of revegetation, techniques outlined herein may be altered as knowledge and practice of desert restoration increases. The intent of any such changes will be to ensure the restoration of indigenous vegetation within the mine pits and otherwise disturbed areas of the Project.

Joshua Tree Salvage

Where Joshua trees are present, there are approximately three to five trees per acre, with an estimated total population of 200. Joshua trees have been successfully transplanted for more than 30 years in the area. Small, young trees with a less developed root system respond better to relocation. Because of their higher success rate, unbranched specimens greater than three feet and less than ten feet in height would be relocated. Removal and relocation of trees would be timed to coincide with winter or early spring rains.

Prior to soil salvage and vegetation removal of Mining Phase 1, Joshua trees between three and ten feet in height would be marked and thoroughly watered. The added moisture would cause sandy soil and other soil particles to cling to roots. Trees would be removed, transported and replanted by a qualified landscape contractor with experience in relocating this particular species. Trees would be removed with a "tree spade" capable of removing approximately 40 to 60 inches of soil and root material or by other suitable equipment.

Joshua trees do not grow well on sloped terrain, which are the main areas available for revegetation at the Project site. Joshua trees would be transplanted and maintained within the more level setback areas around the Project perimeter, as illustrated in Reclamation Plan Figures 15 and 16 (refer to EIR Figures 14 and 15). The Joshua trees transplanted from Mining Phase 1 would be monitored to determine transplant success rates and to provide the information needed to revise the transplanting process, if needed.

Note about Figures: Reclamation Plan Figure 15 will be revised to include Test Plot Areas once the County has approved a Project.

Vegetation Removal

Prior to excavation, but no more than one year prior to surface mining activities, existing vegetation will be removed following Joshua tree removal and relocation. Crushed vegetation will be stored, and later placed on top of the salvaged topsoil. The material will act as mulch and protect the stockpiles from wind and water erosion. In time, material will decompose and add to the soil's organic matter.

Topsoil Salvage and Storage

Topsoil salvage, maintenance and redistribution will be accomplished based on required performance standards stated in § 3711 of SMARA.

Topsoil, which varies in thickness and occurrence, and crushed vegetation will be stripped prior to mining and stored in the identified Topsoil Storage Area. Salvaged topsoil contains beneficial microorganisms, soil animals, seeds of native plants and physical components that contribute to soil heterogeneity and successful revegetation. Topsoil and subsoil removal will not precede mining activities by more than one year and, when practical, will be collected during the dry season. Trash and objectionable material will be removed prior to topsoil excavation.

Most of the site is covered with cobbles and large rocks, and approximately 30 percent of the area contains a topsoil layer. To maintain the viability of topsoil removed from the site, it will be used as a top layer atop berms, once they have been constructed. Since the amount of topsoil needed to cover all surfaces that will be revegetated is not present onsite, subsoil will also be salvaged and stored separately within designated Subsoil Storage Areas.

Topsoil and subsoil salvaged during Mining Phase 1 will be stockpiled and used during the reclamation of that Mining Phase. Topsoil and subsoil salvaged during subsequent mining phases will be similarly stockpiled and used for reclamation. Stockpile areas are illustrated in Attachment A, Figure 10 (Mining Phase 1 – North Pit) and 12 (Mining Phase 2 – South Pit) (refer to EIR Figures 9 and 10).

Note about Figures: Reclamation Plan Figures 15 and 16 will be revised to include Topsoil Storage Areas once the County has approved a Project.

Topsoil and subsoil will be stockpiled separately no higher than 10 feet and be clearly marked to distinguish it from mine waste. Excessive height of the topsoil stockpile should be avoided since it may cause the internal temperature of the pile to increase, thereby "cooking" native seed and microbial material contained in the stock pile. The stockpile will be maintained free of exotic, invasive weeds. Other native plant material will be encouraged to grow and establish on the stockpiles. Stockpiles will be seeded or hydro-seeded with the seed mix shown in Table 5 (below) as needed to minimize the loss of soil from erosion and to preserve soil microbes. The prescribed mix contains seeds of native herbs and small shrubs. Stockpiles will then be mulched with a single layer of crushed vegetation. Crushed vegetation should cover no more than 70 percent of the soil surface to allow for new plant growth.

To prevent compaction, no equipment will be allowed to travel over, or park on, the stockpiles. Stockpiles will be secured to prevent unauthorized access.

Vegetation Density, Cover and Species Richness

Plant density varies over the Project site. Where Joshua trees are present, there are approximately three to five trees per acre, with an estimated total population of 200, while creosote shrubs are abundant. Overall plant cover is approximately 40 to 50 percent. Refer to the photographs in the *Biological Assessment* (EIR Appendix 13) and the *Sensitive Plant Survey Report* (EIR Appendix 14 and its Addendum). Onsite plant diversity is typical for the Mojave Desert environment and is described in Section 3.4 and summarized below.

The dominant vegetation community, which was observed on approximately 270 acres (87 percent) of the Project site, is Creosote Bush Series (Sawyer and Keeler-Wolf 1995). This vegetation community is classified as Mojave Creosote Bush Scrub (CDFG 2003). The dominant plant species observed in the Project site is creosote bush (*Larrea tridentata*), with the co-dominant plant species observed to be white bursage (*Ambrosia dumosa*) and cheesebush (*Hymenoclea salsola*). Many individuals of the species Joshua tree (*Yucca brevifolia*) were observed throughout the site; an estimated 200 Joshua trees grow on the property. Other species observed within the on-site Mojave Creosote Bush Scrub include: big sagebrush (*Artemisia tridentata*), four-wing saltbush (*Atriplex canescens*), spinescale (*Atriplex spinifera*), rubber rabbitbrush (*Chrysothamnus nauseosus*), ephedra (*Ephedra nevadensis*), California buckwheat (*Eriogonum fasciculatum*), matchweed (*Gutierrezia sarothrae*), winterfat (*Krascheninnikovia lanata*), desert alyssum (*Lepidium fremontii*), Anderson boxthorn (*Lycium andersonii*), short-jointed beavertail cactus (*Opuntia basilaris* var. *brachyclada*), golden cholla (*Opuntia echinocarpa*), antelope bush (*Purshia tridentata*), Mexican bladdersage (*Salazaria mexicana*), Russian thistle (*Salsola tragus*), and Mojave horsebrush (*Tetradymia stenolepis*). The scrub understory contains annuals, including soft chess (*Bromus hordeaceus*), red-stemmed filaree (*Erodium cicutarium*), and Mediterranean grass (*Schismus barbatus*).

Approximately 34 acres (11 percent) of the site comprises drainage channels vegetated with Rubber Rabbitbrush Series (Sawyer and Keeler-Wolf 1995) and classified as Rabbitbrush Scrub (CDFG 2003). The on-site drainages also contain four-wing saltbush and antelope bush. The remaining approximately 7 acres (2 percent) of the Project site have been disturbed by dirt access roads and off-road driving disturbances.

Table 5 Topsoil and Subsoil Seeding Mix [1]

Species Name	Common Name	Lbs/Acre	Purity/Germination
Ambrosia dumosa	Burro-weed	1.0	95/25
Chrysothamnus Nauseosus ssp. mohavensius	Rabbitbrush	2.0	10/50
Ephedra nevadensis	Mormon Tea	1.5	95/65
Eriogonum fasciculatum	California buckwheat	3.0	10/65
Hoplapappus cooperii	Cooper's goldenbush	0.5	n/a
Lasthenia chrysostoma	Goldfields	2.0	75/80
Layia glandulosa	White tidy tips	2.0	90/75
Phacelia distans	Phacialia	1.0	n/a
Salvia columbariae	Chia	2.0	85/40
	Total lbs per acre:	**15.0**	
For hydroseeding, the following materials will be added to the hydroseed slurry: 500 lbs per acre of cellulose wood fiber 160 lbs per acre of organic soil stabilizer			

[1] Information obtained from S&S Seeds

The seed mixes, Joshua tree transplanting and performance criteria described in Table 7 are designed to achieve successful revegetation of the Project site, eventually attaining vegetation density, cover and species richness comparable to the existing environment.

Seed Collection

Seeds will be collected by a revegetation specialist at the site at least one year prior to any disturbance and during the mine operation. In desert environments, adequate seed-set may happen only after rainy years, which happens on average once every ten years. Timing of seed collection is critical. Seed will be collected when it is ripe and before it falls from the plant. Once harvested, seed will be dried, cleaned and stored by seed collection specialists. If seed collection fails to collect the necessary seed, supplemental seeds will be purchased from a reputable native plant nursery, if necessary.

Baseline Surveys

Prior to the initiation of mining activities, baseline surveys will be carried out to determine the vegetative density, cover and diversity of the naturally occurring habitat. The baseline surveys will be conducted, using valid sampling techniques to develop the quantitative performance standards required under § 3705(m) of SMARA.

Method - Data collected will generally include at least 12 samples, using Line Intercept (or Point-Line Intercepts), to obtain an 80 percent confidence level. The following data will be collected:

- Relative cover by native species (of total transect length)
- Total vegetative cover (all native species combined, of total transect length)
- Total cover of exotic and/or noxious weed cover
- Plant species density within a 2-meter belt, centered along transect
- Species richness (which for the purposes of SMARA compliance is considered diversity)
- Estimated average height of trees and shrubs
- Evidence of biological activity (for example, ant mounds, rodent disturbance, fecal pellets)
- Evidence of erosion

This data will serve to establish the "Shrubs and Forbs baseline" referenced in the Revegetation Performance Criteria (Reclamation Plan Table 7).

Photographic Documentation - At each revegetation site, multiple permanent photo locations will be identified and recorded using GPS. Photo locations will be shown on maps of the monitoring sites and permanently marked in the field. Whenever feasible, a meter stick or range pole will be used as a scale to illustrate the relative size of plants in photographs.

Revegetation Test Plot

A Revegetation Test Plot program will be established to determine the effectiveness of the proposed seeding methods and species composition, seeding rates and irrigation application rates, if any. The Test Plots will determine the necessary germination rate of the proposed seed palette, the ultimate vegetative cover of native plants and weeds that emerge. Test Plots will also provide insight into the overall performance of the Revegetation Plan.

Joshua trees will also be replanted into the Test Plot Areas. This will establish whether or not Joshua trees can be successfully grown on sloped land.

The proposed Test Plot Areas will be composed of four Test Plots. Refer to Attachment A, Figure 10 for the location of the Test Plots (refer to EIR Figure 9). The Test Plots will be located within the Mining Phase 1 setback area and in the southern-most Phase 1 mining area after completion of mining in that area will be partially on the slope and partially on relatively flat land. Two Test Plots will be hydroseeded the other Test Plot will be hand seeded. Additionally, one Test Plot will be irrigated the other one will test the viability of seeds in a non-irrigated environment. Irrigation of the Test Plots is recommended to determine whether or not irrigation may be more favorable in obtaining quicker establishment and coverage of the native plant material.

<u>Note about Figures</u>: Reclamation Plan Figure 15 will be revised to include Test Plots, once the County has approved a Project.

The Test Plots will be permanently marked and identified with T-stakes and yellow polypropylene rope. Seventy percent of each Test Plot will be located on a slope, similar to the final grade of the extraction pit.

To simulate restoration conditions, approximately four inches of stored top soil and about six inches of subsoil, mixed with fines, will be spread prior to seeding the Test Plots. If the Test Plot Areas were

compacted as a result of mining activities, the area will be ripped and/or disked to loosen the underlying medium to establish a suitable root zone in preparation of planting.

Table 6 shows the preliminary seed mix that will be used. This mixture will be hydroseeded or broadcast over the Test Plots. If alterations are needed, additional testing will be undertaken. Results of the Test Plots will be matched against baseline information gathered from a representative, undisturbed area prior to the initiation of mining activities. If necessary, monitoring criteria of the seeding prescription will be altered to conform to the naturally-occurring species composition and distribution.

Test Plots for the seed mix will be monitored for at least five years. Results of the Test Plots will be compared to baseline conditions. Density, cover and diversity of the representative site will be measured. If necessary, the seed palette and/or planting procedures will be adjusted to be similar to the adjacent naturally occurring species composition and distribution.

Success of Joshua trees transplants will also be evaluated. If proven successful, trees will continue to be transplanted within the setback areas surrounding the Project perimeter. If success cannot be achieved, the trees will be salvager and either donated or sold to public agencies, i.e., to the City of Palmdale, Saddleback Buttes State Park, other governmental entities, or land owners who must comply with the City of Palmdale Joshua Tree and Native Desert Vegetation Preservation Ordinance.

Planting Procedure

Timing and Irrigation – Seeding of plants will coincide with the winter rainy season, although the final decision will be based on the weather conditions at the time of planting. To maximize plant growth, it is usually preferred to plant just after a major storm, and apply seed when the ground is soaked.

Irrigation may be used depending on the results of the Test Plots; supplemental water is expected to be necessary due to the semi-arid climate. Irrigation will be slowly tapered off and will cease by March or April. Additional water may be needed once or twice during the summer or early fall months if plants are experiencing a permanent wilt (i.e., a wilt that does not vanish or lessen with nightfall).

Site Preparation – As sections of the excavation site become available for seeding, debris and invasive weeds that have invaded the site will be removed. This can be accomplished either by hand, or if the problem is severe, by applying a short duration, broad spectrum, contact herbicide. Several methods of application can be employed, depending on the type of vegetation being eliminated. First, large shrubs will be cut down manually, followed by application of herbicide to the remaining stumps. For herbaceous plants, the herbicide solution is applied directly to the foliage. Spraying will be conducted when winds are not stronger than seven miles per hour. A hand-carried tank should be used. These measures will help protect adjacent vegetation from inadvertent destruction. Seeding with the prescribed seed mix will commence about two weeks after herbicide application.

The objectives of site preparation in desert environments include techniques designed to capture precipitation, thereby increasing soil moisture, which can greatly improve the success of revegetation efforts. The Office of Mine Reclamation recommends the following methods:

- *Shaping* the surface to create depressions that concentrate water increases seedling survival. Several techniques are available for desert reclamation; these include ripping, imprinting and pitting.

- *Ripping* is used to break up compacted soil layers. The method helps to reduce impacts of compaction and allows for more efficient infiltration of precipitation and will be used primarily on roads and pit bottoms, where soil may have been compacted as a result of vehicle and equipment use. Recommended depths for deep ripping are between 12 and 36 inches.
- *Imprinting* uses heavy rollers to make irregular furrows in the soil surface. This method increases water collection and infiltration, plant material mulching and shielding seedlings from the extremes of the desert environment. Imprinting is quite effective on steep or rough terrain.
- *Pitting* is a surface treatment that creates depressions that serve as rain catchment areas, thereby increasing soil moisture. The capture and retention of precipitation in the pits can range from two to ten times that of open, untreated slopes. Additional benefits of soil pitting are enhanced erosion control and a more natural appearance of treated slopes that blend in with the surrounding topography compacted to that of straight engineered slopes.

Phased / Concurrent Reclamation

Mining will take place in three major phases described in Section 4.2.3 above. Reclamation of Mining Phase 1 will start with the north and east slopes of Mining Phase 1, as soon as the slopes are finished and the down-drains have been installed. The south and west slopes and pit bottoms will be revegetated within two years after secession of mining, followed by the revegetation of north slope. Joshua trees removed from Mining Phase 1 will be transplanted within the setback areas surrounding the Project perimeter at a density similar to that growing naturally.

Reclamation of Mining Phase 2 will start in the northern-most area and will entail revegetation of the north, east and west slopes. As mining is completed within other areas of Mining Phase 2, the side slopes will be revegetated. At this time, the south, east and west slopes will be replanted.

Reclamation of Mining Phase 3a will proceed in the same manner as described for Mining Phases 1 and 2 above. Mining Phase 3b is comprised of the final mining phase, if the operator chooses to remove material from under the Raw Cement and Aggregate Distribution Facility.

The proposed planting plan will be followed, unless Test Plots indicate that the original seed mix needs to be altered to achieve the objectives of the Revegetation Plan. It is estimated that it will take approximately two years to reclaim each slope and to complete the full Reclamation Plan after all mining has ceased.

Final Reclamation

Stockpiles, mining equipment and accessory structures will be removed at the conclusion of mining activities. Where the surface mining activities resulted in compaction of soil, ripping, disking or other means will be used in areas that will be revegetated to eliminate compaction and to establish a suitable root zone in preparation of planting and to increase infiltration of precipitation.

Prior to final reclamation, access roads, haul roads and other traffic routes will be stripped of remaining road base, ripped and covered with topsoil and subsoil and revegetated. The stripped material (e.g., road base and asphalt) will be ground up, mixed with excess fines from the mining operation, and placed in the bottom of the mine pits. The access roads shown on Attachment A, Figure 10 and 12 (refer to EIR Figures 9 and 10) and constructed as part of the mining operation will remain at the site during reclamation and monitoring process.

Table 6 Preliminary Seed Mix for Test Plot [1]

Species Name	Common Name	Lbs/Acre	Purity / Germination
Shrubs and Sub-Shrubs			
Ambrosia dumosa	Burro-weed	2	80/50
Atriplex canescens	Four-winged saltbush	2	90/40
Atriplex spinifera	Mojave saltbrush	3	95/20
Bebbia juncea	Sweetbrush	1	20/10
Brickellia californica	Brickelbush	1	10/20
Croton californicus var. mohavensis	Mojave Croton	1	90/30
Encelia farinosa	Brittlebush	3	40/60
Ephedra nevadensis	Mormon tea	3	90/50
Ericameria pinifolia	Goldenbush	2	10/30
Eriogonum fasciculatum	California buckwheat	4	50/10
Hymenoclea salsola	Cheesebush	3	95/60
Larrea tridentata	Creosote bush	4	70/40
Yucca brevifolia	Joshua Tree	2	90/70
Grasses and Herbs			
Acnatherum hymenoides	Indian ricegrass	4	95/80
Amsickia menziesii	Rancher's fireweed	1	40/50
Aristida purpurea	Purple three-awn	3	90/50
Festuca octoflora	Six-week fescue	2	90/50
Lotus strigosus	Stiff-haired lotus	2	90/70
Lupinus arizonicus	Arizona lupine	3	95/70
Plantago ovata	Desert plantain	10	95/85
Pleuraphis rigida	Big galleta	2	30/50
Sphaeralcea ambigua	Desert mallow	1	95/75
Sporobolus airoides	Alkali sakaton	2	95/80
	Total lbs per acres	**61**	
For hydroseeding, the following materials will be added to the hydroseed slurry: • 500 lbs per acre of cellulose wood fiber; and • 160 lbs per acre of organic soil stabilizer			

[1] Information obtained from S&S Seeds and Department of Conservation - Office of Mine Reclamation
Subject to revision and update as described in Section 5.2.2.

Soil Testing and Respreading

Respread soil will be tested for nutrient components prior to seeding and planting. Site samples will be compared to soil test results taken from adjacent, undisturbed areas. Respread soils will be augmented if growth inhibiting deficiencies of essential elements are noted

The slopes will be track-walked with a dozer, perpendicular to the slope. This will bind the re-applied topsoil to the subsoil.

Following the completion of each mining phase, salvaged soils will be respread onto mined slopes. Native vegetation established on the soil stockpiles can be spread with the soil. The broken branches of plants growing on the stockpiles will act as mulch after soil respreading, and will provide partial shade to emerging seedlings. In addition, viable seed will be transported in the seed bank and additional ripe seed may be carried along with the vegetation.

The depth of respread top- and sub-soils will be no less than 4 inches. Subsoil, mixed with no more than 5 percent of the fines, if necessary to obtain required depth, will be respread over the slopes and pit bottom. Topsoil will be spread as a final dressing. Site samples will be compared to soil test results from adjacent, undisturbed areas. Respread soils will be augmented if growth-inhibiting deficiencies in essential elements are noted.

Erosion Control

Erosion control is often necessary during the establishment phase, since vegetative cover is usually not adequate to prevent erosion. Angular gravel, ranging in size from 0.2 to 0.6 inches will be spread on the exposed fines at a rate that will provide not less than 50 percent and not more than 80 percent coverage. The gravel mulch will not be spread until all seeding and planting has been completed. Gravel mulch is usually more effective in desert environments than erosion control blankets or other conventional measures.

Maintenance

Maintenance includes activities required to meet the established performance criteria. Maintenance of revegetation areas includes the following:

Maintenance staff training – Prior to the commencement of maintenance activities, the Maintenance Contractor will attend a training session conducted at the site by the Revegetation Specialist to familiarize maintenance staff with the Project (i.e., the boundaries of the site, general requirements of the different habitats, and identification of native and non-native species). This training will include an overview of a Maintenance Manual prepared by the Revegetation Specialist, which will be distributed to the Maintenance Contractor during the training.

Weed control – During the maintenance period, weeds present in the revegetation areas will be removed if more than 25 percent of any 20 square foot of the area is occupied by weeds. Weeds will be removed before they produce seed or reach a height of six inches, whichever comes first.

Methods of weed removal – Weeds present in the revegetation areas will be removed manually or mechanically. No herbicide treatment will be permitted without specific, written authorization from the Revegetation Specialist.

Herbicide treatment guidelines – Spraying will be conducted only when weather conditions are conducive to effective uptake of the herbicide by the targeted species (e.g., sunny, dry, and when plants are actively growing), and during wind conditions that minimize herbicide drift (wind speeds of seven miles per hour less).

Replacement of dead or diseased plant materials – The Maintenance Contractor will be responsible for meeting the performance criteria outlined below. Seeded areas will be assessed annually until performance criteria have been met. If it is determined by the Revegetation Specialist at the time of assessment that supplemental seeding is needed to meet the performance criteria, this additional seeding will be undertaken by the Maintenance Contractor. If the Revegetation Specialist determines that reseeding is required, timing of the seeding is subject to the discretion of the Revegetation Specialist. Plantings that die will be replaced at the first suitable growing season in accordance with the performance criteria.

Monitoring Plan and Performance Criteria

Monitoring is designed to evaluate the success of the seeding and planting procedures and subsequent native plant growth over time and to implement contingency measures in the event the specified performance criteria are not achieved. Pursuant to § 2773(a) of SMARA, the success of reclamation will be monitored annually until performance criteria have been met, provided that, during the last two years, there has been no human intervention, including, for example, irrigation, fertilization, or weeding. Remedial measures will be implemented as necessary to achieve the performance criteria presented in Table 7.

The following performance criteria and the above specifications will be met by the Maintenance Contractor throughout the contracted maintenance period. The performance of the revegetation areas will be assessed just prior to the end of each year to determine whether the performance specifications are met. The performance criteria are as follows:

- No more than 25 percent non-native species occur in any 20 square foot area at any given time during the maintenance period.
- Non-native species do not exceed six inches in height or go to seed in any given area during the maintenance period.
- Percent Cover Standards are shown in Table 7 below.

Table 7 Revegetation Performance Criteria

Shrub and Forbs [1]	
Goal	Reestablish native vegetation exhibiting cover, density and species richness comparable to that of the undisturbed condition.
Performance Criteria	Overall cover: 50 percent of baseline Density: 50 percent of baseline Species Richness: 60 percent of baseline (Refer to Section 5.2.4, which describes the baseline surveys to be completed in advance of land disturbing activities in order to fully identify percent cover, density and species richness.)
Contingency Action	Hand weed if weeds interfere with native plant establishment and reseed if density and/or diversity of native plants are low.
Joshua Trees	
Goal	Reestablish over the entire Project site at a density 50 percent of the undisturbed condition. (Baseline conditions: Where Joshua trees are present, there are 3 to 5 trees per acre, with an estimated total population of 200.)
Performance Criteria	Density of two (2) trees per acre overall, where planted. Density will be increased on available level terrain, if tree reestablishment on slopes cannot be achieved at a density of two (2) trees per acre.
Contingency Action	Alter transplanting technique or increase number of relocated trees.
Erosion	
Goal	Erosion does not interfere with native plant establishment. Loss of topsoil from wind erosion is minimal.
Performance Criteria	Erosion control measures employed onsite are designed to capture and accommodate the Capital Flood flows described in the *Drainage Concept* (EIR Appendix 3 and its Addendum), which are considerably greater than the those of a 20-year, 1-hour intensity storm event. Evaluation of the effectiveness of erosion control measures and a check on slope stability will be conducted and recorded yearly as part of the SMARA annual inspection.
Contingency Action	Backfilling activities, if needed, will be conducted in accordance with the *Drainage Concept*.
Resistance to Invasion by Non-Natives	
Goal	Less than 25 percent of any 20 square foot area.
Performance Criteria	Weeds present in the revegetation areas will be removed if more than 25 percent of any 20 square foot area is occupied by weeds greater than six inches in height.
Contingency Action	Remove manually or mechanically. No herbicide treatment will be permitted without specific, written authorization from the Project Biologist/Revegetation Specialist.

[1] Subject to revision and update as described in Section 5.2.4.

To evaluate the success of the planting, and to weigh the need for weeding and replanting, performance criteria are presented in Table 7 above. Monitoring will be conducted annually by a third-party maintenance contractor until performance criteria are achieved. Test Plots will be subject to the performance standards and monitoring criteria described in Table 7.

Monitoring will consist of the Line-Intercept Method where a 100 meter measuring tape is stretched between two points. The intercept distance is recorded for each plant/species that intercepts the line. The accumulated length for any species, divided by the length of the transect, multiplied by 100, is expressed as percent cover for that species.

The Revegetation Specialist will monitor and evaluate the need for weeding and erosion control as well as plant establishment. Annual reports and recommendations will be submitted to the County of Los Angeles. Follow up monitoring will not cease until performance criteria have been met for two consecutive years without irrigation, weeding or other special maintenance.

The shrub density, cover and diversity goals were set by examining the existing conditions surrounding the site. Establishment of vegetation will be considered successful if the goals set in Table 7 are met.

Success rates falling under the performance criteria may indicate the need for a second or third revegetation effort. These performance values may be modified if restoration experience and knowledge gained during the project life span present more realistic goals. The standards take into account that younger shrubs will show lower cover values and higher density values than those seen in a more established habitat.

Traditional success criteria include survival rate of final vegetative cover. However, success can also be measured by assessing the fundamental characteristic of a functional ecosystem: sustainability, resistance to invasive species, nutrient retention and biotic interactions. Reliable signs of functional ecosystems are the presence of certain target “indicator” species: animals, insects and/or plants typically found in that ecosystem.

5.2.5 Performance Standards for Drainage, Diversion Structures, Waterways, and Erosion Control (California Resources Code § 3706)

Refer to the discussion below regarding Performance Standards for Stream Protection, Including Surface and Groundwater.

5.2.6 Performance Standards for Prime Agricultural Land Reclamation (California Resources Code § 3707)

This performance standard does not apply to the Project because it is not located on Prime Agricultural Land.

5.2.7 Performance Standards for Other Agricultural Land (California Resources Code § 3708)

This performance standard does not apply to the Project because it is not located on Agricultural Land.

5.2.8 Performance Standards for Building, Structure and Equipment Removal (California Resources Code § 3709)

Upon completion of the mining operation, stockpiled material, equipment, structures, and facilities will be dismantled and removed from the site. The ground surface under and around these structures and facilities will be uniformly graded and seeded in accordance with the approved Revegetation Plan, which is described in Section 5.2.4 above.

5.2.9 Performance Standards for Stream Protection, Including Surface and Groundwater (California Resources Code § 3710)

The Project will be operated in accordance with the following:

- General Permit for Storm Water Discharges Associated with Industrial Activities, NPDES No. CAS000001, Order No. 97-03-DWQ (General Permit) including the site-specific Storm Water Pollution Prevention Plan.
- Streambed Alteration Agreement (California Department of Fish and Game).
- Spill Prevention, Control, and Countermeasure Plan.
- Implementation of the *Drainage Concept* (EIR Appendix 3 and its Addendum) approved for the Project, which describes the use of berms along the all of the top slopes to direct surface flow toward the permanent system of interceptor drains and terraces.

5.2.10 Performance Standards for Topsoil Salvage, Maintenance, and Redistribution (California Resources Code § 3711)

Salvageable topsoil, an average of approximately four inches in depth, will be removed as a separate layer and stored in designated topsoil storage areas onsite. Most of the site is covered with cobbles and large rocks, and approximately 30 percent of the area contains a topsoil layer. To maintain the viability of topsoil removed from the site, it will be used as a top layer atop berms, once they have been constructed. Since the amount of topsoil needed to cover surfaces that will be revegetated is not present onsite, subsoil will also be salvaged and stored within the designated topsoil storage areas, separately from the topsoil layer. The process is described in detail in Section 5.2 above.

5.2.11 Performance Standards for Tailing and Mine Waste Management (California Resources Code § 3712)

The majority of the fines and unsalable material will be placed to develop a contoured bottom within the mining pits. This will serve as onsite mitigation of 3.32 acres potential CDFG jurisdictional drainages determined to exist on the Project site (refer to EIR Appendix 6 – Jurisdictional Delineation within the Proposed Lebata Ready Mix Concrete Site). In contouring the pit bottoms in this manner, the replacement drainages and habitat be developed similar to that of normal fluvial processes. The Streambed Alteration Agreement also describes how these areas will be revegetated as part of the onsite mitigation.

The remainder of the fines and unsalable material will be used in the revegetation effort or sold as slurry or other non-structural concrete.

5.2.12 Performance Standards for Closure of Surface Openings (California Resources Code § 3713)

The Project will not create, drill holes, portals, shaft or tunnels that would require abandonment. The water well used as the water source for aggregate processing and fugitive dust control will be maintained to support revegetation efforts, and abandoned at the end of final reclamation in accordance with all applicable federal, state and local laws.

5.3 Security and Public Safety

The reclamation slopes will be seeded to stabilize the soil, minimize erosion and slope failure and to alleviate any potentially dangerous conditions. Access to the slopes will not be permitted except to enter the reclamation area. Six-foot high cyclone fencing around the reclamation area will remain for the duration of the monitoring period, until the reclamation is deemed complete.

5.4 Future Mining

The excavation of sand and gravel at the Project site to the proposed mining depth will preclude the availability of additional materials at that location. It does not affect the availability of aggregate in the surrounding areas, which were also designated as having significant mineral resources.

6.0 REFERENCES

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Reclamation Plan
Lebata, Inc.
Big Rock Creek Surface Mining Project

ATTACHMENT A

Figures

Figure 1 Regional Map (refer to EIR Figure 1)

Figure 2 Vicinity Map (refer to EIR Figure 2)

Figure 3 Site Plan (refer to EIR Figure 3)

Figure 4 Assessor’s Parcel Map 1 (refer to EIR Figure 4)

Figure 5 Assessor's Parcel Map 2 (refer to EIR Figure 5)

Figure 6 Facilities Site Plan (refer to EIR Figure 6)

Figure 7 Aerial Site Plan (refer to EIR Figure 7)

Figure 8 Local Water Wells (refer to EIR Figure 17)

Figure 9 FEMA Map (refer to EIR Figure 19)

Figure 10 Mining Phase 1 – North Pit (refer to EIR Figure 9)

Figure 11 Mining Phase 2 – South Pit (refer to EIR Figure 10)

Figure 12 Mining Phase 3a – North Pit (refer to EIR Figure 11)

Figure 13 Mining Phase 3a – South Pit (refer to EIR Figure 12)

Figure 14 Mining Phase 3b – North Pit (refer to EIR Figure 13)

Figure 15 Final Reclamation – North Pit (refer to EIR Figure 14)

Figure 16 Final Reclamation – South Pit (refer to EIR Figure 15)

Reclamation Plan
Lebata, Inc.
Big Rock Creek Surface Mining Project

ATTACHMENT B

Policy of Title Insurance

Reclamation Plan
Lebata, Inc.
Big Rock Creek Surface Mining Project

ATTACHMENT C

Statement of Responsibility

Reclamation Plan
Lebata, Inc.
Big Rock Creek Surface Mining Project

ATTACHMENT D

Financial Assurance Cost Estimate

SESPE
CONSULTING, INC.

468 Poli Street, Suite 2E • Ventura, California 93001

2012 FINANCIAL ASSURANCE COST ESTIMATE

Big Rock Creek
Antelope Valley
County of Los Angeles, CA

CA Mine ID: Not yet assigned

August 21, 2012

Prepared for: Lebata, Inc.
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2012 FINANCIAL ASSURANCE COST ESTIMATE

Big Rock Creek
Los Angeles County, California

CA Mine ID: Not yet assigned

August 21, 2012

Certification Statement

This Financial Assurance Cost Estimate was prepared based on:

- Public Resources Code Section 2207(a)(9) and 2773.1;
- California Code of Regulations Title 14 Section 3804; and
- State Mining and Geology Board Financial Assurance Guidelines (revision dated January 16, 1997-A; July 23, 2004).

I hereby certify that:

- I am familiar with the requirements of the Surface Mining and Reclamation Act of 1975 and the Public Resources Code Section 2710.
- This Financial Assurance Cost Estimate has been prepared in accordance with good engineering practice.

John A. Hecht, P.E.
President
Sespe Consulting, Inc.

2012 FINANCIAL ASSURANCE COST ESTIMATE

Big Rock Creek
Los Angeles County, California

CA Mine ID: Not yet assigned

August 21, 2012

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2012 FINANCIAL ASSURANCE COST ESTIMATE

Big Rock Creek
Los Angeles County, California

CA Mine ID: Not yet assigned

August 21, 2012

1.0 EXECUTIVE SUMMARY

This Financial Assurance Cost Estimate (FACE) has been prepared for the Big Rock Creek site located in the Antelope Valley in an unincorporated area of Los Angeles County, California.

This FACE covers the period of July 1, 2012 to June 30, 2013.

The total reclamation cost was calculated to be $303,365.

2.0 BACKGROUND

The site is currently being permitted; at this time there are no active mining activities at the site.

The amount of Financial Assurance required is based on the anticipated mining and operating activities during the first year of operation after approval of the project. During this period, the operator anticipates mining about 50% percent of the proposed average annual production, or approximately 500,000 tons. This volume of mining will produce approximately 70,000 tons of excess unusable material.

The amount of the proposed Financial Assurance is adequate to cover the cost of returning the land to a state as required by the proposed Reclamation Plan; however, the final amount may need adjusting after approval of the project because of mitigation measures and conditions of approval that are be placed on the project.

During the first year of operations, the operator anticipates conducting the following tasks:

- Construct the processing area;
- Excavate approximately 500,000 tons (330,000 cubic yards) of material from Phase 1, Block 1;
- Construct a 30 foot asphalt roadway, 1,200 feet long;
- Cut and compact haul roads;
- Construct landscape berms per the approved reclamation plan;
- Stockpile 35,000 tons (23,500 cubic yards) of fines; and
- Stockpile 4,500 tons (3,000 cubic yards) of topsoil and subsoil.

The primary objective of the Reclamation Plan is to reclaim the site as open space, or possibly for use for groundwater recharge.

2.1 Current and Projected Site Conditions

The site is approximately 310 acres in size and is currently undeveloped. There are no mining operations or other industrial activities taking place at the site at this time. Currently, the site is undisturbed (0 acres disturbed). This FACE was prepared assuming that 35 acres will be disturbed in the first year of operation. Appendix 1 presents site figures.

2.2 Reclamation Activities

The following reclamation activities presented in the SMARA Financial Assurance Guidelines ("SMARA Guidelines") would need to be completed if the site were to be abandoned within the first year of operations:

- **Removal of haul / access roads:** Remove paved roadway.
- **Decompaction of staging / stockpile areas:** Decompact, scarify, and regrade compacted areas (roadways and plant area).
- **Topsoil replacement / redistribution**: Transport and distribute 4,500 tons (3,000 cubic yards) of topsoil from landscape berms around the processing area. Transport and distribute 35,000 tons (23,500 cubic yards) of stockpiled fines into cut portion of Phase 1, Block 1.
- **Finish grading:** The disturbed area will need to be graded to final contours.
- **Well closure:** This estimate assumes that one (1) water well will have to be removed.
- **Revegetation:** The disturbed surface area of the site (Phase 1, Block 1 and processing area) will be seeded.
- **Plant and equipment removal**: Processing equipment will be removed from the site.
- **Monitoring:** Revegetation monitoring to ensure adequate reclamation.

To ensure adequate reclamation of the site, this estimate assumes the following additional task will be performed as a part of reclamation:

- **Miscellaneous:** A Phase I Environmental Site Assessment will be prepared to assist the lead agency in determining the condition of the site and to identify issues that should be addressed as a part of reclamation.

The tasks listed above are discussed in Sections 3 through 7 of this document and cost calculations are presented in Appendix 2.

The following common reclamation activities would <u>not</u> need to be completed given the current site conditions and activities anticipated over the next 18 months:

- **Cleanup of boneyard areas:** There are no boneyard areas currently at the site or anticipated during the first year of operation.
- **Remediation of soil contamination**: There is no known soil contamination at this site.
- **Establish access restrictions**: The site will be reclaimed as open space. Access restrictions are not necessary.

2.3 Cost Estimate Calculation Methodology

This FACE is based on the remaining activities necessary to implement the Reclamation Plan for the site. It includes the cost of required physical improvements as well as various indirect costs, including mobilization and contingencies as described by the California State Mining and Geology Board's (SMGB) *Financial Assurance Guidelines.*

Where possible, specific unit equipment and labor costs were used. The cost and unit efficiency / capacity data were obtained from the following sources:

- *Means Heavy Construction Cost Data, 26th Annual Edition, 2012*;
- State Prevailing Wage Rates or "SPWR" (*General Prevailing Wage Determination Made by the Director of Industrial Relations, Pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773, and 1773.1;* http://www.dir.ca.gov/dlsr/pwd/Southern.html), effective through June 30, 2012 (as modified by predetermined rate increases), to determine labor rates;
- CalTrans Equipment Rates *(Labor Surcharge and Equipment Rental Rates (Cost of Equipment Ownership)),* effective April 1, 2012 through March 31, 2013 to determine equipment rental rates; and
- Caterpillar Handbook *(Caterpillar Performance Handbook, Edition 40*) to determine equipment capacity and cycle times.

The Office of Mine Reclamation (OMR) developed an MS Excel version of Appendix A-1 of the *Financial Assurance Guidelines* to assist lead agencies and operators preparing reclamation cost estimates in conformance with Section 2773.1 of SMARA. This tool was used to calculate estimated reclamation costs (see Appendix 2).

3.0 PRIMARY RECLAMATION ACTIVITIES

This section presents details regarding the primary reclamation tasks and the methodology used to calculate the costs for each. Appendix 2 presents detailed calculations for each task as well as a summary of costs.

3.1 Remove Paved Roadway

The 30 feet wide, 1,200 feet long asphalt roadway (4,000 square yards) will be demolished and the rubble will be distributed inside the cut portion of Phase 1, Block 1.

RS Means 024113.17-5050 is used to determine the cost to demolish the roadway. Note that the Means costs used in this estimate were increased by 1.3% to account for the location of the site. A Caterpillar 772 truck will then transport the rubble to Phase 1, Block 1, where it will be distributed with the stockpiled fines. It is assumed that each haul truck round trip takes 15 minutes.

3.2 Distribute Topsoil

Approximately 3,000 cubic yards of topsoil from the landscape berms will be spread over the processing area.

Two (2) Caterpillar 772 trucks will transport the topsoil to the processing area (average haul distance of 500 feet) and one loader will load the trucks. It is assumed that each haul truck round trip takes 15 minutes. A Caterpillar D8R dozer will then spread the material at a rate of 1,050 tons per hour (based on the Caterpillar Handbook). A water truck will be utilized to control emissions for 25% of the time.

CalTrans rental rates were used to determine the rental cost of the equipment. Hourly rates for the equipment operators were obtained from SPWR.

3.3 Distribute Stockpiled Fines

Approximately 23,500 cubic yards of stockpiled fines will be transported 500 feet and distributed inside the cut portion of Phase 1, Block 1.

Four (4) Caterpillar 772 trucks will transport the topsoil to the processing area (average haul distance of 500 feet) and one loader will load the trucks. It is assumed that each haul truck round trip takes 15 minutes. A Caterpillar D8R dozer will then spread the material at a rate of 1,050 tons per hour (based on CPH). A water truck will be utilized to control emissions for 25% of the time.

CalTrans rental rates were used to determine the rental cost of the equipment. Hourly rates for the equipment operators were obtained from SPWR.

3.4 Decompact and Grade Compacted Areas

Before revegetation, approximately 35 acres (1,525 MSF) of compacted surfaces will be decompacted and graded to smooth contours. These areas include the processing area and all roadways.

A Caterpillar 160H grader can decompact 1 acre per hour. A second pass will then be conducted to finish grade the area. A water truck will be utilized to control emissions for 25% of the total grader time.

CalTrans rental rates were used to determine the rental cost of the equipment. Hourly rates for the equipment operators were obtained from SPWR.

3.5 Well Closure

This estimate assumes that there will be one 500' well at the site that must be closed.

RS Means 024113.76-0500 is used to estimate the cost of pump removal and RS Means 024113.76-100 is used to calculate the cost of well screen and casing removal. Note that the Means costs used in this estimate were increased by 1.3% to account for the location of the site.

4.0 REVEGETATION

This section presents details regarding the revegetation tasks remaining and the methodology used to calculate the costs for each. Appendix 2 presents detailed calculations for each task as well as a summary of costs.

Approximately 35 acres (1,525 MSF) will be seeded with a native seed mix.

RS Means Section 329219.14-5700 was used to determine the labor, equipment, and material costs. Note that the Means costs used in this estimate were increased by 1.3% to account for the location of the site.

Monitoring

Costs to monitor the revegetation efforts are addressed in Section 7 of this document.

5.0 PLANT STRUCTURE AND ANCILLARY EQUIPMENT REMOVAL

The plant equipment and associated support structures will be purchased new; therefore, the salvage value of the equipment is assumed to be greater than the removal cost. A contingency cost of $10,000 is assigned for this task to account for equipment mobilization and other associated costs.

6.0 MISCELLANEOUS COSTS

This estimate assumes that a Phase I Environmental Site Assessment will be prepared to assist the lead agency in determining the condition of the site and identifying any issues that should be addressed as a part of reclamation.

7.0 MONITORING / MAINTENANCE

The Reclamation Plan calls for monitoring to evaluate the success of revegetation and subsequent native plant growth over time and to implement contingency measures in the event that the specified performance criteria are not achieved.

Maintenance

Removal of non-native weeds will be conducted twice each year for three (3) years. A combination of mechanical and chemical methods will be used. Mechanical treatment will involve the use of a weed trimmer, where necessary, to remove large stands of tall invasive species, such as castor bean or fennel. Cut stems will be sprayed with Roundup. This estimate assumes that each site visit will require two (2) landscape maintenance laborers two (2) days each to conduct maintenance activities (i.e., 8 man days or 64 man hours per year).

Monitoring / Reporting

This estimate assumes that annual visits will be performed, and a report prepared, by a qualified biologist for five (5) years. The following activity level was assumed:

- Prepare for and conduct an annual site visit (biologist, 8 hours, $115/hour); and
- Prepare an annual report (biologist, 8 hours, $115/hour).

The biologist rate of $115/hour was provided by Aspen Environmental (see Appendix 3).

8.0 INDIRECT COSTS

Supervision

Project inspection and supervision is usually performed by a consultant or staff member with experience in reclamation of disturbed lands. Management activities include but are not limited to recommending change orders, verifying completed work, and verifying compliance with project specifications. The cost factor for management was calculated by the OMR spreadsheet.

Profit and Overhead

In the event that a third party must be retained to do the reclamation work, profit and overhead costs must be added to the total reclamation cost estimate. Profit and overhead are not included in the reclamation cost sheets. The cost factor for profit and overhead was calculated by the OMR spreadsheet.

Contingencies

Contingency costs are included in the financial assurance estimates to provide for project uncertainties and unexpected natural events. A contingency cost was calculated by the OMR spreadsheet.

Mobilization

Mobilization costs are required to move equipment to the project site for reclamation activities. These costs normally range from one to five percent of the total direct cost of the reclamation activities and vary depending upon the site location. A mobilization cost of 5% of the total direct cost of reclamation is assumed in this FACE.

Lead Agency Administrative Cost

An administrative cost of 10% of the total direct and indirect costs has been included in the FACE to account for lead agency costs to implement the Reclamation Plan.

APPENDIX 1

FIGURES

See Figures in EIR

APPENDIX 2

RECLAMATION COST CALCULATIONS

Financial Assurance Guidelines

APPENDIX A-1

[EXAMPLE]

Department of Conservation
Financial Assurance Cost Estimate
Form OMR-23 **(BETA VERSION)**

FINANCIAL ASSURANCE COST ESTIMATE

FOR

Big Rock Creek

CA MINE ID #91- Not yet assigned

Prepared by:

Sespe Consulting, Inc.
468 Poli Street, Suite 2E
Ventura, CA 93001

Date: 8/21/2012

Note: This worksheet should be used in conjunction with the *Financial Assurance Guidelines* adopted by the State Mining and Geology Board, and good cost estimating practices.

I. PRIMARY RECLAMATION ACTIVITIES

Description of Task:

Remove asphalt roadway

Methods to be Used:

RS Means 024113.17-5050 is used to estimate the cost to demolish and remove the road. The Means cost was increased by 1.3% to account for the RS Means location factor for Mojave. A haul truck will transport the material to Phase 1, Block 1 where it will be spread with the stockpiled fines.

Miscellaneous Information

Road Width (ft):	30	Volume (cy)	2,000	Haul truck cycles/hr	4
Road Length (ft):	1,200	Asphalt Density (ton/cy)	1.5	Haul duration (hrs)	15
Road Area (sq ft):	36,000	Asphalt Weight (tons)	3,000		
Road Area (sq yd):	4,000	Haul Size (tons)	50		

A. Equipment - List equipment required to complete identified task. For large reclamation jobs separate mine areas for ease of accounting

Equipment	$/Unit	Units	Cost ($)
RS Means 024113.17-5050	$2.86	4,000	$11,427
Cat 772 Truck (1 total)	$235.14	15	$3,527
			$0
			$0

Total Equipment Cost for this Task = $14,954

B. Labor - List all labor categories to complete identified task

Labor Category	$/Unit	Units	Cost ($)
RS Means 024113.17-5050	$3.83	4,000	$15,317
Group VIII Teamster (1 total)	$51.16	15	$767
			$0
			$0

Total Labor Cost for this Task = $16,084

C. Materials - List all materials required to complete identified task (include disposal costs).

Item	Quantity	$/Unit	Cost ($)
	0	$0.00	$0
	0.00	$0.00	$0
	0.00	$0.00	$0

Total Materials Cost for this Task = $0

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$31,038**

I. PRIMARY RECLAMATION ACTIVITIES

Description of Task:

Distribute topsoil from landscape berms over processing area.

Methods to be Used:

Approximately 3,000 cubic yards of topsoil (4,500 tons) from the landscape berms will be spread over the processing area. Two trucks will transport the material, one loader will load the trucks, and one dozer will spread the material. A water truck will be used 25% of the time.

Miscellaneous Information

Topsoil quantity (tons)	4,500	Haul Size (tons)	50	Dozer Rate (tph)	1,050
Average haul distance (ft)	500	Haul duration (hrs)	23	Dozer duration (hrs)	5
Haul truck cycles/hr	4.0	Loader duration (hrs)	12	Water truck (hrs)	3

A. Equipment - List equipment required to complete identified task. For large reclamation jobs separate mine areas for ease of accounting

Equipment	$/Hour	# of Hours	Cost ($)
Cat 772 Truck (2 total)	$235.14	23	$5,408
980H Loader (1 total)	$207.37	12	$2,488
Caterpillar D8R (1 total)	$184.54	5	$923
6,000 gal Water Truck (1 total)	$59.31	3	$178

Total Equipment Cost for this Task = $8,997

B. Labor - List all labor categories to complete identified task

Labor Category	$/Hour	# of Man-hours	Cost ($)
Group VIII Teamster (2 total)	$51.16	23	$1,177
Group 8 Operating Engineer (1 total)	$61.78	12	$741
Group 8 Operating Engineer (1 total)	$61.78	5	$309
Group V Teamster (1 total)	$50.63	3	$152

Total Labor Cost for this Task = $2,379

C. Materials - List all materials required to complete identified task (include disposal costs).

Item	Quantity	$/Unit	Cost ($)
(None)	0.00	$0.00	$0
	0.00	$0.00	$0
	0.00	$0.00	$0

Total Materials Cost for this Task = $0

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$11,376**

I. PRIMARY RECLAMATION ACTIVITIES

Description of Task:

Distribute stockpiled fines inside the cut portion of Phase 1, Block 1.

Methods to be Used:

Approximately 23,500 cubic yards of fines (35,250 tons) from the fines piles will be spread over Phase 1, Block 1. Four trucks will transport the material, one loader will load the trucks, and one dozer will spread the material. A water truck will be used 25% of the time.

Miscellaneous Information

Topsoil quantity (tons)	35,250	Haul Size (tons)	50	Dozer Rate (tph)	1,050
Average haul distance (ft)	500	Haul duration (hrs)	176	Dozer duration (hrs)	34
Haul truck cycles/hr	4.0	Loader duration (hrs)	44	Water truck (hrs)	11

A. Equipment - List equipment required to complete identified task. For large reclamation jobs separate mine areas for ease of accounting

Equipment	$/Hour	# of Hours	Cost ($)
Cat 772 Truck (4 total)	$235.14	176.0	$41,385
980H Loader (1 total)	$207.37	44.0	$9,124
Caterpillar D8R (1 total)	$184.54	34.0	$6,274
6,000 gal Water Truck (1 total)	$59.31	11.0	$652

Total Equipment Cost for this Task = $57,436

B. Labor - List all labor categories to complete identified task

Labor Category	$/Hour	# of Man-hours	Cost ($)
Group VIII Teamster (4 total)	$51.16	176.0	$9,004
Group 8 Operating Engineer (1 total)	$61.78	176.0	$10,873
Group 8 Operating Engineer (1 total)	$61.78	176.0	$10,873
Group V Teamster (1 total)	$50.63	176.0	$8,911

Total Labor Cost for this Task = $39,662

C. Materials - List all materials required to complete identified task (include disposal costs).

Item	Quantity	$/Unit	Cost ($)
(None)	0.00	$0.00	$0
	0.00	$0.00	$0
	0.00	$0.00	$0

Total Materials Cost for this Task = $0

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$97,097**

I. PRIMARY RECLAMATION ACTIVITIES

Description of Task:

Decompact and grade processing area and roadways (35 acres)

Methods to be Used:

A Caterpillar 160H grader can decompact 1 acre per hour. A second pass will be conducted to grade the areas. To control dust emissions, a water truck will be utilized for 25% of the total task time.

Miscellaneous Information

Area to decompact (acres)	35	Water Truck (hrs)	18		
Grader rate (acres/hr)	1				
Grader duration (hrs)	70				

A. Equipment - List equipment required to complete identified task. For large reclamation jobs separate mine areas for ease of accounting

Equipment	$/Hour	# of Hours	Cost ($)
Caterpillar 160 H (1 total)	$105.62	70.0	$7,393
6,000 gal Water Truck (1 total)	$59.31	18.0	$1,068
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Equipment Cost for this Task = $8,461

B. Labor - List all labor categories to complete identified task

Labor Category	$/Hour	of Man-hours	Cost ($)
Group 8 Operating Engineer (1 total)	$61.78	70.0	$4,325
Group V Teamster (1 total)	$50.63	18.0	$911
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Labor Cost for this Task = $5,236

C. Materials - List all materials required to complete identified task (include disposal costs).

Item	Quantity	$/Unit	Cost ($)
(None)	0.00	$0.00	$0
	0.00	$0.00	$0
	0.00	$0.00	$0

Total Materials Cost for this Task = $0

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$13,697**

I. PRIMARY RECLAMATION ACTIVITIES

Description of Task:

A 500 foot well will be abandoned.

Methods to be Used:

RS Means 024113.76-0500 is used for the pump removal task and RS Means 024113.76-1000 is used for the well screen and casing removal task. The Means cost was increased by 1.3% to account for the RS Means location factor for Mojave.

Miscellaneous Information

# of wells	1		
Vertical Linear Feet	500		

A. Equipment - List equipment required to complete identified task. For large reclamation jobs separate mine areas for ease of accounting

Equipment	$/Unit	# of Units	Cost ($)
RS Means 024113.76-0500	$617.93	1.0	$618
RS Means 024113.76-1000	$9.12	500.0	$4,559
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Equipment Cost for this Task = $5,176

B. Labor - List all labor categories to complete identified task

Labor Category	$/Unit	# of Units	Cost ($)
RS Means 024113.76-0500	$795.21	1.0	$795
RS Means 024113.76-1000	$4.79	500.0	$2,396
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Labor Cost for this Task = $3,191

C. Materials - List all materials required to complete identified task (include disposal costs).

Item	Quantity	$/Unit	Cost ($)
(None)	0.00	$0.00	$0
	0.00	$0.00	$0
	0.00	$0.00	$0

Total Materials Cost for this Task = $0

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$8,367**

II. REVEGETATION

Description of Task:

Revegetation

Methods to be Used:

Approximately 35 acres (1,525 MSF) will be seeded with a native seed mix. RSMeans 329219.14-5700 (tractor spreader and wildflower seeds) is used for labor, equipment, and material costs. The costs were increased by 1.3% to account for the RS Means location factor for Mojave.

A. Equipment - List equipment required to complete identified task.

Equipment	$/MSF	# of MSF	Cost ($)
RS Means Section 329219.14-5700	$4.81	1,525	$7,338
	$0.00	0.0	$0
	$0.00	0.0	$0

Total Labor Cost for this Task = $7,338

B. Labor - List all labor categories to complete identified task.

Labor Category	$/MSF	# of MSF	Cost ($)
RS Means Section 329219.14-5700	$6.99	1,525	$10,659.3
	$0.00	0.0	$0.0
	$0.00	0.0	$0.0

Total Equipment Cost for this Task = $10,659

C. Materials - List all material required to complete identified task.

Item / Plant Species	Unit of Measure	# of Units	$/Unit	Cost ($)
RS Means Section 329219.14-5700	MSF	1,525	$8.76	$13,363
		0.0	$0.00	$0
		0.0	$0.00	$0
		0.0	$0.00	$0
		0.0	$0.00	$0
		0.0	$0.00	$0
		0.0	$0.00	$0

Total Materials Cost for this Task = $13,363

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Materials Cost = **$31,360**

III. PLANT STRUCTURES AND EQUIPMENT REMOVAL

Description of Task:

Remove plant structures and equipment.

Methods to be Used:

The plant equipment and associated support structures will be purchased new; therefore, the salvage value of the equipment is assumed to be greater than the removal cost. A contingency cost of $10,000 is assigned for this task to account for equipment mobilization and other associated costs.

A. Equipment - List equipment required to complete identified task.

Equipment	$ / Each	Hours	Cost ($)
			$0
			$0
			$0
			$0

Total Labor Cost for this Task $0

B. Labor - List all labor categories to complete identified task.

Labor Category	$/Unit	Hours	Cost ($)
			$0
			$0
			$0
			$0

Total Equipment Cost for this Task $0

C. Demolition - List all structures and equipment to be dismantled or demolished.

Structure / Equipment	Type of Material	Units	Unit Cost Basis	Disposal Cost	Cost ($)
(None)					$0
					$0
					$0
					$0

Total Materials Cost for this Task $0

D. Direct Cost for this Task

Equipment Cost + Labor Cost + Demolition Cost = **$10,000**

(Sections "C" and "D" have been automated)

E. Surplus / Salvage Value

1. **Total cost to remove plant structures and equip for which salvage value is being claimed. (This is obtained from values already entered in A, B, & C above. No entry needed if salvage value is not being claimed)	$10,000
2. Net salvage value of the plant structures and equipment.* (no entry if salvage value is not being claimed)	$0
3. Subtract Line 2 from Line 1. (allowable credit for salvage value)	$0
4. Total plant structure and misc structure demo costs	$10,000

*NOTE This is the value of plant structures, buildings and equipment on a salvage basis -- e.g. after the structures and equipment have been removed for sale or use off-site. In order to include net salvage value in the financial assurance calculation, the operator must provide a letter of agreement, signed contract, bid, or quote from an independent company which provides industrial dismantling or equipment salvage services, or is in the business of buying and selling scrap metals or similar products.

**Note This value must be obtained by manually adding items previously entered in sections A, B, & C that are related to removal of items for which salvage value is being claimed. This manual step is necessary in order to apply salvage value only towards costs of removing equipment for which salvage is being claimed, not towards other demolition costs.

IV. MISCELLANEOUS COSTS

Examples of this type of cost could include temporary storage of equipment and materials off site, special one-time permits (I.e. transportation permits for extra wide overweight loads, etc.), decommissioning a process mill (I.e. decontamination of equipment), or disposal of warehouse inventories.

Item / Task	Quantity	$/Unit	Cost ($)
Phase 1 Site Assessment	1.0	$5,000.00	$5,000
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0
	0.0	$0.00	$0

Total Miscellaneous Costs **$5,000.00**

V. MONITORING

Monitoring Task	$/Hour	Man Hours/Year	# of Monitoring Years	Cost ($)
Maintenance	$9.15	64.0	3.0	$1,756
Monitoring / Reporting	$115.00	16.0	5.0	$9,200
	$0.00	0.0	0.0	$0
	$0.00	0.0	0.0	$0
	$0.00	0.0	0.0	$0

Total Monitoring Costs **$10,956**

VII. SUMMARY OF COSTS

Total of all Primary Activities Costs		$153,208
Total of all Revegetation Costs		$31,360
Total of all Plant Structures & Equipment Removal Costs (corrected for salvage)		$10,000
Total of all Miscellaneous Costs		$5,000
Total of all Monitoring Costs		$10,956
	Total of Direct Costs	$210,524
Supervision (5%)	(based on graph no. 1)	$10,526
Profit/Overhead (11%)	(based on graph no. 2)	$23,158
Contingencies (10%)	(based on "C" in section VI.)	$21,052
Mobilization (5%)	(1% to 5%)	10,526.19
	Total of Indirect Costs	$65,262
	Total of Direct and Indirect Costs	$275,786
(calculated at % of Direct plus Indirect Costs) 10%)	Lead Agency Administrative Cost* (Determined by the Lead Agency or OMR, SMARA 3802 (b))	$27,579
	Total Estimated Cost of Reclamation	**$303,365**

***NOTE** The Financial Assurance Guidelines recommend that when reviewing and approving a financial assurance cost estimate, lead agencies should include their administrative cost to draw on the financial assurance and implement the reclamation plan, should it become necessary.

APPENDIX 3

SUPPORTING DOCUMENTATION

ASPEN ENVIRONMENTAL RATE SHEET
CALTRANS RENTAL RATES
STATE PREVAILING WAGE RATE
MEANS COST DATA

5020 Chesebro Road, Suite 200, Agoura Hills, CA 91301
Tel. 818-597-3407, Fax 818-597-8001, www.aspeneg.com

Aspen Environmental Group
2011- 2012 Fee Schedule

Prepared for Sespe Consulting
Environmental Compliance Services

Fully Burdened Hourly Labor Rates

Sr. Associate III	Environ./Life Scientist	$175.00
Sr. Associate II	Environ./Life Scientist	$165.00
Associate III	Environ./Life Scientist	$115.00
Associate II	Environ./Life Scientist	$85.50
Associate II	Environ./Life Scientist	$95.00
Associate I	Environ./Life Scientist	$82.50
Staff II	Environ./Life Scientist	$84.00
Staff II	Management/Administraive	$83.00
Staff I	Environ./Life Scientist	$68.75
Staff I	Management/Administraive	$65.00
Technician	Management/Administraive	$42.00

*All non-labor costs (including subcontractors) will be billed at cost + 10% Aspen fee.
These rates are good through 12/31/2012

State of California
Business, Transportation, and Housing Agency

Department of Transportation
Division of Construction

Labor Surcharge and Equipment Rental Rates

(Cost of Equipment Ownership)

Effective April 1, 2012 through March 31, 2013

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FOR DOUBLE-SIDED PRINTING

USER'S GUIDE
FOR LABOR SURCHARGE AND EQUIPMENT RENTAL RATES
April 1, 2012 - March 31, 2013

Equipment Rental Rates are available on the Internet at:

http://www.dot.ca.gov/hq/construc/equipmnt.html

Miscellaneous Equipment Rental Rates are available on the Internet at:

http://www.dot.ca.gov/hq/construc/misceqrr/index.htm

The miscellaneous listing is updated daily.

Changes

Books are no longer available in hard copy and should be downloaded from the internet and printed.
Changes to the equipment rates in the April 1, 2012 book are the result of: 1) fuel costs increased; 2) interest rates decreased; 3) Producers' Price Index increased; 4) decrease in sales tax; and 5) no change in freight (F.O.B.) rates.

Labor Surcharge

The labor surcharge compensates the contractor for statutory payroll items stipulated by various governmental agencies. The six items included are Workers' Compensation, Social Security, Medicare, Federal Unemployment, State Unemployment, and State Training taxes. The general rate is an average of the job classifications common to Caltrans projects. Changes to the labor surcharge in the April 1, 2012 book were the result of an increase in Worker's Compensation rates. The rates were derived from using the pure premium rate approved by the Insurance Commissioner effective January 1, 2012 and increasing it by the historical statewide average expense. In the calculation of the labor surcharge for overtime work, the Worker's Compensation is not included on the premium portion of overtime, as provided by Worker's Compensation regulations.

The surcharge percentage to be applied to the actual wages paid as provided in Section 9-1.03A(1b) of the Standard Specifications will **be 13 percent for regular time (RT)** and **12 percent for overtime (OT)**.

Exceptions to the general rate are listed below. The classifications were chosen because of very high Workers' Compensation Insurance costs. Questions, regarding worker’s compensation rating and proper labor surcharge usage, will be forwarded to the rental rate personnel in the Division of Construction.

EXCEPTIONS

Type of Work Performed	Labor Surcharge Percent	
	RT	**OT**
Concrete Construction - Bridge	**16**	**14**
Drilling	**17**	**15**
Fence & Guardrail Construction	**14**	**13**
Erection of structural metal for metal bridges, excluding sign bridge	**18**	**16**
Landscape Gardener	**13**	**12**
Mobil Crane & Hoist Service	**17**	**15**
Painting Steel Structures or Bridges	**18**	**16**
Pile Driving, not including drilled, cast-in-place concrete piles	**15**	**14**
Sign Erection or Repair	**21**	**18**
Wrecking & Demolition	**14**	**13**

For work that is determined by the Engineer to be covered by Longshoreman and Harbor Worker's Act, an appropriate labor surcharge will be established by the Division of Construction.

Background

By the authority described in Standard Specifications Section 9-1.03A, compensation for extra work is determined to be the total of the direct equipment costs (rental rate) plus a 15 percent markup for all overhead not included as direct costs. The direct costs include fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance, depreciation, storage, cost of facilities capital, overhaul and all incidentals. The labor costs required to provide the above listed items are also included. The operator cost is not included in the equipment rate.

The calculated rate represents the cost of owning and operating the equipment, which is likely to be lower than the rate charged by a rental yard. The rental yard rate may include additional overhead and profit as well as a premium for short-term rentals. In certain situations, factors are applied to the calculated rates to provide ownership-only rates for delay situations or operating-only rates for overtime situations. The rates are calculated using factors for the direct cost items described above. The factors represent an average and are applied to all makes and models of equipment within the class. **All rates are hourly, unless stated otherwise.**

Overtime and Multiple Shifts

Certain equipment costs are fixed on an annual basis, no matter how many hours are worked. Once an estimate of the costs and hours of use is made, a rate can be determined. When more than the estimated number of hours are worked (Overtime or Multiple Shift), a duplication of payment occurs on the fixed cost portion of the equipment rate.
In order to avoid this duplication, Caltrans uses a reduced rate for the Overtime or Multiple Shift situations. The definition of the Overtime or Multiple Shift periods will be:

Overtime hours occur after the equipment has worked at force account, eight hours per day (or after the daily equivalent of forty hours per week for special work schedules - 4/10 or 9/80). Multiple shift hours will be paid at the same rate as overtime hours.

The hours shown on the Daily Extra Work Bill will determine when the Overtime and Multiple Shift is to be used. **When the hours worked on force account are eight or less, straight time rates will be used**. When the hours worked on force account are more than eight, Overtime and Multiple Shifts rates will be used. Saturday, Sunday or holiday work will be paid at the overtime rate except in those cases where these days are considered working days in the special provisions.

Be advised the computed overtime rates are no longer rounded and now equal the product of the straight time rate and overtime factor. The Overtime and Multiple Shift Factors are recalculated annually to reflect changes in the operating costs.

Right of Way Delay

As described in Section 8-1.09 of the Standard Specifications, the Right of Way Delay Factor applied to the equipment rental rate will be the basis for compensation for idle equipment time on Right of Way Delays. The factor has been calculated to include the ownership costs without including operating costs. The Right of Way Delay Factor recovers all the contractor's non-operating costs in an eight hour day. Payment for equipment on Right of Way Delay is limited to eight hours per day or forty hours per week maximum.

The NONOP class for non-operated items and the TRAFC class for traffic safety devices have been separated from traditional "rolling stock" equipment when calculating the Delay Factor. These classes are comprised of items whose depreciable lives are related to the number of uses per year, rather than the number of hours per year. Accordingly, the reasonable compensation for the Contractor's actual loss has been estimated to equal the cost of facilities capital. **It should be recognized that these items must be out of service before the Delay Factor is applied. For example, if work behind K-rail is delayed, the K-rail should be paid straight time until it is no longer controlling traffic.**

Any use of this factor must have the prior approval of the Resident Engineer. The Right of Way Delay Factor is recalculated annually to reflect changes in the operating costs.

Use of Daily Extra Work Bill

Identification codes and rates are intended to be used with the Caltrans Daily Extra Work Bill (CEM-4902 Series). The class is abbreviated using a 5 digit alpha-code, the make (manufacturer), a 4 digit alpha-code, and the code a 7 digit alpha-numeric code. All three codes must be used to define the equipment when using the automated pay system. Since the majority of items are described by per hour rates, each line has an entry for hours with an allowable maximum of 24. Special items with other than hourly rates should be appropriately checked and then entered in the Regular Hours column. For example, 50 Traffic Cones used 3 days (converts to 1.5, 100-cone-days) requires 1.5 be entered in the Regular Hours column. Note that any entry in the Delay Factor column will automatically apply the Delay Factor to every equipment entry on the current report.

Whenever an identification code cannot be found or the rate for a particular date of work performed is not available, updated information should be requested from the Resident Engineer. It is the Resident Engineer's responsibility to establish rates for equipment not found in the Labor Surcharge and Equipment Rental Rates publication. Support for this determination is available from both District and Headquarters Construction Offices. **Rates are regularly superseded during contract periods, so use of old publications or expired rates should be avoided**.

The equipment is presented with a standard configuration capable of performing work commonly encountered on Caltrans projects. Special attachments or accessories are described under the classification heading in the Labor Surcharge and Equipment Rental Rate book. Attachments other than those described by these remarks will be paid only upon direction of the Resident Engineer.

EQUIPMENT RENTAL RATE

NOTE--THE FOLLOWING RATES ARE IN EFFECT FROM APRIL 1, 2012 THROUGH MARCH 31, 2013

ATTACHMENTS

TRACTOR ATTACHMENTS -including power control units and accessories necessary to provide a functional attachment. Dozer blades are included in the standard configuration for both crawler and heavy, rubber tire tractors. Rippers are listed from R1 to R8 and Winches for logging or towing are listed from S1 to S5. Equipment model groups are as follows:

1. Case 300 Thru 800 Series, Cat D-2 thru D-4, Deere 400 & 450, Dresser TD-7, TD-8 and TD-9, Fiat-Allis FD-5 Thru FD-7, Komatsu D21E Thru D37P, Liebherr PR711 & PR721.
2. Case 1150, Cat D-5, Deere 750, Dresser TD-12, Fiat-Allis FD9 & 10, Komatsu D58P, Liebherr PR731.
3. Case 1450 and 1550, Cat D-6, Deere 850, Dresser TD-15, Komatsu D63PE Thru D68P, Liebherr PR741.
4. Cat D-7 & 814, Dresser TD-20, Fiat-Allis 14 & FD14, Komatsu D83P, Terex 82-30
5. Cat D-8 & 824, Dresser TD-25, Fiat-Allis FD20 Komatsu D135A, Terex 82-40 Michigan 280, Raygo CHD 17 & CD-500.
6. Cat D-9 & 834, Fiat-Allis FD30, Raygo CHD 24 & CD 800.
7. Cat D-10, Dresser TD-40, Fiat-Allis FD40, Komatsu 375, Michigan 380, Raygo CDH 30.
8. Cat D-11, Fiat-Allis FD50, Komatsu 475

Model	Code	Rate
Clam action bucket 1 CY & Less	**C1**	$3.64
Clam action Over 1 CY to 2 CY	**C2**	$6.41
Clam action Over 2 CY to 3.5 CY	**C3**	$9.28
Clam action Over 3.5 CY to 5 CY	**C4**	$13.23
Clam action bucket Over 5 CY	**C5**	$18.28
Ripper on No. 1 models	**R1**	$2.19
Ripper on No. 2 models	**R2**	$2.87
Ripper on No. 3 models	**R3**	$4.78
Ripper on No. 4 models	**R4**	$5.42
Ripper on No. 5 models	**R5**	$8.90
Ripper on No. 6 models	**R6**	$14.06
Ripper on No. 7 models	**R7**	$16.31
Ripper on No. 8 models	**R8**	$27.11
Winch on No. 1 models	**S1**	$2.59
Winch on No. 2 models	**S2**	$3.87
Winch on No. 3 models	**S3**	$5.12
Winch on No. 4 models	**S4**	$6.58
Winch on No. 5 models	**S5**	$11.51
Lift gate	**TG**	$0.75
Pump, water truck only	**TP**	$5.13
Winch, truck	**TW**	$0.27
Gas welding hose per 15.2 m (50 lf)	**WH**	$0.02
Elec welding lead per 30.5 m (100 lf)	**WL**	$0.16

AIR COMPRESSOR [AIRCP]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.89**

All types of self contained units, regardless of power (gas, diesel and lpg) or type of compression (reciprocating, screw and vane). The listed rates include 15.2 meters (50 lineal feet) of hose, all hose whips, fittings, couplings and any compressor attachments. Listed in accordance with mfr's rated capacity in liters per second (cubic feet per minute) at 7 bar (100 psi).

PORTABLE **[PORT]**

OVER	TO	Code	Rate
0	19 (40)	**000-004**	$5.03
19 (40)	76 (160)	**004-016**	$18.69
76 (160)	118 (250)	**016-025**	$20.01
118 (250)	212 (450)	**025-045**	$34.31
212 (450)	354 (750)	**045-075**	$57.24
354 (750)	566 (1200)	**075-120**	$82.64
566 (1200)	708 (1500)	**120-150**	$108.09

AIR DRILLS, CRAWLER [AIRDL]

DELAY FACTOR = 0.48 **OVERTIME FACTOR = 0.56**

All types, pneumatically propelled, including attachments. Expendable carbon drill steel, bits and shanks shall be paid by separate invoice. Rated in accordance with the cylinder bore diameter in millimeters(inches).

CRAWLER DRILLS **[CLR]**

OVER	TO	Code	Rate
0	100 (4)	**0-4**	$22.47
100 (4)	& Over	**5**	$22.98

AIR TOOLS [AIRTO]

DELAY FACTOR = 0.61 **OVERTIME FACTOR = 0.42**

All types including paving breakers, clay spades and diggers, sinker rock drills, trench diggers, sheeting/spike drivers, backfill tampers and hand held grinding tools. Expendable drill steel, bits and breakers points, grinding wheels and shanks shall be paid by separate invoice. Rated by tool weight in kilograms (pounds), determined in accordance with the mfr's specifications.

AIR TOOLS **[ATOL]**

OVER	TO	Code	Rate
0	4.5 (10)	**0-10**	$0.37
4.5 (10)	9.1 (20)	**10-20**	$0.40
9.1 (20)	13.6 (30)	**20-30**	$0.73
13.6 (30)	18.1 (40)	**30-40**	$0.86
18.1 (40)	27.2 (60)	**40-60**	$0.93
27.2 (60)	& Over	**60**	$1.31

ASPHALT DIKE & SHOULDER PAVERS [ASDSP]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.91**

Includes all attachments, accessories and automatic grade and line control.

A.C. DIKE COMPANY **[ACDC]**

Model	Code	Rate
No. 1	**4050**	$73.42
No. 2	**4052**	$59.56
Nos. 43, 44	**4054**	$79.36

ASPHALT PAVING COMPANY **[APCO]**

Model	Code	Rate
E-1	**4000**	$99.84
E-2, E3	**4002**	$178.60

BLAW-KNOX **[B-K]**

Model	Code	Rate
RW-35 / 38	**4075**	$69.84
RW-85	**4077**	$36.65
RW-95	**4079**	$58.71
RW-100	**4081**	$101.67
RW-195D	**4083**	$139.96

DELTA **[DLTA]**

Model	Code	Rate
DC-1	**4095**	$140.87

ASPHALT PAVERS [ASPAV]

DELAY FACTOR = 0.17 **OVERTIME FACTOR = 0.86**

Includes all attachments, accessories and automatic grade and line control.

BARBER-GREENE **[B-G]**

Model	Code	Rate
BG 220	**0805**	$88.21
BG 225	**0810**	$95.68
BG 240	**0815**	$103.91
BG 245	**0820**	$113.70
BG 260	**0825**	$133.64
BG 260B	**0826**	$172.33
BG 265	**0830**	$151.04
RT 435, 4wd	**0905**	$111.73
RT 445, 4wd	**0925**	$108.55
RT 455, 4wd	**0945**	$106.60
RT 455, 4wd, 10-20' screed	**0955**	$110.36
RT 465, 4wd	**0965**	$140.83
SA 125	**1419E**	$84.28
SB 131	**1420**	$104.34
SB 140	**1425**	$129.03
SA 141	**1430**	$88.74
SA 145	**1432**	$111.31
SA 150	**1435**	$140.61
SB 170	**1440**	$142.66

BLAW-KNOX **[B-K]**

Model	Code	Rate
PF-22	**1490**	$39.61
PF-35	**1550**	$70.52
PF-115	**1750**	$112.29
PF-120H	**2010**	$102.64
PF-171	**2090**	$156.04
PF-180	**2100**	$68.53
PF-180H	**2204**	$163.86
PF-200	**2250**	$162.86
PF-200, 18' screed	**2252**	$165.76
PF-220	**2300**	$165.42
PF-400A	**2350**	$144.28
PF-500	**2404**	$179.52
PF-500, 18' screed	**2406**	$182.63
PF-510, 18' screed	**2407**	$189.51
PF-3172, 18' screed	**2408**	$156.68
PF-3200	**2410**	$210.54
PF-5510	**2415**	$220.67

CATERPILLAR **[CAT]**

Model	Code	Rate
AP-200	**2420**	$43.79
AP-800	**2430**	$112.22
AP-1050	**2431**	$175.36
AP-1000	**2435**	$172.04
AP-1000 4wd	**2436**	$178.06
AP-1055B	**2438**	$220.67
AP-1055D	**2438D**	$266.80
AP-1200	**2440**	$143.04

CEDAR RAPIDS **[CEDR]**

Model	Code	Rate
BSF-2H	**2550**	$92.72
BSF-3R	**2600**	$101.65
CR-351	**2668A**	$146.93
CR-351 4wd	**2668B**	$151.72
CR-361R (RUBBER TRACK)	**2668R**	$181.00
CR-431	**2669**	$123.68
CR-551	**2670**	$198.07
CR-461	**2672**	$195.94
CR-561	**2674**	$208.07

LAYTON **[LYTN]**

Model	Code	Rate
F-525	**2680**	$22.22
D-550	**2682**	$24.72
H-500B	**2684**	$7.17

ASPHALT WINDROW PICKUP MACHINE [ASPWP]

DELAY FACTOR = 0.08 **OVERTIME FACTOR = 0.94**

Includes all attachments and accessories.

ATHEY **[ATHY]**

Model	Code	Rate
7-11	**5000**	$90.48

BARBER-GREENE **[B-G]**

Model	Code	Rate
BG-610H	**5100**	$63.68

CATERPILLAR **[CAT]**

Model	Code	Rate
WE-601B	**5200**	$70.67

CLARK'S WELDING COMPANY **[CLAR]**

Model	Code	Rate
500	**5300**	$53.79
601	**5304**	$49.14
Lincoln 660	**5305**	$95.92

C.M.I. **[CMI]**

Model	Code	Rate
851	**5405**	$89.30

AUGERS, CRAWLER MOUNTED [AUGCL]

DELAY FACTOR = 0.29 **OVERTIME FACTOR = 0.74**

Includes carrier, attachments and accessories with up to 6.1 meters(20 feet) of auger flights. Consumable bits or tips to be paid by separate invoice.

BAYSHORE **[BYSH]**

Model	Code	Rate
8400 TD limited access	**1500**	$115.68

TEXOMA **[TXMA]**

Model	Code	Rate
TAURUS	**2010**	$238.94
700CL	**2100**	$136.01

WATSON **[WATS]**

Model	Code	Rate
2000CM	**2500**	$104.78
2500CM	**2505**	$161.75
3000CM	**2510**	$183.50
3100CM	**2515**	$190.57

AUGERS, HORIZONTAL [AUGHZ]

DELAY FACTOR = 0.27 **OVERTIME FACTOR = 0.76**

Includes all attachments and accessories with up to 9.1 meters(30 feet) of auger flight, track and/or pipe pusher. Consumable bits or tips shall be paid by separate invoice. Power unit is included.

AKKERMAN **[AKMN]**

Model	Code	Rate
360	**5000**	$110.45
420 series 1250	**5002**	$113.33

AMERICAN AUGER **[AMAU]**

Model	Code	Rate
36-350	**5014**	$29.79

BORZALL **[BORZ]**

Model	Code	Rate
2300-10	**5040**	$10.18
4265-10	**5042**	$14.16

DITCH WITCH **[D-W]**

Model	Code	Rate
2510	**5040**	$46.69

AUGERS, TRUCK MOUNTED [AUGTK]

DELAY FACTOR = 0.23 **OVERTIME FACTOR = 0.80**

Includes truck/carrier, all attachments and accessories with up to 6.1 meters(20 feet) of auger flight. Consumable bits or tips shall be paid by separate invoice.

ATLANTIC **[ATLN]**

Model	Code	Rate
LDH-80	**5000**	$179.55
LDH-100	**5005**	$150.73
LLDH-80	**5010**	$191.26
LLDH-120	**5015**	$204.25

CALWELD **[CALW]**

Model	Code	Rate
150-A	**5050**	$89.06
200	**5052**	$111.03
4500LH	**5054**	$190.94

HUGHES **[HUGH]**

Model	Code	Rate
EZ 112	**5070**	$63.61
EZ 120	**5071**	$71.80
LDH-100	**5072**	$116.98
LDH-80	**5074**	$115.45
LLDH-120	**5076**	$169.76
LLDH-80	**5078**	$157.16

P.D.E. **[PDE]**

Model	Code	Rate
M -100	**5084**	$44.85
M-400 with hammer	**5085**	$34.73

TEXOMA **[TXMA]**

Model	Code	Rate
Economatic 115	**5087**	$89.31
Super Economatic	**5089**	$90.41
80	**5090**	$135.66
270	**5093**	$90.36
330	**5095**	$94.96
330 with hammer	**5095B**	$109.37
500 with hammer	**5096B**	$111.20
600	**5097**	$117.05
700	**5099**	$184.29

WATSON **[WATS]**

Model	Code	Rate
1000	**6010**	$75.83
2000	**6012**	$149.00
3000	**6014**	$180.33

BITUMINOUS DISTRIBUTORS [BITDT]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

Includes all equipment for handling bituminous materials under pressure. Includes pumps, spray bars and other attachments and accessories.

TRAILER MOUNTED **[TLMD]**

Does not include towing unit. Capacity rated in liters (U.S. gallons).

OVER	TO	Code	Rate
0	1136 (300)	**0-300**	$6.52

TRUCK MOUNTED **[TRMD]**

Including truck. Capacity rated in liters (U.S. gallons).

OVER	TO	Code	Rate
0	3028 (800)	**00-08**	$60.21
3028 (800)	5299 (1400)	**08-14**	$76.20
5299 (1400)	6831 (1800)	**14-18**	$78.54
6831 (1800)	11355 (3000)	**18-30**	$80.15
11355 (3000)	15140 (4000)	**30-40**	$83.53

BROOMS & SWEEPING EQUIPMENT [BRMSW]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.87**

Includes all attachments and accessories with brooms of any type. Includes broom wear.

BROOMS - MOUNTED & TOWED **[MTTD]**

Includes traction, PTO or engine driven.

Model	Code	Rate
ALL	**ALL**	$27.88

BROOMS - SELF PROPELLED **[SFPR]**

Model	Code	Rate
ALL	**ALL**	$40.37

SWEEPERS - SELF PROPELLED, PICK UP **[SWSP]**

Rated in accordance with hopper size in cubic meters (cubic yards).

OVER	TO	Code	Rate
0	2.3 (3.0)	**0-3**	$92.93
2.3 (3.0)	4.6 (6.0)	**3-6**	$123.26
4.6 (6.0)	6.9 (9.0)	**6-9**	$145.11

BRUSH CHIPPING & SHREDDING MACHINES [BRUCP]

DELAY FACTOR = 0.07 **OVERTIME FACTOR = 0.94**

Includes all attachments, accessories and power unit. Rated in accordance with the cutter head width in millimeters(inches)

BRUSH CHIP & SHRED **[BCSM]**

OVER	TO	Code	Rate
0	230 (9)	**00-09**	$28.04
230 (9)	300 (12)	**09-12**	$44.03
300 (12)	405 (16)	**12-16**	$43.28

COMPACTORS, HAND GUIDED [COMHG]

DELAY FACTOR = 0.18 **OVERTIME FACTOR = 0.84**

Includes pan, vibrating plate, rammer and jumping jack type compactors(gas or diesel). Includes all attachments and accessories. Listed in accordance with the weight in kilograms(pounds)

COMPACTORS **[COMP]**

OVER	TO	Code	Rate
0	113 (250)	**0-250**	$3.74
113 (250)	& Higher	**250**	$8.82

CONCRETE MIXERS [CONMX]

DELAY FACTOR = 0.11 **OVERTIME FACTOR = 0.90**

STATIONARY OR PORTABLE **[SORP]**

Rated by Mfr's capacity in cubic meters (sacks or cubic feet).

OVER	TO	Code	Rate
0	0.10 (3.5)	**0-3.5**	$2.08
0.10 (3.5)	0.17 (6.0)	**03.5-6**	$3.00
0.17 (6.0)	0.31 (11)	**06-11**	$3.85
0.31 (11)	0.45 (16)	**11-16**	$5.46

TRANSIT MIX **[TRMX]**

PTO type, including carrier. Rated by Mfr's capacity in cubic meters (cubic yards).

OVER	TO	Code	Rate
6.4 (9)	7.6 (10)	**09-10**	$140.13
7.6 (10)	9.2 (12)	**10-12**	$141.44

CONCRETE PUMPS [CONPM]

DELAY FACTOR = 0.18 **OVERTIME FACTOR = 0.84**

Includes truck/carrier or self powered trailer mounted units. Including attachments, accessories and hoses.

ELBA **[ELBA]**

Model	Code	Rate
K-8020	**1000**	$89.34

MAYCO **[MACO]**

Model	Code	Rate
C-30HD	**1020**	$17.60
LST-30/60S	**1024**	$29.89

SCHWING **[SHWG]**

Model	Code	Rate
BPA-1000	**1050**	$35.17
WP-1000X	**1052**	$47.88
WP-1250X	**1054**	$62.00
900-1200 w/28 m boom	**1055**	$88.74
900-1200 w/32 m boom	**1057**	$95.81
BPL 1200 w/36 m boom	**1058**	$107.75

THOMSEN **[THOM]**

Model	Code	Rate
A-3.75 w/ mixer	**1070**	$23.46
A-7	**1072**	$20.77
11 pump w/28 m boom	**1078**	$101.28
12 pump w/32 m boom	**1082**	$108.56
14 pump w/36 m boom	**1084**	$158.40

CONCRETE SLIPFORM PAVERS [CONSF]

DELAY FACTOR = 0.19 **OVERTIME FACTOR = 0.85**

Includes all attachments and accessories. Detached, independently powered finished bridges or spray/tyne machines are not included.

C.M.I. **[CMI]**

Model	Code	Rate
SF-250	**2002**	$159.39
SF-350 series 2	**2004**	$255.86
SF-550	**2006**	$341.35

GOMACO **[GOMA]**

Model	Code	Rate
GP-2000	**2020**	$161.62
GP-2500	**2022**	$181.03
GP-3500	**2024**	$257.92

CONCRETE VIBRATORS [CONVB]

DELAY FACTOR = 0.29 **OVERTIME FACTOR = 0.73**

Includes all attachments and accessories. Includes vibrator motor but independent power, whether air or electric, shall be paid as a separate item.

CONCRETE VIBRATORS **[CVIB]**

Model	Code	Rate
Each Vibrating Head	**EVHD**	$1.03

CURB EXTRUSION MACHINES [CRBEX]

DELAY FACTOR = 0.21 **OVERTIME FACTOR = 0.83**

Self propelled for asphalt or concrete curb and gutter section. Includes attachments, accessories and molds. Rated by Mfr's maximum width recommendations in millimeters (inches).

CURB EXTRUSION MACHINE **[CEM]**

OVER	TO	Code	Rate
0	460 (18)	**0-18**	$29.66
460 (18)	& Over	**18 PLUS**	$85.81

CONCRETE BARRIER SLIPFORM PAVERS [CRBSF]

DELAY FACTOR = 0.20 **OVERTIME FACTOR = 0.84**

Includes all attachments, accessories and barrier or curb molds.

C.M.I. **[CMI]**

Model	Code	Rate
SF-175	**3000**	$117.96

CURBMASTER **[CURB]**

Model	Code	Rate
CMT-800	**3020**	$73.30

GOMACO **[GOMA]**

Model	Code	Rate
GT-6000-(78&90)	**3040**	$82.05
COMMANDER II	**3045**	$93.77
COMMANDER III	**3050**	$129.53

MILLER FORMLESS **[MILL]**

Model	Code	Rate
M-7500	**3063**	$96.17
M-8100	**3065**	$135.47
M-8800	**3067**	$170.92

ELECTRIC GENERATORS & LIGHT PLANTS [ELGEN]

DELAY FACTOR = 0.11 **OVERTIME FACTOR = 0.90**

Rates are for gas or diesel power and alternating or direct current.

GENERATOR [GEN]

Rated in accordance with Mfr's output in kilowatts.

OVER	TO	Code	Rate
0	1	**000-001**	$0.84
1	3	**001-003**	$1.97
3	7.5	**003-008**	$4.04
7.5	15	**008-015**	$9.02
15	25	**015-025**	$14.18
25	50	**025-050**	$14.24
50	100	**050-100**	$25.81
100	200	**100-200**	$52.37
200	300	**200-300**	$89.61
300	400	**300-400**	$121.88
400	500	**400-500**	$152.54

LIGHTS [LITE]

Includes trailer, pole and generator.

Model	Code	Rate
2 Light Set	**2 LIGHT**	$3.94
4 Light Set	**4 LIGHT**	$7.84

ELECTRIC POWERED HAND TOOLS [ELTOL]

DELAY FACTOR = 0.61 **OVERTIME FACTOR = 0.42**

Includes electric powered, hand held tools not listed elsewhere in this book. Expendable bits, blades, discs, wheels, etc. shall be paid by separate invoice. Rated in accordance with Mfr's suggested retail price.

TOOLS [TOOL]

OVER	TO	Code	Rate
450	600	**045-060**	$0.26
600	800	**060-080**	$0.35
800	1000	**080-100**	$0.44

FORK LIFT TRUCKS [FKLFT]

DELAY FACTOR = 0.20 **OVERTIME FACTOR = 0.81**

Includes attachments and accessories. Listed in accordance with the Mfr's maximum rated capacity in kilograms(pounds).

FORK LIFT TRUCKS [FLT]

OVER	TO	Code	Rate
454 (1000)	1814 (4000)	**010-040**	$27.14
1814 (4000)	2722 (6000)	**040-060**	$36.15
2722 (6000)	3629 (8000)	**060-080**	$40.74
3629 (8000)	5443 (12000)	**080-120**	$56.63
5443 (12000)	7258 (16000)	**120-160**	$59.27
7258 (1600)	9072 (20000)	**160-200**	$69.39
9072 (20000)	11340 (25000)	**200-250**	$68.44
11340 (25000)	13608 (30000)	**250-300**	$75.65
13608 (30000)	18144 (40000)	**300-400**	$95.96
18144 (40000)	22680 (50000)	**400-500**	$114.44
22680 (50000)	34020 (75000)	**500-750**	$155.63

GRADERS [GRADR]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.89**

Includes ripper and scarifier attachments and all accessories. Electronic blade control and specialty cutting tools shall be paid separately.

BLADE-MOR [BMOR]

Model	Code	Rate
727	**2173**	$25.16
747	**2178**	$36.22

CATERPILLAR [CAT]

Model	Code	Rate
120G 87V serial	**2685**	$68.42
130G 74V serial	**2695**	$75.84
12E 99E serial	**2710**	$47.86
12F 73G serial	**2768**	$72.48
12F 13K serial	**2826**	$56.08
12F 89H serial	**2884**	$56.57
12G 61M serial	**2890**	$77.60
12H	**2895**	$84.02
14E 72G serial	**3174**	$74.71
14G	**3180**	$115.65
14H	**3185**	$127.65
140 14U serial	**3250**	$75.73
140G 72V serial	**3260**	$83.89
140H	**3265**	$89.85
143H	**3267**	$100.48
16 49G serial	**3290**	$97.57
16 49G800 serial	**3348**	$142.76
16 G93U serial	**3360**	$160.94
16H	**3380**	$170.76
160H	**3385**	$105.62
163H	**3390**	$111.23

JOHN DEERE [DEER]

Model	Code	Rate
JD-570A	**3890**	$45.05
JD-570B	**3892**	$52.44
JD-670	**3900**	$58.31
JD-670A	**3905**	$64.32
JD-670CH	**3907**	$83.92
JD-770	**3910**	$66.28
JD-770A, 770A-H	**3915**	$77.87
JD-770B	**3916**	$85.12
JD-772CH	**3930**	$102.06

GALION **[GALN]**

Model	Code	Rate
A-400E	**4940**	$62.95
T-400A	**4980**	$60.32
T-500C	**5150**	$69.94
T-500L	**5204**	$69.27
T-500M	**5210**	$71.91

KOMATSU **[KOMA]**

Model	Code	Rate
GD 505A-2	**8980**	$65.79
GD 515A-1	**8986**	$68.43
GD 605A-2	**9000**	$72.59
GD 615A-1	**9005**	$79.42
GD 625A-1C	**9007**	$102.95
GD 655A-2	**9010**	$80.61

HAMMERS, DEMOLITION & PILE [HAMMR]

DELAY FACTOR = 0.23 **OVERTIME FACTOR = 0.79**

Includes attachments, accessories and power unit. Does not include carrier.

ABI **[ABI]**

Model	Code	Rate
HVR-60	**0100**	$37.43

AMERICAN PILE DRIVING EQUIPMENT **[APE]**

Model	Code	Rate
150	**0010**	$160.19
180	**0050**	$220.13
200/500	**0060**	$245.84
300 VIBRO	**0075**	$273.07
400B VIBRO	**0085**	$438.22

ALLIED STEEL & TRACTOR **[AS&T]**

Model	Code	Rate
800	**0300**	$55.29
HYRAM 720	**0310**	$6.07
HYRAM 725	**0320**	$11.49
HYRAM 730	**0330**	$13.93
HYRAM 740	**0340**	$19.89
HYRAM 750	**0350**	$22.03
HYRAM 77	**0360**	$9.13
HYRAM 770	**0370**	$22.18
HYRAM 780	**0380**	$36.21
HYRAM 790	**0390**	$47.27
HYRAM 88	**0400**	$15.48

DELMAG **[DELM]**

Model	Code	Rate
D-12	**0500**	$24.48
D-16	**0510**	$35.88
D-22	**0520**	$57.05
D-30	**0530**	$42.26
D-30-32	**0540**	$62.33
D-36-32	**0560**	$80.99
D46-32	**0570**	$95.70
D62-22	**0580**	$156.13
D100-13	**0590**	$246.82

FOSTER **[FOST]**

Model	Code	Rate
1700	**0600**	$135.23
4030	**0630**	$189.72
FNV-1800	**0660**	$113.39
FNV-4150	**0693**	$243.09

HYDRAULIC POWER SYS **[HPSI]**

Model	Code	Rate
150	**0420**	$95.50
260	**0430**	$151.18
300	**0440**	$181.52

I.C.E. **[ICE]**

Model	Code	Rate
44-50	**0450**	$229.02
216	**0460**	$82.36
416L	**0470**	$136.82
812	**0480**	$214.75

KENT **[KENT]**

Model	Code	Rate
KHB10G	**0700**	$18.79
KHB 15G	**0710**	$30.04
KHB 30G	**0750**	$30.25
KHB 40G	**0760**	$53.23

NPK **[NPK]**

Model	Code	Rate
4XE	**0795**	$16.84
6XA	**0800**	$13.18
H-10XB	**0810**	$36.57
H-12X	**0815**	$37.38
H-16X	**0820**	$31.86
H-20X	**0840**	$35.74
H4X,HXA	**0860**	$11.13
H7X	**0880**	$14.23

OKADA **[OKAD]**

Model	Code	Rate
UB-5	**0900**	$7.83
UB-8	**0950**	$15.30

RAMMER **[RAMR]**

Model	Code	Rate
S-84	**1000**	$31.75
S-86	**1050**	$34.26

STANLEY **[STAN]**

Model	Code	Rate
MB250	**1100**	$6.06
MB2900	**1120**	$23.86
MB4900	**1140**	$42.33
MB550	**1160**	$9.58
MB800	**1180**	$14.22

TELEDYNE **[TELD]**

Model	Code	Rate
950X	**1190**	$35.25
TB1025	**1195**	$38.81
TB1425X	**1200**	$34.68
TB2225X	**1220**	$64.80
TB425	**1240**	$13.92
TB825X	**1260**	$24.03

TRAMAC **[TRMC]**

Model	Code	Rate
BRH1100	**1300**	$36.83
BRH125	**1310**	$11.37
BRH250	**1320**	$12.86
BRH400	**1330**	$12.16
BRH620	**1340**	$24.30
BRH750	**1350**	$22.07
BRV950	**1360**	$23.26

TUNKER **[TUNK]**

Model	Code	Rate
40.01	**1400**	$171.74
40.05	**1450**	$171.74
60.05	**1460**	$150.48

VULCAN **[VULC]**

Model	Code	Rate
1	**1500**	$26.34
010	**1520**	$37.82
100C	**1540**	$39.60
2300	**1560**	$146.07
80C	**1580**	$30.52

HYDRAULIC CRANES & EXCAVATORS, CRAWLER MOUNTED [HCECL]

DELAY FACTOR = 0.18 **OVERTIME FACTOR = 0.84**

Includes all attachments and accessories required for lifting or digging. Pavement breaker or compactor attachments are not included.

BANTAM **[BANT]**

Model	Code	Rate
C 266	**0680**	$82.87
C 366	**0690**	$95.97
C 744	**1075**	$62.73

CASE **[CASE]**

Model	Code	Rate
9030B	**0100B**	$81.62
9040	**0110**	$95.54
9060B	**0120B**	$189.58
40E E-Boom	**1600**	$76.10
40E Y-Boom	**1601**	$76.49
50E	**1602**	$96.30
125B	**1602H**	$77.99
170C	**1602N**	$108.66
220B	**1602R**	$139.23
880B Y-Boom	**1609**	$54.29
980B	**1615**	$84.13
1080	**1615E**	$73.76
1080B	**1615J**	$75.34
1280	**1616**	$100.83
1280B	**1616E**	$94.89

CATERPILLAR **[CAT]**

Model	Code	Rate
304 CR	**0200**	$30.28
305C CR	**0250**	$39.84
312	**0300**	$49.56
312C	**0300C**	$54.34
312CL	**0300CL**	$55.25
314CL CR	**0302CLR**	$60.45
315L	**0305**	$59.99
320	**0310**	$78.98
320BL	**0312**	$83.21
320C	**0312C**	$81.81
320CL	**0312CL**	$90.39
320L	**0315**	$80.39
321C LCR	**0320R**	$110.43
322L	**0325**	$98.58
325	**0330**	$104.23
325BL	**0335**	$114.01
325L	**0340**	$108.78
328D LCR	**0343DR**	$133.26
330BL	**0345**	$143.42

330CL	**0345CL**	$156.84
330D L	**0345DL**	$183.09
330L	**0350**	$137.36
345BL	**0355**	$192.63
350L	**0360**	$193.55
375L	**0365**	$308.92
205	**1617**	$33.90
211	**1617E**	$50.34
213	**1617H**	$55.39
215	**1618**	$56.19
215B LC	**1619E**	$63.04
215C	**1619F**	$69.44
215D	**1619G**	$77.04
225	**1620**	$80.14
225LC	**1621**	$80.65
225D LC	**1622**	$101.13
227	**1623**	$83.62
229	**1625**	$108.69
231D	**1630**	$124.11
231DLC	**1635**	$125.64
235	**1640**	$127.97
235B	**1642**	$142.34
235 Front Shovel	**1645**	$137.48
235B Front Shovel	**1647**	$153.11
235C	**1648**	$162.07
235DLC	**1649**	$167.76
245	**1650**	$215.54
245B	**1650B**	$237.62
245 Front Shovel	**1652**	$226.98
245B Front Shovel	**1652B**	$252.62
E 180	**1653**	$67.38
EL 180	**1654**	$68.49
EL 200B	**1654E**	$73.14
E 240	**1655**	$86.62
EL 240	**1656**	$88.06
E 300	**1657**	$108.69
E 300B	**1657B**	$120.60
EL 300	**1658**	$110.54
EL 300B	**1658B**	$122.60

JOHN DEERE **[DEER]**

Model	Code	Rate
225D LC	**1575D**	$99.73
330C LC	**1600C**	$148.49
450LC	**1645**	$186.43
490	**1660**	$41.38
490E	**1660E**	$52.51
690A	**1685**	$57.78
690B	**1695**	$70.89
690C	**1697**	$65.36
690D	**1697D**	$68.39
690E LC	**1697ELC**	$78.75
790	**1698**	$82.31
790D	**1698D**	$87.64
790E LC	**1698ELC**	$96.31
792	**1699**	$97.39
890	**1700**	$131.63
890A	**1705**	$120.17
892D LC	**1708**	$111.71
990	**1720**	$143.26
992D LC	**1722**	$161.93
30	**1725**	$19.79
50	**1730**	$31.58
70	**1735**	$28.94
200LC	**1745**	$87.49

DROTT **[DROT]**

Model	Code	Rate
35D E boom	**1835**	$57.64
35D Y boom	**1845**	$58.04
40D E boom	**1930**	$72.54
40D Y boom	**1965**	$77.53
50D	**2005**	$93.94

FIAT-ALLIS **[F-A]**

Model	Code	Rate
FE 18	**9000**	$51.91
FE 20 HD	**9010**	$65.55
FE 20 LC	**9020**	$61.80
FE 28	**9030**	$86.94
FE 40 L	**9040**	$149.12

GRADALL **[GRAD]**

Model	Code	Rate
G 660	**0150**	$70.27
G 660B	**0160**	$89.36
G 660C	**0170**	$90.08
G 880B	**0210**	$96.00
G 880C	**0215**	$91.98
G 1000	**0230**	$150.76
XL4200	**0260**	$88.92
XL5200	**0280**	$106.65

HITACHI **[HIT]**

Model	Code	Rate
UH 07LC	**2630**	$67.89
UH 062	**2660**	$73.61
UH 172	**2695**	$133.06
UH 122	**2750**	$88.83
EX 150	**2797**	$61.78
EX 200 LC	**2800**	$75.92
EX 270 LC	**2806**	$111.95
EX 300LC-2	**2807**	$131.69

EX 300LC-3	**2807A**	$135.08
EX 330LC-5	**2807B**	$150.21
EX 370-5	**2807F**	$155.77
EX 400 LC	**2808**	$174.41
EX 450LC-5	**2808K**	$205.39
EX 550LC	**2809**	$254.00
EX 700	**2810**	$304.14
EX 750-5	**2815**	$317.74
EX 1100	**2880**	$395.42

HYUNDAI **[HYUN]**

Model	Code	Rate
200LC	**2950**	$75.70
210LC-3	**2952C**	$78.69
280LC	**2960**	$112.15
290LC	**2970**	$116.76
450LC	**3010**	$175.26

INTERNATIONAL **[INTL]**

Model	Code	Rate
630	**4250**	$53.67
640 HD	**4260**	$70.68
650 HD	**4280**	$79.85

KATO **[KATO]**

Model	Code	Rate
HD450 VII	**3050**	$51.08
HD700 VII LC	**3060**	$73.92
HD1250 VII LC	**3080**	$124.35

KOBELCO **[KOBL]**

Model	Code	Rate
SK200LC MARK III	**4687**	$79.23
K 903B	**4688**	$37.01
K 904D	**4693**	$40.07
K 904E	**4694**	$42.19
K 904 Mark II	**4694A**	$42.03
K 905	**4695**	$45.29
K 905A LC	**4697**	$48.86
K 907C	**4700**	$65.45
K 907D	**4702**	$70.41
K 907 LC	**4704**	$71.13
K 909A	**4710**	$91.14
K 909 LC	**4711**	$93.62
K 912A	**4712**	$107.97
K 914	**4715**	$129.09
K 916	**4717**	$144.58
SK270LC MARK IV	**4720**	$112.74
SK400LC MARK IV	**4725**	$189.55

KOEHRING **[KOEH]**

Model	Code	Rate
366 post 1980	**4752**	$112.38
466E	**4990**	$129.48
566	**5160**	$140.74
666, 666E	**5225**	$178.15
866, 866E	**5235**	$208.77
6611	**6000**	$42.05
6614	**6005**	$51.63
6612	**6010**	$50.22
6620	**6015**	$71.76
6625	**6020**	$87.35
6633	**6029**	$124.09
6644	**6040**	$164.80

KOMATSU **[KOMA]**

Model	Code	Rate
PC 120-5	**9485**	$53.83
PC 150-1	**9490**	$48.32
PC 150-3	**9495**	$59.50
PC 200 LC-2	**9500**	$60.36
PC 200-5	**9504**	$78.37
PC 200 LC-3	**9505**	$72.83
PC 200 LC-5	**9506**	$79.52
PC 220 LC-2	**9510**	$77.87
PC 220 LC-3	**9515**	$90.31
PC 220 LC-5	**9516**	$97.50
PC 220 LC-6	**9516F**	$104.31
PC 220 LC-7	**9516G**	$109.46
PC 280 LC-3	**9517**	$102.07
PC 300 LC-1, LC-2	**9520**	$100.53
PC 300 LC-3	**9525**	$119.90
PC 300 LC-5	**9526**	$136.11
PC 300 LC-6	**9526A**	$149.62
PC 360 LC-3	**9527**	$136.82
PC 400 LC-1	**9530**	$136.44
PC 400 LC-3	**9535**	$159.99
PC 400 LC-5	**9536**	$179.11
PC 400 LC-6	**9537**	$196.85
PC 600 LC-6	**9539**	$277.02
PC 650-1	**9540**	$249.73
PC 650-1 Front Shovel	**9550**	$264.11
PC 650-3	**9552**	$265.13
PC 750-6	**9555**	$317.96
PC 1000-1	**9560**	$403.55
PC 1000 LC-1	**9565**	$415.78
PC 1100 LC-6	**9575LC**	$481.47

LINK-BELT **[L-B]**

Model	Code	Rate
LS 1600	**5390**	$31.88
LS 2650	**5395**	$44.42
LS 2700C II	**5398**	$60.29
2700 QUANTUM	**5399**	$62.99
LS 2800	**5400**	$52.20
LS 2800A	**5402**	$60.32
LS 2800A PL	**5404**	$52.26
LS 2800 PL	**5405**	$49.49
LS 2800B	**5410**	$65.99
LS 3400	**5475**	$87.48
LS 3400C II	**5477**	$93.16
LS 4300	**5660**	$110.40
LS 4300C II	**5662**	$121.53
LS 4800	**5750**	$127.16
LS 4800 PL	**5755**	$114.01
LS 5400	**5805**	$147.56
LS 5800	**5810**	$153.66
LS 5800A	**5812**	$162.15
LS 5800C II	**5814**	$169.66
LS 6400	**5820**	$227.48
LS 7400	**5830**	$225.70
LS 7400A	**5840**	$275.81

MASSEY FERGUSON **[M-F]**

Model	Code	Rate
MF 450D	**6245**	$42.97
MF 450S	**6250**	$46.10

MITSUBISHI **[MITS]**

Model	Code	Rate
MS 090	**6290**	$30.63
MS 180-3	**6295**	$58.49
MS 180 LC-8	**6296**	$66.13
MS 230 LC-3	**6300**	$76.24
MS 240 LC-8	**6305**	$82.43
MS 280-2	**6310**	$93.36
MS 380-2	**6320**	$130.97
MS 450-8	**6330**	$150.94

NORTHWEST **[NW]**

Model	Code	Rate
35 DH	**6335**	$117.85
45 DH	**6340**	$128.89
55 DH	**6345**	$136.62
55 DH Series II	**6360**	$232.84

P&H **[P&H]**

Model	Code	Rate
H 750	**6628**	$56.31
H 1250	**6630**	$94.53
H 1750	**6635**	$117.70
H 2500	**6645**	$150.86
HS 2500	**6650**	$155.54

TAKEUCHI **[TAKU]**

Model	Code	Rate
TB 15	**7686**	$13.05
TB 025	**7686A**	$22.00
TB 045	**7686E**	$36.41
TB 070	**7686H**	$35.33
TB 10S	**7688**	$10.40
TB 35S	**7690**	$20.61
TB 68S	**7692**	$29.87
TB 800	**7695**	$14.55

HYDRAULIC CRANES & EXCAVATORS, SELF PROPELLED. [HCESP]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

Includes all attachments and accessories required for lifting or digging.
Pavement breaker or compactor attachments are not included.

BUCYRUS-ERIE **[B-E]**

Model	Code	Rate
300C/SP	**1670**	$67.89
320C	**1672**	$68.08
360C	**1678**	$68.41

BADGER **[BAGR]**

Model	Code	Rate
4425/30	**1565**	$91.64
4435	**1570**	$101.57
4435B	**1573**	$102.83
4435C	**1573C**	$112.31
4445	**1574**	$140.81
4450	**1575**	$108.21
4450B	**1577**	$114.69
4455	**1579**	$141.52

CASE **[CASE]**

Model	Code	Rate
40E E-Boom, Cruz Air	**1685**	$58.52
40E Y-Boom, Cruz Air	**1687**	$58.74
40F E-Boom, Cruz Air	**1687H**	$60.75
40F Y-Boom, Cruz Air	**1687K**	$61.56
45 E-Boom, Cruz Air	**1688**	$75.72
45 Y-Boom, Cruz Air	**1689**	$80.43
45B E-Boom, Cruz Air	**1689H**	$80.09
45B Y-Boom, Cruz Air	**1689K**	$80.82

880R E-Boom	**1690**	$52.62
880R Y-Boom	**1695**	$52.74
1085 E-Boom, Cruz Air	**1696E**	$60.61
1085 Y-Boom, Cruz Air	**1696Y**	$60.91
1085B Y-Boom, Cruz Air	**1696Z**	$68.16
1285 E-Boom, Cruz Air	**1697E**	$76.43
1285 Y-Boom, Cruz Air	**1697Y**	$76.57
3330 Low Profile	**1698E**	$31.27
3330B	**1698H**	$31.51

CATERPILLAR **[CAT]**

Model	Code	Rate
206	**1699**	$42.26
212	**1699E**	$54.06
214	**1699H**	$58.41
224	**1699J**	$71.92

GRADALL **[GRAD]**

Model	Code	Rate
G 3WD, 4x4	**0110**	$88.02

GROVE **[GROV]**

Model	Code	Rate
24	**3820**	$33.37
36	**3830**	$54.51
68	**3850**	$63.12
1012	**3870**	$75.82
2535	**3880**	$99.70
RT-48	**4030**	$57.57
RT-49	**4115**	$57.85
RT-58	**4285**	$59.07
RT-418	**4354**	$73.22
RT-420	**4356**	$73.22
RT-422	**4358**	$73.22
RT-500D	**4359**	$101.07
RT-525	**4360**	$68.18
RT-525B	**4362**	$71.03
RT-525C	**4363**	$87.76
RT-527.5	**4365**	$69.01
RT-528B	**4370**	$71.03
RT-528C	**4372**	$88.25
RT-60	**4520**	$68.78
RT-60S	**4540**	$70.69
RT-515	**4606**	$68.02
RT-518	**4607**	$69.93
RT-520	**4608**	$71.44
RT-522	**4609**	$70.69
RT-522C	**4609G**	$86.08
RT-625	**4630**	$77.09
RT-630	**4635**	$77.09
RT-630B	**4637**	$82.68
RT-635	**4640**	$87.56
RT-65 S	**4700**	$92.37
RT-740	**4710**	$103.36
RT-745	**4715**	$131.46
RT-75 S	**4720**	$98.30
RT-755	**4725**	$111.41
RT-760	**4727**	$161.07
RT-865	**4730**	$137.60
RT-865B	**4732**	$188.53
RT-875	**4735**	$169.52
RT-980	**4750**	$164.44
RT-990	**4760**	$190.20
RT-9100	**4790**	$243.78

KOMATSU **[KOMA]**

Model	Code	Rate
PW 210-1	**9580**	$97.30

LINK-BELT **[L-B]**

Model	Code	Rate
HSP 15	**5500**	$65.91
HSP 18	**5505**	$65.91
HSP 20	**5510**	$71.86
HSP 22	**5530**	$73.26
HSP 25	**5535**	$78.05
HSP 8015	**5538**	$76.57
HSP 8018	**5538E**	$76.57
HSP 8018XL	**5538G**	$93.10
HSP 8018C	**5538H**	$70.02
HSP 8025	**5538P**	$80.05
HSP 8025 S	**5538PF**	$81.17
HSP 8030	**5538Q**	$91.77
HSP 8035	**5538R**	$133.80
HSP 8040	**5538S**	$133.94
HSP 8050	**5538T**	$136.06
HSP 8055	**5538V**	$122.26
HSP 8060	**5539**	$149.60

LORAIN **[LORN]**

Model	Code	Rate
LRT 15H	**5730**	$67.26
LRT 15U	**5735**	$68.52
LRT 18U	**5740**	$68.97
LRT 35U	**5745**	$100.69
LRT 40U	**5750**	$101.46
LRT 150	**5755**	$66.60
LRT 150D	**5756**	$81.96
LRT 180	**5760**	$66.56
LRT 180D	**5760D**	$81.96
LRT 200	**5765**	$66.38
LRT 200D	**5765D**	$82.13

LRT 220	**5767**	$68.82
LRT 230	**5768**	$73.36
LRT 230D	**5768D**	$82.15
LRT 250	**5769**	$73.38
LRT 250D	**5769D**	$82.15
LRT 275	**5770**	$73.38
LRT 275D	**5770D**	$82.15
LRT 330	**5772**	$94.29
LRT 400	**5773**	$108.22
LRT 450	**5774**	$111.35
LRT 500	**5775**	$114.37
LRT 550	**5790**	$119.61

P&H **[P&H]**

Model	Code	Rate
OMEGA 14	**5790**	$63.08
OMEGA 15	**5792**	$63.08
OMEGA 18	**5794**	$63.51
OMEGA 25	**5795**	$84.91
OMEGA 20	**5796**	$64.19
OMEGA 23	**5796E**	$66.93
OMEGA 30	**5796J**	$87.32
OMEGA 35	**5796P**	$88.28
OMEGA 40	**5797**	$119.01
OMEGA 45	**5797E**	$120.72
OMEGA 50	**5797J**	$122.10
OMEGA 60	**5798**	$125.56
OMEGA 65	**5799**	$148.33
OMEGA 114	**5799C**	$71.92
OMEGA 114D	**5799G**	$69.97
OMEGA 118	**5799Q**	$73.42
OMEGA 118D	**5799S**	$70.11
OMEGA 120	**5799U**	$75.05
OMEGA 120D	**5799W**	$70.82
OMEGA 122	**5799X**	$76.03
OMEGA 122D	**5799Y**	$71.39
OMEGA 125	**5799Z**	$76.41
OMEGA 128	**5799ZA**	$74.90
R 150	**5890**	$53.72
R 150-1	**5910**	$53.23
R 180	**5975**	$54.04
R 200	**6060**	$54.37
OMEGA S-15	**6062**	$87.58
OMEGA S-18	**6063**	$87.58
OMEGA S-20	**6064**	$90.13
S-35	**6064E**	$123.33

PETTIBONE **[PET]**

Model	Code	Rate
16 MK P Series	**6500**	$58.66
20 MK P Series	**6580**	$59.29
25	**6740**	$55.35
25 MK P Series	**6750**	$60.07
29 MK P Series	**6880**	$61.10
30	**6900**	$55.35
30 MK P Series	**6903**	$62.09
30 SC, 30 SC P Series	**6910**	$86.09
60 SC	**6990**	$92.24
60 SC P Series	**6995**	$98.58
70	**7100**	$97.78
70 SC	**7165**	$97.96
70 SC P Series	**7170**	$103.95
80 MK P Series	**7250**	$96.77
80 SC P Series	**7260**	$98.16

R.O. PRODUCTS **[ROP]**

Model	Code	Rate
MC 5A	**8005**	$35.05
MC 50B	**8175**	$55.77
MC 50C	**8260**	$57.10

HYDRAULIC CRANES & EXCAVATORS, TRUCK MTD. W/ CARRIER [HCETD]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.88**

Includes truck/carrier. Includes all attachment and accessories required for lifting or digging. Pavement breaker or compactor attachments are not included.

BUCYRUS-ERIE **[B-E]**

Model	Code	Rate
25 XC	**1360**	$82.87
30 XC	**1370**	$83.51
40 C	**1475**	$74.91
60 XC	**1590**	$134.57
65 C	**1592**	$116.19
90 XC	**1600**	$145.92

BADGER **[BAGR]**

Model	Code	Rate
300 Hydro-Scopic	**0550**	$57.05
460 Hydro-Scopic	**0555**	$69.96
666 Hydro-Scopic	**0560**	$102.98
888 Hydro-Scopic	**0600**	$108.59

BANTAM **[BANT]**

Model	Code	Rate
T 744 Teleskoop	**1285**	$66.99
T 888	**1310**	$96.94
T 888B	**1315**	$112.92

DEVAULT **[DVUT]**

Model	Code	Rate
TK 15-10	**1900**	$41.83

GRADALL **[GRAD]**

Model	Code	Rate
G 3W	**0120**	$69.38
G 660	**0170**	$67.42
G 660B	**0180**	$87.54
G 660C	**0190**	$85.02
G 800	**0210**	$58.47
G 880B	**0220**	$95.78
G 880C	**0230**	$92.78
G 1000	**0240**	$102.54

GROVE **[GROV]**

Model	Code	Rate
TD 520	**2221**	$102.36
TD 522	**2223**	$102.36
TD 525	**2224**	$103.26
TMS 250	**2850**	$96.33
TMS 250A	**2860**	$96.81
TMS 250B	**2870**	$96.81
TMS 250C	**2875**	$133.61
TMS 300	**2922**	$115.17
TMS 300B	**2923**	$132.39
TMS 760	**3180**	$202.85
TMS 865	**3378**	$151.83
TM 875	**3380**	$175.89
TMS 875	**3385**	$176.75
TM 890	**3387**	$193.19
TM 1075	**3390**	$159.41

HIAB **[HIAB]**

Model	Code	Rate
100 AW	**3850**	$37.24
1165	**3852**	$34.18
170 thru 174	**3854**	$32.70
175 thru 177	**3855**	$32.85
550, 5501	**3857**	$35.63
650	**3859**	$36.53

KOEHRING **[KOEH]**

Model	Code	Rate
4460 Teleskoop	**4400**	$67.41
4465 Teleskoop	**4405**	$68.62
4470 Teleskoop	**4410**	$79.81
4475 Teleskoop	**4415**	$81.00

LINK-BELT **[L-B]**

Model	Code	Rate
HTC 14	**4505**	$93.92
HTC 25	**4507**	$93.92
HTC 35	**4509**	$103.67
HTC 50	**4510**	$137.13
HTC 50W	**4520**	$131.85
HTC 814	**4530**	$123.60
HTC 814XL	**4531**	$128.55
HTC 822 S	**4532**	$115.25
HTC 825	**4535**	$107.55
HTC 825 S	**4536**	$116.30
HTC 830	**4537**	$125.51
HTC 835	**4539**	$132.27
HTC 835XL	**4539C**	$149.57
HTC 840	**4539E**	$153.01
HTC 850	**4539G**	$158.08
HTC 855	**4539H**	$138.56
HTC 860	**4539J**	$160.79
HTC 1040	**4540**	$150.56
HTC 1050	**4545**	$152.95
HTC 1055	**4550**	$142.22
HTC 1060	**4555**	$157.55
HTC 11100	**4600**	$276.01

LORAIN **[LORN]**

Model	Code	Rate
MCH 140	**4942**	$109.88
MCH 150	**4946**	$102.66
MCH 180	**4947**	$102.66
MCH 300	**4953**	$120.13
MCH 350	**4955**	$96.45
MCH 400	**4957**	$131.39
MCH 500	**4960**	$105.55

MANITEX **[MANX]**

Model	Code	Rate
1161	**4980**	$40.40
1770	**4985**	$70.78
2284	**4990**	$73.51
2592	**4995**	$75.42

NATIONAL **[NATL]**

Model	Code	Rate
Ser 4/400, 11.3 m (37') boom	**4983**	$36.97
Ser 4/400, 14.0 m (46') boom	**4984**	$37.17
Ser 4/400, 16.8 m (55') boom	**4985**	$37.34
Ser 5/500A/B, 14.3 m (47') boom	**4986**	$42.23
Ser 5/500A/B, 17.1 m (56') boom	**4987**	$42.84
Ser 6/600, 14.3 m (47') boom	**4989**	$41.77
Ser 6/600, 17.1 m (56') boom	**4990**	$42.13

856	**4995**	$42.63
856B	**4996**	$41.81
875	**4997**	$43.37
875B	**4998**	$44.78
Series 85	**4999**	$38.60

P&H **[P&H]**

Model	Code	Rate
ALPHA 100 ton	**5000**	$255.95
CN T-280	**5005**	$137.24
T-150	**5290**	$100.26
T-180	**5380**	$100.69
T-200	**5470**	$101.22
T-250	**5560**	$118.05
CN T-250	**5561**	$139.58
OMEGA T-250	**5570**	$112.37
OMEGA T-300	**5580**	$115.61
OMEGA T-350	**5585**	$116.82
T-300A	**5665**	$111.04
OMEGA T-400	**5666M**	$137.01
OMEGA T-450	**5669**	$138.70
T-600 XL	**5670**	$159.58
OMEGA T-500	**5680**	$138.69
OMEGA T-650	**5745**	$186.87
T-750	**5780**	$131.74

PITMAN **[PIT]**

Model	Code	Rate
Hydralift HL 40 thru 95	**6670**	$33.09
Hydralift HL 100 thru 170	**6675**	$36.43
HL 857	**6685**	$41.37
HL 1200, 1545-T2 or 1580	**6695**	$43.70
POLECAT	**6697**	$47.64
PELICAN	**6699**	$50.48

R.O. PRODUCTS **[ROP]**

Model	Code	Rate
TC-40	**6860**	$34.04
TC-50	**6862**	$35.61
TC-70	**6864**	$36.97
TC-80	**6866**	$37.04
TC-85	**6868**	$36.56
TC-110	**6870**	$40.67
TC-120	**6872**	$41.26
TC-125	**6874**	$40.92
TC-145	**6876**	$43.84
TC-150	**6878**	$42.24

HYDRAULIC CRANES & EXCAVATORS, TRUCK MTD. LESS CARRIER. [HCETG]

DELAY FACTOR = 0.10 **OVERTIME FACTOR = 0.91**

Includes all lifting and digging attachments and accessories. Truck/carrier to be paid separately. Pavement breaker or compactor attachments are not included.

BUCYRUS-ERIE **[B-E]**

Model	Code	Rate
H-3 series two	**1000**	$40.61
H-5 series two	**1300**	$48.03

GALION **[GALN]**

Model	Code	Rate
125 P	**1970**	$49.08
150 P	**1980**	$59.31

GROVE **[GROV]**

Model	Code	Rate
TM 100C	**2020**	$69.93
TM 200C	**2040**	$56.97

HYDRAULIC PERSONNEL LIFTS & AERIAL WORK PLATFORMS [HYLFT]

DELAY FACTOR = 0.20 **OVERTIME FACTOR = 0.81**

Includes self propelled and power take off(PTO) units whether gas, diesel or electric. Rates for any truck or carrier mounted units shall pay for the truck separately. Reach is rated by Mfr's maximum extension in meters(feet).

BOOM TYPE **[BOOM]**

OVER	TO	Code	Rate
0	7.6 (25)	**00-24**	$14.79
7.6 (25)	15.2 (50)	**25-49**	$34.10
15.2 (50)	22.9 (75)	**50-74**	$46.54

SCISSOR TYPE **[SCIS]**

OVER	TO	Code	Rate
0	6.1 (20)	**00-20**	$15.95
6.4 (21)	9.1 (30)	**21-30**	$18.98
9.4 (31)	15.2 (50)	**31-50**	$28.18

LOADERS, CRAWLER [LDRCL]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.90**

Includes all attachments and accessories excluding clam-action buckets and backhoe(see attachment class).

CASE [CASE]

Model	Code	Rate
350B	**2370**	$33.57
450B	**2610**	$30.85
455B	**2620**	$32.60
455C	**2620A**	$36.23
1155D	**3555**	$63.04
1155E	**3556**	$67.90
1450	**3560**	$69.23
1450B	**3565**	$76.83
1455B	**3568**	$77.71

CATERPILLAR [CAT]

Model	Code	Rate
931B	**3735**	$34.62
931C	**3735C**	$36.81
931 LGP	**3740**	$32.61
931B LGP	**3745**	$35.71
935B	**3845**	$41.25
935C	**3845C**	$43.83
939C	**3900**	$56.76
943	**4130**	$53.48
943 LGP	**4135**	$50.35
951C 86J 1992 serial	**4200**	$47.13
951C 86J 2598 serial	**4210**	$52.48
951C LGP 86J 2598 ser	**4215**	$53.31
953	**4220**	$72.10
953 LGP	**4230**	$67.19
955L 85J 6247 serial	**4675**	$66.83
955L 85J 13X10129 ser	**4680**	$72.65
955L LGP 85J 13X10129	**4685**	$72.99
963	**4690**	$99.56
963 LGP	**4693**	$90.13
973	**4695**	$147.84
973 LGP	**4698**	$126.91
977K	**5014**	$77.28
977K 11K serial	**5092**	$81.50
977L 11K 3919 serial	**5170**	$95.17
977L 11K 5083 serial	**5180**	$104.30
977L 14X serial	**5185**	$108.73
977L LGP	**5190**	$108.40
983	**5248**	$147.72
983B	**5265**	$159.41

JOHN DEERE [DEER]

Model	Code	Rate
JD 350C	**5420**	$35.48
JD 450C (4 speed PS)	**5805**	$35.56
JD 455D	**5807**	$37.46
JD 455E	**5809**	$37.92
JD 455G	**5809A**	$43.48
JD 555	**5810**	$40.19
JD 555A	**5812**	$44.42
JD 555B	**5814**	$43.65
JD 555G	**5814A**	$55.79
JD 655	**5815**	$63.69
JD 655B	**5817**	$73.53
JD 755	**5820**	$59.78
JD 755A	**5822**	$74.67
JD 755B	**5824**	$84.81
JD 855	**5830**	$112.93

DRESSER [DRES]

Model	Code	Rate
100E (PS)	**9000**	$36.89
100G	**9005**	$42.78
125E (PS)	**9010**	$45.55
125G	**9015**	$51.85
175C (PS)	**9020**	$88.55
200	**9025**	$105.37
250C (PS)	**9030**	$106.88
250E (PS)	**9035**	$123.22

KOMATSU [KOMA]

Model	Code	Rate
D 53S-16	**7878**	$60.68
D 53S-17	**7878A**	$73.28
D 55S-2	**7900**	$61.93
D 55S-3	**7978**	$61.93
D 57S-1	**8000**	$84.61
D 65S-6	**8017**	$81.53
D 66S-1	**8020**	$114.75
D 75S-2	**8056**	$88.41
D 75S-3	**8060**	$110.65
D 75S-5	**8061**	$151.72
D 155S-1	**8080**	$217.12

LOADERS, RUBBER TIRE [LDRRT]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.89**

Includes all attachments and accessories. Clam-action buckets, 4WD and backhoes are excluded unless otherwise noted.

ALLIS-CHALMERS [A-C]

Model	Code	Rate
710C	**0747**	$33.82
714B	**0750**	$32.93
714C w/ backhoe	**0752**	$35.40
715B w/ backhoe	**0765**	$34.82
715C w/ backhoe	**0767**	$35.66

CASE [CASE]

Model	Code	Rate
W-11	**1365**	$31.79
W-11B	**1368**	$38.68
W-18	**1444**	$53.47
W-18 9213140 serial	**1450**	$56.92
W-18B	**1460**	$61.45
W-20	**1472**	$57.04
W-20B	**1480**	$57.81
W-20C	**1482**	$62.24
W-30	**1565**	$85.24
480B	**1636**	$26.89
480B w/ backhoe	**1640**	$28.17
480C	**1650**	$34.76
480C w/ backhoe	**1660**	$36.29
480D	**1662**	$38.98
480D w/ backhoe	**1664**	$40.88
480E w/ backhoe	**1666**	$33.43
480E LL	**1667**	$32.24
480F w/ backhoe	**1668**	$34.70
480F LL	**1669**	$32.97
480LL	**1677**	$39.02
570L XT 4WD	**1690**	$37.93
580B w/ backhoe	**1705**	$35.35
580C	**1710**	$28.12
580C w/ backhoe	**1715**	$29.99
580D	**1717**	$29.44
580D w/ backhoe	**1720**	$31.89
580 Super D	**1725**	$32.14
580 Super D w/ backhoe	**1727**	$34.64
580 Super E	**1731**	$33.01
580 Super E w/ backhoe	**1735**	$35.70
580K w/ backhoe	**1739**	$35.99
580K 4WD w/ backhoe	**1740**	$37.05
580 Super K w/ backhoe	**1742**	$39.76
580L w/ backhoe	**1743**	$40.01
580 Super L 4WD w/ backhoe	**1744**	$46.50
590 Turbo w/ backhoe	**1745**	$48.58
590 Super L 4WD w/ backhoe	**1746**	$50.95
621	**1750**	$65.56
721	**1752**	$79.67
821	**1754**	$97.48
680E w/ backhoe	**1840**	$45.64
680G w/ backhoe	**1850**	$44.35
680H w/ backhoe	**1852**	$47.18
680K w/ backhoe	**1854**	$51.43
680L w/ backhoe	**1856**	$52.14
680L 4WD w/ backhoe	**1857**	$52.93
780 w/ backhoe	**1864**	$58.42
780B w/ backhoe	**1866**	$62.73
780C w/ backhoe	**1867**	$63.86
780D w/ backhoe	**1868**	$64.61
780D 4WD w/ backhoe	**1869**	$65.97

CATERPILLAR [CAT]

Model	Code	Rate
416 w/ backhoe	**1860**	$35.98
416 Series II w/ backhoe	**1860A**	$36.21
416B 4WD w/ extend-a-hoe	**1861A**	$44.63
416C 4WD w/ backhoe	**1861C**	$46.30
416D w/ backhoe	**1861D**	$41.54
416D 4WD w/ backhoe	**1861D4**	$42.63
420D w/ backhoe	**1861M**	$46.57
420D 4WD w/ backhoe	**1861M4**	$47.65
426 w/ backhoe	**1862**	$40.67
426 Series II w/ backhoe	**1862A**	$40.90
426C w/ backhoe	**1862C**	$50.96
426C 4WD w/ backhoe	**1862C4**	$52.35
428 w/ backhoe	**1864**	$40.65
428 Series II w/ backhoe	**1864A**	$40.87
430D	**1865D**	$56.49
430E	**1865E**	$59.23
436 w/ backhoe	**1866**	$44.30
436 Series II w/ backhoe	**1866A**	$44.48
446 w/ backhoe	**1868**	$57.42
446B w/ backhoe	**1868B**	$63.52
446D	**1868D**	$65.24
450E	**1869E**	$78.52
910	**1870**	$38.38
910E	**1870E**	$45.21
916	**1885**	$51.21
920	**1894**	$46.82
926	**2065**	$59.97
926E	**2067**	$64.93
928G	**2070G**	$77.88
930 41K serial	**2088**	$57.33
930G	**2088G**	$91.23
936	**2100**	$72.79

936E	**2110**	$79.37
936F	**2120**	$82.48
938F	**2130**	$84.27
938G	**2130G**	$95.24
950 90A serial	**2228**	$61.29
950 31K & 81J serial	**2270**	$73.97
950B	**2272**	$91.06
950E	**2300**	$96.93
950F	**2301**	$102.06
950F Series II	**2303**	$105.74
950G	**2310**	$113.65
950H	**2310H**	$130.35
962G	**2320G**	$124.29
966C	**2340**	$108.40
966D	**2350**	$119.52
966E	**2360**	$132.04
966F	**2361**	$134.95
966G	**2362**	$151.76
966H	**2362H**	$174.64
970F	**2370**	$158.63
972G	**2372G**	$169.20
980B	**2376**	$137.23
980C	**2378**	$168.29
980F	**2381**	$173.51
980G	**2382**	$191.31
980H	**2382H**	$207.37
988 87A6868 serial	**2398**	$167.70
988B 50W serial	**2436**	$241.51
992B 25K serial	**2460**	$299.32
992C	**2470**	$461.73
IT 12	**2472**	$39.15
IT 12B	**2472B**	$45.61
IT 14F	**2473**	$52.89
IT 18	**2474**	$49.98
IT 18B	**2475**	$56.54
IT 28	**2476**	$60.44
IT 28B	**2477**	$65.64
IT 28F	**2477G**	$76.08
IT 28G	**2478**	$79.27
IT 38G	**2480**	$91.28
IT 62G	**2482**	$125.56

CLARK **[CLRK]**

Model	Code	Rate
35C	**2484**	$47.74
45C	**2486**	$55.81
55C	**2488**	$67.37
75C	**2491**	$88.03
125B	**2492**	$113.17
275B	**2496**	$196.56
275C	**2497**	$215.10

JOHN DEERE **[DEER]**

Model	Code	Rate
JD-210C	**2485**	$30.23
JD-210C w/ backhoe	**2490**	$30.31
JD-210LE	**2495**	$39.75
JD-310A w/ backhoe	**2504**	$31.77
JD-310B w/ backhoe	**2506**	$32.46
JD-310C w/ backhoe	**2507**	$35.74
JD-310D w/ backhoe	**2507D**	$40.29
JD-310E w/ backhoe	**2507E**	$41.25
JD-310SE w/ backhoe	**2507F**	$46.18
310G	**2507G**	$42.32
JD-315SE w/ backhoe	**2507H**	$46.81
JD-410 w/ backhoe	**2508**	$34.76
JD-410B w/ backhoe	**2509**	$35.45
JD-410C w/ backhoe	**2509F**	$41.60
JD-410D w/ backhoe	**2509G**	$49.57
JD-410E w/ backhoe	**2509H**	$52.03
410G	**2509J**	$53.17
JD-444	**2510**	$46.18
JD-444C	**2515**	$48.17
JD-444D	**2520**	$49.60
JD-444E	**2521**	$53.90
JD-500C w/ backhoe	**2592**	$45.13
JD-510 w/ backhoe	**2620**	$41.73
JD-510B w/ backhoe	**2625**	$40.34
JD-510C w/ backhoe	**2630**	$47.54
JD-510D w/ backhoe	**2630D**	$56.36
JD-544B	**2660**	$57.25
JD-544C	**2670**	$58.86
JD-544D	**2672**	$57.77
JD-544E	**2673**	$63.91
JD-544G	**2673B**	$70.56
JD-610B w/ backhoe	**2690**	$46.13
JD-610C w/ backhoe	**2691**	$52.51
JD-624E	**2700**	$76.57
JD-624G	**2700G**	$86.81
JD-624H	**2700H**	$95.04
JD-644B	**2710**	$79.15
JD-644C	**2715**	$82.06
JD-644D	**2717**	$84.71
JD-644E	**2719**	$91.74
JD-644G	**2719B**	$104.46
JD-644H	**2719H**	$111.95
644J	**2719J**	$122.93
JD-710B w/ backhoe	**2720**	$58.96
JD-710C w/ backhoe	**2721**	$65.53
JD-710D w/ backhoe	**2722**	$71.50
JD-710D 4WD w/ backhoe	**2722D**	$73.44
710G	**2722G**	$75.91

JD-744H	**2723**	$152.44
744J	**2723J**	$177.90
JD-844	**2725**	$146.53

DRESSER **[DRES]**

Model	Code	Rate
510B	**2310**	$44.99
510C	**2310C**	$60.15
515B	**3517**	$58.43
515C	**3517C**	$71.17
520B	**3519**	$67.58
520C	**3519C**	$84.84
530	**3520**	$94.73
530C	**3520C**	$103.45
540	**3530**	$130.52
550	**3540**	$130.50

FIAT-ALLIS **[F-A]**

Model	Code	Rate
545B	**3042**	$55.15
745C	**3046**	$108.19
FR 10	**3049H**	$58.32
FR 10B	**3049I**	$63.51
FR 20	**3050**	$122.58
FR 30	**3051**	$160.30
FR 20B	**3051B**	$136.52
FR 35	**3052**	$213.22

FORD **[FORD]**

Model	Code	Rate
545C	**3054**	$32.60
650 w/ backhoe	**3056**	$35.95
655A w/ backhoe	**3056F**	$40.31
655C w/ backhoe	**3056G**	$44.29
750 w/ backhoe	**3057**	$47.09
755 w/ backhoe	**3061**	$50.24
755B w/ backhoe	**3063**	$57.17
755A w/ backhoe	**3065**	$55.78
A-62	**3114**	$49.11
A-64	**3116**	$59.59
A-66	**3118**	$77.69

FURUKAWA **[FURU]**

Model	Code	Rate
FL 320A	**3120M**	$109.76
FL 330	**3120S**	$119.72

HOUGH **[HOUG]**

Model	Code	Rate
H65C	**3578**	$76.18
H-90E	**3884**	$132.11
H-100C	**3954**	$155.22

INTERNATIONAL **[INTL]**

Model	Code	Rate
260A	**2260**	$34.83
260A w/ backhoe	**2270**	$36.48
270A w/ backhoe	**2280**	$40.20
280A w/ backhoe	**2285**	$49.43

J C B **[JCB]**

Model	Code	Rate
214S w/ backhoe	**4430**	$48.35
215S w/ backhoe	**4435**	$53.13
217S w/ backhoe	**4440**	$56.44
3C 1550 2WD w/ hoe	**4448**	$34.51
3D 1700 4WD w/ hoe	**4450**	$46.13
1400B w/ backhoe	**4455**	$39.09
1550B w/ backhoe	**4457**	$44.76
1600B w/ backhoe	**4458**	$51.53
1700B w/ backhoe	**4459**	$52.60

KAWASAKI **[KAWA]**

Model	Code	Rate
60Z IV	**4300**	$66.47
65Z IV	**4310**	$74.27
KSS 80Z II	**4330**	$95.28
80Z III	**4335**	$110.94
80Z IV	**4340**	$113.01
85Z IV	**4345**	$141.82
90Z III	**4350**	$156.96
90Z IV	**4355**	$161.05
95Z IV-2	**4360**	$206.83

KOMATSU **[KOMA]**

Model	Code	Rate
W 120-3	**4520**	$111.29
W 180-1	**4525**	$157.77
WA 200-1	**4536**	$62.94
WA 250-1	**4537**	$86.22
WA 300-1	**4538**	$82.12
WA 320-1	**4539**	$100.94
WA 350-1	**4540**	$97.02
WA 380-1	**4541**	$120.27
WA 380-3	**4541C**	$120.36
WA 400-1	**4542**	$115.68
WA 420-3	**4543C**	$138.39
WA 450-1	**4544**	$143.84
WA 450-2	**4544B**	$162.04
WA 450-3	**4544C**	$164.65
WA 470-1	**4545**	$158.03
WA 500-1	**4546**	$191.25
WA 600-1	**4550**	$281.52
WB 140-2 4WD	**4700**	$50.88

WB 150-2 4WD	**4710**	$58.66

MASSEY FERGUSON **[M-F]**

Model	Code	Rate
MF 44C	**5143**	$59.37
MF 50H Series S	**5150**	$35.19
MF 50H Series S, 4WD	**5152**	$35.88
MF 50HX Series S	**5154**	$37.94
MF 50HX Series S, 4WD	**5156**	$38.81
MF 55C	**5170**	$76.22
MF 60 w/ backhoe	**5171**	$37.27
MF 60H Series S w/ hoe	**5172**	$40.20
MF 66C	**5174**	$97.41
MF 80 w/ backhoe	**5182**	$53.17
MF 88	**5184**	$154.67
640	**6000**	$35.40
650	**6010**	$37.93

NEW HOLLAND **[NHND]**

Model	Code	Rate
545D	**0100**	$33.95
575E w/ backhoe	**0110**	$47.85
655D w/ backhoe	**0120**	$43.06
655E w/ backhoe	**0130**	$51.54
675D 4WD w/ backhoe	**0140**	$49.73
675E 4WD w/ backhoe	**0150**	$58.95

TEREX **[TERX]**

Model	Code	Rate
70C	**7938**	$138.95
72-61	**8036**	$170.55
72-71B	**8055**	$222.63
72-81	**8080**	$263.57

VOLVO-MICHIGAN-EUCLID **[VME]**

Model	Code	Rate
175B	**6186**	$139.93
175C	**6186C**	$160.96
275B	**6330**	$178.32
275C	**6330C**	$215.10
L-70C	**9570C**	$72.54
L-90	**9575**	$86.97
L-120	**9595**	$112.87
L-120C	**9595C**	$116.92
L-150C	**9598C**	$145.66
L-160	**9600**	$151.76
L-180C	**9602C**	$163.89
L-190	**9605**	$176.44

LEADS, PILE DRIVING [LEADS]

DELAY FACTOR = 0.46 **OVERTIME FACTOR = 0.59**

FIXED **[FIXD]**

Includes headblock, taper top, tip sled and connector, foot yoke, foot yoke sheave, intermediate flights, and all attachments and accessories. Rated in accordance with height of the lead measured in meters (linear feet)

OVER	TO		Code	Rate
0	16.8 (55)	(w/o spotter)	**0100**	$17.27
16.8 (55)	32.0 (105)	(w/o spotter)	**0200**	$22.03
over	32.0 (105)	(w/o spotter)	**0300**	$27.61
0	16.8 (55)	(w/ spotter)	**1100**	$29.17
16.8 (55)	32.0 (105)	(w/ spotter)	**1200**	$34.84
over	32.0 (105)	(w/ spotter)	**1300**	$41.32

SWINGING **[SWNG]**

Includes headblock, taper top, tip sled and connector, foot yoke, foot yoke sheave, intermediate flights, and all attachments and accessories. Rated in accordance with the height of the lead measured in meters (linear feet).

OVER	TO		Code	Rate
0	16.8 (55)	(w/o spotter)	**0400**	$11.45
16.8 (55)	32.0 (105)	(w/o spotter)	**0500**	$15.96
over	32.0 (105)	(w/o spotter)	**0600**	$21.54
0	16.8 (55)	(w/ spotter)	**1400**	$23.35
16.8 (55)	32.0 (105)	(w/ spotter)	**1500**	$28.76
over	32.0 (105)	(w/ spotter)	**1600**	$35.24

NON-OPERATED EQUIPMENT (DAILY RATES) [NONOP]

DELAY FACTOR = 0.55 **OVERTIME FACTOR = 1.00**

Note various units for different items. The following allowance is entered on the extra work bill by using the (unit listed x number of days) in the hours worked column. The following list is limited to items with long estimated lives. Additional traffic related items such as cones and barricades, are still listed under TRAFC in this publication. Other non-operated items with short estimated lives should be treated as materials and should not be "rented". Non rented items are 1) intended to be job specific (amortized over the life of the project) and 2) have an estimated life measured by number of uses rather than a length of time.

MISCELLANEOUS **[MISC]**

Model	Code	Rate
Casing, 450 mm dia, per 0.3 m (Casing, 18" dia, per lf)	**0120**	$0.03
Casing, 650 mm dia, per 0.3 m (Casing, 26" dia, per lf)	**0130**	$0.05
Casing, 900 mm dia, per 0.3 m (Casing, 36" dia, per lf)	**0140**	$0.07
Casing, 1800 mm dia, per 0.3 m (Casing, 72" dia, per lf)	**0150**	$0.17
Casing, 2400 mm dia, per 0.3 m (Casing, 96" dia, per lf)	**0160**	$0.22
Casing, 2700 mm dia, per 0.3 m (Casing, 108" dia, per lf)	**0170**	$0.25
Casing, 3000 mm dia, per 0.3 m (Casing, 120" dia, per lf)	**0180**	$0.33

Pile, all depths "H" pile, per 45.0 kg (Pile, all depths "H" pile, per hundred-weight)	**0190**	$0.03
Pipe, 250-300 mm dia, per 0.3 m (Pipe, 10-12" dia, per lf)	**0200**	$0.02
Plate, 22 mm thick, per 9.3 sm (Plate, 7/8" thick, per 100 sf)	**0210**	$1.05
Plate, 25 mm thick, per 9.3 sm (Plate, 1" thick, per 100 sf)	**0220**	$1.20
Plate, 38 mm thick, per 9.3 sm (Plate, 1.5" thick, per 100 sf)	**0230**	$1.80

SCAFFOLDING, SHORING, [SSFW]

FALSEWORK

Model	Code	Rate
Metal form, 1.8 m x3.0 m, per 14.6 m (Metal form, 6x10 box culvert, per 48 lf)	**0310**	$36.70
Metal form, 2.4 m x3.7 m, per 15.2 m (Metal form, 8x12 box culvert, per 50 lf)	**0320**	$40.67
Metal form, 2.1 m x4.3 m, per 15.2 m (Metal form, 7x14 box culvert, per 50 lf)	**0330**	$44.69
Metal form, type 25 barrier, per 3.0 m (Metal form, type 25 barrier, per 10 lf)	**0340**	$2.24
Metal form, type 26 barrier, per 3.0 m (Metal form, type 26 barrier, per 10 lf)	**0350**	$2.37
Metal form, type 27 barrier, per 3.0 m (Metal form, type 27 barrier, per 10 lf)	**0360**	$2.05
Metal form, type 50 barrier, per 3.0 m (Metal form, type 50 barrier, per 10 lf)	**0370**	$2.21
Metal form, 1.8 m x 3.7 m girder panel, per 0.1 sm (6x12 girder panel, per sf)	**0380**	$0.16
Metal form, all heights paving, per 3.0 m (Metal form, all heights paving, per 10 lf)	**0390**	$0.04
Scaffolding, 1.5 m section, per section (Scaffolding, 5' section, per section)	**0410**	$0.46
Scaffolding, 3.0 m section, per section (Scaffolding, 10' section, per section)	**0420**	$1.03
Scaffolding, 4.6 m section, per section (Scaffolding, 15' section, per section)	**0430**	$1.36
Scaffolding, bottom/top section, per 1.5 m section (per 5 ft section)	**0440**	$0.64
Scaffolding, 2.1 m high, rolling (Scaffolding, 7' high, rolling)	**0450**	$0.97
Scaffolding, spider staging, plus air compressor	**0460**	$20.37
Shoring, 1.1 m deep x 2235 mm wide, per section (Shoring,3.5' deep x 88" wide trench, per section)	**0510**	$1.05
Shoring, 1.2 m deep x 3.7 m wide box, per 7.3 m (Shoring, 4' deepx12' wide trench box, per 24')	**0515**	$9.81
Shoring, 1.5 m deep x 2235 mm wide, per section (Shoring, 5' deep x 88" wide trench, per section)	**0520**	$1.11
Shoring, 2.1 m deep x 1397 mm wide, per section (Shoring, 7' deep x 55" wide trench, per section)	**0530**	$0.97
Shoring, 2.1 m deep x 2235 mm wide, per section (Shoring, 7' deepx88" wide trench, per section)	**0540**	$1.17
Shoring, 2.4 m deep x 4.6 m wide, per 3.0 m (Shoring, 8' deepx15' wide trench box, per 10')	**0550**	$8.12
Shoring, 2.4 m deep x 2.4 m max width, per 7.3 m(8' deep x 8' max width trench box, per 24')	**0560**	$15.95
Shoring, 3.0 m deep x 2.4 m max box, per 4.9 m (Shoring, 10' deepx8' max trench box, per 16')	**0570**	$14.33
Shoring, 3.0 m deep x 2.4 m max box, per 7.3 m (Shoring, 10' deepx8' max trench box, per 24')	**0580**	$19.91
Wood, 50 mm x255 mm, per 30.5 m (Wood, 2"x10", per 100 lf)	**0605**	$0.13
Wood, 50 mm x305 mm, per 30.5 m (Wood, 2"x12", per 100 lf)	**0610**	$0.17
Wood, 100mm x100mm, per 30.5 m (Wood, 4"x4", per 100 lf)	**0615**	$0.11
Wood, 100 mm x150 mm, per 30.5 m (Wood, 4"x6", per 100 lf)	**0620**	$0.16
Wood, 100 mm x205 mm, per 30.5 m (Wood, 4"x8", per 100 lf)	**0625**	$0.23
Wood, 100 mm x305 mm, per 30.5 m (Wood, 4"x12", per 100 lf)	**0630**	$0.35
Wood, 150 mm x305 mm, per 30.5 m (Wood, 6"x12", per 100 lf)	**0635**	$0.57
Wood, 150 mm x455 mm, per 30.5 m (Wood, 6"x18", per 100 lf)	**0640**	$0.93
Wood, 205 mm x405 mm, per 30.5 m (Wood, 8"x16", per 100 lf)	**0645**	$1.14
Wood, 305 mm x455 mm, per 30.5 m (Wood, 8"x18", per 100 lf)	**0650**	$1.28
Wood, 305 mm x305 mm, per 30.5 m (Wood, 12"x12", per 100 lf)	**0655**	$1.11
Wood form, type 27 barrier, per 2.4 m (Wood form, type 27 barrier, per 8 lf)	**0660**	$0.24
Wide flange beam, all depths, per 45 kg (Wide flange beam, all depths, per hundred wt.)	**0670**	$0.03

TANK [TANK]

Model	Code	Rate
Tank, metal, 0-2270 liters (0-600 gallons)	**0710**	$0.62
Tank, metal, 2270-4540 liters (600-1200 gal)	**0720**	$0.85
Tank, metal, 4540-9840 liters (1200-2600 gal)	**0730**	$2.11
Tank, metal, 22 710 liters (6000 gallons)	**0740**	$4.25
Tank, metal, 28 390 liters (7500 gallons)	**0750**	$5.33
Tank, metal, 30 280 liters (8000 gallons)	**0760**	$5.64
Tank, metal, 37 850 liters (10000 gallons)	**0770**	$6.25

TRAFFIC SAFETY [TRAF]

Model	Code	Rate
Crash cushion barrel, filled, each	**0810**	$1.14
K-rail, temporary concrete barrier, per 6.1 m (20 lf)	**0820**	$0.41

PAVEMENT GRINDERS, DIAMOND BLADES [PGDIA]

DELAY FACTOR = 0.09 **OVERTIME FACTOR = 0.92**

Includes water(but not water truck or trailer), coolant, cutting compounds and all attachments and accessories. Replacement blades are included in the rates listed below.

CONCUT **[CCUT]**

Model	Code	Rate
BC-38 (136 blades)	**0500**	$177.89
BC-244 (187 blades)	**0505**	$220.48
BC-1268 (48 blades)	**0510**	$68.71

CUSHION CUT **[CUCT]**

Model	Code	Rate
HG-130A (127 blades)	**0600**	$171.13
PC-390(171 blades)	**0610**	$264.93

PENHALL **[PENH]**

Model	Code	Rate
G-38 (172 blades)	**0800**	$337.15

TARGET **[TARG]**

Model	Code	Rate
CG-65 (41 blades)	**0900**	$105.53
PRM-3804 (170 blades)	**0905**	$371.10

PAVEMENT GRINDERS, TUNGSTEN-CARBIDE BITS [PGT-C]

DELAY FACTOR = 0.13 **OVERTIME FACTOR = 0.89**

Includes water(but not water truck or trailer), coolant, cutting compounds and all attachments and accessories. Replacement bits or tips are included in the rates listed below.

BARBER-GREENE **[B-G]**

Model	Code	Rate
RX-20	**0100**	$174.71
RX-30	**0105**	$277.28
RX-40B	**0110**	$320.83
RX-50	**0115**	$377.22
RX-80B	**0120**	$626.88

CATERPILLAR **[CAT]**

Model	Code	Rate
PM-800	**0200**	$488.95
PR-105	**0201**	$85.59
PR-275	**0205**	$233.57
PR-450	**0210**	$340.68
PR-750	**0215**	$496.99
PR-750B	**0216**	$521.58
PR-1000	**0220**	$682.82

C.M.I. **[CMI]**

Model	Code	Rate
PR-275 RT	**0150**	$221.92
PR-375	**0155**	$282.39
PR-450	**0160**	$323.71
PR-525	**0165**	$348.28
PR-500FL	**0170**	$381.96
PR-750	**0175**	$479.76
PR-800-7	**0177**	$524.62
PR-1000	**0180**	$577.83

INGERSOLL-RAND **[I-R]**

Model	Code	Rate
MW-175	**0280**	$97.36
MW-250	**0285**	$105.35
MW-250C	**0286**	$127.04
MT-6520 (crawler)	**0300**	$314.68
MW-6520	**0305**	$227.27
MW-6520HC	**0310**	$290.85
MT-7000	**0315**	$397.76

WIRTGEN **[WIRT]**

Model	Code	Rate
300VC	**0380**	$37.99
1000VC	**0390**	$145.18
1900DC	**0395**	$336.03
2000VC	**0400**	$326.52
2100VC	**0402**	$421.90
2200VC	**0405**	$548.80
3500VC	**0410**	$561.30
4200VC	**0420**	$578.88

PUMPS, WATER HOSE [PUMWA]

DELAY FACTOR = 0.35 **OVERTIME FACTOR = 0.68**

Centrifugal and diaphragm types (including submersibles). Rate includes power (gas, diesel or electric generator), 7.6 meters(25 lineal feet) of suction hose, 15.2 meters (50 lineal feet) of discharge hose, foot valve and all fittings, attachments and accessories.

A PUMP **[APMP]**

Listed by Mfr's rated capacity measured in thousands of liters per minute (thousands of gallons per hour) at 3.0 meters (10 feet) of suction head.

OVER	TO	Code	Rate
0	0.6 (10)	**000-010**	$3.29
0.6 (10)	1.3 (20)	**010-020**	$5.24
1.3 (20)	1.9 (30)	**020-030**	$5.90
1.9 (30)	3.2 (50)	**030-050**	$22.61
3.2 (50)	7.9 (125)	**050-125**	$26.13
7.9 (125)	15.8 (250)	**125-250**	$30.50

INLET-SUCTION HOSE **[INHS]**

Additional 7.6 meter (25 foot) lengths of suction hose shall be paid based on the inside hose diameter in millimeters (inches).

OVER	TO	Code	Rate
0	60 (2.5)	**0-2.5**	$0.06
60 (2.5)	80 (3)	**2.5-3.5**	$0.11
80 (3)	100 (4)	**3.5-4**	$0.15
100 (4)	150 (6)	**4-6**	$0.24

OUTLET-DISCHARGE HOSE **[OUHS]**

Additional 15.2 meter (50 foot) lengths of discharge hose shall be paid based on the inside hose diameter in millimeters (inches).

OVER	TO	Code	Rate
0	60 (2.5)	**0-2.5**	$0.04
60 (2.5)	90 (3.5)	**2.5-3.5**	$0.08
90 (3.5)	100 (4)	**3.5-4**	$0.12
100 (4)	150 (6)	**4-6**	$0.17

ROLLERS, TANDEM STEEL WHEELS [ROL-2]

DELAY FACTOR = 0.11 **OVERTIME FACTOR = 0.90**

Includes all attachments and accessories.

BOMAG **[BMAG]**

Model	Code	Rate
BW-4AS	**1150**	$24.20
BW-6AS	**1155**	$25.80
BW-10AS	**1160**	$43.93
BW-12AS	**1165**	$44.70

DRESSER **[DRES]**

Model	Code	Rate
S3-5B	**2500**	$31.65
S8-12A	**2520**	$41.74
S10-14A	**2525**	$42.51

FERGUSON **[FERG]**

Model	Code	Rate
3-5 ton	**4048**	$19.35
3-5A	**4048A**	$20.54
4-6A	**4142A**	$20.68
5-8 ton	**4236**	$46.03
5-8A	**4240**	$35.39
8-12 ton	**4424**	$36.62
8-12B	**4424B**	$38.82
8-12A	**4430**	$36.37
10-14 ton	**4450**	$37.50
10-14A	**4455**	$36.88
10-14B	**4455B**	$39.38

GALION **[GALN]**

Model	Code	Rate
4-6 ton roll-o-static	**4650**	$30.32
S4-6A, S4-6B	**4670**	$32.85
5-8 ton roll-o-static	**4800**	$35.30
S5-8A	**4820**	$38.02
8-10.5 ton roll-o-static	**4988**	$35.94
S8-10.5A	**5000**	$38.71
8-12 ton roll-o-static	**5176**	$36.25
S8-12A	**5190**	$39.35

HYSTER **[HYST]**

Model	Code	Rate
C 330A 3-5 ton	**6520**	$32.62
C 330B 3-5 ton (Hypac)	**6520B**	$25.41
C 330A 4-6 ton	**6525**	$33.96
C 330B 4-6 ton (Hypac)	**6526**	$27.52
C 340A 5-8 ton	**6530**	$39.72
C 340A 8-10 ton	**6540**	$40.27
C 340B 5-8 ton	**6545**	$35.63
C 340C 5-8 ton (Hypac)	**6546**	$38.12
C 340B 8-10 ton	**6548**	$36.34
C 340C 8-10 ton (Hypac)	**6549**	$38.60
C 350B 8-12 ton	**6710**	$41.15
C 350B 10-14 ton	**6740**	$41.64
C 350C 8-12 ton	**6750**	$37.60
C 350C 10-14 ton	**6755**	$38.30
C 350D 8-12 ton	**6757**	$39.05

INGRAM **[INGM]**

Model	Code	Rate
4-6 ton FB	**6900**	$24.77
5-6.5 ton FB	**6965**	$26.30
8-12 ton HB	**7175**	$36.54
10-14 ton HB	**7275**	$37.14

REXNORD **[RXND]**

Model	Code	Rate
3-5 ton	**8566**	$23.62
4-6 ton	**8572**	$24.19
5-8 ton	**8578**	$53.48
7-10 ton	**8584**	$53.68
8-12 ton	**8590**	$54.03
10-14 ton	**8596**	$54.36

ROLLERS, RUBBER TIRE, SELF PROPELLED [ROLRT]

DELAY FACTOR = 0.16 **OVERTIME FACTOR = 0.86**

Includes all attachments and accessories.

BUFFALO-BOMAG **[B-B]**

Model	Code	Rate
BW 20R	**2624**	$39.71

CATERPILLAR **[CAT]**

Model	Code	Rate
PS 110	**3460**	$40.91
PS 130	**3465**	$40.33
PS 180	**3470**	$42.53
PS 200B	**3480**	$53.63

DYNAPAC **[DYPC]**

Model	Code	Rate
CP 15	**3500**	$39.28
CP 21	**3510**	$48.78
CP 27	**3520**	$62.76

GALION **[GALN]**

Model	Code	Rate
3500	**4310**	$40.27
P 3000	**4315**	$37.13
P 3500A	**4320**	$40.78

HYSTER **[HYST]**

Model	Code	Rate
C 530A	**5401**	$40.14
C 550A	**5494**	$44.99

ROLLER-TAMPING, SEGMENTED, SHEEPSFOOT, SELF PROPELLED [ROTAM]

DELAY FACTOR = 0.10 **OVERTIME FACTOR = 0.91**

Includes all attachments and accessories.

BUFFALO-BOMAG **[B-B]**

Model	Code	Rate
K 300	**1630**	$77.31
K 301	**1635**	$87.33
K 401	**1638**	$104.02

CATERPILLAR **[CAT]**

Model	Code	Rate
815	**2300**	$91.18
815B	**2310**	$135.72
815F	**2320**	$148.02
825B	**2500**	$152.77
825C	**2510**	$201.03
835	**2700**	$193.92

RAYGO **[RAGO]**

Model	Code	Rate
30	**6490**	$75.69
45	**6500**	$114.83
RAM PAK 45	**6505**	$123.32

REXNORD **[RXND]**

Model	Code	Rate
3-30	**7120**	$91.28
3-35 PACTOR	**7127**	$112.67
3-45 PACTOR	**7130**	$143.42
3-50, 3-50A PACTOR	**7140**	$158.66
3-55, 3-55B PACTOR	**7150**	$192.45

ROLLERS-TAMPING, SEGMENTED, SHEEPSFOOT, TOWED [ROTAT]

DELAY FACTOR = 0.44 **OVERTIME FACTOR = 0.61**

Includes all attachments and accessories. Listed by drum dimensions in millimeters (feet) in either direction. The first digit is the diameter and the second digit is the length of each drum.

SINGLE DRUM UNIT **[ADRU]**

Model	Code	Rate
1220 mm x1220 mm (4'X4') & under	**4X4**	$1.63
over 1220 mm (4') - not over 1520 mm (5')	**4X5**	$1.84
over 1520 mm (5')	**5**	$3.34

DOUBLE DRUM UNIT **[DDRU]**

Model	Code	Rate
1220 mm x1220 mm (4'X4') & under, each	**4X4**	$3.92
over 1220 mm (4') - not over 1520 mm (5'), each	**4X5**	$11.88
over 1520 mm (5'), each	**5**	$21.84

ROLLERS, VIBRATORY, SELF PROPELLED [ROVIB]

DELAY FACTOR = 0.17 **OVERTIME FACTOR = 0.85**

Includes all attachments and accessories.

BUFFALO-BOMAG **[B-B]**

Model	Code	Rate
BW 210	**2060**	$59.60
BW 210A	**2070**	$61.58
BW 213	**2080**	$60.69
BW 214	**2090**	$62.42

BOMAG **[BMAG]**

Model	Code	Rate
BW 35	**0700**	$6.48
BW 60, 60S	**0800**	$9.88
BW 65, 65S	**0900**	$6.90
BW 75, 75S	**1000**	$11.05
BW 85T	**1200**	$19.61
BW 90	**1300**	$12.80

BW 100AD-3	**1325C**	$32.70
BW 120AD	**1350**	$33.12
BW 142PD	**1359**	$38.75
BW 151AD	**1365**	$55.81
BW 170AD, D	**1380**	$48.52
BW 172AD, D	**1385**	$48.98
BW 202AD	**1400**	$76.34

BROS **[BROS]**

Model	Code	Rate
VM 255	**2023**	$49.16
VM 268, VM 268H	**2024**	$60.58
VM 278	**2025**	$92.08

CASE **[CASE]**

Model	Code	Rate
50B	**2228**	$7.06
W 251	**2400**	$23.41
252, W 252	**2405**	$30.18
752, W 752	**2450**	$52.98
1102, W 1102	**2500**	$69.49
1102D, W 1102D	**2505**	$70.96
602D	**2510**	$47.78
752B	**2520**	$55.89

CATERPILLAR **[CAT]**

Model	Code	Rate
CB 214	**8025**	$29.26
CB 214B	**8026**	$30.46
CB 224	**8030**	$30.35
CB 224B	**8031**	$32.31
CB 224C	**8031C**	$33.10
CB 314	**8035**	$32.02
CP 323 padfoot drum	**8040**	$52.03
CS 323 smooth drum	**8042**	$50.35
CB 414	**8045**	$50.12
CS 431	**8050**	$46.37
CS 431B	**8051**	$63.20
CP 433 padfoot drum	**8055**	$52.78
CP 433B padfoot drum	**8056**	$69.47
CP 433E	**8056E**	$82.87
CS 433 smooth drum	**8060**	$52.88
CS 433B smooth drum	**8061**	$66.55
CB 434	**8062**	$58.04
CB 514	**8065**	$63.57
CB 534	**8067**	$81.51
CB 534C	**8067C**	$79.95
CS 551	**8070**	$88.37
CP 553 padfoot drum	**8075**	$93.11
CS 553 smooth drum	**8080**	$89.59
CP 563 padfoot drum	**8082**	$95.92
CS 563 smooth drum	**8083**	$92.10
CS 563C	**8083C**	$97.74
CB 614	**8085**	$99.27
CB 634	**8095**	$98.10
CB 634C	**8095C**	$99.51

DYNAPAC **[DYPC]**

Model	Code	Rate
LR 90	**2401**	$13.93
A 36V, A 36D	**2405**	$33.65
CA 12	**2409A**	$44.23
CA 12D	**2409B**	$38.12
CA 12PD	**2409E**	$38.60
CA 12PDB strikeoff blade	**2409H**	$36.87
CA 15	**2410**	$58.95
CA 15A	**2420**	$52.38
CA 15D	**2421**	$62.40
CA 20D	**2422**	$51.55
CA 15PD	**2425**	$53.17
CA 25	**2430**	$75.67
CA 25S	**2440**	$73.89
CA 25A, CA 25D	**2450**	$78.67
CA 25PD	**2455**	$81.54
CA 25T	**2460**	$67.75
CA 30	**2462**	$79.84
CA 30D	**2464**	$84.32
CA 51S, CA 51D	**2466**	$99.64
CA 55D	**2468**	$102.50
CA 151PDB	**2469**	$73.63
CC 10, CC 10 series II	**2470**	$30.11
CC 10A	**2472**	$26.04
CC 102	**2472C**	$32.45
CC 12	**2472E**	$33.05
CC 14	**2473**	$47.58
CC 21	**2474**	$49.51
CC 21 II	**2474B**	$52.62
CC 211	**2474C**	$60.92
CC 42 II Dynatronic	**2475**	$79.52
CC 42A	**2476**	$78.46
CC 50	**2482**	$85.64
CC 50A	**2488**	$97.58
CC 50PD	**2488E**	$152.72
CC 50S	**2489**	$144.59
DD 18	**2498**	$11.96
300V	**2499E**	$15.56
2100V	**2499H**	$14.82

ESSICK **[ESIK]**

Model	Code	Rate
VR 30RE	**2700**	$9.12
VR 42RE	**2820**	$23.29
V 30WR, V 30W2-R	**2902**	$9.93

HYSTER **[HYST]**

Model	Code	Rate
C 612B	**3450**	$54.48
C 610A	**3500**	$40.57
C 610B	**3540**	$52.72
C 615B	**3562**	$54.83
C 617B	**3563**	$55.33
C 620B	**3566**	$54.22
C 625B	**3570**	$55.93
C 627B	**3572**	$56.61
C 727A	**3572E**	$79.18
C 748A (Hypac/Hyster)	**3572F**	$34.97
C 766A	**3572G**	$70.48
C 766B (Hypac/Hyster)	**3572H**	$84.68
C 850A	**3572J**	$83.84
C 850B (Hypac/Hyster)	**3572K**	$98.65
C 852A	**3572N**	$89.34
C 852B (Hypac/Hyster)	**3572P**	$102.13
C 860A	**3572S**	$88.04
C 860B (Hypac/Hyster)	**3572T**	$96.52

INGERSOLL-RAND **[I-R]**

Model	Code	Rate
DD 22	**3565**	$38.79
DD 23	**3570**	$28.73
DD 24	**3572**	$38.07
DA 30	**3573**	$30.21
DD 35	**3573C**	$31.69
DA 40	**3573E**	$54.31
DA 41	**3573G**	$56.66
DD 34HF	**3573HF**	$47.01
DA 48	**3573M**	$75.19
DA 50	**3574**	$76.13
DD 65	**3574A**	$59.43
DF 84	**3574B**	$124.12
DS 84	**3574C**	$120.87
DD 90	**3574D**	$82.21
DD 110	**3574F**	$91.03
DD 130	**3574H**	$120.76
DD 145	**3574J**	$103.51
SPA 56	**3810**	$58.95
SP 48	**3880**	$56.90
SP 48DD	**3885**	$58.49
SPF 48	**3890**	$60.79
SPF 48B	**3892**	$62.00
SP 54	**4000**	$57.77
SP 54DD	**4005**	$59.77
SPA 54	**4010**	$58.66
SPF 54	**4020**	$63.98
SP 56	**4030**	$67.82
SP 56DD	**4035**	$70.70
SP 56DH	**4037**	$95.43
SPF 56	**4040**	$72.58
SPF 56B	**4050**	$75.48
SPF 56DH	**4080**	$96.92
SPF 56DHB	**4090**	$100.80
SP 60	**4100**	$120.24
SP 84	**4105**	$100.20
SP 60DD	**4110**	$142.45
SPF 60	**4120**	$147.11
SPF 60B	**4130**	$155.06
SPF 60C	**4132**	$135.19
SPF 84	**4133**	$101.90
SPF 84B	**4134**	$106.34
SD 40D	**4138**	$52.37
SD 40F w/ blade	**4138FB**	$53.89
SD 70	**4139**	$59.93
SD 100	**4140**	$76.81
SD 100D	**4140D**	$92.63
SD 100F	**4140F**	$93.18
SD 115D	**4141D**	$114.32
SD 150D	**4143D**	$123.22

KOEHRING-BOMAG **[KOBO]**

Model	Code	Rate
BW 120AC	**4168E**	$32.64
BW 120AD	**4169**	$33.10
BW 121AD	**4193**	$29.70
BW 130AD	**4193E**	$34.91
BW 140AD	**4194**	$54.14
BW 141AC	**4194B**	$53.86
BW 141AD	**4194E**	$48.81
BW 142D	**4194H**	$37.33
BW 172	**4212**	$46.12
BW 172D	**4212E**	$48.68
BW 213D	**4237**	$76.81
BW 214D	**4238**	$94.43
BW 215D	**4240**	$92.84
BW 217D	**4242**	$116.88
BW 220D	**4250**	$87.10

MIKASA **[MIKA]**

Model	Code	Rate
MDR 7DW	**4404**	$8.09
MDR 9G	**4405**	$11.67
MDR T38S	**4407**	$8.23
MRV 10GA	**4409**	$13.20

RAYGO **[RAGO]**

Model	Code	Rate
1-36 REBEL	**4805**	$13.76
2-36 ROMPER	**4810**	$30.06
2-66 RANGER	**4820**	$77.49
2-84 RANGER	**4830**	$107.15
220A RASCAL	**4840**	$45.30
320A RASCAL	**4876**	$54.73
320S RASCAL	**4890**	$52.01
400A RASCAL	**5010**	$54.43
404B RUSTLER	**5110**	$59.76
410A RASCAL	**5150**	$57.99
600A RASCAL	**5220**	$73.30
4000 RASCAL	**5235**	$79.52
4200 RASCAL	**5236**	$85.48
4404 RUSTLER	**5236E**	$31.75

RAMMAX **[RAMX]**

Model	Code	Rate
P 33/24	**4605**	$18.22
P 33/24 w/ remote	**4606**	$17.52
P 51	**4625**	$69.55
S 51	**4630**	$35.92
P 47	**5290**	$35.09

SAKAI **[SAKI]**

Model	Code	Rate
SV 70	**8025**	$54.92
SV 70D	**8026**	$57.26
SV 91	**8050**	$81.98
SV 91D	**8051**	$83.95
SV 200D	**8060**	$41.82

TAMPO **[TAMP]**

Model	Code	Rate
RP 16D (HD)	**5990**	$52.42
RP 28D	**5995**	$69.90
RP 48D	**6110**	$90.31
RP 58D	**6115**	$83.32
RS 16 (HD)	**6170**	$49.55
RS16A (HD)	**6180**	$51.50
RS 16D (HD)	**6185**	$52.00
RS 28C	**6315**	$65.79
RS 28D	**6320**	$67.01
RS 58D	**6327**	$81.86
RS 156A	**6340**	$54.98
RS 166A	**6350**	$72.11
RS 188A	**6370**	$91.62
RS 210	**6400**	$71.36

WACKER **[WACK]**

Model	Code	Rate
R 900	**7850**	$20.18
R 1000	**7855**	$32.43
W 55T	**7860**	$10.37
W 74L, W 74T	**7880**	$10.25
W 74	**7890**	$9.91
W 75	**7900**	$10.37
WDH 84	**7910**	$14.46
WDH 86-110	**7912**	$18.17
WHK 90, WHK 90L	**7915**	$17.72

SHOVELS & CRANES CRAWLER [S&CCL]

DELAY FACTOR = 0.19 **OVERTIME FACTOR = 0.84**

Includes all attachments and accessories when used as a crane, clamshell, dragline or for pile driving (not including leads or driving equipment).

LINK-BELT **[L-B]**

Model	Code	Rate
LS 78	**4702**	$65.38
LS 78 pipeliner	**4724**	$67.38
LS 98	**4826**	$73.53
LS 98 pipeliner	**4852**	$79.66
LS 98A	**4924**	$74.60
LS 108B	**4980**	$83.83
LS 108D	**4981**	$110.11
LS 118	**4998**	$120.23
LS 218H	**5010**	$201.02
LS 318	**5012**	$120.17
LS 338	**5020**	$131.33
LS 518	**5124**	$193.66

MANITOWOC **[MTWC]**

Model	Code	Rate
222EX (WEST)	**5600**	$242.30
2900 WC	**5764**	$106.12
3000 W	**5812**	$131.61
3900B (100 ton)	**6036**	$175.16
3900 W VICON series 2	**6132**	$234.21
4000 W VICON	**6180**	$211.01
4100 W VICON series 1	**6196**	$320.84
4100 W VICON series 2	**6198**	$330.13
4600 VICON series 1	**6328**	$483.74
4600 VICON series 3	**6332**	$544.64

P&H **[P&H]**

Model	Code	Rate
535	**7716**	$105.34
550	**7748**	$111.36
670 WLC	**7892**	$130.80

SHOVELS & CRANES, TRUCK MOUNTED [S&CTK]

DELAY FACTOR = 0.22 **OVERTIME FACTOR = 0.81**

Includes truck/carrier. Includes all attachments and accessories when used as a crane, clamshell, dragline or for pile driving (leads and driving equipment not included).

AMERICAN HOIST & DERRICK **[AMHD]**

Model	Code	Rate
5470	**1015**	$109.17
5530	**1080**	$191.11
7450	**1130**	$103.96
7460	**1140**	$149.62
7530	**1170**	$167.63
8460	**1178**	$213.53
8470	**1179**	$341.29

LINK-BELT **[L-B]**

Model	Code	Rate
HC 48A	**4332**	$64.81
HC 108B	**4960**	$77.45
HC 108C	**4970**	$115.25
HC 138	**4992**	$84.77
HC 138A	**4995**	$184.00
HC 218	**5050**	$110.62
HC 218A	**5051**	$183.25
HC 228H	**5054**	$227.59
HC 238A, 238B	**5065**	$187.73

P&H **[P&H]**

Model	Code	Rate
440 TC	**7240**	$81.88
650A TC	**7720**	$115.44
670 TC	**7790**	$119.03
790 TC	**7880**	$110.14
8115A TC	**7950**	$151.60

SANBLASTING EQUIPMENT [SANBL]

DELAY FACTOR = 0.52 **OVERTIME FACTOR = 0.52**

Includes helmets, gauntlets, 30.5 meters(100 feet) of hose, pot, all control valves, nozzles and other attachments and accessories. Rated in accordance with the capacity of the pot measured in kilograms(pounds)of sand.

REMOTE CONTROL ONLY **[REMC]**

OVER	TO	Code	Rate
45 (100)	159 (350)	**010-035**	$1.40
159 (350)	272 (600)	**035-060**	$1.85
272 (600)	454 (1000)	**060-100**	$1.87
454 (1000)	680 (1500)	**100-150**	$2.35
680 (1500)	907 (2000)	**150-200**	$2.62

SAWS, CHAIN AND EARTH AUGER ATTACHMENT [SAWCH]

DELAY FACTOR = 0.10 **OVERTIME FACTOR = 0.90**

Hand held type, one or two man, gas, air or electric powered including all attachments and accessories. Blades, chains and tips shall be paid separately. Saws which cost less than $500 are considered minor tools and are no longer listed. Rated in accordance with Mfr's kilowatts (horsepower).

SAWS **[SAW]**

Model		Code	Rate
>3.7 (5)	30 amps @ 120V	**5-HP**	$2.78

SAWS, CONCRETE AND MASONRY [SAWCO]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.87**

Self powered gas, air or electric powered. Includes water (but not water truck or trailer), coolant, cutting compounds and all attachments and accessories. Saw blades or abrasive discs shall be paid in accordance with the following sawkerf codes.

SINGLE & MULTI-BLADE **[ABOP]**

OPERATION

Listed in accordance with Mfr's rated kilowatts (horsepower).

OVER	TO	Code	Rate
0	7.5 (10)	**0-10**	$3.17
7.5 (10)	14.9 (20)	**10-20**	$7.22
14.9 (20)	24.6 (33)	**20-33**	$14.34
24.6 (33)	33.6 (45)	**33-45**	$16.59
33.6 (45)	48.5 (65)	**45-65**	$19.83

BLADE SAWKERF **[ABSK]**

The following allowance is entered on the extra work bill by using the length x depth per blade.

UNITS	Code	Rate
Rate /blade/ 30.5 m (100 lin ft) / 25 mm (inch) depth	**100'/IN**	$18.00
Rate/blade/ 0.3 m (lin ft) / 25 mm (inch) depth	**LF-INDE**	$0.18

SCRAPERS, SELF PROPELLED [SCRSP]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.87**

Includes all attachments and accessories.

CATERPILLAR **[CAT]**

Model	Code	Rate
613	**1395**	$64.14
613B	**1400**	$72.34
613C	**1402**	$90.87
615	**1415**	$125.12
615C	**1416**	$136.91
621B cushion hitch	**1680**	$158.83
623B	**1700**	$164.04
623E	**1702**	$195.13
623F	**1703**	$204.81
627B push pull	**1770**	$210.11
627E non push-pull	**1772**	$225.18
627E push-pull	**1773**	$229.73
631C 67M5012 serial	**2170**	$180.50
631D	**2180**	$224.95
631E	**2185**	$247.80
633C non cushion hitch	**2305**	$176.11
633C cushion hitch	**2315**	$175.92
633C 66M693 serial	**2320**	$185.73
633D	**2330**	$234.46
637 cushion, non-push-pull	**2375**	$265.70
637 non-cushion, push-pull	**2410**	$267.86
637D non push-pull	**2460**	$326.35
637D push-pull	**2470**	$330.15
639D	**2475**	$339.49
637E	**2476**	$358.26
637E push-pull	**2477**	$363.45
641B non cushion hitch	**2620**	$224.08
641B cushion hitch	**2655**	$265.77
651B non cushion hitch	**2935**	$271.19
651B cushion hitch	**2970**	$273.55
651E	**2975**	$340.43
657B non cushion, non p-p	**3360**	$427.83
657B cushion, push-pull	**3370**	$434.05
657E non push-pull	**3375**	$509.09
657E push-pull	**3380**	$527.27
660B	**3470**	$250.56
666B	**3600**	$397.60

JOHN DEERE **[DEER]**

Model	Code	Rate
JD 760A	**3845**	$63.70
JD 762	**3860**	$79.11
JD 762A	**3865**	$83.15
JD 762B	**3866**	$97.98
JD 860A	**3920**	$93.80
JD 860B	**3930**	$98.58
JD 862	**3940**	$117.29
JD 862B	**3942**	$144.22

INTERNATIONAL **[INTL]**

Model	Code	Rate
412B	**5631**	$80.20
431B	**5637**	$156.41
433B	**5643**	$227.34

TEREX **[TERX]**

Model	Code	Rate
S 11EB	**8245**	$63.97
S 23E 33TOT-H-93SH, elev	**8250**	$151.38
S 24 49LOT-76SH serial	**8260**	$193.05
S 24B 023-024 serial	**8270**	$234.92
S 24C	**8275**	$256.06

WABCO **[WAB]**

Model	Code	Rate
101F	**8570**	$73.12
101G	**8575**	$74.37
111A	**8640**	$69.79
222G	**8700**	$136.97
222H	**8704**	$155.30

TRACTORS, CRAWLER [TRACC]

DELAY FACTOR = 0.15 **OVERTIME FACTOR = 0.86**

Includes all attachments and accessories such as dozer blade and power control blocks when needed, but does not include backhoe, winch or ripper units listed elsewhere in this schedule.

CASE **[CASE]**

Model	Code	Rate
350	**1820**	$29.25
350B	**1825**	$31.23
450	**1868**	$25.36
450B	**1869**	$29.02
450C	**1869E**	$32.63
475	**1870**	$42.24
550	**2000**	$34.11
650	**2100**	$40.25
850	**2128**	$34.14
850B	**2130**	$37.02
850C	**2135**	$40.67
850D	**2140**	$42.99
1150B	**2250**	$51.26
1150C	**2255**	$56.61
1150D	**2257**	$58.27
1150E	**2258**	$60.38

CATERPILLAR **[CAT]**

Model	Code	Rate
D-3	**2340**	$29.66
D-3B	**2345**	$32.91
D-3 LGP	**2350**	$30.27
D-3B LGP	**2355**	$34.11
D-3B SA	**2370**	$36.66
D-3C	**2380**	$34.98
D4C Series III	**2450**	$44.93
D-4D	**2655**	$35.75
D-4E direct drive	**2660**	$37.70
D-4E power shift	**2665**	$38.94
D-4H	**2670**	$49.12
D-4H LGP	**2675**	$49.12
D-4H Series II	**2680**	$50.29
D-4E SA	**2772**	$45.41
D-4E LGP power shift	**2780**	$39.13
D-4E LGP direct drive	**2782**	$39.13
D-4G XL	**2790XL**	$45.72
D-5	**3194**	$51.48
D-5B power shift	**3206**	$54.64
D-5B SA	**3325**	$59.39
D-5B LGP	**3345**	$57.20
D-5C	**3346**	$48.72
D-5H	**3347**	$65.41
D-5H Series II	**3348**	$69.23
D-5H LGP	**3350**	$68.32
D-6C direct drive	**3645**	$66.65
D-6C power shift	**3688**	$67.26
D-6C LGP	**3710**	$69.67
D-6D	**3720**	$77.56
D-6D SA	**3725**	$86.89
D-6D LGP	**3730**	$78.00
D-6H	**3732**	$88.05
D-6H Series II	**3733**	$92.47
D-6H LGP	**3735**	$92.42
D-6M LGP	**3745**	$86.25
D-6N XL	**3755**	$88.90
D-6R DS	**3800**	$98.09
D-6R XL	**3815**	$102.97
D-7G	**4180**	$117.09
D-7G LGP	**4200**	$113.07
D-7G SA	**4210**	$123.52
D-7H	**4215**	$120.74
D-7H Series II	**4216**	$129.79
D-7H LGP	**4220**	$126.95
D-8K	**4858**	$154.40
D-8L	**4862**	$186.18
D-8L SA	**4863**	$200.47
D-8N	**4864**	$167.52
D-8R	**4870**	$184.54
D-9H	**5160**	$205.31
D-9L	**5165**	$246.61
D-9N	**5170**	$211.63
D-9R	**5175**	$248.37
D-10	**5220**	$378.27
D-10N	**5225**	$306.53
D-10R	**5227**	$342.48
D-11N	**5230**	$478.66

JOHN DEERE **[DEER]**

Model	Code	Rate
JD 350C	**5360**	$32.59
JD 350D	**5365**	$36.48
JD 400G	**5405**	$30.88
JD 450C	**5474**	$32.94
JD 450D	**5476**	$34.21
JD 450E	**5478**	$34.69
JD 450G	**5479**	$37.73
JD 550	**5480**	$37.22
JD 550A	**5481**	$40.33
JD 550B	**5483**	$39.12
JD 550G	**5484**	$44.03
JD 650G	**5484A**	$49.27
JD 650H LGP	**5484H**	$53.03
JD 750	**5485**	$58.28
JD 750B	**5486**	$63.94
JD 750 LGP	**5487**	$61.11
JD 750B LGP	**5488**	$77.84
JD 850	**5490**	$76.19
JD 850B	**5491**	$87.84
JD 850 LGP	**5492**	$80.76
JD 850B LGP	**5495**	$94.76

DRESSER **[DRES]**

Model	Code	Rate
TD 7E	**9100**	$33.92
TD 7G	**9102**	$37.74
TD 8E	**9105**	$41.39
TD 8G	**9107**	$44.59
TD 12	**9110**	$59.62
TD 12 LGP	**9115**	$68.10
TD 15C	**9120**	$84.36
TD 15E	**9122**	$102.51
TD 15C LGP	**9125**	$81.59
TD 20E	**9130**	$112.62
TD 20G	**9135**	$137.40
TD 20G LGP	**9137**	$144.75
TD 25E	**9139**	$160.17
TD 25G	**9140**	$199.97

FIAT-ALLIS **[F-A]**

Model	Code	Rate
10C	**6043**	$66.12
10C LGP	**6044**	$66.98
14C	**6048**	$83.34
FD 20	**6056**	$119.55
21C	**6060**	$137.84
FD 30	**6060E**	$161.67
31	**6061**	$219.16
FD 40	**6061E**	$251.04

KOMATSU **[KOMA]**

Model	Code	Rate
D 21P-6	**7965**	$35.65
D 31A-16	**7970**	$31.15
D 31A-17	**7972**	$34.28
D 31E-17	**7976**	$35.69
D 31E-18	**7977**	$38.00
D 31P-16	**7980**	$31.52
D 31P-17	**7981**	$34.99
D 31P-17B	**7981E**	$36.68
D 58E-1	**8003**	$69.44
D 58P-1	**8003H**	$77.11
D 65E-6	**8070**	$80.06
D 65E-7, E-8	**8072**	$89.45
D 65P-6	**8080**	$82.69
D 65P-7 / D 65P-8	**8082**	$92.79
D 68P-1	**8083**	$102.32
D 68E-1	**8085**	$97.32
D 83E-1	**8087**	$119.20
D 83P-1	**8088**	$120.53
D 85P-18	**8090**	$128.57
D 85A-18	**8114**	$111.85
D 85E-12	**8120**	$97.91
D 85E-18	**8140**	$121.81
D 135A-1	**8150**	$156.57
D 155A-1	**8160**	$181.21
D 155A-2	**8161**	$180.81
D 375A-1	**8175**	$287.77
D 375A-2	**8176**	$320.71
D 455A-1	**8180**	$353.05
D 475A-2	**8186**	$502.83

TRACTORS, HEAVY [TRACH]

DELAY FACTOR = 0.16 **OVERTIME FACTOR = 0.86**

Includes all attachments and accessories such as dozer blade, power control units and push blocks, when needed, but does not include backhoe, winch or ripper units listed elsewhere in this schedule.

CATERPILLAR **[CAT]**

Model	Code	Rate
814	**1400**	$105.88
814B	**1410**	$156.63
824B	**1720**	$170.91
824C	**1730**	$210.39
834B	**2010**	$318.01

TRACTORS, RUBBER TIRE, INDUSTRIAL, FARM & SKID STEER [TRACS]

DELAY FACTOR = 0.11 **OVERTIME FACTOR = 0.90**

37.3 kW (50 HP) OR LESS **[<50]**

Including, but not limited to the following:
Bobcat--440B, 443B, 450, 453, 542B, 543B, 553, 742B, 743B, 753, 763, 773, 1840, 7753
Case-- 1818, 1825, 1835C, 1838
Deere-- 3375, 4475, 5200, 5575, 6675, 7775
Ford-- L250, L454, L455, L553, L555, L781
Gehl-- SL3310, SL3410, SL3725, SL3825, SL4525, SL4625
Hydra-Mac-- 1300, 1600, 1700D
JCB-- 165Robot, 165Robot Ser II
Massey-Ferguson-- MF30E
Mahto-- LS70, LS75, L933
Mustang-- 920, 920E, 921, 930A, 930AE, 940, 940E, 910, 911, 2040
New Holland-- 1220, 1320, 1620, 1920, 2120, 3415, 3930, L250, L255, L465, LX465, LX485, L565, LX565, LX665
Ramrod-- 230B, 300B, 584B, 784B, 550, 750, 1350, 1550
Thomas-- T-82, T-83, T-83S, T-103, T-132, T-133, T-133S
Trak-- 1300HD, 1300C, 1300CX, 1500C

Model	Code	Rate
with loader or dozer	**A**	$25.35
auger, w/ or w/o loader or dozer	**B**	$25.72
backhoe, w/ or w/o loader or dozer	**C**	$27.08

OVER 37.3 kW (50 HP) **[>50]**

Including, but not limited to the following:
Bobcat-- 853, 863, 873, 943, 953, 980
Case-- 1845C
Deere-- 5300, 5400, 6200, 6300, 6400, 8875
Ford-- L783, L785, 250C, 260C
Gehl-- SL5625, SL6625, SL6635
Hydra-Mac-- 1850, 2650, 2650D
JCB-- 185Robot
Massey-Ferguson-- MF40E, MF50EX
Mustang-- 960, 2060
New Holland-- 4630, 5030, 5640, 6640, 7740, 7840, 8240, 8340, L865, LX865, LX885, 345D, 545D
Ramrod-- 1750, 1950
Thomas-- T-173HL, T-173HLS, T173HLS II, T-203HD, T-233HD
Trak-- 1700HD, 1700C, 1700CX, 1700XHP

Model	Code	Rate
with loader or dozer	**A**	$33.53
auger, w/ or w/o loader or dozer	**B**	$34.00
backhoe, w/ or w/o loader or dozer	**C**	$35.41

TRAFFIC CONTROL & SAFETY DEVICES (HOURLY RATES) [TRAFA]

DELAY FACTOR = 0.35 **OVERTIME FACTOR = 0.70**

CHANGEABLE MESSAGE SIGN **[CMSN]**

Model	Code	Rate
Generator	**GEN1**	$13.13
Generator w/ cell remote	**GEN2**	$14.27
Solar	**SOL1**	$8.78
Solar w/ cell remote	**SOL2**	$9.92

FLASHING ARROW SIGN **[FLAS]**

Including supplies, replacements and servicing.

Model	Code	Rate
Roof mounted	**RM**	$0.77
Trailer mounted	**TM**	$3.20

TRAFFIC CONTROL & SAFETY DEVICES (DAILY RATES) [TRAFC]

DELAY FACTOR = 0.72 **OVERTIME FACTOR = 1.00**

Includes supplies and servicing. The following allowance is entered on the extra work by using days instead of hours worked. Crash cushion barrels and K-rail sections are now listed with Non-Operated items[NONOP].

(1) BARRICADES **[1BAR]**

(A) 750 mm to 900 mm high & 600 mm to 900 mm wide (30 to 36 inches high & 24 to 36 inches wide)
(B) 1500 mm high by 1200 mm wide min. (60" high by 48" wide min.)

Model	Code	Rate
each with flasher	**A1**	$0.42
each without flasher	**A2**	$0.22
each	**B3**	$0.95

(2) TRAFFIC CONES **[2TC]**

Lost or destroyed are no longer paid on invoice.

Model	Code	Rate
450 mm (18") high, per 100	**A100**	$7.62
700 mm (28") high, per 100	**B100**	$13.27
700 mm (28") high w/ refl sleeve, per 100	**D100**	$20.45
1,050 mm (42") high w/ refl sleeve, per 100	**E100**	$34.02

(3) PORTABLE DELINEATOR **[3DEL]**

Lost or destroyed are no longer paid on invoice.

Model	Code	Rate
per 100	**100**	$21.75

(4) ILLUMINATED SIGNS **[4SIG]**

Model	Code	Rate
incl 900 mm x900 mm (3'x3') sign & batteries	**12V**	$5.26

(5) FLASHING BEACON **[5BEA]**

Model	Code	Rate
portable 12 volt	**12V**	$5.37

(6) FLAG/SIGN STAND **[6FSS]**

Model	Code	Rate
incl sign, stand & 3 flags	**EACH**	$2.43

(7) DELINEATOR DRUM **[7DDR]**

Model	Code	Rate
Del. drum w/ base per 100	**100**	$53.75

TRAILERS, EQUIPMENT, LOW BED [TRAIL]

DELAY FACTOR = 0.42 **OVERTIME FACTOR = 0.63**

Includes all attachments and accessories related to hauling. The rates cover drop deck type with and without folding/removable gooseneck or oscillating trunion. Pilot vehicles are extra. Listed in accordance with number of axles and tires per axle. Includes jeeps, booster axles, and dollies. All loads shall be hauled legally or within Caltrans Permit Policy.

LOW BED A **[LB-A]**

2 axle

Model	Code	Rate
4 Tires per axle	**100**	$12.97
8 Tires per axle	**200**	$16.35

LOW BED B **[LB-B]**

3 axle

Model	Code	Rate
4 Tires per axle	**300**	$17.39
8 Tires per axle	**400**	$20.14

LOW BED C **[LB-C]**

4 axle

Model	Code	Rate
4 Tires per axle	**500**	$27.95
8 Tires per axle	**600**	$34.69

LOW BED D **[LB-D]**

6 axle

Model	Code	Rate
8 Tires per axle	**700**	$55.54

TRAILERS, EQUIPMENT, TILT BED [TRAIT]

DELAY FACTOR = 0.42 **OVERTIME FACTOR = 0.63**

Includes all attachments and accessories related to hauling. Pilot vehicles are extra. Listed in accordance with the Mfr's rated capacity in tonnes(tons).

TILT BED 1 AXLE **[TB-1]**

OVER	TO	Code	Rate
0	1.8 (2)	**00-02**	$0.69
1.8 (2)	3.6 (4)	**02-04**	$0.74

TILT BED 2 AXLES **[TB-2]**

OVER	TO	Code	Rate
3.6 (4)	5.4 (6)	**04-06**	$1.23
7.3 (8)	9.1 (10)	**08-10**	$3.81
9.1 (10)	10.9 (12)	**10-12**	$4.39
10.9 (12)	12.7 (14)	**12-14**	$4.94
12.7 (14)	14.5 (16)	**14-16**	$5.49
14.5 (16)	16.3 (18)	**16-18**	$5.31
16.3 (18)	18.1 (20)	**18-20**	$5.13
18.1 (20)	20.0 (22)	**20-22**	$5.87
20.0 (22)	22.7 (25)	**22-25**	$5.72

TRENCHING MACHINES [TRENC]

DELAY FACTOR = 0.12 **OVERTIME FACTOR = 0.90**

Includes all attachments and accessories. When used, tungsten carbide tips shall be replaced by separate invoice.

BOBCAT **[BCAT]**

Model	Code	Rate
T 116	**2000**	$12.51
T 135	**2010**	$28.88
T 136	**2020**	$29.21
T 208	**2030**	$6.48
3022	**2040**	$29.66

CASE **[CASE]**

Model	Code	Rate
TL 70	**9051**	$5.27
TL 100	**9053**	$7.58
TL 120	**9055**	$9.15
TL 200	**9070**	$9.32
16+4	**9120**	$13.54
25+4	**9170**	$18.75
25 + 4 XP	**9171**	$23.77
30+4 standard	**9224**	$26.52
DH 4	**9255**	$35.63
DH 4B	**9256**	$39.10
DH 5	**9257**	$34.34
DH 5 QUAD	**9259**	$35.28
DH 7	**9261**	$40.63
360	**9263**	$28.62
ROAD RUNNER 380	**9277**	$38.78
TF 300	**9374**	$17.92
TF 700	**9398**	$24.03
TF 800	**9405**	$31.24
TF 1000	**9460**	$36.49
760	**9465**	$37.79

DITCH WITCH **[D-W]**

Model	Code	Rate
R 30	**5390**	$24.25
R 36D	**5400**	$29.96
R 40	**5432**	$31.49
R 65	**5556**	$32.31
R 100	**5565**	$78.78
V 30	**5618**	$23.09
1410	**5620**	$9.48
1420	**5625**	$10.14
1500	**5630**	$7.04
1620	**5635**	$13.24
1810	**5640**	$13.60
2020	**5645**	$17.09
2200	**5650**	$16.14
2300	**5660**	$24.35
2310	**5662**	$25.59
3210	**5670**	$27.78
3210 Combo	**5675**	$28.65
3500	**5676**	$32.75
4010	**5677**	$41.90
4010 Combo	**5678**	$32.58
5010	**5679**	$32.59
6510	**5680**	$38.91
6510 Combo	**5685**	$42.00

MIDMARK **[MDMK]**

Model	Code	Rate
300 A	**7945**	$24.06
321	**7950**	$25.33
400 A	**7955**	$30.77
440	**7960**	$38.77

VERMEER **[VERM]**

Model	Code	Rate
CC-135	**8350**	$85.50
M 220	**8380**	$16.04
M 455 / M455A	**8480**	$37.93
M 475	**8570**	$40.16
M 475A	**8571**	$45.44
M 485	**8580**	$44.03
M 495	**8585**	$71.18
T 300B, T 300A	**8718**	$24.90
T 400C, T 400B, T 400A	**8781**	$54.41
T 600D, C, B, A	**8842**	$78.52
T 650	**8843**	$132.45
T 800B, T 800A, T800	**8870**	$125.88
T 800C	**8871**	$137.34
T 850	**8875**	$244.81
V 430	**8950**	$28.44
V 430A	**8951**	$31.97
V 434 / M 434	**9000**	$27.42
V 440	**9015**	$30.47
V 450	**9017**	$36.06
V 454	**9020**	$31.24
V 1550	**9025**	$14.99

TRUCK, TRUCK TRAILERS, EXCL. DUMP TRUCKS & EQPT TRAIL [TRUCK]

DELAY FACTOR = 0.14 **OVERTIME FACTOR = 0.87**

Includes all attachments and accessories related to hauling, with and without trailers as needed. Includes water trucks, freight trucks and passenger vehicles, including 4wd option. Listed by Mfr's Gross Vehicle Weight in Kilograms(pounds). For tractor-trailer units, the gross vehicle weight of the cargo carrying unit or units will control. In the case of water trucks, the tank capacity expressed in kilograms (pounds) of water plus 20%, will determine the gross vehicle weight. For attachment allowance, see attachment class.

TRUCKS **[T&TT]**

OVER	TO	Code	Rate
CARS , LIGHT TRUCKS		**00-06**	$19.98
3175 (7000)	5443 (12000) No small pickups	**06-12**	$25.04
5443 (12000)	9072 (20000)	**12-20**	$30.70
9072 (20000)	12701(28000)	**20-28**	$33.12
12701 (28000)	16330 (36000)	**28-36**	$41.66
16330 (36000)	21773 (48000)	**36-48**	$48.11
21773 (48000)	27216 (60000)	**48-60**	$59.31
27216(60000) & Over		**60**	$75.26

TRUCKS, OFF-HIGHWAY [TRUOF]

DELAY FACTOR = 0.19 **OVERTIME FACTOR = 0.82**

Includes all attachments and accessories. Includes end dump, belly dump and earthmover types. Listed in accordance with Mfr's rated capacity in tonnes (tons). In the case of earthmover types, rated by Mfr's volumetric capacity, a factor of 1.4 tonnes per cubic meter (1-1/2 tons per cubic yard) of struck capacity shall be used.

TRUCK OFF-HIGHWAY **[TRU]**

OVER	TO	Code	Rate
9.1 (10)	13.6 (15)	**10-15**	$45.44
16.3 (18)	20.0 (22)	**18-22**	$80.74
20.0 (22)	24.5 (27)	**22-27**	$101.12
24.5 (27)	29.0 (32)	**27-32**	$115.38
29.0 (32)	36.3 (40)	**32-40**	$157.39
36.3 (40)	49.9 (55)	**40-55**	$235.14
49.9 (55)	60.8 (67)	**55-67**	$263.75

TRUCKS, DUMP, ON-HIGHWAY [TRUON]

DELAY FACTOR = 0.16 **OVERTIME FACTOR = 0.85**

Includes all end dump, side dump and belly dump types; including all attachments and accessories.

TRUCK ON-HIGHWAY **[TRUN]**

Model	Code	Rate
2 axles	**2AXL**	$51.72
3 axles	**3AXL**	$66.43
4 axles	**4AXL**	$73.99
5 axles	**5AXL**	$83.50

WELDING EQUIPMENT [WELD]

DELAY FACTOR = 0.18 **OVERTIME FACTOR = 0.84**

ARC WELDING MACHINES **[AWM]**

Diesel, gas or electric powered. Includes helmets, holders, cable and all attachments and accessories. Rate capacity in amps.

OVER	TO	Code	Rate
0	250	**0-250**	$6.11
250	500	**250-500**	$11.87
over	500	**500**	$12.02

GAS WELDING OUTFIT **[GWO]**

Includes regulator, 7.6 meters (25 feet) of hose, torch, goggles, lighter and attachments and accessories. Gas and rod shall be paid separately.

Model	Code	Rate
ALL	**ALL**	$0.24

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

CRAFT: ## LANDSCAPE MAINTENANCE LABORER

DETERMINATION: SC-LML-2008-1
ISSUE DATE: February 22, 2008
EXPIRATION DATE OF DETERMINATION: December 31, 2008* Effective until superseded by a new determination issued by the Director of Industrial Relations. Contact the Division of Labor Statistics and Research at (415) 703-4774 for the new rates after 10 days from the expiration date, if no subsequent determination is issued.

		Employer Payments					Straight-Time		Overtime
LOCALITY:	Basic Hourly Rate	Health and Welfare	Pension	Vacation	Holiday	Training	Hours	Total Hourly Rate	1 1/2X
Imperial	$8.00	-	-	[a] 0.115	0.17	-	8	[b]8.285	[b]12.285
Inyo, Mono and San Bernardino	8.00	-	-	0.30	0.17	-	8	8.47	12.47
Kern	8.00	-	-	[c] 0.16	0.17	-	8	[b]8.33	[b]12.33
	10.00	-	-	[d] 0.27	0.46	-	8	[b]10.73	[b]15.73
Los Angeles	8.00	0.89	-	[e] 0.115	0.14	-	8	[b]9.145	[b]13.145
Orange	8.00	-	-	[f] 0.11	0.11	-	8	[b]8.22	[b]12.22
Riverside	8.00	-	-	[g] 0.20	0.16	-	8	[b]8.36	[b]12.36
San Diego	8.00	-	-	0.22	0.115	-	8	8.335	12.335
	8.00	-	-	0.24	0.12	-	8	8.36	12.36
San Luis Obispo	8.00	-	-	[k] 0.15	0.15	-	8	8.30	12.30
	8.00	-	-	[l] 0.16	0.16	-	8	8.32	12.32
Santa Barbara	8.00	-	-	[h] 0.12	0.12	-	8	[b]8.24	[b]12.24
	8.00	-	-	[i] 0.13	0.13	-	8	[b]8.26	[b]12.26
Ventura	8.00	-	-	0.115	0.16	-	8	8.275	12.275
	8.00	2.97	-	[j] 0.19	0.26	-	8	[b]11.42	[b]15.42

Craft is not apprenticeable.

NOTE: If there are two rates, the first rate is for routine work, the second rate is for complex work.

[a] $0.22 after 3 years of service.
[b] Computation is based on the first years of employment. This rate should be increased by any applicable vacation increase as stated in other footnotes.
[c] $0.31 after 2 years of service.
[d] $0.54 after 2 years of service: $0.81 after 3 years of service.
[e] $0.24 after 3 years of service: $0.37 after 7 years of service.
[f] $0.22 after 4 years of service.
[g] $0.40 after 3 years of service.
[h] $0.23 after 2 years of service.
[i] $0.27 after 2 years of service.
[j] $0.38 after 3 years of service.
[k] $0.29 after 2 years of service.
[l] $0.31 after 2 years of service.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at http://www.dir.ca.gov/DLSR/PWD. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and subsistence provisions for the current determinations on the Internet at http://www.dir.ca.gov/DLSR/PWD. Travel and subsistence provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #OPERATING ENGINEER

DETERMINATION: SC-23-63-2-2011-2
ISSUE DATE: August 22, 2011
EXPIRATION DATE OF DETERMINATION: June 30, 2012** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Division of Labor Statistics and Research for specific rates at (415) 703-4774.

LOCALITY: All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, and Ventura counties.

		Employer Payments					Straight – Time		Overtime Hourly Rate		
CLASSIFICATION (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday (a)	Training	Other Payments	Hours	Total Hourly Rate	Daily (c)	Saturday (d)	Sunday/ Holiday
									1 1/2X	1 1/2X	2X
Classification Groups (b)											
Group 1	$36.13	$11.20	$5.95	$2.82	$0.80	$0.29	8	$57.19	$75.255	$75.255	$93.32
Group 2	$36.91	$11.20	$5.95	$2.82	$0.80	$0.29	8	$57.97	$76.425	$76.425	$94.88
Group 3	$37.20	$11.20	$5.95	$2.82	$0.80	$0.29	8	$58.26	$76.860	$76.860	$95.46
Group 4	$38.69	$11.20	$5.95	$2.82	$0.80	$0.29	8	$59.75	$79.095	$79.095	$98.44
Group 6	$38.91	$11.20	$5.95	$2.82	$0.80	$0.29	8	$59.97	$79.425	$79.425	$98.88
Group 8	$39.02	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.08	$79.590	$79.590	$99.10
Group 10	$39.14	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.20	$79.770	$79.770	$99.34
Group 12	$39.31	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.37	$80.025	$80.025	$99.68
Group 13	$39.41	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.47	$80.175	$80.175	$99.88
Group 14	$39.44	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.50	$80.220	$80.220	$99.94
Group 15	$39.52	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.58	$80.340	$80.340	$100.10
Group 16	$39.64	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.70	$80.520	$80.520	$100.34
Group 17	$39.81	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.87	$80.775	$80.775	$100.68
Group 18	$39.91	$11.20	$5.95	$2.82	$0.80	$0.29	8	$60.97	$80.925	$80.925	$100.88
Group 19	$40.02	$11.20	$5.95	$2.82	$0.80	$0.29	8	$61.08	$81.090	$81.090	$101.10
Group 20	$40.14	$11.20	$5.95	$2.82	$0.80	$0.29	8	$61.20	$81.270	$81.270	$101.34
Group 21	$40.31	$11.20	$5.95	$2.82	$0.80	$0.29	8	$61.37	$81.525	$81.525	$101.68
Group 22	$40.41	$11.20	$5.95	$2.82	$0.80	$0.29	8	$61.47	$81.675	$81.675	$101.88
Group 23	$40.52	$11.20	$5.95	$2.82	$0.80	$0.29	8	$61.58	$81.840	$81.840	$102.10
Group 24	$40.64	$11.20	$5.95	$2.82	$0.80	$0.29	8	$61.70	$82.020	$82.020	$102.34
Group 25	$40.81	$11.20	$5.95	$2.82	$0.80	$0.29	8	$61.87	$82.275	$82.275	$102.68

# Indicates an apprenticeable craft. Effective as of July 1, 2008, the issuance and publication of the prevailing wage apprentice schedules/apprentice wage rates have been reassigned by the Department of Industrial Relations from the Division of Labor Statistics and Research to the Division of Apprenticeship Standards. To obtain any apprentice schedules/apprentice wage rates, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at http://www.dir.ca.gov/das/das.html.

[a] Includes an amount withheld for supplemental dues.

[b] For classifications within each group, see pages 8 and 9.

[c] Rate applies to the first 4 overtime hours. All other daily overtime is paid at the Sunday rate.

[d] Rate applies to the first 12 hours worked. All other time is paid at the Sunday rate.

NOTE: For Special Shift and Multi-Shift, see pages 9A and 9B.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at http://www.dir.ca.gov/DLSR/PWD. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. Travel and/or subsistence requirements for each craft, classification or type of worker may be obtained from the Prevailing Wage Unit at (415) 703-4774. You may obtain the Travel and/or subsistence provisions for the current determinations on the Internet at http://www.dir.ca.gov/DLSR/PWD. Travel and/or subsistence provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

DETERMINATION: SC-23-63-2-2011-2

CLASSIFICATIONS:

GROUP 1

Bargeman
Brakeman
Compressor Operator
Ditchwitch, with seat or similar type equipment
Elevator Operator - Inside
Engineer Oiler
Forklift Operator (includes loed, lull or similar types – under 5 tons)
Generator Operator
Generator, Pump or Compressor Plant Operator
Heavy Duty Repairman Helper
Pump Operator
Signalman
Switchman

GROUP 2

Asphalt-Rubber Plant Operator (Nurse Tank Operator)
Concrete Mixer Operator - Skip Type
Conveyor Operator
Fireman
Forklift Operator (includes loed, lull or similar types – over 5 tons)
Hydrostatic Pump Operator
Oiler Crusher (Asphalt or Concrete Plant)
Petromat Laydown Machine
RJU Side Dump Jack
Rotary Drill Helper (Oilfield)
Screening and Conveyor Machine Operator (or similar types)
Skiploader (Wheel type up to 3/4 yd. without attachment)
Tar Pot Fireman
Temporary Heating Plant Operator
Trenching Machine Oiler

GROUP 3

Asphalt Rubber Blend Operator
Bobcat or similar type (Skid Steer)
Equipment Greaser (rack)
Ford Ferguson (with dragtype attachments)
Helicopter Radioman (ground)
Stationary Pipe Wrapping and Cleaning Machine Operator

GROUP 4

Asphalt Plant Fireman
Backhoe Operator (mini-max or similar type)
Boring Machine Operator
Boring System Electronic Tracking Locator
Boxman or Mixerman (asphalt or concrete)
Chip Spreading Machine Operator
Concrete Cleaning Decontamination Machine Operator
Concrete Pump Operator (small portable)
Drilling Machine Operator, Small Auger types (Texoma Super Economatic, or similar types - Hughes 100 or 200, or similar types - drilling depth of 30 maximum)
Equipment Greaser (grease truck)
Excavator Track/Rubber-Tired (Operating weight under 21,000 lbs)
Guard Rail Post Driver Operator
Highline Cableway Signalman
Hydra-Hammer-Aero Stomper
Micro Tunneling Operator (above ground tunnel)
Power Concrete Curing Machine Operator
Power Concrete Saw Operator
Power - Driver Jumbo Form Setter Operator
Power Sweeper Operator
Rock Wheel Saw/Trencher
Roller Operator (compacting)
Screed Operator (asphalt or concrete)
Trenching Machine Operator (up to 6ft.)
Vacuum or Muck Truck

GROUP 5 (for multi-shift rate, see page 9B)

Equipment Greaser (Grease Truck/Multi-Shift)

GROUP 6

Articulating Material Hauler
Asphalt Plant Engineer
Batch Plant Operator
Bit Sharpener
Concrete Joint Machine Operator (canal and similar type)
Concrete Planer Operator
Dandy Digger
Deck Engine Operator
Deck Engineer
Derrickman (oilfield type)

Drilling Machine Operator, Bucket or Auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum)
Drilling Machine Operator (including water wells)
Hydrographic Seeder Machine Operator (straw, pulp or seed)
Jackson Track Maintainer, or similar type
Kalamazoo Switch Tamper, or similar type
Machine Tool Operator
Maginnis Internal Full Slab Vibrator
Mechanical Berm, Curb or Gutter (concrete or asphalt)
Mechanical Finisher Operator (concrete, Clary-Johnson-Bidwell or similar)
Micro Tunnel System Operator (below ground)
Pavement Breaker Operator
Road Oil Mixing Machine Operator
Roller Operator (asphalt or finish)
Rubber-Tired Earthmoving Equipment (single engine, up to and including 25 yds. struck)
Self-Propelled Tar Pipelining Machine Operator
Skiploader Operator (crawler and wheel type, over 3/4 yds. and up to and including 1 1/2 y
Slip Form Pump Operator (power driven hydraulic lifting device for concrete forms)
Tractor Operator - Bulldozer, Tamper-Scraper (single engine, up to 100 H.P. flyweel and similar types, up to and including D-5 and similar types)
Tugger Hoist Operator (1 drum)
Ultra High Pressure Waterjet Cutting Tool System Operator
Vacuum Blasting Machine Operator
Volume Mixer Operator
Welder – General

GROUP 7 (for multi-shift rate, see page 9B)

Welder – General (Multi-Shift)

GROUP 8

Asphalt or Concrete Spreading Operator (tamping or finishing)
Asphalt Paving Machine Operator (barber greene or similar type)
Asphalt-Rubber Distributor Operator
Backhoe Operator (up to and including 3/4 yds.) small ford, case or similar
Backhoe Operator (over 3/4 yd. and up to 5 cu. yds. M.R.C.)
Cast in Place Pipe Laying Machine Operator
Combination Mixer and Compressor Operator (gunite work)
Compactor Operator - Self Propelled
Concrete Mixer Operator - Paving
Crushing Plant Operator
Drill Doctor
Drilling Machine Operator, Bucket or Auger types (Calweld 150 bucket or similar types - Watson 1500, 2000, 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum)
Elevating Grader Operator
Excavator Track/Rubber-Tired (Operating Weight 21,000 lbs - 100,000 lbs)
Global Positioning System/GPS (or Technician)
Grade Checker
Gradall Operator
Grouting Machine Operator
Heavy Duty Repairman/Pump Installer
Heavy Equipment Robotics Operator
Kalamazoo Balliste Regulator or similar type
Kolman Belt Loader and similar type
Le Tourneau Blob Compactor or similar type
Loader Operator (Athey, Euclid, Sierra and similar types)
Master Environmental Maintenance Mechanic
Mobark Chipper or similiar types
Ozzie Padder or similar types
P.C. 490 Slot Saw
Pneumatic Concrete Placing Machine Operator (Hackley-Presswell or similar type)
Pumpcrete Gun Operator
Rock Drill or Similiar Types (see Miscellaneous Provision #4 for additional information regarding this classification)
Rotary Drill Operator (excluding caison type)
Rubber-Tired Earth Moving Equipment Operator (single engine, caterpillar, euclid, athey wagon, and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck)
Rubber-Tired Earth Moving Equipment Operator (multiple engine - up to and including 25 yds. struck)
Rubber-Tired Scraper Operator (self-loading paddle wheel type - John Deere, 1040 and similar single unit)
Self-Propelled Curb and Gutter Machine Operator
Shuttle Buggy
Skiploader Operator (crawler and wheel type over 1 1/2 yds. up to and including 6 1/2 yds.)
Soil Remediation Plant Operator (CMI, Envirotech or Similar)
Soil Stabilizer and Reclaimer (WR-2400)
Somero SXP Laser Screed
Surface Heaters and Planer Operator
Tractor Compressor Drill Combination Operator
Tractor Operator (any type larger than D-5 - 100 flyweel H.P. and over, or similar – bulldozer, tamper, scraper and push tractor, single engine)
Tractor Operator (boom attachments)
Traveling Pipe Wrapping, Cleaning and Bending Machine Operator
Trenching Machine Operator (over 6 ft. depth capacity, manufacturer's rating)
Trenching Machine with Road Miner Attachment (over 6ft. depth capacity, manufacturer's rating - Oiler or Journeyman Trainee required)
Ultra High Pressure Waterjet Cutting Tool System Mechanic
Water Pull (compaction)

DETERMINATION: SC-23-63-2-2011-2

GROUP 9 (for multi-shift rate, see page 9B)
Heavy Duty Repairman (Multi-Shift)

GROUP 10
Backhoe Operator (over 5 cu. yds. M.R.C.)
Drilling Machine Operator, Bucket or Auger types (Calweld 200 B bucket or similar types - Watson 3000 or 5000 auger or similar types - Texoma 900 auger or similar types - drilling depth of 105' maximum)
Dual Drum Mixer
Dynamic Compactor LDC350 or similar types
Heavy Duty Repairman-Welder combination
Monorail Locomotive Operator (diesel, gas or electric)
Motor Patrol - Blade Operator (single engine)
Multiple Engine Tractor Operator (euclid and similar type - except quad 9 cat.)
Pneumatic Pipe Ramming Tool and similar types
Pre-stressed Wrapping Machine Operator (2 Operators required)
Rubber - Tired Earth Moving Equipment Operator (single engine, over 50 yds. struck)
Rubber - Tired Earth Moving Equipment Operator (multiple engine, euclid caterpillar and similar - over 25 yds. and up to 50 yds. struck)
Tower Crane Repairman
Tractor Loader Operator (crawler and wheel-type over 6 1/2 yds.)
Welder - Certified
Woods Mixer Operator (and similar pugmill equipment)

GROUP 11 (for multi-shift rate, see page 9B)
Heavy Duty Repairman – Welder Combination (Multi-Shift)
Welder – Certified (Multi-Shift)

GROUP 12
Auto Grader Operator
Automatic Slip Form Operator
Backhoe Operator (over 7 cu. yds. M.R.C.)
Drilling Machine Operator, Bucket or Auger types (Calweld, auger 200 CA or similar types - watson, auger 6000 or similar types - hughes super duty, auger 200 or similar types - drilling depth of 175' maximum)
Excavator Track/Rubber Tired (Operating Weight 100,000 lbs. - 200,000 lbs)
Hoe Ram or similar with compressor
Mass Excavator Operator - less than 750 cu. yds.
Mechanical Finishing Machine Operator
Mobile Form Traveler Operator
Motor Patrol Operator (multi-engine)
Pipe Mobile Machine Operator
Rubber-Tired Earth Moving Equipment Operator (multiple engine, euclid, caterpillar and similar type, over 50 cu. yds. struck)
Rubber-Tired Self-Loading Scraper Operator (paddle-wheel-auger type self-loading - (two (2) or more units)

GROUP 13
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (single engine, up to and including 25 yds. struck)

GROUP 14
Canal Liner Operator
Canal Trimmer Operator
Remote Controlled Earth Moving Operator ($1.00 per hour additional to base rate)
Wheel Excavator Operator (over 750 cu. yds. per hour)

GROUP 15
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (single engine, caterpillar, euclid, athey wagon, and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (multiple engine - up to and including 25 yds. struck)

GROUP 16
Excavator Track/Rubber Tired (Operating Weight exceeding 200,000 lbs.)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (single engine, over 50 yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (multiple engine, euclid, caterpillar, and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Push-Pull System (multiple engine, euclid, caterpillar, and similar type, over 50 cu. yds. struck)
Tandem Tractor Operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19
Rotex Concrete Belt Operator
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - single engine, caterpillar, euclid, athey wagon, and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engines, up to and including 25 yds. struck)

GROUP 20
Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck)

Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, euclid, caterpillar and similar, over 25 yds. and up to 50 yds. struck)
Drilling Machine Operator, Bucket or Auger types (Calweld, auger 200 CA or similar types

GROUP 21

Rubber-Tired Earth Moving Equipment Operator, Operating in Tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, euclid, caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (single engine, up to and including 25 yds. struck)

GROUP 23

Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (single engine, caterpillar, euclid, athey wagon, and similar types with an and all attachments over 25 yds. and up to and including 50 cu. yds. struck)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (multiple engine, up to and including 25 yds. struck)

GROUP 24
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (single engine, over 50 yds. Struck)
Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (multiple engine, euclid, caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25
Concrete Pump Operator-Truck Mounted
Pedestal Concrete Pump Operator

Rubber-Tired Earth Moving Equipment Operator, Operating Equipment with the Tandem Push-Pull System (multiple engine, euclid, caterpillar and similar over 50 cu. yds struck)

MISCELLANEOUS PROVISIONS:

1. Operators on hoists with three drums shall receive fifteen cents (15¢) per hour additional pay to the regular rate of pay. The additional pay shall be added to the regular rate and become the base rate for the entire shift.
2. All heavy duty repairman and heavy duty combination shall receive fifty cents (50¢) per hour tool allowance in addition to their regular rate of pay and this shall become their base rate of pay.
3. Employees required to suit up and work in a hazardous material environment, shall receive Two Dollars ($2.00) per hour in addition to their regular rate of pay, and that rate shall become the basic hourly rate of pay.
4. A review of rock drilling is currently pending. The minimum acceptable rate of pay for this classification or type of work on public works projects is Laborer and Related Classifications/Group 5 (Driller) as published on pages 13 and 14 of the Director's General Prevailing Wage Determinations. However, the published rate for the craft/classification of Operating Engineer/Group 8 (Rock Drill or Similar Types) may be used by contractors to perform rock drilling on public works projects.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

CRAFT: #TEAMSTER
(APPLIES ONLY TO WORK ON THE CONSTRUCTION SITE)

DETERMINATION: SC-23-261-2-2011-1
ISSUE DATE: August 22, 2011
EXPIRATION DATE OF DETERMINATION: June 30, 2012** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Division of Labor Statistics and Research for specific rates at (415) 703-4774.

LOCALITY: All localities within Imperial, Inyo, Kern, Los Angeles, Mono, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara and Ventura Counties

			Employer Payments				Straight-Time		Overtime Hourly Rates		
Classification[c] (Journeyperson)	Basic Hourly Rate	Health and Welfare	Pension	Vacation/ Holiday	Training[e]	Other Payments	Hours	Total Hourly Rate	Daily[d] 1 1/2X	Saturday[d] 1 1/2X	Sunday/ Holiday 2X
Group I	26.79	12.22	5.00	2.70[a]	1.37	.35	8	48.43	61.825	61.825	75.22
Group II	26.94	12.22	5.00	2.70[a]	1.37	.35	8	48.58	62.05	62.05	75.52
Group III	27.07	12.22	5.00	2.70[a]	1.37	.35	8	48.71	62.245	62.245	75.78
Group IV	27.26	12.22	5.00	2.70[a]	1.37	.35	8	48.90	62.53	62.53	76.16
Group V	27.29	12.22	5.00	2.70[a]	1.37	.35	8	48.93	62.575	62.575	76.22
Group VI	27.32	12.22	5.00	2.70[a]	1.37	.35	8	48.96	62.62	62.62	76.28
Group VII	27.57	12.22	5.00	2.70[a]	1.37	.35	8	49.21	62.995	62.995	76.78
Group VIII	27.82	12.22	5.00	2.70[a]	1.37	.35	8	49.46	63.37	63.37	77.28
Group IX	28.02	12.22	5.00	2.70[a]	1.37	.35	8	49.66	63.67	63.67	77.68
Group X	28.32	12.22	5.00	2.70[a]	1.37	.35	8	49.96	64.12	64.12	78.28
Group XI	28.82	12.22	5.00	2.70[a]	1.37	.35	8	50.46	64.87	64.87	79.28
Subjourneyman											
0-2000 hours	13.50	12.22	5.00	1.35[a]	1.37	.35	8	33.79	40.54	40.54	47.29
2001-4000 hours	15.50	12.22	5.00	1.60[a]	1.37	.35	8	36.04	43.79	43.79	51.54
4001-6000 hours	17.50	12.22	5.00	1.85[a]	1.37	.35	8	38.29	47.04	47.04	55.79
Over 6000 hours and thereafter at journeyman rates											

#Indicates an apprenticeable craft. Effective as of July 1, 2008, the issuance and publication of the prevailing wage apprentice schedules/apprentice wage rates have been reassigned by the Department of Industrial Relations from the Division of Labor Statistics and Research to the Division of Apprenticeship Standards. To obtain any apprentice schedules/apprentice wage rates, please contact the Division of Apprenticeship Standards or refer to the Division of Apprenticeship Standards' website at http://www.dir.ca.gov/das/das.html.

[a] Includes an amount for Supplemental Dues.

[b] Subjourneyman may be employed at a ratio of one subjourneyman for every five journeymen.

[c] For classifications within each group, see page 21A.

[d] Rate applies to the first 4 daily overtime hours on weekdays and the first 12 hours on Saturday. All other overtime is paid at the Sunday/Holiday double-time rate.

[e] Includes $0.45 for Apprentice Program Fund.

RECOGNIZED HOLIDAYS: Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Internet at http://www.dir.ca.gov/DLSR/PWD. Holiday provisions for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

TRAVEL AND/OR SUBSISTENCE PAYMENT: In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Internet at http://www.dir.ca.gov/DLSR/PWD. Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Prevailing Wage Unit at (415) 703-4774.

DETERMINATION: SC-23-261-2-2011-1

Group I
Warehouseman and Teamster

Group II
Driver of Vehicle or Combination of Vehicles - 2 axles
Traffic Control Pilot Car, excluding moving heavy equipment permit load
Truck Mounted Power Broom

Group III
Driver of Vehicle or Combination of Vehicles - 3 axles
Bootman
Cement Mason Distribution Truck
Fuel Truck Driver
Water Truck - 2 axles
Dump Truck of less than 16 yards water level
Erosion Control Driver

Group IV
Driver of Transit Mix Truck-Under 3 yds
Dumpcrete Truck Less than 6 1/2 yards water level
Truck Repairman Helper

Group V
Water Truck 3 or more axles
Warehouseman Clerk
Working Truck Driver
Truck Greaser and Tireman - $0.50 additional for Tireman
Pipeline and Utility Working Truck Driver, including Winch Truck and Plastic Fusion, limited to Pipeline and Utility Work
Slurry Truck Driver

Group VI
Driver of Transit Mix Truck - 3 yds or more
Dumpcrete Truck 6 1/2 yds water level and over
Driver of Vehicle or Combination of Vehicles - 4 or more axles
Driver of Oil Spreader Truck
Dump Truck 16 yds to 25 yds water level
Side Dump Trucks
Flow Boy Dump Trucks

Group VII
A Frame, Swedish Crane or Similar
Forklift Driver
Ross Carrier Driver

Group VIII
Dump Truck of 25 yds to 49 yards water level
Truck Repairman
Water Pull Single Engine
Welder

Group IX
Truck Repairman Welder
Low Bed Driver, 9 axles or over

Group X
Water Pull Single Engine with attachment
Dump Truck and Articulating - 50 yards or more water level

Group XI
Water Pull Twin Engine
Water Pull Twin Engine with attachments
Winch Truck Driver - $0.25 additional when operating a Winch or similar special attachments

STATE OF CALIFORNIA EDMUND G. BROWN, JR., *Governor*

DEPARTMENT OF INDUSTRIAL RELATIONS
Division of Labor Statistics and Research
455 Golden Gate Avenue, 9th Floor
San Francisco, CA 94102

MAILING ADDRESS:
P. O. Box 420603
San Francisco, CA 94142-0603

PREDETERMINED INCREASES FOR

OPERATING ENGINEER (SC-23-63-2-2011-2)

CRANES, PILE DRIVER AND HOISTING EQUIPMENT (OPERATING ENGINEER) (SC-23-63-2-2011-2B)

CRANES, PILE DRIVER AND HOISTING EQUIPMENT (OPERATING ENGINEER, SPECIAL SHIFT) (SC-23-63-2-2011-2B1)

CRANES, PILE DRIVER AND HOISTING EQUIPMENT (OPERATING ENGINEER, MULTI-SHIFT) (SC-23-63-2-2011-2B2)

TUNNEL (OPERATING ENGINEER) (SC-23-63-2-2011-2C)

TUNNEL (OPERATING ENGINEER) (SC-23-63-2-2011-2C1) (MULTI-SHIFT)

BUILDING/CONSTRUCTION INSPECTOR, FIELD SOILS AND MATERIAL TESTER, AND NON-DESTRUCTIVE TESTING (SC-23-63-2-2011-2D)

BUILDING/CONSTRUCTION INSPECTOR, FIELD SOILS AND MATERIAL TESTER, AND NON-DESTRUCTIVE TESTING (SPECIAL SHIFT) (SC-23-63-2-2011-2D1)

BUILDING/CONSTRUCTION INSPECTOR, FIELD SOILS AND MATERIAL TESTER, AND NON-DESTRUCTIVE TESTING (MULTI-SHIFT) (SC-23-63-2-2011-2D2)

ALL LOCALITIES WITH IMPERIAL, INYO, KERN, LOS ANGELES, MONO, ORANGE, RIVERSIDE, SAN BERNARDINO, SAN LUIS OBISPO, SANTA BARBARA, AND VENTURA COUNTIES

These predetermined increases for the above named crafts apply only to the current determinations for work being performed on public works projects with bid advertisement dates on or after **September 1, 2011**, until the determination(s) is/are superseded by a new determination(s) or a predetermined increase modification notice becomes effective.

When referencing our prevailing wage determinations, please note that if the prevailing wage rate determination which was in effect on the bid advertisement date of a project has a single asterisk (*)

after the expiration date, the rate will be good for the life of the project. However, if a prevailing wage rate determination has double asterisks (**) after the expiration date, the rate must be updated on the following date to reflect the predetermined rate change(s).

OPERATING ENGINEER: All Classifications and All Shifts

The above Determinations are currently in effect and will expire on June 30, 2012**.

Effective on July 1, 2012, there will be an increase of $1.70 to be allocated as follows:

- $1.27 to Basic Hourly Rate
- $0.40 to Pension
- $0.03 to Supplemental Dues

There will be no further increases applicable to these determinations.

Issued 8/22/2011, Effective 9/1/2011 until superseded.

This page will be updated when wage rate breakdown information becomes available. **Last Updated:** June 27, 2012

02 32 Geotechnical Investigations

02 32 19 – Exploratory Excavations

02 32 19.10 Test Pits		Crew	Daily Output	Labor-Hours	Unit	Material	2012 Bare Costs Labor	Equipment	Total	Total Incl O&P
0120	Loader-backhoe, light soil	B-11M	28	.571	C.Y.		23.50	13	36.50	50
0130	Heavy soil	"	20	.800	↓		32.50	18.20	50.70	69.50
1000	Subsurface exploration, mobilization				Mile				6.25	7.85
1010	Difficult access for rig, add				Hr.				240	300
1020	Auger borings, drill rig, incl. samples				L.F.				23	28
1030	Hand auger				↓				29	36
1050	Drill and sample every 5', split spoon				↓				29	36
1060	Extra samples				Ea.				35	44

02 41 Demolition

02 41 13 – Selective Site Demolition

02 41 13.15 Hydrodemolition

0010	**HYDRODEMOLITION** R024119-10									
0015	Hydrodemolition, concrete pavement, 4000 PSI, 2" depth	B-5	500	.112	S.F.		4.33	2.63	6.96	9.50
0120	4" depth	↓	450	.124	↓		4.81	2.92	7.73	10.55
0130	6" depth	↓	400	.140	↓		5.40	3.29	8.69	11.85
0410	6000 PSI, 2" depth	↓	410	.137	↓		5.30	3.21	8.51	11.60
0420	4" depth	↓	350	.160	↓		6.20	3.76	9.96	13.60
0430	6" depth	↓	300	.187	↓		7.20	4.38	11.58	15.85
0510	8000 PSI, 2" depth	↓	330	.170	↓		6.55	3.99	10.54	14.45
0520	4" depth	↓	280	.200	↓		7.75	4.70	12.45	16.95
0530	6" depth	↓	240	.233	↓		9	5.50	14.50	19.85

02 41 13.17 Demolish, Remove Pavement and Curb

0010	**DEMOLISH, REMOVE PAVEMENT AND CURB** R024119-10									
5010	Pavement removal, bituminous roads, 3" thick	B-38	690	.058	S.Y.		2.30	1.71	4.01	5.40
5050	4" to 6" thick	↓	420	.095	↓		3.78	2.82	6.60	8.85
5100	Bituminous driveways	↓	640	.063	↓		2.48	1.85	4.33	5.80
5200	Concrete to 6" thick, hydraulic hammer, mesh reinforced	↓	255	.157	↓		6.25	4.64	10.89	14.60
5300	Rod reinforced	↓	200	.200	↓		7.95	5.90	13.85	18.60
5400	Concrete, 7" to 24" thick, plain	↓	33	1.212	C.Y.		48	36	84	113
5500	Reinforced	↓	24	1.667	"		66	49.50	115.50	155
5600	With hand held air equipment, bituminous, to 6" thick	B-39	1900	.025	S.F.		.94	.11	1.05	1.55
5700	Concrete to 6" thick, no reinforcing	↓	1600	.030	↓		1.11	.13	1.24	1.84
5800	Mesh reinforced	↓	1400	.034	↓		1.27	.15	1.42	2.11
5900	Rod reinforced	↓	765	.063	↓		2.32	.27	2.59	3.86
6000	Curbs, concrete, plain	B-6	360	.067	L.F.		2.55	.93	3.48	4.92
6100	Reinforced	↓	275	.087	↓		3.34	1.21	4.55	6.45
6200	Granite	↓	360	.067	↓		2.55	.93	3.48	4.92
6300	Bituminous	↓	528	.045	↓		1.74	.63	2.37	3.36
6500	Site demo, berms under 4" in height, bituminous	↓	528	.045	↓		1.74	.63	2.37	3.36
6600	4" or over in height	↓	300	.080	↓		3.07	1.11	4.18	5.90

02 41 13.20 Selective Demo, Highway Guard Rails & Barriers

0010	**SELECTIVE DEMOLITION, HIGHWAY GUARD RAILS & BARRIERS**									
0100	Guard rail, corrugated steel	B-6	600	.040	L.F.		1.53	.56	2.09	2.95
0200	End sections	↓	40	.600	Ea.		23	8.35	31.35	44
0300	Wrap around	↓	40	.600	"		23	8.35	31.35	44
0450	Timber 4" x 8"	↓	600	.040	L.F.		1.53	.56	2.09	2.95
0500	Three 3/4" cables	↓	600	.040	"		1.53	.56	2.09	2.95
0600	Wood posts	↓	240	.100	Ea.		3.83	1.39	5.22	7.40
0700	Guide rail, 6" x 6" box beam	B-80B	120	.267	L.F.		10	1.94	11.94	17.45

02 41 Demolition

02 41 19 – Selective Demolition

	02 41 19.19 Selective Facility Services Demolition	Crew	Daily Output	Labor-Hours	Unit	2012 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
3000	Loading & trucking, including 2 mile haul, chute loaded	B-16	45	.711	C.Y.		25.50	13	38.50	53.50
3040	Hand loading truck, 50' haul	"	48	.667			24	12.20	36.20	50
3080	Machine loading truck	B-17	120	.267			10	5.75	15.75	21.50
5000	Haul, per mile, up to 8 C.Y. truck	B-34B	1165	.007			.24	.50	.74	.92
5100	Over 8 C.Y. truck	"	1550	.005			.18	.38	.56	.69

02 41 19.20 Selective Demolition, Dump Charges

0010	SELECTIVE DEMOLITION, DUMP CHARGES R024119-10									
0020	Dump charges, typical urban city, tipping fees only									
0100	Building construction materials				Ton	82			82	90
0200	Trees, brush, lumber					70			70	77
0300	Rubbish only					70			70	77
0500	Reclamation station, usual charge					82			82	90

02 41 19.21 Selective Demolition, Gutting

0010	SELECTIVE DEMOLITION, GUTTING R024119-10									
0020	Building interior, including disposal, dumpster fees not included									
0500	Residential building									
0560	Minimum	B-16	400	.080	SF Flr.		2.85	1.46	4.31	6
0580	Maximum	"	360	.089	"		3.17	1.62	4.79	6.65
0900	Commercial building									
1000	Minimum	B-16	350	.091	SF Flr.		3.26	1.67	4.93	6.85
1020	Maximum	"	250	.128	"		4.56	2.34	6.90	9.55

02 41 19.25 Selective Demolition, Saw Cutting

0010	SELECTIVE DEMOLITION, SAW CUTTING R024119-10									
0015	Asphalt, up to 3" deep	B-89	1050	.015	L.F.	.34	.60	.41	1.35	1.73
0020	Each additional inch of depth	"	1800	.009		.11	.35	.24	.70	.91
1200	Masonry walls, hydraulic saw, brick, per inch of depth	B-89B	300	.053		.42	2.11	2.46	4.99	6.35
1220	Block walls, solid, per inch of depth	"	250	.064		.42	2.53	2.95	5.90	7.55
2000	Brick or masonry w/hand held saw, per inch of depth	A-1	125	.064		.34	2.25	.53	3.12	4.41
5000	Wood sheathing to 1" thick, on walls	1 Carp	200	.040			1.76		1.76	2.71
5020	On roof	"	250	.032			1.41		1.41	2.17

02 41 19.27 Selective Demolition, Torch Cutting

0010	SELECTIVE DEMOLITION, TORCH CUTTING R024119-10									
0020	Steel, 1" thick plate	1 Clab	360	.022	L.F.	.37	.78		1.15	1.61
0040	1" diameter bar	"	210	.038	Ea.		1.34		1.34	2.06
1000	Oxygen lance cutting, reinforced concrete walls									
1040	12" to 16" thick walls	1 Clab	10	.800	L.F.		28		28	43
1080	24" thick walls	"	6	1.333	"		47		47	72

02 43 Structure Moving

02 43 13 – Structure Relocation

02 43 13.13 Building Relocation

0010	BUILDING RELOCATION									
0011	One day move, up to 24' wide									
0020	Reset on new foundation, patch & hook-up, average move				Total					11,200
0040	Wood or steel frame bldg., based on ground floor area G	B-4	185	.259	S.F.		9.20	2.50	11.70	16.90
0060	Masonry bldg., based on ground floor area G	"	137	.350			12.45	3.37	15.82	23
0200	For 24' to 42' wide, add									15%
0220	For each additional day on road, add G	B-4	1	48	Day		1,700	460	2,160	3,125
0240	Construct new basement, move building, 1 day									
0300	move, patch & hook-up, based on ground floor area G	B-3	155	.310	S.F.	9.20	11.60	14.70	35.50	44

32 92 Turf and Grasses

32 92 19 – Seeding

32 92 19.14 Seeding, Athletic Fields

		Crew	Daily Output	Labor-Hours	Unit	2012 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
2900	Crown vetch, 4#/M.S.F., push spreader	1 Clab	8	1	M.S.F.	14.70	35		49.70	70
3000	Tractor spreader	B-66	52	.154		14.70	6.90	4.75	26.35	32
3100	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		20	11.70	7.75	39.45	48.5
3300	Rye, 10#/M.S.F., annual, push spreader	1 Clab	8	1		7.50	35		42.50	62.5
3400	Tractor spreader	B-66	52	.154		7.50	6.90	4.75	19.15	24
3500	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		16.50	11.70	7.75	35.95	44.5
3600	Fine textured, push spreader	1 Clab	8	1		18.95	35		53.95	75
3700	Tractor spreader	B-66	52	.154		18.95	6.90	4.75	30.60	36.5
3800	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		41.50	11.70	7.75	60.95	72.5
4000	Shade mix, 6#/M.S.F., push spreader	1 Clab	8	1		16.80	35		51.80	72.5
4100	Tractor spreader	B-66	52	.154		16.80	6.90	4.75	28.45	34
4200	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		37	11.70	7.75	56.45	67
4400	Slope mix, 6#/M.S.F., push spreader	1 Clab	8	1		19.65	35		54.65	75.5
4500	Tractor spreader	B-66	52	.154		19.65	6.90	4.75	31.30	37
4600	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		49	11.70	7.75	68.45	80
4800	Turf mix, 4#/M.S.F., push spreader	1 Clab	8	1		20	35		55	76
4900	Tractor spreader	B-66	52	.154		20	6.90	4.75	31.65	37
5000	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		50	11.70	7.75	69.45	83
5200	Utility mix, 7#/M.S.F., push spreader	1 Clab	8	1		17	35		52	73
5300	Tractor spreader	B-66	52	.154		17	6.90	4.75	28.65	34
5400	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		64	11.70	7.75	83.45	96
5600	Wildflower, .10#/M.S.F., push spreader	1 Clab	8	1		8.65	35		43.65	63
5700	Tractor spreader	B-66	52	.154		8.65	6.90	4.75	20.30	25
5800	Hydro or air seeding, with mulch and fertilizer	B-81	80	.300		47.50	11.70	7.75	66.95	79
7000	Apply fertilizer, 800 lb./acre	B-66	4	2	Ton	800	89.50	62	951.50	1,07
7025	Fertilizer, mechanical spread	1 Clab	1.75	4.571	Acre	3.30	160		163.30	25
7100	Apply mulch, see Section 32 91 13.16									

32 92 23 – Sodding

32 92 23.10 Sodding Systems

0010	**SODDING SYSTEMS**	B-63	22	1.818	M.S.F.	175	67.50	7.25	249.75	3
0020	Sodding, 1" deep, bluegrass sod, on level ground, over 8 M.S.F.		17	2.353		240	87	9.40	336.40	4
0200	4 M.S.F.		13.50	2.963		295	110	11.80	416.80	5
0300	1000 S.F.		6	6.667		175	247	26.50	448.50	6
0500	Sloped ground, over 8 M.S.F.		5	8		240	296	32	568	7
0600	4 M.S.F.		4	10		295	370	40	705	9
0700	1000 S.F.		20	2		600	74	8	682	7
1000	Bent grass sod, on level ground, over 6 M.S.F.		18	2.222		665	82.50	8.85	756.35	9
1100	3 M.S.F.		14	2.857		875	106	11.40	992.40	1
1200	Sodding 1000 S.F. or less		15	2.667		600	99	10.65	709.65	8
1500	Sloped ground, over 6 M.S.F.		13.50	2.963		665	110	11.80	786.80	1
1600	3 M.S.F.		12	3.333		875	123	13.30	1,011.30	1
1700	1000 S.F.									

32 92 26 – Sprigging

32 92 26.13 Stolonizing

0010	**STOLONIZING**	1 Clab	4	2	M.S.F.	25	70		95	
0100	6" O.C., by hand	"	80	.100		25	3.51		28.51	
0110	Walk behind sprig planter	B-66	350	.023		25	1.02	.71	26.73	
0120	Towed sprig planter	1 Clab	5.20	1.538		16.75	54		70.75	
0130	9" O.C., by hand	"	92	.087		16.75	3.05		19.80	
0140	Walk behind sprig planter	B-66	420	.019		16.75	.85	.59	18.19	
0150	Towed sprig planter	1 Clab	6	1.333		12.50	47		59.50	
0160	12" O.C., by hand									

Location Factors

Costs shown in RSMeans cost data publications are based on national averages for materials and installation. To adjust these costs to a specific location, simply multiply the base cost by the factor and divide by 100 for that city. The data is arranged alphabetically by state and postal zip code numbers. For a city not listed, use the factor for a nearby city with similar economic characteristics.

STATE/ZIP	CITY	MAT.	INST.	TOTAL
ALABAMA				
350-352	Birmingham	97.6	74.6	87.4
354	Tuscaloosa	96.6	58.6	79.9
355	Jasper	96.8	57.6	79.5
356	Decatur	96.5	60.1	80.5
357-358	Huntsville	96.6	68.1	84.1
359	Gadsden	96.6	57.6	79.4
360-361	Montgomery	97.4	56.6	79.4
362	Anniston	96.0	64.5	82.1
363	Dothan	96.6	52.0	76.9
364	Evergreen	96.2	53.4	77.3
365-366	Mobile	97.7	67.5	84.4
367	Selma	96.3	51.9	76.7
368	Phenix City	97.1	55.9	78.9
369	Butler	96.5	52.0	76.9
ALASKA				
995-996	Anchorage	124.5	114.0	119.9
997	Fairbanks	122.4	115.0	119.1
998	Juneau	120.3	113.9	117.5
999	Ketchikan	134.1	113.9	125.2
ARIZONA				
850,853	Phoenix	97.9	76.6	88.5
851,852	Mesa/Tempe	97.4	72.4	86.3
855	Globe	97.4	62.5	82.0
856-857	Tucson	96.1	72.1	85.5
859	Show Low	97.5	62.9	82.2
860	Flagstaff	100.3	73.9	88.7
863	Prescott	98.2	62.1	82.2
864	Kingman	96.4	73.4	86.3
865	Chambers	96.5	63.0	81.7
ARKANSAS				
716	Pine Bluff	96.7	63.8	82.2
717	Camden	94.1	50.1	74.7
718	Texarkana	95.9	51.3	76.2
719	Hot Springs	93.4	52.9	75.5
720-722	Little Rock	97.0	65.0	82.9
723	West Memphis	95.8	62.8	81.2
724	Jonesboro	96.8	60.7	80.9
725	Batesville	94.2	56.1	77.4
726	Harrison	95.5	52.3	76.5
727	Fayetteville	92.9	54.1	75.8
728	Russellville	94.1	55.4	77.0
729	Fort Smith	97.1	62.5	81.8
CALIFORNIA				
900-902	Los Angeles	100.1	115.5	106.9
903-905	Inglewood	95.3	113.1	103.2
906-908	Long Beach	96.9	113.2	104.1
910-912	Pasadena	95.2	113.6	103.3
913-916	Van Nuys	98.1	113.5	104.9
917-918	Alhambra	97.1	113.5	104.3
919-921	San Diego	99.3	107.8	103.0
922	Palm Springs	96.4	110.9	102.8
923-924	San Bernardino	94.3	110.5	101.4
925	Riverside	98.9	112.4	104.9
926-927	Santa Ana	96.1	110.8	102.6
928	Anaheim	98.9	112.8	105.1
930	Oxnard	100.2	112.3	105.5
931	Santa Barbara	99.5	112.3	105.1
932-933	Bakersfield	100.0	109.5	104.2
934	San Luis Obispo	99.7	109.4	104.0
935	Mojave	97.0	106.9	101.3
936-938	Fresno	100.5	115.7	107.2
939	Salinas	100.5	122.7	110.3
940-941	San Francisco	108.5	142.3	123.4
942,956-958	Sacramento	102.9	118.6	109.9
943	Palo Alto	101.3	129.9	113.9
944	San Mateo	103.8	131.3	115.9
945	Vallejo	102.2	128.2	113.7
946	Oakland	106.3	133.9	118.5
947	Berkeley	105.5	133.2	117.7
948	Richmond	104.7	129.7	115.7
949	San Rafael	106.0	129.5	116.4
950	Santa Cruz	105.0	122.8	112.9
CALIFORNIA (CONT'D)				
951	San Jose	103.2	135.1	117.3
952	Stockton	100.7	117.2	108.0
953	Modesto	100.7	116.9	107.9
954	Santa Rosa	100.3	135.0	115.6
955	Eureka	101.6	114.2	107.2
959	Marysville	100.9	114.4	106.8
960	Redding	102.8	114.4	107.9
961	Susanville	101.5	114.4	107.2
COLORADO				
800-802	Denver	101.7	84.7	94.2
803	Boulder	98.6	82.9	91.7
804	Golden	100.7	81.7	92.3
805	Fort Collins	102.6	79.1	92.2
806	Greeley	100.0	78.2	90.4
807	Fort Morgan	99.3	82.0	91.7
808-809	Colorado Springs	101.6	81.7	92.8
810	Pueblo	100.4	80.8	91.8
811	Alamosa	101.5	76.7	90.6
812	Salida	101.3	78.3	91.2
813	Durango	101.9	79.6	92.1
814	Montrose	100.8	79.3	91.3
815	Grand Junction	104.2	79.6	93.4
816	Glenwood Springs	101.6	82.2	93.1
CONNECTICUT				
060	New Britain	101.1	118.6	108.8
061	Hartford	102.0	118.7	109.4
062	Willimantic	101.7	118.4	109.1
063	New London	97.6	118.6	106.9
064	Meriden	99.7	118.6	108.0
065	New Haven	102.8	118.6	109.8
066	Bridgeport	102.2	118.7	109.5
067	Waterbury	101.8	118.6	109.2
068	Norwalk	101.8	126.3	112.6
069	Stamford	101.9	126.3	112.7
D.C.				
200-205	Washington	102.4	92.8	98.2
DELAWARE				
197	Newark	99.4	107.9	103.2
198	Wilmington	99.1	108.0	103.0
199	Dover	99.5	107.9	103.2
FLORIDA				
320,322	Jacksonville	98.7	69.4	85.7
321	Daytona Beach	98.8	75.2	88.4
323	Tallahassee	99.4	59.3	81.7
324	Panama City	100.1	60.5	82.7
325	Pensacola	102.6	64.1	85.6
326,344	Gainesville	100.4	69.7	86.9
327-328,347	Orlando	101.8	73.0	89.1
329	Melbourne	101.5	78.2	91.2
330-332,340	Miami	99.6	76.7	89.6
333	Fort Lauderdale	98.1	75.9	88.3
334,349	West Palm Beach	96.7	74.4	86.9
335-336,346	Tampa	99.8	82.1	92.0
337	St. Petersburg	102.5	65.8	86.3
338	Lakeland	99.0	82.0	91.5
339,341	Fort Myers	98.1	75.8	88.3
342	Sarasota	100.0	77.3	90.0
GEORGIA				
300-303,399	Atlanta	98.0	76.5	88.5
304	Statesboro	97.4	54.0	78.3
305	Gainesville	96.1	64.0	82.0
306	Athens	95.5	64.2	81.7
307	Dalton	97.6	60.1	81.1
308-309	Augusta	96.7	64.5	82.5
310-312	Macon	96.4	64.2	82.2
313-314	Savannah	98.1	60.5	81.5
315	Waycross	97.3	61.4	81.5
316	Valdosta	97.6	60.8	81.4
317,398	Albany	97.6	61.5	81.7
318-319	Columbus	97.5	64.6	83.0

Reclamation Plan
Lebata, Inc.
Big Rock Creek Surface Mining Project

ATTACHMENT E

Streambed Alteration Agreement (pending)

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 3

Drainage Concept

and

Drainage Concept Addendum

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2008 DRAINAGE CONCEPT

Drainage Concept for Lebata Inc. Surface Mine
Project Alternative and Alternative 1

Big Rock Creek, Los Angeles County

FINAL

Prepared Under the Supervision of:

_____
James F. Reilly, P.E., Supervising Engineer

DECEMBER 2008

STETSON ENGINEERS INC.
San Rafael and West Covina, California
Mesa, Arizona

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1.0 INTRODUCTION

1.1 PURPOSE

This report describes the technical basis for the proposed Lebata Inc. mine drainage concept shown in the attached Drainage Plans (14 sheets). The design discharge for the drainage concept is the Los Angeles County designated Capital Flood[1] event for the Big Rock Creek watershed combined with local surface flows generated by the 50-year rainfall-runoff over the 2,079-acre portion of the inactive alluvial fan surface located upstream from the site (Figure 3). Specifically, 175 cfs is contributed by Capital Flood overflow from the main channel near the mountain front cross-section which flows onto the proposed mine site via the relict "apex braid" in the event of complete failure of the flood control levee near the mountain front (i.e., "South Levee" in Figure 3). In addition, a total of 188 cfs (unburned and unbulked)[2] is generated by rainfall-runoff from each of 6 separate drainage area zones comprising the 2,079-acre upstream fan surface which flows onto the site as shallow overland flow (Figure 3).

For the purposes of this drainage concept, the combination of the 175 cfs main channel overflow and the 188 cfs local rainfall-runoff flow onto the site comprises the total discharge of the Capital Flood, which is 363 cfs. The terms, 'design discharge' and 'Capital Flood,' have the same meaning and are used interchangeably in this report.

[1] The Capital Flood is the runoff produced by a 50-year frequency design storm falling on a saturated watershed (soil moisture at field capacity). A 50-year frequency design storm has a probability of 1/50 of being equaled or exceeded in any year. Capital Flood protection also requires adding the effects of fires (burn factor) and erosion (bulking factor) under certain conditions (Source: LA County 2006 Hydrology Manual). Fire greatly increases the amount of runoff and erosion from a mountain watershed. A denuded watershed after fires will produce greater than normal sediment volumes due to higher runoff caused by a lack of vegetation and lowered infiltration rates. The inclusion of sediment in runoff (i.e., sediment-laden runoff) results in a greater total discharge. This is referred to as bulking (Source: LA County 2006 Sedimentation Manual). The LA County-estimated Capital Flood flow for the Big Rock Creek main channel at the Pearblossom Highway is 21,700 cfs.

[2] The alluvial fan below the mountain front has little vegetation and there is no need to include a burn factor in the peak flow estimate. The alluvial fan below the mountain front is in the Antelope Valley Debris Production Area Zone 11 (DPA-11) with a bulking factor of about 1.02 (Source: LA County 2006 Sedimentation Manual, Appendix B). Since the bulking factor is close to 1.0, there would be little difference between bulked flow and unbulked flow.

1.2 DESCRIPTION OF THE PROJECT

The proposed mine is located on an approximately 309 acre site owned by Lebata Inc. on the Big Rock Creek alluvial fan surface in the Antelope Valley in northern Los Angeles County near Pearblossom. The site has a natural surface slope of about 1.8 percent trending north-westerly. Pearblossom Highway crosses the Big Rock alluvial fan in an east-west direction about 1.5 miles upstream from the site (refer to Figure 1). The 10 to 12 ft-high Southern Pacific Rail Road embankment crosses the fan in an east-west direction and bifurcates the site forming the North and South Parcels. The Big Rock Creek main channel flows south-north approximately 1 mile to the east of the site. The adjacent Vulcan Materials Company (VMC) Mine No. 88126-(5) located approximately 0.5 mile east of the proposed mine is also shown on Figure 1.

As shown in the Federal Emergency Management Agency (FEMA)'s effective Flood Insurance Rate Map (FIRM), a portion of the proposed mine site is within the FEMA's Flood Zone A (Figure 2) mapped by approximate methods. Examination of the Floodplain Management Paths (FMPs) outlined in the Antelope Valley Comprehensive Plan for Flood Control and Water Conservation shows that the proposed mine site is not within the FMP limits. The FMP is analogous to the FEMA floodway, within which encroachment activities including fill, new construction, substantial improvements, and other development, are prohibited unless it has been demonstrated through hydrologic and hydraulic analyses that the proposed encroachment would not result in any increase in base flood water levels.

The County's regional plan envisions construction of a southerly extension of Longview Road on the proposed mine site. There are two possible roadway alignments considered by the County: a 1,500-foot turning radius alignment and a 750-foot turning radius alignment. Accordingly, the following two alternatives were considered in the proposed mine site drainage plans:

1. Project Alternative with 1,500-foot turning radius roadway alignment;
2. Alternative 1 with 750-foot turning radius roadway alignment.

For each alternative, the site would be mined to a depth of 80 feet below ground surface with average side slopes of 2H:1V as measured from the top to the bottom of the mining pit. The

pit bottom would have a similar slope at about 1.8 percent as the existing land surface. An 8-foot wide drainage terrace would be established on the cut slope at 30 foot depth intervals for the purpose of preventing surface erosion in accordance with the LA County Grading Guidelines dated January 2008. With an average slope of 2H:1V and construction of 8-foot wide drainage terraces, the side slope between the terraces is estimated to be about 1.85 H: 1V, which provides for a stable condition (Bryant, August 22, 2008).

The mine would be developed in four phases (refer to the attached Drainage Plans):

- Phase 1 would involve mining of the north parcel (North Pit) to the eastern edge of roadway alignment, excluding the area containing the proposed processing facilities and raw cement transfer and distribution facility sites (see Drainage Plan Sheets 1 and 8 for the two alternatives).
- Phase 2 would involve mining of the south parcel (South Pit) to the eastern edge of roadway alignment (see Drainage Plan Sheets 2, 3, 9 and 10 for the two alternatives).
- Phase 3 would involve the excavation of the roadway alignment, the processing plant area, and raw cement transfer and distribution facility area. In advance of Phase 3 excavation, the facilities occupying that location would be relocated to a 30 foot high engineered filled pad in the North Pit (see Drainage Plan Sheets 4, 5, 11 and 12).
- Final Reclamation would involve reconstructing of the roadway prism with engineered fill in the north and south parcels (see Drainage Plan Sheets 6, 7, 13 and 14).

1.3 SUMMARY OF THE DRAINAGE CONCEPT

The drainage system is designed in accordance with the LA County's Grading Guidelines, dated January 2008. The completed mine pits would intercept the entire Capital Flood discharge via a system of interceptor drains and convey the water to the bottom of the pits via a system of down drains and terrace drains. The total captured Capital Flood volume, inundation depth and pit emptying time for each phase are summarized in Table 1. Since the pit bottom has a similar north-westerly slope as the existing land surface of about 1.8 percent, the estimated inundation depth in Table 1 represents the estimated maximum inundation depth in the north-west corner of each pit.

TABLE 1: TOTAL CAPITAL FLOOD VOLUME, INUNDATION DEPTH, AND EMPTYING TIME

Mining Pit	Project Alternative				Alternative 1			
	Capital Flood Volume (acre-ft)	Inundation Depth (ft)	Emptying Time Total (days)	Emptying Time After Capital Flood (days)	Capital Flood Volume (acre-ft)	Inundation Depth (ft)	Emptying Time Total (days)	Emptying Time After Capital Flood (days)
Phase 1								
North Pit	107	19	5	1	115	13	6	2
Phase 2								
North Pit	58	16	3	0	66	11	5	1
South Pit	190	16	9	5	190	16	9	5
Phase 3								
North Pit	83	13	7	3	83	13	7	3
South Pit	193	16	9	5	193	16	9	5
Final Reclamation								
North Pit	54	17	5	1	65	11	5	1
South Pit	190	16	9	5	190	16	9	5

The total Capital Flood volume shown in Table 1 consists of flood volumes generated by the main channel overflow at the mountain front, local overland flow (sheet flow from the 2,079-acre upstream fan surface), on-site runoff, and direct precipitation on the mining pits. All of this water would leave the pit by evaporation and infiltration to groundwater. Since the completed North and South Pits would be 80 ft in depth, which is much deeper than the estimated maximum inundation depth, none of the captured Capital Flood discharge would overflow from the pits and escape as surface flow.

The 188 cfs local rainfall-runoff portion of the Capital Flood inflow would flow onto the mine site as shallow overland flow (sheetflow). This sheetflow would enter the completed mine via both the North and South Pits. The remaining 175 cfs main channel overflow portion of the Capital Flood would flow onto the site via the Lebata braid (Figure 3). Both types of flow would be collected at the top of the mine pit slopes by interceptor drains and then conveyed down the averaged 2:1 pit slopes via down drains. Two additional down drains would also be provided on the southern side of the North Pit during Phase 1 to convey

flows entering the pit through the two existing rail road culverts within the site boundary. Erosion protection would be provided on the pit floor at the outlets of the down drains.

The estimated emptying time shown in Table 1 includes two columns, one is the total time required to empty the Capital Flood volume and the other is the emptying time after the Capital Flood event. The two columns have a difference in 4 days. This is because infiltration also occurs over the 4-day Capital Flood event (According to the LACDPW 2006 Hydrology Manual, the 50-year design storm occurs over a period of four days). The analysis results show that all mining phases for each alternative could be emptied within 5 days after the Capital Flood event.

The following is a summary of hydrologic and hydraulic design considerations:

- All on-site runoff and off-site runoff that enters the project site during the Capital Flood event are collected and conveyed to the mining pits for infiltration without any overflow to downstream of the mine site. The mining pits could be emptied via infiltration within 5 days after the Capital Flood event. The project would have no adverse impact on properties adjacent to and downstream of the mine site.
- To prevent sedimentation, the 2008 LA County Grading Guidelines require that the slope of interceptor drains be not less than 2 percent (%). In cases where this ≥2% slope requirement can not be practically met due to the natural slope of the mine site, analysis was conducted to verify that these interceptor drains have sufficient flow velocities to prevent sedimentation.
- Interceptor drains were designed to have a 1-foot standard minimum depth and a minimum width of 3 feet at the inlet with 1.5H:1V side slopes, in accordance with the 2008 LA County Grading Guidelines.
- All down drains were designed in accordance with the minimum dimensions (1.5 foot depth and 3 foot width) provided in the 2008 Los Angeles County Grading Guidelines. Energy dissipators at the base of all down drains were designed for erosion protection.
- 8-foot wide drainage terraces would be constructed on the pit slopes at 30-foot vertical depth intervals to prevent surface erosion and all terraces drains are required

to have a minimum slope of 5 percent and a minimum depth of 1 foot, in accordance with the 2008 LA County Grading Guidelines. The terrace drains would be lined with crushed rock in consideration of the availability of these materials on site. The crushed rock was found to be stable enough to deliver the runoff flows generated by the pit slope surface.

- Minimum two-foot-high MSHA-required safety berms would be installed along the tops of the mine pit slopes around the entire northern, eastern, southern, and western edges and pit entrance/exit ramps to prevent the temporary inundated water from creating a public safety hazard.
- Stormwater runoff in the plant processing facility area during the mining would be collected and conveyed to a temporary mining pit for infiltration, no polluted stormwater will be discharged to off-site.

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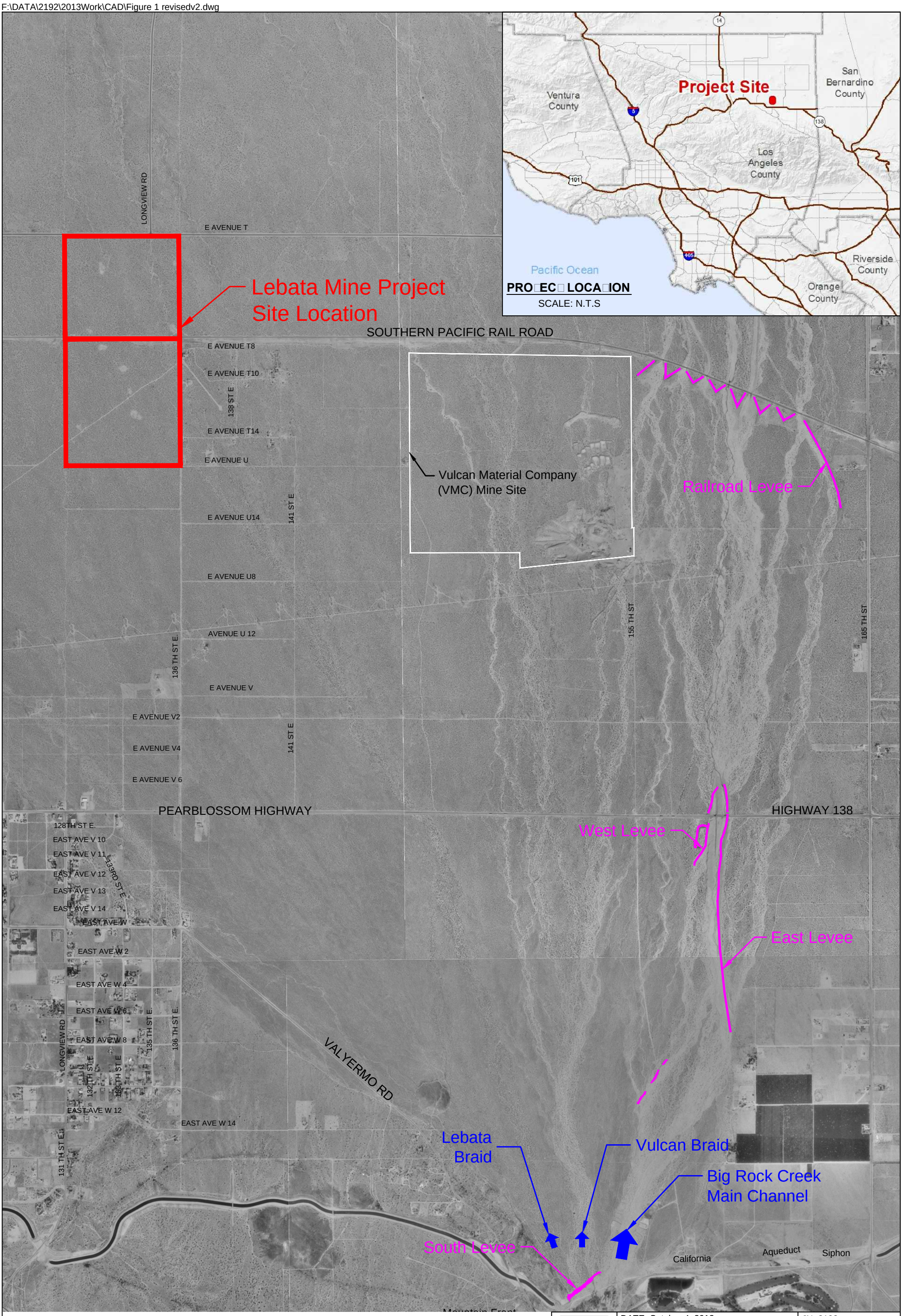

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BIG ROCK WASH ALLUVIAL FAN AND PROJECT SITE LOCATION

FIGURE 1

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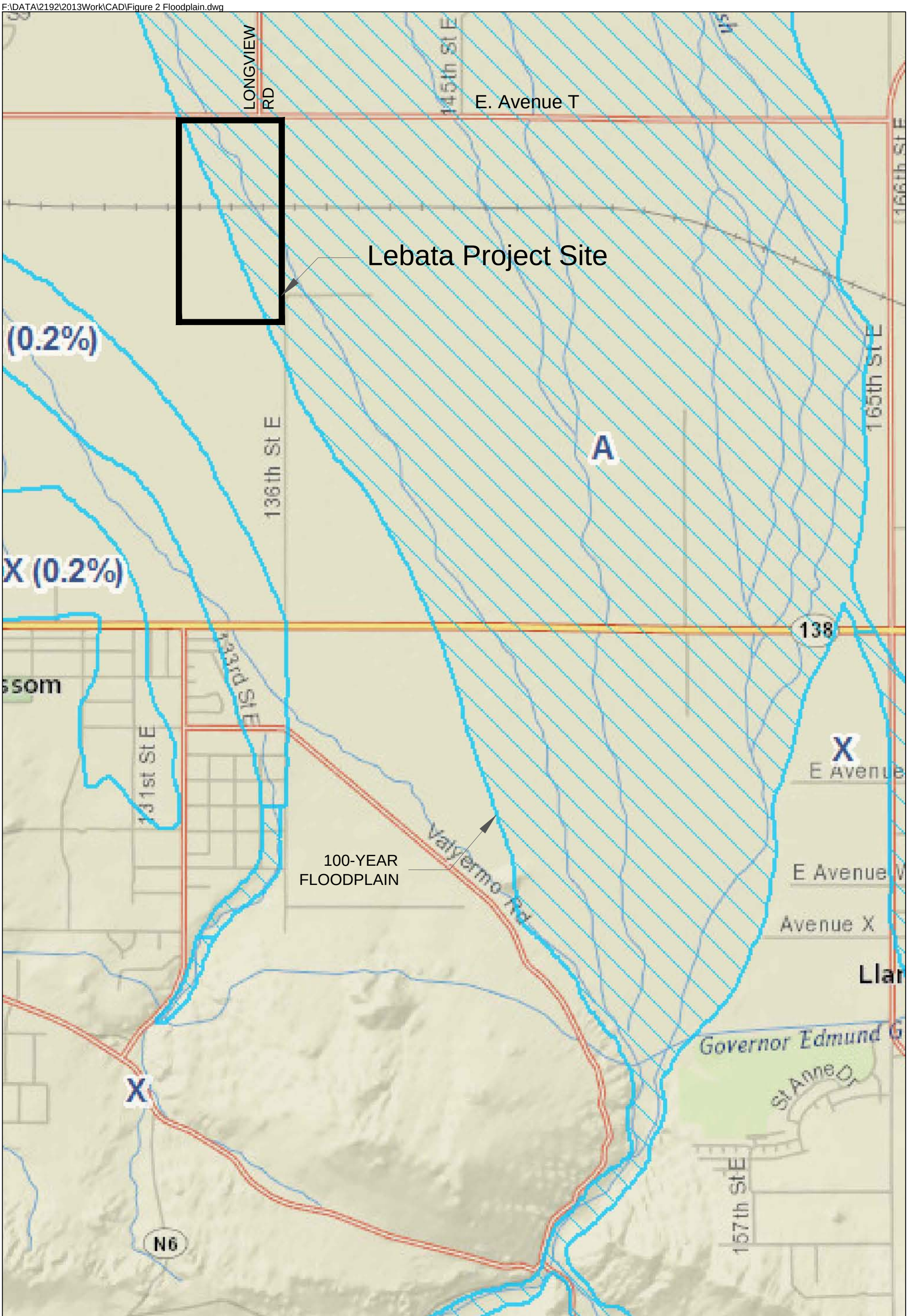

LEGEND

100-YEAR FLOODPLAIN

500-YEAR FLOODPLAIN

NOTE: PROJECT SITE IS NOT WITHIN COUNTY ADOPTED FLOODWAY

SOURCE: FLOODPLAIN MAP OBTAINED FROM THE LOS ANGELES COUNTY WEBSITE: HTTP://DPW.LACOUNTY.GOV/WMD/FLOODZONE/

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PROJECT LOCATION AND FEMA 100-YEAR FLOODPLAIN MAP

FIGURE

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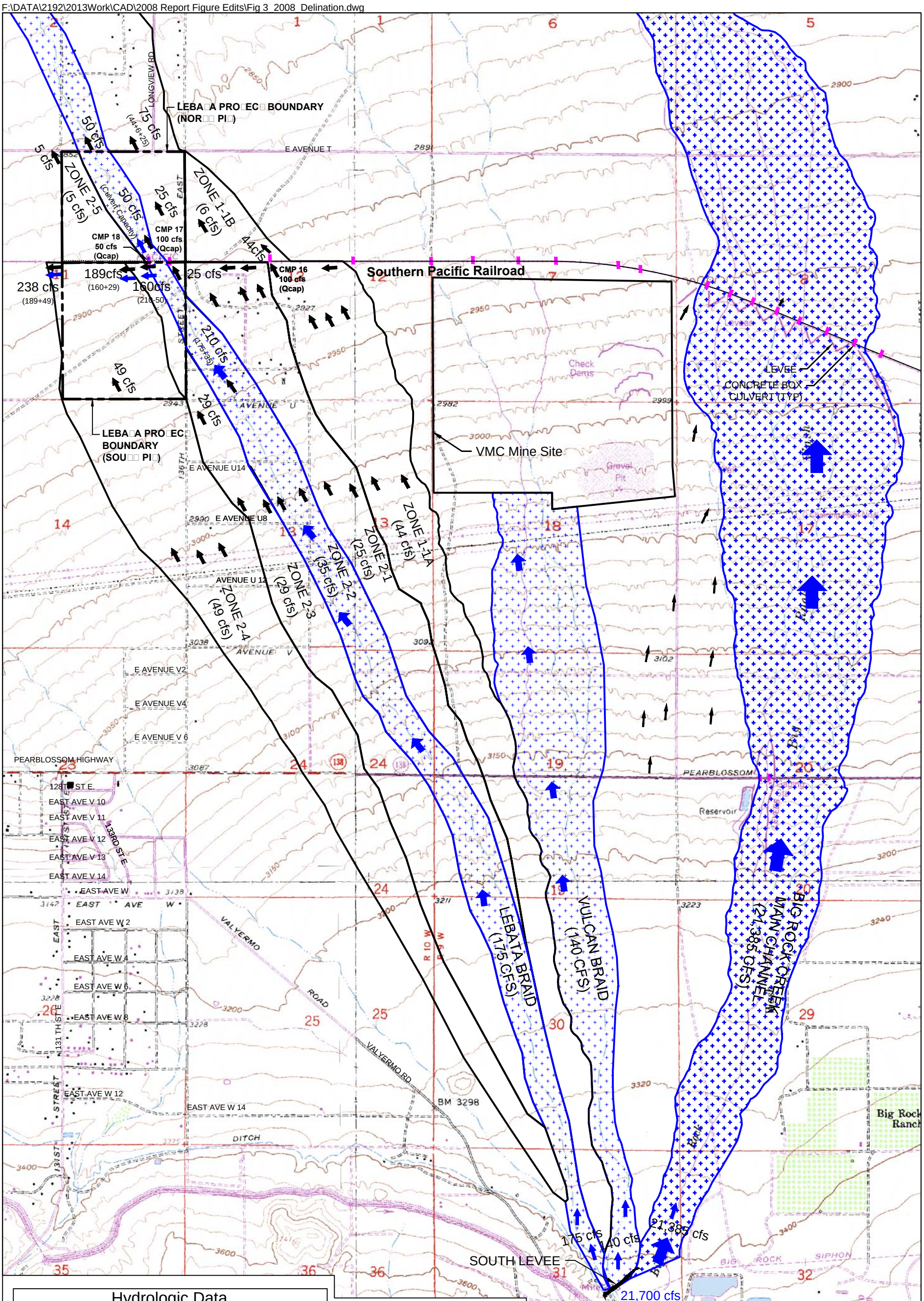

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1A	489	44
1-1B	65	6
2-1	279	25
2-2	392	35
2-3	323	29
2-4	544	49
2-5	53	5
Total	2,132	194

Legend

- Main channel / VMC braid flow area
- Local rainfall - runoff drainage area
- Channel/braid flow
- Runoff flow direction
- Existing culvert

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Project Alternative and Alternative 1

Subwatershed Delineation Based on USGS □opography and Existing Offsite and Onsite Drainage

FIGURE □a

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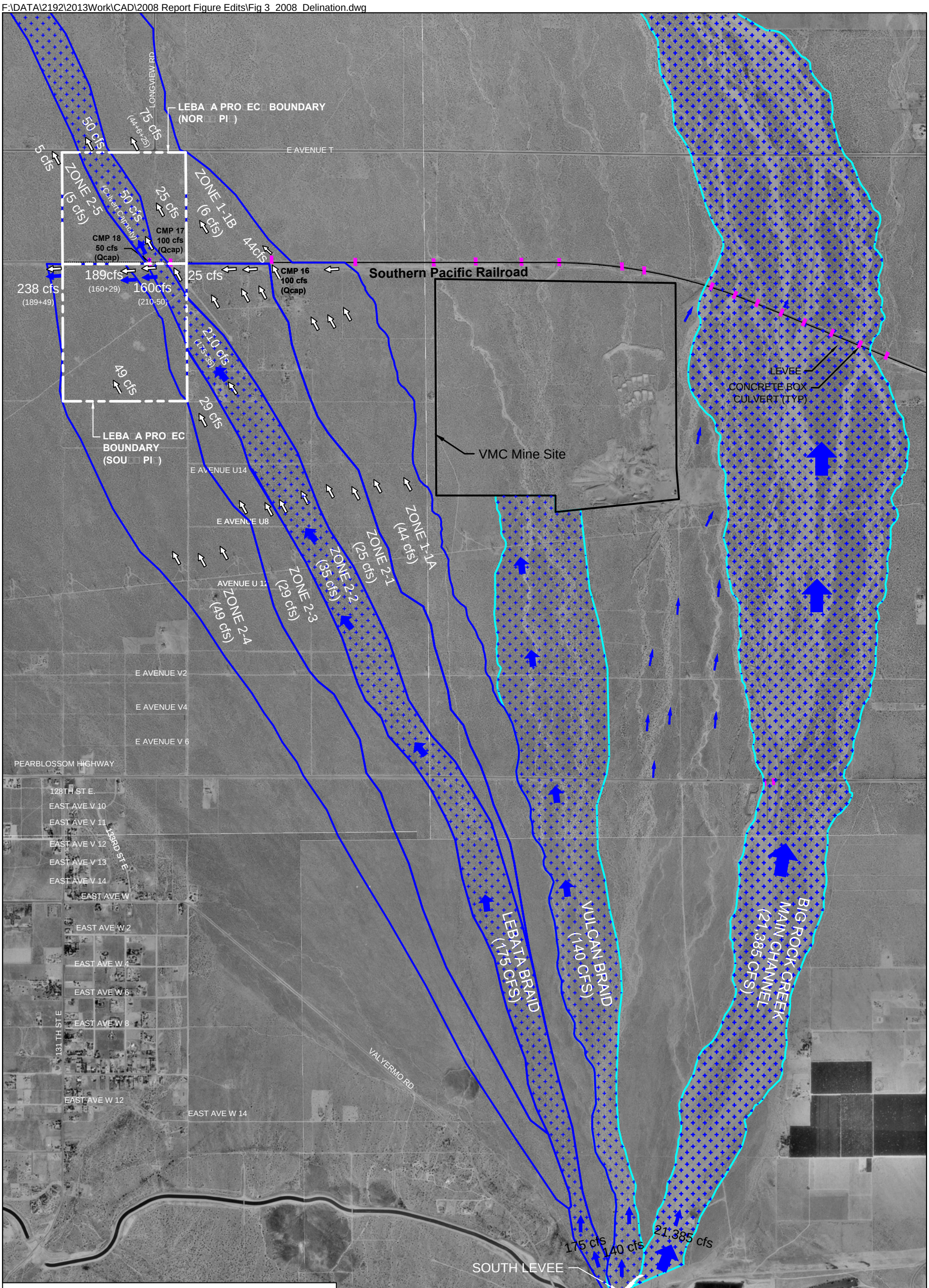

Hydrologic Data	
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Soil Type	121
Debris Production Area (DPA)	Zone 11
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2-5	53	5
Total	2,132	194

Legend

- Main channel / VMC braid flow area
- Local rainfall - runoff drainage area
- Channel/braid flow
- Runoff flow direction
- Existing culvert

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Project Alternative and Alternative 1

Existing Offsite and Onsite Drainage

(Same as Figure 3a Except Different Background Map)

FIGURE □b

2.0 CAPITAL FLOOD HYDROLOGY

2.1 SUMMARY OF DRAINAGE PATTERNS

2.1.1 Flows in the Alluvial Braid Channels

Big Rock Creek emerges from the San Gabriel Mountains onto a small valley along the San Andreas Rift Zone near Valyermo. Big Rock Creek is joined by Pallett Creek just before debouching on its alluvial fan along the mountain front. Big Rock Creek flow is perennial upstream of the mountain front and ephemeral downstream. Continuous surface flow often reaches Pearblossom Highway, but typically infiltrates completely to groundwater downstream from the highway.

On the alluvial fan, flows in Big Rock Creek are largely contained in its main channel, with a few secondary braids breaking off from the main channel at the apex of the fan. This is evident in aerial photography of the area (Stetson Engineers, 2003). The secondary braid immediately to the west of the main channel, which was a focus of hydraulic analyses in previous studies undertaken by Stetson Engineers (2003), flows parallel to the main channel and ultimately flows through the proposed VMC mine site farther downstream (refer to Figure 3). For the purposes of this study, this braid will be referred to as the VMC Braid.

Another second secondary braid, which flows through the proposed Lebata mine site farther downstream, is located farther to the west of the VMC Braid away from the main channel and closer to the mountain front (refer to Figure 3). For the purposes of this study, this braid will be referred to as the Lebata Braid.

Historically, the VMC and Lebata Braids only conveyed flows during large flood events when the main channel began to overflow. Examination of historical aerial photos from 1928 to 1994 indicate that the VMC Braid conveyed flows twice during the 77 year stream gage record, during the 1938 event (100-year flood event) and the 1943 event (25-year flood event) (Stetson Engineers, 2003). The same aerial photos indicate no-flow occurred in the Lebata Braid during this 77-year period.

A flood control levee was constructed by the State on the left bank of the main channel near the mountain front (i.e., South Levee on Figure 1) some time after the 1943 flood event. The levee is approximately 8 to 10 feet high, 20 feet wide at the top and 1,000 feet long and serves to contain flood flows within the main channel, effectively cutting off the VMC and Lebata Braids from main channel overflows. Hence the levee aided in preventing overflows from the main channel into the secondary channels during the 1969 (40-year flood) and the 1978 (34-year flood) events, both of which exceeded the 1943 event (25-year flood).

The California Aqueduct Siphon crosses under the Big Rock Creek channel bed immediately upstream of the mountain front and immediately downstream of the alluvial fan apex. The underground section is contained in a 10 foot wide concrete encasement and controls the location of the main channel on the fan by training flood flows towards the low point of the siphon encasement. In addition, the siphon also acts a structural grade control on the secondary braids, preventing headcutting upstream of the secondary braids and forcing all or the majority of the total flows in the main channel (Stetson Engineers, 2003).

2.1.2 Locally Generated Sheetflow

There is no flow in any of the channels on the inactive alluvial fan surface except for during and shortly following individual rainfall-runoff generating events. Short-duration shallow overland sheetflow is generated when rainfall intensity is greater than infiltration capacity. The resulting shallow overland flow (sheetflow) is collected and conveyed downstream primarily by numerous shallow low-capacity relict braids in a nearly random distributary pattern. Surface flow occurs less than approximately 0.1 percent of the time (Stetson Engineers, 2004).

2.1.3 Railroad Embankment Culverts

There are several corrugated metal pipe (CMP) culverts that pass under the rail road embankment in the vicinity of the site. Three culverts identified by Stetson Engineers (2003) as CMP 16, CMP 17 and CMP 18 would convey flows from upstream of the railroad, which would then continue downstream and into the north parcel of the mine site. CMP 17 and CMP 18 are located inside the site boundary. It is assumed that flows conveyed through these culverts would initially be concentrated and then dissipate, flowing through the area

downstream of the railroad as sheetflow. The capacity of these culverts was estimated and is tabulated below (Table 2). The locations of the culverts are shown on Figure 3. Estimates for culvert capacities of CMP16 and CMP17 are based on a previous assessment undertaken by Stetson Engineers (2003). The estimate for culvert capacity of CMP18 is based on a nomograph published by the American Iron and Steel Institute (1994). The nomograph is reproduced in Appendix A of this report.

TABLE 2: RAIL ROAD EMBANKMENT CULVERT CAPACITIES

Culvert	Dimensions	Estimated Capacity (cfs)
CMP16	4’10” x 3’ (oval)	100
CMP17	4’10” x 3’ (oval)	100
CMP18	2’6” diameter	50
	Total	250

Examination of detailed site survey and site observations indicate that flows in excess of the combined culvert capacities would be deflected west by the rail road embankment off-site and then conveyed under the embankment by the culverts located to the west of the site.

A fourth minor CMP (24 inch diameter) is located immediately east of the eastern site boundary. This culvert was found during site inspection on October 25, 2006 and was not identified in the previous study by Stetson (2003). The culvert is poorly maintained and was observed to be 50% blocked by sediment along its entire length. For the purposes of this study this culvert is assumed to convey minimal flow and could become fully blocked during Capital Flood flows; hence, it is ignored in hydraulic calculations.

2.2 EXISTING CAPITAL FLOOD FLOWS

2.2.1 In-Channel Flow

Stetson Engineers (2003) previously reported that the flow in Big Rock Creek during the Capital Flood is 21,700 cfs. As previously established in the hydrologic studies undertaken

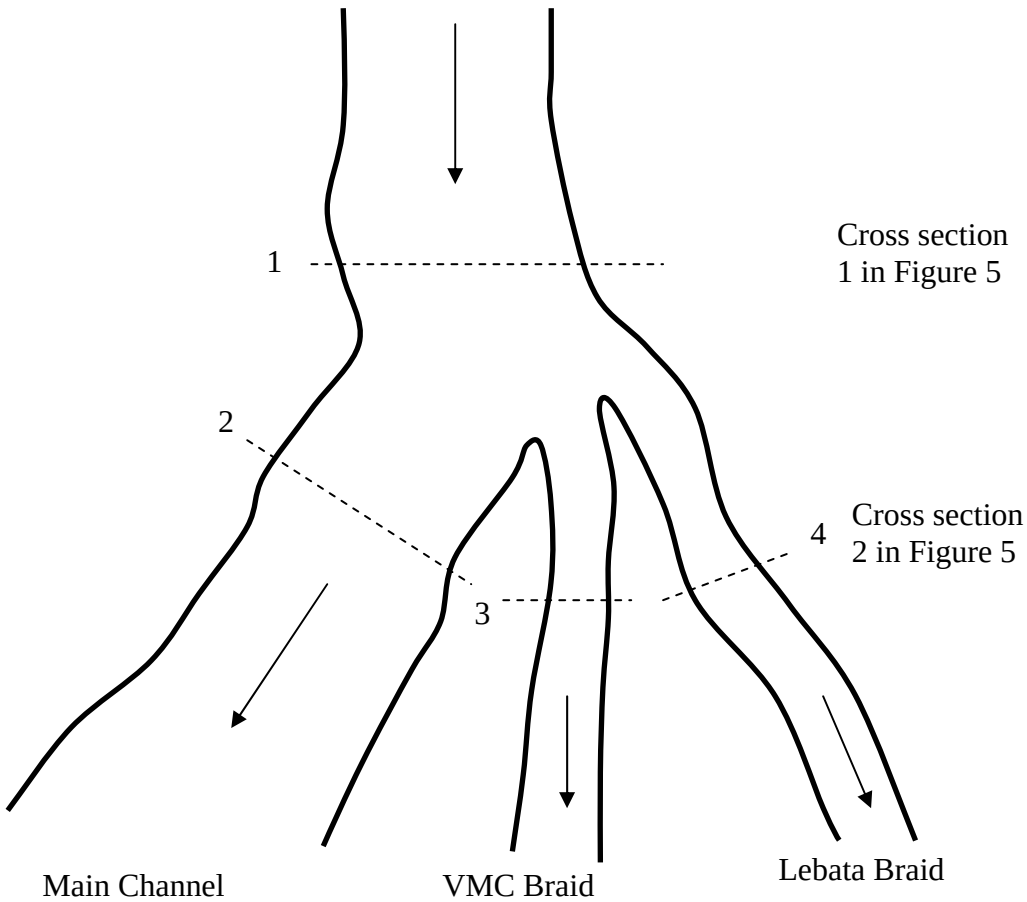
for the adjacent VMC mine site, flows in Big Rock Creek would normally be retained in the main channel due to:

- The California Aqueduct Siphon acting as a hydraulic control; and
- The flood levee near the mountain front directing flood flows towards the main channel, and effectively cutting off the VMC and Lebata Braids from main channel overflows (Stetson Engineers 2003).

However, there is a possibility that the mountain front flood levee could catastrophically fail during the Capital Flood since the levee was constructed from non-engineered fill. This represents a worst case scenario of the levee being absent.

The Lebata Braid flow was estimated using a split flow analysis assuming a worst case, complete failure of the mountain front flood levee. Historical aerial photography and observations taken during a site inspection on October 25, 2006 indicate that the Lebata Braid is an overflow of the main channel and not of the VMC Braid, and that the channel split is approximately in the same location as the VMC Braid – main channel split, at a location approximately 5,000 ft downstream of the mountain front. Hence, during the levee-failure scenario, the Capital Flood flow would split into three channels at the junction of the main channel and the secondary VMC and Lebata Braids, as shown in Figure 4.

FIGURE 4 SCHEMATIC OF FLOW SPLIT BELOW THE FAN APEX WITH LEVEE FAILURE



The flow split at the junction can be calculated using an energy-based analytical method. The energy equations from station 1 to 2, 3 and 4 are written as follows:

$$WS_1 + \frac{\alpha_1 V_1^2}{2g} = WS_2 + \frac{\alpha_2 V_2^2}{2g} + L_{1-2}\overline{S}_{f_{1-2}} + C_{1-2}\left|\frac{\alpha_1 V_1^2}{2g} - \frac{\alpha_2 V_2^2}{2g}\right| \quad (1)$$

$$WS_1 + \frac{\alpha_1 V_1^2}{2g} = WS_3 + \frac{\alpha_3 V_3^2}{2g} + L_{1-3}\overline{S}_{f_{1-3}} + C_{1-3}\left|\frac{\alpha_1 V_1^2}{2g} - \frac{\alpha_3 V_3^2}{2g}\right| \quad (2)$$

$$WS_1 + \frac{\alpha_1 V_1^2}{2g} = WS_4 + \frac{\alpha_4 V_4^2}{2g} + L_{1-4}\overline{S}_{f_{1-4}} + C_{1-4}\left|\frac{\alpha_1 V_1^2}{2g} - \frac{\alpha_4 V_4^2}{2g}\right| \quad (3)$$

In addition, flow continuity equation can be expressed as:

$$A_1V_1 = A_2V_2 + A_3V_3 + A_4V_4 \quad (4)$$

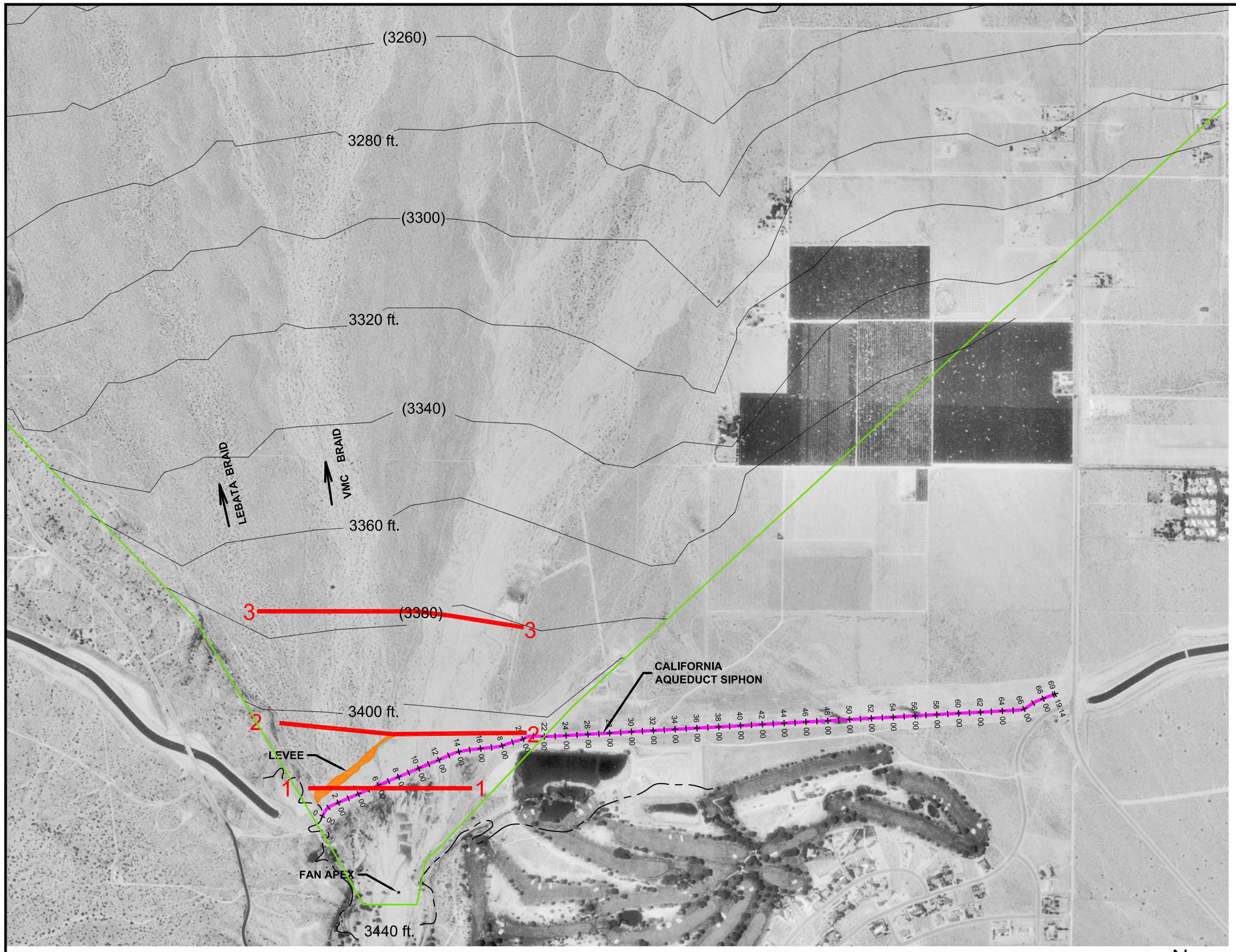
Where:

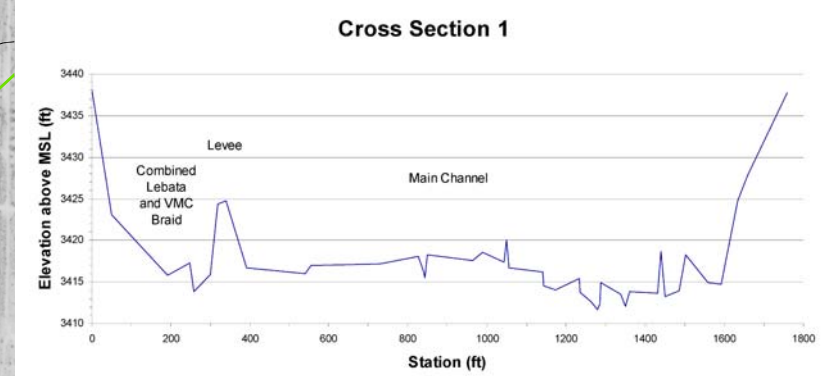
WS_1, WS_2, WS_3, WS_4:	Water surface elevation at station 1, 2, 3 and 4 respectively;
V_1, V_2, V_3, V_4:	Flow velocity at station 1, 2, 3 and 4 respectively;
$L_{1\text{-}2}$, $L_{1\text{-}3}$, $L_{1\text{-}4}$:	Distance from station 1, 2, 3 and 4 respectively;
$\overline{S}_{f_{1-2}}, \overline{S}_{f_{1-3}}, \overline{S}_{f_{1-4}}$:	Friction loss coefficient from station 1, 2, 3 and 4 respectively;
$C_{1\text{-}2}$, $C_{1\text{-}3}$, $C_{1\text{-}4}$:	Flow contraction coefficient from station 1, 2, 3 and 4 respectively;
A_1, A_2, A_3, A_4:	Cross sectional area at stations 1, 2, 3 and 4 respectively, which is a function of water surface elevation.

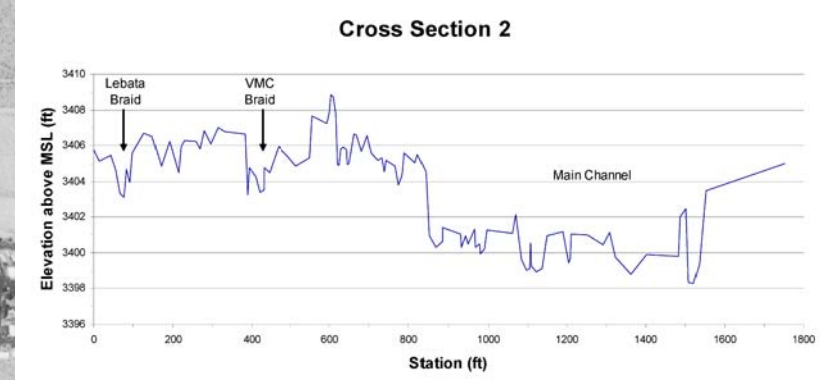
In this analysis, the portion of main channel at field-surveyed cross section 1 in Figure 5 is used to represent the upstream controlling cross section, while the portions of main channel and secondary channel at field-surveyed cross section 2 in Figure 5 are used to represent cross sections of the main and secondary channels for the flow split calculation, respectively. The surveyed cross section locations and profiles are shown on Figure 5. Rating curves used in the split flow analysis are shown in Appendix B.

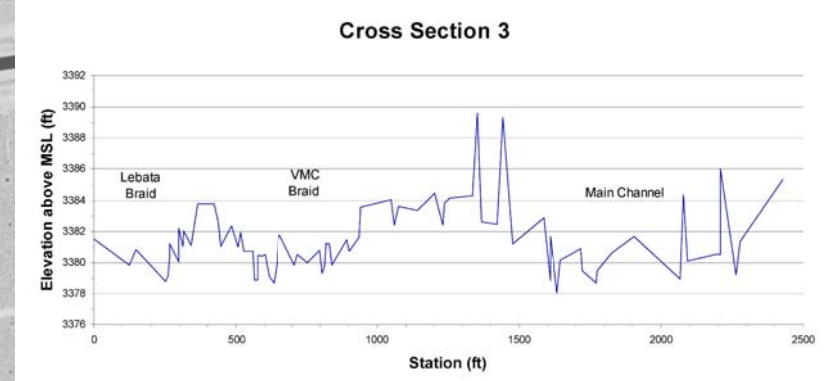
Assuming the friction losses from station 1 to 2, 3 and 4 are similar and the flow contraction coefficient is 0.3, then the water surface elevation, cross sectional area, and flow velocity at each station can be estimated using equations (1)-(4) by trial-and-error. The estimated results are shown in Table 3. As per Stetson Engineers (2003), Manning's n for the main channel is selected as n = 0.065, and Manning's n for the VMC and Lebata Braids is the recommended value for natural channels with "coarse gravels mixed with boulders' by the Los Angeles County Flood Control District's Hydraulic Design Manual (1982) (n = 0.035). Using a smaller value of Manning's n for the secondary braids is conservative in that it reduces resistance and, thus, maximizes the flow split into the secondary braids.

FIGURE 5

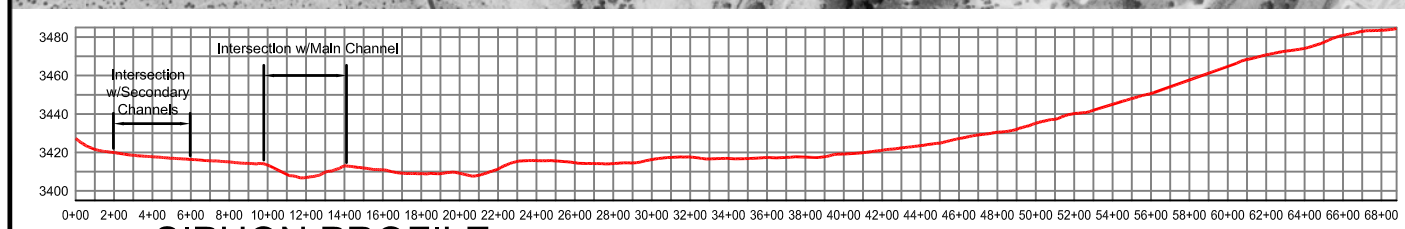








CROSS-SECTIONS



SIPHON PROFILE

HORZ. SCALE: 1" = 1000' / VERT. SCALE 1" = 100'

PLAN VIEW

SCALE: 1" = 1000'

SCALE (FEET)

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BIG ROCK CREEK
June 9, 1994 Air Photo

STETSON ENGINEERS INC.	PLAN VIEW, PROFILE AND CROSS-SECTIONS		FIGURE
JN: 2192	DATE: 12/23/2008	SCALE: AS INDICATED	5

\\NAS\MAINDATA\2192\2013\WORK\CAD\ST_FIG1&5.DWG

TABLE 3: ESTIMATES OF FLOW SPLIT FOR CAPITAL FLOOD AT THE MOUNTAIN FRONT WITH LEVEE FAILURE

Item	Main Channel Station 2	VMC Braid Station 3	Lebata Braid Station 4	TOTAL
Flow (cfs)	21,385	140	175	21,700
Water Surface Elevation (ft)	3404.6	3404.7	3404.8	-
Cross Sectional Area (sqft)	3022.9	30.7	37.6	-
Velocity (ft/s)	7.07	4.56	4.65	-
Manning's n	0.065	0.035	0.035	-

Given the Capital Flood flow of 21,700 cfs at the mountain front, the estimated flow in the Lebata Braid under the worst case scenario is 175 cfs (assuming levee failure at the mountain front). The total offsite flow entering the mine site during Capital Flood includes this braid flow plus additional sheetflow generated by local rainfall-runoff on the alluvial fan upstream of the site. Estimation of this sheetflow is discussed in the next section.

2.2.2 Sheetflow

Using the U.S. Geologic Survey (USGS) quad maps with 10-foot contour intervals and 1994 aerial photos , the entire upstream watershed of the proposed mine site was delineated and divided into six (6) sub-watersheds with a total drainage area of 2,079 acres. The obstruction effects of the Southern Pacific Rail Road embankment on flow distribution were considered in the delineation of the sub-watersheds. Figure 6 and Figure 7 show the delineation of the upstream watersheds for each phase based on the topography shown on the USGS Quad map. Note that since only North Pit is present in Phase 1, the number and the areas of upstream watersheds for Phase 1 are different than the other phases.

The entire local watershed has an almost uniform slope of approximately 1.8%. According to the Los Angeles County Department of Public Works Hydrology Manual (January 2006), the entire watershed is within LA County designated Soil Classification Area 121. From the 50-year precipitation contour lines on the GIS drainage area overlay map, the calculated area-weighted average of 50-year precipitation for the watershed is 3.2 inches per 24 hours, which would be the maximum 24-hour rainfall amount in the fourth day of the 50-year design storm

event. According to the LACDPW Hydrology Manual, the 50-year design storm occurs over a period of four days, with the maximum rainfall falling on the fourth day, and the maximum 24-hour rainfall amounts for the first three days being, sequentially 10, 40, and 35 percent of the fourth day's rainfall.

To calculate the discharge rates generated by rainfall-runoff from the local watershed, the LACDPW "T_c Calculator" was used and the watershed was divided into equally sized unit sub-areas of approximately 40 acres (The LACDPW 2006 Hydrology Manual recommends that the drainage area shall not be greater than 40 acres when using the Tc Calculator). Using the parameters of impervious cover (0.01), soil type (121), 50-year precipitation (3.2 inches per 24 hours), basin slope (0.018), and basin length, the Tc Calculator program calculated the time of concentration (T_c) of 30 minutes, peak rainfall intensity of 0.82 inch/hr, composite runoff coefficient of 0.11, and peak discharge rate of 3.61 cfs for a 40-acre unit sub-area. It appears that varying the basin length in the Tc Calculator has no effect on the calculation results in this watershed.

The peak runoff rate of 3.61 cfs was estimated for a 40 acre unit sub-area using the Tc Calculator. Multiplying this by the ratio between the entire local watershed area (2,079 acres) and the 40 acre unit sub-area results in a total peak sheetflow rate of about 188 cfs arriving at the site boundary. Since there are no distinct conveyance channels and no distinct flow collection points in the alluvial fan, hydrologic routing or any potential attenuation effects are not considered in this calculation and, hence, the peak flow estimate is considered conservative.

The results of the estimated runoff peak flows for the delineated sub-watersheds for Phase 1 and the subsequent phases are summarized in Tables 4 and 5. Since only the North Pit is involved in Phase 1, the number and the areas of upstream contributing watersheds for Phase 1 are different than the other phases.

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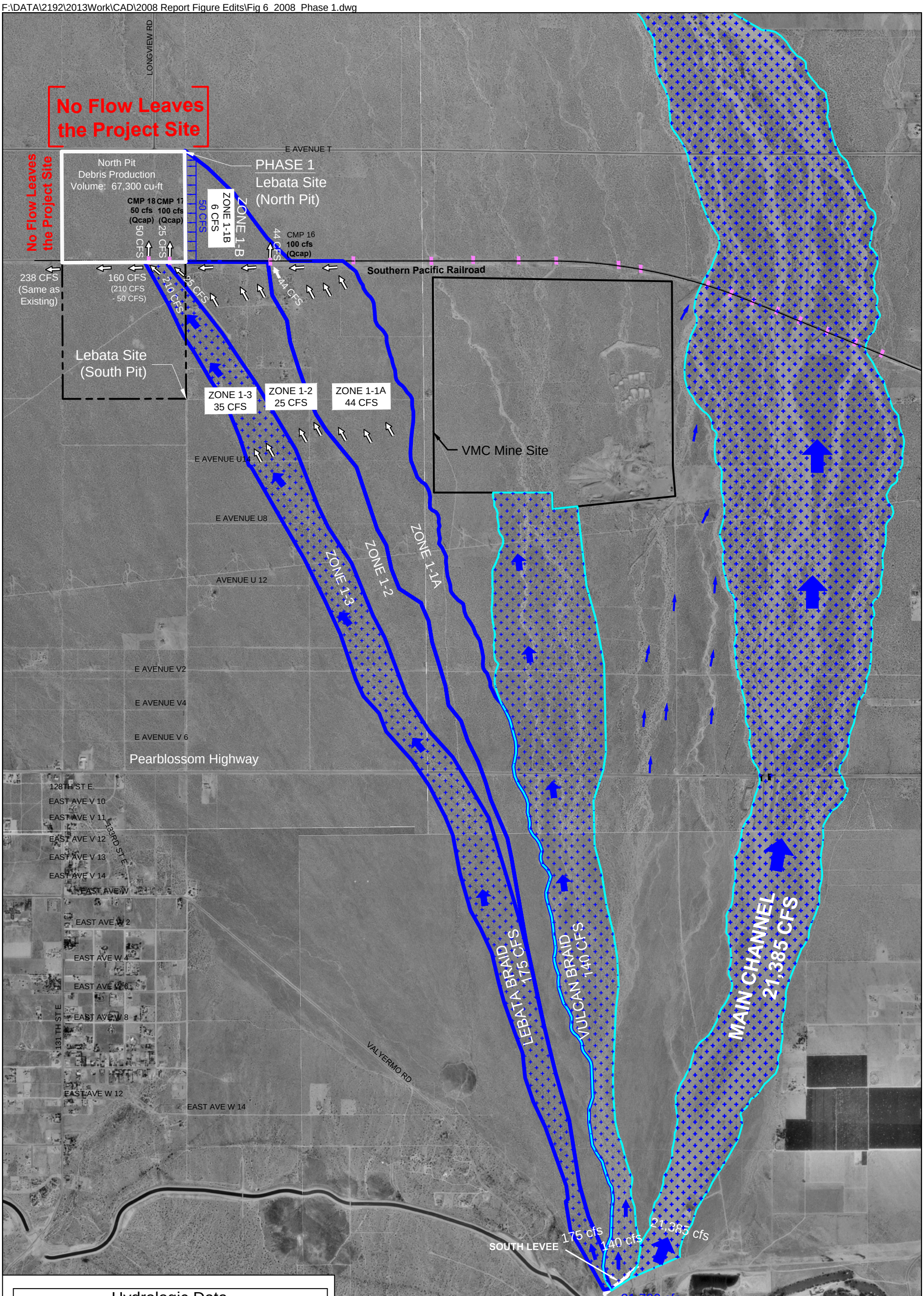

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1A	489	44
1-1B	65	6
1-2	282	25
1-3	392	35
Total	1,228	111

Legend
- Main channel / VMC braid flow area
- Local rainfall - runoff drainage area
- Channel/braid flow
- Runoff flow direction
- Existing culvert
- Flows captured by interceptor

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Project Alternative and Alternative 1

PHASE 1

Existing Offsite and Proposed Onsite Drainage

FIGURE 6

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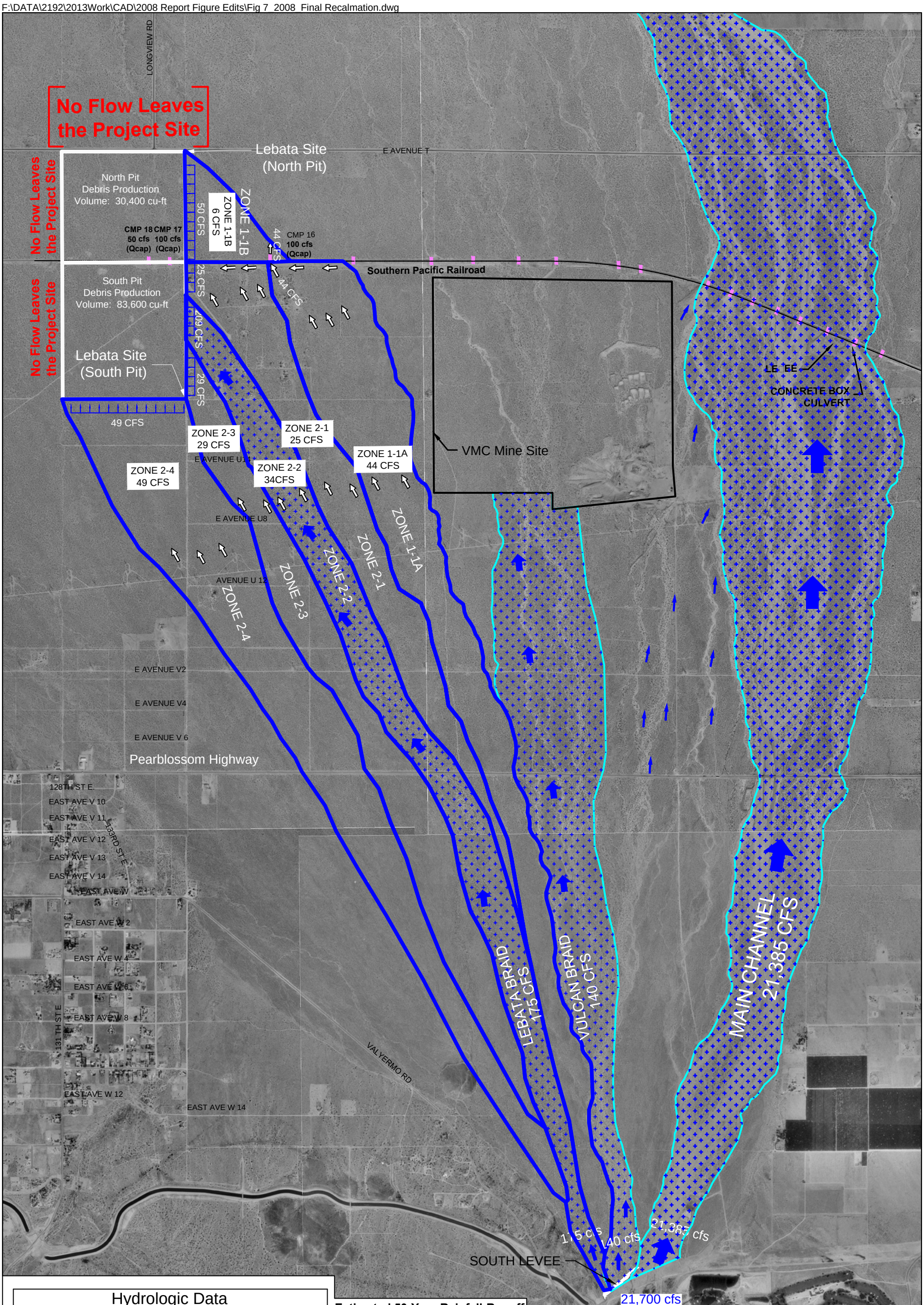

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
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Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1A	489	44
1-1B	65	6
2-1	279	25
2-2	378	34
2-3	323	29
2-4	544	49
Total	2,079	188

Legend
- Main channel / VMC braid flow area
- Local rainfall - runoff drainage area
- Channel/braid flow
- Runoff flow direction
- Existing culvert
- 50 CFS Flows captured by interceptor

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Project Alternative and Alternative 1

Final Reclamation Existing Offsite and Proposed Onsite Drainage

FIGURE 7

TABLE 4: ESTIMATED 50 YEAR RAINFALL-RUNOFF SHEETFLOW DISCHARGES FOR SUB-WATERSHEDS UPSTREAM OF SITE BOUNDARY DURING PHASE 1

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1A	489	44
1-1B	65	6
1-2	282	25
1-3	392	35
Total	1,228	111

Note: 1) Peak discharge does not include on-site runoff.
2) Subbasin areas were delineated based on the topography shown on the USGS Quad map.

TABLE 5: ESTIMATED 50 YEAR RAINFALL-RUNOFF SHEETFLOW DISCHARGES FOR SUB-WATERSHEDS UPSTREAM OF SITE BOUNDARY DURING PHASES 2, 3 AND FINAL RECLAMATION

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1A	489	44
1-1B	65	6
2-1	279	25
2-2	378	34
2-3	323	29
2-4	544	49
Total	2,079	188

Note: 1) Peak discharge does not include on-site runoff.
2) Subbasin areas were delineated based on the topography shown on the USGS Quad map.

The flows tabulated in Tables 4 and 5 were used in the design and sizing of drainage structures on the site and will be described in Section 3.0. The combined peak flow arriving at the upstream boundary of the site during the final reclamation includes local sheetflow of 188 cfs and the Lebata Braid flow of 175 cfs, totaling 363 cfs.

3.0 PROPOSED DRAINAGE CONCEPT

3.1 OVERVIEW

The drainage concept for the management of flows into the proposed mine site incorporates a system of interceptor drains, which would be located along the top of the pits to collect sheetflow and braid flow and deliver these flows to the down drains, which convey the flow down the averaged 2:1 side slope to the bottom of the mine pit. The locations of down drains are generally at the downstream point of the sub-watersheds. Additional down drains are provided along the drainage terrace to capture the runoff generated by the pit slopes to prevent soil erosion in accordance with the LA County's Grading Guidelines (January 2008).

Two down drains would also be required to handle the culvert flows from the existing culverts through the rail road embankment which are within the mine site boundary (CMP17 and CMP18). The rail road culvert flows would pass through the cement transfer facility area. It is proposed to convey these flows in below-ground culverts through the facility for discharge into the North Pit. This option is considered more practical than diverting flows around the facility. These culverts would convey flows only during Phase 1 mining. In phase 2, these two CMPs would become defunct as all flows that previously conveyed by the culverts in Phase 1 would instead be captured by the South Pit.

The mine pits would be aligned slightly obliquely to the general fall of the land. The high point of the site is at the south-eastern corner of the site. Hence drainage structures would only be required on the southern and eastern sides of the mine pits to capture the Capital Flood flows. On-site runoff generated in the processing facilities area in the North Pit during Phase 1 will be collected by a catch basin at the northwest corner on the North Pit and conveyed into the bottom of the North Pit by an underground 18-inch steel pipe. Refer to Drainage Plan Sheets 1 and 8 for layout of drainage structures during Phase 1 (Sheet 1 for the Project Alternative and Sheet 8 for Alternative 1).

3.2 HYDROLOGIC DESIGN CONSIDERATIONS

Runoff on the sub-watersheds would generally pass onto the site as sheetflow. The interceptor drains function by intercepting the sheetflow and the Lebata Braid flow and conveying these flows to the down drains. Several other design considerations have been made:

- Zones 1-1A and 1-1B are separated by the railway embankment, with runoff from Zone 1-1A flowing through an existing railroad culvert CMP 16 into Zone 1-1B and ultimately into the North Pit (Refer to Figure 6 and Figure 7). After passing through exiting the culvert, it is assumed that the flows would diffuse and pass through Zone 1-1B as sheetflow. Interceptor 1-1 is sized for the summed peak flows from Zones 1-1A and 1-1B.

- The Lebata Braid passes through Zone 1-3, and conveys the channelized flow downstream into the North Pit through an existing railroad culvert CMP 18 and a down drain during Phase 1. In Phases 2, 3 and Final Reclamation, the Lebata Braid will pass through Zone 2-2 and the channelized flow would be collected by an interceptor drain.

3.3 HYDRAULIC DESIGN CONSIDERATIONS

3.3.1 Interceptor Drains

The interceptor drains would be installed along the top of cut slopes and constructed as V-shaped reinforced concrete-lined drains designed according to the 2008 LA County Grading Guidelines (see details on Drainage Plans). Each interceptor drain would have a 1 foot standard minimum depth and a minimum width of 3 feet at the inlet with 1.5H:1V side slopes.

The 2008 LA County Grading Guidelines require the flow path slope of interceptor drains not to be less than 2 percent (%). Due to the natural slope of the project area, meeting 2 percent slope will require more than 10 feet cut depth at the interceptor outlets in the south side of the South Pit (Interceptor 1-1) and the east side of the North Pit (Interceptor 2-3). This was judged unrealistic and a less than 2% slope for these two interceptor drains was used in the

concept design (see Table 6). Although the flow path slopes of the interceptor drains along these sides are less than 2 %, the design path slopes have been shown to be sufficient enough to prevent sedimentation (to be discussed later). The depth and the width of the interceptors at the outlet would vary with the nature slope and the cut slopes, and range from 2.2 feet to 4.2 feet deep and 3.3 feet to 6.3 feet wide.

The flow velocities of the interceptor drains are summarized in Table 6. The flow velocities of the interceptor drains were computed using Manning's Equation and Continuity Equation:

$$Q = \frac{1.486}{n} AR^{2/3} S^{1/2}$$ **Manning's Equation**

$$Q = VA$$ **Continuity Equation**

where:

Q is the discharge or flow in cubic feet per second (cfs)

A is cross-sectional area perpendicular to flow in square feet (sf)

R is the hydraulic radius in feet (ft) , equal to A divided by wetted perimeter

S is the longitudinal or profile slope of the stream in horizontal /vertical.

n is Manning's roughness coefficient. A Manning's coefficient of 0.014 for concrete channel is taken from page G39 in the 1982 edition of Los Angeles County Flood Control District's Hydraulic Design Manual, update March 2002.

V is the flow velocity in feet per second (fps)

TABLE 6: INTERCEPTOR-DRAIN DESIGN AND FLOW VELOCITIES

Interceptor	Capital Flow (cfs)	Design Flow Slope%	Natural Slope %	Velocity (fps)	Water Depth (ft)	Cut Depth at Outlet (ft)	Freeboard at Outlet (ft)
Zone 1-1	50	1.40	1.33	11.1	1.7	2.5	0.8
Zone 2-1	25	2.00	1.73	10.6	1.3	2.2	0.9
Zone 2-2	209	2.00	1.80	18.1	2.8	3.3	0.5
Zone 2-3	29	2.00	1.73	11.1	1.3	4.2	2.9
Zone 2-4	49	0.80	0.75	8.9	1.9	2.3	0.4

As shown in Table 6, all interceptor drains would have a flow velocity close to or greater than 10 feet per second (fps) under the Capital Flood flow conditions. The calculated interceptor flow velocities on the south side of the South Pit and the east side of the North Pit with less than 2% flow slope were found to be 8.9 fps and 10.6 fps, respectively.

To determine if these interceptor flow velocities are sufficient enough to prevent sedimentation, Laursen's Critical Velocity Method (US Department of Transportation, 2001) was used:

$$V_{CL} = K_U y^{1/6} D_{50}^{1/3}$$ **Laursen's Critical Velocity Method**

Where

V_{CL} is the critical velocity above which bed material of size D_{50} and smaller will be transported, (ft/sec);

y is an average flow depth, (feet);

D_{50} is an average of particle size of which 50 percent are smaller, (feet);

Ku is 11.17 for English unit

The mean sediment size (D_{50}) of the mine site was obtained from the grain size distribution curve in the slope stability evaluation report (Furgo West, 2006). Gravel and silty gravel materials lying between 0 to 20 feet deep below the ground surface were selected to represent the surficial sediments exposed to sheet flow and braid flows. The mean sediment size D_{50} was found to be 12mm (0.039 ft).

As shown in Table 7, all interceptor drains have flow velocities that are greater than the critical velocities required to transport the sediment particles. Hence, the interceptor velocities would be sufficient enough to prevent sedimentation.

TABLE 7: COMPARISON OF INTERCEPTOR FLOW VELOCITY AND THE CRITICAL VELOCITY TO TRANSPORT THE SEDIMENTS

Interceptor	Capital Flow (cfs)	Flow Slope %	Flow Velocity (fps)	Critical Velocity (fps)
Zone 1-1	50	1.40	11.1	4.2
Zone 2-1	25	2.00	10.6	3.9
Zone 2-2	209	2.00	18.1	4.5
Zone 2-3	29	2.00	11.1	4.0
Zone 2-4	49	0.80	8.9	4.2

3.3.2 Down Drains

All down drains are designed in accordance with the minimum dimensions (1.5 foot depth and 3 foot width) provided in the 2008 Los Angeles County Grading Guidelines (see Drainage Plans details). Down Drain 1-3 which conveys a portion of the Lebata Braid flow and the entire Zone 1-3 sheet flow during Phase 1 would be designed based on the existing culvert capacity (see Table 8 and Figure 6). Down Drain 2-2 in Phase 2 is further enlarged to handle the 175 cfs Lebata Braid flow and the entire Zone 2-2 sheet flow. All down drains are designed to have enough capacity to handle the Capital Flood flow with freeboard depths ranging from 0.3 feet to 1.0 feet to the normal water surface calculated using Manning's Equation. Since the flows in the steep down drains (54% slope) will likely to be in a supercritical flow condition, the actual water depth would be less than the normal water depth that was calculated using Manning's Equation. Hence the calculated freeboards shown in Table 8 are conservative and the actual freeboards for the down drains would be greater than that shown in the table.

TABLE 8: DOWN DRAIN DESIGN FOR CAPITAL FLOOD FLOW

Down Drain	Capital Flood Flow(cfs)	Manning's n	Normal Water Depth (ft)	Slope %	Velocity (fps)	Channel Depth (ft)	Freeboard (ft)
1-1	50	0.016	1.2	54	38	1.5	0.3
1-2	25	0.016	0.9	54	32	1.5	0.6
1-3	50[a]	0.016	1.2	54	38	1.5	0.3
2-1	25	0.016	0.9	54	32	1.5	0.6
2-2	209	0.016	2.0	54	54	3.0	1.0
2-3	29	0.016	0.9	54	33	1.5	0.6
2-4	49	0.016	1.1	54	38	1.5	0.4

Note: [a] The Down drain sizing is based on the existing culvert capacity.

Down drains which convey the Capital Flood flow would discharge onto 30 ft-wide, 60 ft-long rock-lined energy dissipators, excavated to a minimum depth of 5 ft below the surrounding mine pit floor grade. Other down drains that collect small flows from the on-site terrace drains would discharge onto 15 ft-wide, 30 ft-long rock-lined energy dissipators, excavated to a minimum depth of 3 ft below the pit floor grade. The rock-lined energy dissipators at the base of all down drains would be covered with 3 inch-thick gunite for added erosion protection.

3.3.3 Rail Road Culvert Flow Management

Rectangular concrete box culverts (RCBCs) would be provided to convey flows from the existing rail road culverts CMP17 and CMP18 through the cement transfer facility area to down drains that convey the flows down the side slopes of the North Pit. The RCBCs, using the nomograph for box culverts in Appendix A, would be located underground beneath the cement transfer facility area. The RCBCs are sized to have the capacity at least equal to the rail road culvert capacities, assuming inlet controlled conditions and 30° to 75° wingwalls. Maximum acceptable headwater level is the ground surface level (culvert height plus cover). Dimensions and capacities for the RCBCs are indicated in Table 9.

TABLE 9: DIMENSIONS AND CAPACITIES OF BOX CULVERTS FOR CMP17 AND CMP18 FLOWS

Box Culvert	Dimensions	Maximum Cover	HW/D	Q_{Cap} (cfs)	Q_{Max} (cfs)
CMP17	4' x 3'	2'	1.7	104	100
CMP18	4' x 2'	2'	2	68	50

* Q_{Cap} is the capacity of the culvert for the given headwater, HW. Q_{Max} is the maximum flow of the CMPs.

Down Drains 1-2 & 1-3 which serve CMP17 and CMP18 are similar in design to those in other parts of the site as discussed earlier. When Phase 3 mining is undertaken, the two RCBCs and down drains would be removed as a part of mining of the cement transfer facility area. The down drains would not need reconstruction to serve the rail road culverts, since flows upstream of the rail road culverts would be captured by the South Pit during and after Phase 2 mining, rendering the rail road culverts inactive.

3.3.4 Terrace / Terrace Drains

In accordance with the 2008 Los Angeles County Grading Guidelines, an 8-foot wide drainage terrace would be constructed on the pit slopes at 30 foot vertical intervals to prevent surface erosion. All terrace drains are required to have a minimum slope of 5 percent and a minimum depth of 1 foot. The terrace drains would be lined with crushed rock in consideration of the availability of these materials on-site. Using the Rational Method, the maximum runoff generated by the pit slope surface and captured by any terrace drain was estimated to be less than 1 cfs. Applying the Manning's Equation with a roughness coefficient of 0.3 for coarse gravel, the calculated maximum flow velocity in any terrace drain is approximately 2 fps. The averaged size of ¾-inch crushed rock lining in the terrace drain is found to be stable enough to deliver the runoff flows generated by the pit slope surface without being entrained into the flow (National Stone Association, 1978).

3.3.5 Drain Collectors

Drain collectors would be constructed along the northern, western, and southern edge of the North Pit to capture the on-site runoff during Phase 1. The captured runoff would be conveyed through the drain collectors to a catch basin at the northwest corner of the Processing Site for discharge to the North Pit bottom through an 18-inch steel drain pipe.

Similar to the interceptor drains, the drain collectors would be V-shaped with minimum dimensions of 1-foot depth and 3-foot width. The drain pipe would have an intake elevation of 2,905 ft, with a minimum slope of 0.001 (0.1 percent) as recommended in the Los Angeles County Hydraulic Design Manual. The estimated flow velocity is about 4 fps under full flow condition. The drain collectors, catch basin, and the drain pipe are only temporary drainage facilities and would be eliminated during Phase 3.

3.4 PIT INUNDATION, EMPTYING, AND SEDIMENTATION

3.4.1 Flood Volume

The total flood volume entering the mine during Capital Flood consists of Lebata Braid flow, local runoff, on-site runoff from the un-mined surface along the edges of the mining pits, and direct precipitation over the surface of the mining pits.

Lebata Braid Flow (Main Channel Overflow)

One component of the Capital Flood inflow to the site is the 175 cfs Lebata Braid flow produced by hypothetical main channel overflow at the alluvial fan apex in the event of failure of the flood levee there. The duration of this flow cannot be determined by any methods provided in the LA County Hydrology Manual. For purposes of this drainage concept report, the total duration of the 175 cfs Lebata Braid flow was assumed to be 3 hours. This is a conservative assumption because the small amount of the overflow would only occur at the peak time of the Capital Flood (21,700 cfs). Under the conservative assumption, the Lebata Braid flow volume would equal to 175 cfs × 3 hours, or 43 acre-ft. During Phase 1, the contribution of the Lebata Braid flow to the North Pit will be limited to the capacity of the culvert CMP18 which is 50 cfs. So the flood volume contribution of the Lebata Braid flow to the North Pit during Phase 1 would equal to 50 cfs × 3 hours, or 12 acre-ft.

Local and On-site Runoff Volume

According to the LACDPW Hydrology Manual, the 50-year design storm occurs over a period of four days, with the maximum rainfall falling on the fourth day, and the maximum

24 hour rainfall amounts for the first three days are, sequentially 10, 40, and 35 percent of the fourth day's rainfall. Based on the 50 year precipitation contour lines on the GIS drainage area overlay map, the calculated average area-weighted 50-year precipitation for the drainage area is 3.2 inches per 24 hours – the maximum 24 hour rainfall amount in the fourth day is 3.2 inches. Thus the maximum 24-hour rainfall amounts for the first three days would be 0.32 inches, 1.28 inches, and 1.12 inches, respectively. The total rainfall during the four days for the 50-year design storm is 5.92 inches. The rainfall amount for the four days was then input into the Tc-calculator to determine the total flood volume generated by the local watershed.

The North Pit in Phase 1 and Phase 2 will have on-site runoff generated by the un-mined area (mainly the processing facilities area) along the edges of the pit including a paved impervious area of about 7 acres. Using the same parameters that were used for the local runoff volume calculation, with the exception of rainfall intensity and impervious surface, the on-site flood volume was also determined by the Tc-calculator. Based on the 50-year precipitation contour lines, maximum rainfall at the mine site ranges from 2.6 to 3.0 inches per 24 hours. The estimated average maximum rainfall of 2.8 inches per 24 hours during the 50-year design storm was used to calculate on-site flood volume.

Direct Precipitation Volume

The flood volume generated by the direct precipitation is obtained by multiplying the pit open area and the total on-site rainfall of 5.18 inches during the 50-year design storm (maximum 2.8 inches per 24 hr in the fourth day, and 0.28, 1.12, and 0.98 inches in the first, second, and third day respectively, totaling 5.18 inches).

Tables 10 and 11 summarize the flood volumes entering each pit during each phase for Project Alternative and Alternative 1. The inundation depth was obtained from the storage capacity curves generated by the AutoCAD Land Desktop software.

TABLE 10: FLOOD VOLUME ENTERING EACH PIT DURING PHASE 1 , PHASE 2, PHASE 3 AND FINAL RECLAMATION FOR PROJECT ALTERNATIVE

Mine Pit	Upstream Watershed Area (Acre)	Local Watershed Sheetflow Volume (acre-ft)	Lebata Braid Flow Volume (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
Phase 1							
North Pit	1,228	66	12	7	21	107	19
Phase 2							
North Pit	554	30	0	7	21	58	16
South Pit	1,525	82	43	0	65	190	16
Phase 3							
North Pit	554	30	0	0	53	83	13
South Pit	1,525	82	43	0	68	193	16
Final Reclamation							
North Pit	554	30	0	0	24	54	17
South Pit	1,525	82	43	0	65	190	16

TABLE 11: FLOOD VOLUME ENTERING EACH PIT DURING PHASE 1, 2, 3 AND FINAL RECLAMATION FOR ALTERNATIVE 1

Mine Pit	Upstream Watershed Area (Acre)	Local Watershed Sheetflow Volume (acre-ft)	Lebata Braid Flow Volume (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
Phase 1							
North Pit	1,228	66	12	5	32	115	13
Phase 2							
North Pit	554	30	0	5	32	66	11
South Pit	1,525	82	43	0	65	190	16
Phase 3							
North Pit	554	30	0	0	53	83	13
South Pit	1,525	82	43	0	68	193	16
Final Reclamation							
North Pit	554	30	0	0	35	65	11
South Pit	1,525	82	43	0	65	190	16

Note that the Lebata Braid flow, 175 cfs, would be conveyed to the CMP 18 (50 cfs capacity), located inside the Lebata site boundary. During Phase 1, the flow in excess of the CMP 18 capacity (175 cfs – 50 cfs = 125 cfs) would be deflected west by the rail road embankment off-site as the existing condition. To be conservative in calculating flood flow volume entering the site, it was assumed that the local sheet flow and the Lebata Braid flow would not arrive at the culvert CMP 18 at the same time, therefore the sheet flow from Zone 1-3 (35 cfs) and the portion of 50 cfs (limited by the CMP capacity) from the Lebata Braid flow (175 cfs) would pass through the culvert into the North Pit (see Figure 6).

Comparison of the depths of flooding to the proposed 80 ft depth of the mine pits indicates that the Capital Flood volume is well below the capacity of the mine pits. Based on this reasoning, the pits would not overflow in the Capital Flood.

Minimum 2-foot high MSHA-required safety berms would be installed along the top of the mine pit slope around the entire northern, eastern, southern, and western rims of the mine pits and pit entrance/exit ramps (as indicated on the Drainage Plans). These berms would create a barrier and prevent the temporary inundated water from creating a public safety hazard.

3.4.2 Water Budget Analysis and Estimated Rates

Flood water entering the mine pits would be emptied by three potential pathways; (1) evaporation, (2) vertical infiltration through the mine pit bottom, and (3) horizontal infiltration through the mine slope.

Water budget analysis was performed to estimate the Capital Flood water emptying time. Water budget analysis uses the principle of mass balance: The change in storage is equal to the inflows minus the outflows. Inflow components include Capital Flood inflow from the main channel overflow, off-site inflow, on-site inflow, and direct precipitation over the surface of the mining pit. Outflow components include evaporation (E), vertical infiltration (Qv) and horizontal infiltration (Q_H). The water budge analysis was performed using the following equation:

$$\frac{dV}{dt} = 0 - (E + Q_V + Q_H)$$

Where V is the volume of water storage in the pit and t is time.

The following describe how each outflow pathway was estimated:

1. Evaporation (E)

The 1972 – 1979 average evaporation rate measured by the California Department of Water Resources at the gage "Pearblossom – DWR Construct", about 3 miles upstream from the site, was 3,574 mm/year, or 0.032 ft/day (California Department of Water Resources 1979:127). The average evaporation for the four-month typical winter rainfall runoff season (December-March, inclusive) at this gage was 0.018 ft/day. To calculate the evaporation losses, the evaporate rate (0.018ft/day) was multiplied by the water surface area.

2. Vertical and Horizontal Infiltration (Qv, Q_H)

Both horizontal and vertical infiltration rates were estimated by applying Darcy's Law:

$$Q = kAi \text{ or } Q = kA\frac{h}{l}$$

Where

Q = rate of flow

K = coefficient of permeability

i = hydraulic gradient

A = area normal to flow direction

h = different in elevation between water surface and ground water table

l = length of flow path

- *Hydraulic Gradient*

The hydraulic gradient is the change in water elevation between the pit water surface and groundwater table at the bottom of the mine pit divided by the flow path. The vertical hydraulic gradient (water depth/water depth) is simply equal to 1.

The horizontal hydraulic gradient is estimated to be 0.01 based on the regional groundwater level contour lines in the Antelope Valley basin (Leighton and Phillips)

- *Permeability*

The permeability is the property of the soil to transmit water and depends upon soil materials. The soil permeability at the mine site was obtained from the geotechnical study (Bryant, August 22, 2008). The study identified several soil materials (gravel/silty gravel and silty clay) on site and estimated their permeability rates as follows:

> Gravel/ Silty Gravel: The estimated vertical permeability is at a range of 0.1 cm/sec to 1cm/sec, with the best estimate of 0.4 cm/sec (1,134 ft/day).
>
> Silty Clay: The estimated vertical permeability is at a range of 5×10^{-6} cm/sec $-$ 5×10^{-5} cm/sec, with the best estimate of 2×10^{-5} cm/sec (0.057 ft/ day).

The geotechnical study also estimated the horizontal permeability of the gravel material on the site to be 4 times of the vertical permeability. To be conservative, the horizontal permeability of gravel materials adopted in this drainage concept is estimated to be 1.6 cm/sec (4,536 ft/day), which is an average of geotechnical report estimated values for the gravel materials on site.

Since the pits will be mined to the surface of the clay layer, the water would be infiltrated laterally through the gravel materials, and vertically through the silty clay layer to groundwater.

3.4.3 Emptying Time

Using the Water Budget Analysis, the emptying time can be estimated by applying the following equation:

$$t = \frac{V_T}{EA_E + k_V A_V i_V + k_H A_H i_H}$$

Where

t = pit emptying time (day)

V_T = total flood volume (ac-ft)

E = evaporation rate (ft/day)

K = coefficient of permeability (ft/day); Subscripts V and H represent permeability for vertical infiltration and horizontal infiltration, respectively.

i = hydraulic gradient, Subscripts V and H represent hydraulic gradient for vertical infiltration and horizontal infiltration, respectively.

A = area normal to flow direction (acre), Subscripts V, H and E represent the area normal to flow direction for vertical infiltration, horizontal infiltration and evaporation, respectively.

The change in flood volume and its associated water depth due to evaporation and seepage were calculated using daily time steps. The emptying times after the Capital Flood for the two alternatives are summarized in Table 12.

TABLE 12: CAPITAL FLOOD VOLUME AND PIT EMPTYING TIME

	Project Alternative			Alternative 1		
		Emptying Time			Emptying Time	
Mining Pit	Total Capital Flood Volume (acre-ft)	Total (days)	After Capital Flood (days)	Total Capital Flood Volume (acre-ft)	Total (days)	After Capital Flood (days)
Phase 1						
North Pit	107	5	1	115	6	2
Phase 2						
North Pit	58	3	0	66	5	1
South Pit	190	9	5	190	9	5
Phase 3						
North Pit	83	7	3	83	7	3
South Pit	193	9	5	193	9	5
Final Reclamation						
North Pit	54	5	1	65	5	1
South Pit	190	9	5	190	9	5

The estimated emptying time shown in Table 12 includes two columns, one is the total time required to empty the Capital Flood volume and the other is the emptying time after the Capital Flood event. The two columns have a difference in 4 days. This is because infiltration also occurs over the 4-day Capital Flood event.

The analysis results show that all mining phases for each could be emptied within 5 days after the Capital Flood event. Note that the lateral infiltration is the major factor contributing to the emptying time. If a higher permeability was used, instead of the average permeability, the estimated emptying time would be even shorter.

3.4.4 Pit Sedimentation

All of the sediment transported into the pit by the Capital Flood inflow would be deposited on the pit floor. The depth of sediment deposition resulting from Capital Flood inflow on the completed mine pit bottom area would depend on the concentration of sediment in the inflowing water. According to the Los Angeles County Department of Public Works Sedimentation Manual (March 2006), the entire watershed is within LA County designated Debris Production Area (DPA) Zone 11 in the Antelope Valley Basin. The debris production rate of 1,300 cubic yards per square mile was obtained from the Debris Production curves in Sedimentation Manual B-1. Multiplying debris production rate by the approximated local watershed areas, the debris production volume during Phase 1 and after Phase 1 is determined to be 2,500 cubic yards and 4,200 cubic yards, respectively. Table 13 summarizes the estimated depths of sediment deposited in the mine pits during Phase 1 and after Phase 1 (Phase 2, 3 and Final Reclamation).

TABLE 13: MINE PIT SEDIMENTATION FOR EACH MINING PHASE

		Project Alternative		Alternative 1	
Mining Pit	**Local Watershed Area (sq mi)**	**Pond Bottom Area (sq ft)**	**Deposited Sediment Layer Thickness (ft)**	**Pond Bottom Area (sq ft)**	**Deposited Sediment Layer Thickness (ft)**
Phase 1					
North Pit	1.9	718,561	0.09	1,023,575	0.07
Phase 2					
North Pit	1.9	457,078	0.07	764,535	0.04
South Pit	3.2	1,228,807	0.07	1,233,827	0.07
Phase 3					
North Pit	1.9	884,268	0.03	884,109	0.03
South Pit	3.2	1,336,548	0.06	1,341,764	0.06
Final Reclamation					
North Pit	1.9	228,515	0.13	724,028	0.04
South Pit	3.2	1,228,807	0.07	1,233,827	0.07

The sediments would deposit in the bottom of pond where the vertical infiltration occurs. Since the mine pits will be mined to the surface of clay layer, which would have a lower permeability than the deposited sediments, sediment deposition on the clay layer in the mining pits would not have an affect on the vertical infiltration rate. Furthermore, the horizontal infiltration is more important with regard to pit empty time. Sediment deposition in the bottom of pit would not have an affect on the horizontal infiltration rate and the pit empty time.

3.5 IMPACT OF DRAINAGE CONCEPT ON ADJACENT PROPERTIES

The mine drainage concept would have no adverse impact on properties adjacent to and downstream of the mine site during the Capital Flood. The interceptor drains located on the upstream (southern and eastern) sides of the mine pits are adequately sized to capture and convey any sheetflow and the Lebata Braid flow arriving at each interceptor drain for delivery to the down drains and subsequent discharge to the mine pits. Hence, there would be no backwater effects or associated increases in flood depths caused by the interceptor drains. Therefore, flooding on adjacent properties would not be impacted.

Following completion of mining, all flows arriving at the site boundary during the Capital Flood would be intercepted by the completed mine pits. No flows would be diverted around the mine. Hence, flows and flooding conditions downstream of the mine would not be exacerbated compared to existing conditions.

In the existing case, a portion of the Capital Flood arriving at CMP 18 would be deflected westwards by the rail road embankment due to constrained culvert capacity. The deflected flows would not be increased by Phase 1 mining as all mining activities would occur on the downstream side of the embankment. During and following Phase 2 mining, the deflected flows would be reduced or eliminated due to interception of flows by the South Pit.

4.0 REFERENCES

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APPENDIX A – CULVERT CAPACITY NOMOGRAPH

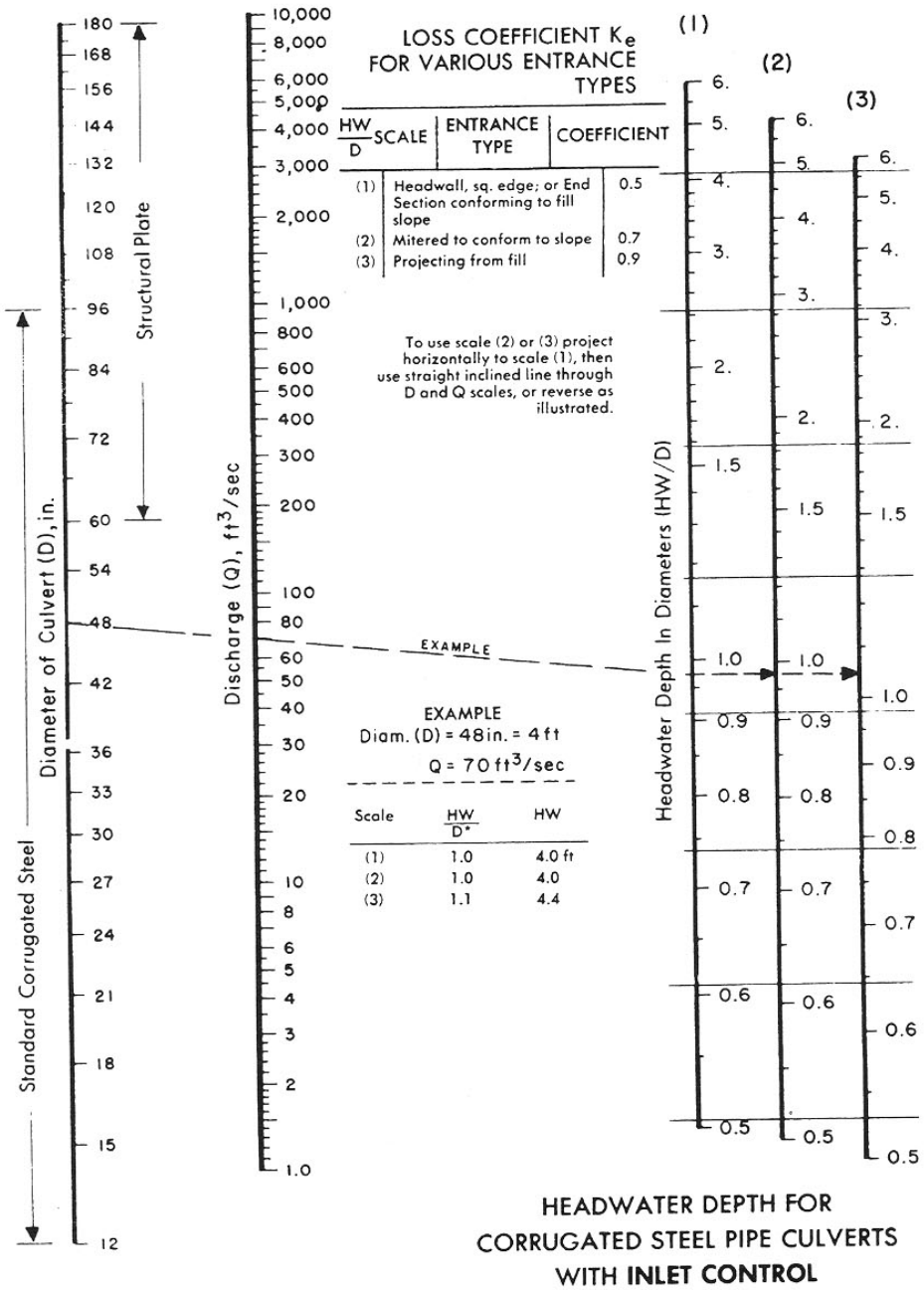


Figure 3.28 *Inlet control* nomograph for corrugated steel *pipe* culverts.[13] The manufacturers recommend keeping *HW/D* to a maximum of 1.5 and preferably to no more than 1.0 for diameters greater than 4 to 5 feet.

Source: American Iron and Steel Institute. 1994. Handbook of Steel Drainage and Highway Construction Products.

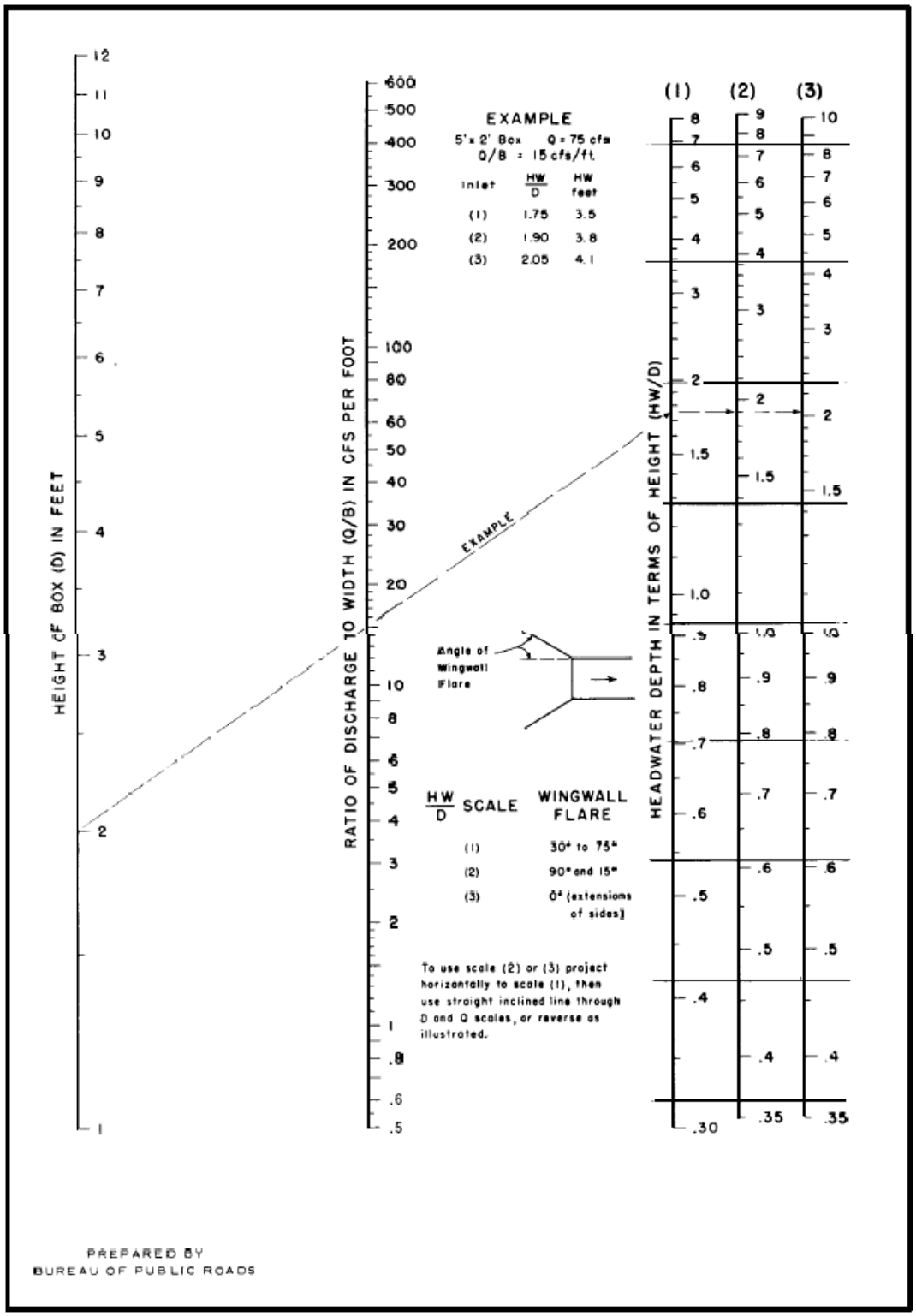
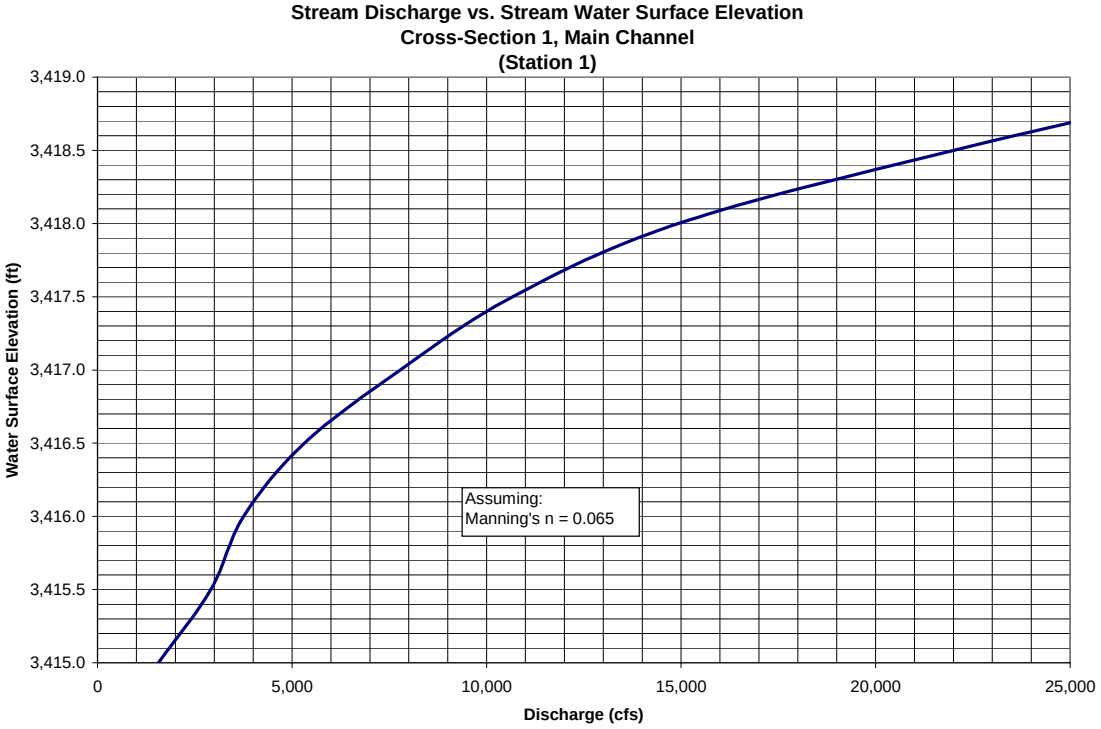
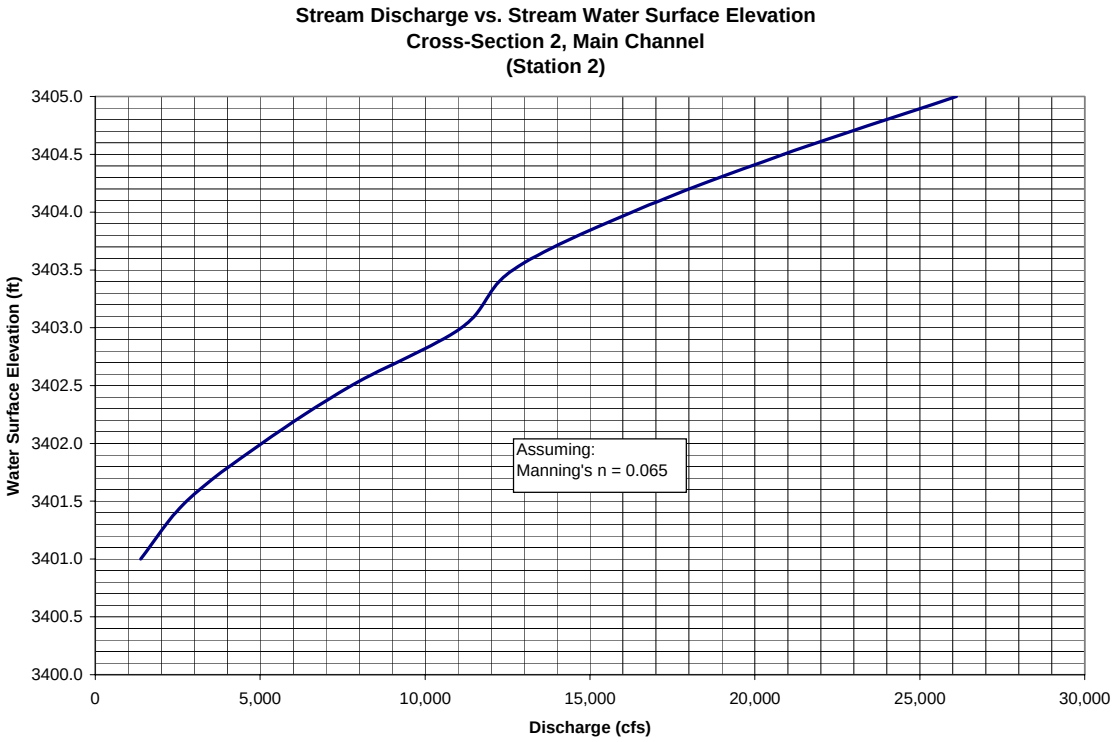


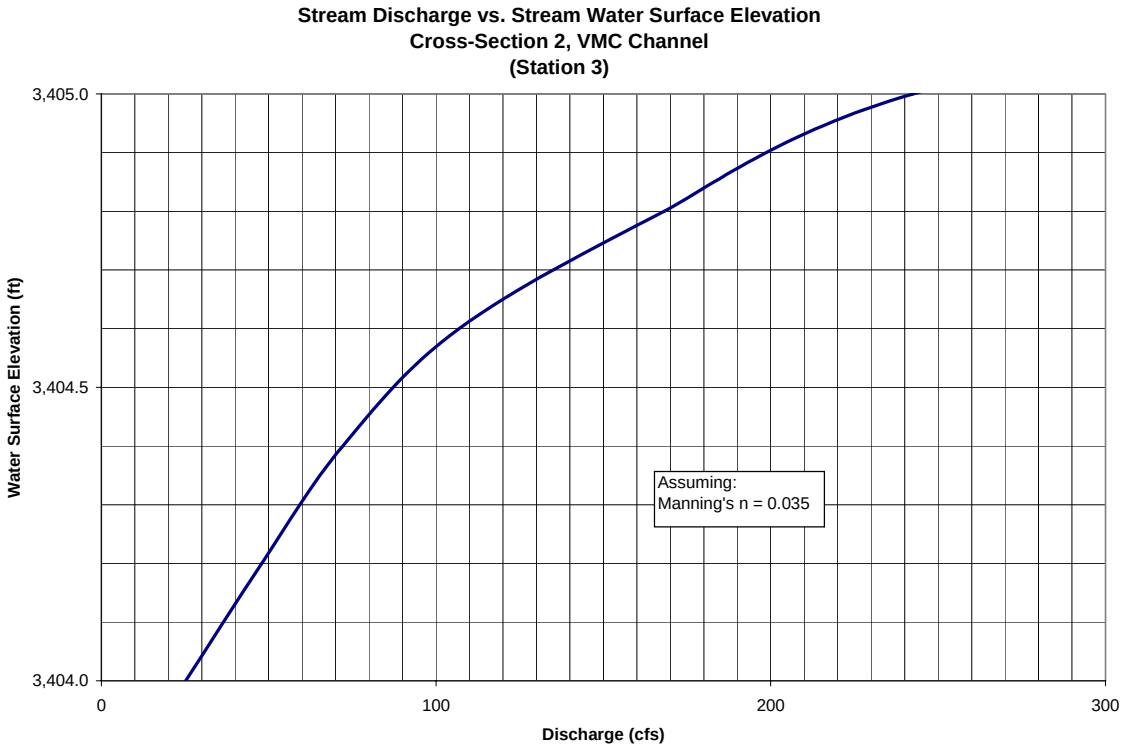
Figure B-7. Headwater depth for box culverts with inlet control.

Source: US Army Corps of Engineers1983 Technical Manual TM 5-820-4 Drainage for Areas other than Airfields

APPENDIX B – RATING CURVES USED IN SPLIT FLOW ANALYSIS



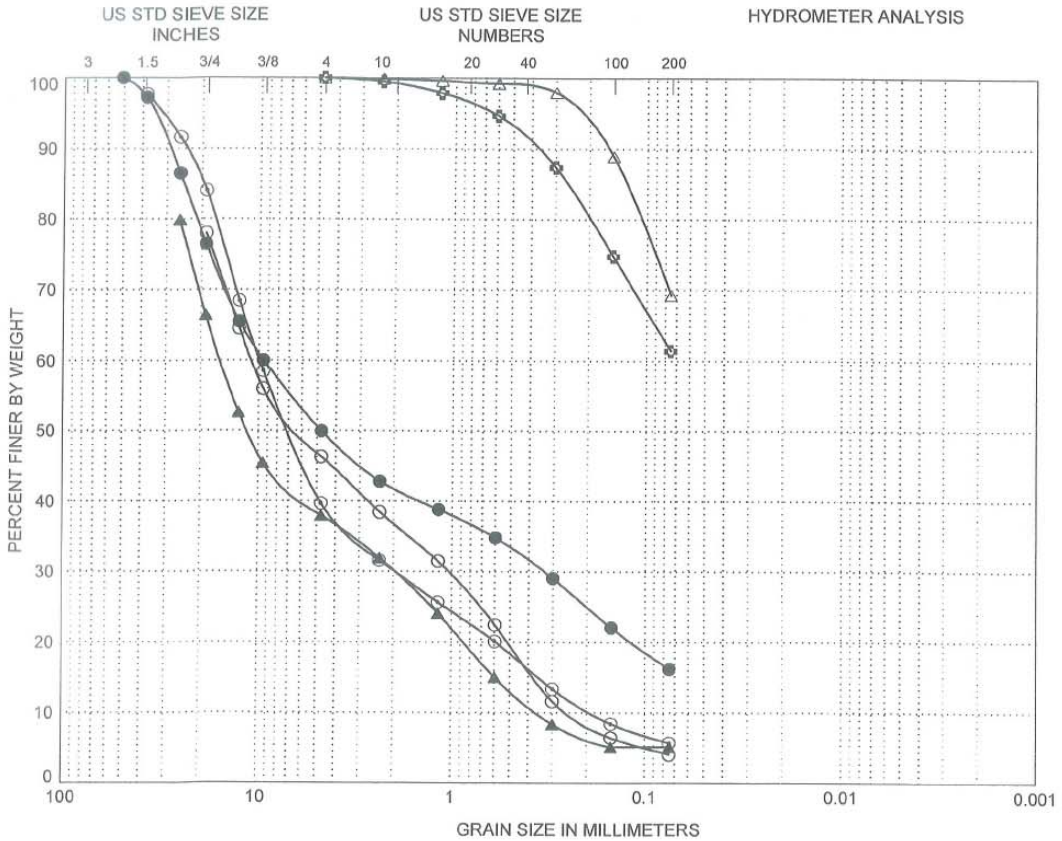



Stream Discharge vs. Stream Water Surface Elevation
Cross-Section 2, VMC Channel
(Station 3)
3,405.0
3,404.5
3,404.0
Water Surface Elevation (ft)
0
100
200
300
Discharge (cfs)
Assuming:
Manning's n = 0.035

Stream Discharge vs. Stream Water Surface Elevation
Cross-Section 2, Lebata Channel
(Station 4)
3,405.0
3,404.5
3,404.0
Water Surface Elevation (ft)
0
100
200
300
Discharge (cfs)
Assuming:
Manning's n = 0.035

APPENDIX C – GRAIN SIZE CURVES

McGee & Associates
Project No. 3543.001



GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

LEGEND	(location)	(depth,ft)	CLASSIFICATION	Cc	Cu
○	DH-1	35.0	GRAVEL (GP) and silty gravel (GP-GM)	0.4	45.1
●	DH-1	40.0	GRAVEL (GP) and silty gravel (GP-GM)		
△	DH-1	65.0	Silty SAND (SM)		
▲	DH-2	20.0	GRAVEL (GP) and silty gravel (GP-GM)	0.7	44.3
⊙	DH-2	35.0	GRAVEL (GP) and silty gravel (GP-GM)	2.1	53.2
✪	DH-2	70.0	SILT (ML) with sand		

GRAIN SIZE CURVES
Big Rock Creek Mine
Pearblossom, California

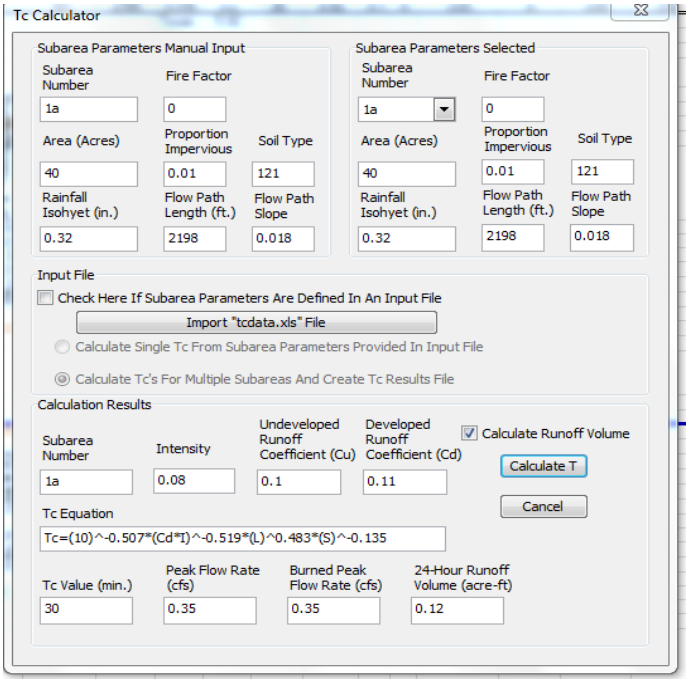
PLATE B-2

Appendix D - Miscellaneous Calculations

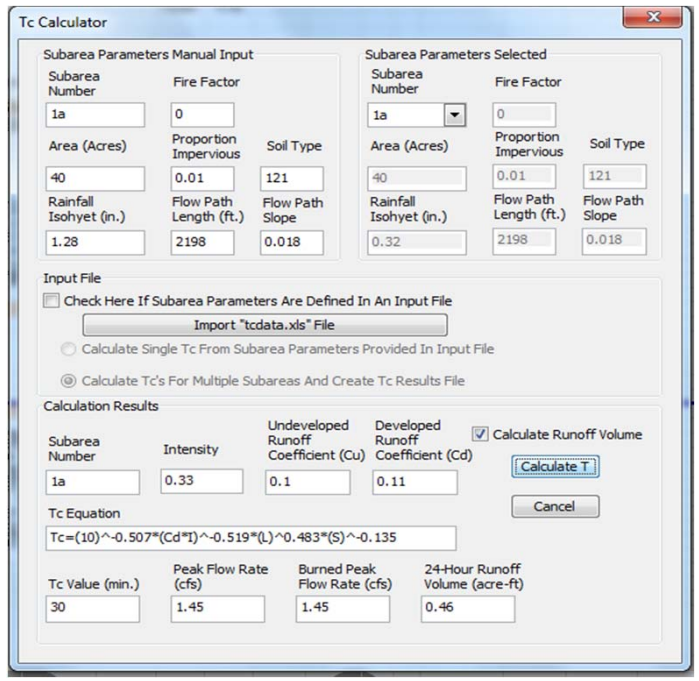
- Input and output files of the Tc Calculator for the Capital Flood event for a 40 acre subbasin (4 days).
- Tc Calculator-generated 4-day hydrographs for the Capital Flood event (i.e., 50-year storm event) for a 40 acre subbasin.
- Runoff volume calculation EXCEL spreadsheets for the Capital Flood event.
- Pit emptying time calculation EXCEL spreadsheets for the Capital Flood event.

Input and Output files of the Tc Calculator

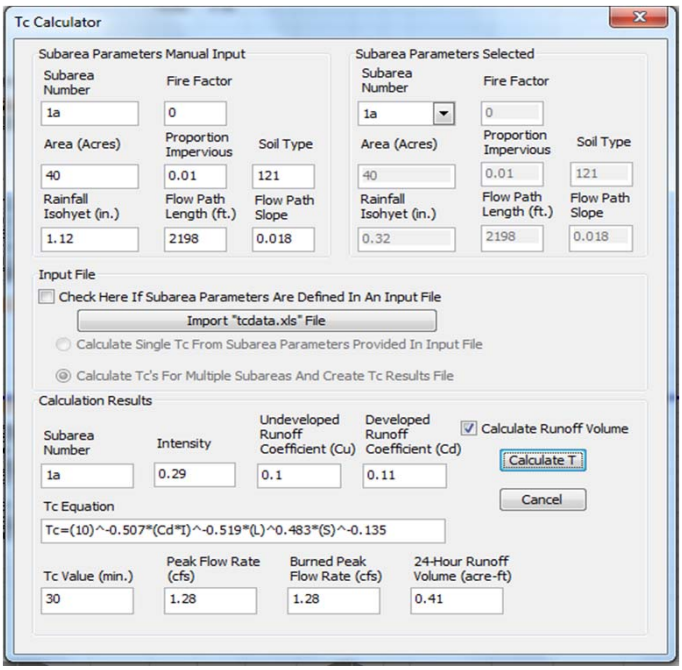
Day 1



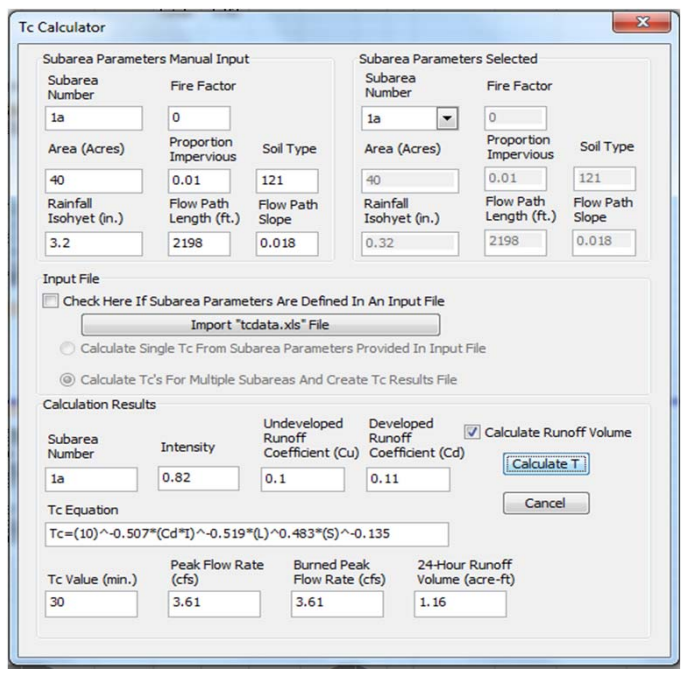
Day 2

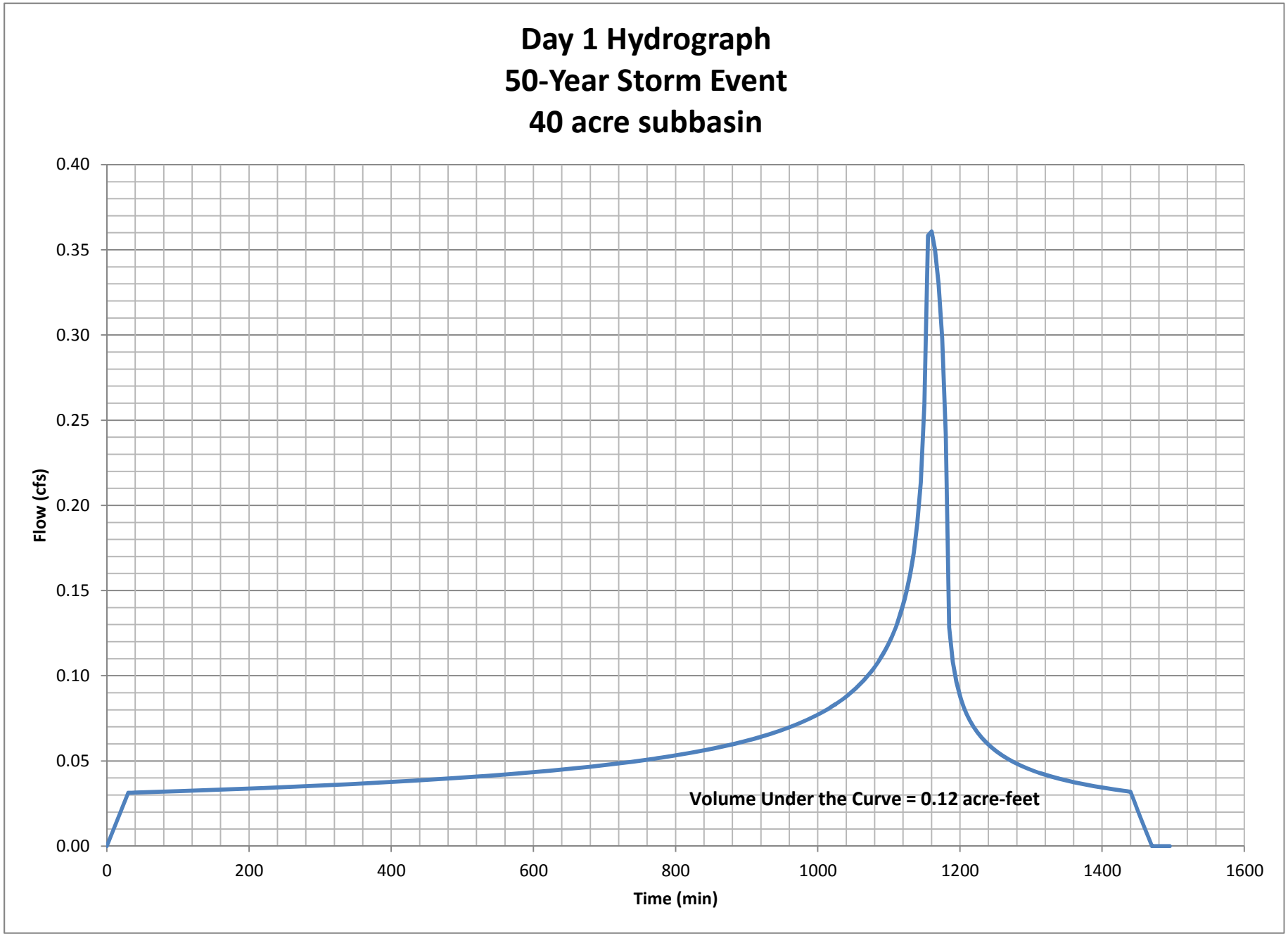


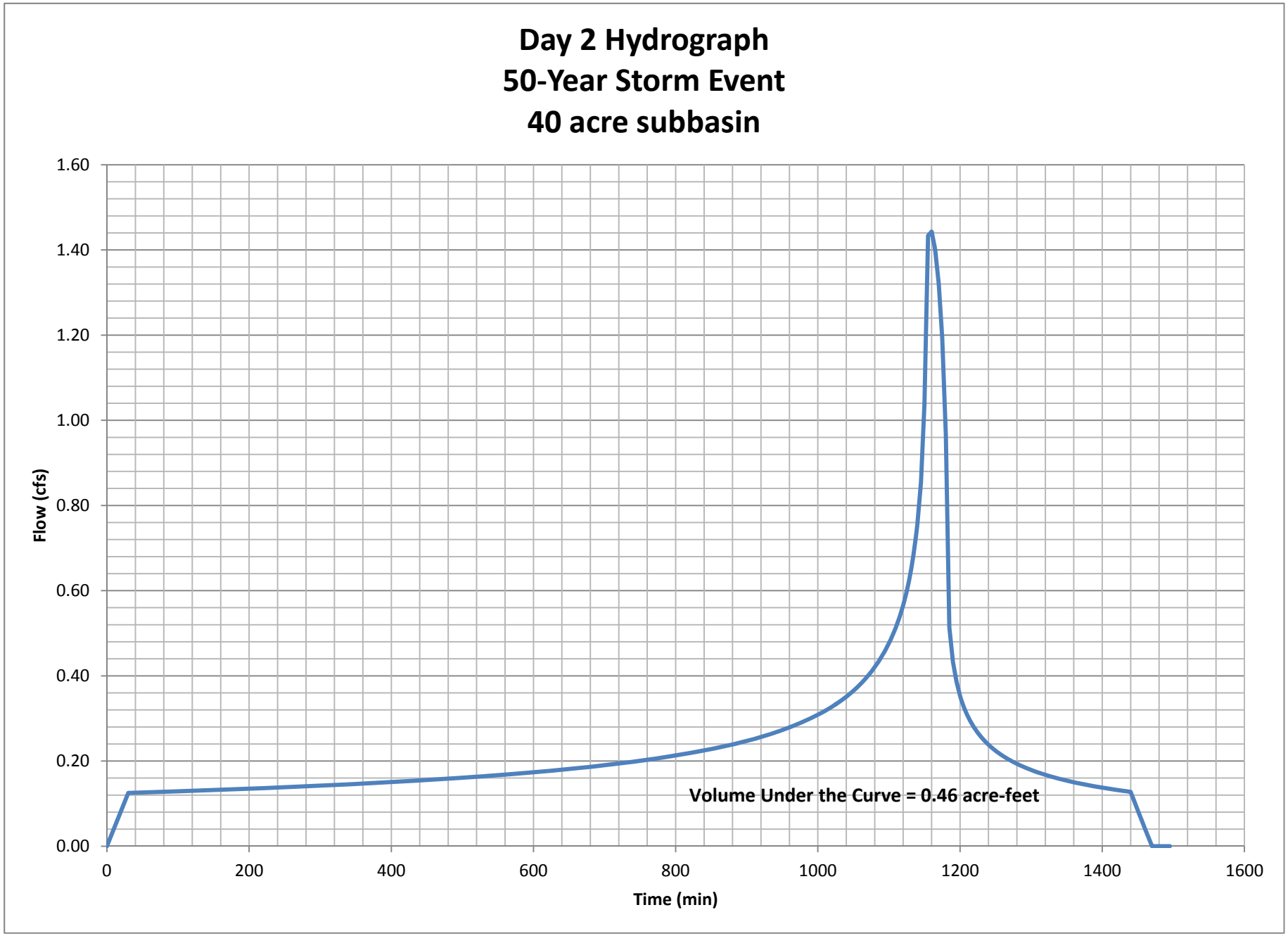
Day 3

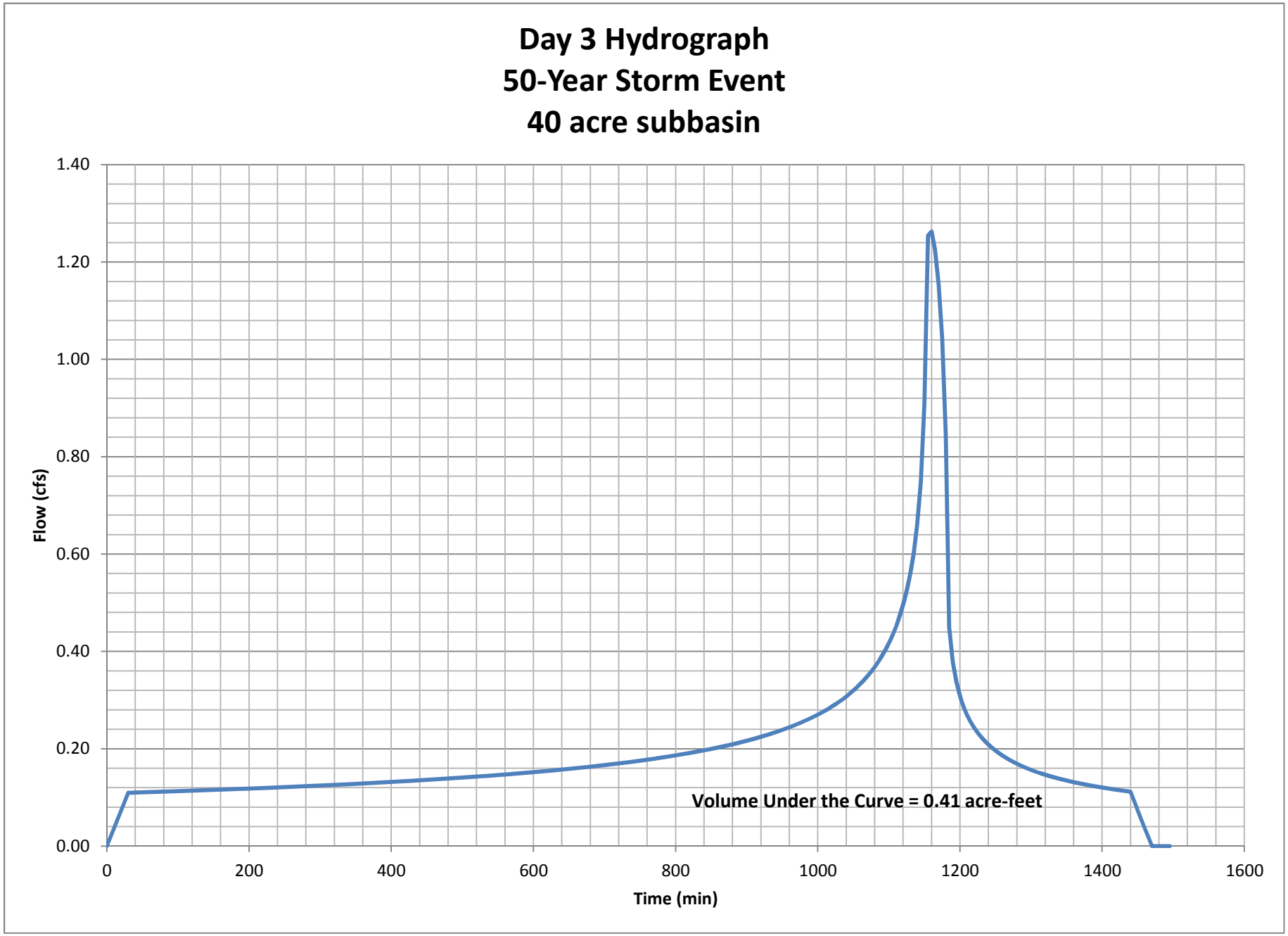


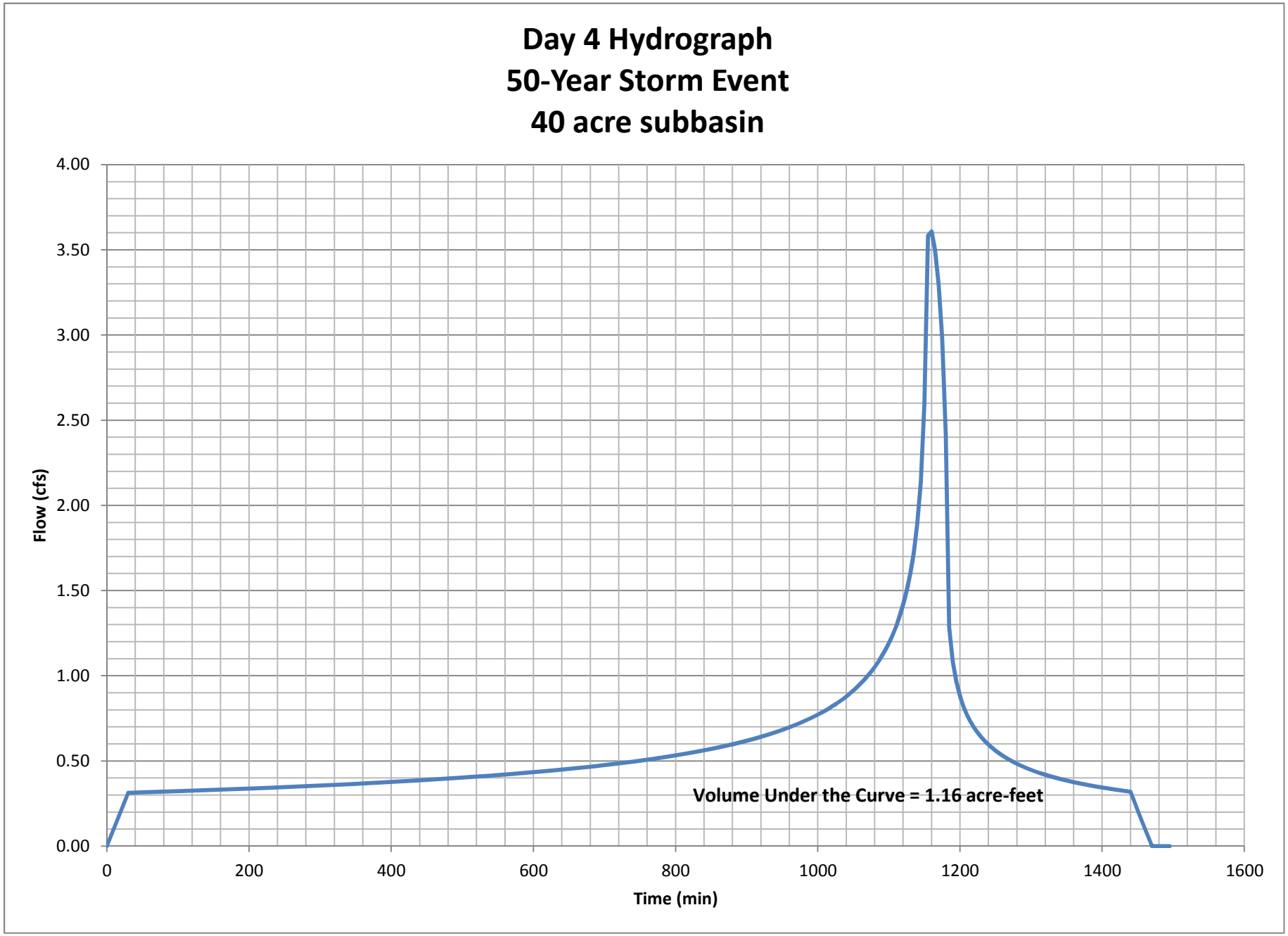
Day 4




Day 1 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.12 acre-feet


Day 2 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.46 acre-feet


Day 3 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.41 acre-feet


Day 4 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 1.16 acre-feet

Alternative 1 (750' Alignment)

Day	Project	Subarea	Area (acres)	Proportion Imprevious	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)	Fire Factor	Burned flow rate (cfs)	Volume (acre-ft)
1	Lebata	1a	40	0.01	50	121	2198	0.018	0.32	30	0.08	0.1	0.11	0.35	0	0.35	0.12
2	Lebata	1a	40	0.01	50	121	2198	0.018	1.28	30	0.33	0.1	0.11	1.45	0	1.45	0.46
3	Lebata	1a	40	0.01	50	121	2198	0.018	1.12	30	0.29	0.1	0.11	1.28	0	1.28	0.41
4	Lebata	1a	40	0.01	50	121	2198	0.018	3.2	30	0.82	0.1	0.11	3.61	0	3.61	1.16

Sheet Flow Volume

Phase 1

	Basin	Basin Area (acres)	Day1 Flood Volume (ac-ft)	Day2 Flood Volume (ac-ft)	Day3 Flood Volume (ac-ft)	Day4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
	1A	489.1	1.5	5.6	5.0	14.2	26.3
1-1-NP	1B	65.2	0.2	0.7	0.7	1.9	3.5
1-2-NP	1-2	281.7	0.8	3.2	2.9	8.2	15.1
1-3-NP	1-3	391.7	1.2	4.5	4.0	11.4	21.1
	Total	1227.7	3.7	14.1	12.6	35.6	66.0

Total Volume **66.0** ac-ft

Phase2/3/Final

	Basin	Basin Area (acres)	Day1 Flood Volume (ac-ft)	Day2 Flood Volume (ac-ft)	Day3 Flood Volume (ac-ft)	Day4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
	1A	489.1	1.5	5.6	5.0	14.2	26.3
1-1- NP	1B	65.2	0.2	0.7	0.7	1.9	3.5
2-1-SP	2-1	279.2	0.8	3.2	2.9	8.1	15.0
2-2-SP	2-2	378.2	1.1	4.3	3.9	11.0	20.3
2-3-SP	2-3	323.3	1.0	3.7	3.3	9.4	17.4
2-4-SP	2-4	543.8	1.6	6.3	5.6	15.8	29.2
	Total	2078.8	6.2	23.9	21.3	60.3	111.7

NP 554.4 acres

SP 1524.5 acres

Total Volume **111.7** ac-ft

NP 29.8 ac-ft

SP 81.9 ac-ft

Main Channel Overflow Volume

	Flood Flow (cfs)	Duration (hr)	Flood Volume (ac-ft)
Phase1-NP	50	3	**12.4**
Phase2/3 and Final -SP	175	3	**43.4**

	On-Site Facilities/Transfer Area						
	Location	Area (acres)	Day1 Flood Volume (ac-ft)	Day2 Flood Volume (ac-ft)	Day3 Flood Volume (ac-ft)	Day4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
PHASE 1-NP	On-Site	51	0.25645	1.02985	0.8896	2.5626	4.7

On-Site Direct Rainfall Volume		
Phase	Top of the Pit (acres)	Total Flood Volume (ac-ft)
Phase1-NP	73	**31.5**
Phase2-SP	150	**64.9**
Phase 3-NP	124	**53.4**
Phase 3-SP	157	**67.9**
Final Reclamation-NP	81	**35.1**
Final Reclamation-SP	150	**64.9**

Alternative 1 (750'radius)

	Upstream Watershed Area (Acre)	Sheetflow Volume (acre-ft)	Main Channel Overflow Volume (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
			Phase 1				
North Pit	1228	66	12	5	31	115	13.0
			Phase 2				
North Pit	554	30	0	5	31	66	11.0
South Pit	1525	82	43	0	65	190	16.0
			Phase 3				
North Pit	554	30	0	0	53	83	13.0
South Pit	1525	82	43	0	68	193	16.0
			Final Reclamation				
North Pit	554	30	0	0	35	65	11.0
South Pit	1525	82	43	0	65	190	16.0

Project Alternative (1500' Alignment)

Day	Project	Subarea	Area (acres)	Proportion Imprevious	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)	Fire Factor	Burned flow rate (cfs)
1	Lebata	1a	40	0.01	50	121	2198	0.018	0.32	30	0.08	0.1	0.11	0.35	0	0.35
2	Lebata	1a	40	0.01	50	121	2198	0.018	1.28	30	0.33	0.1	0.11	1.45	0	1.45
3	Lebata	1a	40	0.01	50	121	2198	0.018	1.12	30	0.29	0.1	0.11	1.28	0	1.28
4	Lebata	1a	40	0.01	50	121	2198	0.018	3.2	30	0.82	0.1	0.11	3.61	0	3.61

Sheet Flow Volume

Phase 1

	Basin	Basin Area (acres)	Day1 Flood Volume (ac-ft)	Day2 Flood Volume (ac-ft)	Day3 Flood Volume (ac-ft)	Day4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
	1A	489	1.5	5.6	5.0	14	26.3
1-1-NP	1B	65	0.2	0.7	0.7	2	3.5
1-2-NP	1-2	282	0.8	3.2	2.9	8	15.1
1-3-NP	1-3	392	1.2	4.5	4.0	11	21.1
	Total	1228	3.7	14.1	12.6	36	66.0

Total Volume **66** ac-ft

Phase2/3/Final

	Basin	Basin Area (acres)	Day1 Flood Volume (ac-ft)	Day2 Flood Volume (ac-ft)	Day3 Flood Volume (ac-ft)	Day4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
	1A	489	1.5	5.6	5.0	14	26.3
1-1- NP	1B	65	0.2	0.7	0.7	2	3.5
2-1-SP	2-1	279	0.8	3.2	2.9	8	15.0
2-2-SP	2-2	378	1.1	4.3	3.9	11	20.3
2-3-SP	2-3	323	1.0	3.7	3.3	9	17.4
2-4-SP	2-4	544	1.6	6.3	5.6	16	29.2
	Total	2079	6.2	23.9	21.3	60	111.7
	NP	554.4	acres				
	SP	1524.5	acres				

Total Volume **112** ac-ft

NP	29.8	ac-ft
SP	81.9	ac-ft

Main Channel Overflow Volume

	Flood Flow (cfs)	Duration (hr)	Flood Volume (ac-ft)
Phase1-NP	50	3	**12.4**
Phase2/3 and Final	175	3	**43.4**

On-Site Facilities/Transfer Area

	Location	Area (acres)	Day1 Flood Volume (ac-ft)	Day2 Flood Volume (ac-ft)	Day3 Flood Volume (ac-ft)	Day4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
PHASE 1-NP	On-Site	66.6	0.4	1.6	1.4	4	7.4

On-Site Direct Rainfall Volume

Phase	Top of the Pit (acres)	Total Flood Volume (ac-ft)
Phase1-NP	48	2.2
Phase2-SP	150	7.1
Phase 3-NP	124	5.8
Phase 3-SP	157	7.5
Final Reclamation-NP	55	2.6
Final Reclamation-SP	150	7.1

Project Alternative (1500'radius)

	Upstream Watershed Area (Acre)	Sheetflow Volume (acre-ft)	Main Channel Overflow Volume (acre-ft)	On-Site Runoff Volume	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
			Phase 1				
North Pit	1228	66	12	7	21	107	19
			Phase 2				
North Pit	554	30	0	7	21	58	16
South Pit	1525	82	43	0	65	190	16
			Phase 3				
North Pit	554	30	0	0	53	83	13
South Pit	1525	82	43	0	68	193	16
			Final Reclamation				
North Pit	554	30	0	0	24	54	17
South Pit	1525	82	43	0	65	190	16

Emptying Time

Original Project -Alternative 1

Phase 1 NP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	115.0	2,858	4,536	0.8	0.01	36.7	0.057	23.5	1	1.3	25.0	0.018	0.4	38.5	13	12	76.5
2	76.5	2,857	4,536	0.7	0.01	31.9	0.057	20.5	1	1.2	21.8	0.018	0.4	33.4	12	10	43.1
3	43.1	2,855	4,536	0.5	0.01	22.6	0.057	14.6	1	0.8	15.5	0.018	0.3	23.7	10	8	19.4
4	19.4	2,853	4,536	0.3	0.01	13.9	0.057	8.6	1	0.5	9.2	0.018	0.2	14.6	8	5	4.8
5	4.8	2,850	4,536	0.1	0.01	3.0	0.057	2.4	1	0.1	2.5	0.018	0.0	3.2	5	4	1.6
6	1.6	2,849	4,536	0.1	0.01	2.7	0.057	1.2	1	0.1	1.3	0.018	0.0	2.8	4	0	0.0
7	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
8	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project -Alternative 1

Phase 2 NP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	66.0	2,856	4,536	0.6	0.01	27.2	0.057	17.5	1	1.0	18.7	0.018	0.3	28.5	11	9	37.5
2	37.5	2,854	4,536	0.4	0.01	18.2	0.057	11.6	1	0.7	12.3	0.018	0.2	19.1	9	8	18.4
3	18.4	2,853	4,536	0.3	0.01	13.9	0.057	8.6	1	0.5	9.2	0.018	0.2	14.6	8	5	3.8
4	3.8	2,850	4,536	0.1	0.01	3.0	0.057	2.4	1	0.1	2.5	0.018	0.0	3.2	5	2	0.7
5	0.7	2,847	4,536	0.0	0.01	1.0	0.057	0.5	1	0.0	0.5	0.018	0.0	1.0	2	0	0.0
6	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
7	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
8	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project -Alternative 1

Phase 2 SP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	190.0	2,881	4,536	0.9	0.01	39.9	0.057	28.3	1	1.6	29.9	0.018	0.5	42.0	16	15	148.0
2	148.0	2,880	4,536	0.8	0.01	35.7	0.057	25.7	1	1.5	27.2	0.018	0.5	37.6	15	14	110.4
3	110.4	2,879	4,536	0.7	0.01	31.8	0.057	23.1	1	1.3	24.4	0.018	0.4	33.5	14	12	76.8
4	76.8	2,877	4,536	0.5	0.01	24.2	0.057	18.0	1	1.0	19.0	0.018	0.3	25.6	12	10	51.3
5	51.3	2,875	4,536	0.4	0.01	17.1	0.057	12.9	1	0.7	13.5	0.018	0.2	18.0	10	9	33.2
6	33.2	2,874	4,536	0.3	0.01	13.9	0.057	10.5	1	0.6	11.0	0.018	0.2	14.7	9	7	18.6
7	18.6	2,872	4,536	0.2	0.01	8.4	0.057	6.4	1	0.4	6.8	0.018	0.1	8.9	7	6	9.7
8	9.7	2,871	4,536	0.1	0.01	6.0	0.057	4.7	1	0.3	5.0	0.018	0.1	6.4	6	5	3.3
9	3.3	**2,870**	4,536	0.1	0.01	4.0	0.057	3.2	1	0.2	3.4	0.018	0.1	4.2	5	0	0.0
10	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project -Alternative 1

Phase 3 NP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	83.0	2,845	4,536	0.6	0.01	28.2	0.057	20.3	1	1.2	21.4	0.018	0.4	29.7	13	11	53.3
2	53.3	2,843	4,536	0.4	0.01	20.4	0.057	14.4	1	0.8	15.2	0.018	0.3	21.5	11	9	31.7
3	31.7	2,841	4,536	0.3	0.01	13.6	0.057	9.5	1	0.5	10.0	0.018	0.2	14.3	9	7	17.5
4	17.5	2,839	4,536	0.2	0.01	7.7	0.057	5.5	1	0.3	5.8	0.018	0.1	8.1	7	6	9.3
5	9.3	2,838	4,536	0.1	0.01	5.5	0.057	4.1	1	0.2	4.3	0.018	0.1	5.8	6	4	3.5
6	3.5	2,836	4,536	0.1	0.01	2.5	0.057	2.0	1	0.1	2.1	0.018	0.0	2.7	4	2	0.8
7	0.8	2,834	4,536	0.0	0.01	0.7	0.057	0.6	1	0.0	0.6	0.018	0.0	0.8	2	0	0.0
8	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project -Alternative 1

Phase 3 SP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	193.0	2,881	4,536	1.0	0.01	43.5	0.057	30.8	1	1.8	32.6	0.018	0.6	45.8	16	15	147.2
2	147.2	2,880	4,536	0.9	0.01	39.0	0.057	28.1	1	1.6	29.6	0.018	0.5	41.1	15	13	106.1
3	106.1	2,878	4,536	0.7	0.01	30.6	0.057	22.6	1	1.3	23.8	0.018	0.4	32.3	13	11	73.8
4	73.8	2,876	4,536	0.5	0.01	22.6	0.057	17.2	1	1.0	18.1	0.018	0.3	23.9	11	10	49.9
5	49.9	2,875	4,536	0.4	0.01	18.8	0.057	14.4	1	0.8	15.2	0.018	0.3	19.9	10	8	30.0
6	30.0	2,873	4,536	0.3	0.01	12.3	0.057	9.6	1	0.5	10.1	0.018	0.2	13.0	8	7	17.0
7	17.0	2,872	4,536	0.2	0.01	9.5	0.057	7.6	1	0.4	8.0	0.018	0.1	10.0	7	5	7.0
8	7.0	2,870	4,536	0.1	0.01	4.8	0.057	4.1	1	0.2	4.2	0.018	0.1	5.1	5	3	1.9
9	1.9	**2,868**	4,536	0.0	0.01	1.8	0.057	1.6	1	0.1	1.7	0.018	0.0	1.9	3	0	0.0
10	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project -Alternative 1

Final Phase NP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	65.0	2,856	4,536	0.6	0.01	27.2	0.057	17.5	1	1.0	18.7	0.018	0.3	28.5	11	9	36.5
2	36.5	2,854	4,536	0.4	0.01	18.2	0.057	11.6	1	0.7	12.3	0.018	0.2	19.1	9	8	17.4
3	17.4	2,853	4,536	0.3	0.01	13.9	0.057	8.6	1	0.5	9.2	0.018	0.2	14.6	8	4	2.8
4	2.8	2,849	4,536	0.1	0.01	2.7	0.057	1.2	1	0.1	1.3	0.018	0.0	2.8	4	1	0.1
5	0.1	2,846	4,536	0.0	0.01	0.5	0.057	0.3	1	0.0	0.3	0.018	0.0	0.5	1	0	0.0
6	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
7	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
8	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project -Alternative 1

Final Phase SP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	190.0	2,881	4,536	0.9	0.01	39.9	0.057	28.3	1	1.6	29.9	0.018	0.5	42.0	16	15	148.0
2	148.0	2,880	4,536	0.8	0.01	35.7	0.057	25.7	1	1.5	27.2	0.018	0.5	37.6	15	14	110.4
3	110.4	2,879	4,536	0.7	0.01	31.8	0.057	23.1	1	1.3	24.4	0.018	0.4	33.5	14	12	76.8
4	76.8	2,877	4,536	0.5	0.01	24.2	0.057	18.0	1	1.0	19.0	0.018	0.3	25.6	12	10	51.3
5	51.3	2,875	4,536	0.4	0.01	17.1	0.057	12.9	1	0.7	13.5	0.018	0.2	18.0	10	9	33.2
6	33.2	2,874	4,536	0.3	0.01	13.9	0.057	10.5	1	0.6	11.0	0.018	0.2	14.7	9	7	18.6
7	18.6	2,872	4,536	0.2	0.01	8.4	0.057	6.4	1	0.4	6.8	0.018	0.1	8.9	7	6	9.7
8	9.7	2,871	4,536	0.1	0.01	6.0	0.057	4.7	1	0.3	5.0	0.018	0.1	6.4	6	5	3.3
9	3.3	2,870	4,536	0.1	0.01	4.0	0.057	3.2	1	0.2	3.4	0.018	0.1	4.2	5	0	0.0
10	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project - Project Alternative

Phase 1 NP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	107.0	2,864	4,536	1.0	0.01	46.0	0.057	16.5	1	0.9	18.4	0.018	0.3	47.3	19	16	59.7
2	59.7	2,861	4,536	0.7	0.01	31.2	0.057	10.5	1	0.6	11.8	0.018	0.2	32.1	16	12	27.7
3	27.7	2,857	4,536	0.4	0.01	17.3	0.057	5.1	1	0.3	5.8	0.018	0.1	17.7	12	8	9.9
4	9.9	2,853	4,536	0.2	0.01	8.1	0.057	2.3	1	0.1	2.7	0.018	0.0	8.3	8	4	1.7
5	1.7	2,849	4,536	0.1	0.01	2.4	0.057	0.8	1	0.0	0.9	0.018	0.0	2.5	4	0	0.0
6	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
7	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
8	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project - Project Alternative

Phase 2 NP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	58.0	2,861	4,536	0.7	0.01	31.2	0.057	10.5	1	0.6	11.8	0.018	0.2	32.1	16	12	25.9
2	25.9	2,857	4,536	0.4	0.01	17.3	0.057	5.1	1	0.3	5.8	0.018	0.1	17.7	12	8	8.2
3	8.2	2,853	4,536	0.2	0.01	8.1	0.057	2.3	1	0.1	2.7	0.018	0.0	8.3	8	0	0.0
4	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
5	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
6	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
7	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
8	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project - Project Alternative

Phase 2 SP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	190.0	2,882	4,536	1.0	0.01	43.6	0.057	30.8	1	1.8	32.6	0.018	0.6	45.9	16	14	144.1
2	144.1	2,880	4,536	0.8	0.01	35.2	0.057	25.6	1	1.5	27.1	0.018	0.5	37.2	14	12	106.9
3	106.9	2,878	4,536	0.6	0.01	27.6	0.057	20.5	1	1.2	21.6	0.018	0.4	29.1	12	11	77.8
4	77.8	2,877	4,536	0.5	0.01	23.9	0.057	17.9	1	1.0	18.9	0.018	0.3	25.2	11	10	52.6
5	52.6	2,876	4,536	0.4	0.01	20.3	0.057	15.3	1	0.9	16.1	0.018	0.3	21.4	10	8	31.2
6	31.2	2,874	4,536	0.3	0.01	13.6	0.057	10.4	1	0.6	10.9	0.018	0.2	14.4	8	6	16.7
7	16.7	2,872	4,536	0.2	0.01	8.2	0.057	6.3	1	0.4	6.7	0.018	0.1	8.7	6	5	8.1
8	8.1	2,871	4,536	0.1	0.01	5.8	0.057	4.6	1	0.3	4.9	0.018	0.1	6.2	5	3	1.9
9	1.9	**2,869**	4,536	0.0	0.01	2.0	0.057	1.8	1	0.1	1.9	0.018	0.0	2.2	3	0	0.0
10	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project - Project Alternative

Phase 3 North Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	83.0	2,845	4,536	0.6	0.01	28.3	0.057	20.4	1	1.2	21.5	0.018	0.4	29.8	13	11	53.2
2	53.2	2,843	4,536	0.4	0.01	20.4	0.057	14.4	1	0.8	15.3	0.018	0.3	21.5	11	9	31.7
3	31.7	2,841	4,536	0.3	0.01	13.6	0.057	9.5	1	0.5	10.1	0.018	0.2	14.3	9	7	17.4
4	17.4	2,839	4,536	0.2	0.01	7.7	0.057	5.5	1	0.3	5.8	0.018	0.1	8.1	7	6	9.2
5	9.2	2,838	4,536	0.1	0.01	5.5	0.057	4.1	1	0.2	4.3	0.018	0.1	5.8	6	4	3.4
6	3.4	2,836	4,536	0.1	0.01	2.5	0.057	2.0	1	0.1	2.1	0.018	0.0	2.7	4	2	0.7
7	0.7	2,834	4,536	0.0	0.01	0.7	0.057	0.6	1	0.0	0.6	0.018	0.0	0.8	2	0	0.0
8	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project - Project Alternative

Phase 3 South Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	193.0	2,881	4,536	1.0	0.01	43.5	0.057	30.8	1	1.8	32.6	0.018	0.6	45.8	16	15	147.2
2	147.2	2,880	4,536	0.9	0.01	39.0	0.057	28.1	1	1.6	29.6	0.018	0.5	41.1	15	13	106.1
3	106.1	2,878	4,536	0.7	0.01	30.6	0.057	22.6	1	1.3	23.8	0.018	0.4	32.3	13	11	73.8
4	73.8	2,876	4,536	0.5	0.01	22.6	0.057	17.2	1	1.0	18.1	0.018	0.3	23.9	11	10	49.9
5	49.9	2,875	4,536	0.4	0.01	18.8	0.057	14.4	1	0.8	15.2	0.018	0.3	19.9	10	8	30.0
6	30.0	2,873	4,536	0.3	0.01	12.3	0.057	9.6	1	0.5	10.1	0.018	0.2	13.0	8	7	17.0
7	17.0	2,872	4,536	0.2	0.01	9.5	0.057	7.6	1	0.4	8.0	0.018	0.1	10.0	7	5	7.0
8	7.0	2,870	4,536	0.1	0.01	4.8	0.057	4.1	1	0.2	4.2	0.018	0.1	5.1	5	3	1.9
9	1.9	**2,868**	4,536	0.0	0.01	1.8	0.057	1.6	1	0.1	1.7	0.018	0.0	1.9	3	0	0.0
10	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project - Project Alternative

Final Phase NP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	54.0	2,861	4,536	0.7	0.01	30.7	0.057	5.2	1	0.3	6.5	0.018	0.1	31.1	17	12	22.9
2	22.9	2,856	4,536	0.3	0.01	14.1	0.057	4.6	1	0.3	5.2	0.018	0.1	14.4	12	8	8.4
3	8.4	2,852	4,536	0.1	0.01	6.2	0.057	2.4	1	0.1	2.7	0.018	0.0	6.4	8	4	2.1
4	2.1	2,848	4,536	0.0	0.01	1.6	0.057	1.0	1	0.1	1.1	0.018	0.0	1.7	4	2	0.4
5	0.4	2,846	4,536	0.0	0.01	0.5	0.057	0.4	1	0.0	0.4	0.018	0.0	0.5	2	0	0.0
6	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
7	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
8	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
9	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
10	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0	#N/A

Emptying Time

Original Project - Project Alternative

Final Phase SP

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	190.0	2,882	4,536	1.0	0.01	43.6	0.057	30.8	1	1.8	32.6	0.018	0.6	45.9	16	14.0	144.1
2	144.1	2,880	4,536	0.8	0.01	35.2	0.057	25.6	1	1.5	27.1	0.018	0.5	37.2	14	12.0	106.9
3	106.9	2,878	4,536	0.6	0.01	27.6	0.057	20.5	1	1.2	21.6	0.018	0.4	29.1	12	11.0	77.8
4	77.8	2,877	4,536	0.5	0.01	23.9	0.057	17.9	1	1.0	18.9	0.018	0.3	25.2	11	10.0	52.6
5	52.6	2,876	4,536	0.4	0.01	20.3	0.057	15.3	1	0.9	16.1	0.018	0.3	21.4	10	8.0	31.2
6	31.2	2,874	4,536	0.3	0.01	13.6	0.057	10.4	1	0.6	10.9	0.018	0.2	14.4	8	6.0	16.7
7	16.7	2,872	4,536	0.2	0.01	8.2	0.057	6.3	1	0.4	6.7	0.018	0.1	8.7	6	5.0	8.1
8	8.1	2,871	4,536	0.1	0.01	5.8	0.057	4.6	1	0.3	4.9	0.018	0.1	6.2	5	3.0	1.9
9	1.9	**2,869**	4,536	0.0	0.01	2.0	0.057	1.8	1	0.1	1.9	0.018	0.0	2.2	3	0.0	0.0
10	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0.0	#N/A
11	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	#N/A	0	0.0	#N/A

APPENDIX 3 ADDENDUM

Drainage Concept Addendum

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2010 DRAINAGE CONCEPT

Drainage Concept for Lebata Inc. Surface Mine,
Lowered Facilities Alternative

Big Rock Creek, Los Angeles County

FINAL

REGISTERED PROFESSIONAL ENGINEER
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Prepared Under the Supervision of:

James F. Reilly 4/4/14
James F. Reilly, P.E., Supervising Engineer

JULY 2010

STETSON
ENGINEERS INC.

STETSON ENGINEERS INC.
San Rafael and West Covina, California
Mesa, Arizona

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Appendix A – Miscellaneous Calculations

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

In December 2008, Stetson Engineers (Stetson) prepared a drainage report, entitled "Drainage Concept for Lebata Inc. Surface Mine"(2008 Report), and 14-sheet Drainage Plans for the proposed Lebata Inc mine site located on the Big Rock Creek alluvial fan near Pearblossom[1]. Since then, the California Department of Transportation (Caltrans) has completed improvements to Pearblossom Highway which crosses the Big Rock alluvial fan in an east-west direction about 1.5 mile upstream from the Lebata mine site (Refer to Figure 1 for the Project site location).

Recently, a new mining alternative, referred to as the Lowered Facilities Alternative, was proposed. The purpose of this drainage concept report (2010 Report) is to describe and analyze the drainage concept for this new mining alternative. This drainage concept accounts for the effects that Caltrans' recently-completed improvements in 2009 to Pearblossom Highway would have on flood flows reaching the mine site. In general, the technical terms and methods used in this 2010 Report are the same as the 2008 Report. Detailed information about the technical terms and methods would need to refer to the 2008 Report.

The drainage concepts provided in the 2008 Report for the original project alternatives (Project Alternative and Alternative 1) did not consider the effects that Caltrans' recently-completed improvements to Pearblossom Highway would have on flood flows reaching the mine site. However, since the improvements to Pearblossom Highway would intercept and reduce the amount of Capital Flood flow entering the site (will be discussed later), the carrying capacity of the designed drainage facilities and the estimated pit emptying time for the original project and alternative discussed in the 2008 Report are considered to be conservative. Accordingly, the drainage concept analyses and designs for the original project alternatives provided in the 2008

[1] Examination of the Federal Emergency Management Agency (FEMA)'s effective Flood Insurance Rate Map (FIRM) shows that a portion of the proposed mine site is within the FEMA's Flood Zone A (Figure 2) mapped by approximate methods. Examination of the Floodplain Management Paths (FMPs) outlined in the Antelope Valley Comprehensive Plan for Flood Control and Water Conservation shows that the proposed mine site is not within the FMP limits. The FMP is analogous to the FEMA floodway, within which encroachment activities including fill, new construction, substantial improvements, and other development, are prohibited unless it has been demonstrated through hydrologic and hydraulic analyses that the proposed encroachment would not result in any increase in base flood water levels.

Report were not updated to account for the effects of the Pearblossom Highway improvements on flood flows reaching the mine site.

1.2 LOWERED FACILITIES ALTERNATIVE ANALYZED IN THIS REPORT

There are a total of three mining alternatives for the proposed mine site. The two original alternatives, Project Alternative and Alternative 1, are covered in the 2008 Report. The newly proposed alternative, referred to as the Lowered Facilities Alternative, is as follows:

Lowered Facilities Alternative conforms to LA County's proposed 750-foot radius alignment of the extension of Longview Road. The site would be mined to a depth of 80 feet below ground surface, with the upper 65 feet cut sloped at 1H:1V and the last 15 feet cut sloped at 2H:1V (Fugro, 2010). The upper 65 feet of cut slope would be back filled using spoil materials and the lower 15 feet of cut slope would remain as native materials. Leaving the lower 15 feet of cut slope as native materials would facilitate the pit emptying during the Capital Flood because the native materials have a much higher permeability than the spoil materials. The required 15 feet height of native materials along the mine slope is determined based on the estimated inundation depth for the Capital Flood (to be discussed later). Terraces would be established at 30-foot depth intervals on the final 2H: 1V fill slope with the side slope between terraces at about 1.85H:1V (Bryant, August 22, 2008).

The mine would be developed in four phases (refer to the attached Drainage Plans):

- Pre-production Phase is a temporary phase which would involve mining of the plant area to a depth of 25 feet, grading a notch through the roadway alignment and a small portion of the pit bottom immediately south of the notch to a depth of 80 feet, and grading the rail facility bench to a depth of 25 feet. Details of mining area and setback are shown on Drainage Plan Sheet 1 (Grading). The pre-production phase is a temporary phase which involves only mining of a relatively small area for a short period of time. For this reason, drainage facilities to intercept Capital Flood are not included in this drainage concept report.
- Phase 1 would involve mining of the remaining acreage south of the roadway alignment and north of the rail facility bench area of the North Pit to a depth of 80 feet. The plant area and the railway facility bench area would remain at a depth of 25 feet and 25 feet, respectively. Details of mining area and setback are shown in Drainage Plan Sheet 2.

- Phase 2 would involve mining of the entire South Pit to a depth of 80 feet. Details of mining area and setback are shown in Drainage Plan Sheet 3.
- Final Reclamation would involve filling the notch in the roadway alignment and east side of roadway alignment in the North Pit to restore the 750-foot road prism and requisite setbacks. The details of mining area and setback are shown in Drainage Plan Sheets 4-5.

1.3 SUMMARY OF THE DRAINAGE CONCEPT

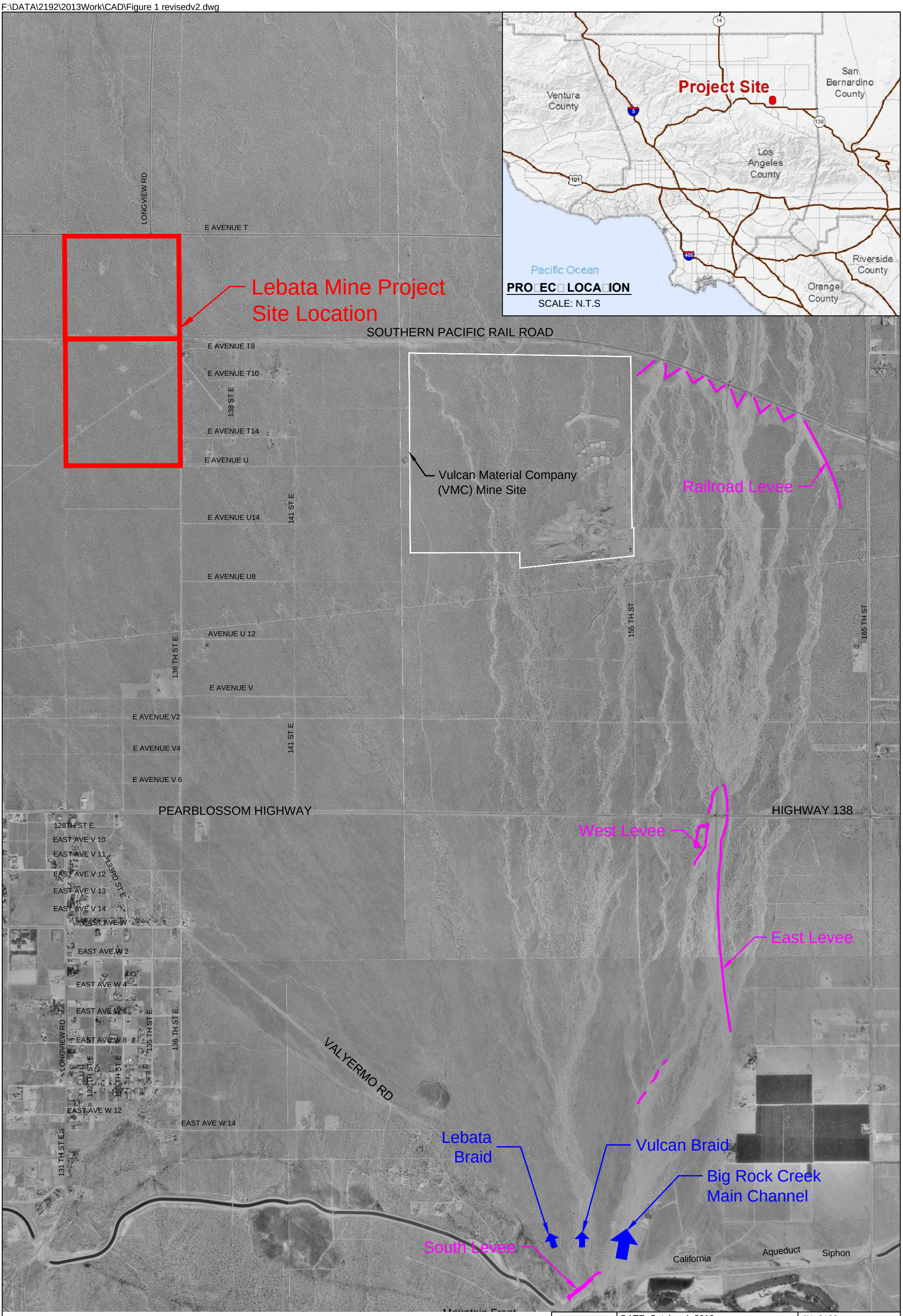
The drainage system is designed in accordance with the LA County's Grading Guidelines, dated January 2008. The completed mine pits would intercept the entire Capital Flood discharge via a system of interceptor drains and convey the water to the bottom of the pits via a system of down drains and terrace drains. Interceptor drains would be located along the top of the mine pits to collect Capital Flood overflows[2] and local sheetflows and deliver these flows to down drains, which convey flows down the 2H:1V side slopes to the bottom of the mine pit. Terrace drains would be constructed on the pit slopes to capture runoff generated by the pit slopes and prevent slope surface erosion. The following is a summary of hydrologic and hydraulic design considerations:

- All on-site runoff and off-site runoff that enters the project site during the Capital Flood event are collected and conveyed to the mining pits for infiltration without any overflow to downstream of the mine site. The mining pits could be emptied via infiltration within 4 days after the Capital Flood event. The project would have no adverse impact on properties adjacent to and downstream of the mine site.
- To prevent sedimentation, the 2008 LA County Grading Guidelines require that the slope of interceptor drains be not less than 2 percent (%). In cases where this ≥2% slope requirement can not be practically met due to the natural slope of the mine site, analysis was conducted to verify that these interceptor drains have sufficient flow velocities to prevent sedimentation.
- Interceptor drains were designed to have a 1-foot standard minimum depth and a minimum width of 3 feet at the inlet with 1.5H:1V side slopes, in accordance with the 2008 LA County Grading Guidelines.

[2] Capital Flood overflow is the worse case overflow from the Big Rock Creek main channel near the mountain front cross section that flows onto the mine site via the relict "apex braid" in the event of complete failure of the flood control levee near the mountain front.

- All down drains were designed in accordance with the minimum dimensions (1.5 foot depth and 3 foot width) provided in the 2008 Los Angeles County Grading Guidelines. Energy dissipators at the base of all down drains were designed for erosion protection.
- 8-foot wide drainage terraces would be constructed on the pit slopes at 30-foot vertical depth intervals to prevent surface erosion and all terraces drains are required to have a minimum slope of 5 percent and a minimum depth of 1 foot, in accordance with the 2008 LA County Grading Guidelines. The terrace drains would be lined with crushed rock in consideration of the availability of these materials on site. The crushed rock was found to be stable enough to deliver the runoff flows generated by the pit slope surface.
- Minimum two-foot-high MSHA-required safety berms would be installed along the tops of the mine pit slopes around the entire northern, eastern, southern, and western edges and pit entrance/exit ramps to prevent the temporary inundated water from creating a public safety hazard.
- Stormwater runoff in the plant processing facility area during the mining would be collected and conveyed to a temporary mining pit for infiltration, no polluted stormwater will be discharged to off-site.

F:\DATA\2192\2013Work\CAD\Figure 1 revisedv2.dwg



STETSON ENGINEERS INC.

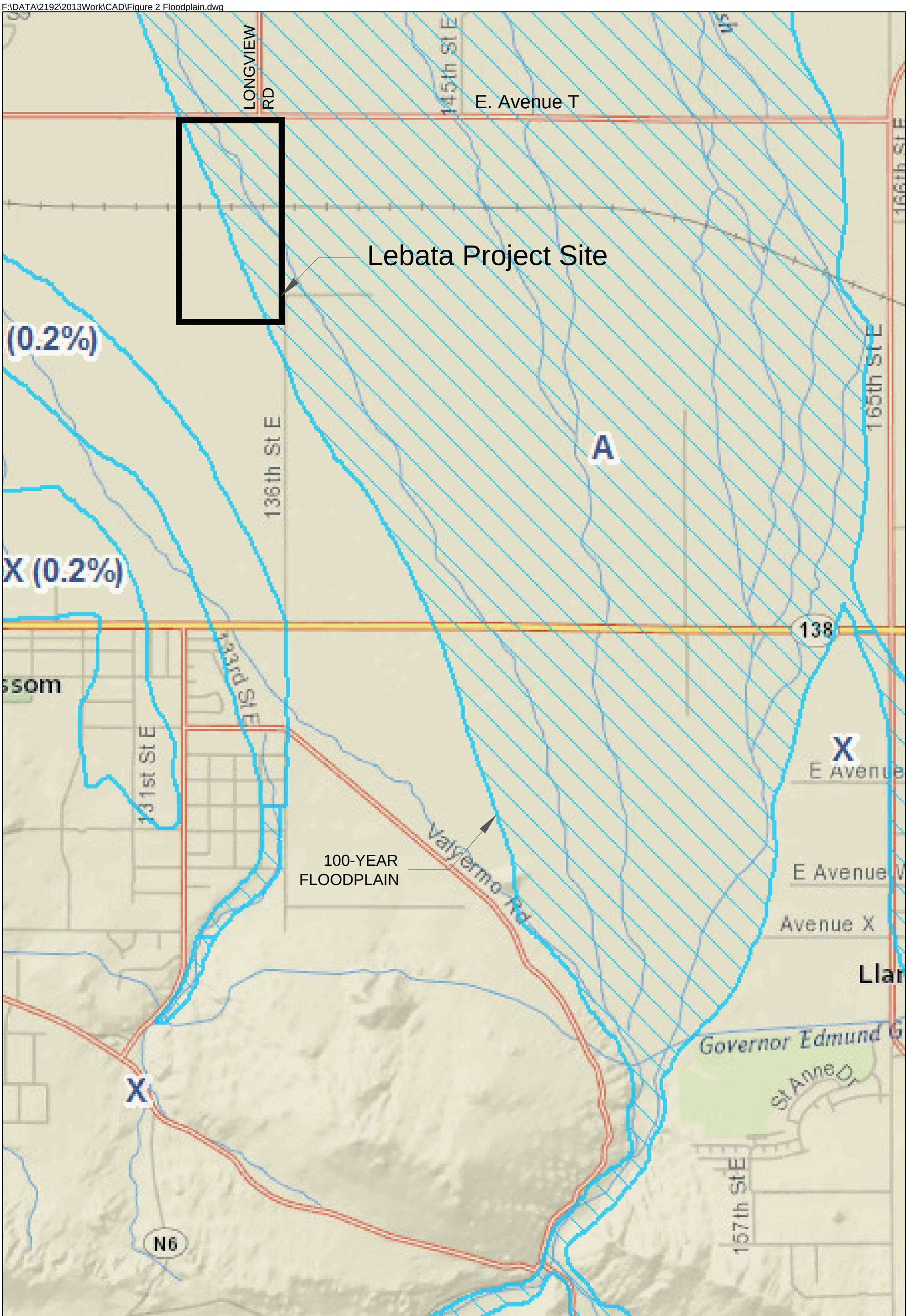
DATE: October 4, 2013

JN: 2192

BIG ROCK WASH ALLUVIAL FAN AND PROJECT SITE LOCATION

FIGURE 1

F:\DATA\2192\2013Work\CAD\Figure 2 Floodplain.dwg



LEGEND

100-YEAR FLOODPLAIN

500-YEAR FLOODPLAIN

NOTE: PROJECT SITE IS NOT WITHIN COUNTY ADOPTED FLOODWAY

SOURCE: FLOODPLAIN MAP OBTAINED FROM THE LOS ANGELES COUNTY WEBSITE: HTTP://DPW.LACOUNTY.GOV/WMD/FLOODZONE/

N W E S

SCALE N.T.S.

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PROJECT LOCATION AND FEMA 100-YEAR FLOODPLAIN MAP

FIGURE

2.0 ANALYSIS OF THE EFFECTS OF PEARBLOSSOM HIGHWAY IMPROVEMENTS ON CAPITAL FLOOD FLOWS REACHING THE MINE SITE

2.1 PEARBLOSSOM HIGHWAY IMPROVEMENTS OVERVIEW

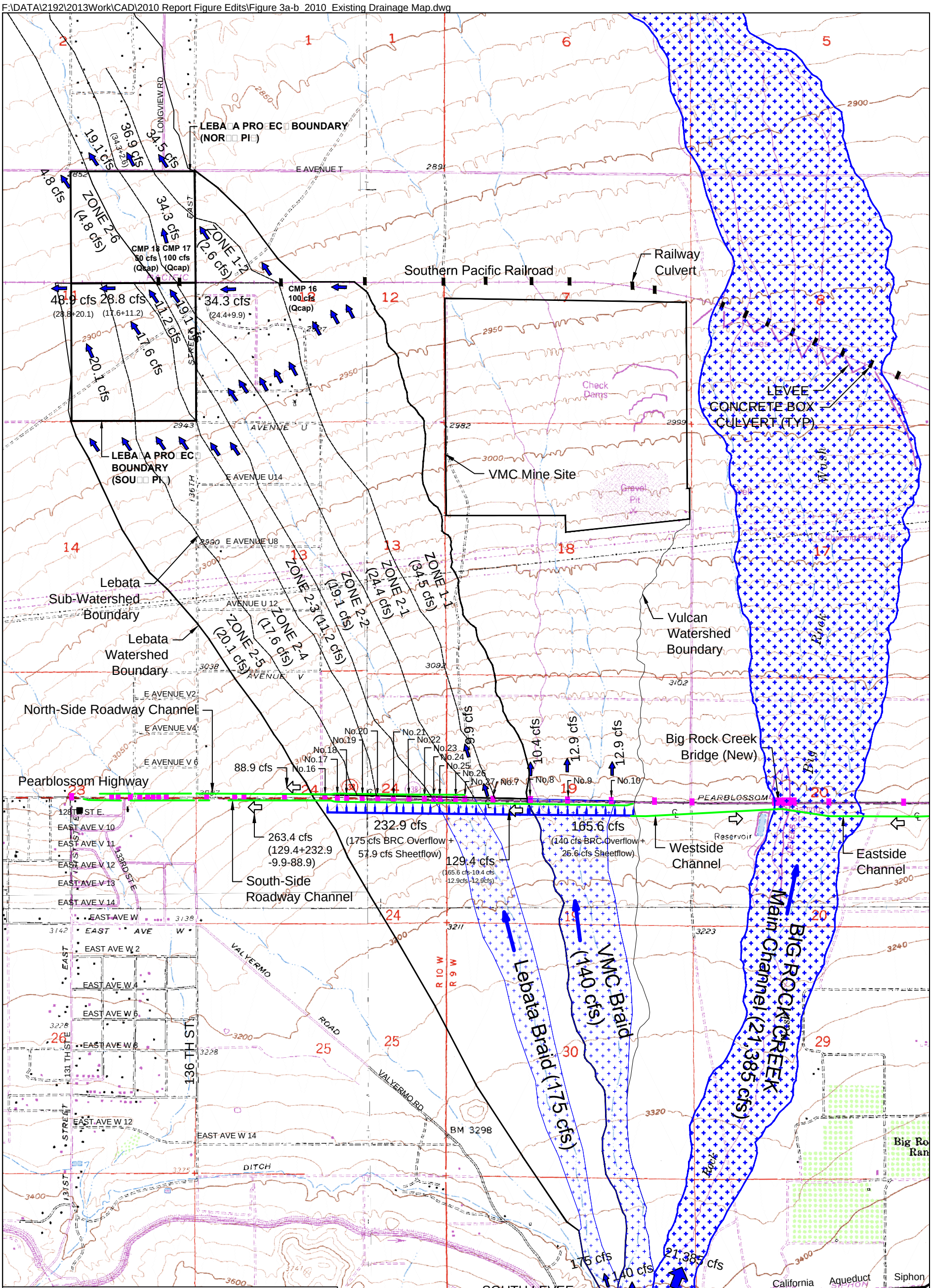
Pearblossom Highway crosses the Big Rock Creek alluvial fan in an east-west direction about 1.5 miles south of the Lebata mine site. An adjacent Vulcan Material Materials Company (VMC) mine, approximately 0.5 mile east of the Lebata mine site, is also located north of the Pearblossom Highway on the Big Rock Creek alluvial fan (Figure 1).

Caltrans recently completed improvements to Pearblossom Highway consisting of construction of a new bridge over Big Rock Creek, raising of the grade of the highway, and associated drainage improvements. In order to account for the effects of these improvements on flood flows reaching the mine site, Stetson contacted Caltrans and obtained the as-built design plans of the improvements.

Figure 3 shows existing drainage flow patterns. Figures 4 and 5 show the drainage improvements on Pearblossom Highway and the estimated amount of flows that would pass through these drainage facilities during Phase 1 and Phase 2/Final Reclamation Phase, respectively. As shown in the figures, the Pearblossom Highway drainage improvements include roadside channels on both the north and south sides of the highway, and multiple culverts beneath the highway.

The south-side roadway channel of Pearblossom Highway begins near the eastern boundary of VMC's contributing watershed, and would intercept flows from south side of the highway. A portion of the flows intercepted by the south-side channel would continue to flow down along the channel. The other portion of the flows would pass through the culverts and discharge into either the Lebata or VMC mine sites or be conveyed into the north-side roadway channel which begins near culvert # 27, approximately 0.25 miles west of eastern boundary of the Lebata watershed.

F:\DATA\2192\2013Work\CAD\2010 Report Figure Edits\Figure 3a-b_2010_Existing Drainage Map.dwg



Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
2-1	271	24.4
2-2	212	19.1
2-3	124	11.2
2-4	195	17.6
2-5	223	20.1
2-6	53	4.8
Total	1,489	134.4

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

N W E S

SCALE (Feet) 0 1000 2000

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DATE: October 4, 2013 | JN: 2192

Lowered Facilities Alternative

Subwatershed Delineation Based on USGS Topography and Existing Offsite and Onsite Drainage

FIGURE 3a

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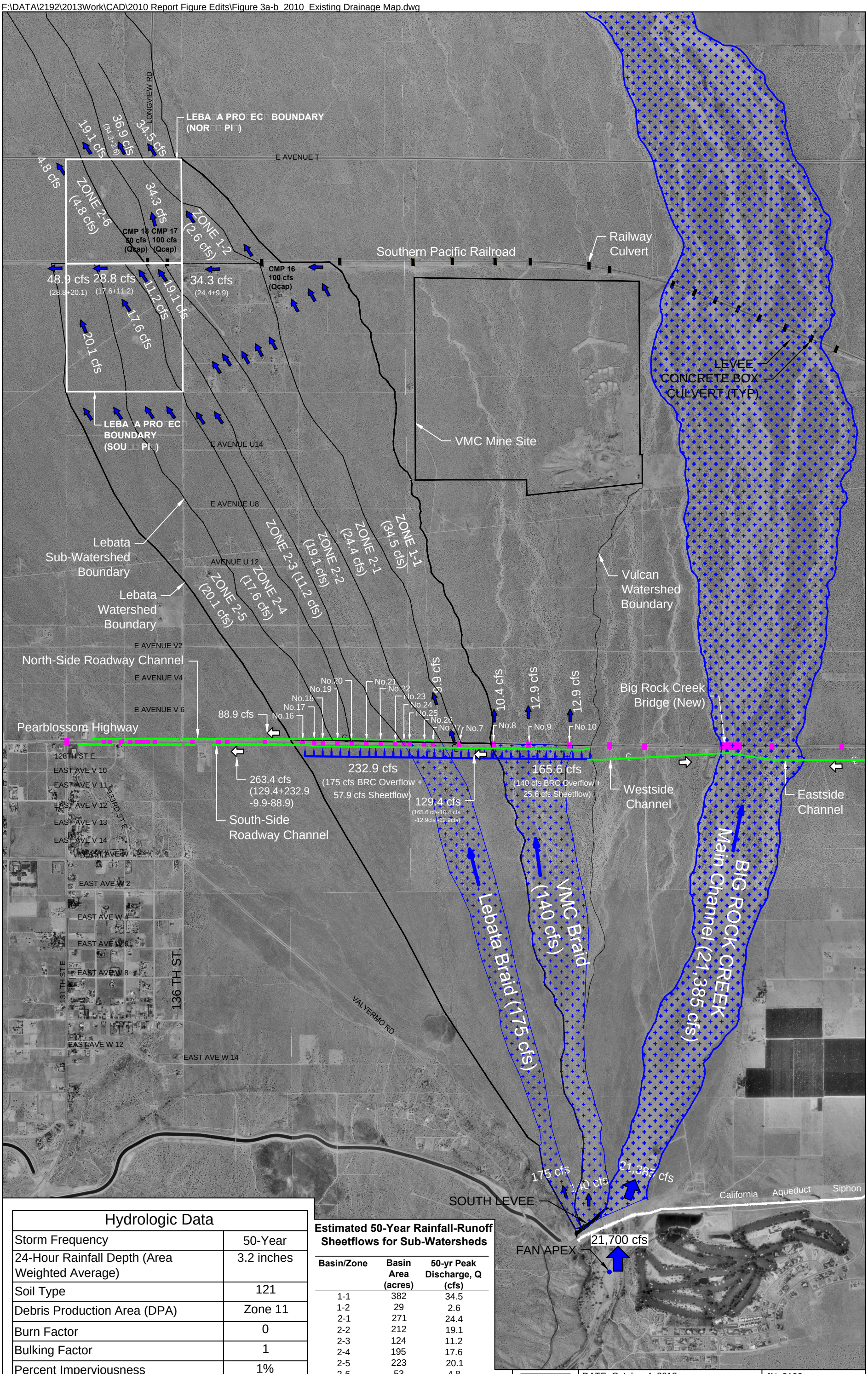

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
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Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

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2-5	223	20.1
2-6	53	4.8
Total	1,489	134.4

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

N W E S

SCALE (Feet) 0 1000 2000

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Lowered Facilities Alternative

Existing Offsite and Onsite Drainage

(Same as Figure 3a Except Different Background Map)

FIGURE 3b

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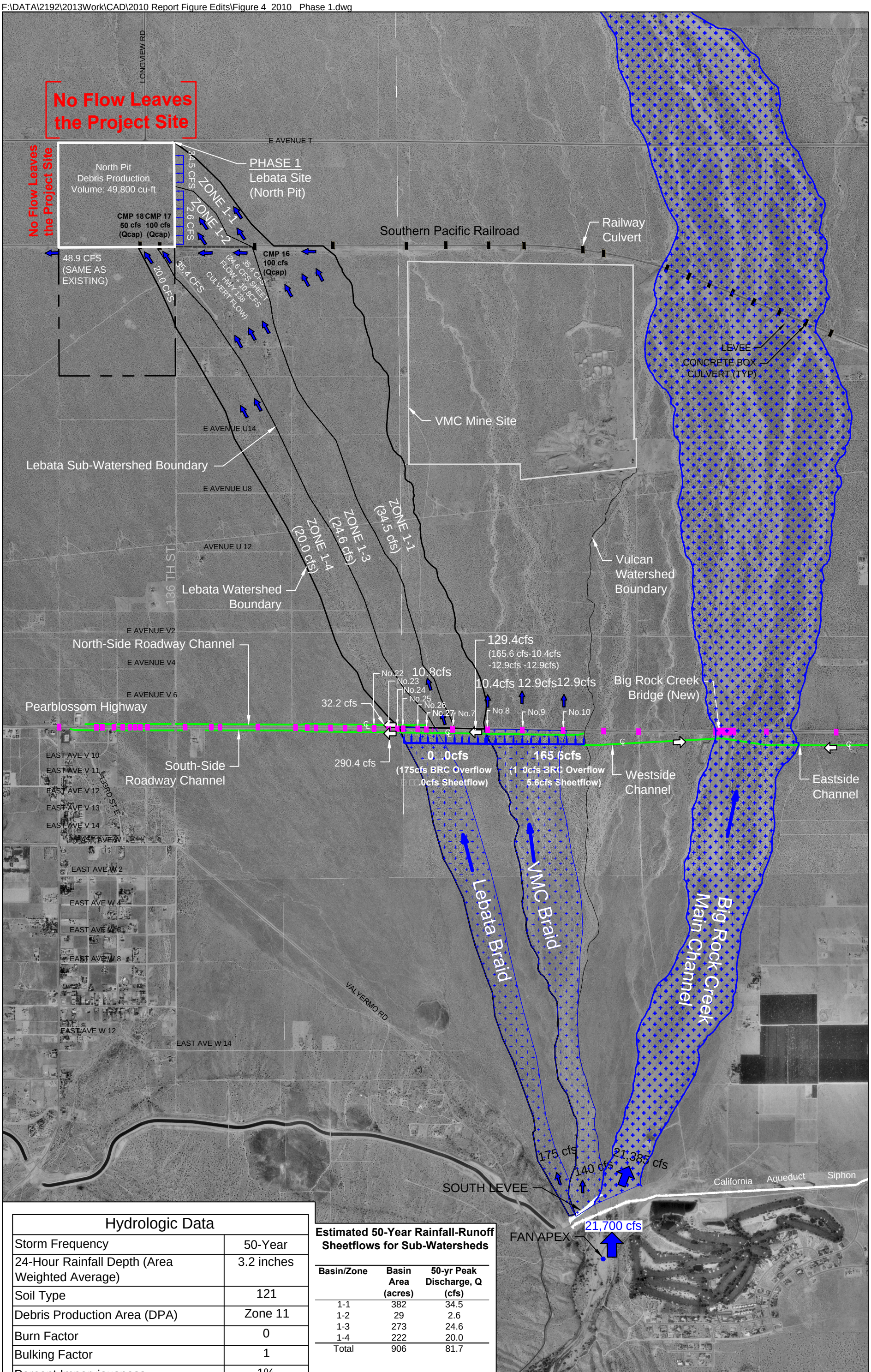

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
1-3	273	24.6
1-4	222	20.0
Total	906	81.7

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

N W E S

SCALE (Feet) 0 1000 2000

STETSON ENGINEERS INC.

DATE: October 4, 2013 | JN: 2192

Lowered Facilities Alternative

PHASE 1

Existing Offsite and Proposed Onsite Drainage

FIGURE

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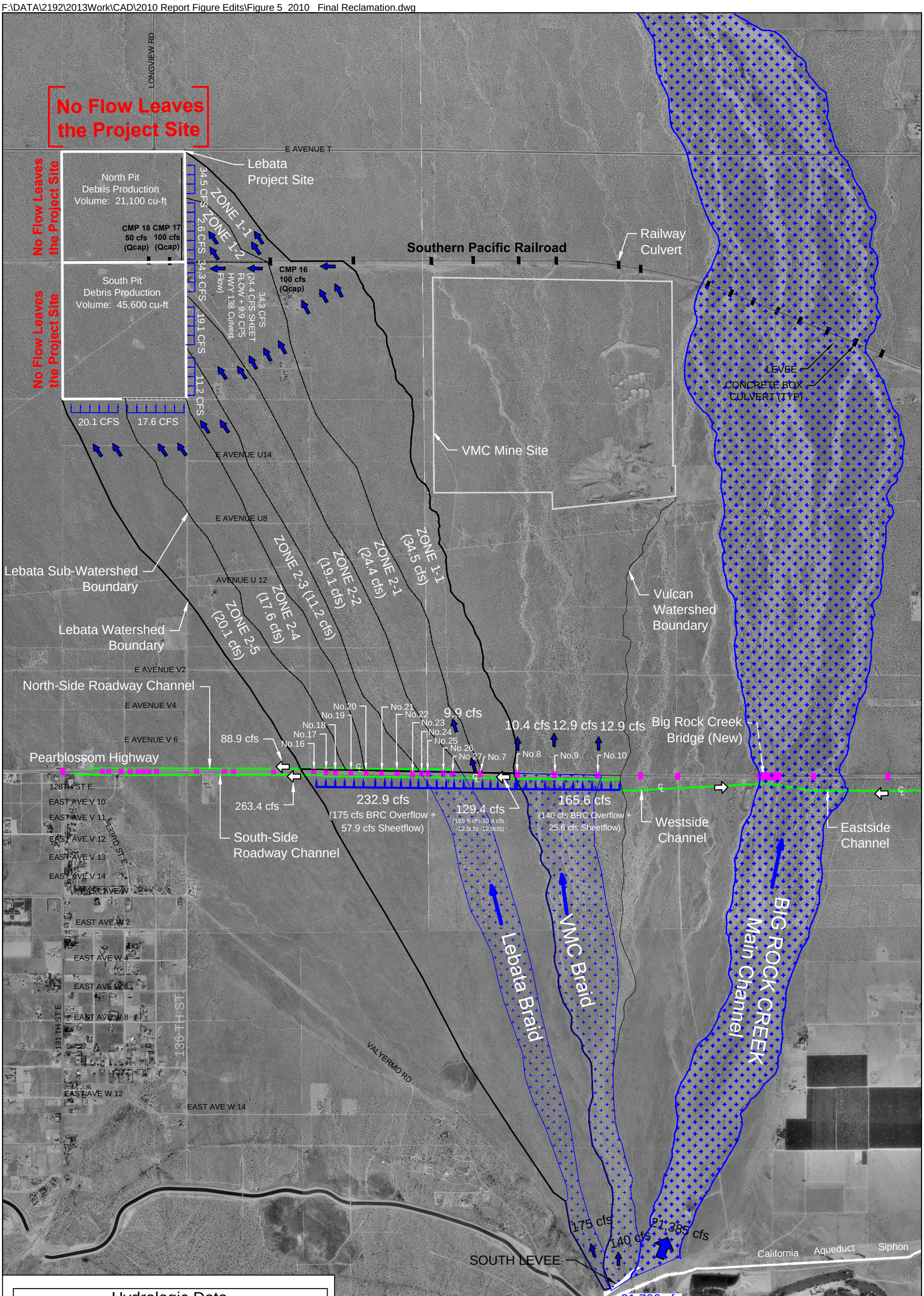


Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
2-1	271	24.4
2-2	212	19.1
2-3	124	11.2
2-4	195	17.6
2-5	223	20.1
Total	1,436	129.6

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

N W E S

SCALE (Feet) 0 1000 2000

STETSON ENGINEERS INC.

DATE: October 4, 2013 | JN: 2192

Lowered Facilities Alternative

Final Reclamation Existing Offsite and Proposed Onsite Drainage

FIGURE 5

2.2 PEARBLOSSOM HIGHWAY DRAINAGE FACILITIES DETAILS

Details of the Pearblossom Highway drainage improvements are summarized in Table 1. The two roadside channels are constructed as trapezoidal earthen channels with flow direction from east to west. There are thirteen culverts located in the Lebata watershed. Twelve of them (Nos. 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27) would convey the portion of intercepted flows from the south-side channel onto the north-side channel, and one (No. 7) would directly discharge to the Lebata mine site. Three others (Nos. 8, 9, 10) located in the Vulcan watershed would discharge a portion of the intercepted flows to the VMC mine site. All culverts are circular reinforced concrete pipes (RCP). In general, as long as the combined hydraulic capacity of the south-side channel and the north-side channel that are connected by the 12 culverts is greater than the total inflow coming from the south side of Pearblossom Highway, only the flow passing culvert No.7 could reach the Lebata mine site.

TABLE 1: DIMENSIONS AND CAPACITIES OF PEARBLOSSOM HIGHWAY DRAINAGE IMPROVEMENTS

Drainage Facility	Dimensions*	Capacity
Earthen Channel (South) (Trapezoidal)	Bottom width: 12 ft Side slope: 6H:1V Channel depth: 2.9 ft Bottom slope: 0.009	580 cfs
Earthen Channel (North) (Trapezoidal)	Bottom width: 12 ft Side slope: 6H:1V Channel depth: 2.4 ft Bottom slope: 0.009	390 cfs
Culverts Nos. 8, 16,17, 18 ,19, 20, 21, 22, 23,24, 25, 26, 27 (Circular)	3-ft diameter	40 cfs
Culverts No. 7, 9, 10 (Circular)	4-ft diameter	70 cfs

* Data source: As-built design plans of the Pearblossom Highway drainage improvements obtained from Caltrans.

2.3 HYDROLOGY ANALYSIS

To analyze the effects of the Pearblossom Highway drainage facilities on flood flows reaching the mine site, the flows intercepted by the south-side roadway channel in both Lebata watershed and Vulcan watershed need to be considered. Some of the intercepted flows from the Vulcan watershed would pass downstream along the channel. These flows are considered as inflows to the downstream part of the roadside channel that intercepts flows from the Lebata watershed, and are referred to as "roadside channel inflows."

The flows intercepted by the south-side roadway channel include the 50-year rainfall-generated local overland sheetflow produced by the drainage area of the Lebata site, from the apex of the alluvial fan at the mountain front to Pearblossom Highway , combined with the Capital Flood overflow from the Big Rock Creek which, in the event of failure of the flood control levee near the mountain front, could potentially escape from the main channel near the mountain front via the relict "Lebata Braid" [Note: The flood control levee near the mountain front was constructed from non-engineered fill]. The overflow from the Big Rock Creek main channel into the Lebata Braid is referred to as "Lebata Braid flow."

The roadside channel inflow is a portion of the flows intercepted from the 281-acre Vulcan watershed south of Pearblossom Highway. This flow would pass downstream along the channel, and is considered as inflow to the downstream part of the roadside channel that intercepts flows from the Lebata watershed. The flows intercepted from the Vulcan watershed south of Pearblossom Highway include the 50-year rainfall-runoff generated local overland sheetflow produced by the drainage area of the VMC site from the apex of the alluvial fan at the mountain front to Pearblossom Highway, combined with the Capital Flood overflow from the Big Rock Creek via the relict "VMC Braid" in the event of failure of the flood control levee near the mountain front. The overflow from the Big Rock Creek main channel into the VMC Braid is referred to as "VMC Braid flow."

The 2008 Report estimated that the Lebata Braid and Vulcan Braid flows are 175 cfs and 140 cfs, respectively.

To calculate the 50-year rainfall-generated sheetflow, the Los Angeles County Department Public Works (LACDPW) "Tc calculator" program was used. Using the Tc-calculator, the 2008 Report estimated the peak runoff rate to be 3.61 cfs (unburned and unbulked)[3] per 40-acre unit sub-area for the Lebata mine. The Big Rock alluvial fan is a relatively homogeneous area with soil type of 121 and a land surface slope of about 1.8 %. Using the same input parameter as Lebata watershed but a slightly higher weighted average of 50-year precipitation of 3.26 inches per 24 hours (3.2 inches per 24 hours for Lebata) inputted to Tc calculator, the peak flow rate for the VMC mine was found to be 3.7 cfs per 40-acre unit sub-area. The LA County's rainfall isohyte map for the alluvial fan shows higher precipitation in the south than the north. The reason that the Vulcan watershed has a little higher weighted average of 50-year precipitation than the Lebata watershed is because the Vulcan mine site is located more to the south which has higher rainfall as compared to the north.

Multiplying the peak runoff rate of 3.61 cfs per 40-acre unit sub-area by the ratio between the total local watershed area and the 40-acre unit sub-area, the amounts of sheetflow reaching Pearblossom Highway generated by the Lebata watershed from the mountain front to Pearblossom Highway during Phase 1 and Phase 2/ Final Reclamation are summarized in Table 2. Note that the upstream drainage area for Phase 1 is different from the other mining phases, since Phase 1 involves only the North Pit. Similarly, the sheetflow generated by the VMC watershed (277 acres) from the mountain front to Pearblossom Highway was estimated to be 25.6 cfs. Since there are no distinct conveyance channels and no distinct flow collection points in the alluvial fan, hydrologic routing or any potential attenuation effects are not considered in this calculation and, hence, the peak flow estimate is considered conservative.

[3] The alluvial fan below the mountain front has little vegetation and there is no need to include a burn factor in the peak flow estimate. The alluvial fan below the mountain front is in the Antelope Valley Debris Production Area Zone 11 (DPA-11) with a bulking factor of about 1.02 (Source: LA County 2006 Sedimentation Manual, Appendix B). Since the bulking factor is close to 1.0, there would be little difference between bulked flow and unbulked flow.

TABLE 2: SUMMARY OF CAPITAL FLOOD FLOWS REACHING PEARBLOSSOM HIGHWAY

Mining Phase	Drainage Area (acres)	Lebata Braid Flow (cfs)	Sheetflow from the Mountain Front to Pearblossom Highway(cfs)	Total Capital Flood Flow Intercepted by the South-side Channel (cfs)
Phase 1	322	175	29.0	204.0
Phase 2 and Final Reclamation	642	175	57.9	232.9

Note: Drainage areas were delineated based on the topography shown on the USGS Quad map.

2.4 HYDRAULIC ANALYSIS

The flow passing beneath the highway onto the north-side channel is related to the hydraulics of the south-side channel and the culverts. The hydraulics of the south-side channel was analyzed using Manning's Equation:

$$Q = A \cdot \frac{1.49}{n} \cdot R^{\frac{2}{3}} \cdot \sqrt{S} \qquad (1)$$

Where

Q = discharge in the channel (cfs)

A = flow area, which is a function of water depth (h in Figure 6) in the channel.

n = Manning's "n" or roughness coefficient. 0.03 was used in the analysis.

R = hydraulic radius, which is a function of water depth in the channel.

S = channel slope.

The culvert flow would be Type 2 culvert flow (Lindeburg, 2001). The following simplified equation that governs hydraulics through a Type 2 culvert flow (i.e., partially full, outlet controlled, critical depth at outlet) was used to calculate the culvert flow (see Figure 6):

$$Q = C_d \cdot A_c \cdot \sqrt{2g \cdot (h - d_c)} \qquad (2)$$

Where

Q = discharge through the culvert (cfs)

C_d = discharge coefficient (0.62)

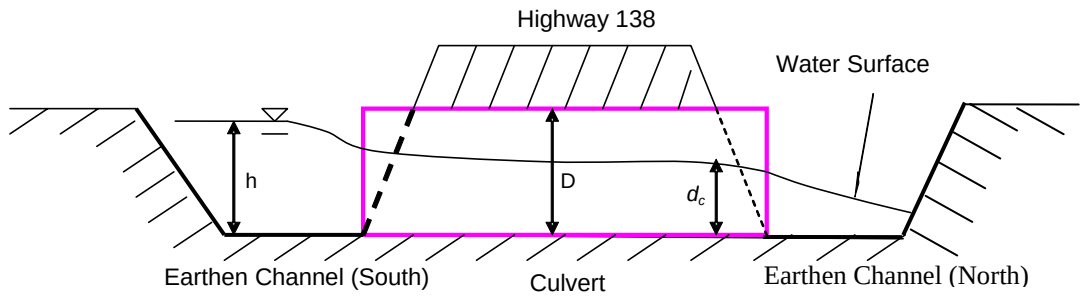
A_c = flow area at the critical section (ft^2). It is not the area of the culvert.

g = acceleration due to gravity (32.2 ft/sec^2)

h = water depth at the upstream of the culvert, which needs to be solved.

d_c = critical depth, which is a function of culvert size and discharge rate.

Figure 6 Sketch of Earthen Channel Cross Section and Type 2 Culvert Flow



The roadside channel inflow (i.e. an amount of flow that would remain in the south-side channel intercepted from the Vulcan watershed and would pass downstream along the channel to the Lebata watershed) was first analyzed. For a given Capital Flood flow of 165.6 cfs (25.6 cfs VMC sheetflow + 140 cfs Vulcan Braid flow) reaching the south side of Pearblossom Highway, applying equation (1) to the earthen channel (south) and equation (2) to the culverts, the water depth (h) at the upstream of the culverts (i.e. water depth in the earthen channel) and the flow distributions can be solved. About 129.4 cfs from the VMC watershed would remain in the earthen channel and pass downstream along the channel to the Lebata watershed.

Combining the roadside channel inflow of 129.4 cfs and the total Capital Flood flow of 204.0 cfs intercepted from the Lebata watershed by the south-side channel, the flows passing through the Pearblossom Highway drainage facilities estimated using the previously-described analysis method are summarized in Table 3 and Figures 4 and 5.

TABLE 3: CAPITAL FLOOD FLOWS OF PEARBLOSSOM HIGHWAY DRAINAGE IMPROVEMENTS WITHIN THE LEBATA WATERSHED

Flow Description	50-Year Capital Flow	
	Phase 1	**Phase 2/ Final Reclamation**
Total flow (intercepted flow from Lebata Braid Watershed plus roadside channel inflow from VMC Braid Watershed (129.4 cfs); see Figures 4 and 5)	333.4 cfs (204.0+129.4)	362.3 cfs (232.9+129.4)
Contained in the south-side channel	290.4 cfs	263.5 cfs
To north-side channel conveyed from 3-foot diameter culverts (Nos. 16,17, 18,19, 20, 21, 22, 23,24, 25, 26, 27)	32.2 cfs[1]	88.9 cfs[2]
To Lebata mine from a 4-foot diameter culvert (No.7)	10.8 cfs	9.9 cfs

Notes: [1] A total amount of flow that would pass through the four culverts (Nos 24, 25, 26, 27) with an individual flow rate of 8.06 cfs during Phase 1.
[2] A total amount of flow that would pass all twelve culverts with an individual flow rate of 7.01 cfs during Phase 2 and Final Reclamation Phase.

As shown in Table 3, about 9.9 cfs and 10.8 cfs of intercepted flows would discharge through Culvert No. 7 and these flows as sheetflow onto the mine site during Phase 1 and Phase2/Final Reclamation, respectively. And about 32.2 cfs and 88.9 cfs would pass to the north-side channel under Phase 1 and Phase2/Final Reclamation, respectively. Note that the estimated flow from a single culvert in Phase 2/ Final Reclamation is less than the flow from the same culvert in Phase 1. This is because more culverts are involved in Phase 2/Final Reclamation. However, the sum of the individual flows for all culverts in Phase 2/Reclamation is greater than that in Phase 1.

Comparison of the intercepted flows and the carrying capacities of the roadside channels shown in Table 4 indicates that the intercepted flows are less than the carrying capacity of the south-side channel, and the flows conveyed to the north-side channel are also less than its carrying capacity. Therefore, all intercepted flows would be contained in the channels without overtopping the channel banks. Only the flows passing culvert No.7 could reach the Lebata mine site.

TABLE 4: COMPARISON OF ROADSIDE CHANNEL CAPACITIES AND THE INTERCEPTED FLOWS

Roadside Channel	Capacity (cfs)	Capital Flood Flows Intercepted and Conveyed by the Roadside Channels (cfs)	
		Phase 1	Phase 2/ Final Reclamation
Earthen Channel (South) (Trapezoidal)	580	290.4	263.5
Earthen Channel (North) (Trapezoidal)	390	32.2	88.9

3.0 PROPOSED DRAINAGE CONCEPT FOR THE LOWERED FACILITIES ALTERNATIVE

3.1 OVERVIEW

The drainage concept for handling flows into the proposed mine site for the Lowered Facilities Alternative is similar to the concept described in the 2008 Report. With the reduction in the amount of Capital Flood flow entering the site due to the Pearblossom Highway improvements, the sizes and locations of the on-site drainage facilities would be slightly different for this alternative. Refer to Drainage Plan Sheets 1 through 5 for layout of drainage structures for the different mining phases. Figures 4 and 5 show the drainage flow patterns under proposed conditions of Phase 1 and Phase 2/Final Reclamation Phase, respectively.

The drainage system is designed in accordance with the LA County's Grading Guidelines, dated January 2008. The drainage facilities would incorporate a system of interceptor drains, which would be located along the top of the pits to collect and deliver sheetflows and deliver these flows to down drains, which convey flows down the 2H:1V side slopes to the bottom of the mine pit. The locations of down drains are at the downstream point of the sub-watersheds. Additional down drains are provided along the drainage terrace to capture runoff generated by the pit slopes and prevent soil erosion.

3.2 HYDROLOGIC DESIGN CONSIDERATIONS

As discussed in Section 2.0, the sheetflow from the mountain front to Pearblossom Highway and the Lebata Braid flow would be captured by the new drainage facilities on Pearblossom Highway. Only about 10.8 cfs and 9.9 cfs would flow through Culvert No. 7 onto the mine site as sheetflow during Phase 1 and Phase2/Final Reclamation Phase, respectively.

For drainage design purpose, the watershed from the northern border of Pearblossom Highway to the mine site was further divided into small sub-watersheds (See Figures 1 and 2). Using the Tc calculator, overland sheetflows contributed by these sub-watersheds are summarized in Tables 5 and 6.

TABLE 5: ESTIMATED 50 -YEAR RAINFALL-RUNOFF SHEETFLOWS FOR SUB-WATERSHEDS FROM THE NORTHERN BORDER OF PEARBLOSSOM HIGHWAY TO THE SITE BOUNDARY DURING PHASE 1

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
1-3	273	24.6
1-4	222	20.0
Total	906	81.7

Note: Drainage areas were delineated based on the topography shown on the USGS Quad map.

TABLE 6: ESTIMATED 50-YEAR RAINFALL-RUNOFF SHEETFLOWS FOR SUB-WATERSHEDS FROM THE NORTHERN BORDER OF PEARBLOSSOM HIGHWAY TO THE SITE BOUNDARY DURING PHASES 2 AND FINAL RECLAMATION

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
2-1	271	24.4
2-2	212	19.1
2-3	124	11.2
2-4	195	17.6
2-5	223	20.1
Total	1,436	129.6

Note: Drainage areas were delineated based on the topography shown on the USGS Quad map.

The flows tabulated in Tables 5 and 6 were used in the design and sizing of drainage facilities on the site. Note that Zone 1-1 is separated by the railway embankment. Runoff from the south-side of the railway would flow through an existing railroad culvert CMP 16 (100 cfs Capacity) to the North Pit. Similarly, during Phase 1 sheetflows from Zones 1-2 and 1-4 would pass through the existing culverts CMP 17 (100 cfs capacity) and CMP 18 (50 cfs capacity) into the North Pit via down drains.

3.3 HYDRAULIC DESIGN CONSIDERATIONS

3.3.1 Interceptor Drains

In accordance with the Grading Guidelines, interceptor drains were designed to have a 1-foot standard minimum depth and a minimum width of 3 feet at the inlet with 1.5H:1V side slopes. Water depth and velocity of the design interceptor drains was computed using Manning's Equation and the Continuity Equation (Refer to the 2008 Report). Table 7 summarizes the interceptor design hydraulics.

TABLE 7: INTERCEPTOR-DRAIN DESIGN AND HYDRAULICS

Interceptor	Capital Flow (cfs)	Design Flow Slope%	Natural Slope %	Velocity (fps)	Water Depth (ft)	Cut Depth at Outlet (ft)	Freeboard at Outlet (ft)
Zone 1-1	34.5	1.5	1.33	10.4	1.5	2.4	0.9
Zone 1-2	2.6	1.5	1.33	5.4	0.6	3.2	2.7
Zone 2-1	34.3[a]	2.0	1.73	11.5	1.4	2.7	1.3
Zone 2-2	19.1	2.0	1.73	9.9	1.1	1.3	0.2
Zone 2-3	11.2	2.0	1.73	8.7	0.9	3.7	2.8
Zone 2-4	17.6	1.0	0.75	7.5	1.3	4.0	2.8
Zone 2-5	20.1	1.0	0.75	7.8	1.3	3.9	2.6

Note: [a] Includes culvert flow (9.9 cfs) from Pearblossom Highway culvert No. 7 during Phase 2/Final Reclamation and the sheetflow (24.4 cfs) generated by Zone 2-1, totaling 34.3 cfs.

The 2008 LA County Grading Guidelines require the flow path slope of interceptor drains not to be less than 2 percent (%). Due to the natural slope of the project area, meeting 2 percent slope will require more than 10 feet cut depth at the interceptor outlets in the south side of the South Pit (Interceptors1-1 & 1-2) and the east side of the North Pit (Interceptors 2-4 & 2-5). This was judged unrealistic and a less than 2% slope for these two interceptor drains was used in the concept design (see Table 7). Although the flow path slopes of the interceptor drains along these sides are less than 2 %, the design path slopes have been shown to be sufficient enough to prevent sedimentation. Using Lauren's Critical Velocity Method as described in the 2008 Report, it is determined that flow velocities in these interceptor are greater than the required velocities to transport any sediment particles that would likely enter the interceptor drains (see Table 8).

TABLE 8: COMPARISON OF INTERCEPTOR FLOW VELOCITIES AND THE CRITICAL VELOCITY TO TRANSPORT THE SEDIMENTS USING LAURSEN'S METHOD

Interceptor	Capital Flow (cfs)	Flow Slope %	Flow Velocity (fps)	Critical Velocity (fps)
Zone 1-1	34.5	1.5	10.4	4.1
Zone 1-2	2.6	1.5	5.4	3.5
Zone 2-1	34.3[a]	2.0	11.5	4.0
Zone 2-2	19.1	2.0	9.9	3.9
Zone 2-3	11.2	2.0	8.7	3.8
Zone 2-4	17.6	1.0	7.5	3.9
Zone 2-5	20.1	1.0	7.8	4.0

[a] Includes culvert flow (9.9 cfs) from Pearblossom Highway culvert No. 7 during Phase 2/ Final Reclamation and the sheetflow (24.4 cfs) generated by Zone 2-1, totaling 34.3 cfs.

3.3.2 Down Drains

All down drains were designed in accordance with the minimum dimensions (1.5 foot depth and 3 foot width) provided in the 2008 Los Angeles County Grading Guidelines. Using Manning's Equation and the Continuity Equation, water depth and velocity of the design down drains which capture the offsite flows were computed and are summarized in Table 9.

TABLE 9: DOWN-DRAIN DESIGN FOR CAPITAL FLOOD FLOW

Down Drain	Capital Flood Flow(cfs)	Manning's n	Water Depth (ft)	Slope %	Velocity (fps)	Channel Depth (ft)	Freeboard (ft)
Zone 1-1	34.5	0.016	1.1	35	29.1	1.5	0.5
Zone 1-2	2.6	0.016	0.4	54	18.0	1.5	1.1
Zone 1-3	35.4[a]	0.016	1.0	54	34.5	1.5	0.5
Zone 1-4	20	0.016	0.8	54	29.9	1.5	0.7
Zone 2-1	34.3[b]	0.016	1.1	35	29.1	1.5	0.5
Zone 2-2	19.1	0.016	0.8	54	29.6	1.5	0.7
Zone 2-3	11.2	0.016	0.7	54	25.9	1.5	0.8
Zone 2-4	17.6	0.016	0.8	54	29.0	1.5	0.7
Zone 2-5	20.1	0.016	0.9	35	25.5	1.5	0.7

Note: [a] Includes culvert flow (10.8 cfs) from Pearblossom Highway culvert No. 7 during Phase 1 and the sheetflow (24.6 cfs) generated by Zone 1-3, totaling 35.4 cfs.
[b] Includes culvert flow (9.9 cfs) from Pearblossom Highway culvert No. 7 during Phase 2/Final Reclamation and the sheetflow (24.4 cfs) generated by Zone 2-1, totaling 34.3 cfs.

Note that Down Drains 1-3 & 1-4 which serving CMP17 and CMP18 would be eliminated during Phase 2 and Final Reclamation, since their flows would be captured by the South Pit. Additional down drains are provided along the drainage terrace, the road ramp, and the notch in the North Pit to capture on-site runoff generated by the facility areas and pit slopes. Two down drains would be constructed along the notch in the North Pit during Phase 1 to covey the on-site runoff generated by the plant facility area into the bottom of the North pit. During Final Reclamation, this notch would be filled and the two down drains along the notch would be removed to restore the Longview extension roadway.

3.3.3 Drainage Terrace / Terrace Drains

8-foot wide drainage terraces would be constructed on the pit slopes at 30-foot vertical depth intervals to prevent surface erosion. All terraces drains are required to have a minimum slope of 5 percent and a minimum depth of 1 foot. The terrace drains would be lined with crushed rock in consideration of the availability of these materials on site. The crushed rock was found to be stable enough to deliver the runoff flows generated by the pit slope surface (2008 Report).

3.3.4 Drain Canals

Drain canals would be constructed around the plant facility area and along the southern and western edges of the rail facility area in the North Pit to capture on-site runoff. The captured on-site runoff would be conveyed through down drains to the North Pit bottom. The drain canal would be V-shaped with minimum dimensions of 1-foot depth and 3-foot width and lined with crushed rock.

3.4 PIT INUNDATION, EMPTYING AND SEDIMENTATION

3.4.1 Flood Volume

The total Capital Flood volume consists of local runoff (including culvert flows from Pearblossom Highway), on-site runoff, and direct precipitation.

As discussed in the 2008 Report, the maximum 24-hour rainfall amounts during the four days of the 50-year design storm would be 0.32 inches, 1.28 inches, 1.12 inches, and 3.2 inches, totaling 5.92 inches (According to the LACDPW Hydrology Manual, the 50-year design storm occurs over a period of four days, with a maximum rainfall on the fourth day). The local runoff and on-site runoff volume were computed using the Tc calculator. Culvert flows from Pearblossom Highway were converted to equivalent drainage area in order for the Tc calculator to account for these flows in the runoff volume calculation. The flood volume generated by the direct precipitation is obtained by multiplying the pit open area by the total on-site rainfall of 5.18 inches (maximum 2.8 inches per 24-hr in the fourth day based on the rainfall isohyte map) during the 50-year design storm. Table 10 summarizes the flood volumes entering each pit during the different phases.

TABLE 10: FLOOD VOLUME ENTERING EACH PIT DURING PHASE 1 , PHASE 2, PHASE 3 AND FINAL RECLAMATION FOR LOWERED FACILITIES ALTERNATIVE

Mine Pit	Upstream Watershed Area (Acre)	Sheetflow Volume (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
Phase 1						
North Pit	1,026[a]	56 [a]	8	30	94	12
Phase 2						
North Pit	411	22	3	30	55	11
South Pit	1,135[b]	61[b]	3	65	129	13
Final Reclamation						
North Pit	411	22	3	30	55	11
South Pit	1,135[b]	61[b]	3	65	129	13

Notes: [a] Includes the equivalent area (120 acres) and flood volume (7ac-ft) that contributed the same amount of culvert flow during Phase 1
[b] Includes the equivalent area (113 acres) and flood volume (6ac-ft) that contributed the same amount of culvert flow during Phase 2/Final Reclamation.

The inundation depth is well below the proposed 80 ft depth of the mine pits. Thus, the Capital Flood volume inside the pits would not overflow. In addition, minimum two-foot-high MSHA-required safety berms would be installed along the tops of the mine pit slopes around the entire northern, eastern, southern, and western edges and pit entrance/exit ramps. Note that there would be no inundation volume accumulated in the bottom of the plant facility area, which would be

mined to a depth of 25 feet of the gravel layer. This is because direct precipitation is the primary source of water to the plant facility area and the vertical infiltration rate of gravel materials (1,134 feet per day) is much higher than the maximum rainfall intensity (2.8 inches per day) at the mine site. Any direct rainfall would be infiltrated to the surroundings at the same moment when the rainfall reaches the bottom of the plant facility area.

3.4.2 Emptying Time

Using Water Budget Analysis as discussed in the 2008 Report, emptying times after the Capital Flood for the Lowered Facilities Alternative are summarized in Table 11.

TABLE 11: CAPITAL FLOOD VOLUME AND PIT EMPTYING TIME

Mine Pit	Total Capital Flood Volume (acre-ft)	Emptying Time	
		Total (days)	After Capital Flood (days)
Phase 1			
North Pit	94	4	0
Phase 2			
North Pit	55	3	0
South Pit	129	8	4
Final Reclamation			
North Pit	55	3	0
South Pit	129	8	4

The estimated emptying time shown in Table 11 includes two columns, one is the total time required to empty the Capital Flood volume and the other is the emptying time after the Capital Flood event. The two columns have a difference in 4 days. This is because infiltration also occurs over the 4-day Capital Flood event. The analysis results show that all mining phases for the Lowered Facilities Alternative could be emptied within 4 days after the Capital Flood event.

3.4.3 Pit Sedimentation

All of the sediment transported into the pit by the Capital Flood inflow would be deposited on the pit floor. Table 12 summarizes the estimated volumes and depths of sediment deposited in the mine pits. The sedimentation analysis was based on the debris production rate of 1,300 cubic

yards per square mile in Debris Production Area Zone 11 obtained from LACDPW Sedimentation Manual (2006).

TABLE 12: MINE PIT SEDIMENTATION FOR EACH MINING PHASE

Mining Pit	Debris Production Volume		Pond Bottom Area	Deposited Sediment Layer Thickness
	(cu-yd)	(cu-ft)	(sq ft)	(ft)
Phase 1				
North Pit	1,846	49,842	939,391	0.05
Phase 2				
North Pit	780	21,060	804,156	0.03
South Pit	1,690	45,630	1,103,790	0.04
Final Reclamation				
North Pit	780	21,060	804,156	0.03
South Pit	1,690	45,630	1,103,790	0.04

The sediments would deposit in the bottom of pond where the vertical infiltration occurs. Since the mine pits will be mined to the surface of clay layer, which would have a lower permeability than the deposited sediments, sediment deposition on the clay layer in the mining pits would not have an affect on the vertical infiltration rate. Furthermore, the horizontal infiltration is more important with regard to pit empty time. Sediment deposition in the bottom of pit would not have an affect on the horizontal infiltration rate and the pit empty time.

3.5 IMPACT OF DRAINAGE CONCEPT ON ADJACENT PROPERTIES

The mine drainage concept would have no adverse impact on properties adjacent to and downstream of the mine during the Capital Flood. The interceptor drains located on the upstream (southern and eastern) sides of the mine pits are adequately sized to capture and convey any flows arriving at each interceptor drain for delivery to the down drains and subsequent discharge to the mine pits. Hence, there would be no backwater effects or associated increases in flood depths caused by the interceptor drains. Therefore, flooding on adjacent properties would not be impacted.

4.0 REFERENCES

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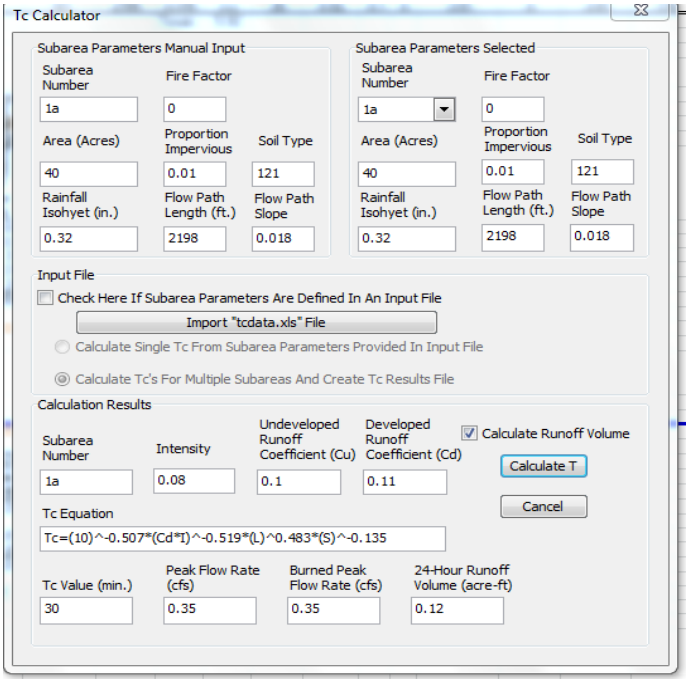
Appendix A - Miscellaneous Calculations

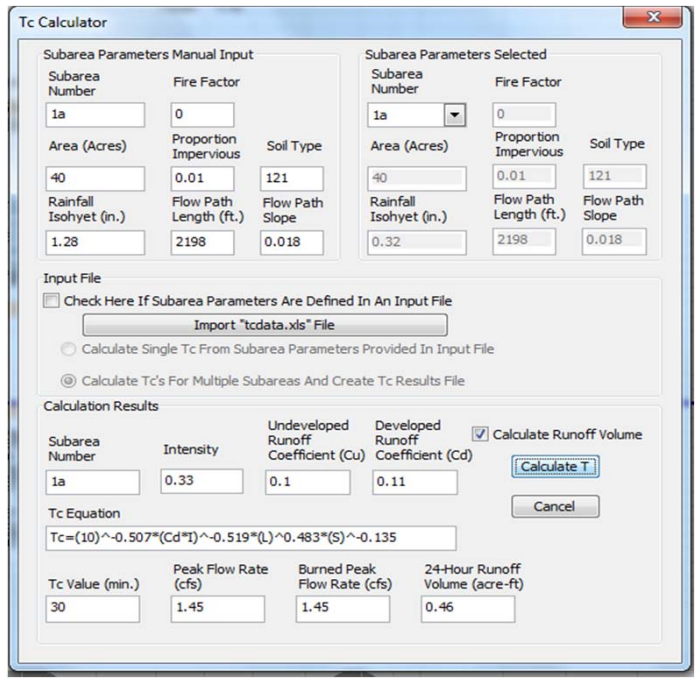
- Input and output files of the Tc Calculator for the Capital Flood event for a 40 acre subbasin (4 days).
- Tc Calculator-generated 4-day hydrographs for the Capital Flood event (i.e., 50-year storm event) for a 40 acre subbasin.
- Runoff volume calculation EXCEL spreadsheets for the Capital Flood event.
- Pit emptying time calculation EXCEL spreadsheets for the Capital Flood event.

Input and Output files of the Tc Calculator

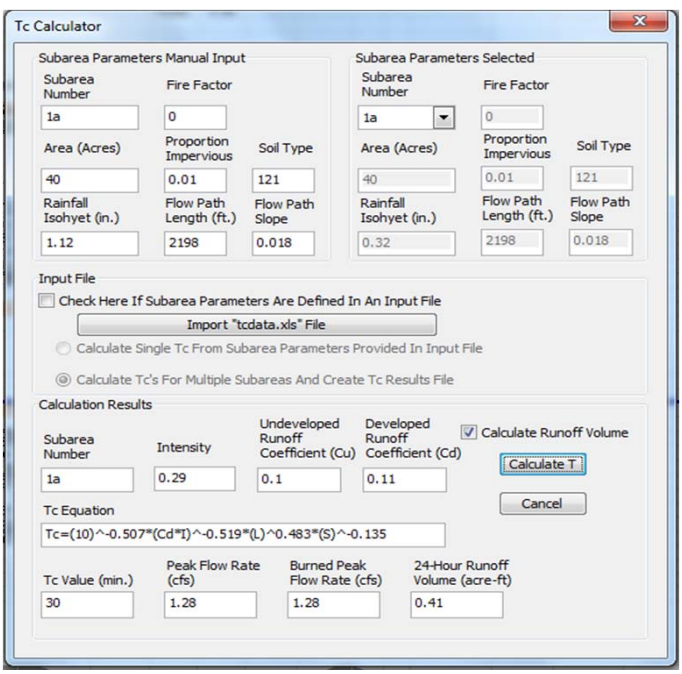
Day 1



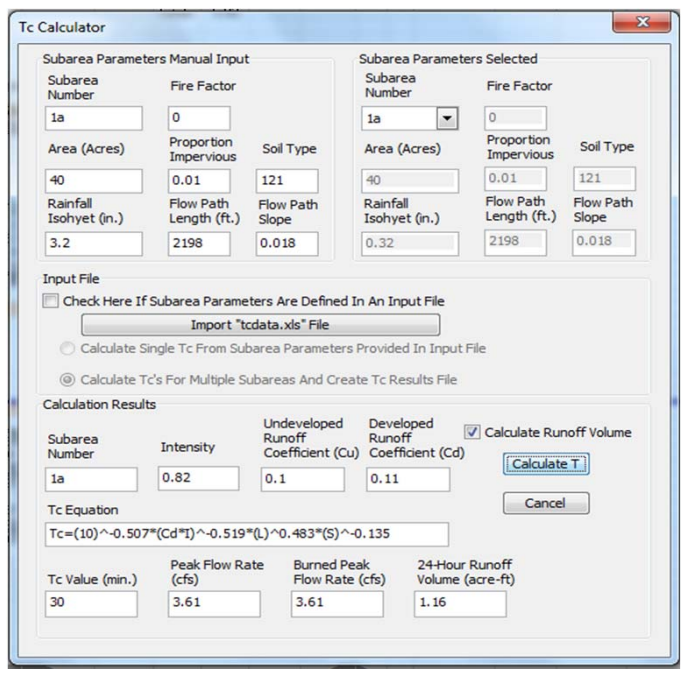
Day 2

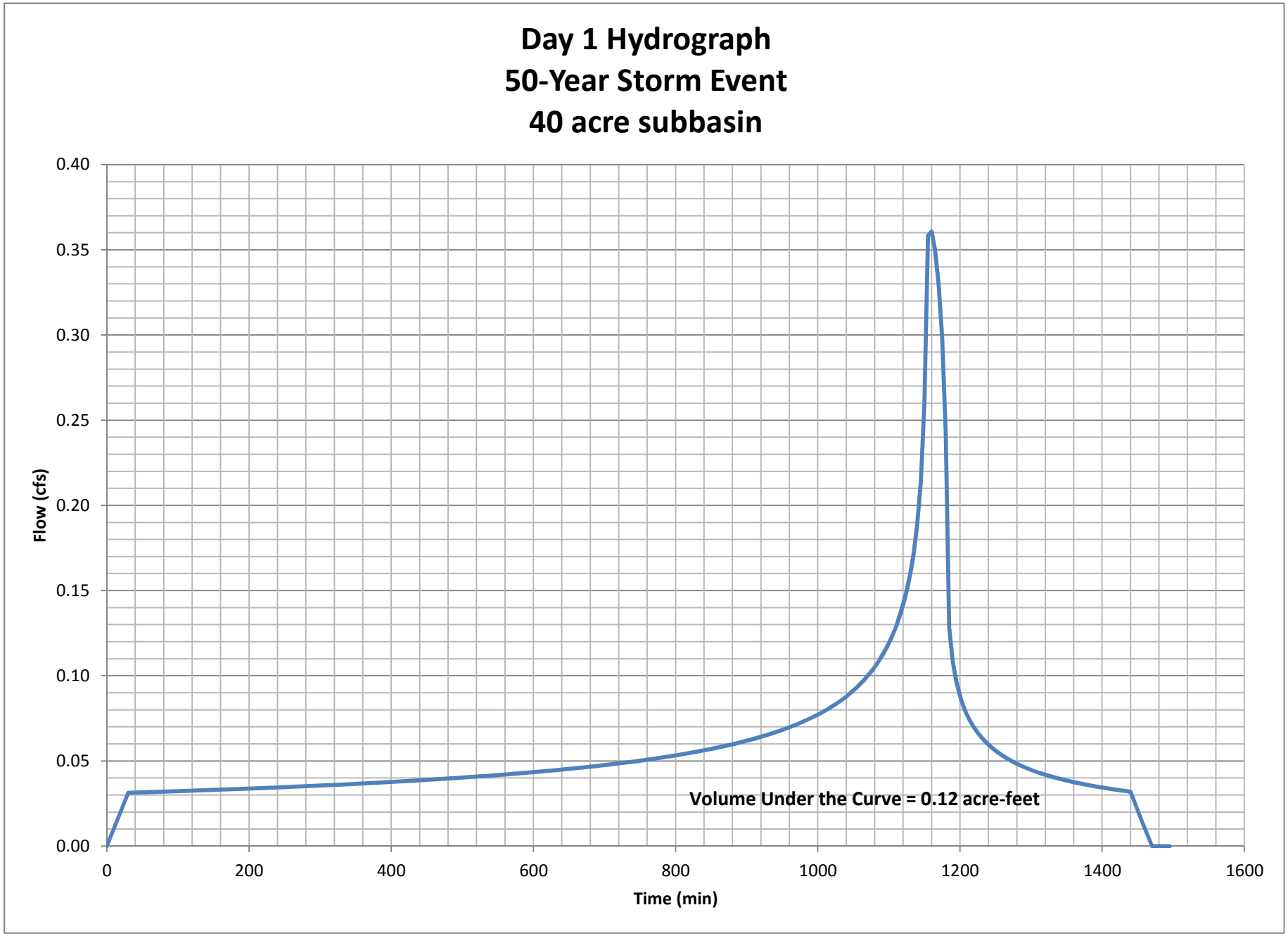


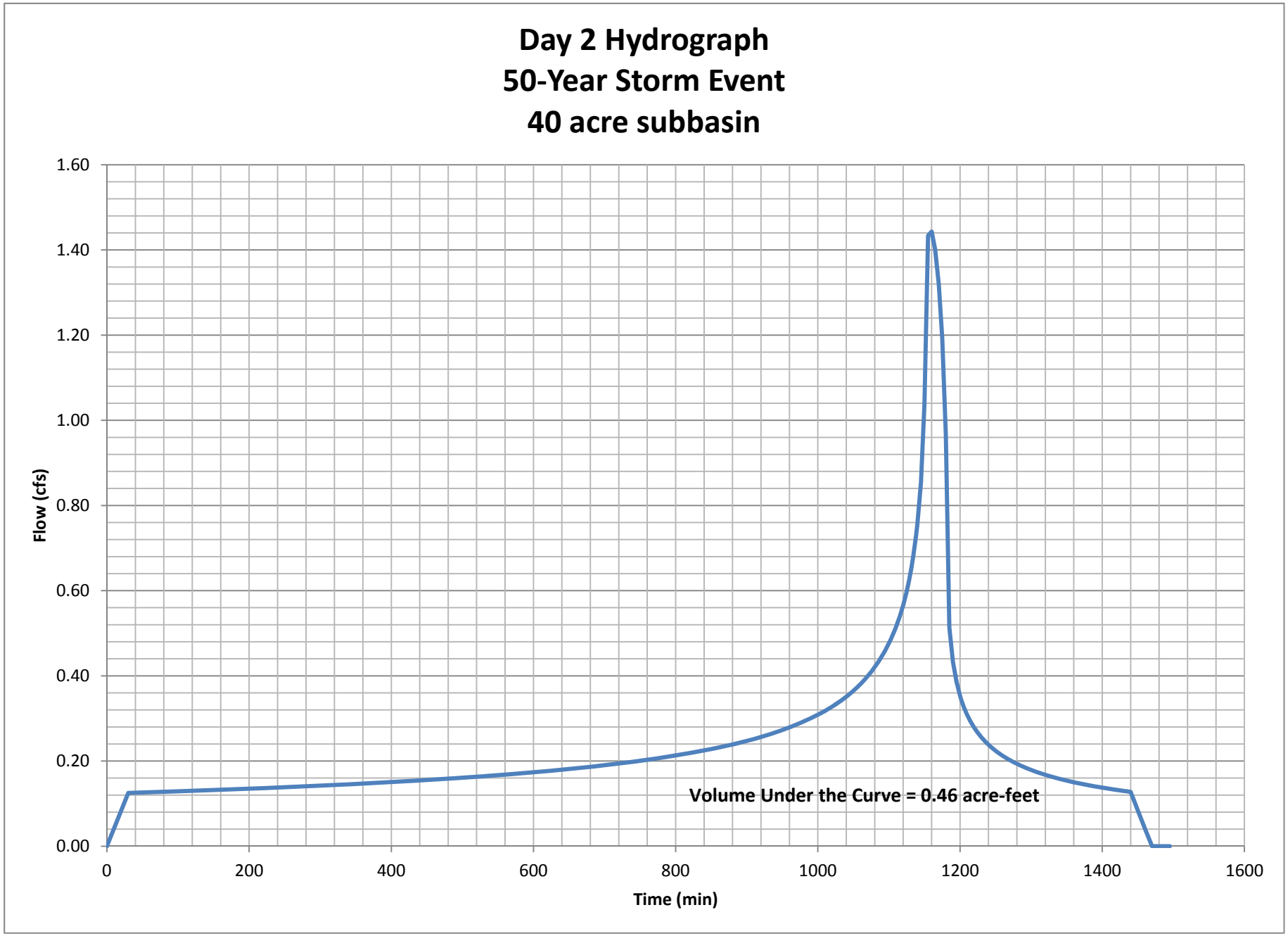
Day 3

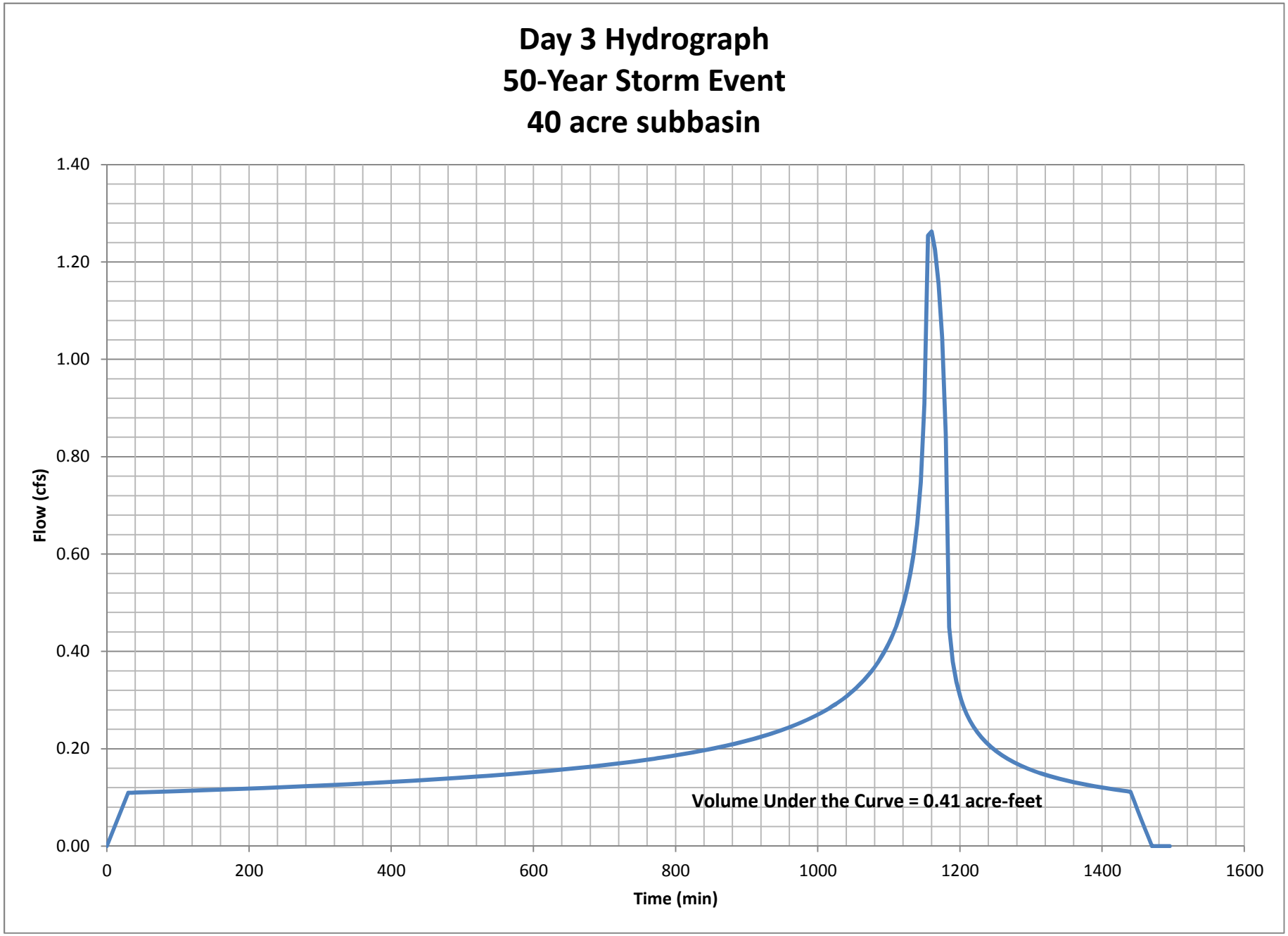


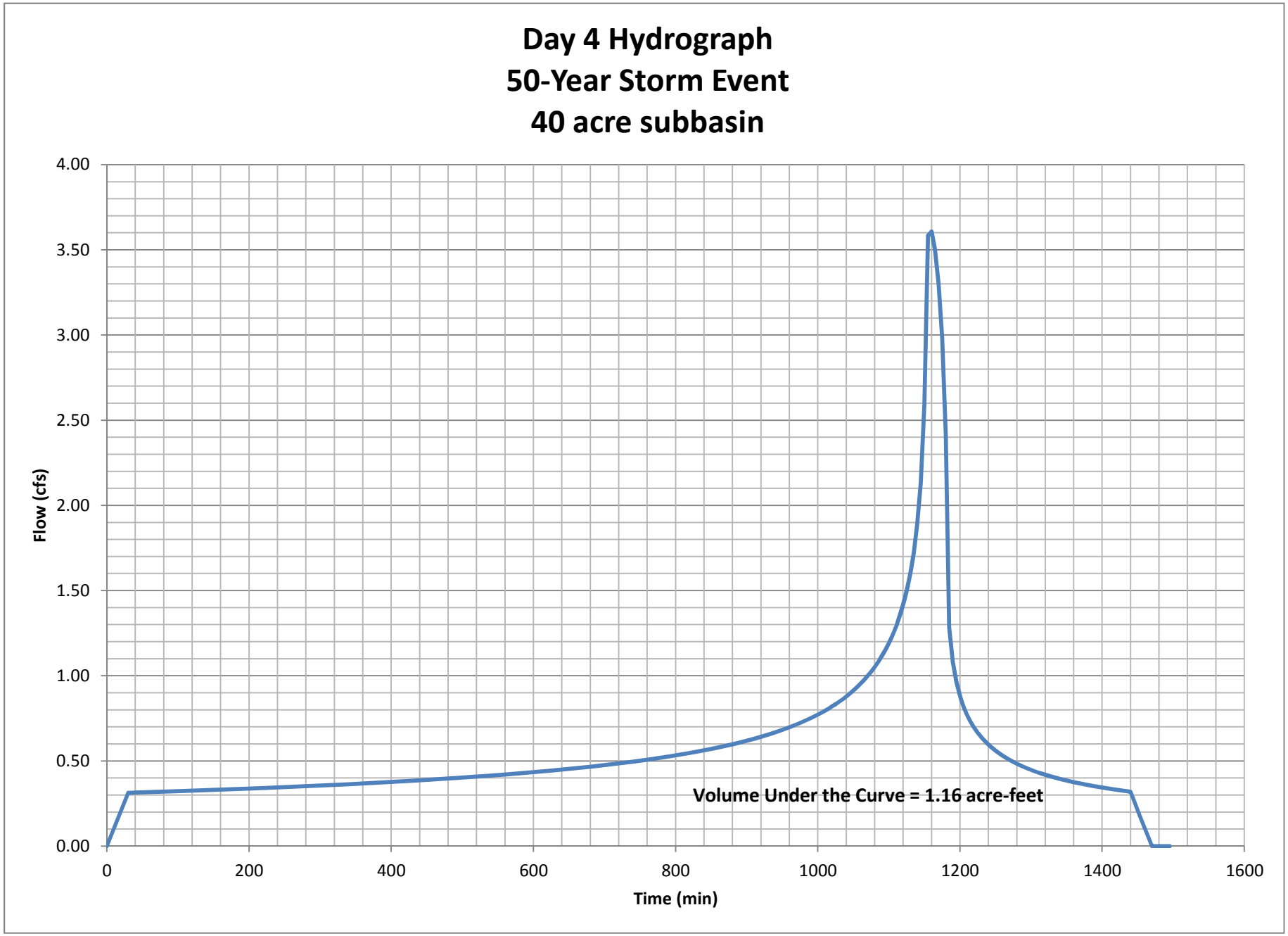
Day 4




Day 1 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.12 acre-feet


Day 2 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.46 acre-feet


Day 3 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.41 acre-feet


Day 4 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 1.16 acre-feet

Tc Calculator Outputs

Day	Project	Subarea	Area (acres)	Proportion Impervious	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)	Fire Factor	Burned flow rate (cfs)	Volume (acre-ft)	Volume per Ac-foot
1	Lebata	1a	40	0.01	50	121	2198	0.018	0.32	30	0.08	0.1	0.1	0.35	0	0.35	0.12	0.003
2	Lebata	1a	40	0.01	50	121	2198	0.018	1.28	30	0.33	0.1	0.1	1.45	0	1.45	0.46	0.0115
3	Lebata	1a	40	0.01	50	121	2198	0.018	1.12	30	0.29	0.1	0.1	1.28	0	1.28	0.41	0.01025
4	Lebata	1a	40	0.01	50	121	2198	0.018	3.2	30	0.82	0.1	0.1	3.61	0	3.61	1.16	0.029
								Totals	5.92									

Equivalent Area of the Culvert Flow

Flows (cfs)	Equivalent Area (ac)
10.8	120.0

Flood Volume Generated by Zone

Mining Pit	Zone	Basin Area (Acres)	Day 1 Flood Volume (ac-ft)	Day 2 Flood Volume (ac-ft)	Day 3 Flood Volume (ac-ft)	Day 4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
North	1 --1	382	1.1	4.4	3.9	11.1	20.5
North	1 --2	29	0.1	0.3	0.3	0.8	1.6
North	2--1	273	0.8	3.1	2.8	7.9	14.7
North	2--2	222	0.7	2.6	2.3	6.4	11.9
North	Culvert Flow	120	0.4	1.4	1.2	3.5	**6.5**
	Total	**906**	**3.1**	**11.8**	**10.5**	**29.8**	**55.2**

Total Sheetflow Volume

Pit	Area (acres)	Flood Volume (ac-ft)
North Pit	906	55.2

Direct Rainfall Volume

Day	%	Isohypte in North Pit	40 Acres Volume (acre-ft)	40 Acres NP Volume (acre-ft)	22 Acres SP Volume (acre-ft)
1	10%	0.28	0.1	0.25	0.18
2	40%	1.12	0.41	1	0.73
3	35%	0.98	0.35	0.87	0.64
4	100%	2.8	1.01	2.49	1.82
	Total	5.18	1.87	4.61	3.37
	Average	5.18			
				C=0.27	C=0.36

Phase	Top of the Pit Surface Area (acres)	Flood Volume (ac-ft)	
Phase1-NP	69.5	**30.0**	Large Pit

Direct Rainfall Volume = C*P/12*A
Where C=0.11, P=5.18 in

On-Site Runoff Volume

Phase	Area (acres)	Flood Volume (ac-ft)
Phase 1	41.4	4.8
Small Pond	29	3.3
	70	**8.1**

Notes:[1] NP contains about 8.86 ac cement road (13%)

Captial Flood Volume Received During Phase 1

	Sheetflow Volume (acre-ft)	Culvert Flow From Pearblossom Hwy (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
Phase 1						
NP	**49**	**7**	**8**	**30**	**93**	**12**

Inundation depth was based on volume and elevation curve created by AutoCAD

Tc Calculator Outputs

Day	Project	Subarea	Area (acres)	Proportion Impervious	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)	Fire Factor	Burned flow rate (cfs)	Volume (acre-ft)	Volume per Ac-foot
1	Lebata	1a	40	0.01	50	121	2198	0.018	0.32	30	0.08	0.1	0.11	0.35	0	0.35	0.12	0.003
2	Lebata	1a	40	0.01	50	121	2198	0.018	1.28	30	0.33	0.1	0.11	1.45	0	1.45	0.46	0.0115
3	Lebata	1a	40	0.01	50	121	2198	0.018	1.12	30	0.29	0.1	0.11	1.28	0	1.28	0.41	0.01025
4	Lebata	1a	40	0.01	50	121	2198	0.018	3.2	30	0.82	0.1	0.11	3.61	0	3.61	1.16	0.029
								Totals	5.92									

Equivalent Area of the Culvert Flow

Flows (cfs)	Equivalent Area (ac)
9.93	110.3

Flood Volume Generated by Zone

Mining Pit	Zone	Basin Area (Acres)	Day 1 Flood Volume (ac-ft)	Day 2 Flood Volume (ac-ft)	Day 3 Flood Volume (ac-ft)	Day 4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
North	1 --1	382	1.1	4.4	3.9	11.1	20.5
North	1 --2	29	0.1	0.3	0.3	0.8	1.6
South	2--1	271	0.8	3.1	2.8	7.8	14.5
South	2--2	212	0.6	2.4	2.2	6.1	11.4
South	2--3	124	0.4	1.4	1.3	3.6	6.7
South	2--4	195	0.6	2.2	2.0	5.7	10.5
South	2--5	223	0.7	2.6	2.3	6.5	12.0
	Culvert Flow	110	0.3	1.3	1.1	3.2	5.9
	Total	**1,436**	**4.6**	**17.8**	**15.8**	**44.8**	**83.1**

Total Sheetflow Volume

Pit	Area (acres)	Flood Volume (ac-ft)
North Pit	411	22.1
South Pit	1,025	61.0

Direct Rainfall Volume

Day	%	Isohypte in North Pit	Isohypte in South Pit	40 Acres Volume (acre-ft)	40 Acres NP Volume (acre-ft)	22 Acres SP Volume (acre-ft)
1	10%	0.28	0.285	0.1	0.25	0.18
2	40%	1.12	1.14	0.41	1	0.73
3	35%	0.98	0.9975	0.35	0.87	0.64
4	100%	2.8	2.85	1.01	2.49	1.82
	Total	5.18	5.2725	1.87	4.61	3.37
	Average	5.22625				
					C=0.27	C=0.36

Phase	Top of the Pit Surface Area (acres)	Flood Volume (ac-ft)	
Final Reclamation-NP	69.5	30.0	Large Pit
	28.6	12.3	Small Pond
Final Reclamation-SP	151.3	65.3	

Direct Rainfall Volume = C*P/12*A
Where C=0.11, P=5.18 in

On-Site Runoff Volume

Phase	Area (acres)	Flood Volume (ac-ft)		
Final Reclamation-NP[1]	41.4	4.8	3.3	1.4
Final Reclamation-SP[2]	22	3.4		

Notes:[1] NP contains about 8.86 ac cement road
[2] SP contains about 7.145 ac cement road

Captial Flood Volume Received During Final Phase

	Sheetflow Volume (acre-ft)	Culvert Flow From Pearblossom Hwy (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)	
Final Configuration							
North Pit-1	22	0	3	30	55	11	
North Pit-2	0	0	1	12	14	X	
South Pit	55	6	3	65	130	13	Elev 2878'

Inundation depth was based on volume and elevation curve created by AutoCAD

Emptying Time

Lower Facilities Alternative

North Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ft	ft	ac-ft
1	93.0	2,857	4,536	0.8	0.01	36.6813	0.057	21.6	1	1.23	23.062	0.018	0.42	12	10	54.7
2	54.7	2,855	4,536	0.6	0.01	26.3994	0.057	15.4	1	0.88	16.433	0.018	0.30	10	9	27.1
3	27.1	2,854	4,536	0.5	0.01	21.4505	0.057	12.3	1	0.70	13.127	0.018	0.24	9	5	4.7
4	4.7	2,850	4,536	0.1	0.01	5.3559	0.057	2.5	1	0.14	2.704	0.018	0.05	5	3	0.0
5	0.0	2,848	4,536	0.0	0.01	1.5968	0.057	0.7	1	0.04	0.742	0.018	0.01	3	0	0.0
6	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A

Emptying Time

Lower Facilities Alternative

North Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ft	ft	ac-ft
1	55.0	2,855	4,536	0.6	0.01	26.3994	0.057	15.4	1	0.88	16.433	0.018	0.30	10	8	27.4
2	27.4	2,853	4,536	0.4	0.01	16.6843	0.057	9.1	1	0.52	9.826	0.018	0.18	8	7	10.0
3	10.0	2,852	4,536	0.3	0.01	12.3459	0.057	6.3	1	0.36	6.812	0.018	0.12	7	0	0.0
4	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A
5	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A
6	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A

Emptying Time

Lower Facilities Alternative

South Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	130.0	2,880	4536.0	0.7	0.0	32.6	0.1	25.3	1.0	1.4	26.7	0.0	0.5	34.5	13	11	95.5
2	95.5	2,878	4536.0	0.6	0.0	25.0	0.1	20.1	1.0	1.1	21.1	0.0	0.4	26.6	11	10	69.0
3	69.0	2,877	4536.0	0.5	0.0	21.5	0.1	17.4	1.0	1.0	18.3	0.0	0.3	22.8	10	8	46.2
4	46.2	2,875	4536.0	0.3	0.0	14.9	0.1	12.2	1.0	0.7	12.8	0.0	0.2	15.8	8	7	30.4
5	30.4	2,874	4536.0	0.3	0.0	12.0	0.1	9.8	1.0	0.6	10.3	0.0	0.2	12.7	7	6	17.7
6	17.7	**2,873**	4536.0	0.2	0.0	9.3	0.1	7.7	1.0	0.4	8.0	0.0	0.1	9.9	6	4	7.7
7	7.7	2,871	4536.0	0.1	0.0	5.1	0.1	4.1	1.0	0.2	4.3	0.0	0.1	5.4	4	3	2.3
8	2.3	2,870	4536.0	0.1	0.0	3.4	0.1	2.7	1.0	0.2	2.8	0.0	0.1	3.6	3	0	0.0
9	0.0		4536.0	#N/A	0.0	#N/A	0.1	#N/A	1.0	#N/A	#N/A	0.0	#N/A	#N/A	0	0	#N/A
10	#N/A		4536.0	#N/A	0.0	#N/A	0.1	#N/A	1.0	#N/A	#N/A	0.0	#N/A	#N/A	0	0	#N/A
11	#N/A		4536.0	#N/A	0.0	#N/A	0.1	#N/A	1.0	#N/A	#N/A	0.0	#N/A	#N/A	0	0	#N/A

for those changes. This report and the figures contained in this report are intended for input to the preliminary design of the proposed mining slopes; they are not intended to act as construction drawings or specifications.

Soil and rock deposits vary in type, strength, and other geotechnical properties between points of observations and explorations. Additionally, groundwater and soil moisture conditions vary seasonally or for other man-induced and natural reasons. Therefore, we do not and cannot have complete knowledge of subsurface conditions underlying the site. The criteria presented in this report are based upon findings at the points of exploration and on interpolation and extrapolation of information obtained at the points of observation.

The scope of our services did not include the assessment of the presence or absence of hazardous/toxic substances in the soil, groundwater, surface water, or atmosphere. Statements in this report regarding odors or conditions observed are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous/ toxic substances.

10.0 REFERENCES

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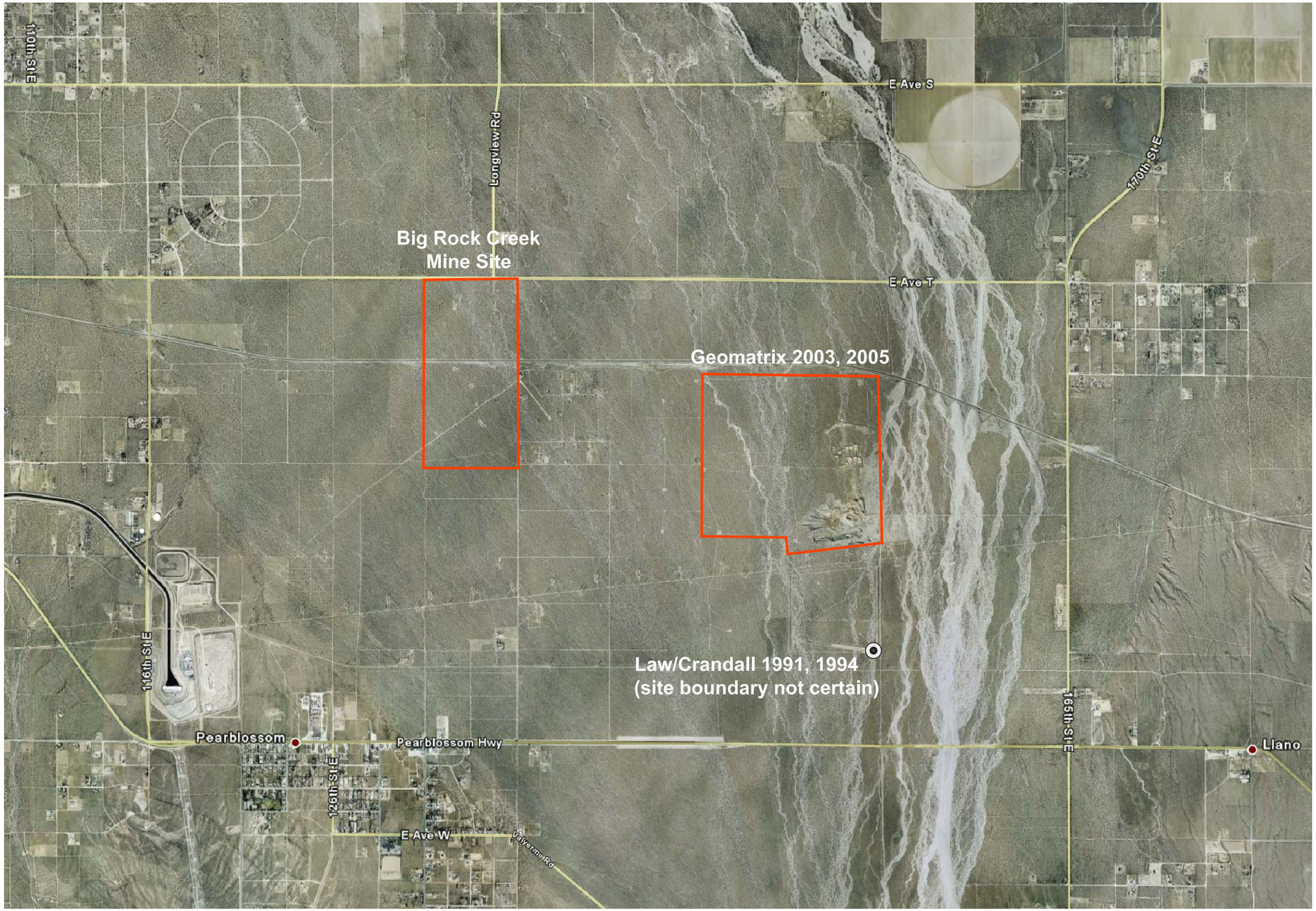
PLATES



LEGEND

Site Boundary

NORTH

0 3000 6000

FEET

VICINITY MAP
Big Rock Creek Mine
Antelope Valley Near Pearblossom
Los Angeles County, California

BASE MAP SOURCE: This Vicinity Map is based on an aerial photograph from Google Earth Pro 2007.

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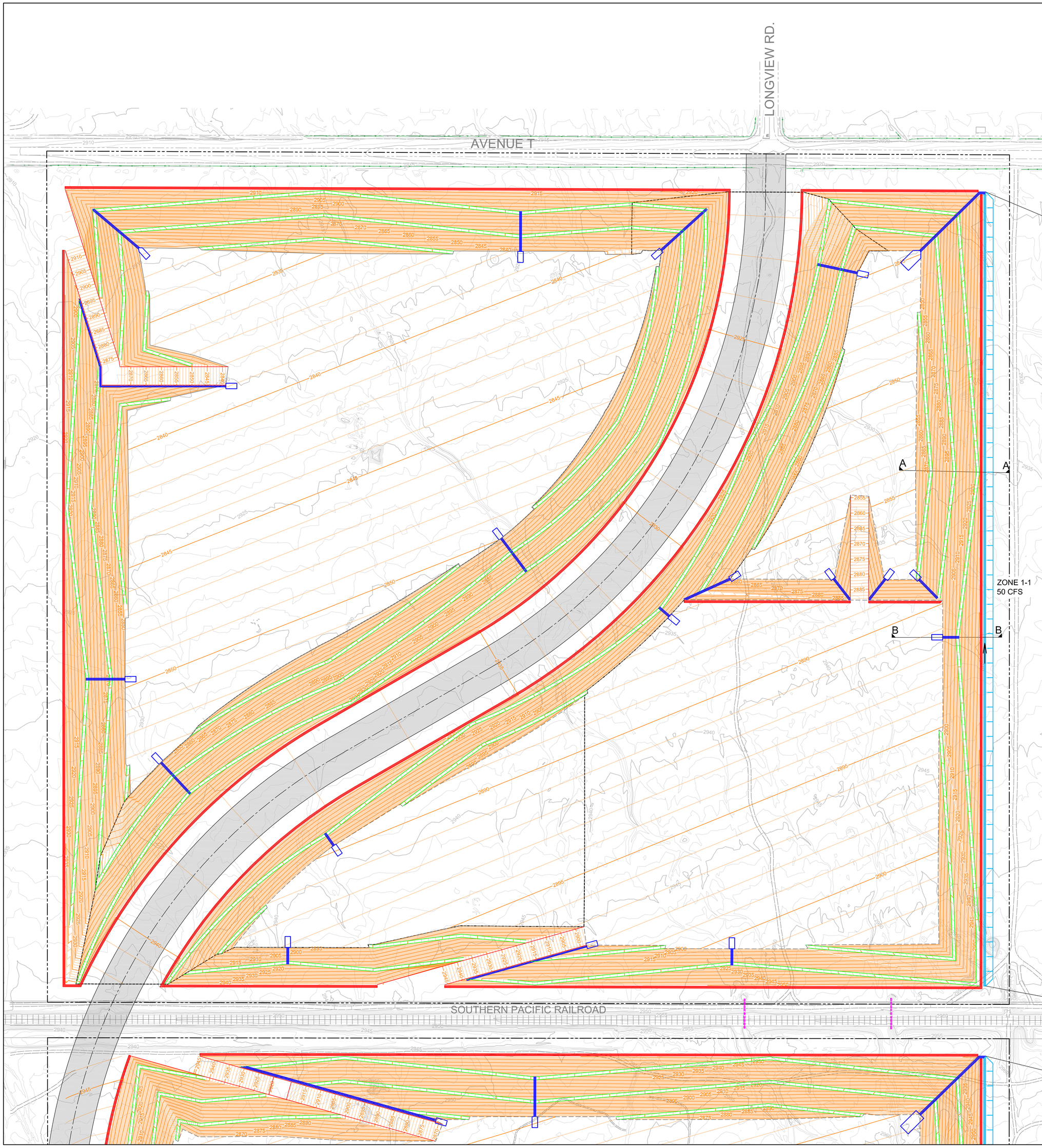
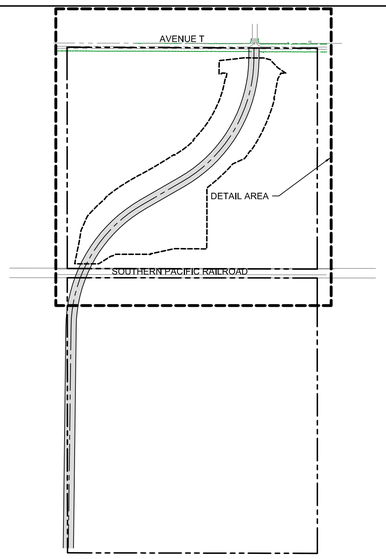
APPENDIX A
STETSON (2012) CONCEPTUAL GRADING AND DRAINAGE PLAN SHEETS

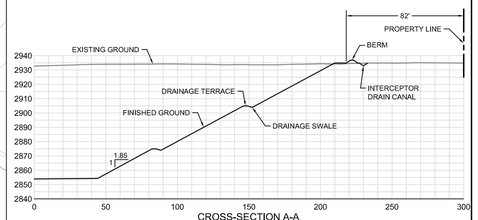




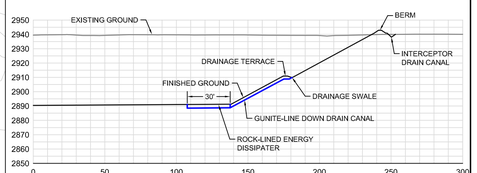
PROJECT OVERVIEW
Scale: 1" = 750'

LEGEND

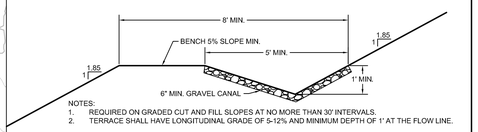
- PROPERTY BOUNDARY
- EXISTING CONTOUR LINE
- EXISTING DIRT ROAD
- EXISTING CMP CULVERT
- PROPOSED ROAD (1500-FOOT TURNING RADIUS)
- PHASE GRADING BOUNDARY
- TOE OF SLOPE
- PROPOSED CONTOUR LINE
- PROPOSED RAMP
- PROPOSED TERRACE
- GUNITE-LINED DOWN DRAIN CANAL
- EARTHEN BERM
- CONCRETE-LINED INTERCEPTOR DRAIN CANAL
- OVERLAND SHEET FLOW



CROSS-SECTION A-A
SCALE: 1"=50'

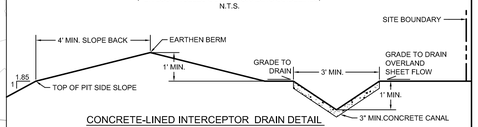


CROSS-SECTION B-B
SCALE: 1"=50'

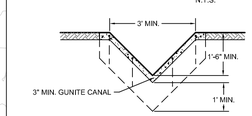


NOTES:
1. REQUIRED ON GRADED CUT AND FILL SLOPES AT NO MORE THAN 30' INTERVALS.
2. TERRACE SHALL HAVE LONGITUDINAL GRADE OF 5-12% AND MINIMUM DEPTH OF 1' AT THE FLOW LINE.

TYPICAL TERRACE CROSS-SECTION
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



CONCRETE-LINED INTERCEPTOR DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



NOTES:
1. DOWN DRAIN ANCHORS TO BE CONSTRUCTED EVERY 10' OF VERTICAL HEIGHT.
2. MINIMUM REINFORCING: #3 BARS AS SHOWN WITH #3 TIE BARS 4" O.C. ANCHOR DOWEL TO BE TIED TO LINGITUDINAL 6" WELDED WIRE STEEL MESH.

GUNITE-LINED DOWN DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.

NOTES:
1. MINIMUM INTERCEPTOR AND DOWN DRAIN SIZES SHOWN.
2. SIZES INCREASED AS NEEDED TO HANDLE PORTION OF CAPITAL FLOOD INFLOW.
3. GUNITE AND CONCRETE LININGS WILL BE REINFORCED WITH 6" WELDED WIRE STEEL MESH.
4. EARTHEN BERM REQUIRED ALONG TOP OF PIT SIDE SLOPE AS INDICATED.
5. INTERCEPTOR DRAIN REQUIRED ON SOUTHERN AND EASTERN SIDES OF MINE ONLY AS INDICATED.

SCALE (FEET)
0 50 100 200

N W E S

CONCEPTUAL GRADING AND DRAINAGE PLAN

BIG ROCK CREEK SITE - ANTELOPE VALLEY - CALIFORNIA

PROJECT (RADIUS = 1500 FT)
FINAL RECLAMATION - NORTH PIT

JN:	2192
Scale:	1" = 100'
	1 - Inch

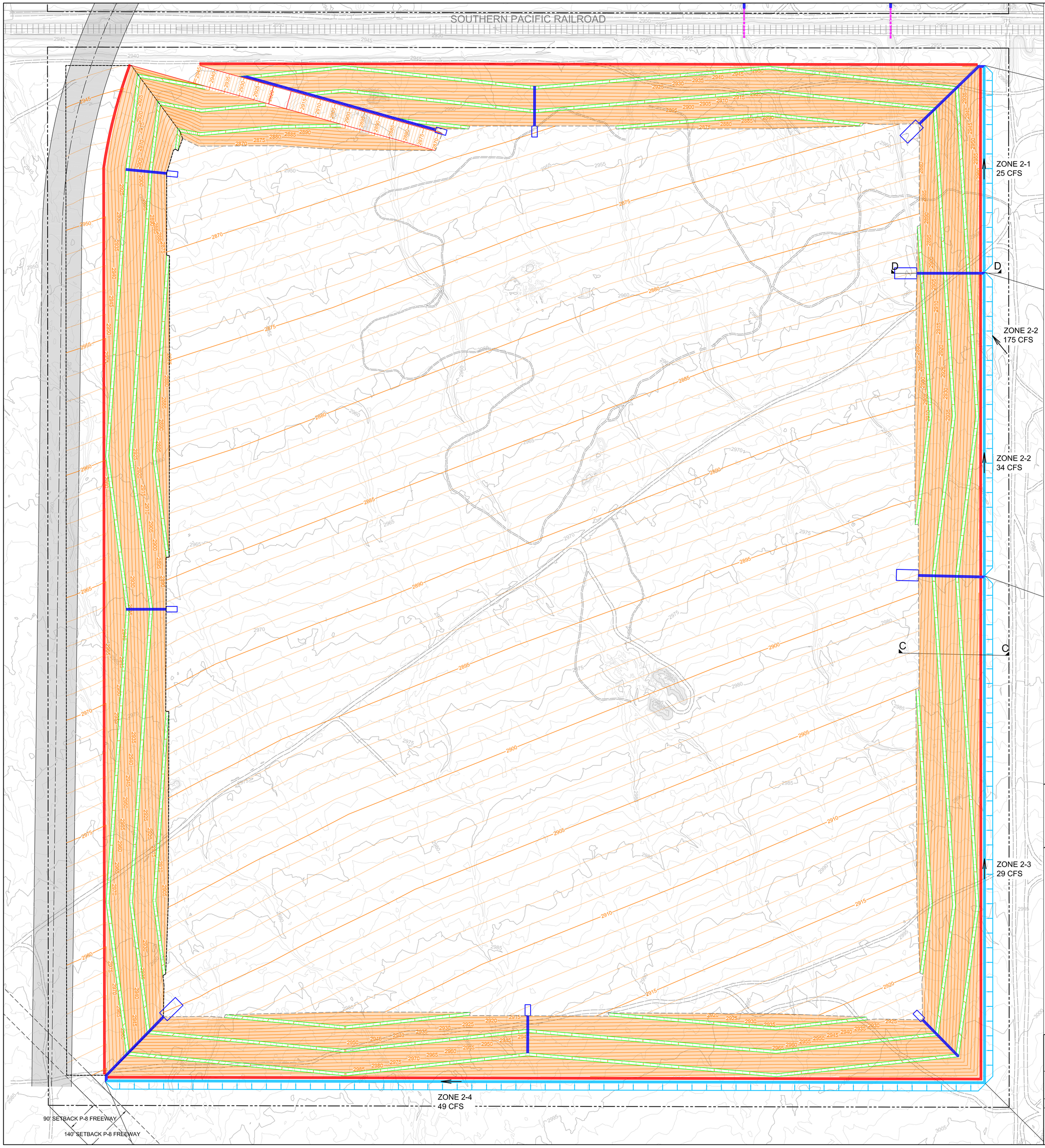
Egineering Fill Volume: 3,156,000 CY | Date: December 5, 2008

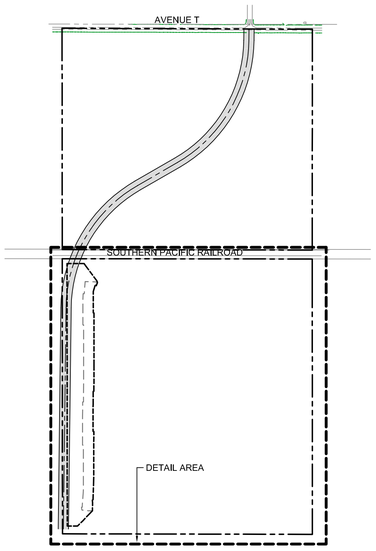
STETSON ENGINEERS INC.

Topo Source: Inland Aerial Survey Inc.
Date of Flight: 05/02/2006

Designed By: G. Trinidad | Drawn By: G. Trinidad
Revised By: J. Reilly | Approved By:

SHEET
6

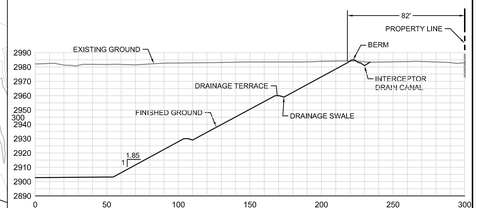




PROJECT OVERVIEW
Scale: 1" = 750'

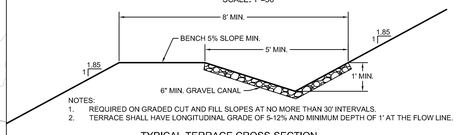
LEGEND

- PROPERTY BOUNDARY
- EXISTING CONTOUR LINE
- EXISTING DIRT ROAD
- EXISTING CMP CULVERT
- PROPOSED ROAD (1500-FOOT TURNING RADIUS)
- PHASE GRADING BOUNDARY
- TOE OF SLOPE
- PROPOSED CONTOUR LINE
- PROPOSED RAMP
- PROPOSED TERRACE
- GUNITE-LINED DOWN DRAIN CANAL
- EARTHEN BERM
- CONCRETE-LINED INTERCEPTOR DRAIN CANAL
- OVERLAND SHEET FLOW



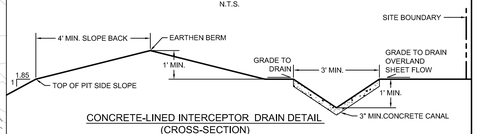
CROSS-SECTION C-C
SCALE: 1"=50'

CROSS-SECTION D-D
SCALE: 1"=50'

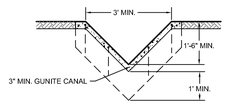


NOTES:
1. REQUIRED ON GRADED CUT AND FILL SLOPES AT NO MORE THAN 30' INTERVALS.
2. TERRACE SHALL HAVE LONGITUDINAL GRADE OF 5-12% AND MINIMUM DEPTH OF 1' AT THE FLOW LINE.

TYPICAL TERRACE CROSS-SECTION
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



CONCRETE-LINED INTERCEPTOR DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



NOTES:
1. DOWN DRAIN ANCHORS TO BE CONSTRUCTED EVERY 10' OF VERTICAL HEIGHT.
2. MINIMUM REINFORCING: #3 BARS AS SHOWN WITH #3 TIE BARS 4" O.C. ANCHOR DOWEL TO BE TIED TO LINGITUDINAL 6" WELDED WIRE STEEL MESH.

GUNITE-LINED DOWN DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.

NOTES:
1. MINIMUM INTERCEPTOR AND DOWN DRAIN SIZES SHOWN.
2. SIZES INCREASED AS NEEDED TO HANDLE PORTION OF CAPITAL FLOOD INFLOW.
3. GUNITE AND CONCRETE LININGS WILL BE REINFORCED WITH 6" WELDED WIRE STEEL MESH.
4. EARTHEN BERM REQUIRED ALONG TOP OF PIT SIDE SLOPE AS INDICATED.
5. INTERCEPTOR DRAIN REQUIRED ON SOUTHERN AND EASTERN SIDES OF MINE ONLY AS INDICATED.

SCALE (FEET)
0 50 100 200

N
W E
S

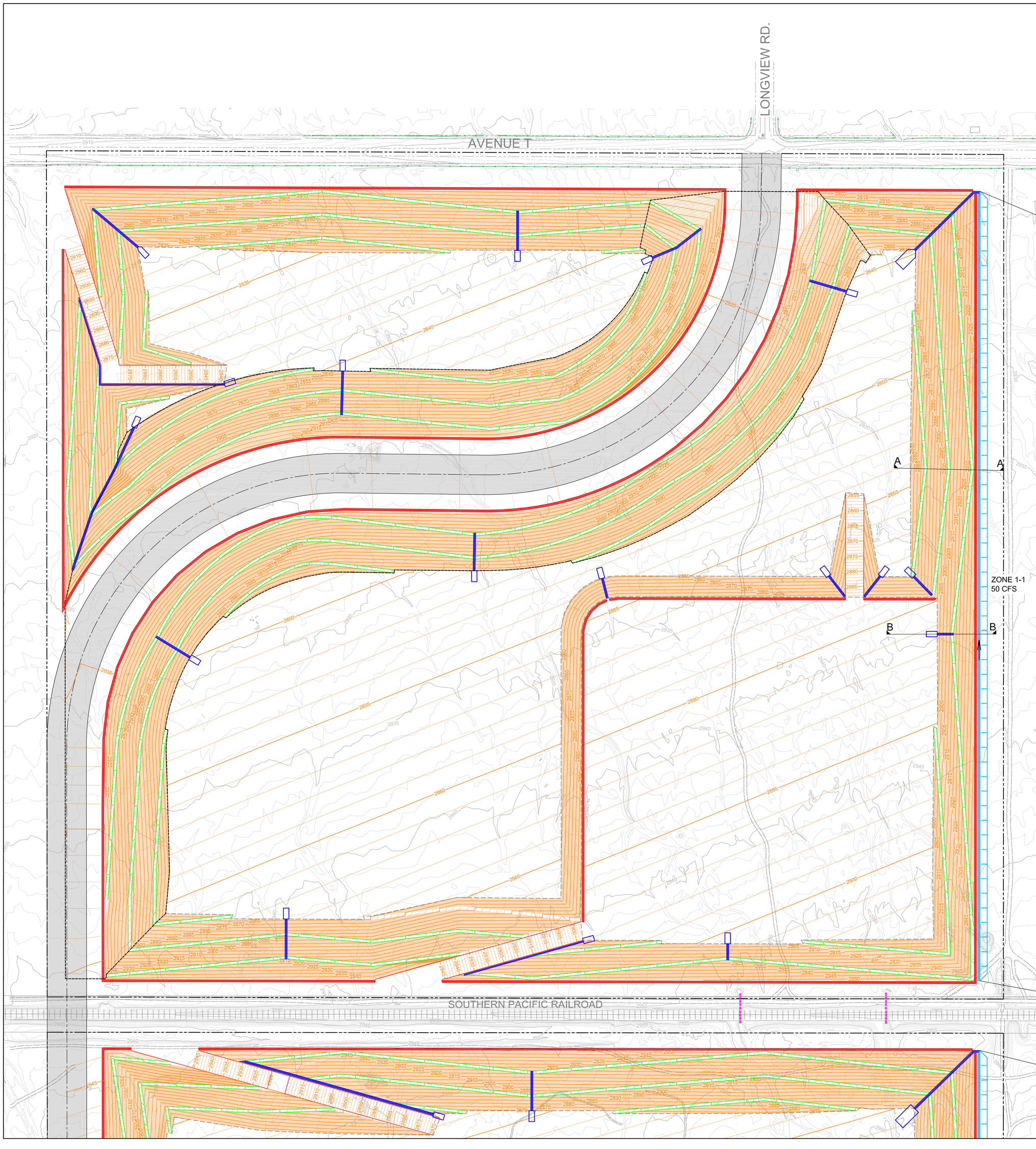
CONCEPTUAL GRADING AND DRAINAGE PLAN

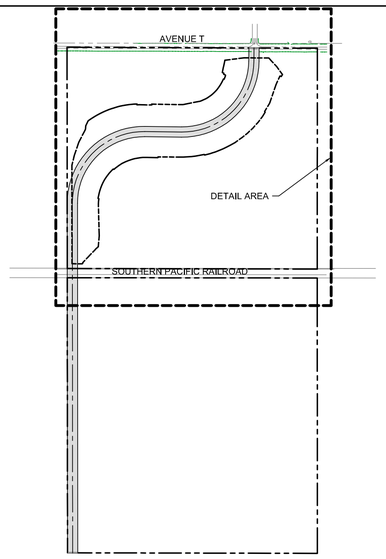
BIG ROCK CREEK SITE - ANTELOPE VALLEY - CALIFORNIA

PROJECT (RADIUS = 1500 FT)
FINAL RECLAMATION - SOUTH PIT

JN:	2192
Scale:	1" = 100'
	1 - Inch
Engineering Fill Volume: 850,000 CY	Date: December 5, 2008
Topo Source:	Inland Aerial Survey Inc. Date of Flight: 05/02/2006
Designed By: G. Trinidad	Drawn By: G. Trinidad
Revised By: J. Reilly	Approved By:
SHEET	7

STETSON ENGINEERS INC.

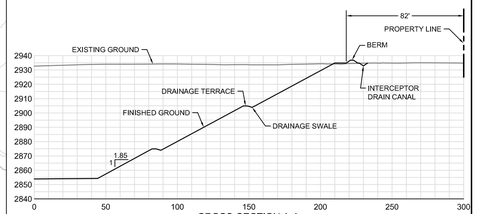




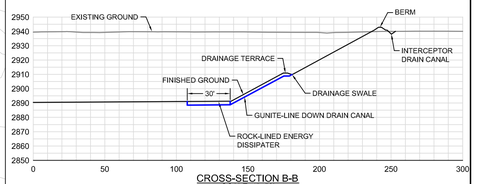
PROJECT OVERVIEW
Scale: 1" = 750'

LEGEND

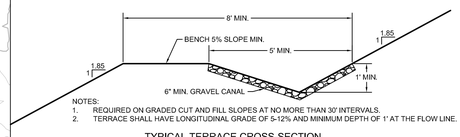
- PROPERTY BOUNDARY
- EXISTING CONTOUR LINE
- EXISTING DIRT ROAD
- EXISTING CMP CULVERT
- PROPOSED ROAD (750-FOOT TURNING RADIUS)
- PHASE GRADING BOUNDARY
- TOE OF SLOPE
- PROPOSED CONTOUR LINE
- PROPOSED RAMP
- PROPOSED TERRACE
- GUNITE-LINED DOWN DRAIN CANAL
- EARTHEN BERM
- CONCRETE-LINED INTERCEPTOR DRAIN CANAL
- OVERLAND SHEET FLOW



CROSS-SECTION A-A
SCALE: 1"=50'

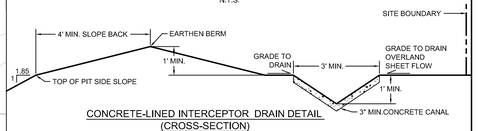


CROSS-SECTION B-B
SCALE: 1"=50'

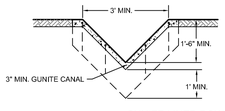


NOTES:
1. REQUIRED ON GRADED CUT AND FILL SLOPES AT NO MORE THAN 30' INTERVALS.
2. TERRACE SHALL HAVE LONGITUDINAL GRADE OF 5-12% AND MINIMUM DEPTH OF 1' AT THE FLOW LINE.

TYPICAL TERRACE CROSS-SECTION
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



CONCRETE-LINED INTERCEPTOR DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



NOTES:
1. DOWN DRAIN ANCHORS TO BE CONSTRUCTED EVERY 10' OF VERTICAL HEIGHT.
2. MINIMUM REINFORCING: #3 BARS AS SHOWN WITH #3 TIE BARS 4" O.C. ANCHOR DOWEL TO BE TIED TO LINGITUDINAL 6" WELDED WIRE STEEL MESH.

GUNITE-LINED DOWN DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.

NOTES:
1. MINIMUM INTERCEPTOR AND DOWN DRAIN SIZES SHOWN.
2. SIZES INCREASED AS NEEDED TO HANDLE PORTION OF CAPITAL FLOOD INFLOW.
3. GUNITE AND CONCRETE LININGS WILL BE REINFORCED WITH 6" WELDED WIRE STEEL MESH.
4. EARTHEN BERM REQUIRED ALONG TOP OF PIT SIDE SLOPE AS INDICATED.
5. INTERCEPTOR DRAIN REQUIRED ON SOUTHERN AND EASTERN SIDES OF MINE ONLY AS INDICATED.

SCALE (FEET)
0 50 100 200

N W E S

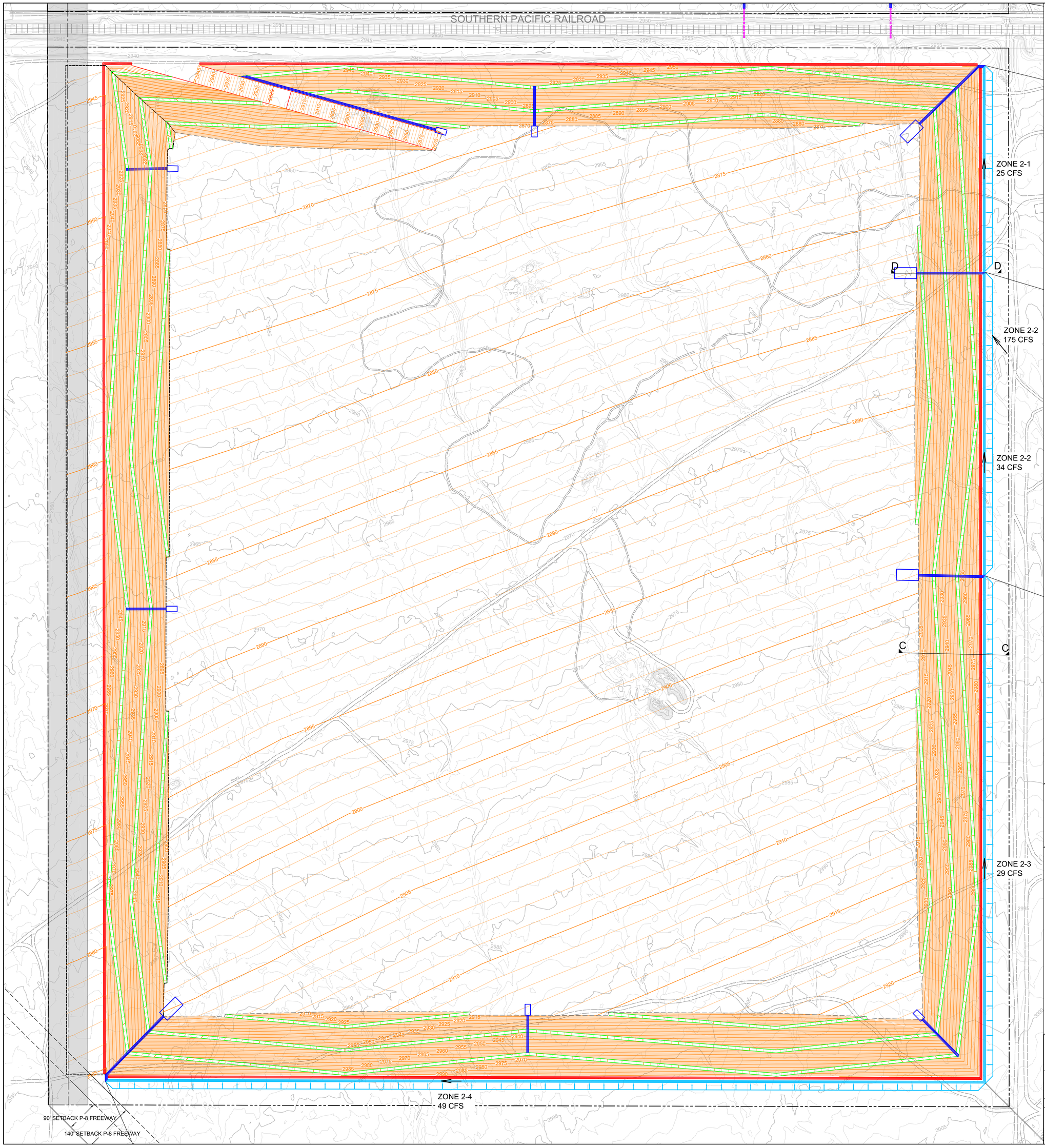
CONCEPTUAL GRADING AND DRAINAGE PLAN

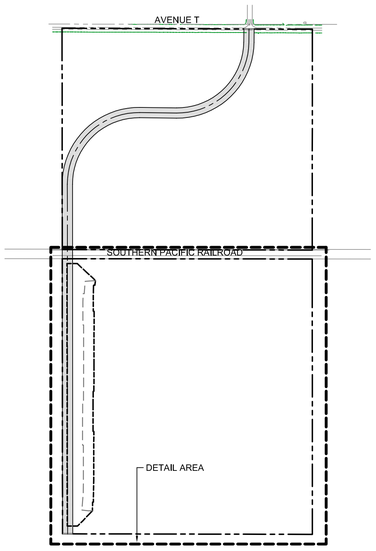
BIG ROCK CREEK SITE - ANTELOPE VALLEY - CALIFORNIA

ALTERNATIVE 1 (RADIUS = 750 FT)

FINAL RECLAMATION - NORTH PIT

Egineering Fill Volume: 2,896,000 CY	Date: December 5, 2008	JN: 2192
		Scale: 1" = 100'
		1 - Inch
STETSON ENGINEERS INC.	Topo Source: Inland Aerial Survey Inc. Date of Flight: 05/02/2006	SHEET
	Designed By: G. Trinidad / Drawn By: G. Trinidad	13
	Revised By: J. Reilly / Approved By:	

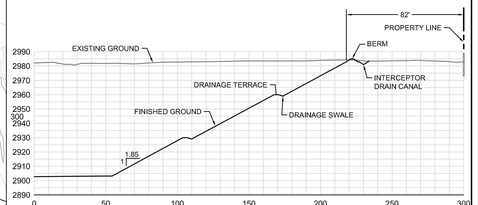




PROJECT OVERVIEW
Scale: 1" = 750'

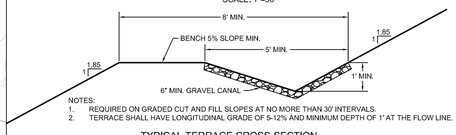
LEGEND

- PROPERTY BOUNDARY
- EXISTING CONTOUR LINE
- EXISTING DIRT ROAD
- EXISTING CMP CULVERT
- PROPOSED ROAD (750-FOOT TURNING RADIUS)
- PHASE GRADING BOUNDARY
- TOE OF SLOPE
- PROPOSED CONTOUR LINE
- PROPOSED RAMP
- PROPOSED TERRACE
- GUNITE-LINED DOWN DRAIN CANAL
- EARTHEN BERM
- CONCRETE-LINED INTERCEPTOR DRAIN CANAL
- OVERLAND SHEET FLOW



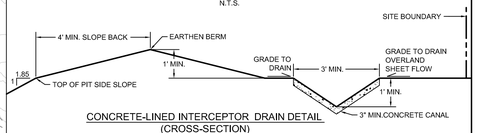
CROSS-SECTION C-C
SCALE: 1"=50'

CROSS-SECTION D-D
SCALE: 1"=50'

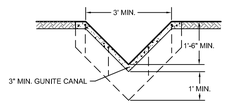


NOTES:
1. REQUIRED ON GRADED CUT AND FILL SLOPES AT NO MORE THAN 30' INTERVALS.
2. TERRACE SHALL HAVE LONGITUDINAL GRADE OF 5-12% AND MINIMUM DEPTH OF 1' AT THE FLOW LINE.

TYPICAL TERRACE CROSS-SECTION
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



CONCRETE-LINED INTERCEPTOR DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



NOTES:
1. DOWN DRAIN ANCHORS TO BE CONSTRUCTED EVERY 10' OF VERTICAL HEIGHT.
2. MINIMUM REINFORCING: #3 BARS AS SHOWN WITH #3 TIE BARS 4" O.C. ANCHOR DOWEL TO BE TIED TO LINGITUDINAL 6" WELDED WIRE STEEL MESH.

GUNITE-LINED DOWN DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.

NOTES:
1. MINIMUM INTERCEPTOR AND DOWN DRAIN SIZES SHOWN.
2. SIZES INCREASED AS NEEDED TO HANDLE PORTION OF CAPITAL FLOOD INFLOW.
3. GUNITE AND CONCRETE LININGS WILL BE REINFORCED WITH 6" WELDED WIRE STEEL MESH.
4. EARTHEN BERM REQUIRED ALONG TOP OF PIT SIDE SLOPE AS INDICATED.
5. INTERCEPTOR DRAIN REQUIRED ON SOUTHERN AND EASTERN SIDES OF MINE ONLY AS INDICATED.

SCALE (FEET)
0 50 100 200

N W E S

CONCEPTUAL GRADING AND DRAINAGE PLAN

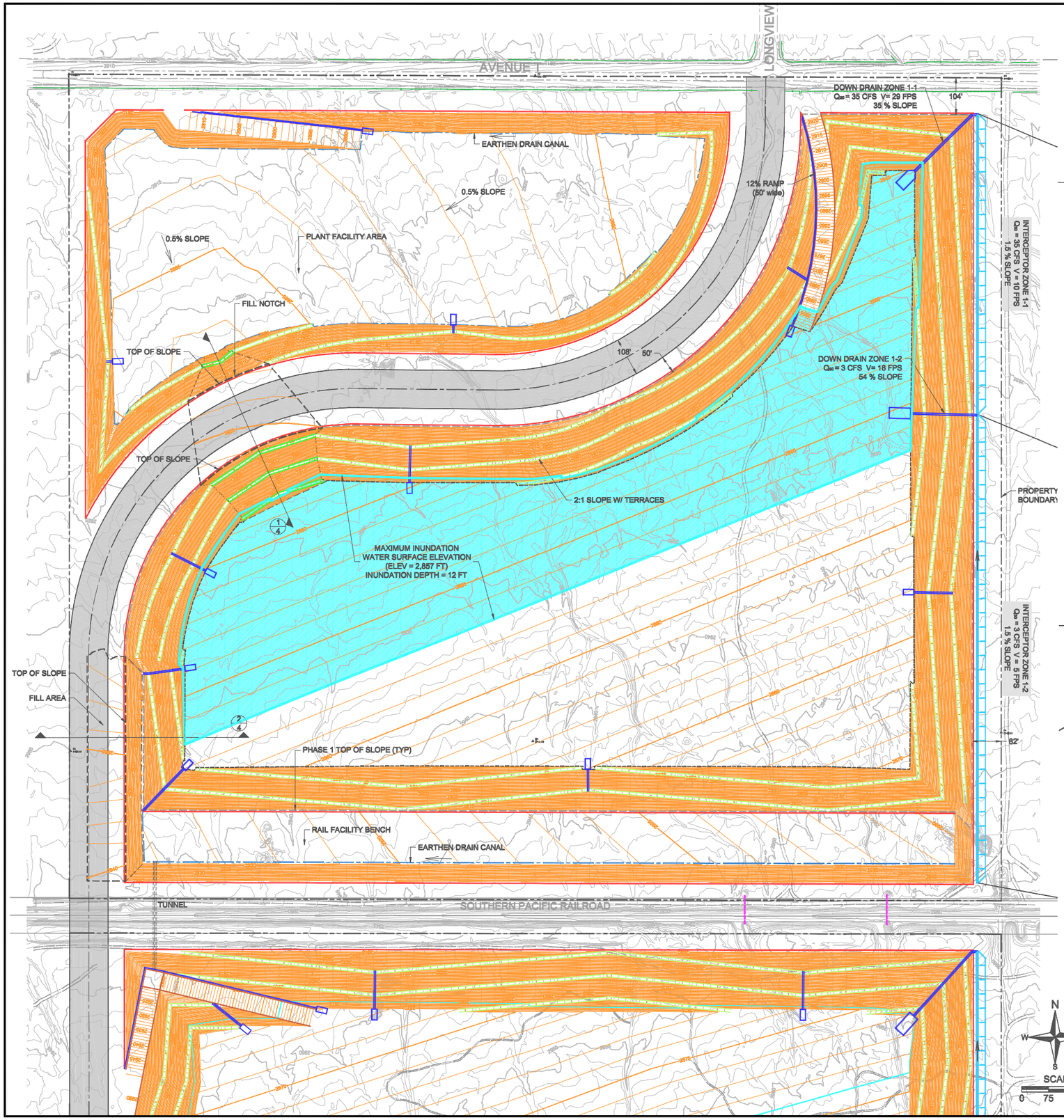
BIG ROCK CREEK SITE - ANTELOPE VALLEY - CALIFORNIA

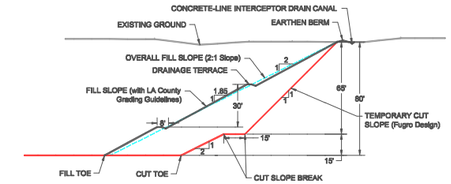
ALTERNATIVE 1 (RADIUS = 750 FT)

FINAL RECLAMATION - SOUTH PIT

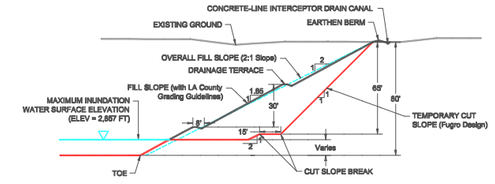
JN:	2192
Scale:	1" = 100'
	1 - Inch
Engineering Fill Volume: 838,000 CY	Date: December 5, 2008
Topo Source:	Inland Aerial Survey Inc. Date of Flight: 05/02/2006
Designed By: G. Trinidad	Drawn By: G. Trinidad
Revised By: J. Reilly	Approved By:
SHEET	14

STETSON ENGINEERS INC.

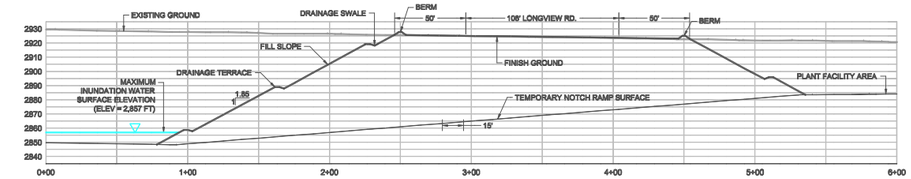




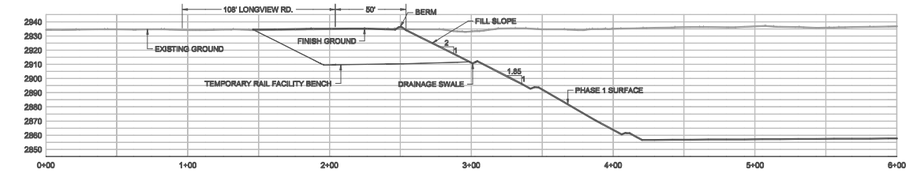
TYPICAL CUT AND FILL CROSS-SECTION
(WHERE BOTTOM PIT ELEVATION IS HIGHER THAN INUNDATION WATER SURFACE ELEVATION)
SCALE 1" = 50'



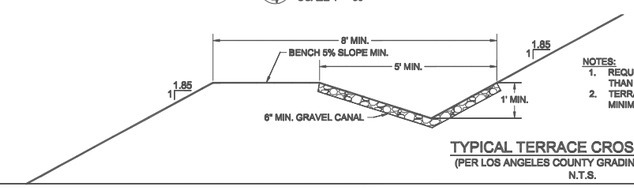
TYPICAL CUT AND FILL CROSS-SECTION
(WHERE BOTTOM PIT ELEVATION IS LOWER THAN INUNDATION WATER SURFACE ELEVATION)
SCALE 1" = 50'



1/4 CROSS-SECTION
SCALE 1" = 50'

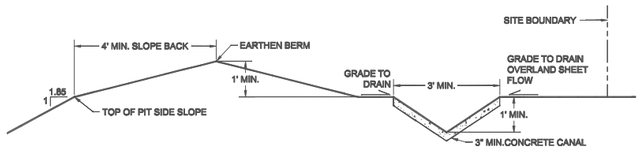


2/4 CROSS-SECTION
SCALE 1" = 50'

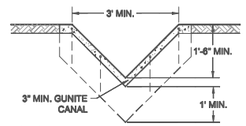


NOTES:
1. REQUIRED ON GRADED CUT AND FILL SLOPES AT NO MORE THAN 30' INTERVALS.
2. TERRACE SHALL HAVE LONGITUDINAL GRADE OF 5-12% AND MINIMUM DEPTH OF 1' AT THE FLOW LINE.

TYPICAL TERRACE CROSS-SECTION
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



CONCRETE-LINED INTERCEPTOR DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



NOTES:
1. DOWN DRAIN ANCHORS TO BE CONSTRUCTED EVERY 10' OF VERTICAL HEIGHT.
2. MINIMUM REINFORCING: #3 BARS AS SHOWN WITH #3 TIE BARS 4" O.C. ANCHOR DOWEL TO BE TIED TO LONGITUDINAL 6" WELDED WIRE STEEL MESH.

GUNITE-LINED DOWN DRAIN DETAIL
(CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.

NOTES:
1. MINIMUM INTERCEPTOR AND DOWN DRAIN SIZES SHOWN.
2. SIZES INCREASED AS NEEDED TO HANDLE PORTION OF CAPITAL FLOOD INFLOW.
3. GUNITE AND CONCRETE LININGS WILL BE REINFORCED WITH 6" WELDED WIRE STEEL MESH.
4. EARTHEN BERM REQUIRED ALONG TOP OF PIT SIDE SLOPE AS INDICATED.
5. INTERCEPTOR DRAIN REQUIRED ON SOUTHERN AND EASTERN SIDES OF MINE ONLY AS INDICATED.

LEGEND
- PROPERTY BOUNDARY
- 2950 EXISTING CONTOUR LINES
- EXISTING DIRT ROAD
- EXISTING CMP CULVERT
- PROPOSED ROAD (750-FOOT TURNING RADIUS)
- RECLAMATION FILL BOUNDARY
- 2870 FINAL CONTOUR LINES
- PROPOSED RAMP
- PROPOSED TERRACE
- EARTHEN BERM
- EARTHEN DRAIN CANAL
- GUNITE-LINED DOWN DRAIN CANAL
- CONCRETE-LINED INTERCEPTOR DRAIN CANAL
- OVERLAND SHEET FLOW

N W E S

SCALE (FEET)
0 75 150 300

NOTES:
1. ALL TEMPORARY CUT SLOPES ARE BASED ON PIT SLOPE STABILITY EVALUATION PREPARED BY FUGRO WEST, INC., MAY 2010.
2. ALL PERMANENT FILL SLOPE FOR THIS PHASE SHALL BE CONSTRUCTED PER LOS ANGELES COUNTY GRADING GUIDELINES. OVERALL FILL SLOPE IN THESE AREAS ARE 2(H):1(V) OR FLATTER.
3. SEE SHEET 1 FOR GRADING PLAN ON RAIL FACILITY BENCH AND PLANT FACILITY AREAS.

CONCEPTUAL GRADING AND DRAINAGE PLAN
BIG ROCK CREEK SITE - ANTELOPE VALLEY - CALIFORNIA

LOWERED FACILITIES ALTERNATIVE
FINAL RECLAMATION NORTH PIT GRADING AND DRAINAGE PLAN

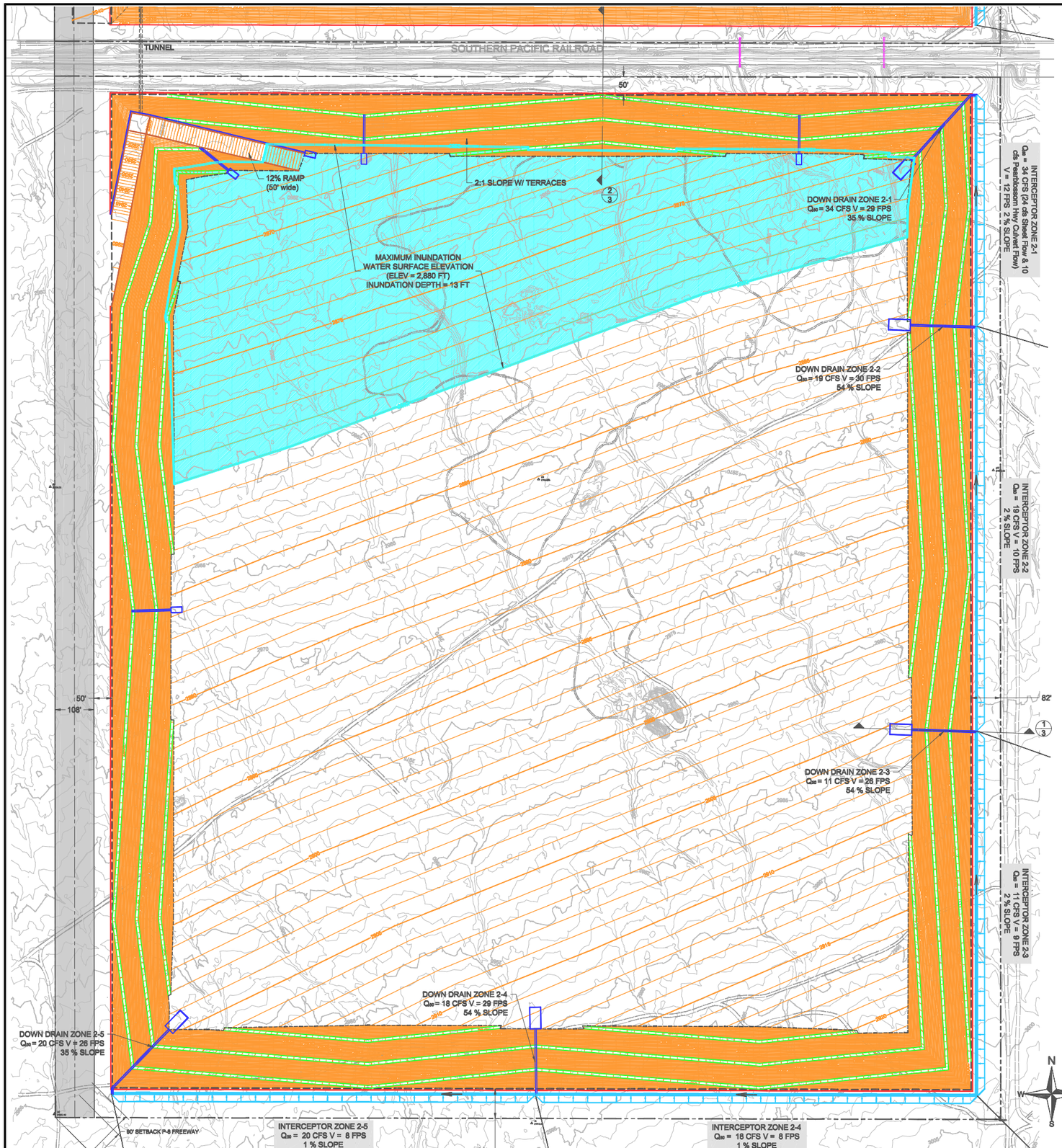
Fill Volume: 185,700 CY	Date: July 27, 2010	JN: 2192
		Scale: 1" = 150'
		1 - Inch
Topo Source: Inland Aerial Survey Inc. Date of Flight: 05/02/2006		SHEET 4 of 5
Designed By: G. Trinidad	Drawn By: G. Trinidad	
Revised By: J. Reilly	Approved By:	

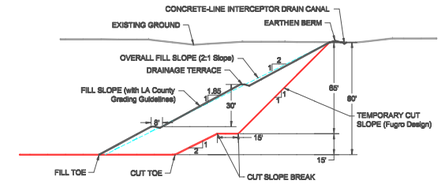
STETSON ENGINEERS INC.

Lowered Facilities Alternative
Final Reclamation- North Pit
Big Rock Creek Site
Antelope Valley, California

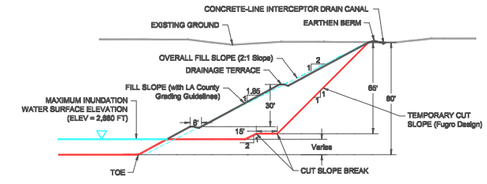
FIGURE 73

SCALE: AS SHOWN
DATE: 7-30-2010

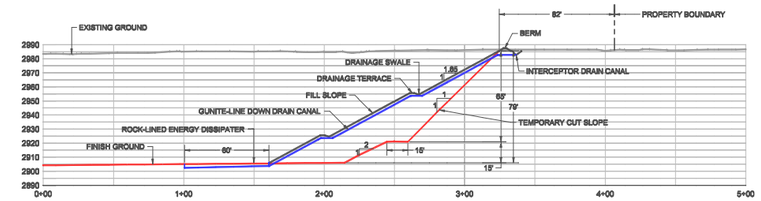




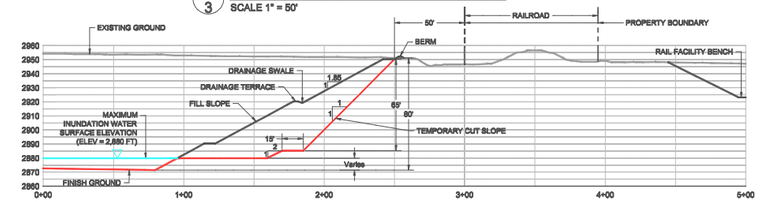
TYPICAL CUT AND FILL CROSS-SECTION
(WHERE BOTTOM PIT ELEVATION IS HIGHER THAN INUNDATION WATER SURFACE ELEVATION)
SCALE 1" = 50'



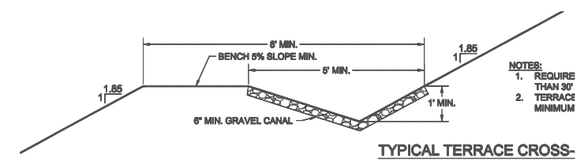
TYPICAL CUT AND FILL CROSS-SECTION
(WHERE BOTTOM PIT ELEVATION IS LOWER THAN INUNDATION WATER SURFACE ELEVATION)
SCALE 1" = 50'



1/3 DOWN DRAIN CANAL CROSS-SECTION
SCALE 1" = 50'

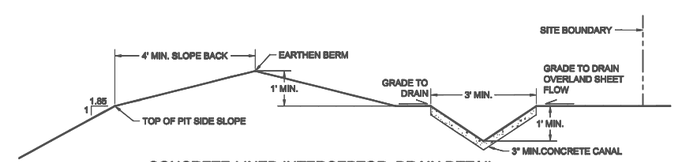


2/3 CUT AND FILL CROSS-SECTION
SCALE 1" = 50'

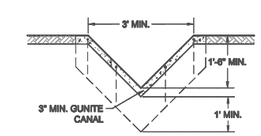


NOTES:
1. REQUIRED ON GRADED CUT AND FILL SLOPES AT NO MORE THAN 30' INTERVALS.
2. TERRACE SHALL HAVE LONGITUDINAL GRADE OF 5-12% AND MINIMUM DEPTH OF 1' AT THE FLOW LINE.

TYPICAL TERRACE CROSS-SECTION
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



CONCRETE-LINED INTERCEPTOR DRAIN DETAIL (CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.



NOTES:
1. DOWN DRAIN ANCHORS TO BE CONSTRUCTED EVERY 10' OF VERTICAL HEIGHT.
2. MINIMUM REINFORCING: #3 BARS AS SHOWN WITH #3 TIE BARS 4" O.C. ANCHOR DOWEL TO BE TIED TO LONGITUDINAL 6" WELDED WIRE STEEL MESH.

GUNITE-LINED DOWN DRAIN DETAIL (CROSS-SECTION)
(PER LOS ANGELES COUNTY GRADING GUIDELINES)
N.T.S.

NOTES:
1. MINIMUM INTERCEPTOR AND DOWN DRAIN SIZES SHOWN.
2. SIZES INCREASED AS NEEDED TO HANDLE PORTION OF CAPITAL FLOOD INFLOW.
3. GUNITE AND CONCRETE LININGS WILL BE REINFORCED WITH 6" WELDED WIRE STEEL MESH.
4. EARTHEN BERM REQUIRED ALONG TOP OF PIT SIDE SLOPE AS INDICATED.
5. INTERCEPTOR DRAIN REQUIRED ON SOUTHERN AND EASTERN SIDES OF MINE ONLY AS INDICATED.

LEGEND
- PROPERTY BOUNDARY
- EXISTING CONTOUR LINES (2950)
- EXISTING DIRT ROAD
- EXISTING CMP CULVERT
- PROPOSED ROAD (750-FOOT TURNING RADIUS)
- FINAL CONTOUR LINES (2870)
- PROPOSED RAMP
- PROPOSED TERRACE
- TOE OF FILL SLOPE
- EARTHEN BERM
- GUNITE-LINED DOWN DRAIN CANAL
- CONCRETE-LINED INTERCEPTOR DRAIN CANAL
- OVERLAND SHEET FLOW

NOTES:
1. ALL TEMPORARY CUT SLOPES ARE BASED ON PIT SLOPE STABILITY EVALUATION PREPARED BY FUGRO WEST, INC., MAY 2010.
2. ALL PERMANENT FILL SLOPE FOR THIS PHASE SHALL BE CONSTRUCTED PER LOS ANGELES COUNTY GRADING GUIDELINES. OVERALL FILL SLOPE IN THESE AREAS ARE 2(H):1(V) OR FLATTER.
3. SEE SHEET 1 FOR GRADING PLAN ON RAIL FACILITY BENCH.

CONCEPTUAL GRADING AND DRAINAGE PLAN
BIG ROCK CREEK SITE - ANTELOPE VALLEY - CALIFORNIA

LOWERED FACILITIES ALTERNATIVE
FINAL RECLAMATION SOUTH PIT GRADING AND DRAINAGE PLAN

Cut Volume: 0 CY	Date: July 27, 2010	JN: 2192
		Scale: 1" = 150'
		1 - Inch
Topo Source: Inland Aerial Survey Inc. Date of Flight: 05/02/2006		SHEET 5 of 5
Designed By: G. Trinidad	Drawn By: G. Trinidad	
Revised By: J. Reilly	Approved By:	

STETSON ENGINEERS INC.

Lowered Facilities Alternative
Final Reclamation - South Pit
Big Rock Creek Site
Antelope Valley, California

FIGURE 74

SCALE: AS SHOWN
DATE: 7-30-2010

APPENDIX B
LOS ANGELES COUNTY (2013) REVIEW SHEET

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

SOILS ENGINEERING REVIEW SHEET

Address: 900 S. Fremont Ave., Alhambra, CA 91803
Telephone: (626) 458-4925
Fax: (626) 458-4913

District Office ---
PCA GMPH
Sheet 1 of 1

DISTRIBUTION:
___ Drainage
___ Grading
1 Geo/Soils Central File
___ District Engineer
___ Geologist
1 Soils Engineer
___ Engineer/Architect

Surface Mine (Big Rock Creek Mine)

Location: Avenue T & 121st Street East, Pearblossom
Developer/Owner: ---
Engineer/Architect: ---
Soils Engineer: Fugro West, Inc. (3543.001.04)
Geologist: ---

SMP No. 200700001

Review of:

Conceptual Grading Plans Dated **7/27/10**
Soils Engineering Reports Dated **5/17/10**, **9/20/06**

REMARKS:

1. Submit an update soils report/letter, which addresses and evaluates current site conditions and the most recent plans, for all reports older than one year to verify the validity and applicability of the original soils report.

2. Provide a signed and stamped copy of the soils report dated 9/20/06.

3. Provide data to substantiate the shear strength parameters of the native older alluvium used in the slope stability analyses. Provide revised slope stability analyses and recommend mitigation if factors of safety are below the County minimum standards, as necessary.

4. Provide static and seismic slope stability analyses for the proposed typical cut and fill slopes as shown on Figures 73 and 74 of the conceptual grading plans dated 7/27/10 where the bottom pit elevation is lower than the maximum inundation water surface elevation. Recommend mitigation if factors of safety are below the County minimum standards.

5. Provide surficial slope stability analyses for the proposed cut and fill slopes. Recommend mitigation if factors of safety are below the County minimum standards.

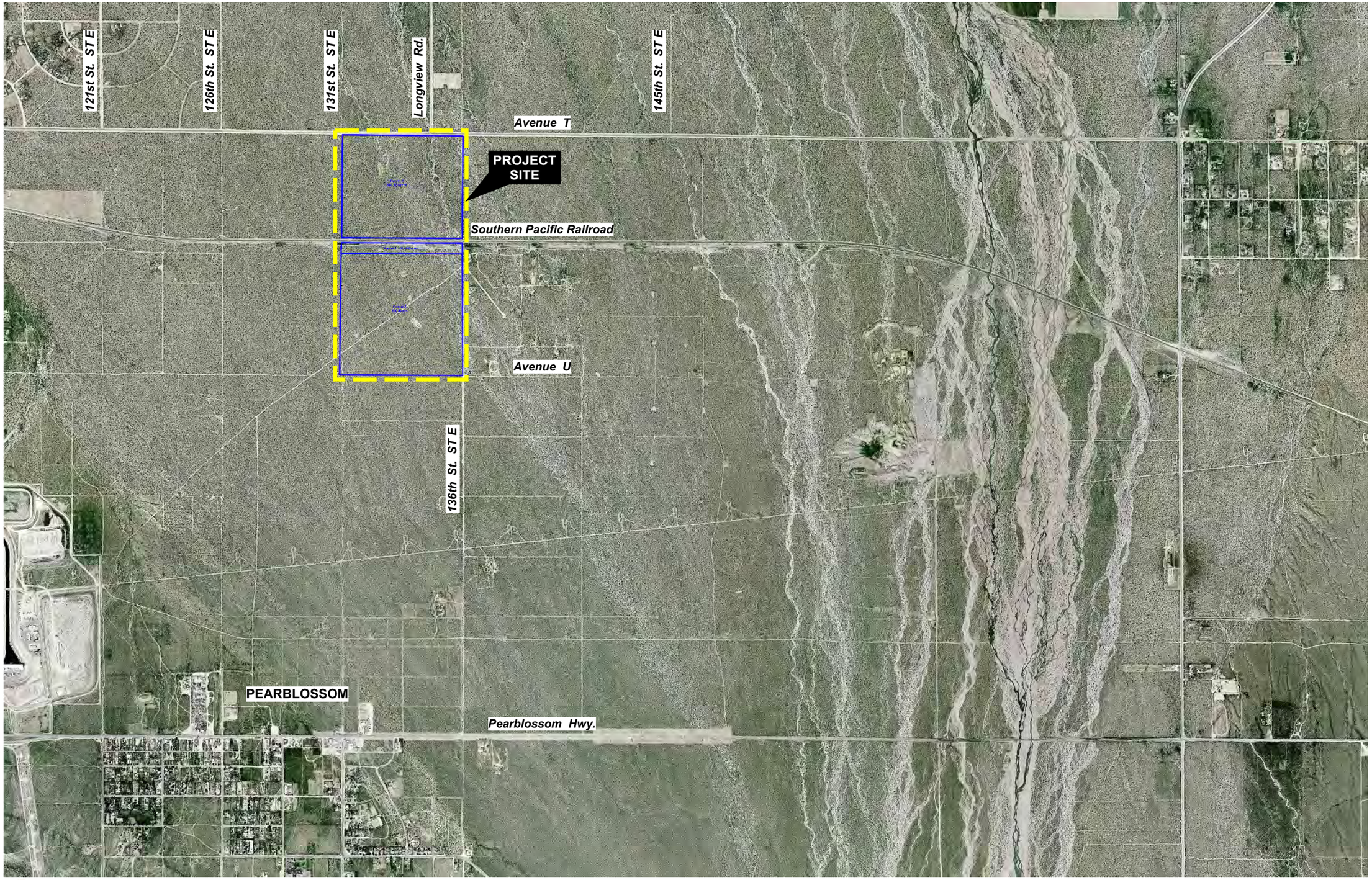
6. Include a copy of this review sheet with your response.

Prepared by _____ Date 7/2/13
Jeremy Wan

Please complete a Customer Service Survey at http://dpw.lacounty.gov/go/gmedsurvey.
NOTICE: Public safety, relative to geotechnical subsurface exploration, shall be provided in accordance with current codes for excavations, inclusive of the Los Angeles County Code, Chapter 11.48, and the State of California, Title 8, Construction Safety Orders.
P:\gmepub\Development Review\Soils Review\Jeremy\Avenue T & 121st Street East (Big Rock Creek Mine), Pearblossom, SMP_1.docx

APPENDIX C
SITE AND SUBSURFACE CONDITIONS

APPENDIX C-1
FUGRO (2006) SUBSURFACE EXPLORATION AND LABORATORY TEST RESULTS



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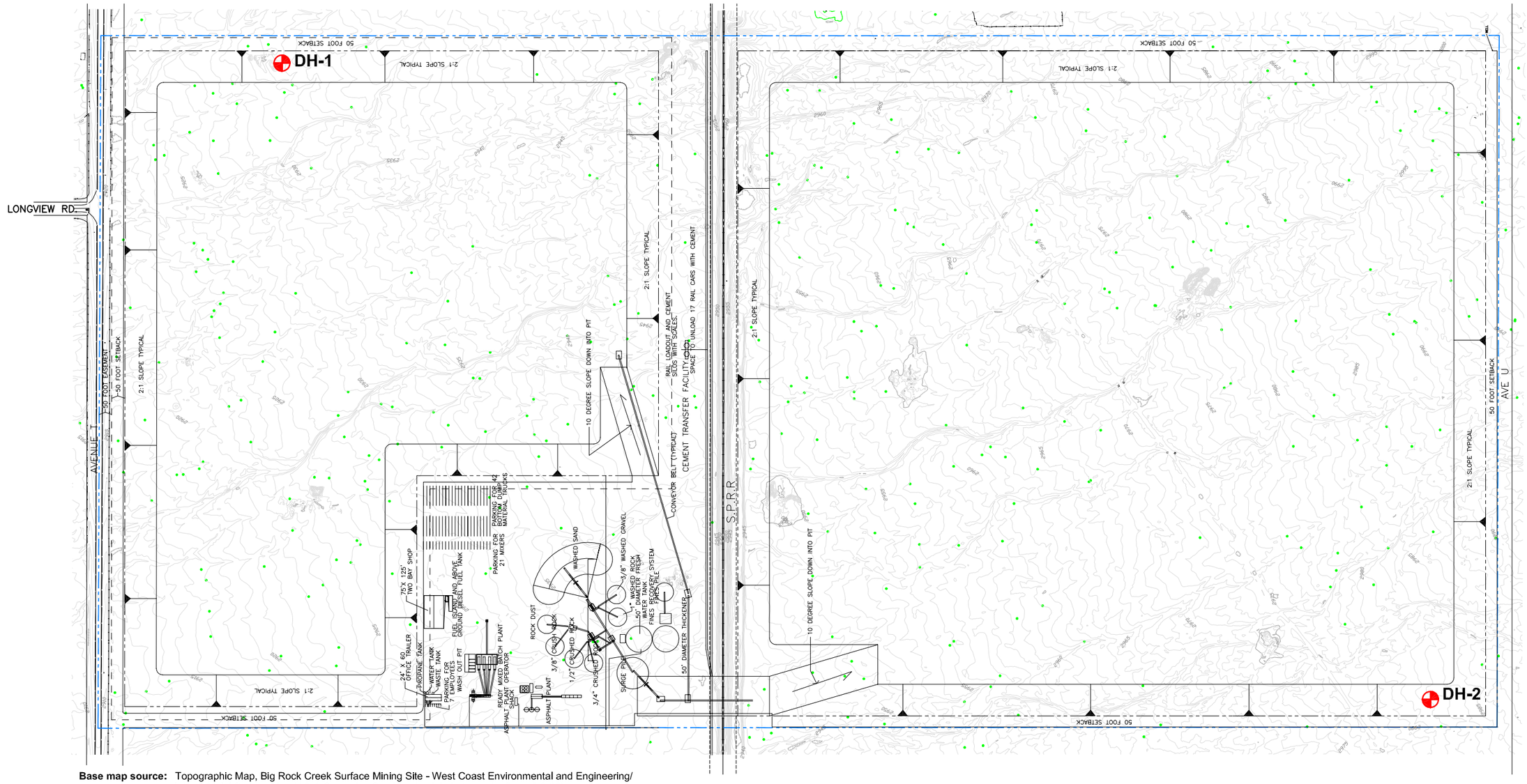
NORTH
0 1000 2000
FEET
(Approximate Scale)

VICINITY MAP
Big Rock Creek Mine
Los Angeles County, California

PLATE 1



Base map source: Topographic Map, Big Rock Creek Surface Mining Site - West Coast Environmental and Engineering/ Inland Aerial Surveys, Inc./J & A Surveying Services (aerial photography flown 5-2-06).

KEY	
PROPERTY	
FENCE	
RAILROAD	
SINGLE TREE	
CONTOUR INTERVAL = 1 FOOT	

LEGEND

DH-2 Approximate drill hole location

NORTH

0 400 800
FEET

SITE LAYOUT AND EXPLORATION PLAN
Big Rock Creek Mine
Los Angeles County, California

PLATE 2

M:\drafting\jobfiles\2006\3543.001\mcf100-site layout.dwg(0,2-6),mcf100.ctb,9-20-06

APPENDIX A - FIELD EXPLORATION

APPENDIX A
FIELD EXPLORATION

INTRODUCTION

The contents of this appendix shall be integrated with the geotechnical engineering study of which it is a part. The data contained in this appendix shall not be used in whole or in part as a sole source for information or recommendations regarding the subject site.

Subsurface exploration for this study consisted of two drill holes. Approximate exploration locations are shown on Plate 2. Exploration locations were determined by tape measurements from various references on the site. Their location should be considered accurate only to the degree implied by the method used.

DRILLING AND SAMPLING

Drill holes were excavated to depths of about 80 and 90 feet using a truck-mounted, hollow-stem-auger drill rig supplied by S & G Drilling Company of Lompoc, California. Drill holes were sampled at selected intervals using a 2-3/8-inch-inside-diameter (ID) thick-walled Modified California Sampler and a 1-3/4-inch-ID Standard Penetration sampler driven using an automatic trip hammer. In addition to driven samples, bulk samples of representative materials were also collected.

EXPLORATION LOGS

Subsurface exploration log holes describe the earth materials encountered, sampling method used, and field and laboratory tests performed. The logs also show the location, identification designation, date of start and completion, and the name of the logger and drilling or backhoe subcontractor.

A Fugro field representative/geologist logged the exploration in general accordance with ASTM D2488 for visual soil classification. Boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual and may change with time. The logs of the drill holes are presented as Plates A-1 and A-2- Log of Drill Hole. A legend to the logs is presented on Plate A-3 - Key to Terms & Symbols Used on Logs.

Following completion of the exploration and sampling effort, each drill hole was backfilled with the cuttings. Excess soil materials were mounded onsite. Backfill in drill holes may settle with time. The property owner should periodically check the drill-hole locations and refill as necessary.

LOCATION: 675' S of Ave T on 136th St E, then 108' W

SURFACE EL: 2932 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
						ALLUVIUM (Qal) Poorly-graded GRAVEL (GP) and silty gravel (GP-GM) with sand: dense, light brown, dry, trace cobbles							
2930	2												
2928	4												
2926	6		1		(20)								
2924	8												
2922	10		2		(24/50/ 11.5")								
2920	12												
2918	14												
2916	16		3		50								
2914	18												
2912	20		4		(31)		127	121	5				
2910	22												
2908	24												
2906	26		5		45								
2904	28												
2902	30		6		(33/50/ 9")								
2900	32												
2898	34												
2896	36		7		(REF/ 5.5")		109	107	2	4			
2894	38												
2892	40		8 B1		(REF/ 5.5")	- sandier below 40'	121	109	3	16			
2890	42												
2888	44												
2886	46		9		(78)								
2884	48												

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 91.5 ft
DEPTH TO WATER: 70.0 ft
BACKFILLED WITH: Native Materials
DRILLING DATE: August 15, 2006

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: S/G Drilling
LOGGED BY: C Butler
CHECKED BY: S M Bryant P.E.

LOG OF DRILL HOLE NO. DH-1

Big Rock Creek Mine
Pearblossom, California

PLATE A-1a

LOCATION: 675' S of Ave T on 136th St E, then 108' W

SURFACE EL: 2932 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
		10		(13/50/10")	Silty SAND (SM): yellowish brown, moist, some gravel, moderately cemented							
2880	52											
2878	54											
2876	56	11		50/5"	- uncemented 55-65'							
2874	58											
2872	60	12		(REF/5.5")	- light brown at 60'							
2870	62											
2868	64											
2866	66	13		(67)	- cemented below 65'	128	99	30	69	32	NP	
2864	68											
2862	70	14		17	**OLDER ALLUVIUM (Qoal)** Silty CLAY (CL-ML) with sand: olive, wet, cemented							
2860	72											
2858	74											
2856	76	15		(79)		138	123	12		24	6	
2854	78											
2852	80	16		(77)	- dark brown, strong cementation at 80'	136	118	15				
2850	82											
2848	84											
2846	86	17 B2		14/50/11.5"	- dark brown and olive, medium dense to very dense at 85'							
2844	88											
2842	90	18										
2840	92											
2838	94											
2836	96											
2834	98											

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 91.5 ft
DEPTH TO WATER: 70.0 ft
BACKFILLED WITH: Native Materials
DRILLING DATE: August 15, 2006

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: S/G Drilling
LOGGED BY: C Butler
CHECKED BY: S M Bryant P.E.

LOG OF DRILL HOLE NO. DH-1

Big Rock Creek Mine
Pearblossom, California

PLATE A-1b

LOCATION: 250' N of Ave U on 131st St E, then 100'#

SURFACE EL: 2988 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
						ALLUVIUM (Qal) Poorly-graded GRAVEL (GP) and silty gravel (GP-GM) with sand: dense, light brown, dry, trace cobbles							
2986	2												
2984	4												
2982	6		18		(16/50/11")								
2980	8												
2978	10		19		(34)								
2976	12												
2974	14												
2972	16		20		35/50/10"								
2970	18												
2968	20		21		(27/50/9")	- light brown at 20'	112	110	2	5			
2966	22												
2964	24												
2962	26		22		(96)	- brown 25'							
2960	28												
2958	30		23 B3		REF/5.5"	- tan at 30'							
2956	32												
2954	34												
2952	36		24		(37/50/9")	- brown, tr-moist at 35'	102	100	2	6			
2950	38												
2948	40		25		(REF/5")	- dry at 40'							
2946	42												
2944	44												
2942	46		26		(36/50/9")								
2940	48												

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 80.0 ft
DEPTH TO WATER: Not Encountered
BACKFILLED WITH: Native Materials
DRILLING DATE: August 16, 2006

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: S/G Drilling
LOGGED BY: C Butler
CHECKED BY: S M Bryant P.E.

LOG OF DRILL HOLE NO. DH-2

Big Rock Creek Mine
Pearblossom, California

PLATE A-2a

LOCATION: 250' N of Ave U on 131st St E, then 100'#

SURFACE EL: 2988 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
		27	(REF/ 2")	**ALLUVIUM (Qal)** Poorly-graded GRAVEL (GP) and silty gravel (GP-GM) with sand: dense, light brown, dry, trace cobbles							
2936	52										
2934	54										
2932	56	28	(72)	Silty SAND (SM): light brown to dark brown, trace gravel							
2930	58										
2928	60	29	38	Silty SAND (SM): medium dense, brown, dry, strong, cemented							
2926	62										
2924	64										
2922	66	30	REF/ 3"	- no sample, highly cemented silty sand out of the tip at 65'							
2920	68										
2918	70	31 B4	(70)	**OLDER ALLUVIUM (Qoal)** SILT (ML) with sand: medium dense to dense, brown, moist, stiff, cemented	133	113	18	61			
2916	72										
2914	74										
2912	76	32	61	- not cemented at 75'							
2910	78										
2908	80			- refusal at 80'							
2906	82										
2904	84										
2902	86										
2900	88										
2898	90										
2896	92										
2894	94										
2892	96										
2890	98										

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 80.0 ft
DEPTH TO WATER: Not Encountered
BACKFILLED WITH: Native Materials
DRILLING DATE: August 16, 2006

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: S/G Drilling
LOGGED BY: C Butler
CHECKED BY: S M Bryant P.E.

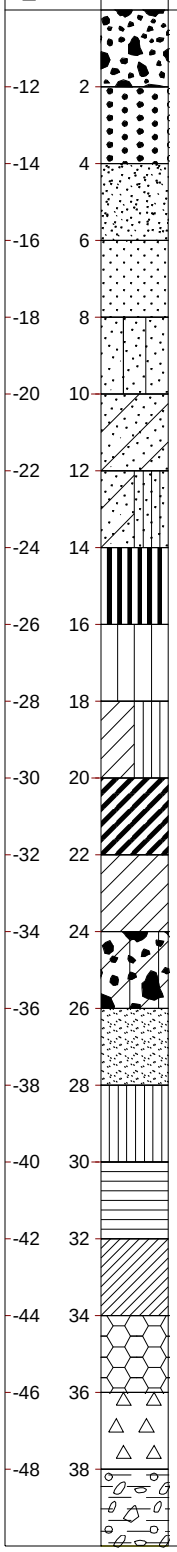
LOG OF DRILL HOLE NO. DH-2

Big Rock Creek Mine
Pearblossom, California

PLATE A-2b

LOCATION: The drill hole location referencing local landmarks or coordinates

SURFACE EL: Using local, MSL, MLLW or other datum



SAMPLE NO.	SAMPLES	BLOW COUNT / REC"/DRIVE"	MATERIAL DESCRIPTION	
1		25	Well graded GRAVEL (GW)	COARSE GRAINED
2		(25)	Poorly graded GRAVEL (GP)	COARSE GRAINED
3		(25)	Well graded SAND (SW)	COARSE GRAINED
4		(25)	Poorly graded SAND (SP)	COARSE GRAINED
5		18"/ 30"	Silty SAND (SM)	COARSE GRAINED
6			Clayey SAND (SC)	COARSE GRAINED
7			Silty, Clayey SAND (SC-SM)	COARSE GRAINED
8		20"/ 24"	Elastic SILT (MH)	FINE GRAINED
9		(25)	SILT (ML)	FINE GRAINED
10		30"/ 30"	Silty CLAY (CL-ML)	FINE GRAINED
11		20"/ 24"	Fat CLAY (CH)	FINE GRAINED
12	●		Lean CLAY (CL)	FINE GRAINED
13			CONGLOMERATE	ROCK
			SANDSTONE	ROCK
			SILTSTONE	ROCK
			MUDSTONE	ROCK
			CLAYSTONE	ROCK
			BASALT	ROCK
			ANDESITE BRECCIA	ROCK
			Paving and/or Base Materials	

General Notes

Soil Texture Symbol

Sloped line in symbol column indicates transitional boundary

Samplers and sampler dimensions
(unless otherwise noted in report text) are as follows:

Symbol for:

1	SPT Sampler, driven 1-3/8" ID, 2" OD
2	CA Liner Sampler, driven 2-3/8" ID, 3" OD
3	CA Liner Sampler, disturbed 2-3/8" ID, 3" OD
4	Thin-walled Tube, pushed 2-7/8" ID, 3" OD
5	Bulk Bag Sample (from cuttings)
6	CA Liner Sampler, Bagged
7	Hand Auger Sample
8	CME Core Sample
9	Pitcher Sample
10	Lexan Sample
11	Vibracore Sample
12	No Sample Recovered
13	Sonic Soil Core Sample

Sampler Driving Resistance

Number of blows with 140 lb. hammer, falling 30" to drive sampler 1 ft. after seating sampler 6"; for example,

Blows/ft	Description
25	25 blows drove sampler 12" after initial 6" of seating
86/11"	After driving sampler the initial 6" of seating, 36 blows drove sampler through the second 6" interval, and 50 blows drove the sampler 5" into the third interval
50/6"	50 blows drove sampler 6" after initial 6" of seating
Ref/3"	50 blows drove sampler 3" during initial 6" seating interval

Blow counts for California Liner Sampler shown in ( )

Length of sample symbol approximates recovery length

Classification of Soils per ASTM D2487 or D2488

Geologic Formation noted in bold font at the top of interpreted interval

Strength Legend

Q = Unconfined Compression
u = Unconsolidated Undrained Triaxial
t = Torvane
p = Pocket Penetrometer
m = Miniature Vane

Water Level Symbols

- Initial or perched water level
- Final ground water level
- Seepages encountered

Rock Quality Designation (RQD) is the sum of recovered core pieces greater than 4 inches divided by the length of the cored interval.

KEY TO TERMS & SYMBOLS USED ON LOGS

PLATE A-3

APPENDIX B
LABORATORY TEST RESULTS

APPENDIX B
LABORATORY TEST RESULTS

INTRODUCTION

The contents of this appendix shall be integrated with the geotechnical engineering study of which it is a part. The data contained in this appendix shall not be used in whole or in part as a sole source for information or recommendations regarding the subject site.

LABORATORY ANALYSIS

Laboratory tests were performed on selected samples to estimate engineering characteristics of the various earth materials encountered. Testing was performed in general accordance with ASTM Standards for Soil Testing, latest revision. The results of the laboratory analyses are summarized on Plates B-1 - Summary of Laboratory Test Results.

LABORATORY MOISTURE AND DENSITY DETERMINATIONS

Moisture content and dry density determinations were performed on selected driven ring samples collected to evaluate the natural water content and dry density of the various soils encountered in accordance with ASTM D2937. The results are presented on Plates B-1 and on the respective drill-hole logs (Appendix A).

GRAIN SIZE DISTRIBUTION

Grain-size distribution analyses were determined for selected soil samples in accordance with standard test method ASTM D422. The grain-size curves are presented on Plate B-2 - Grain Size Curves. Percentages of soil, by dry weight, passing No. 200 sieve are shown on Plates B-1 and on the respective drill-hole logs.

ATTERBERG LIMITS TESTS

Atterberg limits tests were performed on two selected samples. Liquid and plastic limits were determined in accordance with standard test method ASTM D4318. The test results are shown on Plates B-3 - Plasticity Chart, and on the respective drill-hole logs.

DIRECT SHEAR TESTS.

Two sets of direct shear tests were performed on representative remolded samples to evaluate the shear strength of earth materials. The tests were performed in accordance with standard test method ASTM D-3080. Summary plots of the direct shear data are presented on Plates B-4a through B-4b - Direct Shear Test Results.

For testing in the 2.4-inch-diameter direct shear box, the maximum particle size should be no greater than 1/10 of the specimen diameter. Because of the gravel content, materials selected for testing were extracted from the ring liners and screened through the No. 4 sieve. Subsequently, the materials were reconstituted by compacting the materials to a target dry

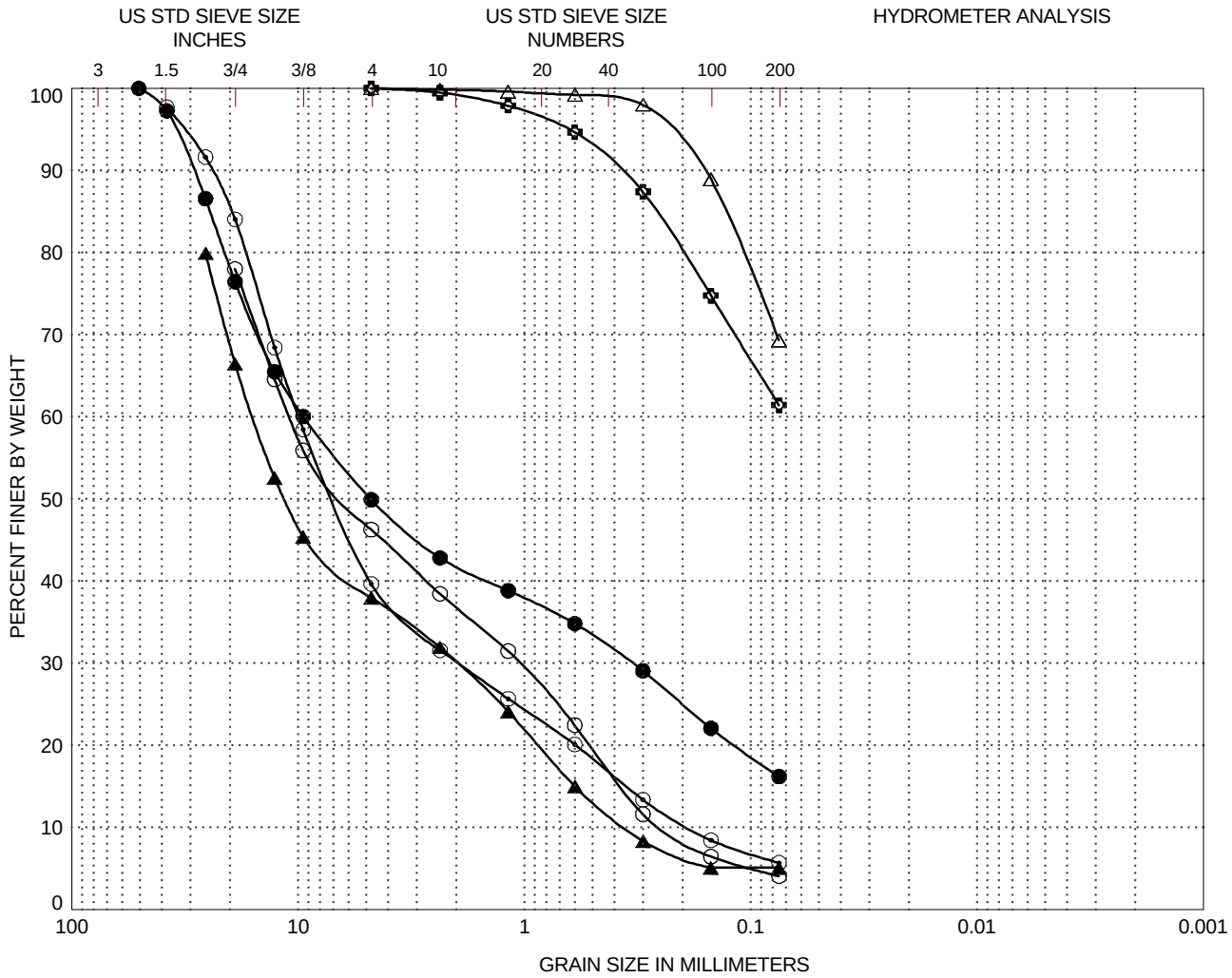
density of about 110 pcf and a target moisture content of about 10 percent. The target values were selected after review of measured in situ dry density and moisture content values.

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC %	FINES %	ATTERBERG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	SPECIFIC GRAVITY
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4 (%)				
DH-1	20.0	4	GRAVEL (GP) and silty gravel (GP-GM)	127	121	5																	
DH-1	35.0	7	GRAVEL (GP) and silty gravel (GP-GM)	109	107	2	4																
DH-1	40.0	8	GRAVEL (GP) and silty gravel (GP-GM)	121	109	3	16					0.0	39										
DH-1	65.0	13	Silty SAND (SM)	128	99	30	69	32	NP														
DH-1	75.0	15	Silty CLAY (CL-ML) with sand	138	123	12		24	6														
DH-1	80.0	16	Silty CLAY (CL-ML) with sand	136	118	15																	
DH-2	20.0	21	GRAVEL (GP) and silty gravel (GP-GM)	112	110	2	5																
DH-2	35.0	24	GRAVEL (GP) and silty gravel (GP-GM)	102	100	2	6					0.0	42										
DH-2	70.0	31	SILT (ML) with sand	133	113	18	61																

SUMMARY OF LABORATORY TEST RESULTS

Big Rock Creek Mine
Pearblossom, California

LAB SUMMARY TABLE VENTURA N:\PROJECTS\3543_MCGEE\3543-001_BIGROCKCREEK\EXPLORATIONS\GINT\2006\VAL006.GPJ 9/21/06 02:06 PM-cab

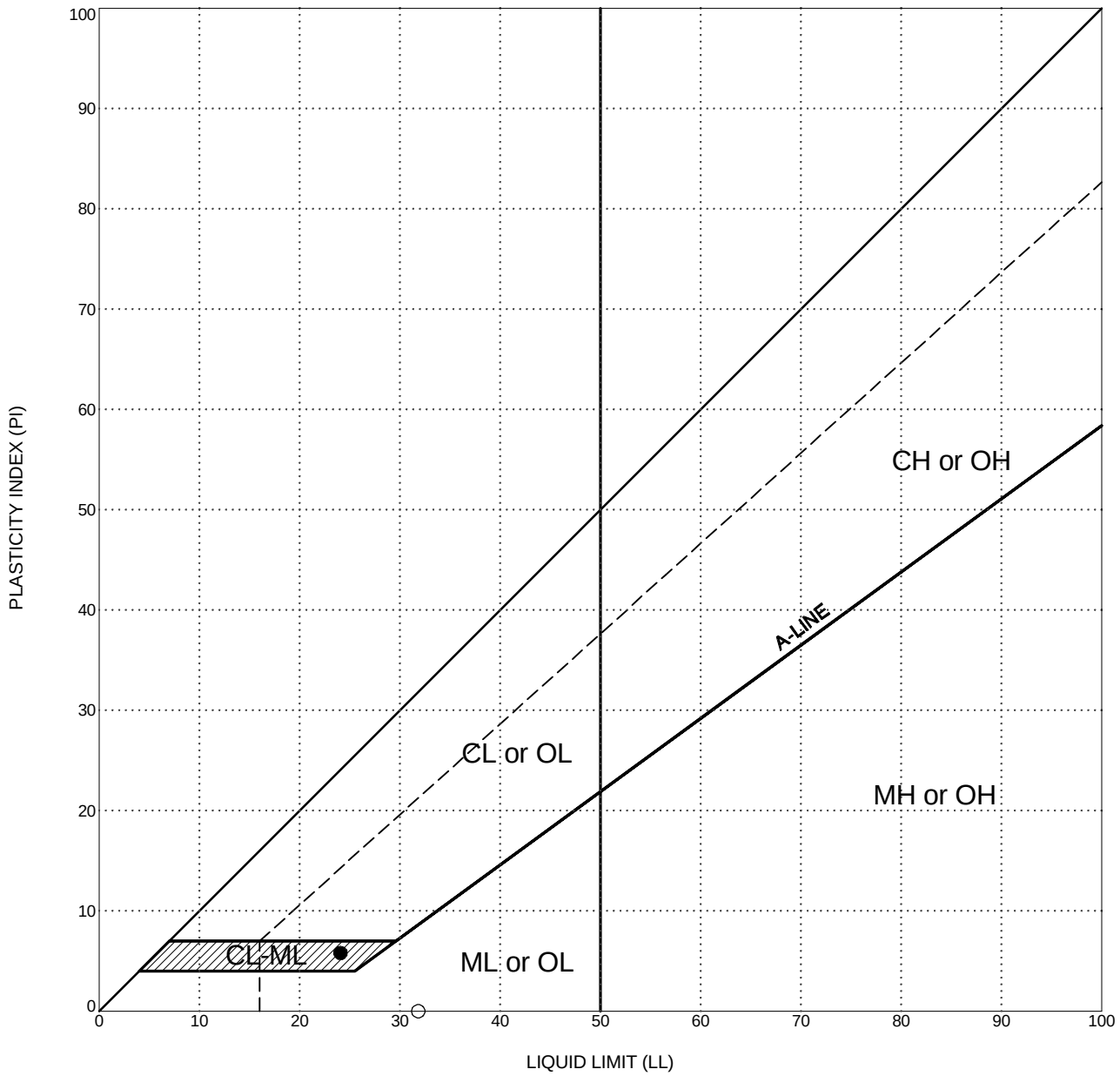


GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

LEGEND	(location)	(depth,ft)	CLASSIFICATION	Cc	Cu
○	DH-1	35.0	GRAVEL (GP) and silty gravel (GP-GM)	0.4	45.1
●	DH-1	40.0	GRAVEL (GP) and silty gravel (GP-GM)		
△	DH-1	65.0	Silty SAND (SM)		
▲	DH-2	20.0	GRAVEL (GP) and silty gravel (GP-GM)	0.7	44.3
⊙	DH-2	35.0	GRAVEL (GP) and silty gravel (GP-GM)	2.1	53.2
✿	DH-2	70.0	SILT (ML) with sand		

GRAIN SIZE CURVES
Big Rock Creek Mine
Pearblossom, California

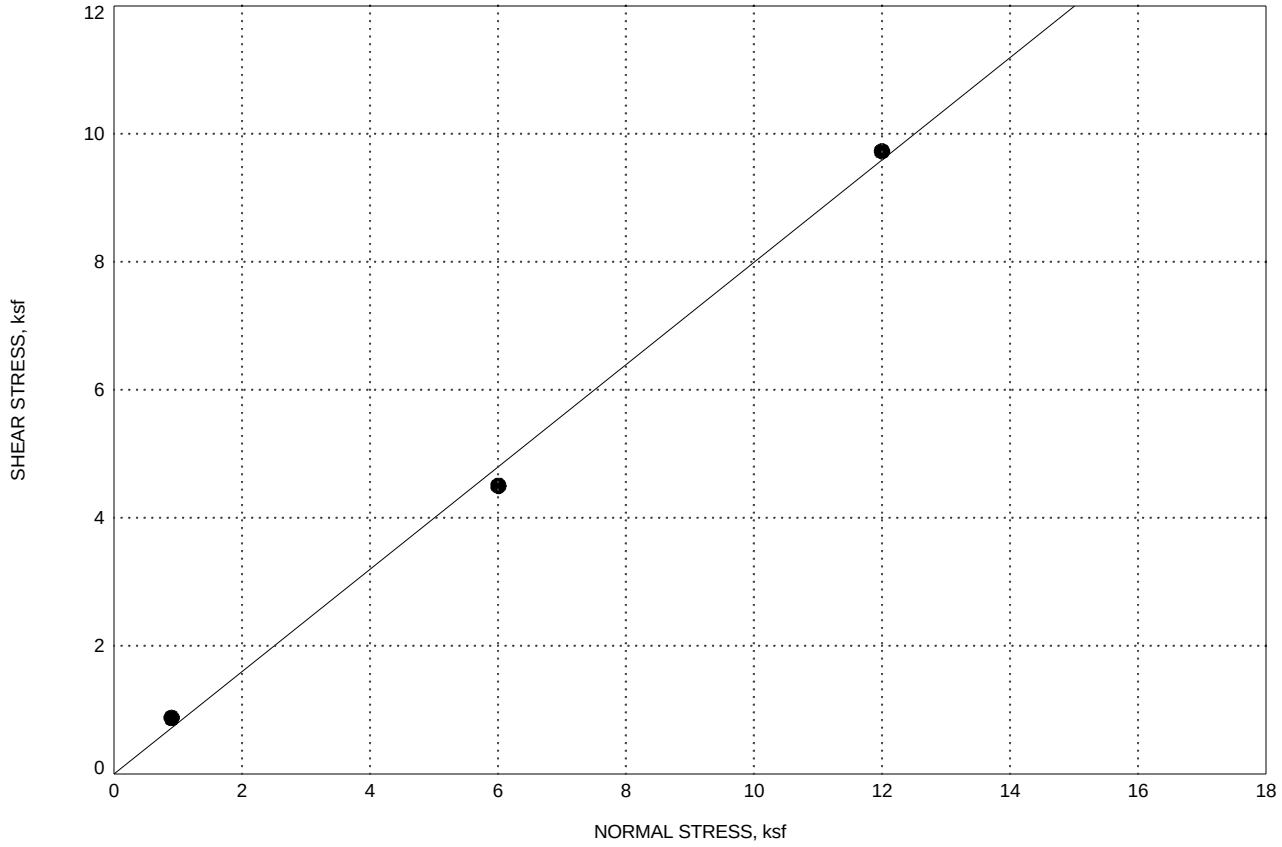
PLATE B-2



LEGEND	location	depth, ft	CLASSIFICATION	ATTERBERG LIMITS TEST RESULTS LIQUID LIMIT(LL)	PLASTIC LIMIT(PL)	PLASTICITY INDEX (PI)
○	DH-1	65.0	Silty SAND (SM)	32	NP	NP
●	DH-1	75.0	Silty CLAY (CL-ML) with sand	24	18	6

PLASTICITY CHART
Big Rock Creek Mine
Pearblossom, California

PLATE B-3

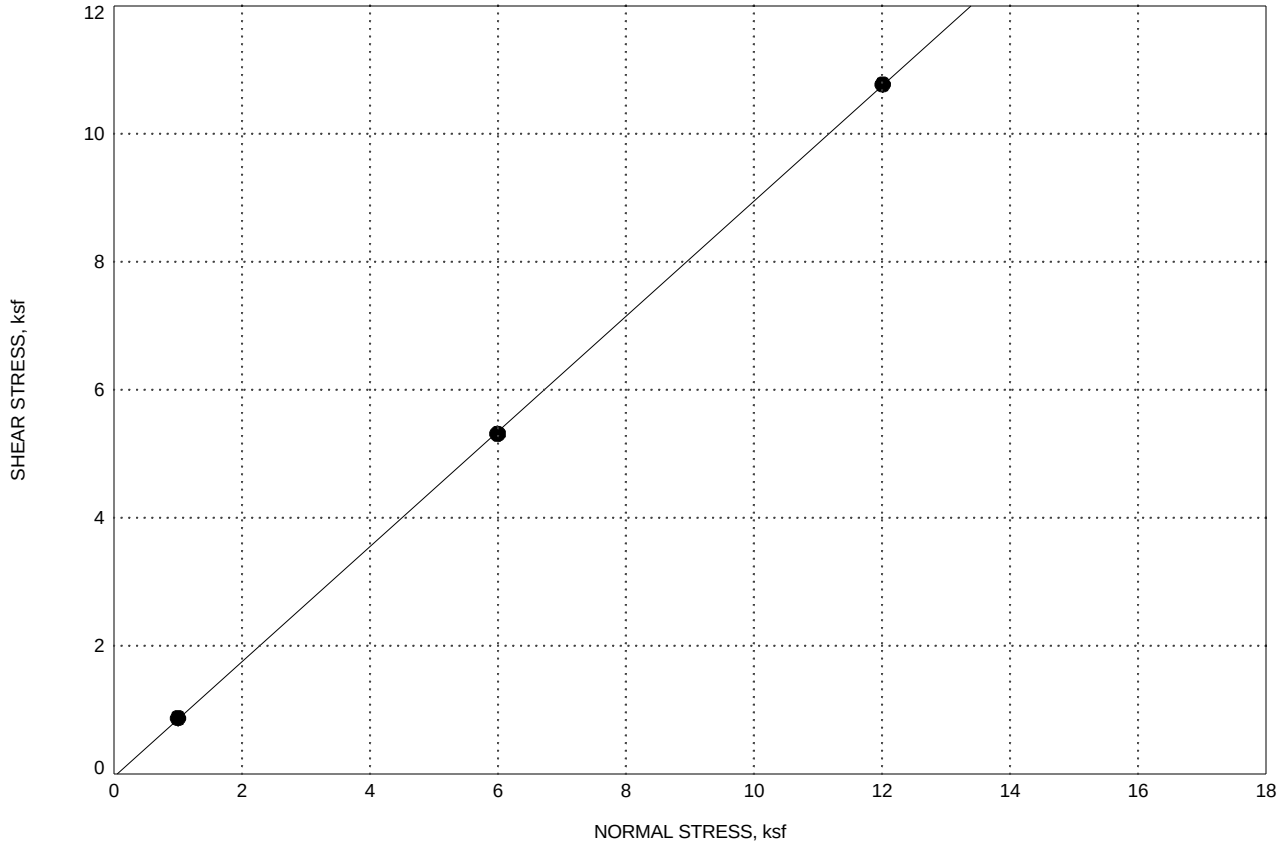


COHESION, ksf	0.0
ANGLE OF INTERNAL FRICTION, deg	39

LOCATION	DH-1
DEPTH, ft	40
MOISTURE CONTENT, %	11
UNIT DRY WEIGHT, pcf	109
MATERIAL DESCRIPTION	Silty SAND (SM)
SAMPLE CONDITION	Remold, Minus No. 4 Material

DIRECT SHEAR TEST RESULTS
Big Rock Creek Mine
Pearblossom, California

PLATE B-4a



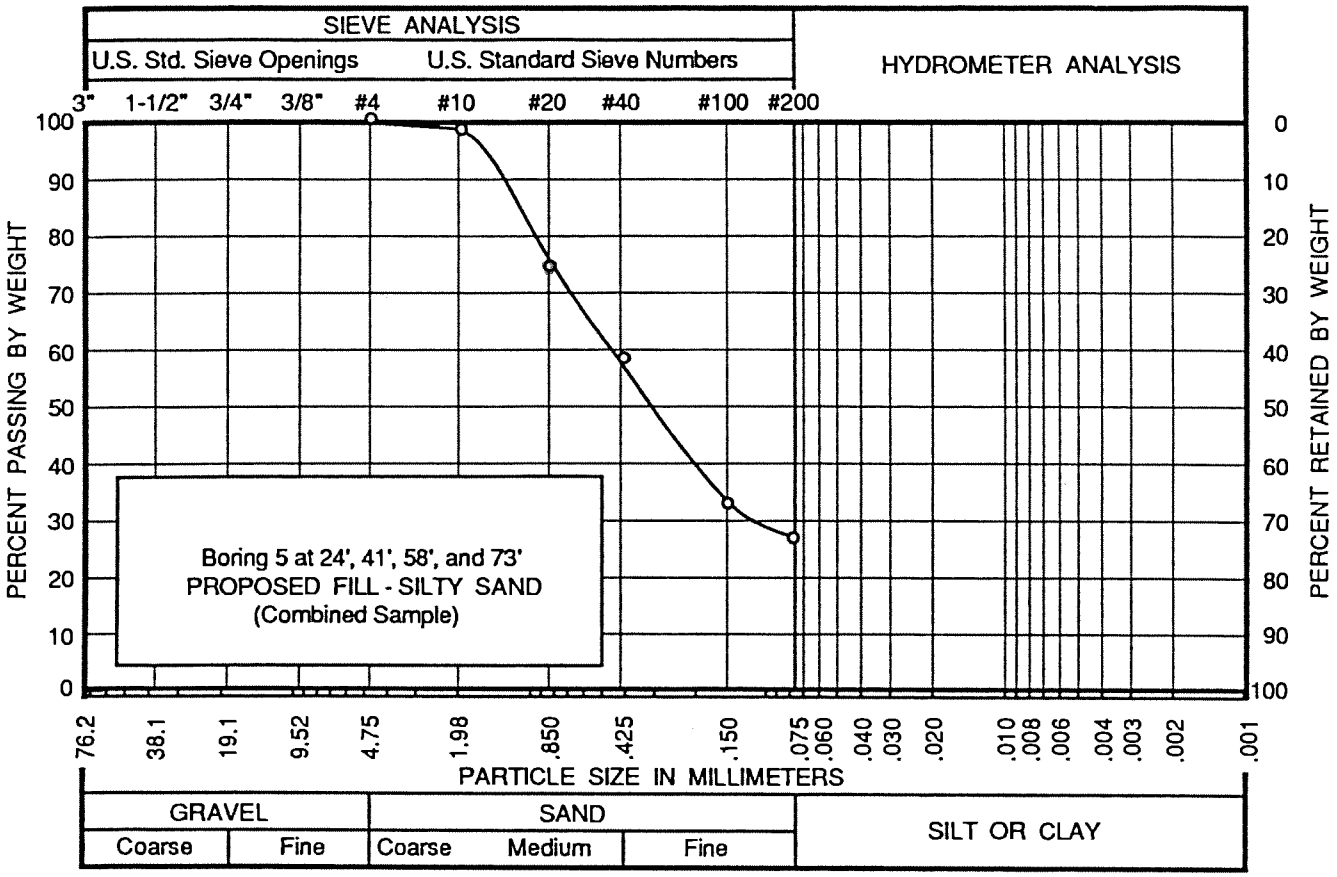
COHESION, ksf	0.0
ANGLE OF INTERNAL FRICTION, deg	42

LOCATION	DH-2
DEPTH, ft	35
MOISTURE CONTENT, %	11
UNIT DRY WEIGHT, pcf	109
MATERIAL DESCRIPTION	Silty SAND (SM)
SAMPLE CONDITION	Remold, Minus No. 4 Material

DIRECT SHEAR TEST RESULTS
Big Rock Creek Mine
Pearblossom, California

PLATE B-4b

APPENDIX C-2
LAW/CRANDALL (1991) LABORATORY TEST RESULTS FOR PROPOSED FILL



JOB L91206.AO DATE 7/24/91 D.R. lk O.E. MMK CHKD

PARTICLE SIZE DISTRIBUTION

LAW/CRANDALL, INC.

JOB L91206.AO DATE 7/24/91 DR. lk O.E. MMK CHKD

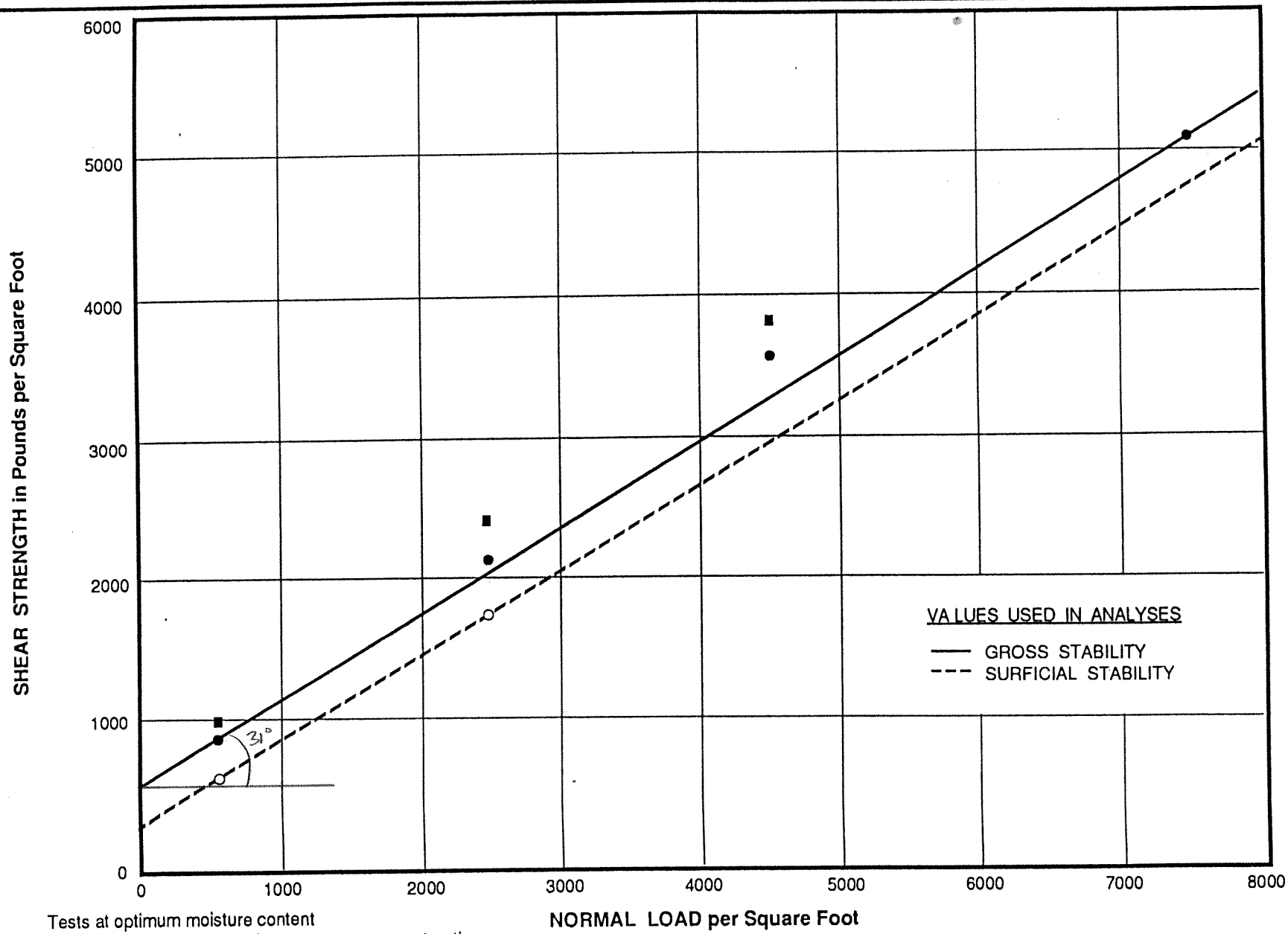
BORING NUMBER AND SAMPLE DEPTH:	5 at 24', 41', 58' and 73' (Combined Sample)
SOIL TYPE:	SILTY SAND
MAXIMUM DRY DENSITY: (lbs./cu. ft.)	134.0
OPTIMUM MOISTURE CONTENT: (% of dry wt.)	7.5

TEST METHOD: ASTM Designation D1557 - 78

COMPACTION TEST DATA

LAW/CRANDALL, INC.

JOB L91206.AO DATE 7/23/91 DR. lk O.E. MMK CHKD



KEY:

■ ○ Tests at optimum moisture content

● Tests after soaking to a moisture content near saturation

Proposed fill compacted to 90%

Proposed fill compacted to 95%

DIRECT SHEAR TEST DATA

LAW/CRANDALL, INC.

APPENDIX C-3
PHOTOGRAPHS

Big Rock Creek Mine Site Photos
August 6, 2013

View looking north from Ave T and Longview Dr.

View looking north from just south of railroad tracks

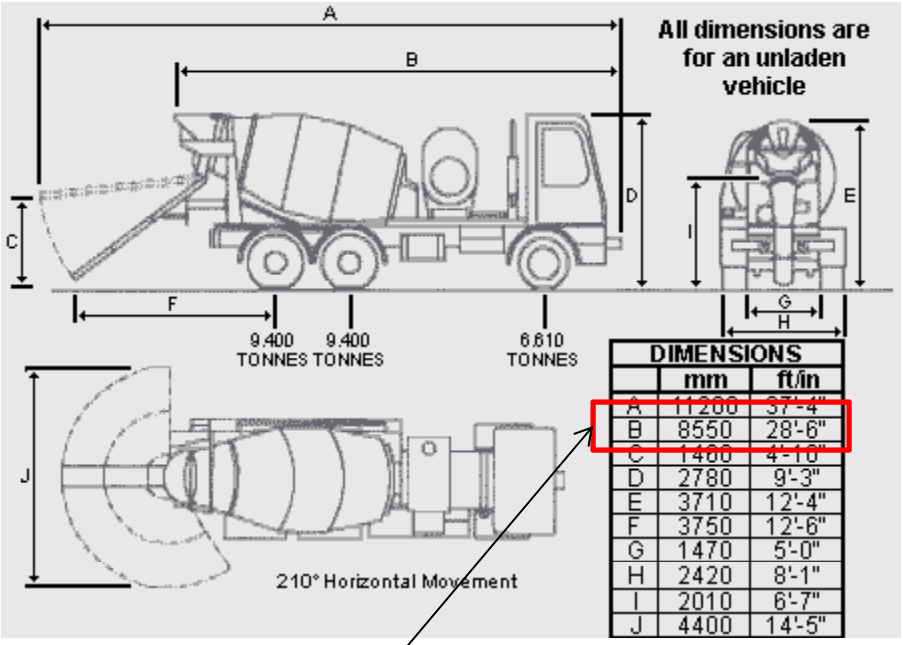
View looking northwest from atop dirt pile just south of railroad tracks

Hi-Grade Materials Site Photos
6500 East Avenue T
Littlerock, California
August 6, 2013

View of main plant excavation area from west side

View of cut slope from west side

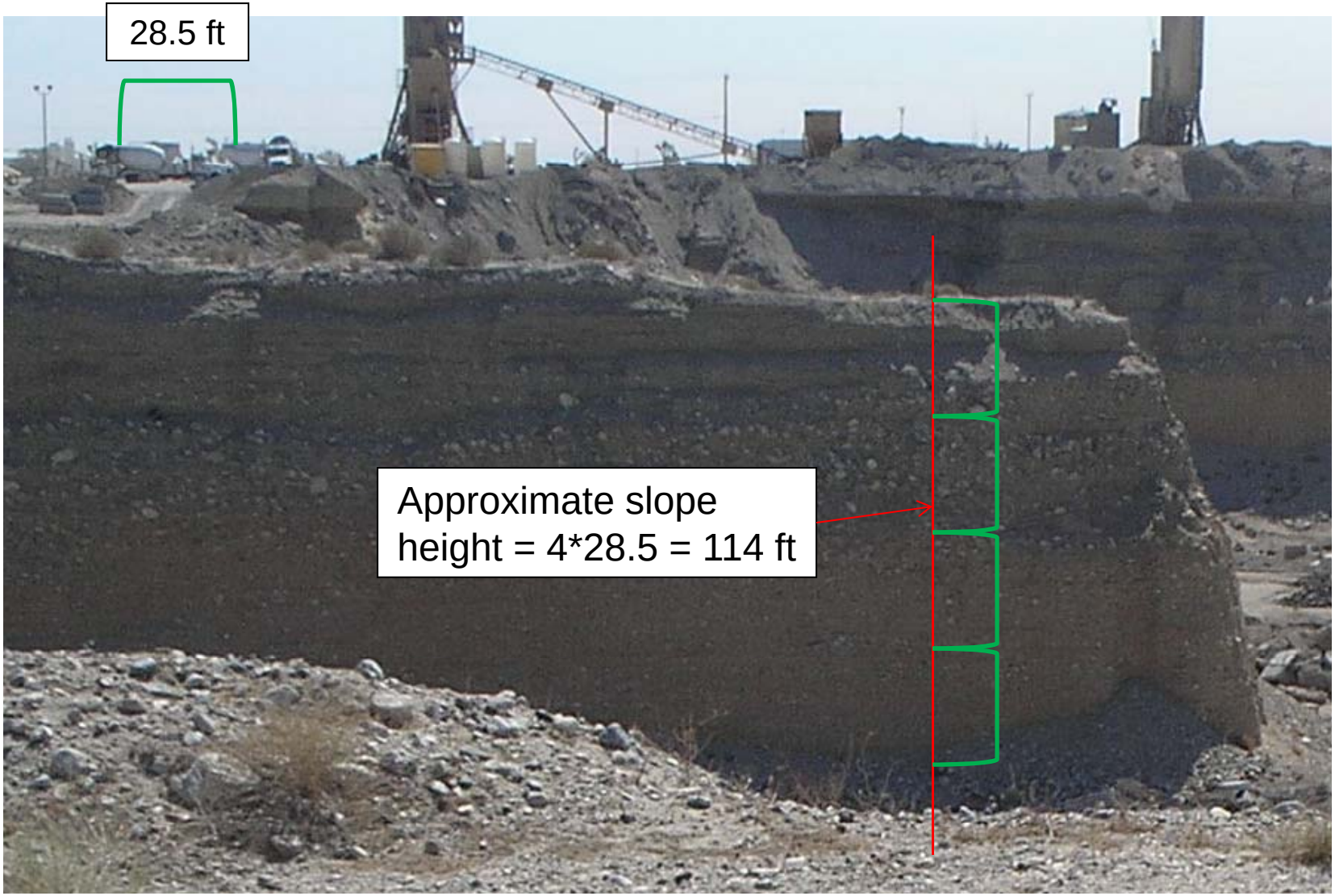
View of cut slope from west side



DIMENSIONS	mm	ft/in
A	11200	37'-4"
B	8550	28'-6"
C	1480	4'-10"
D	2780	9'-3"
E	3710	12'-4"
F	3750	12'-6"
G	1470	5'-0"
H	2420	8'-1"
I	2010	6'-7"
J	4400	14'-5"

Concrete truck length = 28.5 ft

View of cut slope from west side



Estimated cut slope height from concrete truck height

APPENDIX D
PARAMETER SYNTHESIS

Fugro (2006) Lab Data								Assumed G_s	2.7		
Boring	Depth	Unit	Classification	γ	γ_d	mc	FC	Computed γ	e	mc_{sat}	Computed γ_{sat}
	ft			pcf	pcf	%	%			%	pcg
DH-1	20	Qal	GP/GP-GM	127	121	5		127.1	0.3924	14.53	138.6
	35	Qal	GP/GP-GM	109	107	2	4	109.1	0.5746	21.28	129.8
	40	Qal	GP/GP-GM	121	109	3	16	112.3	0.5457	20.21	131.0
	65	Qal	SM, ML lense	128	99	30	69	128.7	0.7018	25.99	124.7
	75	Qoal, cem	CL-ML	138	123	12		137.8	0.3698	13.69	139.8
	80	Qoal, cem	CL-ML	136	118	15		135.7	0.4278	15.84	136.7
DH-2	20	Qal	GP/GP-GM	112	110	2	5	112.2	0.5316	19.69	131.7
	35	Qal	GP/GP-GM	102	100	2	6	102.0	0.6848	25.36	125.4
	70	Qoal, cem	ML	133	113	18	61	133.3	0.4910	18.18	133.5
		Unit	Classification	Average γ	Average γ_d	FC	e	mc_{sat}	Opt mc	Computed γ at Opt mc	Computed γ_{sat}
				pcf	pcf	%		%	%	pcf	pcf
		Qal	GP/GP-GM	116.5	107.7	4 to 16	0.5648	20.92			130.2
		Qoal	CL-ML	135.7	118	>50	0.4278	15.84			136.7
	L/C (1991)	Fill, 90%R/C	SM		120.6	27	0.3970	14.70	7.5	129.6	138.3
		Fill, 95%R/C	SM		127.3	27	0.3235	11.98	7.5	136.8	142.6

Summary of Density Data

Unit	Classification	Total Unit Weight	
		Moist	Saturated
		pcf	pcf
Qal	GP/GP-GM	115	130
Qoal	CL-ML	135	135
Fill, 90%R/C	SM	130	135

Selected Material Density

Back-calculation of Shear Strength Parameters using Rankine Earth Pressure Theory

Applied to a Vertical Cut

Height, H, ft	30
Total Unit Weight, γ, pcf	115

From Rankine Earth Pressure Theory

Active Earth Pressure Coefficient: $K_a = \tan^2(45 - \frac{\phi}{2})$

ϕ=friction angle, deg

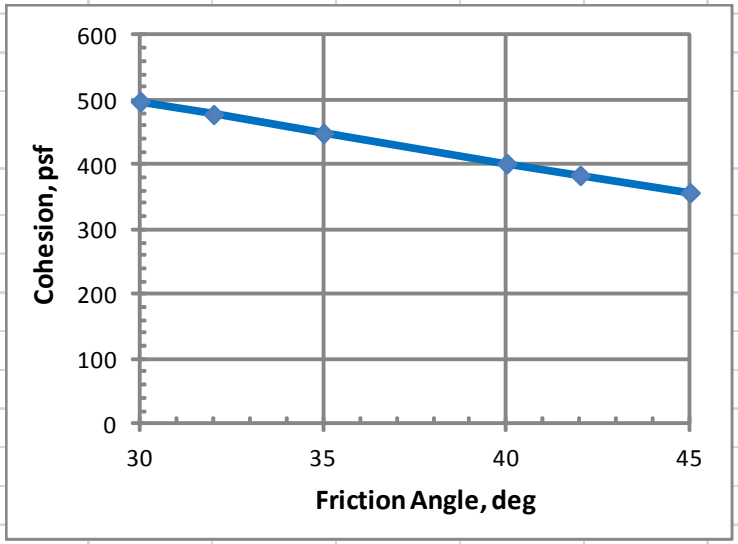
c=cohesion, psf

Total Earth Force, P_a, lb/ft: $P_a = \frac{1}{2} K_a \gamma H^2 - \sqrt{K_a}\, 2cH$

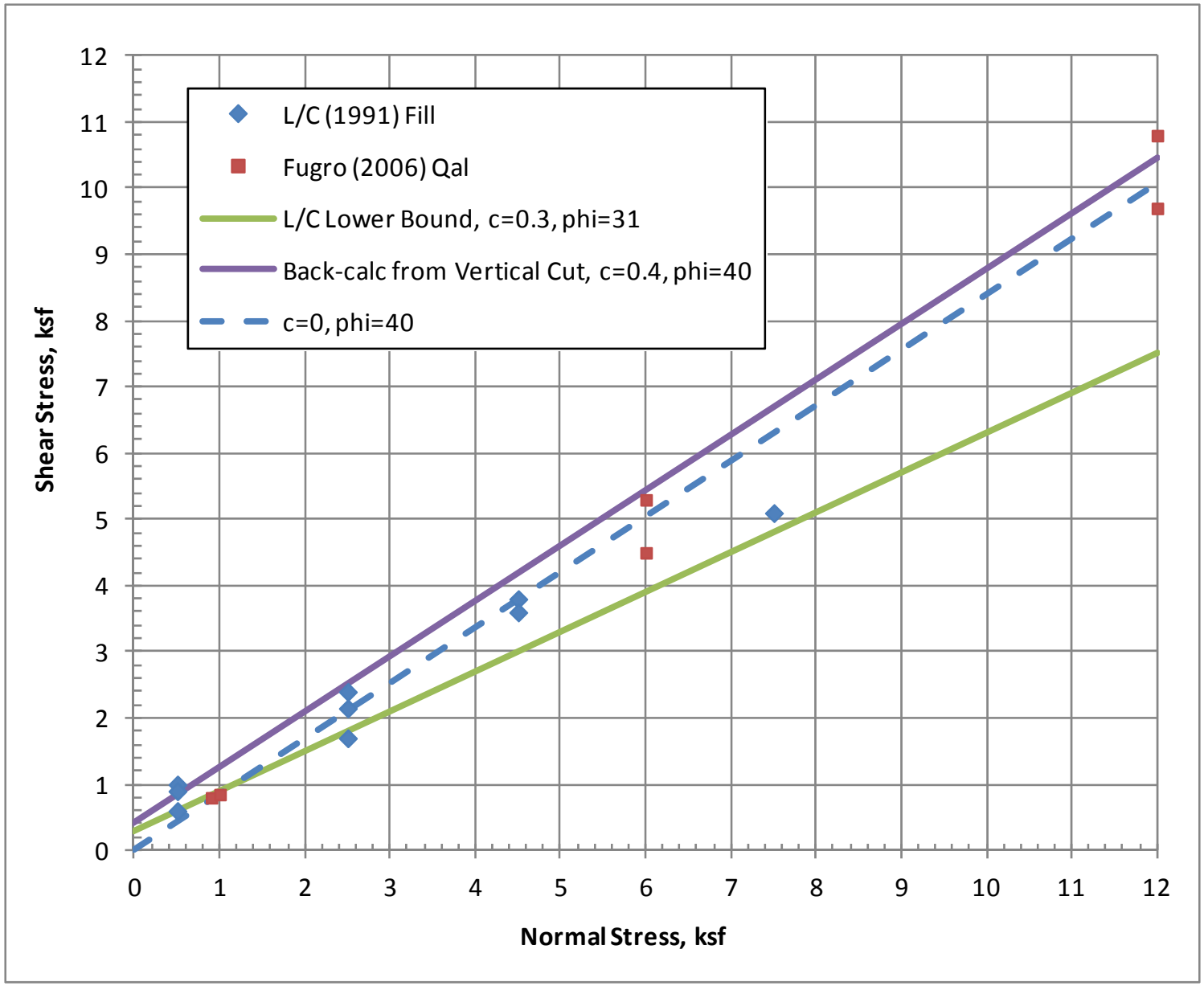
At Pa=0, H is the theoretical maximum height of an unsupported vertical cut. For given H and γ, assume ϕ and solve for c.

Assumed ϕ deg	K_a	Computed c psf	Check P_a lb/ft	Crack Depth H_c ft
30	0.3333	498	0	15
32	0.3073	478	0	15
35	0.2710	449	0	15
40	0.2174	402	0	15
42	0.1982	384	0	15
45	0.1716	357	0	15

Selected parameters → 40

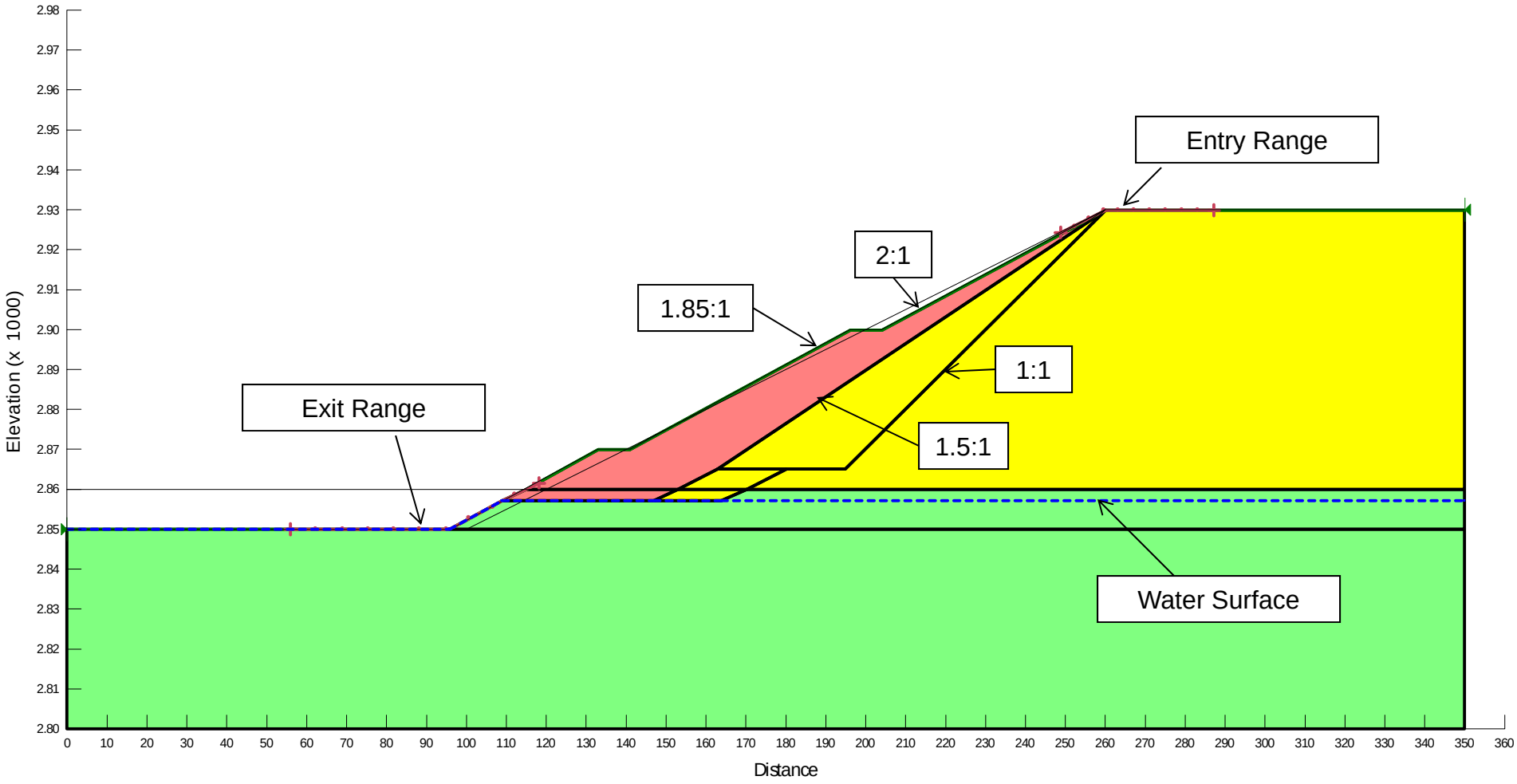


Backcalculation of Shear Strength Parameters from Vertical Cut



Shear Strength Data

APPENDIX E
SLOPE STABILITY RESULTS


Entry Range
2:1
1.85:1
1:1
1.5:1
Exit Range
Water Surface
Elevation (x 1000)
Distance
2.98
2.97
2.96
2.95
2.94
2.93
2.92
2.91
2.90
2.89
2.88
2.87
2.86
2.85
2.84
2.83
2.82
2.81
2.80
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360

Section Key

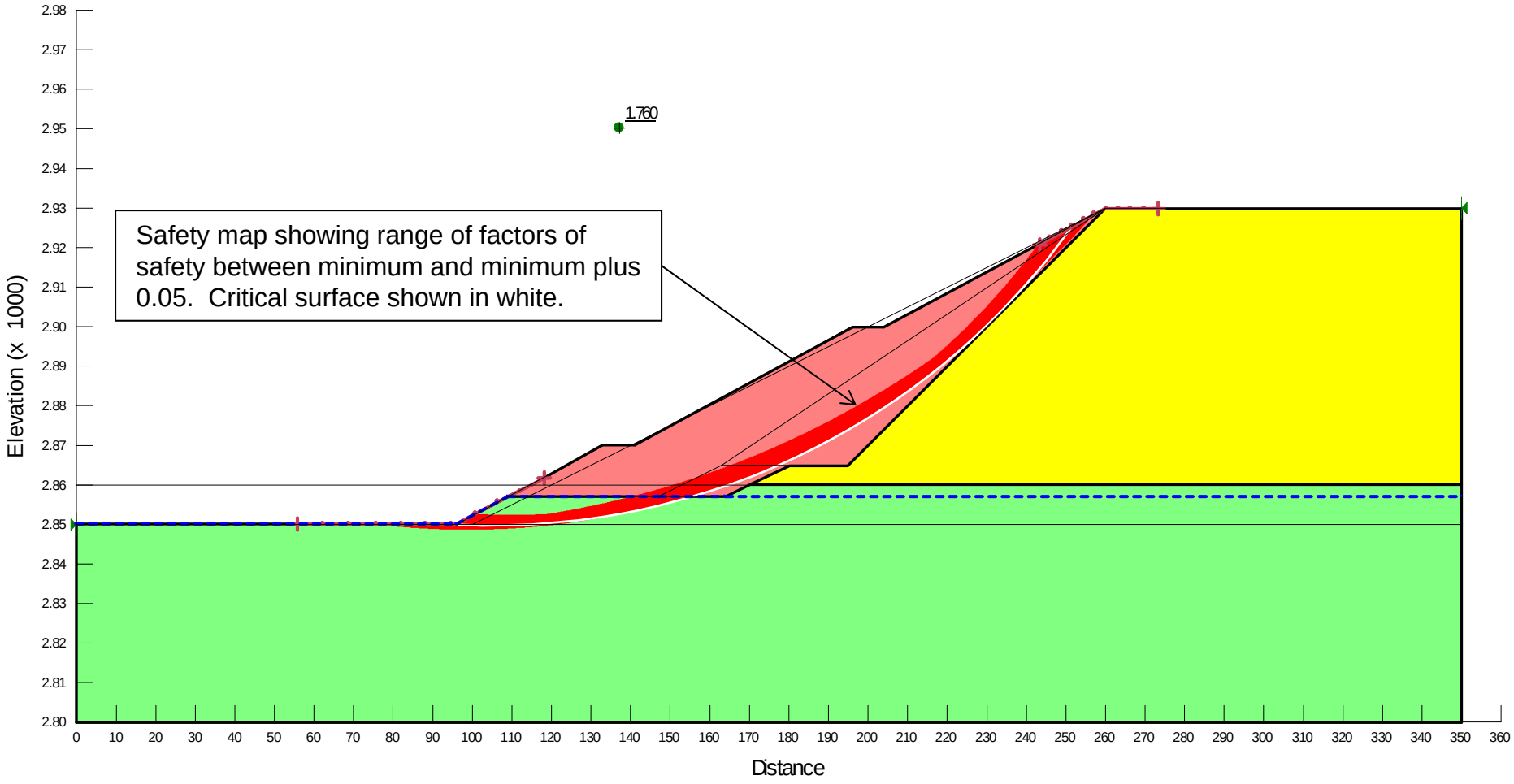
Item	Unit	Moist Unit Weight	Saturated Unit Weight	Cohesion	Friction Angle	Color
		pcf	pcf	psf	deg	
Fill	Qaf	130	135	300	31	
Upper Alluvium	Qal	115	130	400	40	
Older Alluvium	Qoal	135	135	300	31	
Water Surface						
Entry & Exit Ranges						

Legend and Shear Strength Parameters

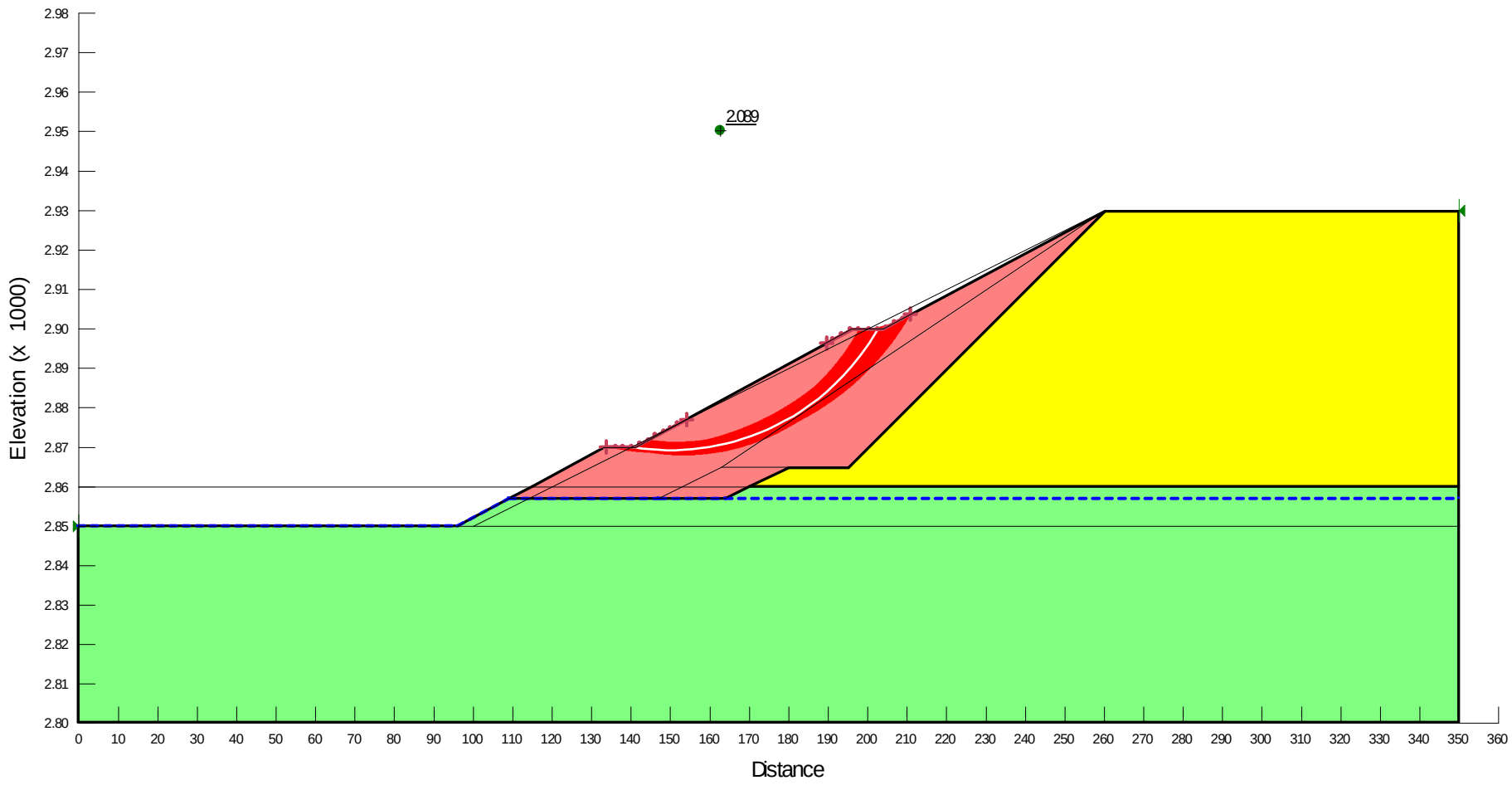
Condition	Factor of Safety		
	Static	Pseudostatic	Surficial
Permanent 1.85:1 Fill over 1:1 Cut	1.760	1.278	1.957
Permanent 1.85:1 Fill Slope, Terrace to Terrace	2.089		
Temporary 1:1 Cut Slope, 65 ft high	1.576	1.260	1.974
Temporary 1.5:1 Cut Slope, 65 ft high	1.842	1.325	2.320
Lower 2:1 Bench Slope, 7 ft high	3.061		

Notes:
1. See Legend for material shear strengths and unit weights.
2. Horizontal acceleration coefficient, k_h = 0.15 for pseudostatic condition.
3. Surficial stability assumes parallel seepage and a 4-foot-deep slide surface.

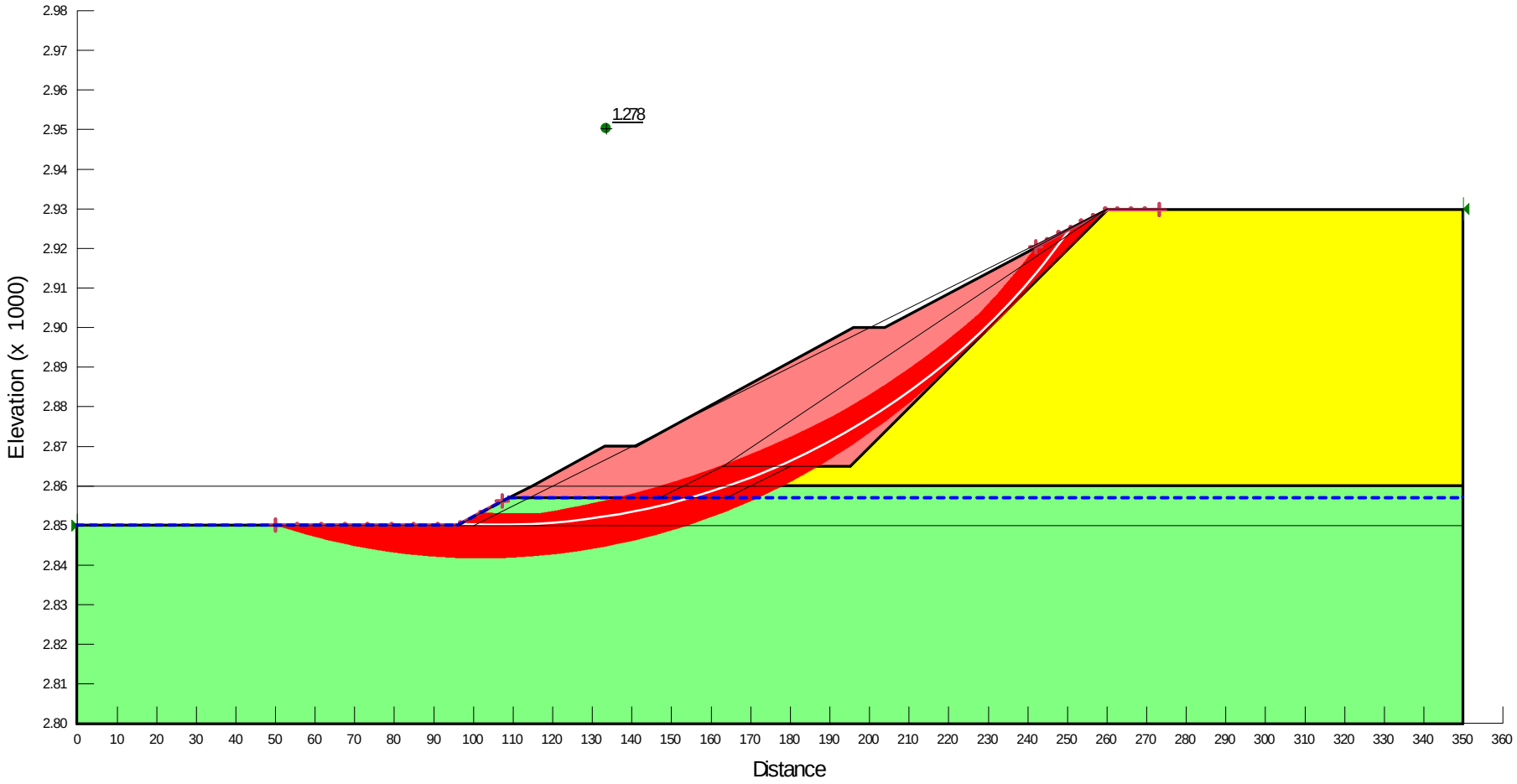
Summary of Factors of Safety



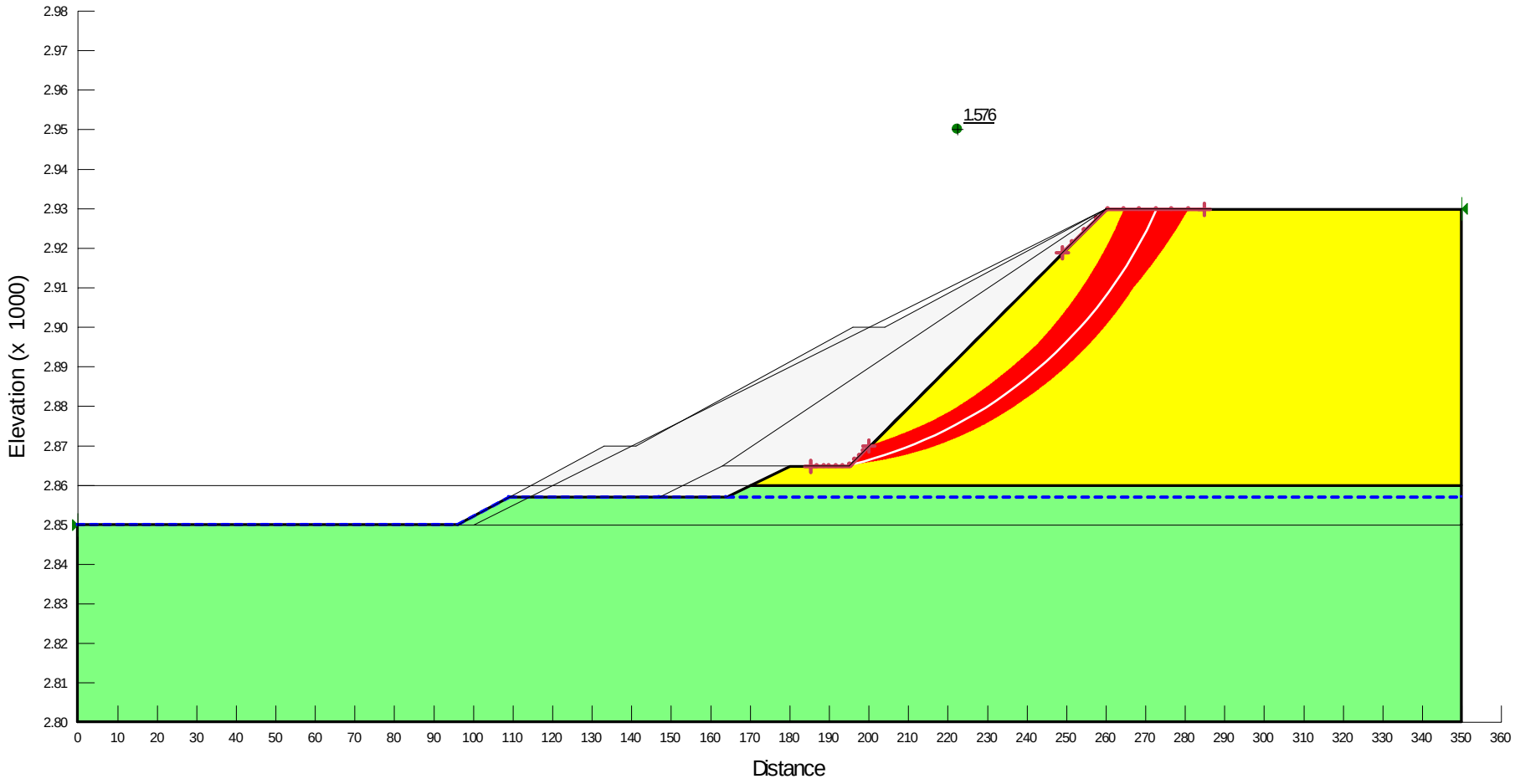
1.85:1 Fill Slope Over 1:1 Cut Slope, Static



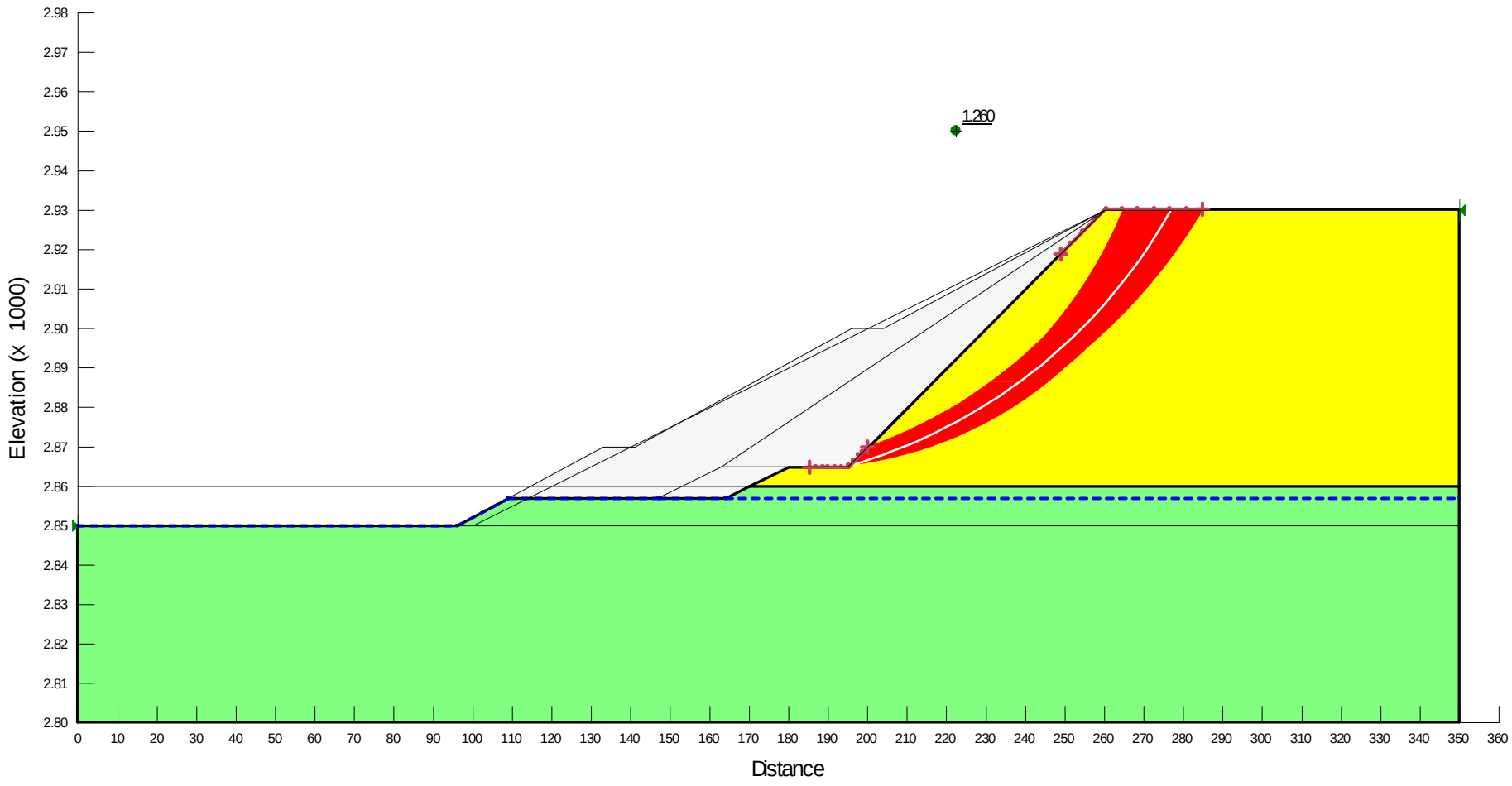
1.85:1 Fill Slope Over 1:1 Cut Slope, Static, Slope Surfaces



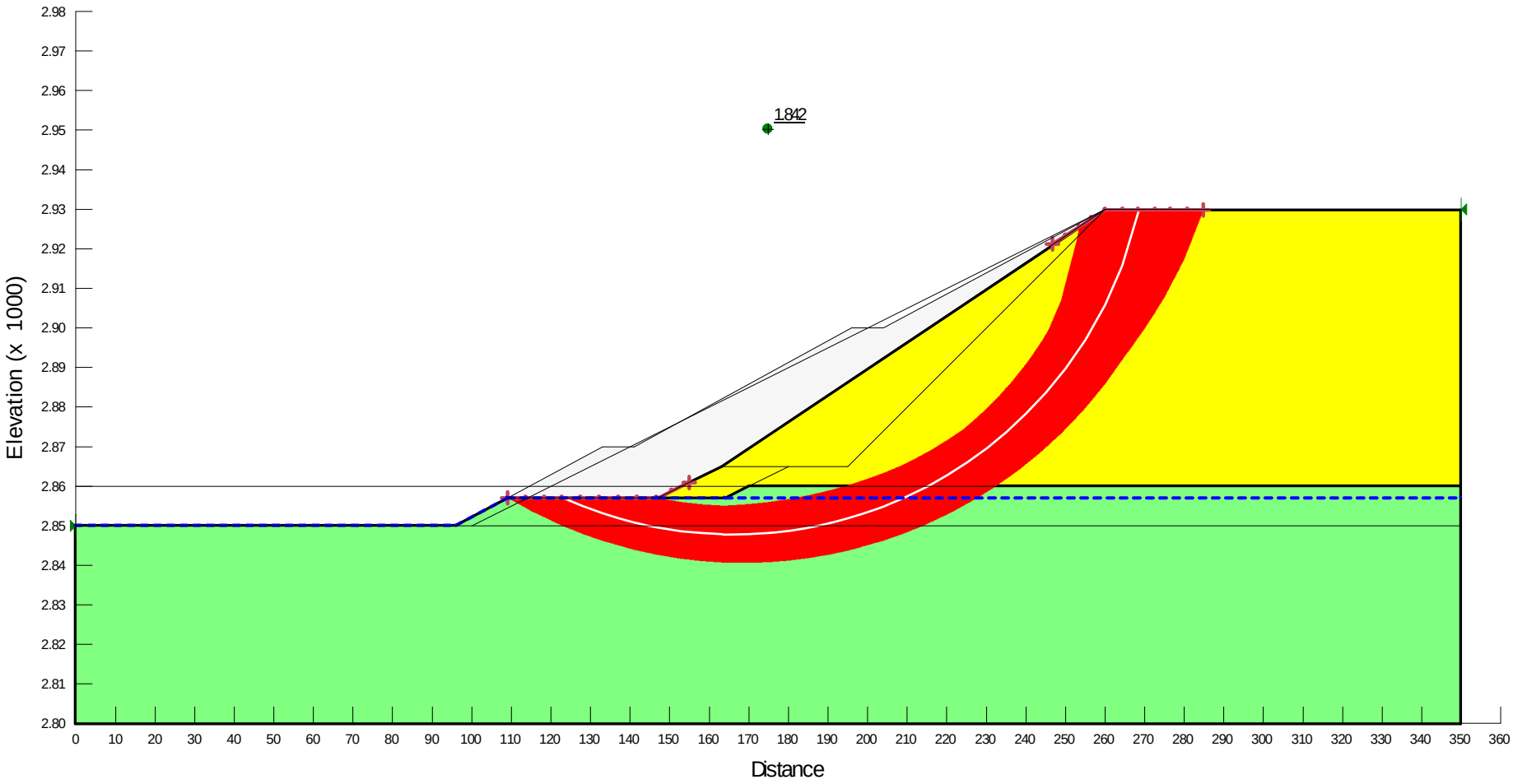
1.85:1 Fill Slope Over 1:1 Cut Slope, Pseudostatic



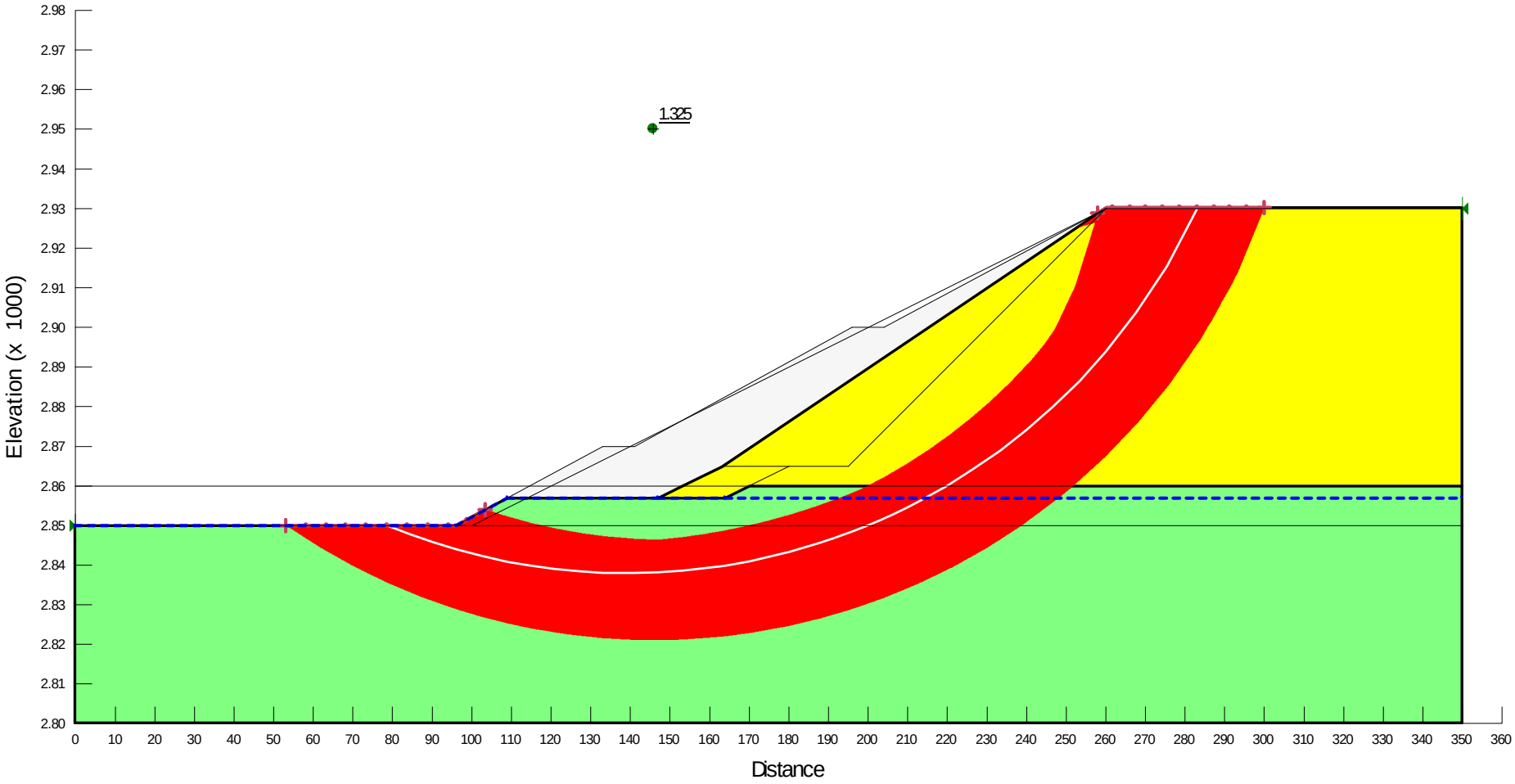
1:1 Temporary Cut Slope, 65 ft High, Static



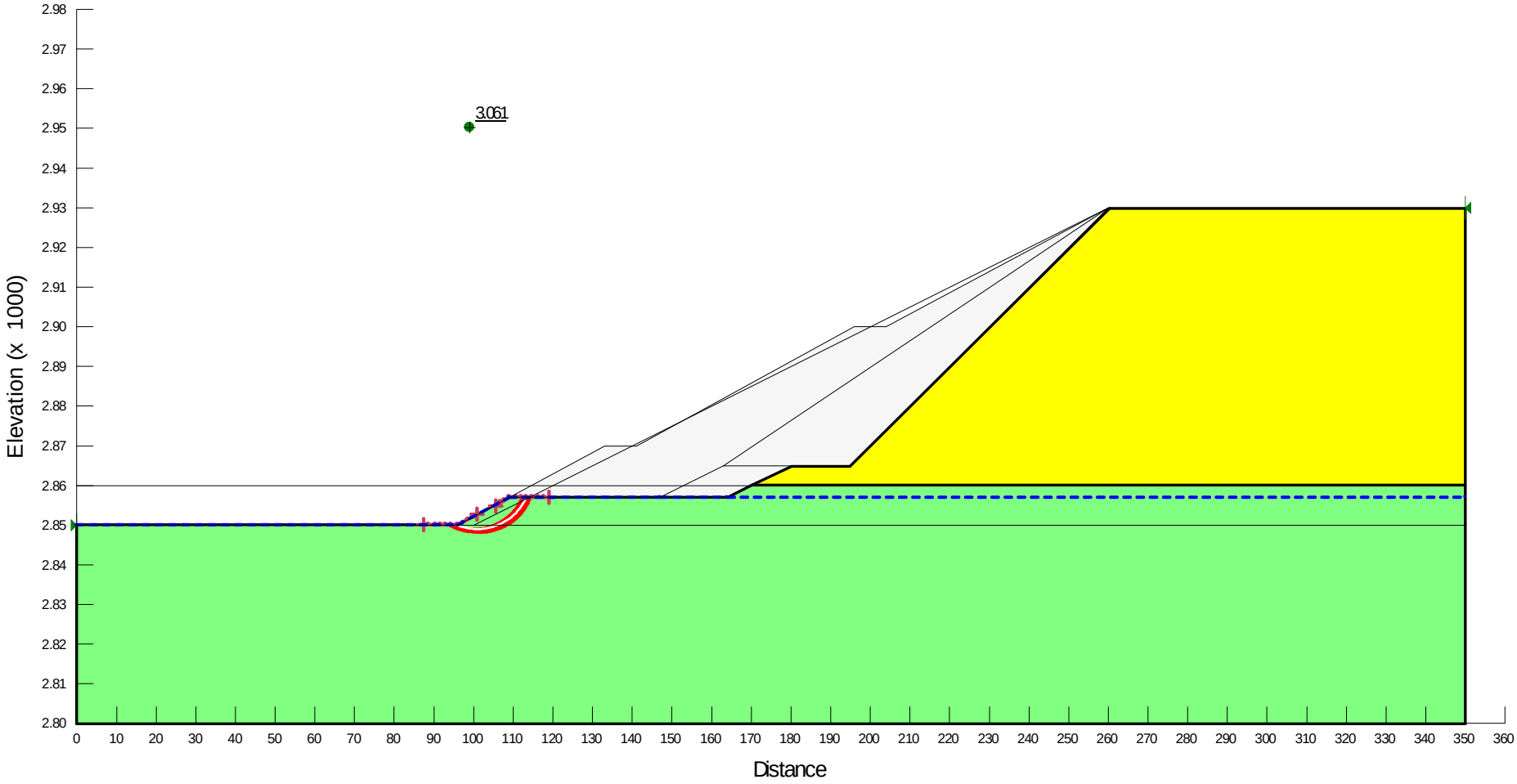
1:1 Temporary Cut Slope, 65 ft High, Pseudostatic



1.5:1 Temporary Cut Slope, 65 ft High, Static



1.5:1 Temporary Cut Slope, 65 ft High, Pseudostatic

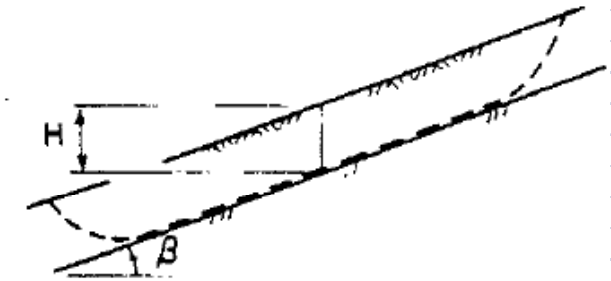


2:1 Bench Slope, 7 ft high, Static

Surficial Stability

Reference: Duncan, J.M., Buchignani, A.L., and De Wet, M. (1987) "An Engineering Manual for Slope Stability Studies," Virginia Tech Department of Civil Engineering, March.

Infinite Slope Geometry



γ = total unit weight of soil

γ_w = unit weight of water

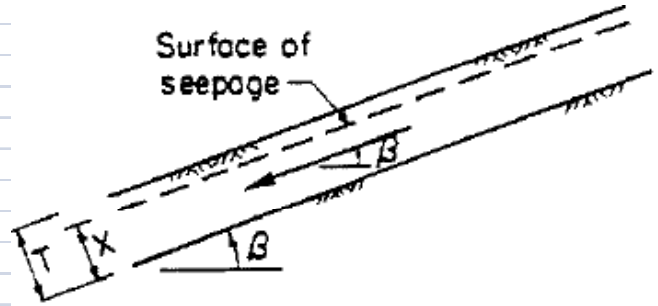
c' = cohesion intercept } Effective Stress

ϕ' = friction angle } Effective Stress

r_u = pore pressure ratio = $\frac{u}{\gamma H}$

u = pore pressure at depth H

Pore Pressure Coefficient for Parallel Seepage



Seepage parallel to slope

$$r_u = \frac{X}{T}\frac{\gamma_w}{\gamma}\cos^2\beta$$

$$A = 1 - \frac{r_u}{\cos^2\beta} \qquad B = \frac{1}{\sin\beta * \cos\beta} \qquad F = A\frac{\tan\phi'}{\tan\beta} + B\frac{c'}{\gamma * H}$$

Input		Calculations	
Slide thickness, T, ft	3.52	Pore pressure ratio, r_u	0.3715
Water height, X, ft	3.52	Vertical Height, H, ft	4.001
Total unit weight, pcf	130	Coefficient A	0.520
Unit weight of water, pcf	62.4	Coefficient B	2.391
Slope Inclination, cot β	1.85	Factor of Safety from Friction, F_f	0.578
Cohesion, c', psf	300	Factor of Safety from Cohesion, F_c	1.379
Friction Angle, ϕ', deg	31	Factor of Safety, F_s	1.957

Surficial Stability Factor of Safety for 1.85:1 Slope

Surficial Stability

Reference: Duncan, J.M., Buchignani, A.L., and De Wet, M. (1987) "An Engineering Manual for Slope Stability Studies," Virginia Tech Department of Civil Engineering, March.

Infinite Slope Geometry

γ = total unit weight of soil

γ_w = unit weight of water

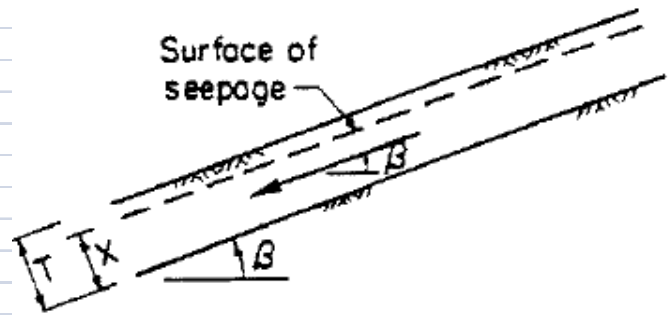
c' = cohesion intercept } Effective Stress

ϕ' = friction angle } Effective Stress

r_u = pore pressure ratio = $\frac{u}{\gamma H}$

u = pore pressure at depth H

Pore Pressure Coefficient for Parallel Seepage



Seepage parallel to slope

$$r_u = \frac{X}{T}\frac{\gamma_w}{\gamma}\cos^2\beta$$

$$A = 1 - \frac{r_u}{\cos^2\beta} \qquad B = \frac{1}{\sin\beta * \cos\beta} \qquad F = A\frac{\tan\phi'}{\tan\beta} + B\frac{c'}{\gamma * H}$$

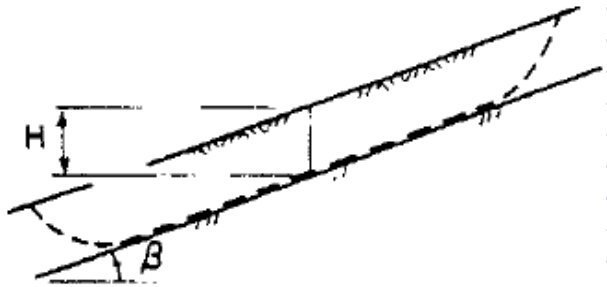
Input		Calculations	
Slide thickness, T, ft	2.83	Pore pressure ratio, r_u	0.2400
Water height, X, ft	2.83	Vertical Height, H, ft	4.002
Total unit weight, pcf	130	Coefficient A	0.520
Unit weight of water, pcf	62.4	Coefficient B	2.000
Slope Inclination, cot β	1	Factor of Safety from Friction, F_f	0.436
Cohesion, c', psf	400	Factor of Safety from Cohesion, F_c	1.538
Friction Angle, ϕ', deg	40	Factor of Safety, F_s	1.974

Surficial Stability Factor of Safety for 1:1 Slope

Surficial Stability

Reference: Duncan, J.M., Buchignani, A.L., and De Wet, M. (1987) "An Engineering Manual for Slope Stability Studies," Virginia Tech Department of Civil Engineering, March.

Infinite Slope Geometry



γ = total unit weight of soil

γ_w = unit weight of water

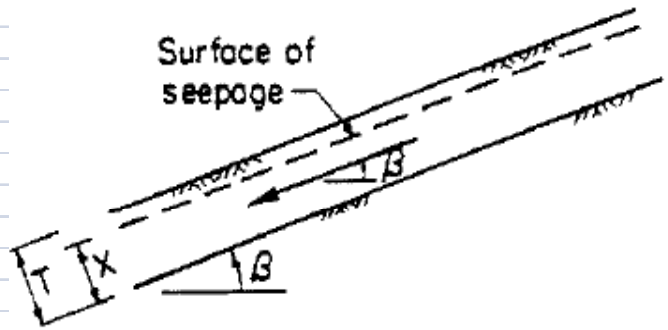
c' = cohesion intercept } Effective Stress

ϕ' = friction angle } Effective Stress

r_u = pore pressure ratio = $\frac{u}{\gamma H}$

u = pore pressure at depth H

Pore Pressure Coefficient for Parallel Seepage



Seepage parallel to slope

$$r_u = \frac{X}{T}\frac{\gamma_w}{\gamma}\cos^2\beta$$

$$A = 1 - \frac{r_u}{\cos^2\beta} \qquad B = \frac{1}{\sin\beta * \cos\beta} \qquad F = A\frac{\tan\phi'}{\tan\beta} + B\frac{c'}{\gamma * H}$$

Input		Calculations	
Slide thickness, T, ft	3.33	Pore pressure ratio, r_u	0.3323
Water height, X, ft	3.33	Vertical Height, H, ft	4.002
Total unit weight, pcf	130	Coefficient A	0.520
Unit weight of water, pcf	62.4	Coefficient B	2.167
Slope Inclination, cot β	1.5	Factor of Safety from Friction, F_f	0.654
Cohesion, c', psf	400	Factor of Safety from Cohesion, F_c	1.666
Friction Angle, ϕ', deg	40	Factor of Safety, F_s	2.320

Surficial Stability Factor of Safety for 1.5:1 Slope

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 5

Geologic Study

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REPORT OF GEOTECHNICAL / GEOLOGIC STUDY PROPOSED AGGREGATE PRODUCTION FACILITY BIG ROCK CREEK SITE SOUTH OF AVENUE 'T' BETWEEN LONGVIEW ROAD AND 121ST STREET PEARBLOSSOM AREA OF LOS ANGELES COUNTY, CALIFORNIA

PROJECT NO.: 594-A06
REPORT NO.: 1

SEPTEMBER 15, 2006

SUBMITTED TO:

McGEE & ASSOCIATES
23 CORPORATE PLAZA, SUITE 230
NEWPORT BEACH, CA 92660

PREPARED BY:

HILLTOP GEOTECHNICAL, INC.
786 SOUTH GIFFORD AVENUE
SAN BERNARDINO, CA 92408

September 15, 2006

McGee & Associates
23 Corporate Plaza, Suite 230
Newport Beach, CA 92660

Project No.: 594-A06
Report No.: 1

Attention: Mr. James F. McGee

Subject: **Report of Geotechnical / Geologic Study, Proposed Aggregate Production Facility, Big Rock Creek Site, South of Avenue 'T' between Longview Road and 121st Street, Pearblossom Area of Los Angeles County, California.**

References:

1. **West Coast Environmental and Engineering**, July 27, 2006 with Revision on August 1, 2006, *Topographic Map, Big Rock Creek Surface Mining Site*, Project: MCG100, Scale: 1" = 150', Drawing MCG100-Topo.dwg.

2. Unauthored, Undated, Untitled, *Site Plan*, Supplied by **West Coast Environmental and Engineering**.

3. **Law / Crandall, Inc.**, November 12, 1991, *Report of Geotechnical Study, Proposed Big Rock Surface Mining Operation, Surface Mining Permit No. 91109, Big Rock Creek Area, Pearblossom, California*, L91206.AO.

4. Technical References - See Appendix 'C.'

Gentlemen:

According to your request, we have completed a geotechnical / geologic study for the design and construction of the proposed aggregate production facility for the

Big Rock Creek Site. We are presenting, herein, our findings and recommendations.

The findings of this study indicate that the project site is suitable for the proposed development provided the recommendations presented in the attached report are complied with and incorporated into the design and construction of the project.

If you have any questions after reviewing the findings and recommendations contained in the attached report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,

HILLTOP GEOTECHNICAL, INC.

Mark Hulett, CEG No. 1623
President

Donald L. Curran, GE No. 254
Senior Engineer
Date Signed: _____

Sundaramoorthy Srirajan, CE No. 68601
Project Engineer
Date Signed: _____

RG/SS/MH/DLC/em

Distribution: (4) Addressee

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REPORT OF GEOTECHNICAL / GEOLOGIC STUDY PROPOSED AGGREGATE PRODUCTION FACILITY BIG ROCK CREEK SITE SOUTH OF AVENUE T BETWEEN LONGVIEW ROAD AND 121ST STREET PEARBLOSSOM AREA OF LOS ANGELES COUNTY, CALIFORNIA

PROJECT NO.: 594-A06
REPORT NO.: 1

SEPTEMBER 15, 2006

INTRODUCTION

AUTHORIZATION

This report presents results of the geotechnical / geologic study conducted on the subject site for the proposed aggregate production facility for the Big Rock Creek Site to be located south of Avenue 'T' between Longview Road and 121st Street in the Pearblossom area of Los Angeles County, California. The general location of the subject site is indicated on the 'Site Location Map,' Figure No. 1.

Authorization to perform this study was in the form of a signed proposal from **Hilltop Geotechnical, Inc.** (Geotechnical / Geologic Consultant) to **McGee & Associates** (Client), dated July 28, 2006, Proposal Number: P0611R.

PURPOSE AND SCOPE OF STUDY

The scope of work performed for this study was designed to determine and evaluate the surface and subsurface conditions on the subject site with respect to

geotechnical characteristics, including potential geologic hazards that may effect the development of the site, and to provide geotechnical recommendations and criteria for use in the design and construction of the proposed development. The scope of work included the following:

- Review of locally and easily available published and unpublished soils, geologic, and seismologic reports and data for the area (see References in Appendix 'C'), flood hazard maps, well data, etc. to ascertain soils, geologic, and hydrologic conditions of the area.
- Telephone conversations with the client and/or representatives of the client.
- Site reconnaissance.
- Subsurface exploration by means of backhoe trenches to characterize earth material, geologic, and groundwater conditions that could influence the proposed development.
- Sampling of on-site earth materials from the exploratory excavations.
- Laboratory testing of selected earth material samples considered representative of the subsurface conditions to determine the engineering properties and characteristics.
- Define the general geology of the subject site and evaluate potential geologic hazards which would have an effect on the proposed site development.
- Determine seismic classification of the site to meet the latest requirements of the 2001 California Building Code (CBC).
- Engineering analysis of field and laboratory data to provide a basis for geotechnical conclusions and recommendations regarding site grading and foundation, floor slab, retaining wall, pavement, etc. design parameters.
- Preparation of this report to present the geotechnical and geologic conclusions and recommendations for the proposed site development.

This report presents our conclusions and/or recommendations regarding:

- The geologic setting of the site.
- Potential geologic hazards (including landslides, seismicity, faulting, liquefaction potential, etc.)
- General subsurface earth conditions.
- Presence and effect of expansive, collapsible, and compressible soils.
- Groundwater conditions within the depth of our subsurface study.
- Excavation characteristics of the on-site earth materials.
- Characteristics and compaction requirements of proposed fill and backfill materials.
- Recommendations and guide specifications for earthwork.
- Seismic design coefficients for structural design purposes.
- Types and depths of foundations.
- Allowable bearing pressure and lateral resistance for foundations.
- Estimated total and differential settlements.
- Corrosion potential evaluation for concrete in direct contact with the on-site soils.
- Utility trench excavation and backfill recommendations.
- Preliminary pavement recommendations.

The scope of work performed for this report did not include any testing of soil or groundwater for environmental purposes, an environmental assessment of the property, or opinions relating to the possibility of surface or subsurface

contamination by hazardous or toxic substances. In addition, evaluation of on-site private sewage disposal systems for the proposed development was not part of this study.

This study was prepared for the exclusive use of **McGee & Associates** and their consultants for specific application to the proposed aggregate production facility for the Big Rock Creek Site in accordance with generally accepted standards of the geotechnical and geologic professions and generally accepted geotechnical (soil and foundation) engineering principles and practices at the time this report was prepared. Other warranties, implied or expressed, are not made. Although reasonable effort has been made to obtain information regarding geotechnical / geologic and subsurface conditions of the site, limitations exist with respect to knowledge of unknown regional or localized off-site conditions which may have an impact at the site. The conclusions and recommendations presented in this report are valid as of the date of this report. However, changes in conditions of a property can occur with passage of time, whether they are due to natural processes or to works of man on this and/or adjacent properties.

If conditions are observed or information becomes available during the design and construction process which are not reflected in this report, **Hilltop Geotechnical, Inc.**, as Geotechnical / Geologic Consultant of record for the project, should be notified so that supplemental evaluations can be performed and conclusions and recommendations presented in this report can be modified or verified in writing as necessary. Changes in applicable or appropriate standards of care in the geologic / geotechnical professions occur, whether they result from legislation or the broadening of knowledge and experience. Accordingly, the conclusions and recommendations presented in this report may be invalidated, wholly or in part,

by changes outside the influence of the project Geotechnical / Geologic Consultant which occur in the future.

PREVIOUS SITE STUDIES

No previous geotechnical and/or geological studies for the aggregate production facility area on the subject site are known to have been performed or were made available for review at the time of this study, if any had been performed. Prior to this report, previous subsurface explorations and geotechnical evaluations of the proposed open-pit quarry excavations had been performed on the subject site. The results of that study were presented in the Reference No. 3 noted on the cover page of this report. The results of the previous study correspond with the results of this study, recognizing the normal variations in subsurface materials within natural alluvial deposits on the site. The information presented in the reference report is not repeated herein. However, reference is made to inform the reader of the existence of the report.

PROJECT DESCRIPTION / PROPOSED DEVELOPMENT

As part of our study, we have discussed the project with Mr. James F. McGee of **McGee & Associates**, the client for the project. We have also been provided with the Reference No. 1 'Topographic Map' and the Reference No. 2 'Site Plan' for the project noted on the cover page of this report.

Based on information presented to this firm, it is our understanding that the proposed project will consist of a new aggregate production facility. The project will include the following: a 24 by 60 foot office trailer with a water tank, a waste tank, and parking for employees; a 75 by 125 foot, two-bay shop building; a fuel island and above groung diesel fuel tank; a wash-out pit; a ready mix concrete

batch plant; an asphalt plant operator shack; an asphalt plant; a cement transfer facility with cement silos and scales; an aggregate manufacturing facility with associated conveyor belt systems, screen towers, various rock stock piles, a 50 foot diameter, low profile, fresh water tank, a 50 foot diameter, low profile, thickener tank; a parking area for concrete mixing trucks and bottom dump material trucks; etc. It is our understanding that the proposed structures are not settlement sensitive to either total or differential movement. Light to moderate foundation loads are typical for these type structures. Maximum dead loads plus frequently applied live loads for the structures will not exceed 3,000 pounds per lineal foot (plf) for wall footings and 50 kips for column footings. Finish pad elevations for the proposed structures and plants had not been furnished at the time of our study, but they are anticipated to be within 5.0 to 10 feet of existing site grades at the proposed structure locations. Per the Reference No. 1 'Topographic Map,' 2:1 (Horizontal to Vertical) cut slopes are proposed for the proposed mining pit (These slopes were evaluated in the Reference No. 3 report noted on the cover page of this report and were not part of this study). Fill and cut slopes of less than 10 feet in vertical height and 2:1 (Horizontal to Vertical) inclination are anticipated for the development of the aggregate production facility area on the subject site. Minor, low height, retaining walls may be required to establish finish grades in areas for the proposed development.

The above project description and assumptions were used as the basis for the field exploration, laboratory testing program, the engineering analysis, and the conclusions and recommendations presented in this report. **Hilltop Geotechnical, Inc.** should be notified if structures, foundation loads, grading, and/or details other than those represented herein are proposed for final

development of the site so a review can be performed, a supplemental evaluation made, and revised recommendations submitted, if required.

FIELD EXPLORATION AND LABORATORY TESTING

The field study performed for this report included a visual reconnaissance of existing surface conditions of the subject site. A study of the property's subsurface condition was performed to evaluate underlying earth strata and the presence of groundwater. Surface and subsurface conditions were explored on August 16, 2006.

The subsurface exploration consisted of excavating nine (9) exploratory backhoe trenches in the area of the proposed structures on the subject property. The approximate locations of the exploratory excavations are shown on the 'Exploratory Excavation Location Plan,' Plate No. 1, presented in the map pocket in Appendix 'A.' The exploratory excavations were observed and logged by a representative of **Hilltop Geotechnical, Inc.** The results are presented on the 'Subsurface Exploration Logs,' Plate Nos. 3 through 11, presented in Appendix 'A.' A more detailed explanation of the field study which was performed for this report is presented in Appendix 'A.'

Representative bulk samples of on-site earth materials were collected during the field exploration and returned to the laboratory for testing. Laboratory tests were conducted to evaluate the index and engineering properties of on-site materials and included in-situ moisture content tests, expansion index tests, chemical tests, sieve analysis tests, and maximum dry density / optimum moisture content

relationship tests. A more detailed explanation of laboratory tests performed for this study and test results are presented in Appendix 'A.'

FINDINGS

SITE DESCRIPTION

The proposed aggregate production facility site was an 'L' shaped parcel of land, and comprised of approximately 30.5 acres. The subject property is located approximately 1,200 feet south of Avenue 'T.' The west side of the property is located approximately 2,000 feet to the west of the intersection of the Longview Road and Avenue 'T.'

The subject property is bounded by an existing railway track to the south and vacant undeveloped properties on the other three (3) sides as shown on the 'Exploratory Excavation Location Plan,' Plate No. 1, presented in Appendix 'A.'

Per the Reference No. 1 'Topographic Map' noted on the cover page of this report, the immediate area of the subject site was almost flat with a shallow, downward inclination toward the north at an average gradient of approximately 1.5 percent. Total on-site relief in the area of the proposed aggregate production facility was approximately 20 feet. On-site drainage was accomplished by sheetflow toward the northwest.

At the time the field exploration was made, the surface of the site was firm and the backhoe did experienced a little difficulty moving around on the site. However, dense vegetation made moving around on the site a little difficult.

At the time of the field study, buildings or other type structures were not present on the site. An underground fiber optic cable easement was observed along the southern boundary of the subject property and adjacent to the railroad track. Other underground, and overhead utilities were not observed on the subject site.

During the field exploration on the subject site, several exploratory trenches and boreholes that had been previously backfilled with native material were observed at random locations.

Miscellaneous debris and refuse, soil, etc. were observed at various locations throughout the subject site at the time the field study was performed for this report.

At the time of the field study, vegetation across the site was heavy and consisted of seasonal native grasses, weeds, forbs, brush, and undergrowth and a few randomly located trees.

ENGINEERING GEOLOGIC ANALYSIS

Regional Geologic Setting

The project site is situated near the southwest margin of the Mojave Desert Geomorphic Province, one (1) of 11 provinces recognized in California. The Mojave Desert Geomorphic Province is a distinctive geological and physiographic region encompassing much of southeastern California, extending from the Tehachapi Mountains on the west to an arbitrary boundary at the Colorado River on the east. The southern edge of the province abuts the east-west trending Transverse Ranges (combined San Gabriel, San Bernardino, Little San Bernardino and Eagle Mountains), while the northern boundary is generally recognized to be the Garlock

fault zone. Characteristic landforms of the province include relatively narrow, elongated ranges separated by wider, intervening valleys.

The Mojave Desert province has a typical, continental arid climate where years to decades may pass in which little or no precipitation falls, separated by brief episodes of locally torrential rain. The brief, heavy precipitation over relatively small areas generally causes rapid erosion in higher elevations, followed by deposition of transported sediments immediately after the runoff leaves the steep gradients of mountainous areas and reaches relatively flat-lying terrain. Alluvial fans extending from isolated mountain ranges in the Mojave Desert often coalesce to form bajadas, broad, continuous alluvial slopes that extend away from the mountain ranges . The characteristic muted topography of the gently sloping bajadas, which form the margins of many relatively flat-floored valleys in this province, stand in contrast to the deeply eroded and incised, often jagged mountain ranges.

Most of the province is internally draining; thus, many valleys typically include at least one (1) flat playa surface, many of which become shallow, ephemeral lakes during seasons of heavy precipitation. The playa lakes and surrounding alluvial fans and bajadas usually conceal underlying fault-controlled, sedimentary basins that often contain thousands of feet of alluvium and soft rock. Topographic relief is subdued in the western Mojave, but becomes increasingly greater to the east and north.

The province contains a diverse array of rock types. Mesozoic-age igneous intrusive granitic rocks are predominant in the western and southern portions of the province, and are widely observed in the remainder. Quaternary and Holocene

extrusive igneous rocks and volcanic formations may be observed throughout this province, though they are most common in the southern and western portions. Parts of the central and northern portions of the province include thick sequences of meta-volcanic rocks as well as a number of Paleozoic-age, sedimentary formations that can be correlated to similar formational units in Arizona and Nevada. Tertiary and Quaternary-age alluvial and lacustrine sediments fill basins and occasionally form low hills. The sediments often host economically significant deposits of gravel, clay, and evaporites including salts and borates. Limited areas of the Mojave Province contain large active aeolian deposits, generally in the form of large, shifting sand dunes.

The area surrounding the subject property is underlain by a thick sequence of Quaternary and older alluvial sediments resulting from weathering, erosion, transport, and subsequent deposition of materials from the San Gabriel Mountains, located to the south of the Pearblossom area. Source rocks within nearby mountains include Mesozoic-age granitic igneous rocks and various metamorphic rock formations. The general geology in the area surrounding the subject site is shown on the 'Regional Geology Map,' Figure No. 2.

Local Subsurface Conditions

Earth Materials Description: Presented as follows are brief descriptions of earth materials encountered in the exploratory excavations. More detailed descriptions of encountered earth materials are presented on the 'Subsurface Exploration Logs,' Plate Nos. 3 through 11, presented in Appendix 'A.' The earth material strata, as shown on the logs, represent conditions at the actual exploratory excavation locations. Other variations may occur beyond and/or between the excavations. Lines of demarcation between earth materials on the

logs represented the approximate boundary between the material types; however, the transition may be gradual.

The earth materials encountered on the subject site during the field exploration were identified as young alluvial deposits (Q).

The alluvium generally consisted of slightly silty to silty, fine- to coarse-grained sand with varying amounts of gravel and cobbles (SP/SM and SM), and gravely, fine- to coarse-grained sand with a trace of silt and a little gravel (SP). These strata generally were brown in color and dry near the surface to moist with depth.

Groundwater: Groundwater was not encountered in the exploratory excavations to the maximum depth explored of approximately 14 feet below existing ground surface at the boring locations at the time the field study was performed for this report.

Groundwater depth data for the site area was available through the **California Department of Water Resources** internet web site. The depth to groundwater in State Well No. 05N10W12M001S, located approximately 0.25 miles southwest of the site, was at 92 feet below the ground surface on January 1, 1959. The surface elevation of this well is approximately 10 to 40 feet higher (topographically) than that of the site. Based on this information, the current depth to static groundwater beneath the site is estimated to be greater than 50 feet. Based on proposed site grading and the inferred groundwater depths, groundwater should not be a factor for project design or long-term performance.

Surface Water: Surface water was not observed on the subject site at the time the field study was performed for this report.

Site Variations: Based on results of our subsurface exploration and experience, variations in the continuity and nature of surface and subsurface conditions should be anticipated. Due to uncertainty involved in the nature and depositional characteristics of earth materials at the site, care should be exercised in extrapolating or interpolating subsurface conditions between and beyond the exploratory excavation locations.

Groundwater observations were made in the exploratory excavations at times and under conditions stated on the boring logs. These data have been reviewed and interpretations made in the text in other sections of this report. However, it should be noted that fluctuations in levels of groundwater, springs, and/or perched water may occur due to variations in precipitation, temperature, and other factors.

Faulting and Regional Seismicity

The site is situated in an area of active and potentially active faults, as is most of metropolitan southern California. Active faults present a variety of potential risks to structures, the most common of which are strong ground shaking, dynamic densification, liquefaction, mass wasting, and surface rupture at the fault plane. Generally speaking, the following four (4) factors are the principal determinants of seismic risk at a given location:

- Distance to seismogenically capable faults.
- The maximum or "characteristic" magnitude earthquake for a capable fault.
- Seismic recurrence interval, in turn related to tectonic slip rates.

- Nature of earth materials underlying the site.

Surface rupture represents the primary potential hazard to structures built on an active fault zone. A reviews of the official map delineating State of California earthquake fault zones (**California Department of Conservation, Division of Mines and Geology**, Effective July 1, 1974, *State of California Special Studies Zones, Littlerock Quadrangle, Official Map*, Scale: 1:24,000) indicated the site is not located within a zone of mandatory study for active faulting. To the southwest, the Mojave segment of the San Andreas fault passes within approximately 7.3 kilometers of the subject site. The Clamshell-Sawpit fault passes within approximately 22.2 kilometers to the south of the site. Accordingly, the potential for surface fault rupture on this site is considered to be very low.

Ground shaking is judged to be the primary hazard most likely to affect the site, based upon proximity to two (2) regionally significant, active faults: the San Andreas fault (Mojave Segment); and the Clamshell-Sawpit fault. Other significant fault zones, including the Sierra Madre fault, Cucamonga fault, and several zones in the high desert area, are located at distances exceeding 23 kilometers from the site. Greater distances, lower slip rates, and lesser maximum magnitudes indicate much lower risk to the site from the latter fault zones than from the two (2) closest faults. Characteristics of the major active fault zones selected for inclusion in analysis of strong ground shaking are listed in the following table:

Fault Zone	Distance from Site (km)[1]	Fault Length (km)[2]	Slip Rate (mm/yr)[2]	Reference Earthquake ($_{Mmax}$)[2]	Fault Type[2]
San Andreas (Mojave Segment)	7.3	103	30.0	7.4	A
Clamshell-Sawpit	22.2	16	0.5	6.5	B

1. **Blake, Thomas F.**, 2000, *Preliminary Fault-Data for EQFault, EQSearch and FriskSP* and **Blake, Thomas, F.,** *Computer Services and Software, Users Manuals, FriskSP v. 4.00, EQSearch v. 3.00, and EQFault v. 3.00.*

2. **California Department of Conservation, Division of Mines and Geology**, 1996 (Appendix A - Revised 2002), *Probabilistic Seismic Hazard Assessment for the State of California*, DMG Open-File Report 96-08.

Deterministic analyses of the hazard of ground shaking at the site were considered for reference earthquakes on each of the regional faults listed above. The assigned reference earthquake for the San Andreas fault (Mojave Segment) is modeled as a single segment event producing a 100-percent, right-lateral, strike-slip, moment magnitude 7.4 earthquake. The Clamshell-Sawpit fault is modeled as a 6.5 moment magnitude source with reverse slip (45 NW) displacement.

Probabilistic seismic hazard maps and data files jointly prepared by the **California Geological Survey (CGS)** and the **U.S. Geological Survey (USGS)** assign a 10 percent likelihood of horizontal ground accelerations of approximately 0.61g at this site within the next 50 years per the **USGS** 'Probabilistic Seismic Hazards Mapping Ground Motion Page' (www.conservation.ca.gov /cgs/rghm/pshamap/pshamain.html). The probabilistic hazard maps were calculated for alluvial sites such as the subject property. Actual shaking intensities at the site from any seismic source may be substantially higher or lower than estimated for a given earthquake magnitude, due to complex and unpredictable effects from variables such as:

- Near-source directivity effects.
- Direction, length, and mechanism of fault rupture (strike-slip, normal, reverse).
- Depth and consistency of unconsolidated sediments.
- Topography.
- Geologic structure underlying the site.
- Seismic wave reflection, refraction, and interference.

Secondary Seismic Hazards

Secondary hazards include induced landsliding or mass wasting, liquefaction, flooding (from ruptured tanks and reservoirs, surface oscillations in larger lakes, or seismic sea waves), and subsidence as a result of soil densification. Landsliding and liquefaction susceptibility maps have been prepared for much of coastal Los Angeles County and Orange County by the **DMG**. Reviews of official maps delineating State of California seismic hazard zones (**California Department of Conservation, Division of Mines and Geology**, Released October 17, 2003, *State of California Seismic Hazard Zones, Littlerock Quadrangle, Official Map*, Scale: 1:24,000) indicated the site is not located within a zone of mandatory study for seismic hazards.

Liquefaction: Liquefaction is a phenomenon in which cohesionless, saturated, fine-grained sand and sandy silt soils lose shear strength due to groundshaking. It is our opinion that liquefaction potential at the subject site is very low due to an estimated depth to groundwater of 50 feet or greater beneath the existing ground surface on the site.

Seiching: Seiching involves an enclosed body of water oscillating due to groundshaking, usually following an earthquake. Lakes and water towers are typical bodies of water affected by seiching. However, large bodies of water do not appear to be within the influence of the site and, as such, seiching should not be considered a hazard in the area.

Tsunamis: Because of the inland geographic location of the site, tsunamis are not considered a hazard.

OTHER GEOLOGIC HAZARDS

Flooding

No flood hazard maps or site specific information were available for the area of subject site at the time this study was performed. It is known that the Big Rock Creek Wash, located just east of the subject site, is surrounded by a relatively wide 100-year flood zone. The precise limits of the 100-year flood zone could not be determined by available information. If necessary, flood potential for the subject property should be evaluated by a Civil Engineer.

Landslide

Due to the flat-lying nature of the site and the surrounding area, on-site landsliding or debris flows sourced from higher elevations should not be considered to be a geologic constraint at this site.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

The conclusions and recommendations presented in this report are, in part, based on the information provided to this firm, the results of the field and laboratory data obtained from nine (9) exploratory excavations located on the subject property, experience gained from work conducted by this firm on projects within the general vicinity of the subject site, the project description and assumptions presented in the 'Project Description / Proposed Development' section of this report, engineering analyses, and professional judgement. Based on a review of the field and laboratory data and the engineering analysis, the proposed development is feasible from a geotechnical / geologic standpoint and that the subject property can be developed without adverse impact onto or from adjoining properties providing the recommendations contained within this report are adhered to during project design and construction.

The average in-situ moisture contents and in-situ dry densities of the near-surface alluvial materials in the upper 4.0 feet of the subject site suggests that the soils have a relative compaction of less than 90 percent.

Therefore, some remedial grading consisting of removals and replacement will have to be performed within loose, near-surface alluvial materials in the area of proposed structural fills, structures, exterior hardscapes, and/or pavement.

The actual conditions of the near-surface supporting material across the site may vary. The nature and extent of variations of the surface and subsurface conditions between the exploratory excavations may not become evident until construction.

If variations of the material become evident during construction of the proposed development, **Hilltop Geotechnical, Inc.** should be notified so that the project Geotechnical / Geologic Consultant can reevaluate the characteristics of the material and the conclusions and recommendations of this report, and, if needed, make revisions to the conclusions and recommendations presented herein.

Recommendations for site grading, foundations, slab support, pavement design, etc., are presented in the subsequent paragraphs.

SITE PREPARATION RECOMMENDATIONS

General

Since mass grading is not anticipated for the development of the project, the grading recommendations presented in this report are intended for: 1) the rework of unsuitable, near-surface, alluvial materials to create engineered pads and satisfactory support for foundations for the proposed structures; and 2) the use of a conventional shallow foundation system and concrete slabs cast on-grade.

The proposed structures for the aggregate production facility are considered to be non-settlement sensitive.

If hardscape and pavement subgrade soils are prepared at the time of grading of the various structure sites, and the improvements are not constructed immediately, additional observations and testing of the subgrade soil will have to be performed to locate areas which may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. The additional observations and testing should be performed before placing aggregate base material, asphaltic concrete, and/or Portland Cement concrete in those areas.

The following recommendations may need to be modified and/or supplemented during grading as field conditions dictate. Typical 'Grading Specifications' are presented in Appendix 'B' for reference. The special site preparation recommendations presented in the following sections will supersede those in the 'Grading Specifications' presented in Appendix 'B' if there is any conflict.

The grading should be performed in accordance with the recommendations presented in this report. We recommend that **Hilltop Geotechnical, Inc.**, as the Geotechnical Engineer / Geologist of Record, be retained by the owner of the proposed project to observe the excavation and grading operations, foundation preparation, and test the compacted fill and utility trench backfill. A pregrading conference should be held at the site with the owner, contractor, County of Los Angeles representative, Civil Engineer, and Geotechnical / Geologic Consultant in attendance. Special grading procedures and/or concerns can be addressed at that time.

Earthwork observation services allow the testing of only a small percentage of the fill placed at the site. Contractual arrangements with the grading contractor by the project owner should contain the provision that he is responsible for excavating, placing, and compacting fill in accordance with the recommendations presented in this report and the approved project grading plans and specifications. Observation by the project Geotechnical / Geologic Consultant and/or his representatives during grading should not relieve the grading contractor of his responsibility to perform the work in accordance with the recommendations presented in this report and the approved project plans and specifications.

The following recommendations may need to be modified and/or supplemented during grading as field conditions require.

Final Grading Plan Review

The project Civil Engineer should review this report, incorporate critical information on to the grading plan and/or reference this geotechnical / geologic study, by Company Name, Project No., Report No., and report date, on the grading plan. Final grading plans should be reviewed by **Hilltop Geotechnical, Inc.** when they become available to address the suitability of our grading recommendations with respect to the proposed improvements.

Clearing and Grubbing

Debris, grasses, weeds, brush, trees, and other deleterious materials should be removed from the proposed building, exterior hardscape and pavement areas and areas to receive structural fill before grading is performed. Any miscellaneous / demolition debris should be legally disposed of off site. Any topsoil or highly organic surface soils encountered should be stripped and stockpiled for use on finished grades in landscape areas or exported from the site. Disking or mixing of organic material into the soils proposed to be used as structural fill should not be permitted. Man-made objects encountered (i.e., septic tanks, leach lines, irrigation systems, underground utilities, old foundations, etc.) should be overexcavated, exported from the site, and legally disposed of off site. Cesspools or seepage pits, if encountered (none were encountered during this study), should be abandoned and capped according to directions and supervision of Los Angeles County Department of Health, the State of California, and/or the appropriate governmental agency procedures which has jurisdiction over them before fill and/or pavement is placed over the area. If no procedures are required by the Health

Department or if the following recommendations are more stringent, the cesspool or seepage pit should be pumped free of any liquid and filled with a low strength sand cement slurry to an elevation 5.0 feet below the final site grade in the area. The upper 5.0 feet of the cesspool or seepage pit should be excavated and the area backfilled with a properly compacted fill material. The location of the cesspool or seepage pit should be surveyed and plotted on the final 'As-Graded' plan prepared by the project Civil Engineer. Trees and their roots should be completely removed, ensuring that 95 percent or more of the root systems are extracted. Wells, if encountered, should be abandoned and capped according to directions and supervision of Los Angeles County Department of Health, the State of California, and/or the appropriate governmental agency procedures which has jurisdiction over the well before fill and/or pavement is placed over the area.

Excavation Characteristics

Excavation and trenching within the subject property is anticipated to be relatively easy in the near-surface alluvial materials on the subject site and should be accomplished with conventional earth-moving equipment since the backhoe was able to penetrate to the indicated depths. Materials were not encountered or are anticipated that would require heavy ripping or blasting to excavate. It is anticipated that a significant amount of oversized rock material (i.e., 6.0 inches in greatest dimension) may be generated during the removal and replacement process which will require special handling during the development of the site.

Suitability of On-Site Materials as Fill

In general, the on-site earth materials present below any topsoil and/or highly organic materials are considered satisfactory for reuse as fill. Fill materials should be free of significant amounts of organic materials and/or debris and should not

contain rocks or clumps greater than 6.0 inches in maximum dimension. It is noted that the in-situ moisture content of the near-surface alluvial soils on the subject site at the time this field study was performed was below the optimum moisture content for the on-site materials and that moisture will have to be added to the on-site soils if the soils are to be used as compacted fill material in the near future. No significant amount of oversized rock materials are anticipated to be generated from the cuts performed in the local materials.

Removal and Recompaction

Uncontrolled or undocumented fills and/or unsuitable, loose, or disturbed near-surface alluvial soil in proposed areas which will support foundations for the proposed structures should be prepared in accordance with the following recommendations for grading in such areas.

- A 5.0 foot overexcavation and replacement is recommended to be performed prior to construction of the foundations. Moreover, the depth of the overexcavation within the perimeter of the proposed non-settlement sensitive structure foundations should be to a uniform elevation throughout the limits of the foundations. The limits of overexcavation for the structure foundations should extend to a distance of 5.0 feet or to the depth of the overexcavation beneath the finish pad grade for the structure, whichever is greater, beyond the structure foundation edges. It is noted that localized areas, once exposed, may warrant additional overexcavation for the removal of any existing construction debris or subsurface obstructions which may be associated with past usage of the site. Actual depths of removals and the competency of the exposed overexcavation bottoms should be determined by the project Geotechnical / Geologic Consultant and/or his representative during grading operations at the time they are exposed and before scarification and recompaction or the placement of fill. The exposed overexcavation bottom surfaces should be scarified to a depth of 6.0 to12 inches, brought to optimum moisture content to 3.0 percent above optimum moisture content, and compacted to 90 percent or greater relative compaction before placement of fill. The scarification and recompaction of the exposed overexcavation bottoms in alluvial materials may be deleted

upon approval by the project Geotechnical / Geologic Consultant and/or his representative when in-place density test results in the alluvial materials indicate a relative compaction of 90 percent or greater. Additional overexcavation will need to be performed in areas where the exposed foundation subgrade can not be properly processed and recompacted per the recommendations presented in this report. Fill material, whether on-site material or import, should be approved by the project Geotechnical / Geologic Consultant and/or his representative before placement. Fill material should be free from vegetation, organic material, debris, and oversize material (i.e., 6.0 inches in maximum dimension). Approved fill material should be placed in horizontal lifts not exceeding 6.0 to 8.0 inches in compacted thickness or in thicknesses the grading contractor can demonstrate that he can achieve adequate compaction. The fill material should be watered or aerated to obtain optimum moisture content to 3.0 percent above optimum moisture content. Each lift should be spread evenly and should be thoroughly mixed to ensure uniformity of soil moisture. Fill soils should be compacted to 90 percent or greater relative compaction. Maximum dry density and optimum moisture content for compacted materials should be determined in accordance with current ASTM D1557 procedures.

- Additional overexcavation will need to be performed in areas where the exposed subgrade can not be properly processed and recompacted per the preceding recommendations presented in this section of this report.

Import Material

Import fill should be non-expansive (i.e., Expansion Index = 0) as determined by current Uniform Building Code (UBC) Standard 18-2 or ASTM D4829 procedures and have strength parameters equivalent to or greater than the on-site soils. Import fill material should be approved by the project Geotechnical / Geologic Consultant prior to it being brought on-site.

Fill Placement Requirements

Fill material, whether on-site material or import, should be approved by the project Geotechnical / Geologic Consultant and/or his representative before placement.

Fill material should be free from vegetation, organic material, debris, and oversize material (i.e., 6.0 inches in maximum dimension). Approved fill material should be placed in horizontal lifts not exceeding 6.0 to 8.0 inches in compacted thickness or in thicknesses the grading contractor can demonstrate that he can achieve adequate compaction and watered or aerated to obtain optimum moisture content to 3.0 percent above optimum moisture content. Each lift should be spread evenly and should be thoroughly mixed to ensure uniformity of soil moisture. Fill soils should be compacted to 90 percent or greater relative compaction. Maximum dry density and optimum moisture content for compacted materials should be determined in accordance with current ASTM D1557 procedures.

Compaction Equipment

It is anticipated that the compaction equipment to be used for the project will include a combination of rubber-tired, track-mounted, sheepsfoot, and/or vibratory rollers to achieve compaction. Compaction by rubber-tired or track-mounted equipment, by itself, may not be sufficient. Adequate water trucks, water pulls, and/or other appropriate equipment should be available to provide sufficient moisture and dust control. The actual selection of equipment and compaction procedures are the responsibility of the contractor performing the work and should be such that uniform compaction of the fill is achieved.

Shrinkage, Bulking, and Subsidence

There will be a material loss due to the clearing and grubbing operations. The following values are exclusive of losses due to clearing, grubbing, tree root removal, or the removal of other subsurface features and may very due to differing conditions within the project boundaries and the limitations of this study.

Volumetric shrinkage of the near-surface alluvium on the subject site that is excavated and replaced as controlled, compacted fill should be anticipated. It is estimated that the average shrinkage of the near-surface soils within the upper 5.0 feet of the site which will be removed and replaced will be approximately 7.0 to 13 percent, based on fill volumes when compacted to 90 to 95 percent of maximum dry density for the soil type based on current ASTM D1557 procedures. For example, a 7.0 percent shrinkage factor would mean that it would take 1.07 cubic yards of excavated material to make 1.0 cubic yard of compacted fill at 90 percent relative compaction. A higher relative compaction would mean a larger shrinkage value.

A subsidence factor (loss of elevation due to compaction of alluvial soils in-place) of 0.06 to 0.11 foot per foot of compacted soil should be used in areas where the existing soils are compacted in-place to 90 to 95 percent relative compaction and to a depth of 12 inches.

Subsidence of the site due to settlement from the placement of less than 10 feet of fill (not including the depth of overexcavation and replacement) during the planned grading operation is expected to be minimal.

Although the above values are only approximate, they represent the recommended estimate of some of the respective factors to be used to calculate lost volume that will occur during grading.

Abandonment of Existing Underground Lines

Abandonment of existing underground irrigation, utility, or pipelines, if present within the zone of construction, should be performed by either excavating the lines and filling in the excavations with documented, properly compacted fill or by filling

the lines with a low strength sand / aggregate / cement slurry mixture. Filled lines should not be permitted closer than 3.0 feet below the bottom of proposed footings and/or concrete slabs on-grade. The lines should be cut off at a distance of 5.0 feet or greater from the area of construction. The ends of the lines should be plugged with 5.0 feet or more of concrete exhibiting minimal shrinkage characteristics to prevent water or fluid migration into or from the lines. Capping of the lines may also be needed if the lines are subject to line pressures. The slurry should consist of a fluid, workable mixture of sand, aggregate, cement, and water. Plugs should be placed at the ends of the line prior to filling with the slurry mixture. Cement should be Portland cement conforming to current ASTM C150 specifications. Water used for the slurry mixture should be free of oil, salts, and other impurities which would have an adverse effect on the quality of the slurry. Aggregate, if used in the slurry, mixture should meet the following gradation or a suitable equivalent:

SIEVE SIZE	PERCENT PASSING
1.5"	100
1.0"	80-100
3/4"	60-100
3/8"	50-100
No. 4	40-80
No. 100	10-40

The sand, aggregate, cement, and water should be proportioned either by weight or by volume. Each cubic yard of slurry should not contain less than 188 pounds (2.0 sacks) of cement. Water content should be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed. The slurry should be placed within 1.0 hour of

mixing. The contractor should take precautions so that voids within the line to be abandoned are completely filled with slurry.

Local ordinances relative to abandonment of underground irrigation, utility, or pipelines, if more restrictive, supersede the above recommendations.

Slope Setbacks

Cut and fill slope setbacks from the permit boundary lines should be in accordance with Appendix Chapter 33, Section 3314, of the 2001 California Building Code (CBC) or current Los Angeles County, California Grading Ordinances, whichever is more stringent.

Fill Slopes

Finish fill slopes should not be inclined steeper than 2:1 (Horizontal to Vertical). Fill slope surfaces should be compacted to 90 percent relative compaction to the face of the finished slope. Overexcavation beneath proposed fill slopes should be performed in accordance with the recommendations presented in previous sections of this report. Fill slopes should be constructed in a skillful manner so that they are positioned at the design orientations and slope ratio. Achieving a uniform slope surface by subsequent thin wedge filling should be avoided. Add-on correction to a fill slope should be conducted under the observation and recommendations of the project Geotechnical / Geologic Consultant. The proposed add-on correction procedures should be submitted in writing by the contractor before commencement of corrective grading and reviewed by the project Geotechnical / Geologic Consultant. Compacted fill slopes should be backrolled with appropriate equipment for the type of soil being used during fill placement at intervals not exceeding 4.0 feet in vertical height. As an alternative to the

bankrolling of the fill slopes, over-filling of the slopes will be considered acceptable and preferred. The fill slope should be constructed by over-filling with compacted fill to a distance of 3.0 feet or greater horizontally, and then trimmed back to expose the dense inner core of the slope surface. Fill slopes steeper than 3:1 (Horizontal to Vertical) are moderately susceptible to erosion due to the low cohesion parameters of the soils.

Cut Slopes

Finish cut slopes should not be inclined steeper than 2:1 (Horizontal to Vertical). The cut slopes should be observed by the project Geotechnical / Geologic Consultant and/or his representative during grading to provide supplemental recommendations for stability of slopes, if needed. Cut slopes that face in the same direction as the prevailing natural slope will require top of cut paved interceptor swales. Cut slopes steeper than 3:1 (Horizontal to Vertical) are moderately susceptible to erosion due to the low cohesion parameters of the soils.

Fill-Over-Cut Slopes

Generally, fill-over-cut slopes should be eliminated by overexcavating the cut portion of the slope a minimum of 15 feet. The transition between cut and fill, on the slope, should be maintained as steep as possible.

Loose Material on Slope Face

The grading contractor should be made aware to take care to avoid spillage of loose material down the face of slopes during grading and during drainage terrace and downdrain construction. Fine grading operations for benches and downdrains should not deposit loose trimmed soils on the finished slope surfaces.

Slope Creep

Proposed slopes are planned to be stable under normal conditions and moderate earthquakes. However, movement due to creep effects of improvements located near the tops of proposed or existing fill and cut slopes must be considered. Due to moisture variations and natural gravity forces, the soils on the face of a slope tend to move downward and outward with time. Past experience has indicated that there is a zone which ranges back from the top of the slope edge that may experience movement. This zone varies from approximately 5.0 feet to 15 to 20 feet depending on the type of soil the slope is composed of, the height of the slope, the inclination of the slope, moisture conditions, etc. The movement tends to be greatest at the top of the slope near the slope edge. Improvements within the creep zone should be designed and constructed to accommodate the anticipated movements. The movements may very from a fraction of an inch to several inches and is dependent on the slope height, soil type, distance from the slope edge, and other factors.

Slope Protection

Permanent slope maintenance and protection measures as presented in the subsequent 'Slope Maintenance and Protection Recommendations' section of this report should be initiated as soon as practicable after completion of cut and/or fill slope construction. Fill slopes and cut slopes in alluvium materials steeper than 3:1 (Horizontal to Vertical) are moderately susceptible to erosion due to the low cohesion parameters of the soils. The plant mix, method of application, and maintenance requirements are subject to the approval of a registered Landscape Architect or other qualified landscape professional. Construction delays, climate or weather conditions, and plant growth rates may be such that additional short-

term non-plant erosion management measures may be needed. Examples would include matting, netting, plastic sheets, deep staking (5.0 feet or deeper), etc.

Protection of Work

During the grading process and prior to the completion of construction of permanent drainage controls, it is the responsibility of the grading contractor to provide good drainage and prevent ponding of water and damage to the in progress or finished work on the site and/or to adjoining properties.

Observation and Testing

During grading, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the grading is being performed according to the recommendations presented in this report. The project Geotechnical / Geologic Consultant and/or his representative should observe the overexcavation bottom and the placement of fill and should take tests to verify the moisture content, density, uniformity and degree of compaction obtained. The contractor should notify the project Geotechnical / Geologic Consultant when cleanout and/or overexcavation bottoms are ready for observation and prior to scarification and recompaction. Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content when needed, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal Grading Report following completion of the grading operations. Grading operations undertaken at the site without the project Geotechnical / Geologic Consultant and/or his representative present may result in exclusions of the affected areas from the grading report for the project. The presence of the project Geotechnical / Geologic Consultant and/or

his representative will be for the purpose of providing observations and field testing and will not include supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the project Geotechnical / Geologic Consultant and/or his field representative nor the field observations and testing will excuse the contractor for defects discovered in the contractor's work. If **Hilltop Geotechnical, Inc.** does not perform the observation and testing of the earthwork for the project and is replaced as Geotechnical / Geologic Consultant of record for the project, per Section 3317.8 of Appendix Chapter 33, 'Transfer of Responsibility,' in the 2001 CBC, the work on the project should be stopped until the replacement Geotechnical / Geological Consultant has reviewed the previous reports and work performed for the project, agreed in writing to accept the recommendations and prior work performed by **Hilltop Geotechnical, Inc.** for the subject project, or has performed their own studies and submitted their revised recommendations.

Soil Expansion Potential

The preliminary expansion potential of the on-site soils is described in detail in the subsequent foundation and floor slab recommendation sections of this report. Upon completion of grading for the building pad areas, near-surface samples should be obtained for expansion potential testing to verify the preliminary expansion test results and the foundation and slab-on-grade recommendations presented in this report.

Soil Corrosion Potential

The preliminary corrosion potential of the on-site soils is described in detail in the subsequent corrosion recommendation sections of this report. Upon completion of grading for the building pad areas, near-surface samples should be obtained for

corrosion potential testing to verify the preliminary chemical test results and the recommendations presented in this report for protection of concrete which come in direct contact with the on-site soils and to present recommendations for protection of bare metal, if desired, which come in direct contact with the on-site soils.

CBC SEISMIC DESIGN CRITERIA

The **California Building Standards Commission**, *2001 California Building Code* (CBC), California Code of Regulations, Title 24, Part 2, Volumes 1 and 2 (Based on 1997 Uniform Building Code) contains substantial revisions and additions to previous editions in the earthquake engineering section in Chapter 16, Division IV, 'Earthquake Design.' New concepts contained in the updated code which will be relevant to construction of this project include:

- **Seismic Source Type A, B, C (Type Fault)**
  Defined by $M_{Max} \geq 7M_w$ or $<6\frac{1}{2}M_w$; and fault slip rate ≥ 5 or ≤ 2 mm/yr.

- **M_{Max} (Maximum Magnitude)**
  Defined using moment magnitude scale, M_w.

- **Soil Profile Types**
  Categorizing the upper 30 meters (±100 ft.) of earth materials into one of the soil profile types S_A, S_B, S_C, S_D, S_E, and S_F that are based on average shear wave velocities, Standard Penetration Test blow counts, or undrained shear strength.

- **Near Source Factors**
  Proximity to the Type 'A,' 'B,' or 'C' fault or seismic source type for:
  N_a (Acceleration): Distance ≤ 2, ≤ 5, or ≥ 10 km.
  N_v (Velocity): Distance ≤ 2, ≤ 5, ≤ 10, or ≥ 15 km.

- **Seismic Coefficients**
  Coefficients for acceleration (C_a) and velocity (C_v) that are based on 'Soil Profile Type' and the 'Near Source Factors' N_a and N_v for a 'Seismic Zone Factor' Z = 0.4.

Based on our understanding of local geologic conditions, the Soil Profile Type judged applicable to this site is S_D, generically described as a 'Stiff Soil' profile per Table 16-J, 'Soil Profile Types,' in the 2001 CBC with an Shear Wave Velocity of 600 to 1,200 feet/second (180 to 360 m/s) or an average Standard Penetration Test value of 15 to 50 blows per foot of penetration in the upper 100 feet (30.48 m) of the site. The property is located within Seismic Zone 4 per Figure 16-2, 'Seismic Zone Map of the United States,' in the 2001 CBC. A 'Seismic Zone Factor' Z = 0.4 should be used in the seismic design per Table 16-I, 'Seismic Zone Factor Z,' in the 2001 CBC. The following table presents additional coefficients and factors relevant to seismic mitigation and design for new construction built according to the 2001 CBC.

SEISMIC SOURCE	SEISMIC SOURCE TYPE[1]	DISTANCE FROM SITE (km)[2]	NEAR-SOURCE FACTOR (N_a)[1]	SEISMIC COEF. (C_a)[1]	NEAR-SOURCE FACTOR (N_v)[1]	SEISMIC COEF. (C_v)[1]
San Andreas (Mojave Segment)	A	7.3	1.11	0.49	1.42	0.91
Clamshell-Sawpit	B	22.2	1.00	0.44	1.00	0.64

1. **California Building Standards Commission**, *2001, California Building Code*, California Code of Regulations, Title 24, Part 2, Volume 2, Table 16-Q, 'Seismic Coefficient C_a,' Table 16-R, 'Seismic Coefficient C_v,' Table 16-S, 'Near Source Factor N_a,' and Table 16-T, 'Near Source Factor N_v.'

2. **Blake, Thomas F.**, 2000, *Preliminary Fault-Data for EQFault, EQSearch and FriskSP* and **Blake, Thomas, F.,** *Computer Services and Software, Users Manuals, FriskSP v. 4.00, EQSearch v. 3.00, and EQFault v. 3.00.*

Since the 2001 CBC specifies that the highest calculated Near-Source Factors be utilized for design, the San Andreas fault (Mojave Segment), the closest fault to the

subject site, becomes the controlling seismic source for this site. Final selection of a "design" acceleration should be made by the project Structural Consultant and should be reflective of the building type, expected seismic response, adopted codes, and level of conservatism exercised during the design process.

FOUNDATION DESIGN RECOMMENDATIONS

General

Foundations for the proposed structures may consist of conventional column and continuous wall footings founded upon undisturbed, documented, properly, compacted fill, and/or firm, competent, undisturbed, alluvial soil, but not a combination of material types within a structure foundation. The recommendations presented in the subsequent paragraphs for foundation design and construction are based on geotechnical characteristics and a 'Very Low' expansion potential for the supporting soils as determined by Table 18-I-B, 'Classification of Expansive Soil,' in the 2001 CBC and should not preclude more restrictive structural requirements. The Structural Engineer for the project should determine the actual footing width, depth, and reinforcing to resist design vertical, horizontal, and uplift forces under static and seismic conditions. Reinforcement recommendations presented in this report are considered the minimum for the soil conditions present on the site and are not intended to supersede the design of the project Structural Engineer or the criteria of the governing agencies for the project.

Due to the freeze / thaw conditions during the winter months in the project area, air entrained concrete should be utilized for concrete exposed to these conditions.

Foundation Size

Continuous footings should have a width of 12 inches or greater. Continuous footings should be continuously reinforced with a minimum of one (1) No. 4 steel reinforcing bar located near the top and one (1) No. 4 steel reinforcing bar located near the bottom of the footings to minimize the effects of slight differential movements which may occur due to minor variations in the engineering characteristics or seasonal moisture change in the supporting soils. Column footings should have a width of 18 inches by 18 inches or greater and be suitably reinforced, based on structural requirements. The continuous footings should extend across doorway and garage entrances and should be founded at the same depths and reinforced the same as the adjacent footings.

Depth of Embedment

Exterior and interior footings founded in undisturbed, documented, properly, compacted fill, and/or firm, competent, undisturbed, alluvial soil should extend to a depth of 12 inches or greater below lowest adjacent finish grade. Frost is not considered a design factor for foundations in the Pearblossom area of Los Angeles County, California, area since there will not be any significant frost penetration in the winter months.

Footing Setback

Embedment of footings on or near existing or planned slopes should be determined by a setback distance measured from the bottom outside edge of the footing to the slope face according to Figure 18-I-1, 'Setback Dimensions,' in the 2001 CBC and/or the County of Los Angeles building codes, whichever is greater.

Bearing Capacity

Provided the recommendations for site earthwork and for footing width and depth of embedment are incorporated into the project design and construction, the allowable bearing value for design of continuous and column footings for the total dead plus frequently-applied live loads is 1,500 psf for footings that are 12 inches in width and a depth of embedment of 12 inches below lowest adjacent finish grade. This value may be increased by 20 percent for each additional foot of depth and/or foot of width up to a value of 3.0 times the designated allowable bearing value. For eccentrically loaded footings and/or overturning moments, the resultant force should be in the middle one-third of the footing and the average bearing value across the footing should not exceed the recommended allowable bearing value. The allowable bearing value has a factor of safety of 3.0 or greater and may be increased by 33.3 percent for short durations of live and/or dynamic loading such as wind or seismic forces.

Settlement

Footings designed according to the recommended bearing value for continuous and column footings, respectively, the assumed wall and column loads, and founded in undisturbed, documented, properly, compacted fill material are not expected to exceed a total settlement of 1.0 inch or a differential settlement of 0.25 inch between similarly sized and loaded footings.

Lateral Capacity

Resistance to lateral loads can be provided by a combination of friction acting at the base of the foundation and passive earth pressure on the sides of the footings and stem walls. Foundation design parameters, based on undisturbed,

documented, properly compacted fill, or firm, competent, undisturbed, natural soil for resistance to static lateral dead forces, are as follows:

Allowable Lateral Bearing Pressure
(Equivalent Fluid Pressure), Passive Case:

Undisturbed Compacted Fill - 150 pcf
Undisturbed Alluvial Soil - 150 pcf

Allowable Lateral Sliding Coefficient of Friction Between Soil and Concrete:

Undisturbed Compacted Fill - 0.25
Undisturbed Alluvial Soil - 0.25

The above values are allowable design values and have safety factors of 2.0 or greater incorporated into them and may be used in combination without reduction in evaluating the resistance to lateral loads. The recommended lateral resistance assumes a horizontal surface for the soil mass extending to a distance of 10 feet or greater from the face of the footing, or three (3) times the height of the surface generating passive pressure, whichever is greater. The allowable values may be increased by 33.3 percent for short durations of live and/or dynamic loading, such as wind or seismic forces. For the calculation of passive earth resistance, the upper 1.0 foot of material should be neglected unless confined by a concrete slab or pavement. The largest recommended allowable passive pressure is 15 times the recommended design value.

Interim Foundation Plan Review

It is recommended that **Hilltop Geotechnical, Inc.** review the foundation plans for the structures as they become available. The purpose of this review is to

determine if these plans have been prepared in accordance with the recommendations contained in this report. This review will also provide us an opportunity to submit additional recommendations as conditions warrant.

Final Foundation Design Recommendations

Final foundation recommendations should be made upon completion of grading and be included in the Report of Grading prepared by the Geotechnical / Geologic Consultant for the project.

Foundation Excavations

Foundation excavations should be observed by the project Geotechnical / Geologic Consultant and/or his representative prior to placement of forms, reinforcing steel, or placement of concrete for the purpose of verification of the recommendations presented in this report and for compliance with the project plans and specifications. The foundation excavations should be trimmed neat, level, and square. Any loose or sloughed material and debris should be removed from the foundation excavations prior to placement of reinforcing steel and removed again prior to the placement of concrete. Soils removed from the foundation excavations should not be placed in slab-on-grade areas unless compacted to 90 percent or greater relative compaction. The maximum dry density and optimum moisture content for the soil should be determined in accordance with current ASTM D1557 procedures.

SLAB-ON-GRADE FLOOR RECOMMENDATIONS

The recommendations for concrete slab on-grade floors are based upon a 'Very Low' expansion potential for the supporting material as determined by Table 18-I-B, 'Classification of Expansive Soil,' in the 2001 CBC. The expansion potential of the

slab subgrade areas should be verified at the completion of grading of the building pad areas. Concrete slabs should be designed to minimize cracking as a result of shrinkage. Joints (isolation, contraction, and construction) should be placed in accordance with the American Concrete Institute (ACI) or Portland Cement Association (PCA) guidelines. Special precautions should be taken during placement and curing of concrete slabs. Excessive slump (high water / cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could result in excessive shrinkage, cracking, or curling in the slabs. It is recommended that concrete proportioning, placement, and curing be performed in accordance with ACI recommendations and procedures.

Commercial and/or industrial slabs should be designed by the project Structural Engineer in accordance with Portland Cement Association (PCA) or other approved design procedures for the actual loads and uses proposed.

Interior Floor Slabs

Interior concrete floor slabs-on-grade should be 4.0 inches or greater in thickness and be placed on properly prepared subgrade per the 'Earthwork Recommendations' section of this report. The concrete for the floor slab should have a compressive strength of 2,500 psi or greater at 28 days. Slab reinforcement should consist of a minimum of No. 3 reinforcing bars placed 30 inches on center in both directions, or an equivalent substitute. The reinforcing should be placed at mid-depth to 1.5 inches below the top surface of the slab to minimize cracking. The concrete section, reinforcing steel, and/or design concrete compressive strength should be increased appropriately for anticipated excessive or concentrated floor loads. A Modulus of Subgrade Reaction (k_s) of 200 pounds per square inch per inch of deflection is recommended for the design of structural slabs cast on grade for

excessive floor loads. A compacted sand or gravel bedding layer beneath lightly loaded floor slabs is not needed but may be desirable to enhance the design section for heavy floor loads. If gravel bedding is used, it should consist of a well graded, crushed aggregate. The sand or gravel layer should be compacted to 90 percent or greater of maximum dry density, as determined by current ASTM D1557 procedures.

If a vapor barrier / moisture retarder is used under the floor slab and it is placed on well graded crushed gravel material, it is recommended that a 1.0 inch thick layer of sand or other approved granular material be placed beneath the vapor barrier / moisture retarder to prevent punctures from angular gravel fragments and projections. If open graded gravel (capillary break) is placed beneath the vapor barrier or retarder, the gravel should be a 6.0 inches or greater in thickness. If open graded gravel is used, a separation fabric such as Mirafi 140N series or an equivalent substitute should be used in-leu of a sand cushion to protect the vapor barrier / moisture retarder from punctures.

If the floor slabs in the warehouse and/or shop areas will be supporting live loads, such as moving forklift trucks or vehicles, it is recommended that construction joints in the floor be provided with a key or dowels to permit the transfer of loads. Keys should not be used unless the slab is 6.0 inches or greater in thickness. If tracked equipment will be using the facility, consideration should be given to the use of a surface hardener for the concrete slabs such Master Builders “Master Plate 200" or “Anviltop.”

Subgrade soils should be moisture conditioned to optimum moisture content to 3.0 percent above optimum moisture content to a depth of 12 inches and proof

compacted to 90 percent or greater relative compaction based on current ASTM D1557 procedures immediately before placing the gravel material, the moisture barrier, or pouring concrete.

Vapor Barrier / Moisture Retarder Recommendations

In areas where moisture sensitive floor coverings are anticipated over the floor slab, the use of a vapor barrier / moisture retarder beneath the slab should be considered. The use or non-use of a vapor barrier / moisture retarder, the thickness of the vapor barrier / moisture retarder, the use of a granular layer over the vapor barrier / moisture retarder, the thickness of the granular materials, the type of granular material, etc. should be determined by the Structural Engineer who is designing the floor slab in conjunction with the Architect who is specifying the use and the type of floor coverings to be placed over the floor slab. The vapor barrier / moisture retarder recommendations provided by the supplier of the flooring materials should also be incorporated into the project plans.

EXTERIOR CONCRETE SLABS

Exterior concrete slabs cast on finish subgrade (i.e., sidewalks, etc., with the exception of PCC pavement) should be 4.0 inches or greater in thickness and be underlain by 12 inches or greater of soil that has been prepared in accordance with the 'Earthwork Recommendation' section of this report. Reinforcing in the slab, the design compressive strength of the concrete, and the use of a compacted sand or gravel base beneath the slabs should be according to the current standards of Los Angeles County, California. Subgrade soils should be moisture conditioned to optimum moisture content to 3.0 percent above optimum moisture content to a depth of 12 inches or greater and proof compacted to 90 percent or greater relative

compaction based on current ASTM D1557 procedures immediately before placing aggregate base material, placing reinforcing steel, or placing the concrete.

Due to the freeze / thaw conditions during the winter months in the project area, air entrained concrete should be considered for use in concrete exposed to these conditions.

RETAINING WALL RECOMMENDATIONS

Low height retaining walls may be needed to achieve finish grades for the proposed structure pads, driveways, and/or parking areas. Retaining walls should be designed in accordance with the recommendations in the following sections. If earth reinforced walls, crib wall, keystone walls, etc. are used for the development of the subject site, the design requirement of the proprietary wall system should supercede the following recommendations if there are any conflicts.

Static Lateral Earth Pressures

Retaining walls backfilled with non-expansive granular soil (i.e., Expansion Index (EI) = 0) or 'Very Low' expansive potential materials (i.e., EI of 20 or less) within a zone extending upward and away from the heel of the footing at a slope of 0.5:1 (Horizontal to Vertical) or flatter for level backfill and 0.7:1 (Horizontal to Vertical) for a 2:1 (Horizontal to Vertical) slope behind the wall can be designed to resist static lateral earth pressures equivalent to those recommended in the following table:

CONDITION	LEVEL BACKFILL	2:1 SLOPE
Active	30 pcf	45 pcf
At-Rest	53 pcf	–

Walls that are free to deflect 0.001 radian at the top should be designed for the above-recommended active condition. Walls that are not capable of this movement should be assumed rigid and designed for the at-rest condition. The above values assume well-drained backfill and that a buildup of hydrostatic pressure will not occur. Surcharge loads, dead and/or live (i.e., construction loads, etc.), acting on the backfill within a horizontal distance behind the wall, equivalent to or less than the vertical height of the wall, should also be considered in the design. Uniform surcharge pressures should be applied as an additional uniform (rectangular) pressure distribution. The lateral earth pressure coefficient for a uniform vertical surcharge load behind the wall is 0.50. Seismic and wind loads should also be added to the design loads on the walls.

Foundation Design

Retaining wall footings should be founded to the same depths below lowest adjacent finished grade and offsets from the face of slopes, and into undisturbed, observed and tested, compacted fill, or firm, competent, undisturbed, formational material as standard foundations. The foundations may be designed for the same average allowable bearing value across the footing (as long as the resultant force is located in the middle one-third of the footing), and with the same allowable static and seismic allowable lateral bearing pressure, allowable passive earth pressure, and allowable sliding resistance as recommended in the 'Foundation Design Recommendations' section of this report. When using the allowable lateral

pressure and allowable lateral sliding resistance, a factor of safety of 1.0 may be used. If ultimate values are used for design, an approximate factor of safety (i.e., 1.5) should be achieved.

Subdrain

A subdrain system should be constructed behind, and at the base of retaining walls to allow drainage and to prevent the buildup of excessive hydrostatic pressures. The subdrain system should be designed by the project Civil Engineer. The use of water-stops, impermeable barriers, or other dampproofing or waterproofing methods should be considered for any walls where moisture migration through the wall is considered critical to the performance and/or appearance of the walls. A waterproofing consultant should be retained to provide specific waterproofing recommendations for the project.

Typical subdrains may include weep holes with a continuous free draining gravel gallery, perforated pipe surrounded by free draining filter rock, or another approved system. The option of providing an ungrouted, open coarse of block at the bottom of a retaining wall is not a recommended drainage option since the openings are so often covered by landscape soil, hardscape, and or pavement. Gravel galleries and/or filter rock, if not designed and graded for the on-site and/or import materials, should be enclosed in a geotextile fabric such as Mirafi 140N series, or an equivalent substitute, to prevent infiltration of fine soil particles into the subdrain and clogging of the system. Before placement of the fabric, the top of the footing should be cleared of loose soil materials, large stones, and/or other debris. Any large depressions or holes should be filled with a concrete slurry or a suitable equivalent to permit close contact of the fabric with the surrounding surface. The fabric should be placed smoothly without folds or excessive wrinkles.

Successive sheets of the fabric should be placed with an overlap of 24 inches or more in the direction of the flow of the water in the pipe with the upstream layer overlapping the downstream layer. The fabric should be folded over the top of the free draining granular material producing an overlap of 12 inches or more. The perforated pipes should be Schedule 40 or stronger and 4.0 inches or greater in diameter. Perforations may be either bored 0.25-inch diameter holes or 0.1875-inch (3/16-inch) wide slots placed on the bottom one-third of the pipe perimeter. If the pipe is bored, a minimum of 10 holes per linear foot should be uniformly placed along the pipe. If slots are used, they should not exceed 2.0 inches in length and should not be closer than 2.0 inches on center along the length of the pipe. The total length of the slots should not be less than 50 percent of the pipe length and should be uniformly spaced along the length of the pipe. Pipe perforations should be placed downward. Gravel filters should have a volume of 3.0 cubic feet or greater per linear foot of pipe. Subdrains should maintain a positive flow gradient and have outlets that drain in a non-erosive manner.

Prefabricated drainage products such as 'Miradrain' or a suitable equivalent may also be used for the purpose of providing drainage behind retaining walls when installed in accordance with the manufacturers recommendations.

Backfill

Backfill directly behind retaining walls (if backfill width is less than 3.0 feet) may consist of 0.5- to 0.75-inch diameter, rounded to subrounded gravel with less than 5.0 percent passing the 0.5 inch sieve enclosed in a geotextile fabric such as Mirafi 140N series, or an equivalent substitute, or a clean sand (Sand Equivalent Value greater than 50) water jetted into place to obtain compaction. If water jetting is used, the subdrain system should be in place. Even if water jetting is used, the

sand should be densified to 90 percent or greater relative compaction. If the specified density is not obtained by water jetting, mechanical methods will have to be used. If other types of soil or gravel are used for backfill, mechanical compaction methods will have to be used to obtain a relative compaction of 90 percent or greater of maximum dry density. Backfill directly behind retaining walls should not be compacted by wheel, track or other rolling by heavy construction equipment unless the wall is designed for the surcharge loading. If gravel, clean sand, or other imported backfill is used behind retaining walls in unpaved areas, the upper 12 to 18 inches of backfill should consist of typical on-site material compacted to 90 percent or greater relative compaction to prevent the influx of surface run-off into the granular backfill and into the subdrain system. Maximum dry density and optimum moisture content for backfill materials should be determined according to current ASTM D1557 procedures.

V-Drain Design

A V-drain should be constructed directly behind retaining walls which have a sloping backfill to intercept surface water and drain it from the back of the wall. The V-drain should be designed and constructed in accordance with the typical standards of Los Angeles County, California. The V-drain should direct water from the back of the wall to an adequate down drain and discharge it in a non-erosive manner.

Observation and Testing

During retaining wall construction, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the work is being performed according to the recommendations presented in this report.

The foundation excavations should be observed by the project Geotechnical / Geologic Consultant and/or his representative prior to placement of forms, reinforcing steel, or placement of concrete for the purpose of verification of the recommendations presented in this report and for compliance with the project plans and specifications. The foundation excavations should be trimmed neat, level, and square. Any loose or sloughed material and debris should be removed from the foundation excavations prior to placement of reinforcing steel and removed again prior to the placement of concrete.

The placement and construction of the subdrain system behind the retaining walls should be observed by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the work is being performed according to the recommendations presented in this report.

During backfill of the retaining walls, observation and testing should be conducted by the project Geotechnical / Geologic Consultant and/or his representatives to verify that the backfilling is being performed according to the recommendations presented in this report. The project Geotechnical / Geologic Consultant and/or his representative should observe the placement of fill and should take tests to verify the moisture content, density, uniformity and degree of compaction obtained. Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content when needed, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal report following completion of the construction operations. Retaining wall backfill operations undertaken at the site without the project Geotechnical / Geologic

Consultant and/or his representative present may result in exclusions of the affected areas from the final report for the project.

The presence of the project Geotechnical / Geologic Consultant and/or his representative will be for the purpose of providing observations and field testing and will not include supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the project Geotechnical / Geologic Consultant and/or his field representative nor the field observations and testing will excuse the contractor for defects discovered in the contractor's work.

CORROSION POTENTIAL EVALUATION

The recommendations for corrosion protection should be verified at the completion of grading of the foundation pads and building pads on the subject site. Bulk samples of the near surface on-site soils were obtained during the field study to evaluate the potential for soil corrosivity. Results from the tests are included in the 'Summary of Laboratory Test Results' presented in Appendix 'A.'

Concrete Corrosion

Preliminary tests on samples of near-surface on-site soil material suggests a soluble sulfate concentration of 0.018 to 0.025 percent. Soils with a water soluble sulfate (SO_4) concentration in the range of 0.0 to 0.10 percent are considered to have a 'Negligible' sulfate exposure to concrete which comes in direct contact with the on-site soil as defined in Table 19-A-4, 'Requirements for Concrete Exposed to Sulfate-Containing Solutions,' in the 2001 CBC. The 2001 CBC should be used to determine the type cement, the maximum water cement ratio, and the minium compressive strength to be used for normal weight concrete which comes in direct

contact with the on-site soils. A lower water / cement ratio or higher compressive strength may be requested for design of concrete for water tightness or for protection against corrosion of embedded metallic items or freezing and thawing per Table 19-A-2, 'Requirements for Special Exposure Conditions,' in the 2001 CBC, if applicable.

Experience in the southern California area has shown that even though the soils do not contain levels of soluble sulfate which would require the use of sulfate resistant cement, maximum water cement ratios, or minimum compressive strength for concrete, concrete corrosion and erosion problems still occur. These problems are the result of concentrations of soluble sulfate, chloride, and other salts and/or acids present in groundwater, irrigation water, rain water, and potable water sources, and in fertilizers or soil amendments used to promote plant growth (i.e., some domestic water sources contain levels of soluble sulfate which would be a moderate sulfate exposure to concrete which comes in contact with it). Therefore, it may be wise to use a concrete designed for a moderate exposure to sulfate per the criteria presented in Table 19-A-4, 'Requirements for Concrete Exposed to Sulfate-Containing Solutions,' in the 2001 CBC that comes into contact with surface run-off or other sources of water. Higher strength, lower water / cement ratio, and denser concrete may also be effective in reducing the potential for evaporation to occur and preventing damage due to salt or acid exposure.

Metallic Corrosion

Preliminary minimum resistivity tests on samples of the near-surface on-site soil material suggest a mild corrosive environment for buried ferrous metal in direct contact with the on-site soils when the soils are moist to wet. Preliminary tests on samples of near-surface on-site soil material suggests a soluble chloride

concentration of 100 to 140 parts per million (ppm). Soils with greater than 300 and 500 ppm of soluble chloride are considered to be aggressive to buried ferrous and copper material, respectively, in direct contact with the soils. Soil pH is a general indicator of the corrosivity of the soils. The measured pH of samples of near-surface on-site soil material of 8.6 to 8.7 indicates a non-corrosive environment to copper and ferrous metals when in direct contact with the on-site soils.

The life of buried metals depends on type of material, thickness, and construction details. If corrosion protection of metals in direct contact with the on-site soils is considered to be a design issue, tests should be performed at the completion of the grading for the building pads and/or an engineer specializing in corrosion should be consulted regarding the potential damage due to corrosion. The corrosion engineer should recommend appropriate types of piping and/or protective measures where needed.

SLOPE STABILITY EVALUATION

The evaluation of the proposed cut slopes for the open-pit mine area on the subject site was not a part of this study.

Since anticipated cut and fill slopes for the development of the aggregate production facility area on the site are not anticipated to exceed 10 feet in vertical height and will not be steeper than 2:1 (Horizontal to Vertical), a formal slope stability analysis was not performed as part of this study. The proposed cut and fill slopes should be constructed at an inclination of 2:1 (Horizontal to Vertical) or flatter. It is anticipated that the proposed cut slopes will expose alluvial material. It is anticipated that the proposed fill slopes will be constructed of the alluvial

materials obtained from the proposed cuts for the development of the subject site. It is the opinion of this firm that the proposed cut and fill slopes will be grossly and surficially stable as designed. However, the compacted fill and exposed cut materials will be vulnerable to erosion if precautions as recommended in the 'Slope Maintenance and Protection' section of this report are not implemented as soon as practicable after completion of grading.

PRELIMINARY PAVEMENT RECOMMENDATIONS

The following are our recommendations for the structural pavement section for the parking areas and driveway areas for the subject development. The Hot Mix Asphalt (HMA) pavement sections have been determined in general accordance with current **CALTRANS** design procedures and are based on an assumed Traffic Index (TI) and an assumed R-Value of at least 50 based on past experience in the vicinity of the site and visual textural classification of the on-site soils which are anticipated to be at subgrade elevation. The preliminary recommendations for the pavement sections should consist of the following:

Site Area	Traffic Index	Pavement Section
Driveway and Parking Areas for Autos and Light Weight Vehicles, Only.	≤5.0	3.0" Asphaltic Concrete (A.C.) over 4.0" Aggregate Base (A.B.) or 4.6" PCC @ 2,500 psi over properly prepared subgrade.
Driveways and Parking Areas for Ready Mix Concrete and Material Hauling Trucks.	≤8.5	5.3" A.C. over 8.3" A.B. or 8.6" PCC @ 2,500 psi over properly prepared subgrade.

Asphalt concrete pavement materials should be as specified in Section 39, 'Asphaltic Concrete,' in the current **CALTRANS** Standard Specifications or an equivalent substitute. Aggregate base should conform to Class 2 (37.5-mm {1-1/2"} Maximum or 19-mm {3/4"} Maximum) material as specified in Section 26-1.02A, 'Class 2 Aggregate Base,' in the current **CALTRANS** Standard Specifications, or an equivalent substitute. Portland Cement Concrete sections are based on a compressive strength of 2,500 psi or greater at 28 days for the concrete. Higher strength design for the concrete can permit thinner pavement sections. Lower strength design for the concrete will require thicker pavement sections. Joints (longitudinal, transverse, construction, and expansion), jointing arrangement, joint type, pavement and/or joint reinforcing, as well as drainage, crowning, finishing and curing of PCC pavement should be in accordance with current Portland Cement Association (PCA) recommendations.

The subgrade soil, including utility trench backfill, should be compacted to 90 percent or greater relative compaction to a depth of 12 inches or greater below finish subgrade elevation. The aggregate base material should be compacted to 95 percent or greater relative compaction. If asphaltic concrete and/or PCC pavement is placed directly on subgrade, the upper 6.0 inches of the subgrade should be compacted to 95 percent or greater relative compaction. Maximum dry density and optimum moisture content for subgrade and aggregate base materials should be determined according to current ASTM D1557 procedures. The asphalt concrete pavement should be densified to 95 percent or greater of the density obtained by current Hveem compacted laboratory sample procedures.

If semi-trailers are to be parked on the pavement, such that a considerable load is transferred from small, steel wheels, it is recommended that a strip of rigid

Portland Cement concrete pavement with a thickness of 6.0 inches or greater be provided in these areas. This will provide for the distribution of loads to the subgrade without causing deformation of the pavement surface. Special consideration should also be given to areas where truck traffic will negotiate small radius turns and/or in areas utilized by solid tired forklifts or other material handling equipment. HMA concrete pavement in these areas should utilize stiffer emulsions or the areas should be paved with Portland Cement concrete. Where HMA pavement abuts concrete aprons, drives, walks, or curb and gutter sections, a thickened edge transition zone is recommended for the HMA section to minimize the effects of impact loading as vehicles transition from PCC paving to HMA paving. This thickened edge should consist of an increased thickness of 2.0 inches for parking areas and 4.0 inches for areas of heavy truck usage. This thickened edge should extend to a distance of 3.0 feet or greater from the edge of pavement and then gradually taper back to the design pavement thickness. If pavement subgrade soils are prepared at the time of grading of the building site and the areas are not paved immediately, additional observations and testing will have to be performed before placing aggregate base material, asphaltic concrete, or PCC pavement to locate areas that may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. In the proposed pavement areas, soil samples should be obtained at the time the subgrade is graded for R-Value testing according to current California Test Method 301 procedures to verify the pavement design recommendations.

The longevity and performance of pavements utilizing aggregate base material for support is dependent upon the quality of the material. **CALTRANS** specifications do not specifically exclude the use of material other than a natural, crushed rock and rock dust for Class 2 Aggregate Base material as the Standard Specifications

for Public Works Construction, Section 200-2.2, does for Crushed Aggregate Base material. Often times, reclaimed PCC concrete, HMA concrete, bricks, concrete blocks, etc. are crushed and graded to produce a Class 2 Aggregate Base material per **CALTRANS** gradation specifications. Bricks, concrete blocks, glass, ceramics, etc. are not an acceptable reclaimed material for use in a Class 2 Aggregate Base material per the **CALTRANS** specifications. However, gradation is not the only quality guidelines for aggregate base material. If a reclaimed material is proposed for use on the project as a Class 2 Aggregate Base, the reclaimed materials should not exceed 50 percent of the total volume of the aggregate used. The aggregate base material should also be tested for the following quality requirements per the current, appropriate **CALTRANS** procedures:

TEST	TEST METHOD NO.	QUALITY REQUIREMENT	
		OPERATING RANGE	CONTRACT COMPLIANCE
Resistance (R-Value)	Calif. 301	--	78 Min.
Sand Equivalent	Calif. 217	25 Min.	22 Min.
Durability Index	Calif. 229	--	35 Min.

If a reclaimed material or a pit run aggregate is proposed for use on the project as a 'Greenbook' Crushed Miscellaneous Base, the materials should be tested for the following quality requirements, per the current 'Greenbook,' 2006 Edition, and appropriate procedures as well as the required gradation and other requirements:

TEST	TEST METHOD NO.	QUALITY REQUIREMENT
Resistance (R-Value)	Calif. 301	78 Minimum[1]
Sand Equivalent	Calif. 217	35 Minimum
Percent Wear[2] 100 Revolutions 500 Revolutions	ASTM C131	15 Maximum 52 Maximum
Gravel Particles[3], (%)	Calif. 202	15 Maximum

1. R-Value requirement may be waived if Sand Equivalent is 40 or more.

2. The percentage wear requirements may be waived if the material has a minimum Durability Index of 40 in accordance with CALTRANS Test Method 229.

3. Gravel is defined as particles with no more than one (1) fractured face.

A 'Greenbook' Crushed Miscellaneous Base may contain broken or crushed asphalt concrete or Portland Cement concrete and may contain crushed aggregate base or other rock materials. The Crushed Miscellaneous Base may contain no more than 3.0 percent brick retained on the # 4 sieve by dry weight of the total sample.

Samples of the proposed aggregate base using reclaimed material should be sampled from the manufacturer's stockpiles prior to delivery to the project. The samples should be obtained at a time as near the delivery to the project as possible but would allow enough time to complete the testing and report the results before delivery to the site. Samples should again be obtained and tested for quality compliance from the materials delivered to the project. In addition, per the current **CALTRANS** Standard Specifications, "No single aggregate grading or Sand

Equivalent test shall represent more than 500 cubic yards or one (1) days production, whichever is less."

Concrete gutters should be provided at flow lines in paved areas. Pavements should be sloped to permit rapid and unimpaired flow of runoff water. In addition, paved areas should be protected from moisture migration and ponding from adjacent water sources. Saturation of aggregate base and/or subgrade materials could result in pavement failure and/or premature maintenance. The gutter material and construction methods should conform to the current standards of the Los Angeles County, California.

POST-GRADING CRITERIA

Soils generated from the excavation of foundations, utility trenches, etc., to be used on-site, should be moisture conditioned to optimum moisture content to 3.0 percent above optimum moisture content and compacted to 90 percent or greater of the maximum dry density for the material type as determined by current ASTM D1557 procedures when it is to be placed under hardscape areas, and/or in paved areas. The placement of the excess material should not alter positive drainage away from structures.

SLOPE MAINTENANCE AND PROTECTION RECOMMENDATIONS

Although the design and construction of slopes are planned to create slopes that possess stability against mass rotational failure, surficial slumping, creep, and pop-outs, certain factors are beyond the influence of the project Geotechnical / Geologic Consultant. Soil slopes are subject to some erosion when subjected to sustained water application. To reduce long term erosion, the following

recommendations for slope protection and maintenance should be considered when planning, designing, and implementing slope erosion methods:

- Surface water should not be allowed to flow over the on-site natural or proposed man-made slopes other than incidental rainfall and irrigation. Alterations of manufactured or natural slopes, terraces, top of slope berms, and/or pad gradients should not be allowed that will prevent pad and roof run-off from the structures from being expediently directed to approved disposal areas and away from the tops of slopes.

- Top of slope berms should be constructed and compacted as part of finish grading of the site and should be maintained by the property owner. The recommended drainage patterns should be established at the time of finish grading and maintained throughout the life of the proposed facility.

- Concentrated surface waters entering the subject aggregate production facility area from off-site sources should be collected and directed to a permanent drainage system.

- The property owner is responsible for the maintenance and cleaning of the interceptor ditches, drainage terraces, downdrains and other drainage devices that have been installed to promote slope stability.

- It is recommended that slopes be planted with light-weight ground cover, shrubs and trees that possess deep (5.0 feet or greater), dense root structures that require minimal of irrigation (drought resistance). It should be the responsibility of the Landscape Architect or other suitably qualified individual to provide such plants initially and of the property owner to maintain such planting. Alteration of the planting scheme is at the property owner's risk.

- If automatic sprinkler systems are installed their use should be adjusted to account for natural rainfall.

- The property owner should establish a program for the elimination of burrowing animals. This should be an on-going program to protect slope stability.

- The property owner should observe the lot drainage during heavy precipitation periods often as this is when trouble occurs. Problems such as gullying or ponding should be corrected as soon as practicable.

- High moisture content in slope soils is a major factor in slope erosion and slope failures. Therefore, precautions should be taken to minimize soil saturation. Leakage from waterlines, irrigation systems, etc. or bypassing of clogged drains should be promptly repaired.

The above guidelines are provided to mitigate slope maintenance and protection problems. The above guidelines are general maintenance and design procedures but may be superseded under specific direction of a Licensed Landscape Architect or other suitably qualified individual.

UTILITY TRENCH RECOMMENDATIONS

Utility trenches within the zone of influence of foundations, exterior hardscape, and/or pavement areas should be backfilled with documented, compacted soil. Where utility trenches are proposed to pass beneath or parallel to structure, retaining wall, and/or concrete block wall footings, the bottom of the trench should not be located below a 1:1 plane projected downward from the outside bottom edge of the adjacent footing unless the utility lines are designed for the footing surcharge loads.

It is recommended that utility trench excavations be designed and constructed in accordance with current OSHA regulations. These regulations provide trench sloping and shoring design parameters for trenches up to 20 feet in vertical depth based on a description and field verification of the soil types encountered. Trenches over 20 feet in vertical depth should be designed by the Contractor's Engineer based on site specific geotechnical analyses. For planning purposes, we

recommend that the following OSHA soil type designations and temporary slope inclinations be used:

EARTH MATERIAL	OSHA SOIL TYPE*	TEMPORARY SLOPE INCLINATION (H:V)**
Undocumented Fill	C	1.5:1
Compacted Fill	C	1.5:1
Alluvium	C	1.5:1

Type 'C': Cohesive soils with an unconfined compressive strength of 0.5 tsf or less: or Granular soils including sands, gravels, loamy, clayey or silty sands, etc.

** Steepest allowable slopes for excavations less than 20 feet in vertical height. Slopes for excavations greater than 20 feet in vertical height should be designed by a Registered Professional Engineer with experience in Geotechnical Consulting and Soil Mechanics.

The classification for the on-site formational material is to be assumed as Type 'C' for planning purposes: upon making and observing the excavations, it may be upgraded to a "Cohesive Soil" or "Stable Rock" classification. However, caution should be exercised, as these designations are based on the performance as opposed to a material description. Upon making the excavations, the soil / rock classifications and excavation performance should be confirmed in the field by a competent person in accordance with current OSHA regulations.

Excavations of less than 5.0 feet in depth may also be subject to collapse due to water, vibrations, previously disturbed soils, or other factors and may require protection for workers such as temporary slopes, shoring, or a shielding protective

system. The excavations should be observed by a qualified, competent person (as defined in the OSHA regulations) looking for signs of potential cave-ins on a daily basis before start of work, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence.

Surcharge loads (i.e., spoil piles, earthmoving equipment, trucks, etc,) should not be allowed within a horizontal distance measured from the top of the excavation slope equivalent to 1.5 times the vertical depth of the excavation. Excavations should be initially observed by the project Geotechnical / Geologic Consultant and/or their representative to verify the recommendations presented or to make additional recommendations to maintain stability and safety. Moisture variations, differences in the cohesive or cementation characteristics, or changes in the coarseness of the deposits may require slope flattening or, conversely, permit steepening upon review and appropriate testing by the project Geotechnical / Geologic Consultant or his representative. The excavations should be observed by a qualified, competent person (as defined in the OSHA regulations) looking for signs of potential problems on a daily basis before start of work, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence. Deep utility trenches may experience caving which will require special considerations to stabilize the walls and expedite trenching operations. Surface drainage should be controlled along the top of the construction slopes to preclude erosion of the slope face. If excavations are to be left open for long periods, the slopes should be sprayed with a protective compound and/or covered to minimize drying out, raveling, and/or erosion of the slopes.

Trench backfill material should be placed in a lift thickness appropriate for the type of backfill material and compaction equipment used. Backfill material should

be brought to optimum moisture content to 3.0 percent above optimum moisture content and compacted to 90 percent or greater relative compaction by mechanical means. Jetting or flooding of the backfill material will **not** be considered a satisfactory method for compaction. Maximum dry density and optimum moisture content for backfill material should be determined according to current ASTM D1557 procedures.

FINISH SURFACE DRAINAGE RECOMMENDATIONS

Positive drainage should be established away from the tops of slopes, the exterior walls of structures, the back of retaining walls, trash enclosure walls, decorative concrete block walls, etc. Finish surface gradients in unpaved areas should be provided next to tops of slopes and buildings to guide surface water away from foundations, hardscape, pavement, and from flowing over the tops of slopes. The surface water should be directed toward adequate drainage facilities. Ponding of surface water should not be allowed next to structures or on pavements. Design criteria for finish lot drainage away from structures and off the lot should be determined by the project Structural Engineer designing the foundations and slabs in conjunction with the project Civil Engineer designing the precise grading for lot drainage, respectively, in accordance with the 2001 CBC and/or the current County of Los Angeles, California building codes and the soil types and expansion characteristics for the soils contained in this report. Finished landscaped and hardscape or pavement grades adjacent to the proposed structures should maintain a vertical distance below the bottom elevation of the weep screed per the 2001 CBC and/or the current County of Los Angeles building codes. Landscape plants with high water needs and trees should be planted at a distance away from the structure equivalent to or greater than the width of the canopy of the mature tree or 6.0 feet, whichever is greater. Downspouts from roof drains should discharge

to a permanent all-weather surface which slopes away from the structure. Downspouts from roof drains should not discharge into planter areas immediately adjacent to the building unless there is positive drainage out of the planter and away from the structure in accordance with the recommendations of the project foundation and slab designer and/or the project Civil Engineer designing the precise grades for the lot drainage.

LIMITATIONS

REVIEW, OBSERVATION, AND TESTING

The recommendations presented in this report are contingent upon review of final plans and specifications for the project by **Hilltop Geotechnical, Inc.** The project Geotechnical / Geologic Consultant should review and verify in writing the compliance of the final grading plan and the final foundation plans with the recommendations presented in this report.

It is recommended that **Hilltop Geotechnical, Inc.** be retained to provide continuous Geotechnical Consulting services during the earthwork operations (i.e., rough grading, utility trench backfill, subgrade preparation for slabs-on-grade and pavement areas, finish grading, etc.) and foundation installation process. This is to observe compliance with the design concepts, specifications and recommendations and to allow for design changes in the event that subsurface conditions differ from those anticipated prior to start of construction. If **Hilltop Geotechnical, Inc.** is replaced as Geotechnical / Geologic Consultant of record for the project, per Section 3317.8 of the Appendix to Chapter 33, 'Transfer of Responsibility,' in the 2001 CBC, the work on the project should be stopped until

the replacement Geotechnical / Geologic Consultant has reviewed the previous reports and work performed for the project, agreed in writing to accept the recommendations and prior work performed by **Hilltop Geotechnical, Inc.** for the subject project, or has submitted their revised recommendations.

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our understanding of the project requirements based on an evaluation of subsurface soil conditions encountered at the subsurface exploration locations and the assumption that soil conditions do not deviate appreciably from those encountered. It should be recognized that the performance of the foundations may be influenced by undisclosed or unforeseen variations in soil conditions that may occur in intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of the **Hilltop Geotechnical, Inc.** so that we may make modifications, if necessary.

CHANGE IN SCOPE

Hilltop Geotechnical, Inc. should be advised of any changes in the project scope of proposed site grading so that it may be determined if recommendations contained herein are valid. This should be verified in writing or modified by a written addendum.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition,

changes in the State-of-the-Art and/or government codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two (2) years without a review by **Hilltop Geotechnical, Inc.** verifying the validity of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with the standard of care and skill ordinarily exercised under similar circumstances by members of the geologic / geotechnical profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our surveys and exploratory excavations are made, and that our data, interpretations, and recommendations are based solely on information obtained by us. We will be responsible for those data, interpretations, and recommendations, but should not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and other warranties, expressed or implied, are not made or intended in connection with work performed by **Hilltop Geotechnical, Inc.** or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings.

CLIENT'S RESPONSIBILITY

It is the responsibility of the client and/or the client's representatives to ensure that information and recommendations contained herein are brought to the attention of the Engineers and Architect for the project and incorporated into project plans and specifications. It is further their responsibility to take measures

so that the contractor and his subcontractors carry out such recommendations during construction.

APPENDIX A

FIELD EXPLORATION

The field study performed for this report included a visual reconnaissance of existing surface conditions of the subject site. Site observations were conducted on August 16, 2006 by a representative of **Hilltop Geotechnical, Inc.**

A study of the property's subsurface condition was performed to evaluate underlying earth strata and the presence of groundwater. Nine (9) exploratory backhoe excavations were performed on the subject site on August 16, 2006. Locations of the exploratory excavations were determined in the field by pacing, and sighting from adjacent existing streets and topographic features as shown on the Reference No. 1, 'Topographic Map,' noted on the cover page of this report. Approximate locations of the exploratory excavations are denoted on the 'Exploratory Excavation Location Plan,' Plate No. 1, presented in the map pocket in this Appendix. Approximate elevations of the exploratory excavations were determined by interpolation to the closest 0.5 foot from a 1.0 foot contour interval topographic plot of the site (Reference No. 1 noted on the cover sheet of this report). Locations and elevations of the exploratory excavations should be considered accurate only to the degree implied by the method used in determining them.

The exploratory trenches were excavated using a rubber-tired, tractor-mounted backhoe. The depths explored in the trenches were approximately 12 to 14 feet below the existing land surface at the excavation locations. Bulk samples were obtained from cuttings developed during backhoe excavation and represent soils within the depth indicated. In-place, moist soil density tests were also performed at various depths in the backhoe exploratory excavations. The tests were performed in general accordance with current nuclear gauge testing procedures per

ASTM D2922. Moist soil density test results were used in conjunction with laboratory moisture content tests performed on samples obtained from correlative nuclear density test locations to determine the in-situ dry density at each test location. The in-situ dry density and moisture content test results are presented on the'Subsurface Exploration Logs,' Plate Nos. 3 through 11, presented in this Appendix.

Groundwater observations, if encountered, were made during and at the completion of the excavation process and are noted on the 'Subsurface Exploration Logs' presented in this Appendix.

The exploratory excavations were logged by a representative of **Hilltop Geotechnical, Inc.** for earth materials and subsurface conditions encountered. Soil materials encountered in the exploratory excavations were visually described in the field in general accordance with the current Unified Soils Classification System (USCS), ASTM D2488, visual-manual procedures, as illustrated on the attached, simplified 'Subsurface Exploration Legend, 'Plate No. 2', presented in this Appendix. The visual textural description, color of the soil at natural moisture content, and apparent moisture condition of the soils, etc., were recorded on the field logs. The field log for each excavation contains factual information and interpretation of soil conditions between samples. The 'Subsurface Exploration Logs' presented in this Appendix, represent our interpretation of the field log contents and results of laboratory observations and tests performed on samples obtained from the exploratory excavations.

The exploratory backhoe excavations were backfilled with excavated earth materials and with reasonable effort to restore the areas to their initial condition

before leaving the site but were not compacted to a relative compaction of 90 percent or greater. Recompaction of the exploratory backhoe excavation backfill, if located within proposed structural fill, building, hardscape, and/or pavement areas, should be addressed during site grading operations. In an area as small and deep as a backhoe excavation, consolidation and subsidence of backfill soil may result over time causing a depression of the excavation areas. The client is advised to observe exploratory excavation areas periodically and, when needed, backfill noted depressions.

LABORATORY TESTING PROGRAM

Laboratory tests were performed on selected, relatively undisturbed ring and bulk samples obtained from exploratory excavations during the field study. Tests were performed in general accordance with generally accepted American Society for Testing and Materials (ASTM), State of California - Department of Transportation (CALTRANS), Uniform Building Code (UBC), or other suitable test methods or procedures. The remaining samples obtained during the field study will be discarded 30 days after the date of this report. This office should be notified immediately if retention of samples will be needed beyond 30 days. A brief description of the tests performed is presented below:

CLASSIFICATION

The field classification of soil materials encountered in the exploratory excavations was verified in the laboratory in general accordance with the current Unified Soils Classification System, ASTM D2488, 'Standard Practice for Determination and Identification of Soils (Visual-Manual Procedures).' The final classification is shown on the 'Subsurface Exploration Logs,' Plate Nos. 3 through 11, presented in this Appendix.

IN-SITU MOISTURE CONTENT

The in-situ moisture content was determined in general accordance with current ASTM D2216 procedure, for selected samples obtained. This information was an aid to classification and permitted recognition of variations in material consistency with depth. The moisture content is determined as a percentage of the oven dry weight of the soil. The moisture content test results were used in conjunction with field moist density test results from the nuclear density tests to determine the in-

situ dry density at each test location. The in-situ dry density and moisture content test results are presented on the'Subsurface Exploration Logs,' Plate Nos. 3 through 11, presented in this Appendix.

EXPANSION TEST

Laboratory expansion tests were performed on samples of near-surface earth material in general accordance with the current ASTM D4829 procedures. In this testing procedure, a remolded sample is compacted in two (2) layers in a 4-inch inside diameter mold to a total compacted thickness of approximately 1.0 inch by using a 5.5-pound weight dropping 12 inches and with 15 blows per layer. The sample should be compacted at a saturation between 41 and 59 percent. After remolding, the sample is confined under a pressure of 144 pounds per square foot (psf) and allowed to soak for 24 hours. The resulting volume change due to the increase in moisture content within the sample is recorded and the Expansion Index (EI) calculated. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 12, presented in this Appendix.

SOLUBLE SULFATE TEST

The concentration of soluble sulfate was determined on samples of near-surface soil material in general accordance with current California Test Method 417 procedures. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 12, presented in this Appendix.

SOLUBLE CHLORIDE TEST

The concentration of soluble chloride was determined on samples of near-surface soil material in general accordance with current California Test Method 422

procedures. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 13, presented in this Appendix.

SIEVE ANALYSIS

The percent by weight finer than a No. 200 sieve (silt and clay content) was determined for selected samples of earth material in general accordance with current ASTM D1140 procedures. The test is performed by taking a known weight of an oven dry sample of soil material, washing it over a No. 200 sieve, and oven drying the soil retained on the No. 200 sieve. The dry weight of soil material retained on the No. 200 sieve is measured and the resulting percentage retained is calculated based on the original total dry soil sample weight. The percent passing the No. 200 sieve is determined by subtracting the percent retained from 100. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 13, presented in this Appendix.

CHEMICAL TESTS

The concentration chemical constituents were determined for samples of near-surface soil materials. The test results are summarized in the 'Summary of Laboratory Test Results,' Plate No. 13, presented in this Appendix.

MAXIMUM DRY DENSITY / OPTIMUM MOISTURE CONTENT RELATIONSHIP TEST

Maximum dry density / optimum moisture content relationship determinations were performed on samples of near-surface earth material in general accordance with current ASTM D1557 procedures using a 6-inch diameter mold. Samples were prepared at various moisture contents and compacted in five (5) layers using a 10-pound weight dropping 18 inches and with 56 blows per layer. A plot of the compacted dry density versus the moisture content of the specimens was

constructed and the maximum dry density and optimum moisture content determined from the plot. The test results are summarized in the 'Maximum Dry Density / Optimum Moisture Content Relationship Test Results,' Plate Nos.14 and 15, presented in this Appendix.

SUMMARY OF LABORATORY TEST RESULTS

EXPANSION INDEX TEST RESULTS (ASTM D4829 Test Method)			
SAMPLE	**SOIL DESCRIPTION**	**EXPANSION INDEX**	**EXPANSION POTENTIAL***
T-2, 0'-3'	Brown fine to coarse sand, trace silt, some gravel, few cobbles (SP)	0	Very Low
T-7, 0'-3'	Brown slightly silty fine to coarse sand, some gravel, few cobbles (SP-SM)	0	Very Low
* Per Table 18-I-B, 'Classification of Expansive Soil,' in the 2001 California Building Code (CBC).			

SOLUBLE SULFATE TEST RESULTS (California Test Method No. 417)			
SAMPLE	**SOIL DESCRIPTION**	**SOLUBLE SULFATE (%)**	**SULFATE EXPOSURE***
T-2, 0'-3'	Brown fine to coarse sand, trace silt, some gravel, few cobbles (SP)	0.018	Negligible
T-7, 0'-3'	Brown slightly silty fine to coarse sand, some gravel, few cobbles (SP-SM)	0.025	Negligible
* Per Table 19-A-4, 'Requirements for Concrete Exposed to Sulfate-Containing Solutions,' in the 2001 CBC.			

SUMMARY OF LABORATORY TEST RESULTS

SOLUBLE CHLORIDE TEST RESULTS (California Test Method No. 422)		
SAMPLE	**SOIL DESCRIPTION**	**SOLUBLE CHLORIDE (ppm)**
T-2, 0'-3'	Brown fine to coarse sand, trace silt, some gravel, few cobbles (SP)	140
T-7, 0'-3'	Brown slightly silty fine to coarse sand, some gravel, few cobbles (SP-SM)	100

PERCENT PASSING #200 SIEVE TEST (ASTM D1140 Test Method)		
SAMPLE	**SOIL DESCRIPTION**	**PERCENT PASSING #200 SIEVE**
T-2, 0'-3'	Brown fine to coarse sand, trace silt, some gravel, few cobbles (SP)	3.6
T-7, 0'-3'	Brown slightly silty fine to coarse sand, some gravel, few cobbles (SP-SM)	7.8

CHEMICAL TEST RESULTS				
SAMPLE	**REDOX POTENTIAL (mv)**	**RESISTIVITY Minimum (ohm-cm)**	**pH**	**SULFIDE**
T-2, 0'-3'	234	18,872	8.7	Neg.*
T-7, 0'-3'	287	11,326	8.6	Neg.
* Neg. - Negative.				

APPENDIX B

REPORT OF GEOTECHNICAL / GEOLOGIC STUDY PROPOSED AGGREGATE PRODUCTION FACILITY BIG ROCK CREEK SITE SOUTH OF AVENUE 'T' BETWEEN LONGVIEW ROAD AND 121ST STREET PEARBLOSSOM AREA OF LOS ANGELES COUNTY, CALIFORNIA

PROJECT NO.: 594-A06
REPORT NO.: 1

SEPTEMBER 15, 2006

GRADING SPECIFICATIONS

GENERAL PROVISIONS

General Intent

The intent of these specifications is to establish procedures for clearing, compacting natural ground, preparing areas to be filled, and placing and compacting fill soils to the lines and grades shown on the accepted plans. The recommendations contained in the 'Site Preparation Recommendations' section of the geotechnical / geologic study report are a part of the Recommended Grading Specifications and should supersede the provisions contained hereinafter in the case of conflict. These specifications should only be used in conjunction with the geotechnical / geologic report for which they are a part. Deviation from these specifications will not be allowed, except where specified in the geotechnical / geologic report or in other written communication signed by **Hilltop Geotechnical, Inc.**

HILLTOP GEOTECHNICAL, INC.

Observation and Testing

Hilltop Geotechnical, Inc. should be retained as the project Geotechnical / Geologic Consultant to observe and test the earthwork in accordance with these specifications. It is advised that the project Geotechnical / Geologic Consultant or his representative provide adequate observations so that he may provide an opinion as to whether the work was or was not accomplished as specified. Therefore, it should be the responsibility of the contractor to assist the project Geotechnical / Geologic Consultant and to keep him apprized of work schedules, changes, and new information and data so that he may provide these opinions. In the event that any unusual conditions not covered by the special provisions or preliminary geotechnical / geologic report are encountered during the grading operations, the project Geotechnical / Geologic Consultant should be contacted for further recommendations.

If in the opinion of the project Geotechnical / Geologic Consultant, substandard conditions are encountered, such as: questionable or unsuitable soil, unacceptable moisture content, inadequate compaction, adverse weather, etc., construction would be stopped until the conditions are remedied or corrected or he should recommend rejection of this work.

Test methods used to determine the degree of compaction should be performed in accordance with the following current American Society for Testing and Materials (ASTM) test methods:

Maximum Dry Density / Optimum Moisture Content - ASTM D1557.
Density of Soil In-Place - ASTM D1556 or ASTM D2922.

Dry densities should be expressed in terms of Relative Compaction as determined by the foregoing ASTM testing procedures.

Preparation of Areas to Receive Fill

The vegetation, brush and debris derived from clearing operations should be removed, and legally disposed of. Areas disturbed by site grading should be left in a neat and finished appearance, free from unsightly debris.

After clearing or benching, the natural ground in areas to be filled should be scarified to a depth of 6.0 inches or the minimum degree of compaction as set forth in the Special Provisions or the recommendation contained in the preliminary geotechnical / geologic report. Loose soils in excess of 6.0 inches in thickness should be removed to firm natural ground which should be determined by the project Geotechnical / Geologic Consultant and/or his representative.

When the slope of the natural ground receiving fill exceeds 20 percent (5 horizontal units to 1 vertical unit), the original ground should be stepped or benched. Benches should be cut to a firm competent soil condition. The key at the toe of slope should be at least 15 feet wide or 1.5 times the equipment width, whichever is greater, and should be sloped back into the hillside at a gradient of not less that 2.0 percent. The other benches should be at least 10 feet wide. The horizontal portion of each bench should be compacted prior to receiving fill as previously specified for compacted natural ground. Vertical separations between benches should be at least 4.0 feet. Ground slopes flatter than 20 percent should be benched when advised by the project Geotechnical Consultant and/or Engineering Geologist.

Any abandoned structures encountered during grading operations should be totally removed. Underground utilities to be abandoned beneath any proposed structure and/or surface improvement should be removed from within 10 feet of the structure or improvement and be properly capped off. The resulting depressions from the above described procedures should be backfilled with acceptable soil that is compacted to the requirements of the project Geotechnical / Geologic Consultant. This includes, but is not limited to, septic tanks, fuel tanks, sewer lines or leach lines, storm drains, and water lines. Any buried structures or utilities not to be abandoned should be brought to the attention of the project Geotechnical / Geologic Consultant, so that he may determine if any special recommendation will be necessary.

All water wells which will be abandoned should be abandoned and capped according to directions and supervision of the County Department of Health, the State of California, and/or the appropriate governmental agency procedures which has jurisdiction over the well before fill and/or pavement is placed over the area.

Fill Material

Materials to be placed in the fill should be approved by the project Geotechnical / Geologic Consultant and should be free of vegetable matter and other deleterious substances. Granular soil should contain sufficient fine material to fill the voids. The definition and disposition of oversized rocks, expansive and/or detrimental soils are covered in the geotechnical / geologic report or special provisions. Expansive soils, soils of poor gradation, or soils with low strength characteristics may be thoroughly mixed with other soils to provide satisfactory fill material, but only with the explicit consent of the project Geotechnical / Geologic Consultant.

Any import material should be approved by the project Geotechnical / Geologic Consultant before being brought to the site.

Placing and Compaction of Fill

Approved fill material should be placed in areas prepared to receive fill in layers not to exceed 6.0 to 8.0 inches in compacted thickness. Each layer should have a uniform moisture content in the range that will allow the compaction effort to be efficiently applied to achieve the specified degree of compaction. Each layer should be uniformly compacted to a minimum specified degree of compaction with equipment of adequate size to economically compact the layer. Compaction equipment should either be specifically designed for soil compaction or of proven reliability. The minimum degree of compaction to be achieved is specified in either the Special Provisions or the recommendations contained in the preliminary geotechnical / geologic report.

When the structural fill material includes rocks, rocks will not be allowed to nest and the voids should be carefully filled with soil such that the minimum degree of compaction recommended in the Special Provisions or the recommendations contained in the geotechnical / geologic report is achieved. The maximum size and spacing of rock permitted in structural fills and in non-structural fills is discussed in the geotechnical / geologic report, when applicable.

Field observation and compaction tests to evaluate the degree of compaction of the fill will be taken by the project Geotechnical / Geologic Consultant or his representative. The location and frequency of the tests should be at the Project Geotechnical / Geologic Consultant's discretion. When the compaction test indicates that a particular layer is less than the recommended degree of

compaction, the layer should be reworked to the satisfaction of the project Geotechnical / Geologic Consultant and until the desired relative compaction has been obtained.

Fill slopes should be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction by sheepsfoot rollers should be at vertical intervals of not greater than 4.0 feet. In addition, fill slopes at ratios of two (2) horizontal to one (1) vertical or flatter, should be gridrolled or trackwalked. Steeper fill slopes, which have been approved by the governing agency, should be over-built and cut-back to finish contours after the slope has been constructed. Slope compaction operations should result in fill material which have been approved by the governing agency having a relative compaction of at least 90 percent of maximum dry density or that specified in the Special Provisions section of this specification. The compaction operation of the slopes should be continued until the project Geotechnical / Geologic Consultant is of the opinion that the slopes will be stable in regards to surficial stability.

Slope tests will be made by the project Geotechnical / Geologic Consultant during construction of the slopes to determine if the recommended compaction is being achieved. Where failing tests occur or other field problems arise, the Contractor will be notified that day of such conditions by written communication from the project Geotechnical / Geologic Consultant or his representative in the form of a daily field report.

If the method of achieving the recommended slope compaction selected by the Contractor fails to produce the recommended results, the Contractor should rework

or rebuild such slopes until the recommended degree of compaction is obtained, without additional cost to the Owner or project Geotechnical / Geologic Consultant.

Cut Slopes

The project Engineering Geologist should observe cut slopes excavated in rock or lithified formational material during the grading operations at intervals determined at his discretion. If any conditions not anticipated in the preliminary geotechnical / geologic report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or fault planes are encountered during grading, these conditions should be analyzed by the project Engineering Geologist and Geotechnical / Geologic Consultant to determine if mitigating measures are necessary.

Unless otherwise specified in the geotechnical / geologic report, cut slopes should not be excavated higher or steeper than that allowed by the ordinances of the controlling governmental agency.

Engineering Observation

Field observation by the project Geotechnical / Geologic Consultant and/or his representative should be made during the filling and compacting operations so that he can express his opinion regarding the conformance of the grading with acceptable standards of practice. The presence of the project Geotechnical / Geologic Consultant or his representative for the observation and testing should not release the Grading Contractor from his duty to compact the fill material to the specified degree of compaction.

Season Limits

Fill should not be placed during unfavorable weather conditions. When work is interrupted by heavy rain, filling operations should not be resumed until the proper moisture content and density of the fill materials can be achieved. Damaged site conditions resulting from weather or acts of God should be repaired before acceptance of work.

SPECIAL PROVISIONS

The minimum degree of compaction to be obtained in compacting natural ground, in the compacted fill, and in the compacted backfill should be at least 90 percent.

Detrimentally expansive soil is defined as soil having an Expansion Index of 21 or greater as determined by Uniform Building Code Standard Procedure 18-2 or ASTM D4829 Test Method.

Oversized material is defined as rocks or lumps over 6.0 inches in greatest dimension.

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Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 6

Jurisdictional Delineation within the

Big Rock Creek Surface Mining Project Site

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March 6, 2013
2008-005

Lou Merzario
Project Manager II
Sespe Consulting, Inc.
468 Poli St., Ste. 2E
Ventura, CA 93001

RE: Jurisdictional Delineation within the Big Rock Creek Surface Mining Project Site, Antelope Valley, Los Angeles County, California

Dear Mr. Merzario:

ECORP Consulting, Inc. (ECORP) was retained to examine the potential for jurisdictional features to occur on the Lebata project site. The project site is located on 312 acres near the intersection of Avenue T and 136th Street East, near Palmdale, California. Portions of the site are being proposed for use in aggregate extraction and use in a concrete ready mix plant. The mine would be developed in three mining phases, and a Reclamation Phase. The site is traversed by several wash features, some of which are relictual in nature, all deriving historically from the Big Rock Wash and its associated floodplain.

Several documents were reviewed as part of the research conducted for this effort, including the 2010 Drainage Concept for the Lebata, Inc. Surface Mine, a letter from the US Army Corps regarding the project (2006), the EIR for the State Route 138 Widening Project, and notes from a field meeting held with the California Department of Fish and Game. Contact was also made with the California Department of Fish and Game to informally discuss the jurisdictional attributes of the drainages in and around Big Rock Wash.

Background Information

Big Rock Creek is the primary source of surface flows within the watershed and within the project site vicinity. Big Rock Creek is an intermittent to perennial stream that originates in the San Gabriel Mountains to the south and historically traversed over a wide alluvial fan encompassing several square miles, including the Lebata project site. The Lebata site is located within a channel braid known as the Lebata Braid.

During the 1940s, flows in Big Rock Creek were partially channelized to allow construction of State Route 138. As a result of the channelization, several formerly active channel braids of the historic wash were rendered inactive. A levee was later constructed at the point where Big Rock Creek historically split into its major component braids, the result of which was to further confine flows to the main channel braid only. Other disturbances to the alluvial fan have

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Rocklin
Santa Ana
Redlands
San Diego

included continuing road improvements along State Route 138 (discussed below), construction, agricultural uses, and development.

State Route 138 (Pearblossom Highway) traverses the northern foot of the San Gabriel Mountains, bisecting both Big Rock Wash and the majority of its historic alluvial fan. The highway was originally constructed in the 1940s, as a single-lane arterial to connect the Inland Empire, High Desert, and Antelope Valley areas. Drainage improvements and construction of stormwater control features were incorporated into the highway to allow for safe vehicle passage. Drainage control features consisted of low flow crossings combined with detention basins, culverts, bridges, and drainage swales. Near Big Rock Wash, improvements included channelization and a bridge over Big Rock Wash, construction of several swales to collect drainage flows entering the Right-of-Way from the south, and culverts to direct some of the larger washes near Big Rock Creek under the highway.

As a result of concerns for safety and a desire to accommodate increased traffic, Caltrans has been recently completing more improvements to State Route 138. The most recent improvements have included a widening of the highway from one lane to two lanes, and associated improvements to storm-control features. The improvements included widening of existing roadside channels to convey flows towards Big Rock Wash, and the enlargement of several culverts along the highway.

Through the years, highway improvements along State Route 138 have resulted in progressively less potential for stormwater flows to reach the Lebata site. Currently Caltrans improvements along State Route 138 have included enlarging of drainage swales along the north and south sides of the highway, upgrades to culverts, and other upgrades. In general, the swale on the south side of the highway collects the majority of flows; the culverts direct a portion of flows under the highway into the swale on that side. Both swales lead to Big Rock Creek, diverting flows that would otherwise reach the Lebata site.

According to the US Army Corps, via correspondence, there is no federal jurisdiction over drainage courses within the project site. The letter concludes that features located on the project site are isolated in nature and do not support substantial interstate commerce. ECORP concurs with this finding, since the watershed is known to drain into the interior of the Mojave Desert and drainage features within the watershed terminate into one of several different isolated desert playas.

During a field meeting with CDFG, the Department suggested that the client should pursue a 1605 Streambed Alteration Agreement (Long-term) if there are Waters of the State that could be impacted by the proposed project. In addition, potential methods for mitigation of the impacts on-site were discussed.

Drainage Concept Study

The Drainage Concept Study was reviewed for its details on the current hydrology within the Big Rock Wash watershed. The Study provides a basis for analysis of the storm flows reaching the Lebata site. It draws a conclusion that flows would not normally reach the Lebata site unless there was a worst-case scenario of catastrophic failure upstream, combined with a 50-year rainfall event. These circumstances are not generally considered to be applicable to the

jurisdictional nature of a drainage course, as they present exceptional rather than ordinary circumstances.

According to the Drainage Concept study for the Lebata site (2010), there are thirteen reinforced concrete pipe culverts located within the watershed for Lebata that pass under State Route 138, four of which are located directly within the Lebata Braid. Results of the study conclude that, due to the presence of the two swales on the north and south side of the highway, only one of the culverts contains flows that could conceivably reach the Lebata site during extreme storm events. Again the only conceivable circumstances under which that would occur involve overlapping catastrophic failure of existing flood control measures. The culvert is a 4-foot diameter circular culvert with a capacity for 70 cubic feet per second (cfs) of flows and is located just east of where the Lebata Braid historically crossed the highway location.

The Study describes the circumstances on which flows would be expected to the Lebata site:

> *However, there is a possibility that the mountain front flood levee could catastrophically fail during the Capital Flood. This represents a worst case scenario of the levee being absent. As mentioned in Section 2.1.1 of the Stetson 2003 report (Stetson Engineers, 2003), catastrophic channel avulsion and diversion of all or the majority of the total flow into the remnant secondary braids is prevented by the California Aqueduct Siphon buried concrete encasement structure. Therefore, there is no potential for the flows in the secondary braids to be increased during the Capital Flood in excess of the complete levee failure scenario (Stetson Engineers, 2003).*
>
> *The Lebata Braids were estimated using a split flow analysis assuming complete erosion of the mountain front flood levee and downstream transport of all eroded materials. Historic aerial photography and observations taken during a site inspection on October 25, 2006 indicate that the Lebata Braid is an overflow of the main channel and not of the VMC Braid, and that the channel split is approximately in the same location as the VMC Braid – main channel split, at a location approximately 5,000 ft downstream of the mountain front. Hence, during the levee-failure scenario, the Capital Flood flow would split into three channels at the junction of the main channel and the secondary VMC and Lebata Braids, as shown in Figure 2.*

An addendum to the Study analyzes the Caltrans improvements that were made since the original Drainage Concept was prepared in 2010. It concludes these additional improvements have served to further reduce the Capital Flood flows into Lebata. Therefore, we conclude that there is even less likelihood of Capital Flood volumes coming from upstream onto the Lebata site unless a catastrophic failure of the mountain front levee were to occur <u>during</u> a 50-year rainfall event.

CDFG Jurisdiction

CDFG asserts jurisdiction over streambeds and lakes, under the California Fish and Game Code Section 1600 et seq. The jurisdictional areas, also known as waters of the state, include the waterbody itself and vegetated areas that are hydrologically connected to the waterbody. Typically, for a streambed the extent of state jurisdiction would include the streambed itself and

the riparian habitat associated with the broader floodplain. For lakes, the jurisdictional limits typically include the highwater mark and a band of riparian or wetland vegetation that is supported by the lakewater. Limits of state jurisdiction are generally larger than the limits of federal waters of the U.S. but the two jurisdictions can coincide for smaller drainage features. Several indicators may render a feature jurisdictional to the state, though the final authority on jurisdiction rests with the CDFG. In accordance with Sections 1601/3 of Fish and Game Code, the indicators for a river or stream are:

- Definable bed, bank, or channel
- Periodic or intermittent surface flows
- Perennial surface flows
- Subsurface flows
- Supports fish or other aquatic life
- Supports riparian or hydrophytic vegetation
- Watercourse having a source and/or terminus

CDFG generally considers all natural lakes, streams, and man-made reservoirs to be jurisdictional. Artificial waterways like ditches and canals also may be considered jurisdictional. Generally, jurisdictional areas include all areas that have "acquired the physical attributes of natural stream courses and which have been viewed by the community as natural streamcourses." This includes isolated or intrastate drainage features that have no federal jurisdiction.

The state has no published methodology for determining jurisdictional status of a waterbody. State jurisdictional limits are normally considered to include the stream, bed, and bank and continue to the outside limits of any riparian (that is, stream associate) vegetation within a channel corridor. Generally, the presence of the OHWM and/or the 3-parameter wetland methodology utilized by the ACOE is considered valid methodology for identification of streambeds and wetlands (excluding Rapanos and other case considerations).

The CDFG regulates projects that propose to:

(1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit,
(2) use material from the streambeds designated by the department, or
(3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the department.

The limits of waters of the state are considered to be the estimated limits of a greater than 10-year flood event. In special cases, the CDFG can take jurisdiction over an entire floodplain if the features connected to the floodplain are hydrologically ambiguous or if the potential capacity of a stream or river is large enough. The FEMA floodplain is sometimes considered in determination of CDFG jurisdictional extent.

CDFG Jurisdiction on the Lebata Site

Due to historic changes noted in the Big Rock Wash, its watershed and alluvial fan, the Lebata site is not expected to contain flows except under extreme conditions, such as the failure of the mountain front levee during a 50-year storm. In spite of these documented changes, it is likely that there are apparent drainage features within the Lebata site due to its position within the historic alluvial fan. Based on the evidence, it is likely that any drainages present are non-functional relicts and would not convey flows as they did historically. It is common for drainage features in desert areas to remain physiographically similar to their historic conditions even if they have been dewatered for many years.

The presence of bed and bank and the existence of a source (presumably Big Rock Creek) alone do not conclusively indicate the presence of Waters of the State if there is reason to believe that a feature may be a relict drainage. In the desert regions of California, landscape features can change very little over time. Within alluvial fan situations, large portions can be inactive for decades and yet still exhibit bed and bank.

The Lebata site has very limited potential for flooding due to hydrological changes in the watershed and improvements such as the State Route 138 Widening Project. There is no riparian vegetation recorded on the Lebata site and no chance for aquatic species, since no permanent water exists on site. Periodic subsurface flows (at depth) may occur rarely in one or more of the drainage features due to very localized sheet flows, but the area exhibits a very high rate of percolation and has been effectively cut off from its historic sources in Big Rock Wash. Surface flows are not expected to occur, even during a Capital Flood event.

Based on the information collected in the Drainage Concept study, and documented changes in flows due to highway construction, it is my opinion the drainage features within the Project area do not meet CDFG jurisdictional criteria. Drainage features are unlikely to contain consistent enough, discrete surface or subsurface flows to qualify as perennial, intermittent or ephemeral.

Thank you for the opportunity to comment on this project.

Sincerely,

ECORP Consulting, Inc.

Scott Taylor
Senior Biological Project Manager

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 7

U.S. Army Corps of Engineers

Letter of Jurisdictional Determination

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DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
VENTURA FIELD OFFICE
2151 ALESSANDRO DRIVE, SUITE 110
VENTURA, CALIFORNIA 93001

June 1, 2006

REPLY TO
ATTENTION OF:

Office of the Chief
Regulatory Branch

West Coast Environmental and Engineering
Attention: Ingrid Elsel
1838 Eastman Avenue, Suite 200
Ventura, California 93003

Dear Ms. Elsel:

Reference is made to your letter (No. 2006-01228-AOA) dated May 25, 2006 for a Department of the Army Permit to extract construction-grade aggregate and operate a ready-mix concrete plant on a 312-acre site in an unnamed tributary to the Big Rock Creek near the intersection of Avenue T and 136th Street East, in the vicinity of Palmdale, Los Angeles County, California.

Based on the information furnished in your letter and the Corps independent assessment of the site, we have determined that your proposed project would impact an isolated, non-navigable drainage feature that does not support substantial interstate commerce and, as a result, does not discharge dredged or fill material into a water of the United States or an adjacent wetland, pursuant to the 2001 Solid Waste Agency of Northern Cooke County Supreme Court decision. Therefore, the project is not subject to our jurisdiction under Section 404 of the Clean Water Act and a Section 404 permit is not required from our office.

Furthermore, you are hereby advised that the Corps of Engineers has established an Administrative Appeal Process for jurisdictional determinations which is fully described at 33 CFR Part 331. The Administrative Appeal Process for jurisdictional determinations is diagrammed on the enclosed Appendix C. If you decide not to accept this approved jurisdictional determination and wish to provide new information, please send the information to this office. If you do not supply additional information you may appeal this approved jurisdictional determination by completing the attached "Notification of Administrative Appeal Options and Process and Request for Appeal" form and submitting it directly to the Appeal Review Officer at the address provided on the form.

Please be aware that our determination does not preclude the need to comply with Section 13260 of the California Water Code (Porter/Cologne) and we recommend that you contact the California Regional Water Quality Control Board to insure compliance with the above regulations. Furthermore, our determination does not obviate the need to obtain other Federal, state, or local authorizations required by law.

I am forwarding copies of this letter to: California State Water Resources Control Board, 1001 I Street, Sacramento, California 95814, Attention: Mr. Oscar Balaguer, Chief, Water Quality Certification. California Regional Water Quality Control Board, Region 6, Lahontan Region, Attention: Mr. Harold J. Singer, 2501 Lake Tahoe Blvd., South Lake Tahoe, California 96150.

If you have any questions, please contact Aaron O. Allen, Ph.D. of my staff at (805) 585-2148.

Sincerely,

Antal Szijj
Acting Chief, North Coast Section
Regulatory Branch

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: West Coast Environmental and Engineering	File Number: 2006-01228-AOA	Date: June 1, 2006

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the DISTRICT engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the DISTRICT engineer. Your objections must be received by the DISTRICT engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the DISTRICT engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the DISTRICT engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the DISTRICT engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse). This form must be received by the DIVISION engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse). This form must be received by the DIVISION (not district) engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse). This form must be received by the DIVISION engineer within 60 days of the date of this notice.

- EXCEPTION: Appeals of Approved Jurisdictional Determinations based on new information must be submitted to the DISTRICT engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II – REQUEST FOR APPEAL OF PROFFERED PERMIT, PERMIT DENIAL, OR APPROVED JD TO **DIVISION ENGINEER** or SUBMITTAL OF OBJECTIONS TO AN INITIAL PROFFERED PERMIT OR NEW INFORMATION FOR APPEAL OF APPROVED JURISDICTION DETERMINATION TO **DISTRICT ENGINEER**

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

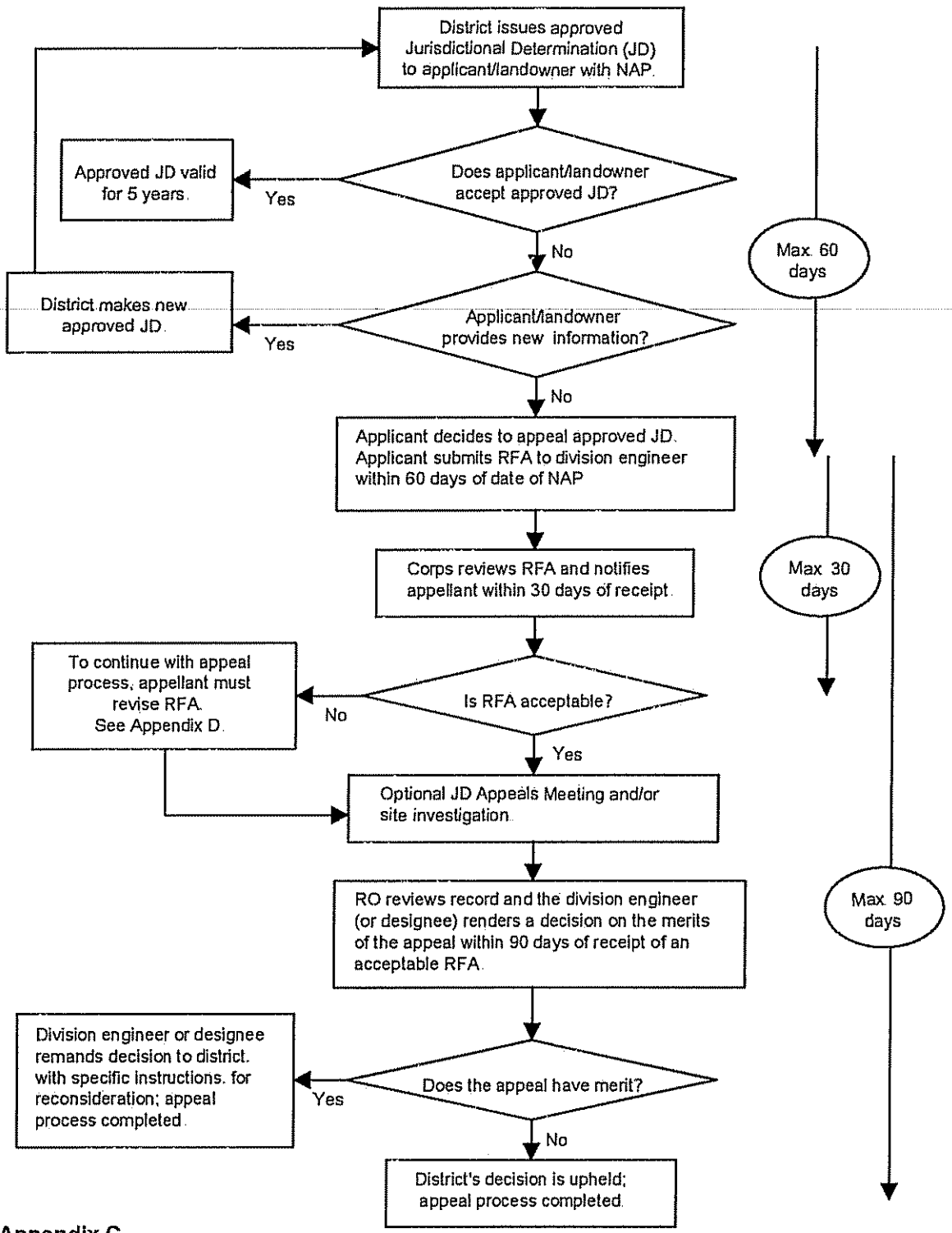
POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: DISTRICT ENGINEER _____ District, Corps of Engineers Attn: _____, Regulatory Branch (Use this address for submittals to the DISTRICT ENGINEER)	If you only have questions regarding the appeal process you may also contact: DIVISION ENGINEER Army Engineer Division, South Pacific, CESPD-CM-O Attn: Doug Pomeroy, Administrative Appeal Review Officer 333 Market Street, San Francisco, CA 94105 (415-977-8035) (Use this address for submittals to the DIVISION ENGINEER)

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

Administrative Appeal Process for Approved Jurisdictional Determinations



Appendix C

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 8

Noise Impact Assessment

and

Noise Impact Assessment Addendum

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WEST COAST
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Noise Impact Assessment

Lebata, Inc.
Big Rock Creek Project
12600 Block of Avenue T
Los Angeles County, California

October 10, 2008

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NOISE IMPACT ASSESSMENT

LEBATA, INC
BIG ROCK CREEK PROJECT
LOS ANGELES COUNTY, CALIFORNIA

October 10, 2008

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NOISE IMPACT ASSESSMENT

LEBATA, INC
BIG ROCK CREEK PROJECT
LOS ANGELES COUNTY, CALIFORNIA

October 10, 2008

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NOISE IMPACT ASSESSMENT

LEBATA, INC
BIG ROCK CREEK PROJECT
LOS ANGELES COUNTY, CALIFORNIA

October 10, 2008

EXECUTIVE SUMMARY

This Noise Impact Assessment (NIA) presents regulatory review, ambient noise measurement, and noise prediction modeling for equipment associated with the operation of an aggregate surface mining and processing facility, ready mix concrete plant, asphalt mixing plant, a Vac-Lite plant, and raw cement transfer and aggregate distribution facility (Project). The Project is located in unincorporated Los Angeles County (Figure 1 – Vicinity Map, Appendix A). This NIA has been prepared for use in a California Environmental Quality Act (CEQA) environmental analysis and it follows methodologies outlined in Los Angeles County's Noise Control Ordinance (Noise Ordinance).

Project noise sources include an aggregate processing plant, a ready mix concrete (RMC) plant, a hot mix asphalt (HMA) plant, Vac-Lite plant, various off road equipment (i.e. loaders), and on road haul trucks. The plants may be operated up to 24 hours per day, except for the portion of the aggregate processing plant located in the pit, which may only operate between 4:00 a.m. and 10:00 p.m. Aggregate reserves are expected to be mined over a period of up to 47 years.

This NIA finds that:

- Unmitigated transportation noise impact is less than significant at all receptors.
- Mitigated industrial noise impact is less than significant at all receptors.
- The Project will result in a Class II impact, significant but mitigable.

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NOISE IMPACT ASSESSMENT

LEBATA, INC
BIG ROCK CREEK PROJECT
UNINCORPORATE LOS ANGELES COUNTY, CALIFORNIA

October 10, 2008

1.0 INTRODUCTION

This Noise Impact Assessment (NIA) presents regulatory review, ambient noise measurement, and noise prediction modeling for equipment associated with the operation of an aggregate surface mining and processing facility, ready mix concrete plant, asphalt mixing plant, Vac-Lite plant, and raw cement transfer and aggregate distribution facility (Project). The Project is located in unincorporated Los Angeles County (Figure 1, Appendix A). This NIA has been prepared for use in a California Environmental Quality Act (CEQA) environmental analysis.

This study follows methodologies outlined in Los Angeles County's Noise Control Ordinance (Noise Ordinance).

2.0 REGULATORY SETTING

This Project is located in unincorporated Los Angeles County, California, in the north-east portion of the County (Antelope Valley). Noise guidance applicable to the Project includes Los Angeles County's Noise Control Ordinance (Noise Ordinance) and the Antelope Valley Areawide General Plan (General Plan).

2.1 California Environmental Quality Act (CEQA)

CEQA (Public Resources Code (PRC) §§21000 - 21177) was enacted by the California State Legislature in 1970. Its purpose is to help ensure that governmental decision makers and the public are fully informed of potential significant environmental effects of proposed projects and activities. CEQA also requires that significant environmental impacts be avoided or reduced where feasible. In addition, if an Environmental Impact Report (EIR) is prepared, alternatives that accomplish most of the Project objectives, and reduce the Project's adverse environmental effects, must be considered. When there are no feasible alternatives, and no feasible mitigation measures available to reduce the project's significant impact to a less than significant level, a statement of overriding considerations can be adopted, which enables a public agency to approve a project despite significant environmental effects.

CEQA applies to activities directly undertaken by governmental agencies, activities financed in whole or in part by governmental agencies, and private activities that require approval from governmental agencies. There are several basic steps in the CEQA process:

- An agency determines whether a project is subject to CEQA or exempt from CEQA analysis.
- If the project is subject to CEQA, the agency prepares an Initial Study to determine whether the project may have a significant effect on the environment.
- If the project will not have a significant effect, the agency prepares a Negative Declaration (ND).
- If the project can be modified to avoid or reduce the significant effect to a level of less than significant, the agency prepares a Mitigated Negative Declaration (MND).
- If the Initial Study shows that the project may have a significant effect, and the effects may not be able to be reduced to a less than significant level with mitigation, the agency prepares an Environmental Impact Report (EIR).

An EIR is a detailed report that analyzes the environmental effects of a project, identifies potential measures to mitigate identified significant adverse environmental effects, and potential project alternatives that reduce or eliminate the project's adverse environmental effects.

2.2 Los Angeles County Noise Ordinance

This Project is located within Los Angeles County and is, therefore, governed by the Los Angeles County Code. Included in the Los Angeles County Code is a Noise Ordinance (Title 12, Chapter 08). The Noise Ordinance presents guidelines for measuring noise levels and determining if noise impacts are significant. This is the primary resource used in this NIA and excerpts of it are included in Appendix B.

2.3 Antelope Valley General Plan

This Project is located in the Antelope Valley, which encompasses the north-east section of Los Angeles County, beyond the San Gabriel Mountains. The Antelope Valley Areawide General Plan was developed to provide decision makers with a policy framework to guide them in efforts to improve the quality of life in the Antelope Valley. The General Plan's Noise Abatement Element (Noise Element) presents recommended ways to mitigate current noise impacts and minimize future impacts. The Noise Element is brief and generalized. It does not provide guidance regarding the preparation of a NIA. For these reasons, the Noise Ordinance (discussed in Section 2.2) is the primary resource used in this NIA.

2.4 Palmdale General Plan

The Project is located approximately 4 miles outside of the City of Palmdale boundary, outside Palmdale's sphere of influence. Nevertheless, to evaluate traffic source noise impacts, the City of Palmdale's General Plan Noise Element (Palmdale Noise Element) is considered applicable to the Project. The Palmdale Noise Element discusses the important components of an acoustical analysis as well as presents a set of thresholds to determine project significance. Excerpts from the Palmdale Noise Element are included in Appendix B.

2.5 Caltrans Guidance Documents

Caltrans has developed the following guidance documents for conducting traffic based noise impact assessments:

- **Traffic Noise Analysis Protocol (TNAP)**. This document contains Caltrans noise policies, which fulfill the highway noise analysis and abatement/mitigation requirements stemming from the following State and Federal environmental statutes: California Environmental Quality Act (CEQA); National Environmental Policy Act (NEPA); Title 23 United States Code of Federal Regulations, Part 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise" (23 CFR 772); and Section 216 et seq. of the California Streets and Highways Code.
- **Technical Noise Supplement (TeNS)**. This document is a supplement to the TNAP, and contains Caltrans noise analysis procedures, practices, and other useful technical noise background information. Noise analysis activities that were performed to support this report closely follow guidance in the TeNS.

2.6 Definitions

The following acoustical terms are employed in this NIA:

- **Decibel (dB).** A logarithmic unit of measurement that expresses the magnitude of power relative to an implied reference level. The reference level (0 dB) for acoustics is generally set at the threshold of human perception.
- **Sound Pressure Level (SPL).** The logarithmic measure of the energy of a sound relative to a reference value, measured in dB.
- **Sound Power Level (SWL).** The acoustical energy emitted by the sound source. An absolute value that is not affected by the environment, unlike SPL.
- **A-Weighted Sound Level (dBA).** The sound level obtained using an A-weighted filter. This filter de-emphasizes the very low and very high frequency response of the human ear and correlates well with subjective reactions to noise.
- **L_{01}, L_{10}, L_{50}, L_{90}.** The A-weighted noise level that is equaled or exceeded by a fluctuating sound level 1 percent, 10 percent, 50 percent, or 90 percent of the stated time period.
- **Equivalent Continuous Noise Level (L_{eq}).** The level of steady sound that has the same A-weighted sound energy as the time varying sound in the stated time (i.e. the average).
- **Community Noise Equivalent Level (CNEL).** The 24-hour A-weighted average sound level obtained after the addition of 5 dBA to sound levels occurring in the evening (7:00 p.m. to 10 p.m.) and 10 dBA to sound levels occurring in the night (10:00 p.m. to 7:00 a.m.).
- **Ambient Noise Level.** The all-encompassing noise associated with an environment, usually a composite of sound from many different sources in different directions.
- **Insertion Loss.** The difference in the sound level at a receiver location with and without the presence of a noise barrier Used to predict the effectiveness of noise barriers.

3.0 ENVIRONMENTAL SETTING

Under CEQA, environmental setting includes physical as well as economic and social aspects of the environment. The environment is affected by noise from day-to-day activities including automobile traffic, trains, airplanes, industrial processes, and residential activities. This section discusses the Project's environmental setting.

3.1 Existing Noise Sources

Ambient noise in the area surrounding the Project is dominated by traffic on Avenue T. High intensity, low frequency noise from the rail road is also present. Various other noise sources that were observed during site visits include traffic on other paved and unpaved roads, barking dogs, and generator operations at residences.

3.2 Receptors

Noise receptors are separated into the following four categories by the Noise Ordinance:

- **Sensitive Receptors.** Areas that are designated by the Health Officer (the main director of the Department of Health Services of the County) as requiring exceptional quiet.
- **Residential Receptors.** Property that is used in part or whole for residential purposes, except transient lodging such as hotels and motels.
- **Commercial Receptors.** Property that is used in part or whole for commercial purposes, such as stores, restaurants, and entertainment venues.
- **Industrial Receptors.** Property that is used in part or in whole for manufacturing purposes.

All receptors in the near vicinity of this Project are residential in nature. The following receptors are considered and shown on Figure 2 (Appendix A):

- **Receptor 1 (R1)** is located west of the Project at the corner of Avenue T and 106th Street. This receptor is expected to experience noise impacts from haul truck travel.
- **Receptor 2 (R2)** is located west of the Project adjacent to Avenue T on the north side. This receptor is expected to experience noise impacts from Project traffic.
- **Receptor 3 (R3)** is located approximately 4,000 feet west of the Project, near 126th Street. This is the closest receptor west of the Project and is expected to experience noise impacts from haul truck travel and industrial activities.
- **Receptor 4 (R4)** is east of, and adjacent to, the Project. It is also situated adjacent to the railroad, on the south side. This receptor is expected to experience noise impacts from industrial activities. Two residences exist at this location. The modeled receptor is placed at the residence that will experience the higher impact.
- **Receptor 5 (R5)** is approximately 600 feet east of the south-east corner of the Project. This receptor is expected to experience noise from industrial activities.

3.3 Ambient Noise Measurements

Ambient measurements were made using two Rion NL-21 sound level meters. Random-incidence type microphones were equipped with a windscreen and placed on a tripod approximately 5 feet above ground level. The microphones were calibrated using a YCT Sound Level Calibrator before each measurement. The sound level meter was programmed to log A-weighted energy equivalent sound levels at 1 minute intervals on a slow response time, as described in the Noise Ordinance.

The following ambient noise measurements were made in the Project vicinity. Figure 2 (Appendix A) illustrates the monitoring locations:

- **Monitoring Location A (ML-A)** is located on the Project site, the same distance from the railroad as R4 and slightly closer to Avenue T than R4. One 24-hour and one 8-hour measurement was made at this location.
- **Monitoring Location B (ML-B)** is located at the intersection of Avenue T and 106th street, near **R1**. One 4-hour peak a.m. traffic measurement was made at this location.
- **Monitoring Location C (ML-C)** is north of the site, equidistant from Avenue T (20 feet) and **R2**. One 4-hour peak p.m. traffic measurement was made at this location.
- **Monitoring Location D (ML-D)** is near **R3**, the same distance from Avenue T as **R3**. One 15-minute measurement was made at this location.
- **Monitoring Location E (ML-E)** is near **R4**, in a location that is the same distance from Avenue T and the Railroad as **R4**. One 15-minute measurement was made at this location.
- **Monitoring Location F (ML-F)** is near **R5**, in a location that is the same distance from Avenue T and the Railroad as **R5**. One 15-minute measurement was made at this location.

Traffic counts were taken from 4:11 to 5:11 PM and from 6:28 to 7:28 a.m. for the peak traffic hours (Appendix C). Traffic counts are used to calibrate the traffic model as discussed in Section 6.2.2.

Due to the high intensity, short duration, and infrequent occurrence of train noise, it has a larger effect on the CNEL parameter used in the General Plan than the median-based noise parameters (L_{50}, L_{25}, $L_{8.3}$, etc.) used in the Noise Ordinance. However, traffic on Avenue T dominates the noise environment in the Project vicinity. Because a single source dominates the noise environment in the Project vicinity, noise levels are predicted based on distance from that source. Ambient noise levels at the receptors are developed using a composite of the 24 hour measurement at ML-A and the short term measurements near ML-B through ML-F. See Appendix C for more information and the raw monitoring data. Ambient noise values are presented in Table 3-1. Figure 2 (Appendix A) illustrates the locations of the monitoring events and receptors.

Table 3-1 Receptor Ambient Noise

Value	ML-A	ML-B	ML-C	ML-D	ML-E	ML-F
Corresponding Receptor	24 Hour	R1	R2	R3	R4	R5
Day Max Hour L_{50}	39.1	58.8	47.9	37.1	38.7	31.0
Night Max Hour L_{50}	39.3	59.0	48.1	37.3	38.9	31.2
CNEL	64.1	65.4	70.6	63.4	73.1	59.4

Note that R4 has a generator or other engine running fairly consistently (noted three separate times on three separate days) that is the dominant source of noise in the area immediately surrounding it. However, the measurement made near this receptor (ML-E) does not include the entire magnitude of generator noise because it could not be taken close enough. Therefore, noise at the receptor is considerably higher then the represented ambient value while the engine is running.

4.0 SIGNIFICANCE THRESHOLDS

A project deemed to result in a potentially significant impact must incorporate mitigation sufficient to reduce its impact to a level that is not significant, if feasible mitigation is available. This section discusses existing noise impact significance thresholds. The Noise Ordinance is used to determine the significance of industrial source noise impacts while the Palmdale Noise Element is used to determine the traffic source noise impacts. The Antelope Valley General Plan does not contain applicable significance thresholds.

4.1 Industrial Source Significance Threshold

Table 4-1 presents the Noise Ordinance (Chapter 12.08 of Title 12, Los Angeles County Code) thresholds for exterior noise from operational activities. The impact is considered significant if:

- The stated threshold is exceeded for a cumulative period of more than 30 minutes in an hour (i.e. if the L_{50} is greater than the threshold);
- The stated threshold plus 5 dBA is exceeded for a cumulative period of more than 15 minutes in an hour (i.e. if the L_{25} is greater than the threshold plus 5 dBA);
- The stated threshold plus 10 dBA is exceeded for a cumulative period of more than 5 minutes in an hour (i.e. if the $L_{8.3}$ is greater than the threshold plus 10 dBA);
- The stated threshold plus 15 dBA is exceeded for a cumulative period of more than 1 minutes in an hour (i.e. if the $L_{1.7}$ is greater than the threshold plus 15 dBA); or
- The stated threshold plus 20 dBA is exceeded for any length of time.

Table 4-1 Noise Ordinance Operational Thresholds

Receptor Type	Time	L_{50} Threshold (dBA)
Noise Sensitive	Anytime	45
Residential	Nighttime – 10:00 pm to 7:00 am	45
	Daytime – 7:00 am to 10:00 pm	50
Commercial	Nighttime – 10:00 pm to 7:00 am	55
	Daytime – 7:00 am to 10:00 pm	60
Industrial	Anytime	70

In the event that the ambient noise L_{50} exceed the threshold "then the ambient L_{50} becomes the exterior noise standard. This provision is applicable to all of the noise parameters (L_{50}, L_{25}, $L_{8.3}$, $L_{1.7}$, L_{max}).

4.2 Transportation Source Significance Threshold

Table 4-2 presents the Palmdale Noise Element thresholds of significance. The 65 dBA CNEL exterior threshold for residential receptors is commonly used for determination of noise impact from transportation sources. This threshold is also utilized by the Lancaster General Plan Noise Element, the Los Angeles County General Plan Noise Element, and the United States Department of Housing and Urban Development.

Table 4-2 Palmdale Noise Element Thresholds

Receptor Type	Exterior Threshold	Interior Threshold	Unit
Residential	65	45	dBA CNEL
Commercial	Level that does not jeopardize health, safety, or welfare of visitors	55	dBA Leq(h)
Institutional	Level that does not jeopardize health, safety, or welfare of visitors	45	dBA Leq(h)
Industrial	Level that does not interfere with normal business activity	65	dBA Leq(h)
Note that the h in Leq describes the duration of exposure (i.e. 8 hours for a normal work day)			

4.3 Summary of Applicable Thresholds

Project specific thresholds are summarized in Tables 4-3 and 4-4. Ambient L_{50} values exceed the L_{50} values identified in the Noise Ordinance for receptors R1 and R2. For these receptors, the significance threshold could have been increased to the ambient noise levels. However, the significance determination in this NIA is conservatively based on the Noise Ordinance thresholds.

Table 4-3 Industrial Source Significance Thresholds (dBA)

Parameter	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}
Industrial Impacts – Day	70	65	60	55	50
Industrial Impacts – Night	65	60	55	50	45
Note that these significance thresholds apply to all receptors. As per Noise Ordinance guidance, significance thresholds can be equal to the ambient noise levels when the ambient noise levels are louder than the thresholds (as is the case for R1 and R2). However, the industrial noise thresholds in this NIA are not adjusted based on background noise.					

Table 4-4 Traffic Source Significance Thresholds (dBA)

Parameter	R1	R2	R3	R4	R5
Traffic Impacts (CNEL)	65.4	70.6	65.0	73.1	65.0
Note that the traffic noise thresholds are adjusted to equal the background noise levels when the background noise levels are louder than the thresholds (as is the case for R1, R2, and R4).					

5.0 PROJECT DESCRIPTION

Lebata, Inc. (Applicant) proposes to construct an Aggregate Surface Mining and Processing Facility, Ready-Mixed Concrete Plant, Asphalt Mixing Plant, Vac-Lite Plant, and Raw Cement Transfer and Aggregate Distribution Facility on an approximately 310 acre parcel in Los Angeles County, California. The parcel is currently vacant but is bisected by railroad tracks. Figure 1 (Appendix A) shows the location of the Project.

A complete Project Description, dated July 17, 2007, can be found in the Revised Application Materials submitted to the County on August 8, 2007. Elements of the Project Description considered vital for the preparation of this NIA are presented in this section.

The following noise producing activities are proposed by the Project:

- **Aggregate Processing Plants.** Off road equipment will excavate and load the unprocessed material into the processing plant. The processing plant, which consists of conveyors, screens, and crushers, is separated into two sections: a pit portion and a plant portion. Primary crushing and screening will be conducted in the pit. A series of conveyors will then transport material to the plant area for further crushing and screening.
- **Ready-Mix Concrete (RMC) Plant.** Aggregate material will be loaded into the concrete plant with a loader. Cement and fly ash used in the process are held in silos. The materials are weighed and conveyed to a mixer. An automated load out system then fills haul trucks with the concrete mixture.
- **Hot Mix Asphalt (HMA) Plant.** Aggregate material will be loaded into the concrete plant with a loader. It is then conveyed to a dryer, which heats the material. Hot aggregate is then transferred to a mixing drum where it is combined with heated asphalt oil. Finally, the asphalt is conveyed to and stored in heated silos for automated load out to haul trucks.
- **Vac-Lite Plant.** "Vac-Lite" is a strong, durable, porous glass pumice aggregate of volcanic origin. Bottom dump trucks will deliver the volcanic aggregate to the Project and dump it into a grizzly hopper/screen. The material will be conveyed to a silo where it will be treated with high pressure water and cement. Once processed, the material will be drained of water and conveyed to radial stockpiles for shipment via truck. The Vac-Lite plant's throughput will be only 30,000 tons per year, so its operation will be infrequent.

- **Haul Truck Traffic.** Haul trucks will be used to deliver the processed aggregate, concrete, cement, and asphalt to market. In addition, haul trucks will be used to deliver asphaltic oil and fly ash to the site. Approximately 80% of the trucks are assumed to head west to Los Angeles and 20% are assumed to head east to the Riverside area. Table 5-1 presents the peak daily traffic as determined by the Austin-Foust Associates' "Big Rock Creek Project Traffic Impact Analysis".
- **Worker Commute Traffic.** The Project is expected to employ 156 people in three shifts. These trips are expected to originate and be destined for the Palmdale/Lancaster area. Table 5-1 presents the peak daily employee traffic.

The aggregate processing plant, ready mix concrete plant, hot mix asphalt plant, and Vac-Lite plant may operate a maximum of 24 hours per day. The excavation activities and corresponding pit processing equipment may operate for a maximum of 18 hours per day (4:00 am to 10:00 pm).

Table 5-1 Peak Day Traffic Count

Vehicle Type	Total Trips	Trips to the West of the Facility on Ave. T	Trips to the East of the Facility on Ave. T
Haul Trucks	301	241	60
Passenger Vehicles	312	312	0

6.0 NOISE IMPACTS

Operational noise impacts are divided into two sections: industrial source impacts and transportation impacts. Industrial noise impacts are compared to the Noise Ordinance thresholds to determine significance and transportation impacts are compared to the Palmdale Noise Element thresholds to determine significance. A discussion of combined impacts is also provided.

6.1 Industrial Noise Source Impacts

This section discusses the sources, modeling assumptions, and results of the industrial noise impact analysis. Industrial sources are limited to onsite activities and equipment.

6.1.1 Industrial Noise Sources

Industrial noise sources include the primary aggregate processing facility, secondary aggregate processing facility, RMC plant, HMA plant, Vac-Lite plant, cement distribution facility, and related mobile equipment. Noise source data is presented in Table 6-1. Industrial source noise levels are from the Robertson Ready Mix EIR (July, 2000). More information regarding these sources is provided in Appendix D. Sound pressure levels (SPL) were converted to sound power levels (SWL) using the SoundPLAN Essential software (See Section 6.1.2). A SWL of 131.8 dBA is equivalent to a SPL of 100 dBA at 100'. The source height for all units is estimated to be 5 meters.

Table 6-1 Industrial Source Noise Levels (SWL dBA)

Source	Equipment Included in Noise Level	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}
Aggregate Plant - Pit Operations	Aggregate Processing Equip.	127.3	126.3	123.3	120.3	119.3
	Two Loaders					
	Trucks Delivering Material					
	Trucks Receiving Material					
Aggregate Plant - Plant Operations	Aggregate Processing Equip.	127.3	126.3	123.3	120.3	119.3
	Two Loaders					
	Trucks Delivering Material					
	Trucks Receiving Material					
RMC Plant	RMC Plant	122.8	122.3	121.3	118.8	118.8
	Concrete Trucks					
HMA Plant	HMA Plant	111.8	111.8	111.8	111.8	111.8
	Asphalt Trucks					
Vac-Lite Plant*	Vac-Lite Plant	122.8	122.3	121.3	118.8	118.8
	Trucks					

*The Vac-Lite plant's noise level is assumed to be equivalent to the RMC plant's noise level. This is a reasonable assumption because both plants are made up of roughly the same number of comparable pieces of equipment (conveyors, hoppers, and silos).

Operation of the cement distribution facility is infrequent and short in duration. This facility's noise originates from the fan used to pneumatically transfer the cement material. The HMA plant includes larger fans and a number of other noise generating sources. Therefore, the cement distribution facility is expected to generate less noise than the HMA plant, which is already the quietest source in Table 6-1. Since noise from the cement distribution facility is not expected to be audible when compared to the other plants, it is not included in the noise level calculations.

The following two scenarios were modeled using the noise source information in Table 6-1:

- Daytime operations (7:00 a.m. to 10:00 p.m.) will include all of the equipment identified in Table 6-1.
- Nighttime operations (10:00 p.m. to 7:00 a.m.) will include all operations identified in Table 6-1 except for the aggregate plant pit operations.

6.1.2 Industrial Source Model

SoundPLAN Essential Version 1.0 was used to model onsite noise sources. Impacts were modeled using the International Organization for Standardization (ISO) 9613-2 methodology. Model input parameters are presented in Appendix D and the model files are included on CD in Appendix F.

Daytime impact is dependent upon the location of the aggregate plant pit operations (Figure 3, Appendix A) and the depth of the operations. Figure 4 (Appendix A) illustrates the profile of the mining plan. Night operations do not include the pit operations, so night noise impact remains constant regardless of the location of the pit operations. In order to determine the location of the pit operations with the highest day impact, the following two scenarios were modeled.

- Mining Phase 2 initial conditions occur while the aggregate pit operations are located at 20 feet below grade on the west end of the southern pit, south of the railroad.
- Mining Phase 2 final conditions occur while the aggregate pit operations are located 80 feet below grade on the east side of the south pit, near R4.

The largest daytime noise impact occurs during mining Phase 2 at initial conditions so this situation is used to determine significance (Appendix D).

6.1.3 Industrial Noise Model Results

Tables 6-2 and 6-3 present the daytime and nighttime results of the industrial noise model and significance determination. Figures 5 through 8 (Appendix A) illustrate the results of the model. Model results indicate that the Project, if unmitigated, would result in a significant daytime and nighttime noise impact at R4. Note that ambient noise is not added to the Project noise in the impact determination because the noise threshold is equal to the ambient noise level (in the event that ambient noise is higher than the pre-designated threshold, see Section 4.1), not the ambient noise level + 3 dBA. Frequently, the ambient noise level + 3 dBA is used for a threshold. In that case, the Project noise level is added to the ambient noise level to determine significance. These methodologies are essentially the same because when a noise level is added to an equivalent noise level, the result is 3 dBA higher than the original levels.

Table 6-2 Unmitigated Daytime Industrial Noise Model Results

Receptor	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}	Significant?
R1	38.1	37.3	35.0	32.3	31.8	No
R2	46.3	45.5	43.3	40.6	40.1	No
R3	52.7	51.9	49.4	46.7	46.1	No
R4	58.7	57.8	55.3	52.5	**51.9**	**Yes**
R5	53.1	52.1	49.6	46.8	46.1	No
Threshold	70.0	65.0	60.0	55.0	50.0	---

Table 6-3 Unmitigated Nighttime Industrial Noise Model Results

Receptor	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}	Significant?
R1	35.9	35.2	33.3	30.8	30.4	No
R2	44.3	43.5	41.7	39.1	38.8	No
R3	49.4	48.6	46.8	44.2	43.9	No
R4	56.2	55.4	53.2	**50.5**	**50.1**	**Yes**
R5	49.6	48.8	46.7	44.1	43.6	No
Threshold	65.0	60.0	55.0	50.0	45.0	---

6.2 Transportation Noise Impacts

This section discusses the sources, assumptions, and results of the transportation noise model. Transportation sources include haul trucks operating off site and trains delivering cement.

6.2.1 Transportation Noise Sources

Traffic noise was modeled using the road segments and the Project induced traffic counts presented in Table 6-4. The traffic counts represent the average hour of the peak day, based on Table 5-1.

Table 6-4 Road Source Description

Road Segment	Description	Hourly Haul Trips	Hourly Passenger Trips
Avenue T West	Project Entrance to 106th Street	10	13
106th Street	South of Avenue T	10	13
Avenue T East	Project Entrance to 165th Street	3	0
Project Entrance	Avenue T to Plant Area	13	13

Train travel on the rail exists with or without the Project. The Project will not induce any new train trips, but will require that the trains carrying cement slow down, idle, and speed up in the vicinity of the Project. Trains that pass by at full speed are traveling at a high rate of speed. Slower moving trains result in less noise impact. A graph of the relationship between train speed and noise impact is included in Appendix D and is based on the Federal Transit Administration's (FTA) *Noise Impact Assessment Spreadsheet.* Since the Project will result in a reduction of noise impact from train travel, train noise is not modeled.

6.2.2 Traffic Noise Model

The Federal Highway Administration's Traffic Noise Model (TNM) version 2.5 was utilized to model traffic noise impacts. Source/receptor geometry, traffic flow controls (i.e. stop signs, lights), and traffic counts are entered into TNM, which calculates noise impact at the receptors. Model input parameters used in the assessment are found in Appendix D.

The TeNS suggests that "model calibrations are recommended if site conditions, highway alignment, and profile are not expected to change significantly before and after construction of a project, and until its design year." Model calibrations are meant to fine tune a model to account for actual site parameters that are not included in model calculations. In order to calibrate the model, the peak AM and peak PM traffic counts collected during the noise monitoring events (see Section 3.3 and Appendix C) were modeled and compared to actual noise monitoring data. Table 6-5 presents the results of this calibration exercise. Calculations are included in Appendix D and model files are included on CD in Appendix F.

Table 6-5 TNM Calibration (dBA)

Monitoring Location	Model Prediction	Monitored Value	Difference
20' from Avenue T (ML-C)	69.4	63.4	6.0
On Project Site (ML-A)	40.5	36.7	3.8
Avenue T/106th Intersection (ML-B)	68.3	62.8	5.5

The most conservative calibration value of 3.8 dBA is utilized to determine traffic noise impacts (Table 6-6).

6.2.3 Traffic Noise Model Results

Table 6-6 presents the results of the traffic noise model and significance determination. See Appendix D for the conversion between the TNM predicted Leq(1hr) and the CNEL. Modeled results indicate that the Project will result in a less than significant traffic noise impact. Note that ambient noise is not added to the Project noise in the impact determination because the noise threshold is equal to the ambient noise level (in the event that ambient noise is higher than the pre-designated threshold, see Section 4.3), not the ambient noise level + 3 dBA. Frequently, the ambient noise level + 3 dBA is used for a threshold. In that case, the Project noise level is added to the ambient noise level to determine significance. These methodologies are essentially the same because when a noise level is added to an equivalent noise level, the result is 3 dBA higher than the original levels.

Table 6-6 Traffic Noise Model Results (CNEL dBA)

Value	R1	R2	R3	R4	R5
Predicted Noise Impact	59.0	61.9	41.1	40.3	36.8
Threshold	65.4	70.6	65.0	73.1	65.0
Significant?	No	No	No	No	No

6.3 Combined Industrial and Traffic Impacts

Noise impacts from industrial and traffic sources will combine to yield potentially higher total impacts. However, the magnitude of these combined impacts will not be significantly higher than the impacts predicted for the industrial sources. The reason for this is that decibels are a logarithmic scale and noise levels are most affected by the loudest source. When two noise levels differ by ten or more decibels, their sum is equal to the larger of the two noise levels (i.e. the lower noise level has no effect on the combined noise level).

For this Project, the receptors primarily impacted by traffic noise (R1 and R2) are far from industrial activities and experience low amounts of industrial noise (10 to 30 dBA below the applicable thresholds). The receptors primarily impacted by industrial noise (R3, R4, and R5) are distant from the traffic activities and experience low amounts of traffic noise (25 to 35 dBA below the applicable thresholds). For these reasons, sound levels are not summed in this NIA.

7.0 MITIGATION

Unmitigated traffic noise impacts are less then significant at all receptors. Unmitigated industrial noise impacts are significant at R4 during the day and night, while less than significant at R1, R2, R3, and R5. As presented in Tables 6-2 and 6-3, the largest noise impact at this receptor (L_{50} during the nighttime) requires mitigation sufficient to obtain a 5.1 dBA reduction in noise levels. Mitigation Measure *NO1* is sufficient to obtain this reduction.

> *NO1. A 7 foot tall berm with sufficient length to break the line-of-site between all of the plants and R4 shall be constructed along the Project's eastern property line.*

Calculations that predict the noise attenuating effect of this are included in Appendix E and Figure 9 (Appendix A) illustrates the location of the berm. The berm will result in a 5.1 dBA insertion loss from sources in the Project's plant area. Mitigated industrial noise impacts are presented in Tables 7-1 and 7-2. Noise impacts at R4 are mitigated to less than significant levels by Mitigation Measure *NO1*.

Table 7-1 Mitigated Daytime Industrial Noise Model Results

Receptor	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}	Significant?
R1	38.1	37.3	35.0	32.3	31.8	No
R2	46.3	45.5	43.3	40.6	40.1	No
R3	52.7	51.9	49.4	46.7	46.1	No
R4	53.6	52.7	50.2	47.4	46.8	No
R5	53.1	52.1	49.6	46.8	46.1	No
Threshold	70.0	65.0	60.0	55.0	50.0	---

Table 7-2 Mitigated Nighttime Industrial Noise Model Results

Receptor	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}	Significant?
R1	35.9	35.2	33.3	30.8	30.4	No
R2	44.3	43.5	41.7	39.1	38.8	No
R3	49.4	48.6	46.8	44.2	43.9	No
R4	51.1	50.3	48.1	45.4	45.0	No
R5	49.6	48.8	46.7	44.1	43.6	No
Threshold	65.0	60.0	55.0	50.0	45.0	---

8.0 FINDINGS

This NIA finds that:

- Unmitigated transportation noise impact is less than significant at all receptors.
- Mitigated industrial noise impact is less than significant at all receptors.
- The Project will result in a Class II impact, significant but mitigable.

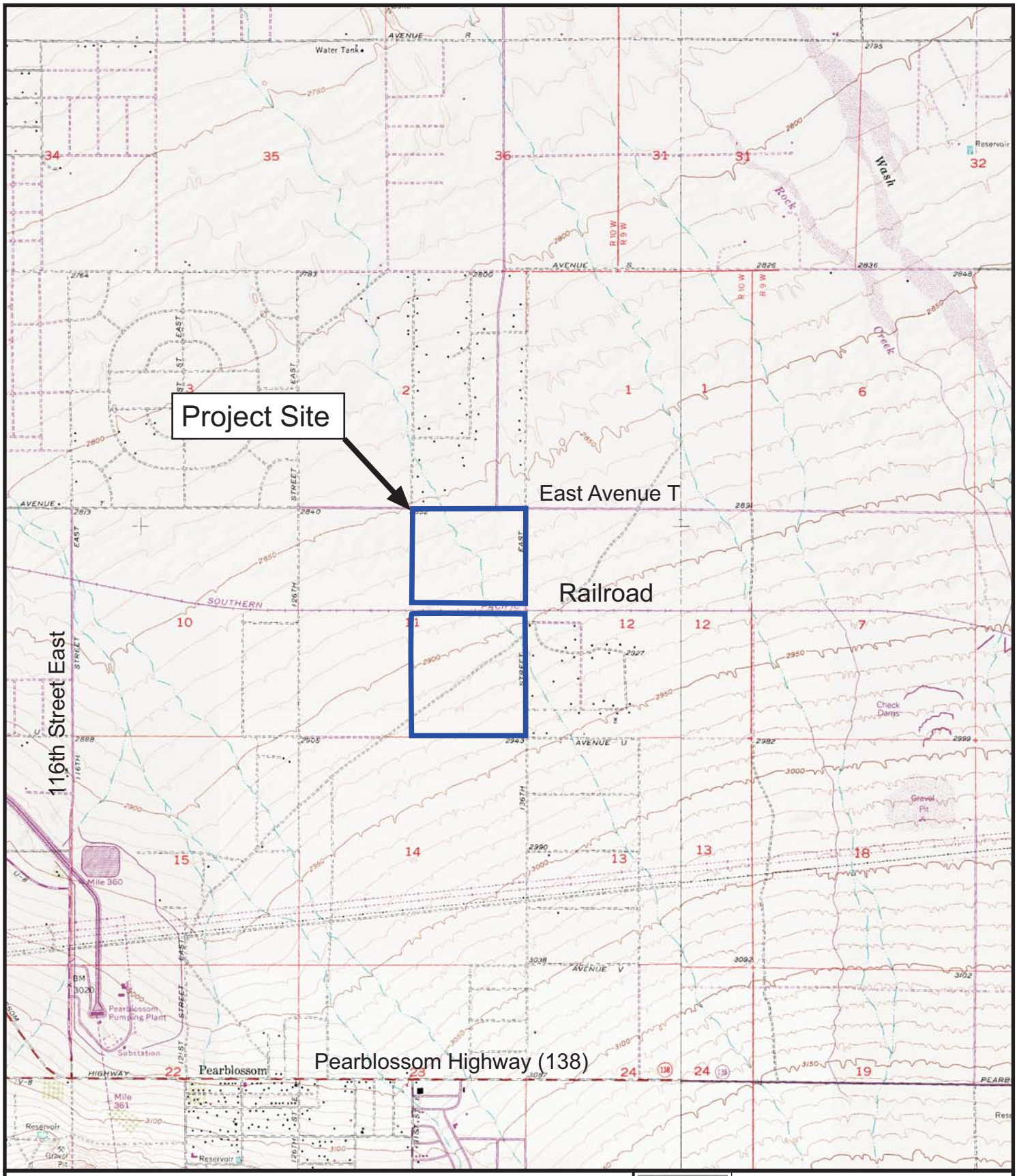
9.0 REFERENCES

This assessment employs the following resources:

- *Los Angeles County Noise Ordinance*, Los Angeles County Code, Title 12 Chapter 08, 1978
- *Antelope Valley Areawide General Plan*, Country of Los Angeles Department of Regional Planning, December 4, 1986
- Noise Element, City of Palmdale General Plan, January 25, 1993
- *Traffic Noise Analysis Protocol*, California Department of Transportation, Division of Environmental Analysis, August 2006 (http://www.dot.ca.gov/hq/env/noise/)
- *Technical Noise Supplement*, California Department of Transportation, October 1998 (http://www.dot.ca.gov/hq/env/noise/pub/Technical%20Noise%20Supplement.pdf)
- Traffic Noise Model v2.5, Federal Highway Administration (http://www.fhwa.dot.gov/environment/noise/tnm/index.htm)
- *Noise Assessment of Potential Noise Impacts of the Proposed Robertson Ready Mix Facility*, County of Los Angeles, Mestre Greve Associates, October 1998
- *Noise Impact Assessment Spreadsheet*, Federal Transit Administration, July, 3 2007 (http://www.fta.dot.gov/planning/environment/planning_environment_2233.html)

APPENDIX A

Figures



Source: USGS 7.5 Minute Topographic Quadrangle
Littlerock & Lovejoy Buttes, California 1957
Photorevised 1992
(C)2002 DeLorme, XMap(R) 3.5

Legend:

Project Boundary

N

0 2000' 4000'

10' Contour Interval
National Geodetic Vertical
Datum 1929

West Coast Environmental and Engineering

VICINITY MAP

Big Rock Creek Site

Antelope Valley, California

PROJECT: MCG100-001-06		FIGURE 1
DRAWN BY: BAJ	DATE: 1/11/06	REVISION:12/20/06 GOZ
APPROVED BY: IE	DATE: 1/12/06	PRINTED: 12/20/06
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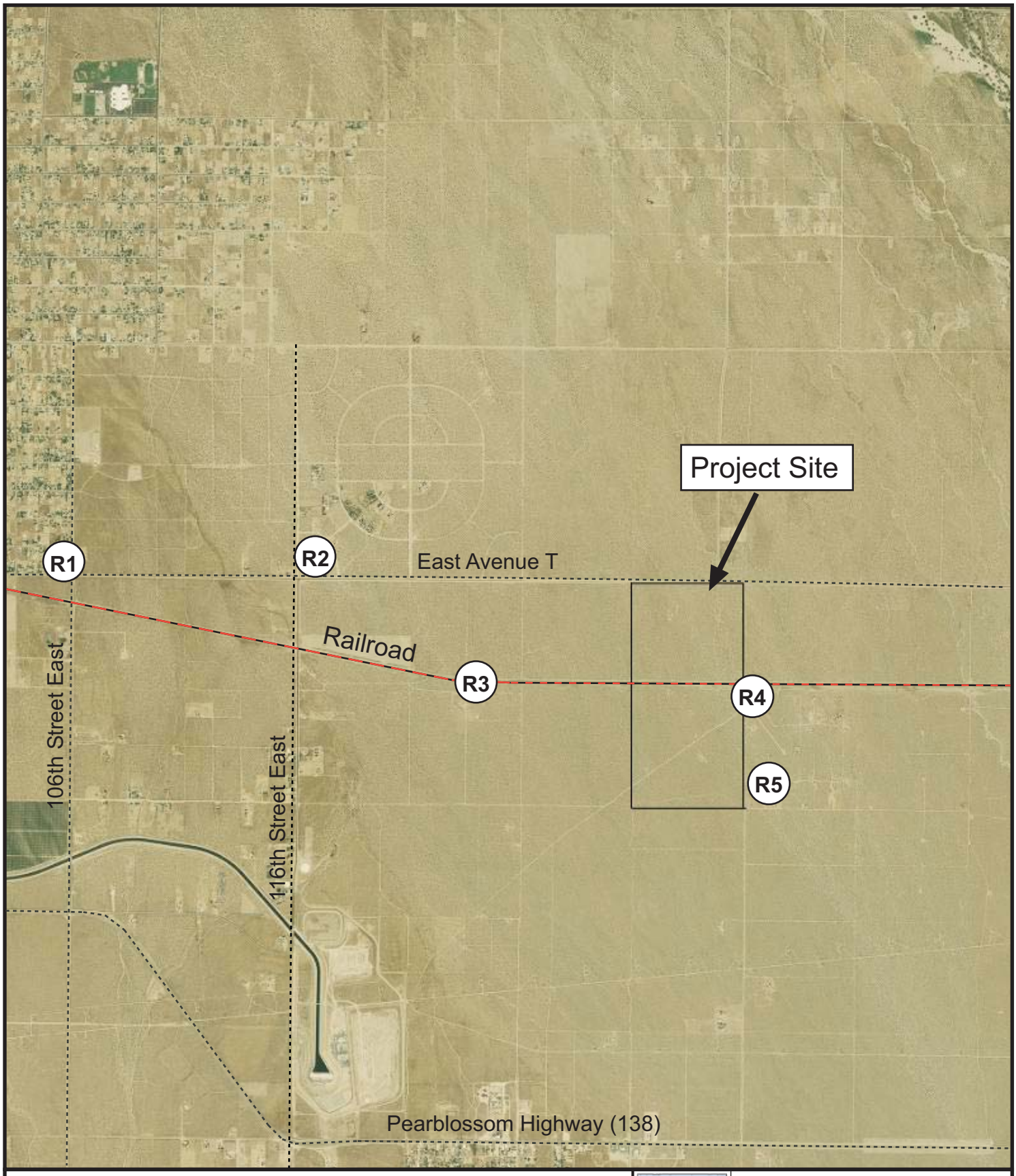
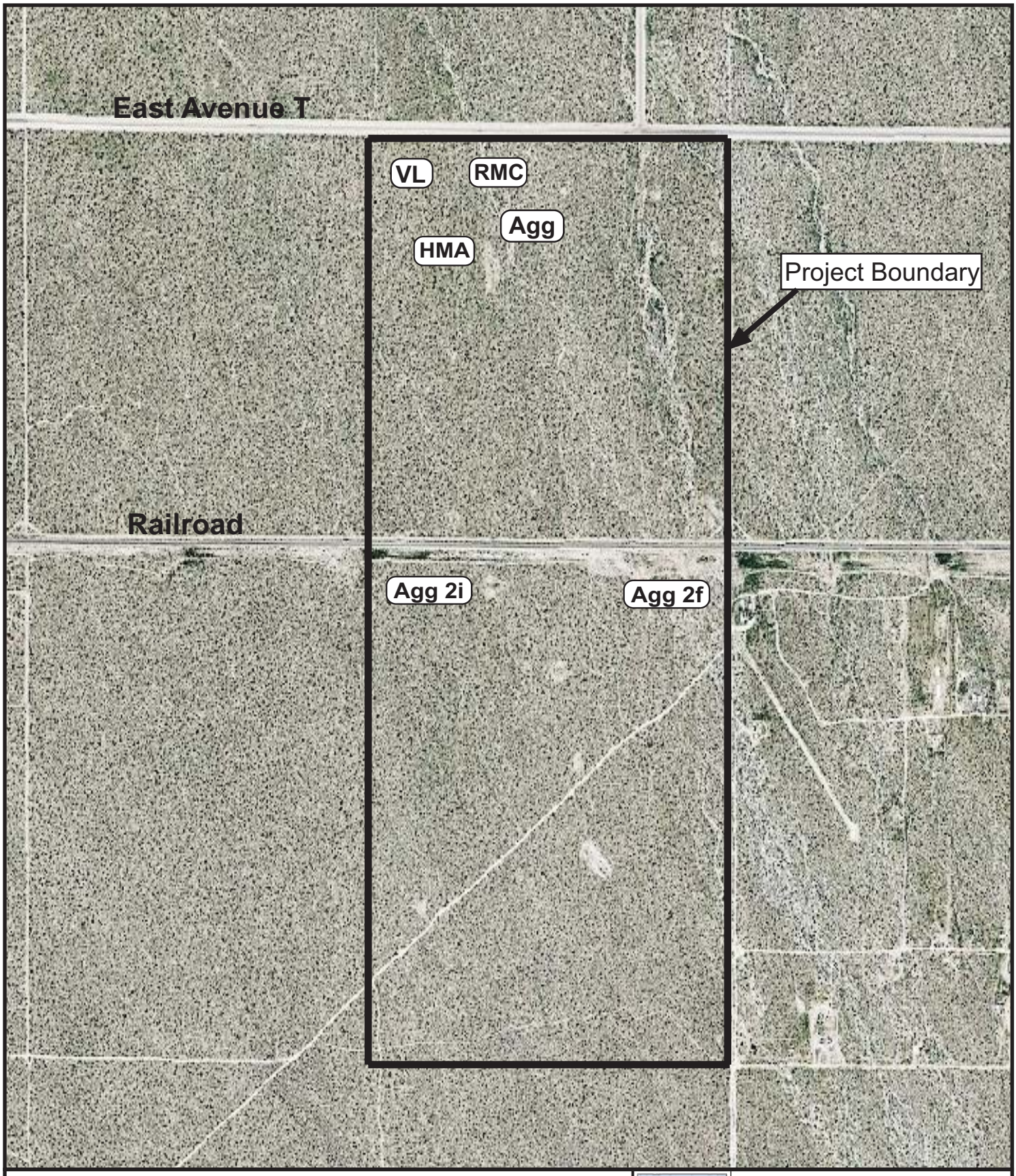


R# Receptors

West Coast Environmental and Engineering

Receptor Locations
Big Rock Creek Project

PROJECT: MCG100-001		FIGURE 2
DRAWN BY: GLZ	DATE: 2/27/08	REVISION: 10/1/08
APPROVED BY: GLZ	DATE: 2/27/08	PRINTED:
DRAWING: MCG100-Receptor Locations.fh11		

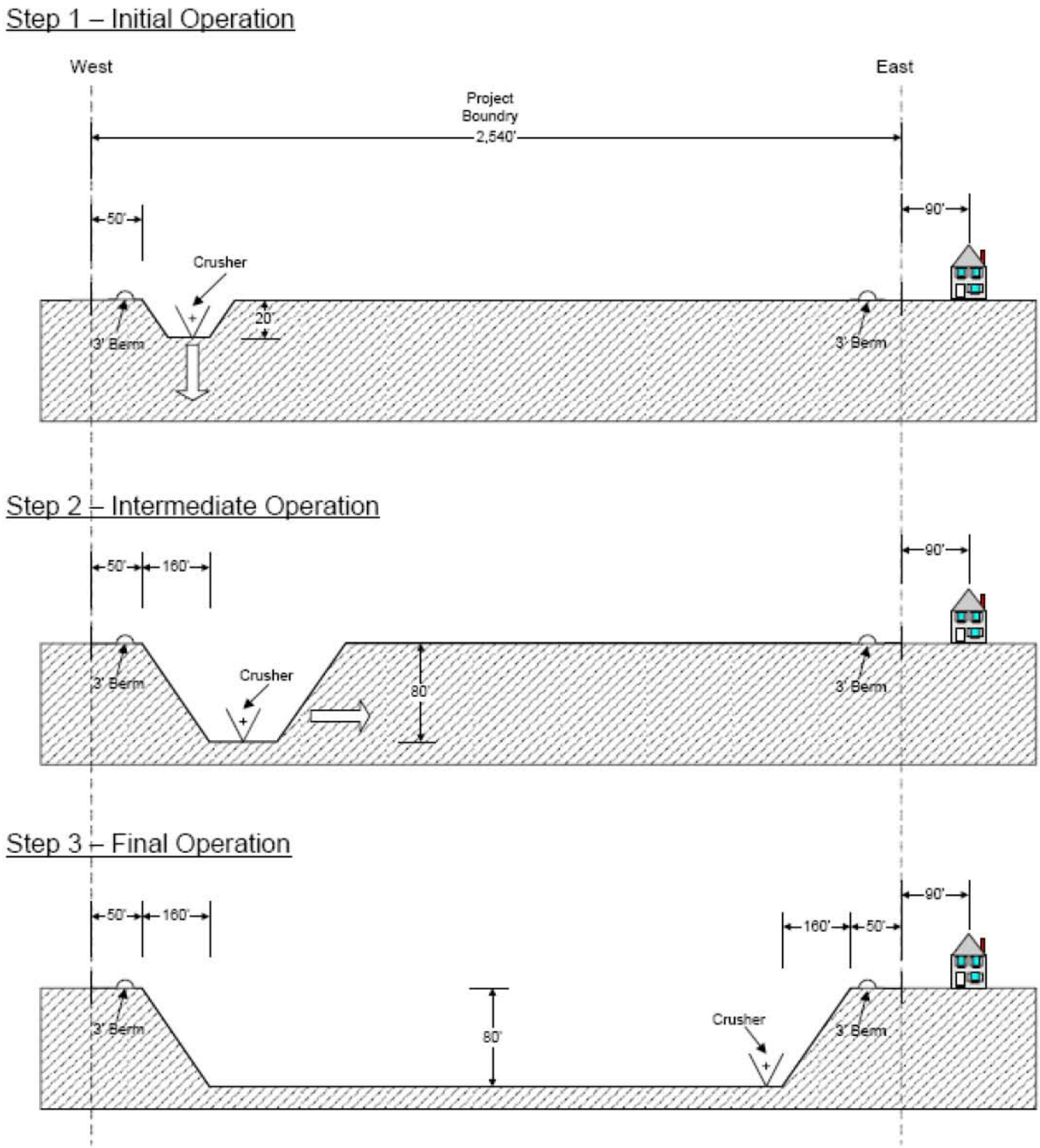


VL = Vac-Lite Plant
RMC = Ready Mix Concrete Plant
HMA = Hot Mix Asphalt Plant
Agg = Aggregate Plant
Agg 2i = Aggregate Pit Plant, Phase 2 Initial Location (see Figure 4)
Agg 2f = Aggregate Pit Plant, Phase 2 Final Location (see Figure 4)

West Coast Environmental and Engineering

Industrial Model Source Locations
Big Rock Creek Project

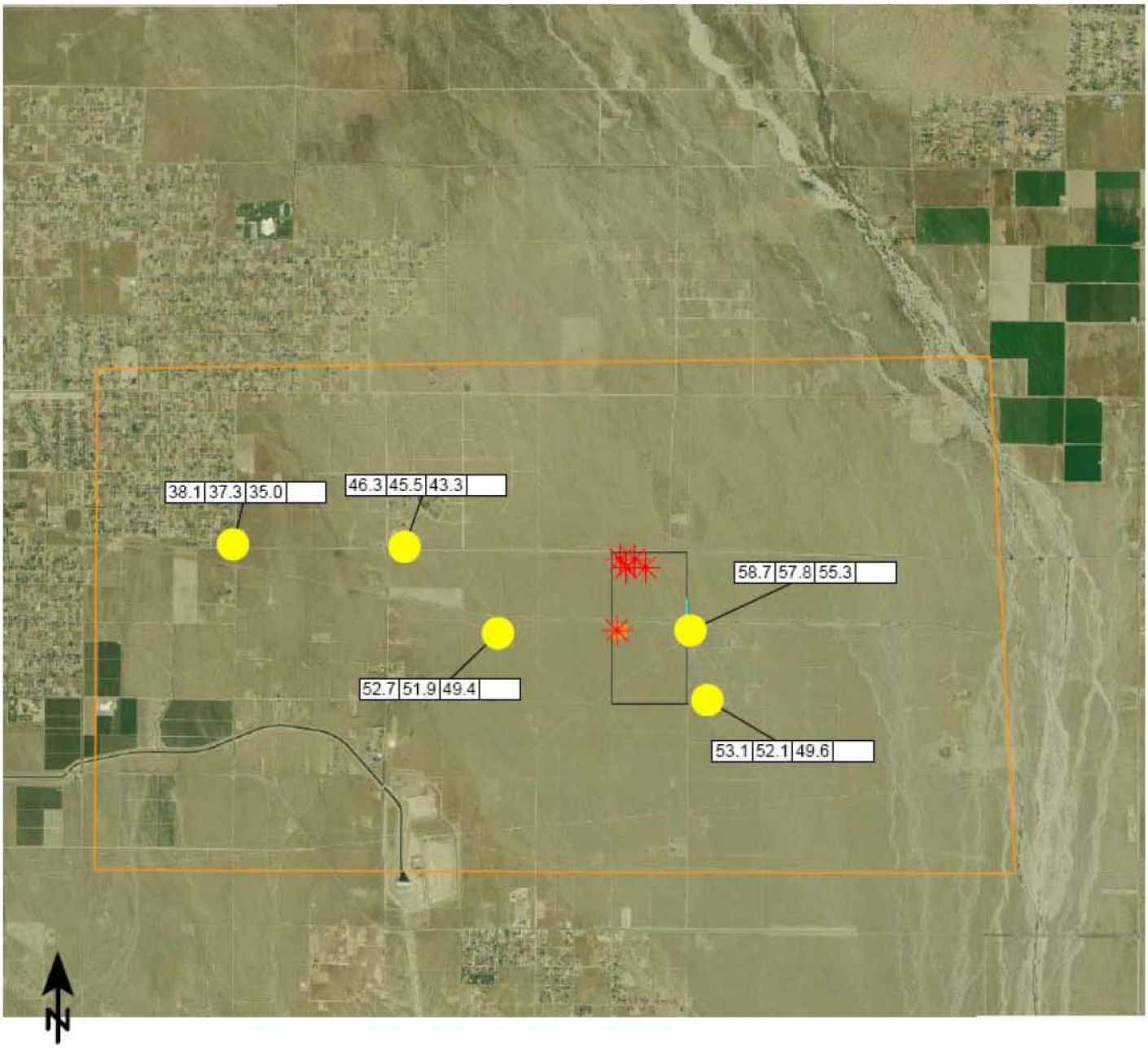
PROJECT: MCG100-001		FIGURE 3
DRAWN BY: GLZ	DATE: 2/27/08	REVISION:7/8/08
APPROVED BY: GLZ	DATE: 2/27/08	PRINTED:
DRAWING: MCG100-Industrial_model_sources.fh11		



WEST COAST
ENVIRONMENTAL
AND ENGINEERING

Mining Operation Profile
Big Rock Creek Project
Antelope Valley, California

PROJECT: MCG100-001-06	FIGURE 4
DRAWN BY: GLZ DATE: 2/27/08	REVISION:
APPROVED BY: GLZ DATE: 2/27/08	PRINTED:



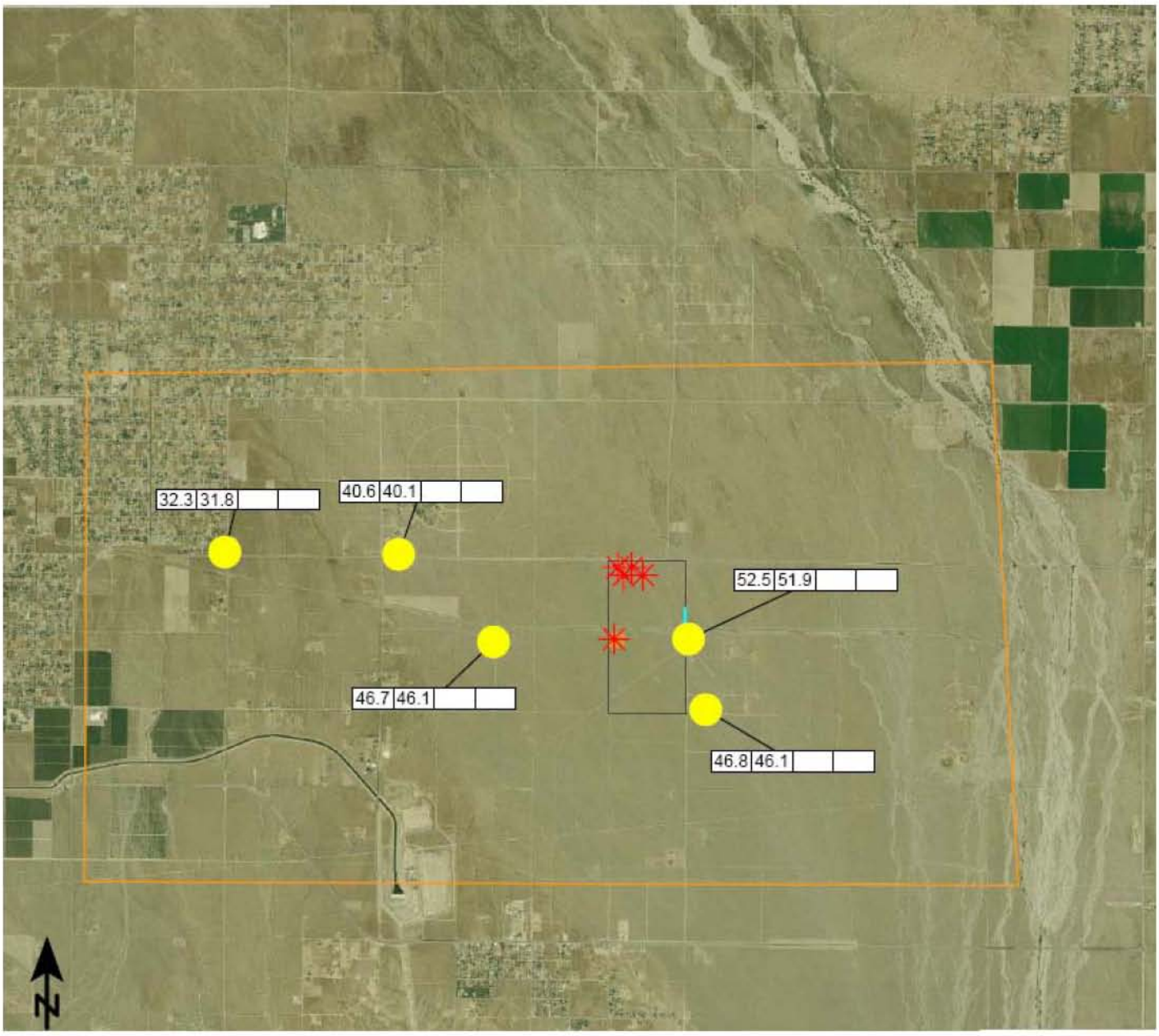
Noise impacts are presented in:
L_{max}, $L_{1.7}$, $L_{8.3}$ (dBA)

Signs and symbols
- Elevation line
- Berm slope
- Berm top
- Receiver
- Point source
- Facade with conflict

WEST COAST ENVIRONMENTAL AND ENGINEERING

Industrial Noise Model Results
Day (1 of 2)
Big Rock Creek Project
Antelope Valley, California

PROJECT: MCG100-001-06	FIGURE 5
DRAWN BY: GLZ DATE: 8/1/08	REVISION:
APPROVED BY: GLZ DATE: 8/1/08	PRINTED:



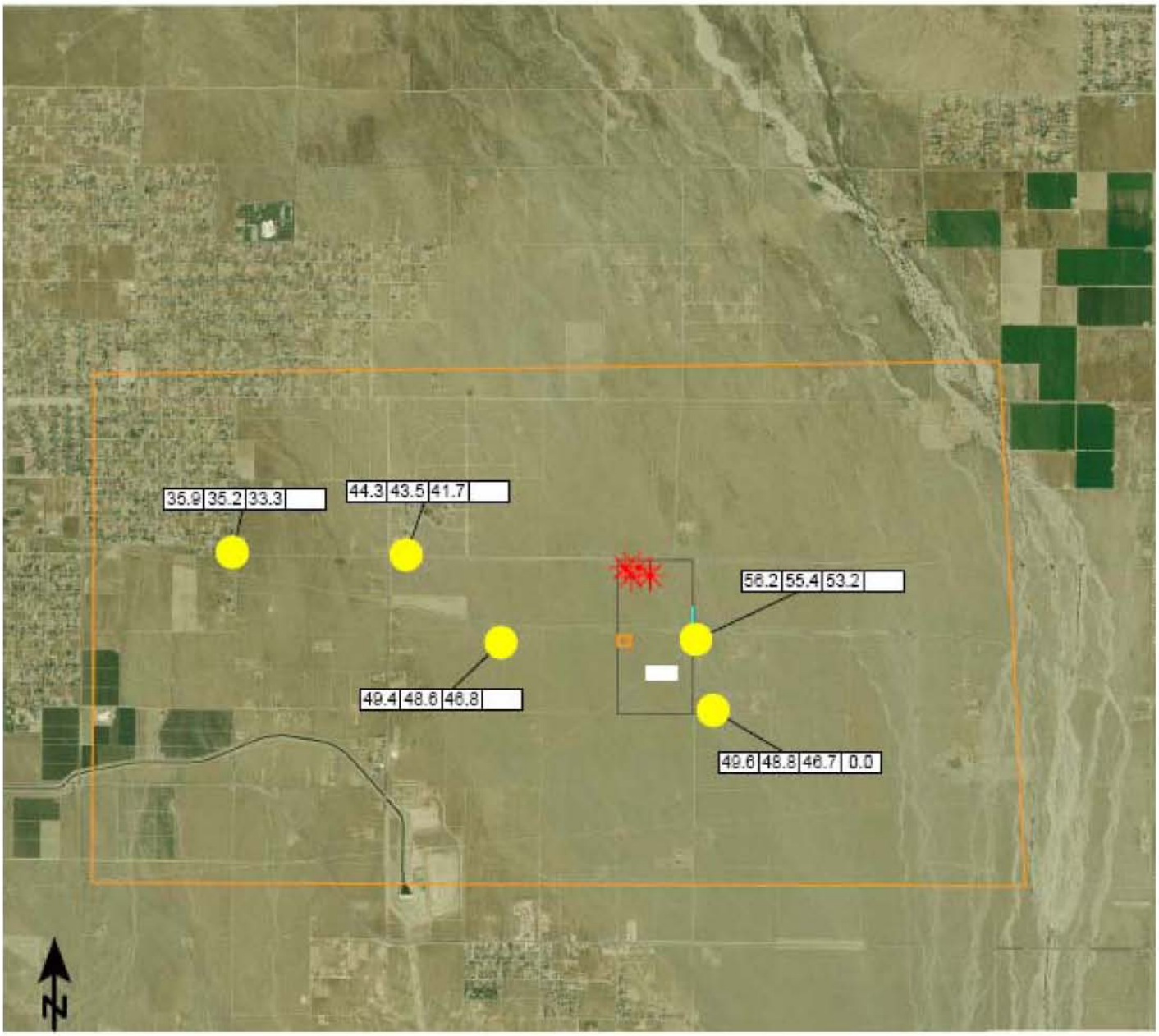
Noise impacts are presented in:
$L_{2.5}$, L_{50} (dBA)

Signs and symbols
- Elevation line
- Berm slope
- Berm top
- Receiver
- Point source
- Facade with conflict

WEST COAST ENVIRONMENTAL AND ENGINEERING

Industrial Noise Model Results
Day (2 of 2)
Big Rock Creek Project
Antelope Valley, California

PROJECT: MCG100-001-06	FIGURE 6
DRAWN BY: GLZ DATE: 8/1/08	REVISION:
APPROVED BY: GLZ DATE: 8/1/08	PRINTED:



Noise impacts are presented in:
L_{max}, $L_{1.7}$, $L_{8.3}$ (dBA)

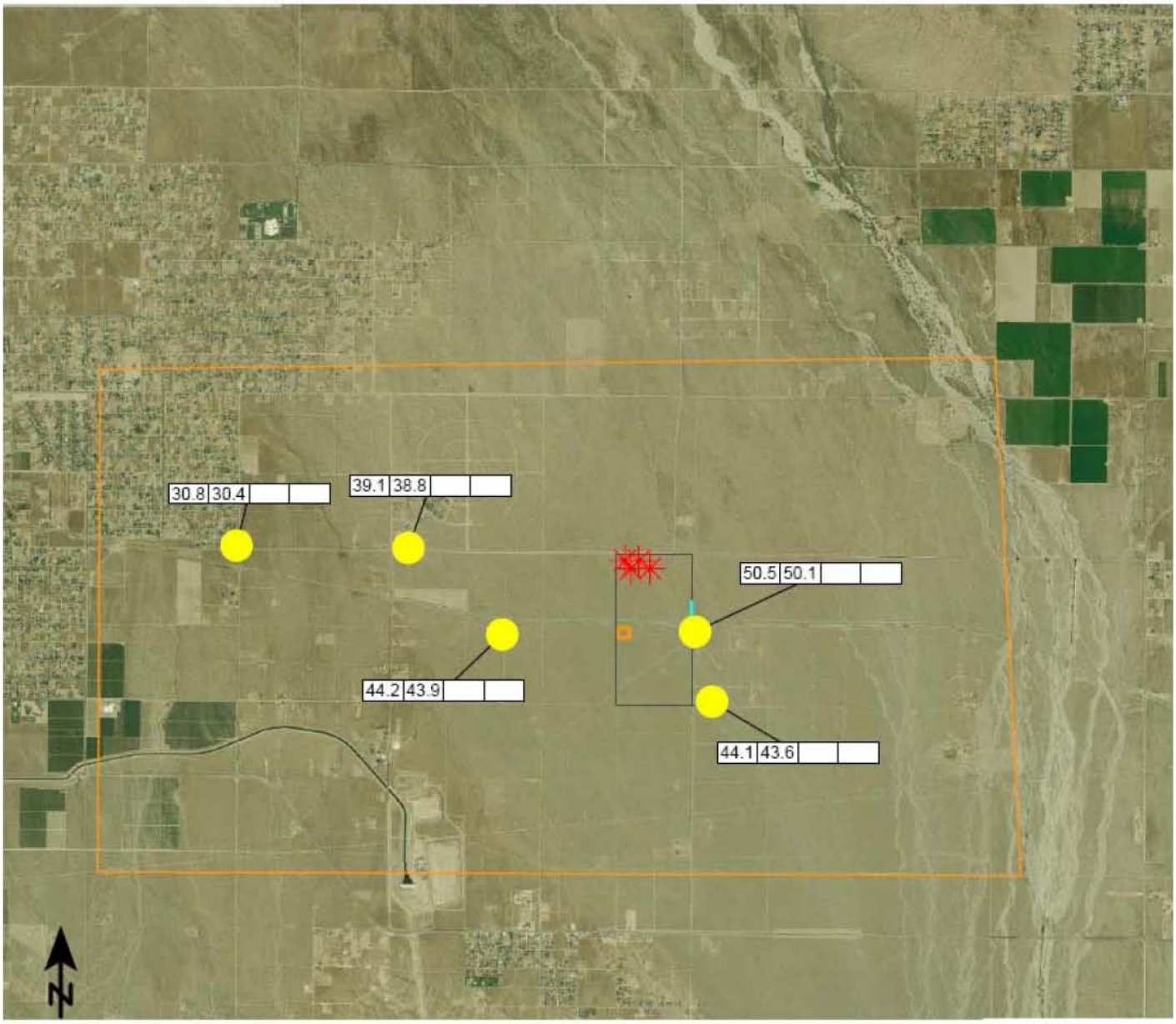
Signs and symbols

- Elevation line
- Berm slope
- Berm top
- Receiver
- Point source
- Facade with conflict

WEST COAST ENVIRONMENTAL AND ENGINEERING

Industrial Noise Model Results
Night (1 of 2)
Big Rock Creek Project
Antelope Valley, California

PROJECT: MCG100-001-06	FIGURE 7
DRAWN BY: GLZ DATE: 8/1/08	REVISION:
APPROVED BY: GLZ DATE: 8/1/08	PRINTED:



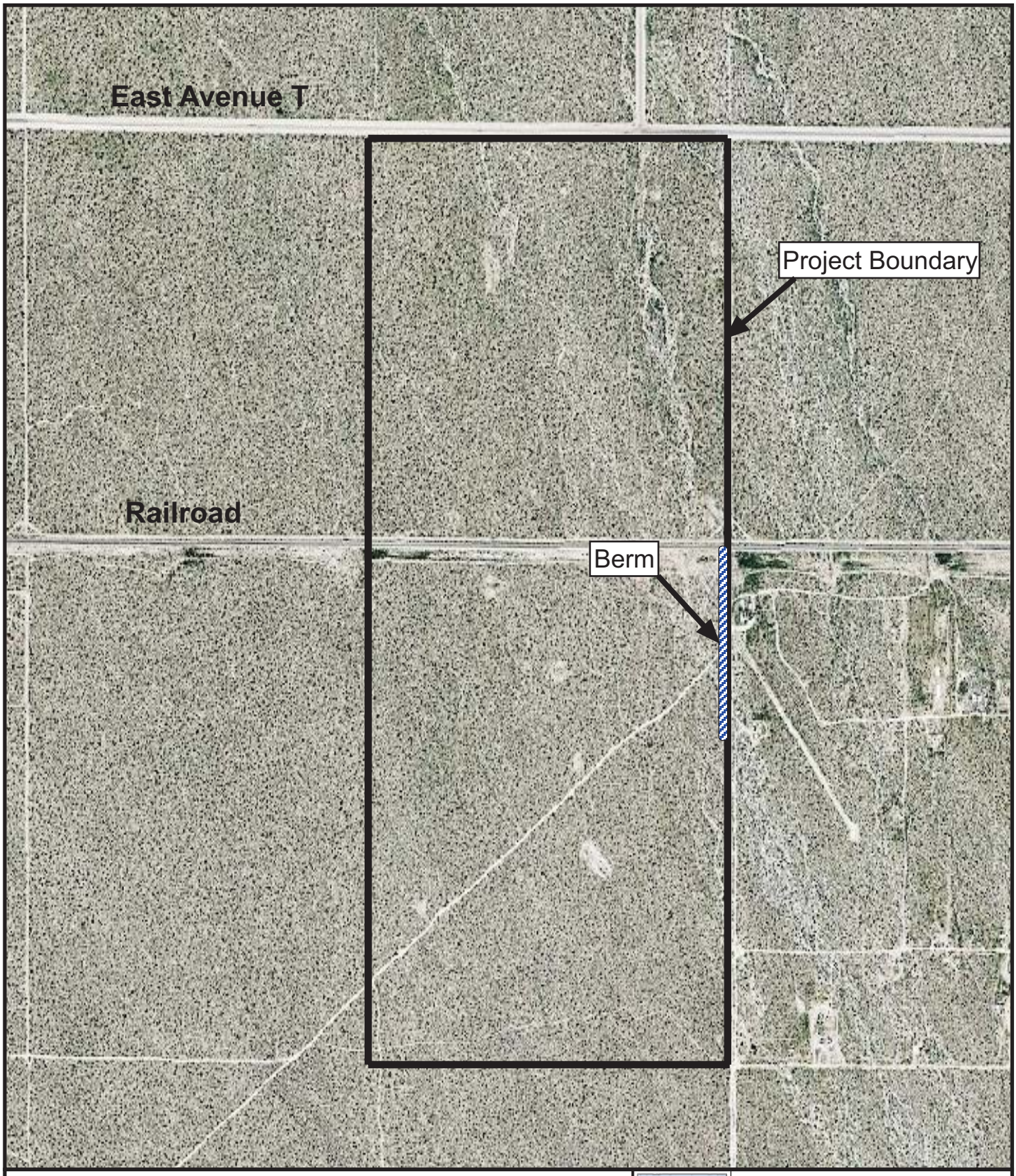
Noise impacts are presented in:
$L_{2.5}$, L_{50} (dBA)

Signs and symbols
- Elevation line
- Berm slope
- Berm top
- Receiver
- Point source
- Facade with conflict

WEST COAST ENVIRONMENTAL AND ENGINEERING

Industrial Noise Model Results
Night (2 of 2)
Big Rock Creek Project
Antelope Valley, California

PROJECT: MCG100-001-06	FIGURE 8
DRAWN BY: GLZ DATE: 8/1/08	REVISION:
APPROVED BY: GLZ DATE: 8/1/08	PRINTED:



West Coast Environmental and Engineering

Berm Location
Big Rock Creek Project

PROJECT: MCG100-001		FIGURE 9
DRAWN BY: GLZ	DATE: 2/27/08	REVISION:
APPROVED BY: GLZ	DATE: 2/27/08	PRINTED:
DRAWING: MCG100-Barrier_location.fh11		

APPENDIX B

Regulatory Documents
-Los Angeles County Noise Ordinance
-Palmdale General Plan Noise Element

12.08.380 Noise zones designated.

Receptor properties described hereinafter in this chapter are hereby assigned to the following noise zones:

Noise Zone I -- Noise-sensitive area;

Noise Zone II -- Residential properties;

Noise Zone III -- Commercial properties;

Noise Zone IV -- Industrial properties.

(Ord. 11778 § 2 (Art. 4 § 402), 1978: Ord. 11773 § 2 (Art. 4 § 402), 1978.)

Title 12 ENVIRONMENTAL PROTECTION

Chapter 12.08 NOISE CONTROL

12.08.390 Exterior noise standards -- Citations for violations authorized when.

A. Unless otherwise herein provided, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

Noise Zone	**Designated Noise Zone Land Use** (Receptor property)	**Time Interval** (dB)	**Exterior Noise Level**
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 pm to 7:00 am (nighttime)	45
		7:00 am to 10:00 pm (daytime)	50
III	Commercial properties	10:00 pm to 7:00 am (nighttime)	55
		7:00 am to 10:00 pm (daytime)	60

IV	Industrial properties	Anytime	70

B. Unless otherwise herein provided, no person shall operate or cause to be operated, any source of sound at any location within the unincorporated county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, when measured on any other property either incorporated or unincorporated, to exceed any of the following exterior noise standards:

Standard No. 1 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 shall be the applicable noise level from subsection A of this section; or, if the ambient L*50* exceeds the foregoing level, then the ambient L*50* becomes the exterior noise level for Standard No. 1.

Standard No. 2 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 shall be the applicable noise level from subsection A of this section plus 5dB; or, if the ambient L*25* exceeds the foregoing level, then the ambient L*25* becomes the exterior noise level for Standard No. 2.

Standard No. 3 shall be the exterior noise level which may not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from subsection A of this section plus 20dB; or, if the ambient L*8.3* exceeds the foregoing level, then the ambient L*8.3* becomes exterior noise level for Standard No. 3.

Standard No. 4 shall be the exterior noise level which may not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from subsection A of this section plus 15dB; or, if the ambient L*1.7* exceeds the foregoing level, then the ambient L*1.7* becomes the exterior noise level for Standard No.4.

Standard No. 5 shall be the exterior noise level which may not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from subsection A of this section plus 20dB; or, if the ambient L*0* exceeds the foregoing level then the ambient L*0* becomes the exterior noise level for Standard No. 5.

C. If the measurement location is on a boundary property between two different zones, the exterior noise level utilized in subsection B of this section to determine the exterior standard shall be the arithmetic mean of the exterior noise levels in subsection A of the subject zones. Except as provided for above in this subsection C, when an intruding noise source orginates on an industrial property and is impacting another noise zone, the applicable exterior noise level as designated in subsection A shall be the daytime exterior noise level for the subject receptor property.

D. The ambient noise histogram shall be measured at the same location along the property line utilized in subsection B of this section, with the alleged intruding noise source inoperative. If for any reason the alleged intruding noise source cannot be turned off, the ambient noise histogram will be estimated by performing a measurement in the same general area of the alleged intruding noise source but at a sufficient distance such that the noise from the alleged intruding noise source is at least l0dB below the ambient noise histogram in order that only the actual ambient noise histogram be measured. If the difference between the ambient noise histogram and the alleged intruding noise source is 5 to 10dB, then the level of the ambient noise histogram itself can be reasonably determined by subtracting a one-decibel correction to account for the contribution of the alleged

intruding noise source.

E. In the event the intrusive exceeds the exterior noise standards as set forth in subsections B and C of this section at a specific receptor property and the health officer has reason to believe that this violation at said specific receptor property was unanticipated and due to abnormal atmospheric conditions, the health officer shall issue an abatement notice in lieu of a citation. If the specific violation is abated, no citation shall be issued therefor. If, however, the specific violation is not abated, the health officer may issue a citation. (Ord. 11778 § 2 (Art. 4 § 403), 1978: Ord. 11773 § 2 (Art. 4 § 403), 1978.)

SECTION 2: GOALS, OBJECTIVES, AND POLICIES

GOAL N1: Minimize the exposure of residents to excessive noise to the extent possible, through the land planning and the development review process.

Objective N1.1: Utilize appropriate land use planning as the primary method of achieving noise compatibility among adjacent land uses.

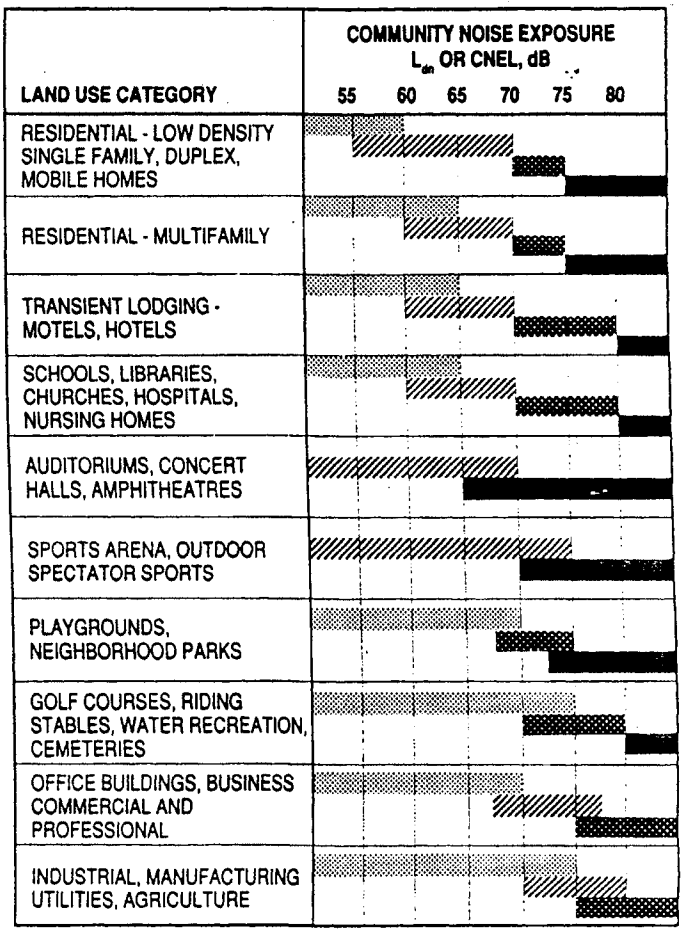
> **Policy N1.1.1**: Locate noise compatible land uses near existing and future air, rail and highway transportation noise sources.
>
> **Policy N1.1.2**: Restrict noise sensitive land uses near existing or future air, rail or highway transportation noise sources unless mitigation measures have been incorporated into the design of the project to reduce the noise levels at the noise sensitive land use to less than 65 dBA CNEL at all exterior living spaces including but not limited to, single-family yards and multi-family patios, balconies, pool areas, cook-out areas and related private recreation areas.
>
> **Policy N1.1.3**: When proposed stationary noise sources could exceed an exterior noise level of 65 dBA CNEL at present, or could impact future noise sensitive land uses, require preparation of an acoustical analysis and mitigation measures to reduce noise levels to no more than 65 dBA CNEL exterior and 45 dBA CNEL interior; if the noise level cannot be reduced to these thresholds through mitigation, the new noise source should not be permitted.
>
> **Policy N1.1.4**: Consider the noise environment when making land use decisions with respect to the guidelines contained in Table N-1, and require noise standards consistent with the criteria listed on Table N-3. The State Recommended Acceptable Noise Guidelines, listed in Table N-1, are provided as guidelines only, and are not represented as standards.

Objective N1.2: Protect and maintain those areas having acceptable noise environments.

> **Policy N1.2.1**: Locate new major noise sources in areas containing existing noise sources, and avoid their location adjacent to noise sensitive land uses unless a finding can be made, based on evidence in the record, that the placement of the new noise source will not result in adverse impacts to the existing noise sensitive land use.

TABLE N-1

State Recommended Noise Level Guidelines



LEGEND

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

CONSIDERATIONS IN DETERMINATION OF NOISE-COMPATIBLE LAND USE

A. NORMALIZED NOISE EXPOSURE INFORMATION DESIRED

Where sufficient data exists, evaluate land use suitability with respect to a "normalized" value of CNEL or L_{dn}. Normalized values are obtained by adding or subtracting the constants described in Table 1 to the measured or calculated value of CNEL or L_{dn}.

B. NOISE SOURCE CHARACTERISTICS

The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in Community Noise Exposure Areas greater than 65 dB should be discouraged and considered located within normally unacceptable areas.

C. SUITABLE INTERIOR ENVIRONMENTS

One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL of L_{dn}. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. ACCEPTABLE OUTDOOR ENVIRONMENTS

Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. When this is the case, more restrictive standards for land use compatibility, typically below the maximum considered "normally acceptable" for that land use category, may be appropriate.

Source: California Department of Health, Guidelines for the Preparation and Content of Noise Elements of The General Plan. February, 1976

Policy N1.2.2: Restrict construction hours during the evening, early morning and Sundays.

Policy N1.2.3: Utilize any or all of the following measures in order to maintain acceptable noise environments throughout the City:

1. Control of noise at its source, including noise barriers and other muffling devices built into the noise source.

2. The provision of buffer areas and/or wide setbacks between the noise source and other development.

3. The reduction of densities, where practical, adjacent to the noise source (freeway, airport, railroad).

4. The use of sound insulation, blank walls, double paned windows and other design or architectural techniques to reduce interior noise levels.

5. Designation of appropriate land uses adjacent to known noise sources.

Policy N1.2.4: Where deemed appropriate based upon available information, acoustical analysis and appropriate mitigation for noise-sensitive land uses should be required in areas which may be adversely impacted by significant intermittent noise sources. Such noise sources may include but not be limited to railroads, racetracks, stadiums, aircraft overflights and similar uses.

GOAL N2: Promote noise compatible land uses within the 65 CNEL contour and the Frequent Overflight Area of Air Force Plant 42.

Objective N2.1: Ensure that land uses planned in the vicinity of Plant 42 will not be adversely affected by present and future noise levels expected to be generated by Plant 42.

Policy N2.1.1: Designate and permit land uses within the 65 CNEL contour and the Frequent Overflight Area which are primarily industrial, business park, commercial and recreational uses which are not noise sensitive; permit other uses only when it is found that no adverse noise impacts will result.

Policy N2.1.2: Restrict noise sensitive land uses (such as residential uses, churches, schools, rest homes, or similar uses) within areas designated as within both the 65 CNEL contour and the Frequent Overflight Area.

Policy N2.1.3: In areas which are outside of the 65 dBA CNEL contour but which are within the Frequent Overflight Area, encourage establishment of compatible uses to the extent feasible.

Policy N2.1.4: Through the development review process, require that all new projects within the Accident Potential Zone (APZ) of Air Force Plant 42 provide an avigation easement. A disclosure statement indicating that the property is subject to frequent overflight and aircraft noise should be required upon sale of property within the APZ.

Policy N2.1.5: Through conditions of approval, require that any owner of developed or undeveloped property within the 65 CNEL noise contour or the low altitude overflight area which is seeking a land use action from the City, provide an avigation easement to the Los Angeles Department of Airports, the U.S. Air Force, and the City.

Policy N2.1.6: Investigate various means of obtaining avigation easements from all properties within the 65 CNEL noise contour and the low altitude overflight area, and obtain those easements to the extent feasible.

SECTION 3: IMPLEMENTATION

Noise control programs involve federal, state, county and city agencies. Table N-2 highlights noise control responsibilities by agency. Other agencies are also involved with noise control; however, those identified in Table N-2 cover the major noise issues found in the City. Through these programs, the City will limit and regulate intrusive noises that accompany development and population growth.

A. Land Use Compatibility

Introduction

The City of Palmdale can achieve a noise compatible environment through comprehensive land use planning. Proposed developments are evaluated in terms of the projected impact from future noise sources and the application of the City's objectives and policies. The City's noise compatibility criteria by land use are summarized in Table N-4 and are consistent with both federal and state standards and guidelines. Proposed residential and other noise-sensitive projects impacted by a 65 dBA CNEL or greater would require additional acoustical analysis to achieve acceptable exterior noise levels. Acceptable interior noise levels of 45 dBA CNEL or less must also be achieved.

Noise-Sensitive Land Uses Defined

"Noise-sensitive land uses" include residential (single and multi-family dwellings, mobile home parks, dormitories, and similar uses); transient lodging (including hotels, motels, and similar uses); hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care; public or private educational facilities, libraries, churches, and places of public assembly. Each of these land uses is particularly susceptible to noise intrusions because of the nature of the use being made of the land, the expectation of the occupants regarding an appropriate noise environment, and because of the fact that, in most cases, these uses involve long-term exposure to the noise environment affecting the property. In other words, residential uses (both single-family and multi-family) involve situations where the residents have an expectation that their daily lives will not be exposed to excessive noise levels which interfere with normal residential activities, such as family conversations, entertaining, telephone use, watching television, and the ability to sleep uninterrupted by outside noise sources. Residential uses also are affected by long-term exposure to a localized noise environment, which can cause a cumulative level of "annoyance" among the residents because their continued exposure to the noise source(s) interferes with their normal expectations regarding an appropriate residential environment. These considerations

also apply to such uses as nursing homes, convalescent hospitals or other long-term medical care facilities.

Similarly, schools (public and private) are typically categorized as "noise sensitive uses" both because the students at a noise affected facility are exposed to continuing noise environment and because the noise is particularly inconsistent with the expected activity of the school - study and instructional conversation.

Some "noise sensitive uses" do not necessarily involve long-term exposure to a noise environment but are sensitive uses nevertheless because of the intended use of the facility and the expectation (or need) of the users for a quiet environment. Libraries and churches, for example, do not involve long-term exposure, since they are typically used only on a periodic basis by any given individual. Still, people using both libraries and places of worship have a reasonable expectation that they will be able to engage in the contemplative activities normally associated with these facilities free from excessive interruptions by external noise sources.

Other Land Uses

Other land uses are not "noise sensitive," or are substantially less sensitive to noise events than residential or other similar uses. This designation does not mean that some protection against noise intrusions is unnecessary or inappropriate for these uses; but these land uses differ from sensitive uses in many respects, and consequently in how they are affected by noise impact. In large part, there are differences in public expectations regarding the urban noise environment. For example, in commercial settings where noise is a factor, the public is present only for limited periods of time, and they have a choice as to whether to patronize any particular establishment. In industrial settings, interior noise levels from industrial or manufacturing operations are often high enough that exterior noise sources are not intrusive. Certain types of recreational uses are also substantially less "noise sensitive" (e.g., golf courses) because of the relative infrequency of use and the voluntary nature of public use of such facilities.

TABLE N-2

NOISE CONTROL RESPONSIBILITY BY ACTIVITY AND AGENCY[a]

Agency	Highway Noise	Aviation Noise	Occupational Noise	Construction Noise	Land Use Compatibility	Building Siting	Complaints	Research	Product Noise
Federal									
Department of Housing and Urban Development						X			
Department of Labor			X	X	X				
Environmental Protection Agency	X	X	X			X			X
Federal Aviation Administration	X								
Federal Highway Administration	X								
State									
Department of Health	X		X	X		X			X
Department of Transportation	X	X				X			
County of Los Angeles	X								
City of Palmdale									
City Council	X	X		X	X				
Building Department			X	X	X	X	X	X	
Planning Department	X	X	X					X	
Police Department			X						

In certain cases, there are potential land uses which are directly supportive of the activities of the facility which is the principal source of noise affecting the property. For example, there are many potential industrial, commercial, service and direct aviation support uses which could support not only the continued mission of Air Force Plant 42, but which would support and enhance the further development of that facility as a scheduled commercial air carrier facility. By directing these uses toward areas most seriously affected by noise from Air Force Plant 42, the City can allow reasonable economic use of property in the vicinity of the facility while simultaneously providing a buffer against noise intrusions into more noise sensitive areas and land uses. Encouraging development of these types of land uses in areas affected by significant and continuing noise sources, such as major arterial roadways, Air Force Plant 42, and rail yards, therefore offers the City significant planning opportunities and advantages.

For the City to achieve noise and land use compatibility, mitigation measures and/or restrictions should be imposed on future noise sensitive developments proposed within 65 dBA CNEL contours from transportation sources. The 45 dBA CNEL or less interior criteria for noise sensitive land uses must also be achieved. In addition, noise sensitive developments, proposed near existing stationary noise sources generating noise levels exceeding 65 dBA CNEL, should be discouraged.

These goals are also served by encouraging the development of compatible land uses in areas subject to continuing noise exposure from stationary or transportation sources. It is not the goal of the City to render the development of any private property economically infeasible, but to ensure that land uses are located appropriately in terms of noise sensitivity and the surrounding noise environment. Therefore, appropriate levels of protection for normally compatible uses have been established in consideration of the health and well-being of employees and the general public, as well as the need for the City to promote development uses on noise-affected properties which support the economic health and infrastructure of the entire community.

B. Acoustical Analysis Reports

The City will require acoustical analysis reports for those projects located within existing or future 60 dBA CNEL impact areas, areas subject to single-event noise episodes or as deemed necessary by the City. All acoustical analysis reports shall consider existing and future ambient and project related noise levels and shall be prepared by a qualified acoustical engineer with experience in environmental noise assessment and noise control design. Specifically, acoustical analysis reports shall include:

- Existing ambient and roadway noise levels recorded by a calibrated noise monitor.
- Roadway traffic noise level analysis models determining existing and future noise levels anticipated from proposed projects and related cumulative noise sources.
- Noise contour maps.
- Surrounding land uses with identification of sensitive noise receptors and noise sources.
- Impacts of the project to the existing ambient noise environment.
- Noise control measures where needed.
- Cumulative impacts due to related projects.
- Unavoidable adverse impacts to the project area.
- Assessment of Impacts from Single-Event Noise Episodes.

Acoustical analysis reports shall evaluate the impacts of the existing noise levels on the proposed project as well as the impact of the project on the existing noise environment. The Planning Department will evaluate projects to ensure that noise sensitive land uses, such as schools, hospitals, and residential developments, will not be located adjacent to sources of noise, when exceeding acceptable levels.

Where appropriate, the City will require acoustical analysis reports to include acoustical design for residential development adjacent to freeways or major arterials to achieve the appropriate interior and exterior noise levels through sound insulation, or other means, as indicated in Table N-3.

TABLE N-3

Land Use	Maximum Acceptable Levels Exterior	Interior	Scale
Residential			
SFR	65	45	dBA CNEL
MFR	65	45	dBA CNEL
MHP	65	45	dBA CNEL
Commercial including, but not limited to:	A noise level which does not jeopardize health, safety, and welfare of visitors.		
Retail		55	Leq(h)
Services		55	Leq(h)
Office		55	Leq(h)
Institutional including, but not limited to:	A noise level which does not jeopardize health, safety, and welfare of visitors.		
Schools		45	Leq(h)
Hospitals		45	Leq(h)
Nursing Homes		45	Leq(h)
Industrial including, but not limited to:	A noise level which does not interfere with normal business activity.		
Industrial Park		65	Leq(h)
Business Park		65	Leq(h)
Quarry	Maximum 65 Leq(h) at the interface with residentially designated land.	N/A	

Leq(h) The A-weighted equivalent sound level averaged over a period of "h" hours. An example would be Leq(12) where the equivalent sound level is the average over a specified 12-hour period (such as 7 a.m. to 7 p.m.). Typically, time period "h" is defined to match the hours of operation of a given type of use.

The Planning Department may require developments which will generate large congregations of people or maintain late nighttime hours to provide special mitigation measures, as indicated by the acoustical analysis.

C. Noise Ordinance

The City Municipal Code, Chapter 8.28 Building Construction Hours and Operation and Noise Control contains provisions that restrict construction between the hours of 8:00 p.m. and 6:30 a.m. and regulates the impact of offensive noise from sources such as loud parties. The City may elect to adopt a noise ordinance if deemed necessary in order to reduce potential health hazards associated with other high noise levels. Any such ordinance would establish noise impact thresholds for noise abatement and attenuation and would be compatible with state and federal standards. Noise

ordinances are typically directed at controlling noise from stationary sources and its intrusion onto adjacent properties. Enforcement of the noise ordinance would be an effective tool in controlling non-transportation noise sources. Federal and state laws regulate noise from transportation sources. *(General Plan Amendment 04-04, adopted by City Council July 26, 2004.)*

The Department of Building and Safety, the Planning Department, and the Sheriff's Department will work cooperatively to enforce the noise ordinance. The noise ordinance may include policies addressing the following issues:

- Land use compatibility.

- Restriction of hours of operation for construction equipment, power mowers, garbage collection, street sweeping, truck deliveries, leaf blowers, and other noise activities within the hours of 6:30 a.m. and 8:00 p.m., unless the work is made in response to an emergency or special purpose.

- Periodic investigation of noise sources throughout the City, with citations issued for offender, in addition to investigations conducted due to such complaints.

The Noise Ordinance shall set standards and penalties for violating the provisions contained therein. Penalties may range from warnings and monetary penalties to revocation of operating licenses for businesses.

D. General Plan Elements

The City will review other General Plan Elements for policies and programs relating to noise. Other General Plan Elements may provide important policy guidance to assist in decisions to ensure noise and land use compatibility. While all of the elements of the General Plan are related and interdependent to some degree, the Noise Element is most closely related to the Land Use, Housing, Circulation, and Environmental Resources Elements as shown in Exhibit N-1.

The objective of the Noise Element is to provide guidelines to achieve compatible land uses. The Land Use and Noise Elements are, therefore, closely related. The Noise Element, by identifying noise-sensitive land uses and establishing compatibility guidelines for land use and noise, will influence the general distribution, location, and intensity of future land use. Effective land use planning can alleviate noise problems.

Residential areas are one of the most noise-sensitive land uses. Therefore, the Housing Element is directly affected by the Noise Element. Enforcement of land use and noise compatibility guidelines can reduce noise impacts in residential locations. In addition, effective noise insulation in housing construction can mitigate exterior to interior noise intrusion.

The circulation system within a city is one of the major sources of noise. Therefore, the existing and future circulation system identified in the Circulation Element will greatly influence the noise environment. The circulation routes such as the freeway, highways, truck routes and the railroad should be located to minimize noise impacts upon noise-sensitive land use. The location and design of new transportation facilities and mitigation of noise from existing and planned facilities should be assessed in order to minimize noise impacts to the extent feasible.

Since noise can adversely affect the enjoyment of quiet outdoor activities, the Noise Element is also closely related to the Environmental Resources Element. Conversely, open space, or appropriate recreational uses, can be used as a noise buffer between incompatible land uses. Generally, the identification of development which is compatible with the local noise environment, and which allows property owners to realize beneficial use of their properties, is a preferred solution in the development of noise buffers between noise sources and land uses which are incompatible with the noise source. These techniques can reduce community noise impacts and also provide usable open space for recreation, or otherwise provide useful economic infrastructure and development without the need to acquire the property from the private land owner.

E. Joint Land Use Committee Policy Review

The City will review all new development applications for conformance with the Joint Land Use Committee (JLUC) policies relating to noise, as adopted by the Palmdale City Council on March 6, 1991. The JLUC policies were developed through the joint efforts of the City of Palmdale, the City of Lancaster and the United States (U. S.) Air Force to address basic air installation land use compatibility issues. These policies relate to both noise and safety issues; the safety related policies appear in the Safety Element of the General Plan. The General Plan Overlay Map shall identify the location of the 65 CNEL Contour and the Frequent Overflight Area for U. S. Air Force Plant 42.

APPENDIX C

Noise Monitoring Data and Traffic Counts

Ambient Noise Monitoring - Calculations

Monitoring Location	A	B	C	D	E	F
Nearby Receptor	---	R1	R2	R3	R4	R5
Monitoring Period	24 hour	5:50-9:50am	3:00-7:00pm	2:27-2:42pm	11:13-11:28pm	10:50-11:05am
CNEL						
CNEL	64.1	---	---	---	---	---
Leq (monitorng period)	---	61.1	60.6	35.7	46.7	33
Leq (Location A, monitoring period)	---	59.8	54.1	36.4	37.7	37.7
Correction Factor[1]	---	1.3	6.5	-0.7	9	-4.7
Corrected CNEL (A + Corr. Factor)	---	65.4	70.6	63.4	73.1	59.4
L_{50}						
Day Max L_{50} (7am-10pm	39.1	---	---	---	---	---
Night Max L_{50} (10pm - 7am)	39.3	---	---	---	---	---
L_{50} (monitorng period)	---	56.4	53.6	32.7	34.8	26.8
L_{50} (Location A, monitoring period)	---	36.7	34.8	34.7	35.2	34.9
Correction Factor[1]	---	19.7	18.8	-2	-0.4	-8.1
Corrected Day L_{50} (A + Corr. Factor)	---	58.8	57.9	37.1	38.7	31.0
Corrected Night L_{50} (A + Corr. Factor)	---	59.0	58.1	37.3	38.9	31.2

Summary

Receptor	CNEL (dBA)	Day L_{50} (dBA)	Night L_{50} (dBA)	Calculation Formula
R1	**65.4**	**58.8**	**59.0**	(B - A) + A
R2	**70.6**	47.9	**48.1**	(C - A) + A
R3	63.4	37.1	37.3	(D - A) + A
R4	**73.1**	38.7	38.9	(E - A) + A
R5	59.4	31.0	31.2	(F - A) + A
Threshold	65.0	50.0	45.0	---

[1] In order to determine the correction factor the Leq for the monitoring location of concern is compared to the Leq from the 24 hour measurement for the same time period. The difference in the values is the correction factor, which is then applied to the 24 hour measurement (which is in the desired units) to determine the receptor's noise level (in the desired units)

Noise Monitoring Event - Traffic Counts

Monitoring Location C - Avenue T
4:11 to 5:11 PM

Eastbound

Passenger:	104
Trucks:	5

Westbound

Passenger:	47
Trucks:	2

Monitoring Location B - Avenue T/106th Street Intersction
6:28 to 7:28 AM

Southbound

	Right Turn	Straight	Left Turn
Passenger:	22	42	18
Trucks:	0	2	1

Eastbound

	Right Turn	Straight	Left Turn
Passenger:	19	71	7
Trucks:	1	2	0

Westbound

	Right Turn	Straight	Left Turn
Passenger:	19	71	7
Trucks:	1	2	0

Northbound

	Right Turn	Straight	Left Turn
Passenger:	2	54	2
Trucks:	0	1	0

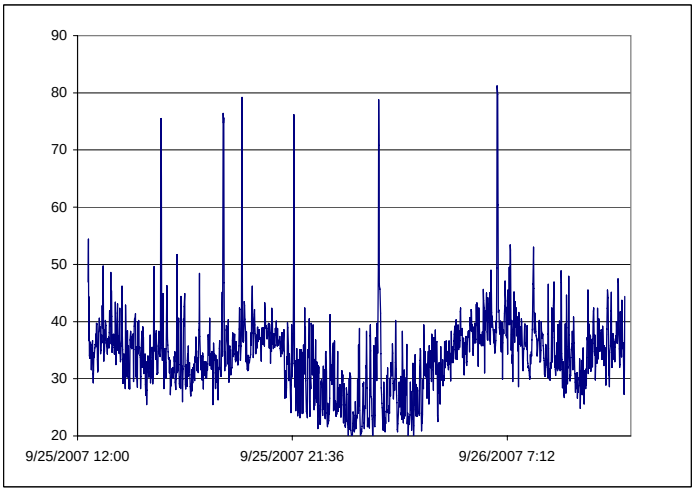
Monitoring Location A (24 Hour)

Noise monitoring data is originally recorded in LAeq and LA50.

Time	LAeq	CNEL	LA50	L50 (1hr)
9/25/2007 12:28	46.9	46.9	44.8	
9/25/2007 12:29	54.4	54.4	41.1	
9/25/2007 12:30	36.7	36.7	36	
9/25/2007 12:31	44.3	44.3	39.6	
9/25/2007 12:32	34.1	34.1	33.1	
9/25/2007 12:33	33.6	33.6	33.6	
9/25/2007 12:34	36.4	36.4	35	
9/25/2007 12:35	35.4	35.4	34.7	
9/25/2007 12:36	33.6	33.6	33.6	
9/25/2007 12:37	31.6	31.6	30.3	
9/25/2007 12:38	33.3	33.3	33.2	
9/25/2007 12:39	35.9	35.9	35.9	
9/25/2007 12:40	36.7	36.7	35.5	
9/25/2007 12:41	30.9	30.9	30.5	
9/25/2007 12:42	29.3	29.3	29.1	
9/25/2007 12:43	31.5	31.5	31.3	
9/25/2007 12:44	34.5	34.5	33.9	
9/25/2007 12:45	33.7	33.7	33.4	
9/25/2007 12:46	35.4	35.4	34.9	
9/25/2007 12:47	36	36	35.8	
9/25/2007 12:48	35.9	35.9	35.6	
9/25/2007 12:49	37.8	37.8	36.9	
9/25/2007 12:50	35.6	35.6	34.9	
9/25/2007 12:51	39.7	39.7	38.9	
9/25/2007 12:52	39.6	39.6	37.7	
9/25/2007 12:53	33.3	33.3	33.1	
9/25/2007 12:54	31.2	31.2	29.7	
9/25/2007 12:55	31.5	31.5	30.3	
9/25/2007 12:56	34.1	34.1	33.4	
9/25/2007 12:57	38.2	38.2	36.2	35.6
9/25/2007 12:58	40.6	40.6	38.6	35.6
9/25/2007 12:59	39.5	39.5	38.4	35.6
9/25/2007 13:00	38.4	38.4	37.1	35.6
9/25/2007 13:01	39.1	39.1	35.6	35.6
9/25/2007 13:02	34.4	34.4	34.4	35.65
9/25/2007 13:03	35	35	34.3	35.65
9/25/2007 13:04	37.7	37.7	37.6	35.75
9/25/2007 13:05	36.3	36.3	36.3	35.75
9/25/2007 13:06	42.8	42.8	41.7	35.8
9/25/2007 13:07	38.8	38.8	38	35.85
9/25/2007 13:08	43.5	43.5	38	35.85
9/25/2007 13:09	49.7	49.7	35.9	35.8
9/25/2007 13:10	33.1	33.1	32.8	35.8
9/25/2007 13:11	38.5	38.5	37.7	35.85
9/25/2007 13:12	34.7	34.7	33.8	35.95
9/25/2007 13:13	36.2	36.2	35	35.95
9/25/2007 13:14	36.8	36.8	35.3	35.95
9/25/2007 13:15	40.2	40.2	39.6	35.95
9/25/2007 13:16	39.3	39.3	38.1	36
9/25/2007 13:17	36.3	36.3	35.3	36.1
9/25/2007 13:18	35.9	35.9	35.7	36.1
9/25/2007 13:19	35.6	35.6	35.3	36.1
9/25/2007 13:20	34.3	34.3	33.8	36.1
9/25/2007 13:21	37	37	36.3	36
9/25/2007 13:22	36.7	36.7	36	36
9/25/2007 13:23	37.3	37.3	36.2	36.1
9/25/2007 13:24	35.4	35.4	35.2	36.1
9/25/2007 13:25	38.1	38.1	37.9	36.1
9/25/2007 13:26	41.9	41.9	41.5	36.1
9/25/2007 13:27	41.9	41.9	41.1	36
9/25/2007 13:28	39.2	39.2	38.4	35.95
9/25/2007 13:29	48.6	48.6	35.8	35.95
9/25/2007 13:30	36.1	36.1	36	35.95
9/25/2007 13:31	45.4	45.4	43.6	35.95
9/25/2007 13:32	40.9	40.9	38.1	35.95
9/25/2007 13:33	34.6	34.6	34.2	35.95
9/25/2007 13:34	37.7	37.7	36.5	35.85
9/25/2007 13:35	35.9	35.9	35.1	35.75
9/25/2007 13:36	36.3	36.3	36.3	35.5
9/25/2007 13:37	37.8	37.8	36.8	35.3
9/25/2007 13:38	35.5	35.5	35.2	35.3
9/25/2007 13:39	34.3	34.3	31.8	35.3
9/25/2007 13:40	36.4	36.4	34.6	35.3
9/25/2007 13:41	43.4	43.4	42.4	35.25
9/25/2007 13:42	38.7	38.7	37.3	35.25
9/25/2007 13:43	32.5	32.5	32.2	35.25
9/25/2007 13:44	35	35	33.1	35.25
9/25/2007 13:45	37.8	37.8	35.3	35.2
9/25/2007 13:46	41.5	41.5	39	35.15
9/25/2007 13:47	43.1	43.1	38.1	35.1
9/25/2007 13:48	35	35	32.8	34.85
9/25/2007 13:49	37.5	37.5	36.9	34.4

Results

For comparison to B	59.8 Leq	5:50-9:50am
For comparison to B	36.7 L50	5:50-9:50am
For comparison to E	37.7 Leq	11:13-11:28pm
For comparison to E	35.2 L50	11:13-11:28pm
For comparison to F	37.7 Leq	10:50-11:05am
For comparison to F	34.9 L50	10:50-11:05am
CNEL:	64.1	
Max L50 Day	39.1	
Max L50 Night	39.3	



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Monitoring Location A (8 hour)

Noise monitoring data is originally recorded in LAeq and LA50.

Time	LAeq	LA50
9/24/2007 11:37	50.2	49.1
9/24/2007 11:38	47.5	45.4
9/24/2007 11:39	42.9	40.9
9/24/2007 11:40	47.2	44.2
9/24/2007 11:41	56.9	50.4
9/24/2007 11:42	40.3	38.4
9/24/2007 11:43	37.3	33.5
9/24/2007 11:44	41.9	38.6
9/24/2007 11:45	42.4	39.5
9/24/2007 11:46	45.8	43.8
9/24/2007 11:47	37.3	36.3
9/24/2007 11:48	38	36.2
9/24/2007 11:49	39.5	38.5
9/24/2007 11:50	40.2	38.3
9/24/2007 11:51	37.2	35.7
9/24/2007 11:52	31.7	30.6
9/24/2007 11:53	30.7	30
9/24/2007 11:54	39.9	33.6
9/24/2007 11:55	39.4	38.1
9/24/2007 11:56	30.5	30
9/24/2007 11:57	44	35.5
9/24/2007 11:58	34.6	33.6
9/24/2007 11:59	38.3	36.4
9/24/2007 12:00	35.5	29.3
9/24/2007 12:01	33.4	30.9
9/24/2007 12:02	32.8	31.2
9/24/2007 12:03	40.3	36.8
9/24/2007 12:04	42.7	41.5
9/24/2007 12:05	50	42.2
9/24/2007 12:06	42.5	42
9/24/2007 12:07	41.7	39.8
9/24/2007 12:08	37	34.1
9/24/2007 12:09	39.4	37.8
9/24/2007 12:10	28.6	26.8
9/24/2007 12:11	27.8	26.9
9/24/2007 12:12	33.3	30.5
9/24/2007 12:13	33	31.2
9/24/2007 12:14	31.9	27.8
9/24/2007 12:15	28.6	28.4
9/24/2007 12:16	42.6	38.2
9/24/2007 12:17	33.3	32.7
9/24/2007 12:18	36	35.5
9/24/2007 12:19	33.1	32.4
9/24/2007 12:20	36.1	34.3
9/24/2007 12:21	37.3	36.9
9/24/2007 12:22	41.2	37.9
9/24/2007 12:23	37	34.8
9/24/2007 12:24	31.1	30.6
9/24/2007 12:25	29.1	28.8
9/24/2007 12:26	35.1	34.9
9/24/2007 12:27	38.4	33.2
9/24/2007 12:28	39.5	36
9/24/2007 12:29	44.1	40
9/24/2007 12:30	36.2	32.2
9/24/2007 12:31	37.2	35.4
9/24/2007 12:32	33.4	31.7
9/24/2007 12:33	36.4	35.8
9/24/2007 12:34	38.2	36.7
9/24/2007 12:35	36.9	35.7
9/24/2007 12:36	43.5	35.2
9/24/2007 12:37	43.1	41
9/24/2007 12:38	39.4	38.2
9/24/2007 12:39	32.4	29.7
9/24/2007 12:40	29.2	27
9/24/2007 12:41	32	31.5
9/24/2007 12:42	31.2	27.8
9/24/2007 12:43	41.6	40.4

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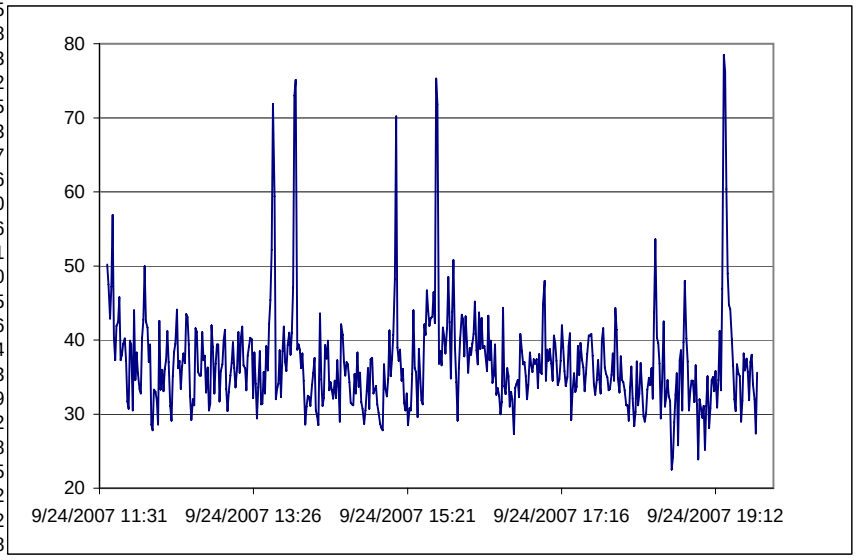
Results

For comparison to C	54.1	Leq	3:00-7:00pm
For comparison to C	34.8	L50	3:00-7:00pm
For comparison to D	36.4	Leq	2:27-2:42pm
For comparison to D	34.7	L50	2:27-2:42pm



Monitoring Location B (4 Hour AM Peak)

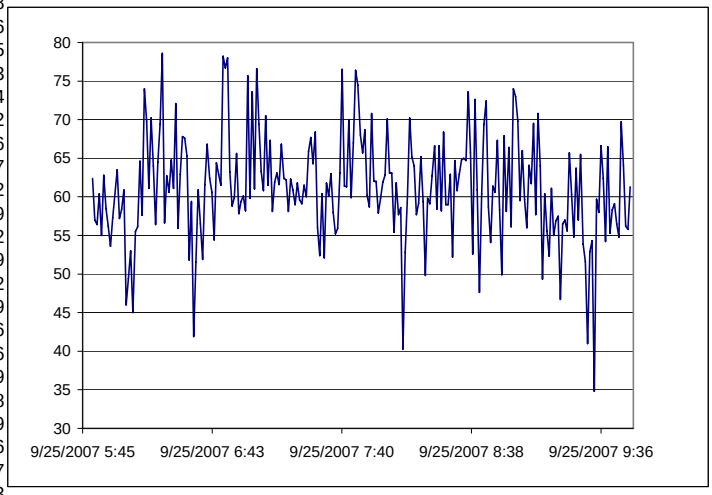
Receptor R1

Noise monitoring data is originally recorded in LAeq and LA50.

Time	LAeq	LA50
9/25/2007 5:50	62.4	57.6
9/25/2007 5:51	57	55.1
9/25/2007 5:52	56.4	53.2
9/25/2007 5:53	60.4	59.6
9/25/2007 5:54	55	52.7
9/25/2007 5:55	62.8	56.8
9/25/2007 5:56	58.5	50.6
9/25/2007 5:57	56.2	52.5
9/25/2007 5:58	53.6	52.3
9/25/2007 5:59	57.3	53.4
9/25/2007 6:00	60.4	59.2
9/25/2007 6:01	63.5	60.6
9/25/2007 6:02	57.2	55.7
9/25/2007 6:03	58.4	57.2
9/25/2007 6:04	60.9	48.9
9/25/2007 6:05	46	41.2
9/25/2007 6:06	49.4	46.9
9/25/2007 6:07	53	48.2
9/25/2007 6:08	45	42.9
9/25/2007 6:09	55.5	50.6
9/25/2007 6:10	56.1	50.6
9/25/2007 6:11	64.6	55.9
9/25/2007 6:12	57.6	55.8
9/25/2007 6:13	74	53.9
9/25/2007 6:14	69.8	66
9/25/2007 6:15	61.1	57.7
9/25/2007 6:16	70.2	64.3
9/25/2007 6:17	64	56.9
9/25/2007 6:18	56.4	54.9
9/25/2007 6:19	64.5	59.8
9/25/2007 6:20	69.4	66.7
9/25/2007 6:21	78.6	63.5
9/25/2007 6:22	56.6	56.4
9/25/2007 6:23	62.7	59.3
9/25/2007 6:24	60.6	59.6
9/25/2007 6:25	64.8	62.5
9/25/2007 6:26	61.1	60.4
9/25/2007 6:27	72.1	60.3
9/25/2007 6:28	55.9	52.3
9/25/2007 6:29	62.9	55.2
9/25/2007 6:30	67.8	63.1
9/25/2007 6:31	67.6	61
9/25/2007 6:32	65.3	59.2
9/25/2007 6:33	51.8	47.2
9/25/2007 6:34	59.4	53.3
9/25/2007 6:35	41.9	41.2
9/25/2007 6:36	51.5	50.7
9/25/2007 6:37	60.9	60.1
9/25/2007 6:38	56.5	55
9/25/2007 6:39	51.9	50.7
9/25/2007 6:40	61.6	58.7
9/25/2007 6:41	66.8	56
9/25/2007 6:42	62.4	59.9
9/25/2007 6:43	60.6	58.8
9/25/2007 6:44	54.4	53.5
9/25/2007 6:45	64.4	61.4
9/25/2007 6:46	62.9	59.3
9/25/2007 6:47	61.5	60.7
9/25/2007 6:48	78.2	63.3
9/25/2007 6:49	76.7	76.5
9/25/2007 6:50	78	76.5
9/25/2007 6:51	63.2	58.5
9/25/2007 6:52	58.8	57.9
9/25/2007 6:53	59.9	57.8
9/25/2007 6:54	65.6	61.7
9/25/2007 6:55	57.8	56.1
9/25/2007 6:56	59.4	51.8
9/25/2007 6:57	60.1	56.2

Results

Leq	61.1
LA50	56.4



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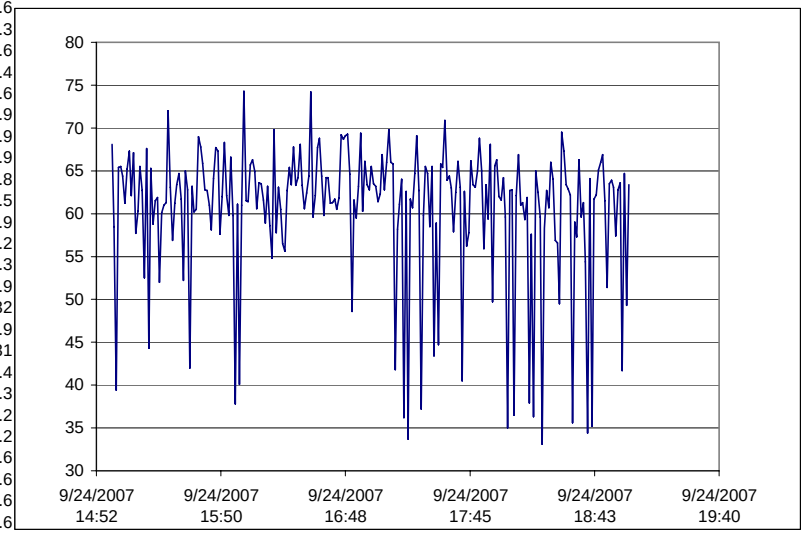
Monitoring Location C (4 Hour PM Peak)
Receptor R2
Noise monitoring data is originally recorded in LAeq and LA50.

Time	LAeq	LA50
9/24/2007 15:00	68.1	61.2
9/24/2007 15:01	58.5	41
9/24/2007 15:02	39.4	27.8
9/24/2007 15:03	65.4	53.6
9/24/2007 15:04	65.5	47.3
9/24/2007 15:05	64.4	42.6
9/24/2007 15:06	61.2	33.4
9/24/2007 15:07	65.2	51.6
9/24/2007 15:08	67.3	48.9
9/24/2007 15:09	62.1	39.9
9/24/2007 15:10	67.1	60.9
9/24/2007 15:11	57.7	38.8
9/24/2007 15:12	60.3	41.5
9/24/2007 15:13	65.5	45.9
9/24/2007 15:14	62.7	46.2
9/24/2007 15:15	52.5	35.3
9/24/2007 15:16	67.6	55.9
9/24/2007 15:17	44.3	32
9/24/2007 15:18	65.3	39.9
9/24/2007 15:19	58.8	31
9/24/2007 15:20	61.5	41.4
9/24/2007 15:21	61.9	44.3
9/24/2007 15:22	52	29.2
9/24/2007 15:23	60.1	35.2
9/24/2007 15:24	61	31.6
9/24/2007 15:25	61.3	40.6
9/24/2007 15:26	72	55.6
9/24/2007 15:27	63.1	36.6
9/24/2007 15:28	56.9	40.6
9/24/2007 15:29	61.2	32.5
9/24/2007 15:30	63.4	41.4
9/24/2007 15:31	64.7	46.1
9/24/2007 15:32	61.7	39.5
9/24/2007 15:33	52.2	31.3
9/24/2007 15:34	65	52.1
9/24/2007 15:35	62.8	54.6
9/24/2007 15:36	42	39.3
9/24/2007 15:37	63.2	42.8
9/24/2007 15:38	60.2	40.8
9/24/2007 15:39	60.5	42.9
9/24/2007 15:40	69	51.9
9/24/2007 15:41	67.8	59.5
9/24/2007 15:42	65.9	55.8
9/24/2007 15:43	62.8	47.9
9/24/2007 15:44	62.7	48.8
9/24/2007 15:45	61	44.2
9/24/2007 15:46	58.1	36.6
9/24/2007 15:47	64.1	45.6
9/24/2007 15:48	67.7	41.9
9/24/2007 15:49	67.3	40.9
9/24/2007 15:50	57.6	45.2
9/24/2007 15:51	62	53.8
9/24/2007 15:52	68.3	57.8
9/24/2007 15:53	62.1	41.7
9/24/2007 15:54	59.8	38.6
9/24/2007 15:55	66.6	55.6
9/24/2007 15:56	59.8	40.7
9/24/2007 15:57	37.8	37.1
9/24/2007 15:58	61.1	37
9/24/2007 15:59	40.1	38.5
9/24/2007 16:00	61	43.1
9/24/2007 16:01	74.3	54.1
9/24/2007 16:02	61.5	48.6
9/24/2007 16:03	61.4	47.4
9/24/2007 16:04	65.7	48.7
9/24/2007 16:05	66.3	54.6
9/24/2007 16:06	64.9	33
9/24/2007 16:07	60.6	50.4
9/24/2007 16:08	63.6	43.3
9/24/2007 16:09	63.5	45.8
9/24/2007 16:10	61.6	46
9/24/2007 16:11	58.9	42.4
9/24/2007 16:12	63.2	48

Results

Leq(3-7pm)	60.6
LA50	43.6



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Monitoring Location D (15 Minute)
Receptor R3

Noise monitoring data is originally recorded in LAeq and LA50.

Time	LAeq	LA50
9/24/2007 14:27	36.2	33.3
9/24/2007 14:28	40.8	35
9/24/2007 14:29	41.6	38.4
9/24/2007 14:30	34.7	33.1
9/24/2007 14:31	30.1	28.6
9/24/2007 14:32	31.3	30.5
9/24/2007 14:33	29.3	29
9/24/2007 14:34	29	28.8
9/24/2007 14:35	30.7	30
9/24/2007 14:36	33.1	31.1
9/24/2007 14:37	34	33.1
9/24/2007 14:38	37.4	35.5
9/24/2007 14:39	31.1	30.9
9/24/2007 14:40	36.7	36.8
9/24/2007 14:41	32.5	32.2
9/24/2007 14:42	34.8	33.5
average:	**33.8**	

Results

Leq	35.7
L50	32.7

Monitoring Location E (Minute)
Receptor R4

Noise monitoring data is originally recorded in LAeq and LA50.

Time	LAeq	LA50
9/25/2007 11:13	35.1	33.1
9/25/2007 11:14	36.3	33.8
9/25/2007 11:15	37.5	34.8
9/25/2007 11:16	43.7	37.7
9/25/2007 11:17	37.8	36.2
9/25/2007 11:18	34.1	33.9
9/25/2007 11:19	34	33.7
9/25/2007 11:20	35	35
9/25/2007 11:21	46.2	43.9
9/25/2007 11:22	56.9	55.5
9/25/2007 11:23	49.4	48.3
9/25/2007 11:24	43.5	41
9/25/2007 11:25	34.3	34
9/25/2007 11:26	32.6	32.5
9/25/2007 11:27	33.2	33
average	**39.3**	

Results

Leq	46.7
L50	34.8

Monitoring Location F (Minute)
Receptor R5
Noise monitoring data is originally recorded in LAeq and LA50.

Time	LAeq	LA50
9/25/2007 10:50	29.1	26.2
9/25/2007 10:51	27.9	25
9/25/2007 10:52	28.7	26
9/25/2007 10:53	36.4	35.2
9/25/2007 10:54	32.5	26.3
9/25/2007 10:55	30.1	28.2
9/25/2007 10:56	27.4	27
9/25/2007 10:57	38.5	33.8
9/25/2007 10:58	34	33
9/25/2007 10:59	25.8	25
9/25/2007 11:00	28.9	26.8
9/25/2007 11:01	30.2	29
9/25/2007 11:02	28.9	22.8
9/25/2007 11:03	32.8	25.8
9/25/2007 11:04	37.7	35.9
average	**31.3**	

Results

Leq	33.0
L50	26.8

APPENDIX D

Source and Receptor Calculations

Noise Impact Summary

Industrial Source Impacts (as predicted by SoundPLAN Essential)

Phase 2 - Initial Conditions		Day (dBA)					Night (dBA)				
Receptor	**Location**	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}	L_{max}	$L_{1.7}$	$L_{8.3}$	L_{25}	L_{50}
R1	Ave. T / 106th St.	38.1	37.3	35.0	32.3	31.8	35.9	35.2	33.3	30.8	30.4
R2	Along Ave. T	46.3	45.5	43.3	40.6	40.1	44.3	43.5	41.7	39.1	38.8
R3	West of Project	52.7	51.9	49.4	46.7	46.1	49.4	48.6	46.8	44.2	43.9
R4	East of Project	58.7	57.8	55.3	52.5	**51.9**	56.2	55.4	53.2	**50.5**	**50.1**
R5	South of R4	53.1	52.1	49.6	46.8	46.1	49.6	48.8	46.7	44.1	43.6
---	Threshold	70.0	65.0	60.0	55.0	50.0	65.0	60.0	55.0	50.0	45.0

Transportation Source Impacts (as predicted by the Traffic Noise Model)

Parameter	R1	R2	R3	R4	R5
CNEL	59.0	61.9	41.1	40.3	36.8
Threshold	65.4	70.6	65.0	73.1	65.0
Significant?	No	No	No	No	No

Industrial Noise Sources - Inputs

			Sound Pressure Level (dBA)					
Facility	**Sources**	**Height (m)**	**Dist. (ft)**	**L_{max}**	**$L_{1.7}$**	**$L_{8.3}$**	**L_{25}**	**L_{50}**
Rock Crushing Plant - Plant Area	Agg Plant Two Loaders Dumping Trucks Loading Trucks	5	150	86.0	85.0	82.0	79.0	78.0
Rock Crushing Plant - Pit Area	Agg Plant Two Loaders Dumping Trucks Loading Trucks	5	150	86.0	85.0	82.0	79.0	78.0
Asphalt Plant	Asphalt Plant Asphalt Trucks	5	50	80.0	80.0	80.0	80.0	80.0
RMC Plant	RMC Plant Concrete Trucks	5	100	85.0	84.5	83.5	81.0	81.0
Vac-Lite Plant	Vac-Lite Plant Trucks	5	100	85.0	84.5	83.5	81.0	81.0

			Sound Pressure Level @ 50' (dBA)					Sound Power Level (dBA)				
Facility	**Sources**	**Height (m)**	**L_{max}**	**$L_{1.7}$**	**$L_{8.3}$**	**L_{25}**	**L_{50}**	**L_{max}**	**$L_{1.7}$**	**$L_{8.3}$**	**L_{25}**	**L_{50}**
Rock Crushing Plant - Plant Area	Agg Plant Two Loaders Dumping Trucks Loading Trucks	5	95.5	94.5	91.5	88.5	87.5	127.3	126.3	123.3	120.3	119.3
Rock Crushing Plant - Pit Area	Agg Plant Two Loaders Dumping Trucks Loading Trucks	5	95.5	94.5	91.5	88.5	87.5	127.3	126.3	123.3	120.3	119.3
Asphalt Plant	Asphalt Plant Asphalt Trucks	5	80.0	80.0	80.0	80.0	80.0	111.8	111.8	111.8	111.8	111.8
RMC Plant	RMC Plant Concrete Trucks	5	86.0	86.0	86.0	86.0	86.0	117.8	117.8	117.8	117.8	117.8
Vac-Lite Plant	Vac-Lite Plant Trucks	5	91.0	90.5	89.5	87.0	87.0	122.8	122.3	121.3	118.8	118.8

Day/Night Activity

Source	Day	Night
Pit Plant	x	
Plant Agg Plant	x	x
RMC	x	x
HMA	x	x
Vac-Lite	x	x

Source Data from Robertson Ready Mix EIR (7/2000). The most conservative (i.e. highest) measurement used for each source, except for the RMC plant which is an average of the measurements because one measurement was made while concrete trucks were reving their engines. The Vac-Lite Plant is assumed to have a sound pressure level equal to the RMC plant.
Sound Power Level determined using SoundPLAN Essential 1.0.

Transporation Noise Source - Impact Calculations

TNM Model Results (Leq1hr dBA)

Parameter	R1	R2	R3	R4	R5
Modeled Results	56.1	59	38.2	37.4	33.9
Calibrated Results	52.3	55.2	34.4	33.6	30.1

CNEL Calculation

Time Period		R1		R2		R3		R4		R5	
Start	Finish	Leq Impact	Total Leq'	Leq Impact	Total Leq'	Leq Impact	Total Leq'	Leq Impact	Total Leq'	Leq Impact	Total Leq'
0:00	1:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
1:00	2:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
2:00	3:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
3:00	4:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
4:00	5:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
5:00	6:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
6:00	7:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
7:00	8:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
8:00	9:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
9:00	10:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
10:00	11:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
11:00	12:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
12:00	13:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
13:00	14:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
14:00	15:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
15:00	16:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
16:00	17:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
17:00	18:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
18:00	19:00	52.3	52.3	55.2	55.2	34.4	34.4	33.6	33.6	30.1	30.1
19:00	20:00	52.3	57.3	55.2	60.2	34.4	39.4	33.6	38.6	30.1	35.1
20:00	21:00	52.3	57.3	55.2	60.2	34.4	39.4	33.6	38.6	30.1	35.1
21:00	22:00	52.3	57.3	55.2	60.2	34.4	39.4	33.6	38.6	30.1	35.1
22:00	23:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
23:00	0:00	52.3	62.3	55.2	65.2	34.4	44.4	33.6	43.6	30.1	40.1
Total CNEL:			**59.0**		**61.9**		**41.1**		**40.3**		**36.8**

Transportation Noise Sources - Inputs

Road Source	Description	Peak Day Haul Trips (trips/day)	Peak Day Passenger Trips (trips/day)	Hourly Haul Trips[1] (trips/hour)	Hourly Passenger Trips[1] (trips/hour)
Avenue T West	Project Entrance to 106th Street	241	312	10	13
106th Street	South of Avenue T	241	312	10	13
Avenue T East	Project Entrance to 106th Street	60	0	3	0
Project Entrance	Avenue T to Plant Area	301	312	13	13

TNM Model Input Parameters
Road Width = 6m
Haul Truck Travel Speed Offsite = 55 mph
Automobile Travel Speed Offsite = 65 mph
All Vehicle Travel Onsite = 15 mph
Stop signs at Avenue T/106th Street Intersection and when exiting the site
Average Pavement Type

[1] Hourly trips are based on the average hour of the peak day

Transportation Noise Sources - Model Calibration

Avenue T Calibration

Input Data

Road	Segment	Automobiles/Hour	Trucks/Hour
Avenue T	West of Project	151	7
Avenue T	East of Project	151	7

Result

Reciever	Model (dBA)	Monitored (dBA)	Difference (dBA)
20' from Road	69.4	63.4	**6.0**
At Project 24 Hour Measurement	40.5	36.7	**3.8**

Interesection of Avenue T and 106th Street Calibration

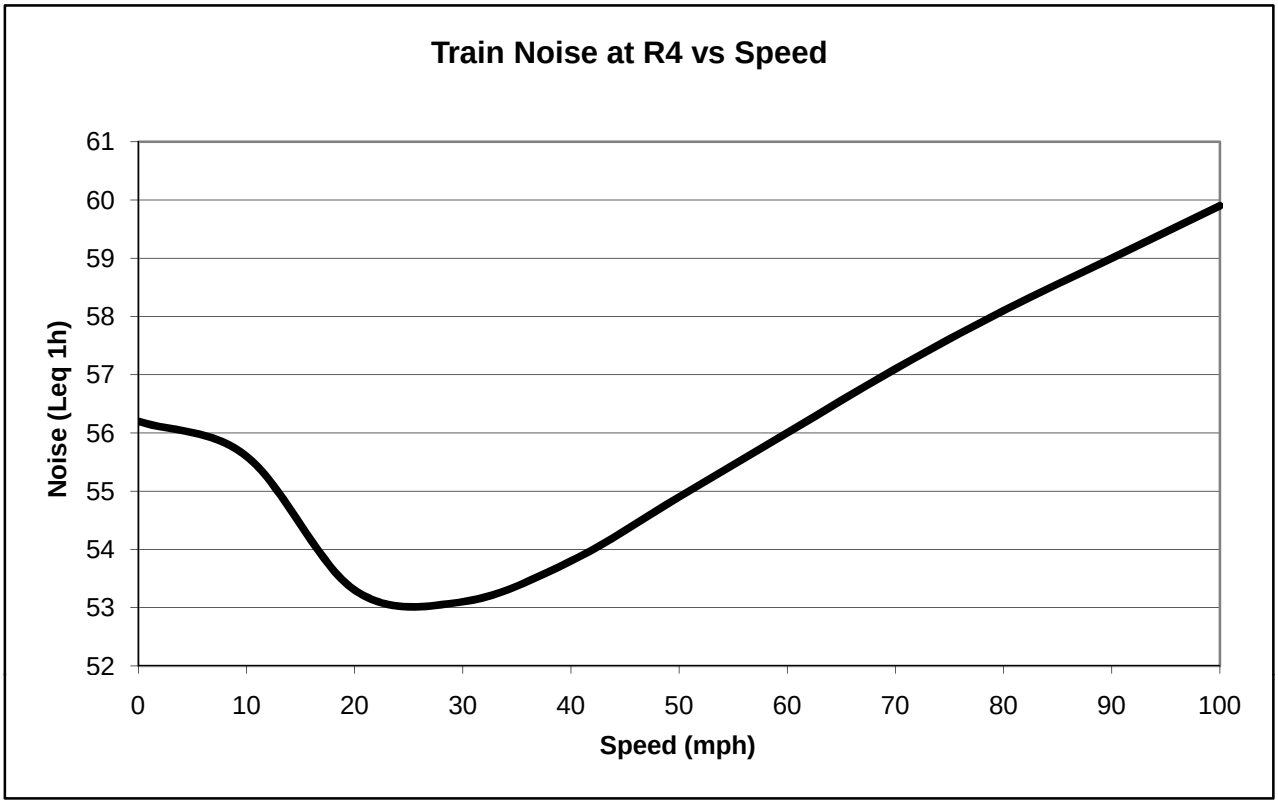
Input Data

Road	Segment	Automobiles/Hour	Trucks/Hour
Avenue T	East of 106th St	145	5
Avenue T	West of 106th St	151	7
106th Street	South of Ave T	111	6
106th Street	North of Ave T	192	5

Result

Reciever	Model (dBA)	Monitored (dBA)	Difference (dBA)
Near Intersection	68.3	62.8	**5.5**

Transportation Noise Sources - Train Noise



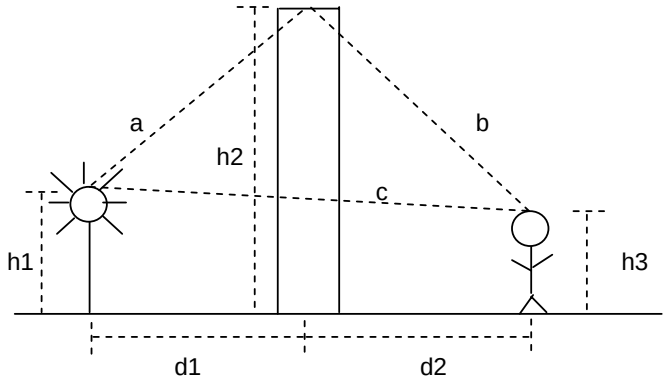
APPENDIX E

Noise Mitigation Calculations

Insertion Loss of a Barrier

Calculation is for a sound wall, however, page N-156 of the CalTrans Technical Noise Supplement (October 1998) says:
"Given the same site cross section, distance between source and receiver, and barrier height, a berm allows a greater attenuation than the thin screen (wedge), such as a sound wall. Although the FHWA assumes a 3 dBA more attenuation for the berm than the thin screen, the actual extra attenuation may be somewhere between 1 and 3 dBA."

User Inputs			Equation	Definition	Elevation		Height
h1 =	2882	ft		h1 is the height of the source =	2867	+	15
h2 =	**2897**	**ft**		**h2 is the height of the barrier =**	2890	+	**7**
h3 =	2896	ft		h3 is the height of the receptor =	2890	+	6
d1 =	2400	ft		d1 is the horizontal distance from the source to the barrier			
d2 =	100	ft		d2 is the horizontal distance from the barrier to the receiver			
f =	1000	Hz	$f = c / \lambda$	f is frequency. 550 Hz is appropriate for highway traffic noise and 2,000 is appropriate for crushing/screening			



Picture is for reference purposes and is not drawn to scale

Constants

c=	1126.5	ft/s	Speed of sound
k=	1		Correction factor for atmospheric effects (1 for < 100m)

Calculated Numbers

d =	2500		d is the horizontal distance from the source to the receiver
a =	2400.0		a is the distance from the source to the top of the barrier
b =	100.0		b is the distance from the top of the barrier to the receiver
c =	2500.0		c is the distance from the source to the receiver
δ =	0.0	δ = a+b-c	δ is the path length difference
No =	0.02	No = 2*f*δ/c	No is the Fresnel Number

Resulting Insertion Loss

IL =	5.1	IL = 10log(3+10NoK)	ISO 9613-2 method

APPENDIX F

Noise Modeling Files

APPENDIX 8 ADDENDUM

Noise Impact Assessment Addendum

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2010 DRAINAGE CONCEPT

Drainage Concept for Lebata Inc. Surface Mine,
Lowered Facilities Alternative

Big Rock Creek, Los Angeles County

FINAL

Prepared Under the Supervision of:

_____

James F. Reilly, P.E., Supervising Engineer

JULY 2010

STETSON ENGINEERS INC.
San Rafael and West Covina, California
Mesa, Arizona

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Appendix A – Miscellaneous Calculations

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

In December 2008, Stetson Engineers (Stetson) prepared a drainage report, entitled "Drainage Concept for Lebata Inc. Surface Mine"(2008 Report), and 14-sheet Drainage Plans for the proposed Lebata Inc mine site located on the Big Rock Creek alluvial fan near Pearblossom[1]. Since then, the California Department of Transportation (Caltrans) has completed improvements to Pearblossom Highway which crosses the Big Rock alluvial fan in an east-west direction about 1.5 mile upstream from the Lebata mine site (Refer to Figure 1 for the Project site location).

Recently, a new mining alternative, referred to as the Lowered Facilities Alternative, was proposed. The purpose of this drainage concept report (2010 Report) is to describe and analyze the drainage concept for this new mining alternative. This drainage concept accounts for the effects that Caltrans' recently-completed improvements in 2009 to Pearblossom Highway would have on flood flows reaching the mine site. In general, the technical terms and methods used in this 2010 Report are the same as the 2008 Report. Detailed information about the technical terms and methods would need to refer to the 2008 Report.

The drainage concepts provided in the 2008 Report for the original project alternatives (Project Alternative and Alternative 1) did not consider the effects that Caltrans' recently-completed improvements to Pearblossom Highway would have on flood flows reaching the mine site. However, since the improvements to Pearblossom Highway would intercept and reduce the amount of Capital Flood flow entering the site (will be discussed later), the carrying capacity of the designed drainage facilities and the estimated pit emptying time for the original project and alternative discussed in the 2008 Report are considered to be conservative. Accordingly, the drainage concept analyses and designs for the original project alternatives provided in the 2008

[1] Examination of the Federal Emergency Management Agency (FEMA)'s effective Flood Insurance Rate Map (FIRM) shows that a portion of the proposed mine site is within the FEMA's Flood Zone A (Figure 2) mapped by approximate methods. Examination of the Floodplain Management Paths (FMPs) outlined in the Antelope Valley Comprehensive Plan for Flood Control and Water Conservation shows that the proposed mine site is not within the FMP limits. The FMP is analogous to the FEMA floodway, within which encroachment activities including fill, new construction, substantial improvements, and other development, are prohibited unless it has been demonstrated through hydrologic and hydraulic analyses that the proposed encroachment would not result in any increase in base flood water levels.

Report were not updated to account for the effects of the Pearblossom Highway improvements on flood flows reaching the mine site.

1.2 LOWERED FACILITIES ALTERNATIVE ANALYZED IN THIS REPORT

There are a total of three mining alternatives for the proposed mine site. The two original alternatives, Project Alternative and Alternative 1, are covered in the 2008 Report. The newly proposed alternative, referred to as the Lowered Facilities Alternative, is as follows:

Lowered Facilities Alternative conforms to LA County's proposed 750-foot radius alignment of the extension of Longview Road. The site would be mined to a depth of 80 feet below ground surface, with the upper 65 feet cut sloped at 1H:1V and the last 15 feet cut sloped at 2H:1V (Fugro, 2010). The upper 65 feet of cut slope would be back filled using spoil materials and the lower 15 feet of cut slope would remain as native materials. Leaving the lower 15 feet of cut slope as native materials would facilitate the pit emptying during the Capital Flood because the native materials have a much higher permeability than the spoil materials. The required 15 feet height of native materials along the mine slope is determined based on the estimated inundation depth for the Capital Flood (to be discussed later). Terraces would be established at 30-foot depth intervals on the final 2H: 1V fill slope with the side slope between terraces at about 1.85H:1V (Bryant, August 22, 2008).

The mine would be developed in four phases (refer to the attached Drainage Plans):

- Pre-production Phase is a temporary phase which would involve mining of the plant area to a depth of 25 feet, grading a notch through the roadway alignment and a small portion of the pit bottom immediately south of the notch to a depth of 80 feet, and grading the rail facility bench to a depth of 25 feet. Details of mining area and setback are shown on Drainage Plan Sheet 1 (Grading). The pre-production phase is a temporary phase which involves only mining of a relatively small area for a short period of time. For this reason, drainage facilities to intercept Capital Flood are not included in this drainage concept report.
- Phase 1 would involve mining of the remaining acreage south of the roadway alignment and north of the rail facility bench area of the North Pit to a depth of 80 feet. The plant area and the railway facility bench area would remain at a depth of 25 feet and 25 feet, respectively. Details of mining area and setback are shown in Drainage Plan Sheet 2.

- Phase 2 would involve mining of the entire South Pit to a depth of 80 feet. Details of mining area and setback are shown in Drainage Plan Sheet 3.
- Final Reclamation would involve filling the notch in the roadway alignment and east side of roadway alignment in the North Pit to restore the 750-foot road prism and requisite setbacks. The details of mining area and setback are shown in Drainage Plan Sheets 4-5.

1.3 SUMMARY OF THE DRAINAGE CONCEPT

The drainage system is designed in accordance with the LA County's Grading Guidelines, dated January 2008. The completed mine pits would intercept the entire Capital Flood discharge via a system of interceptor drains and convey the water to the bottom of the pits via a system of down drains and terrace drains. Interceptor drains would be located along the top of the mine pits to collect Capital Flood overflows[2] and local sheetflows and deliver these flows to down drains, which convey flows down the 2H:1V side slopes to the bottom of the mine pit. Terrace drains would be constructed on the pit slopes to capture runoff generated by the pit slopes and prevent slope surface erosion. The following is a summary of hydrologic and hydraulic design considerations:

- All on-site runoff and off-site runoff that enters the project site during the Capital Flood event are collected and conveyed to the mining pits for infiltration without any overflow to downstream of the mine site. The mining pits could be emptied via infiltration within 4 days after the Capital Flood event. The project would have no adverse impact on properties adjacent to and downstream of the mine site.
- To prevent sedimentation, the 2008 LA County Grading Guidelines require that the slope of interceptor drains be not less than 2 percent (%). In cases where this ≥2% slope requirement can not be practically met due to the natural slope of the mine site, analysis was conducted to verify that these interceptor drains have sufficient flow velocities to prevent sedimentation.
- Interceptor drains were designed to have a 1-foot standard minimum depth and a minimum width of 3 feet at the inlet with 1.5H:1V side slopes, in accordance with the 2008 LA County Grading Guidelines.

[2] Capital Flood overflow is the worse case overflow from the Big Rock Creek main channel near the mountain front cross section that flows onto the mine site via the relict "apex braid" in the event of complete failure of the flood control levee near the mountain front.

- All down drains were designed in accordance with the minimum dimensions (1.5 foot depth and 3 foot width) provided in the 2008 Los Angeles County Grading Guidelines. Energy dissipators at the base of all down drains were designed for erosion protection.
- 8-foot wide drainage terraces would be constructed on the pit slopes at 30-foot vertical depth intervals to prevent surface erosion and all terraces drains are required to have a minimum slope of 5 percent and a minimum depth of 1 foot, in accordance with the 2008 LA County Grading Guidelines. The terrace drains would be lined with crushed rock in consideration of the availability of these materials on site. The crushed rock was found to be stable enough to deliver the runoff flows generated by the pit slope surface.
- Minimum two-foot-high MSHA-required safety berms would be installed along the tops of the mine pit slopes around the entire northern, eastern, southern, and western edges and pit entrance/exit ramps to prevent the temporary inundated water from creating a public safety hazard.
- Stormwater runoff in the plant processing facility area during the mining would be collected and conveyed to a temporary mining pit for infiltration, no polluted stormwater will be discharged to off-site.

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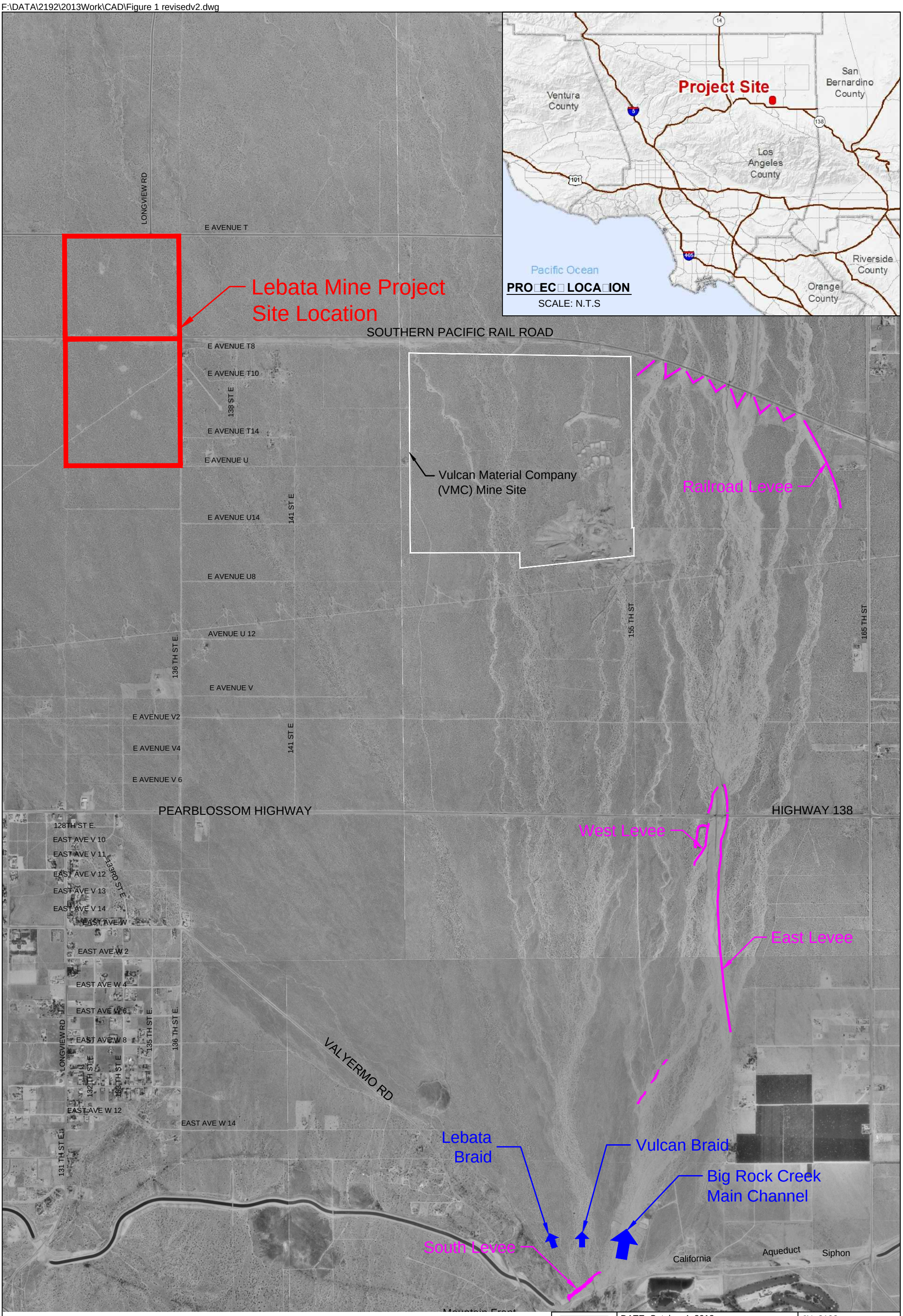

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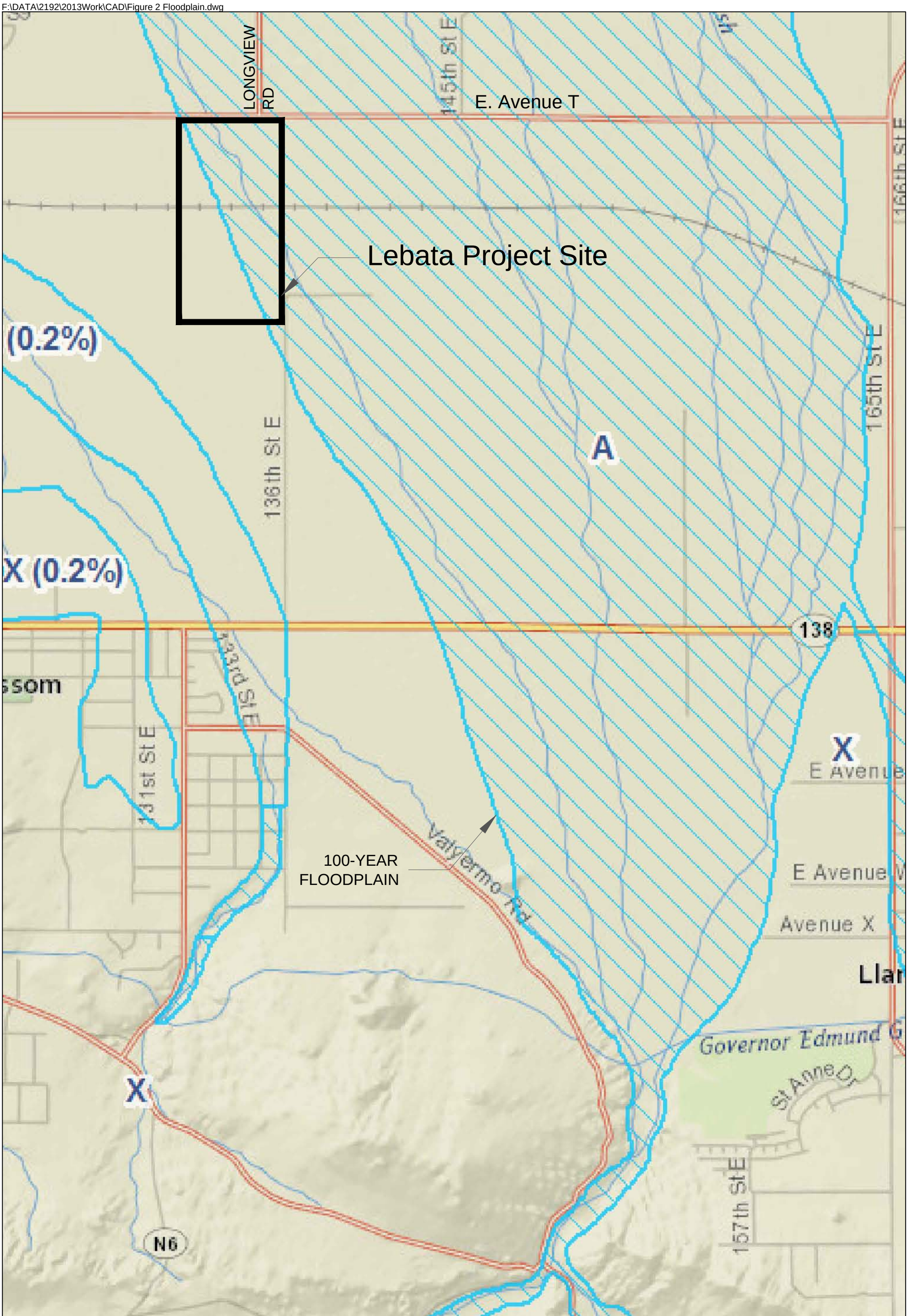
BIG ROCK WASH ALLUVIAL FAN AND PROJECT SITE LOCATION

FIGURE 1

F:\DATA\2192\2013Work\CAD\Figure 2 Floodplain.dwg



LEGEND

100-YEAR FLOODPLAIN

500-YEAR FLOODPLAIN

NOTE: PROJECT SITE IS NOT WITHIN COUNTY ADOPTED FLOODWAY

SOURCE: FLOODPLAIN MAP OBTAINED FROM THE LOS ANGELES COUNTY WEBSITE: HTTP://DPW.LACOUNTY.GOV/WMD/FLOODZONE/

N W E S

SCALE N.T.S.

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PROJECT LOCATION AND FEMA 100-YEAR FLOODPLAIN MAP

FIGURE

2.0 ANALYSIS OF THE EFFECTS OF PEARBLOSSOM HIGHWAY IMPROVEMENTS ON CAPITAL FLOOD FLOWS REACHING THE MINE SITE

2.1 PEARBLOSSOM HIGHWAY IMPROVEMENTS OVERVIEW

Pearblossom Highway crosses the Big Rock Creek alluvial fan in an east-west direction about 1.5 miles south of the Lebata mine site. An adjacent Vulcan Material Materials Company (VMC) mine, approximately 0.5 mile east of the Lebata mine site, is also located north of the Pearblossom Highway on the Big Rock Creek alluvial fan (Figure 1).

Caltrans recently completed improvements to Pearblossom Highway consisting of construction of a new bridge over Big Rock Creek, raising of the grade of the highway, and associated drainage improvements. In order to account for the effects of these improvements on flood flows reaching the mine site, Stetson contacted Caltrans and obtained the as-built design plans of the improvements.

Figure 3 shows existing drainage flow patterns. Figures 4 and 5 show the drainage improvements on Pearblossom Highway and the estimated amount of flows that would pass through these drainage facilities during Phase 1 and Phase 2/Final Reclamation Phase, respectively. As shown in the figures, the Pearblossom Highway drainage improvements include roadside channels on both the north and south sides of the highway, and multiple culverts beneath the highway.

The south-side roadway channel of Pearblossom Highway begins near the eastern boundary of VMC's contributing watershed, and would intercept flows from south side of the highway. A portion of the flows intercepted by the south-side channel would continue to flow down along the channel. The other portion of the flows would pass through the culverts and discharge into either the Lebata or VMC mine sites or be conveyed into the north-side roadway channel which begins near culvert # 27, approximately 0.25 miles west of eastern boundary of the Lebata watershed.

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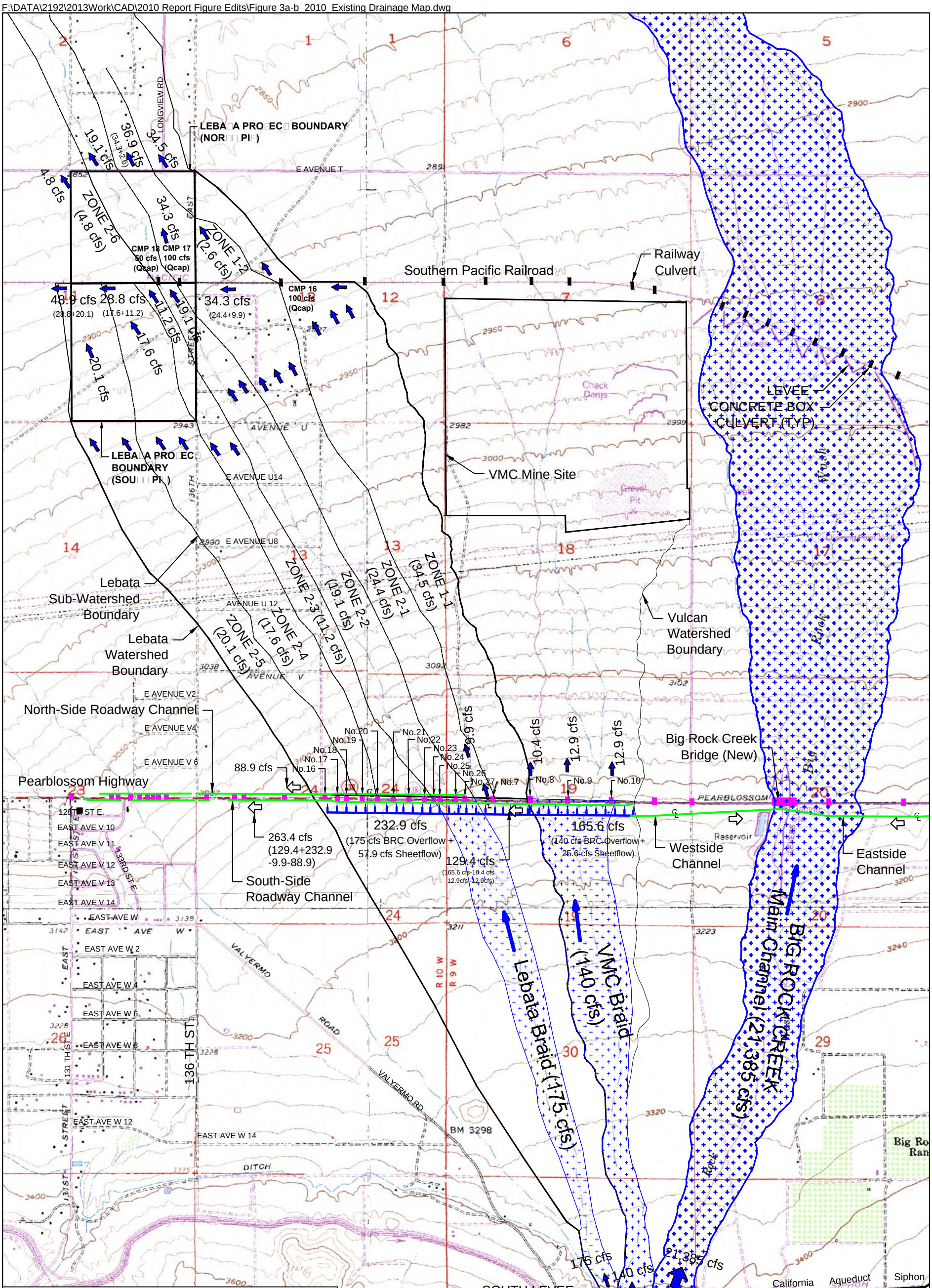

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
2-1	271	24.4
2-2	212	19.1
2-3	124	11.2
2-4	195	17.6
2-5	223	20.1
2-6	53	4.8
Total	1,489	134.4

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

N W E S

SCALE (Feet) 0 1000 2000

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Lowered Facilities Alternative

Subwatershed Delineation Based on USGS Topography and Existing Offsite and Onsite Drainage

FIGURE 3a

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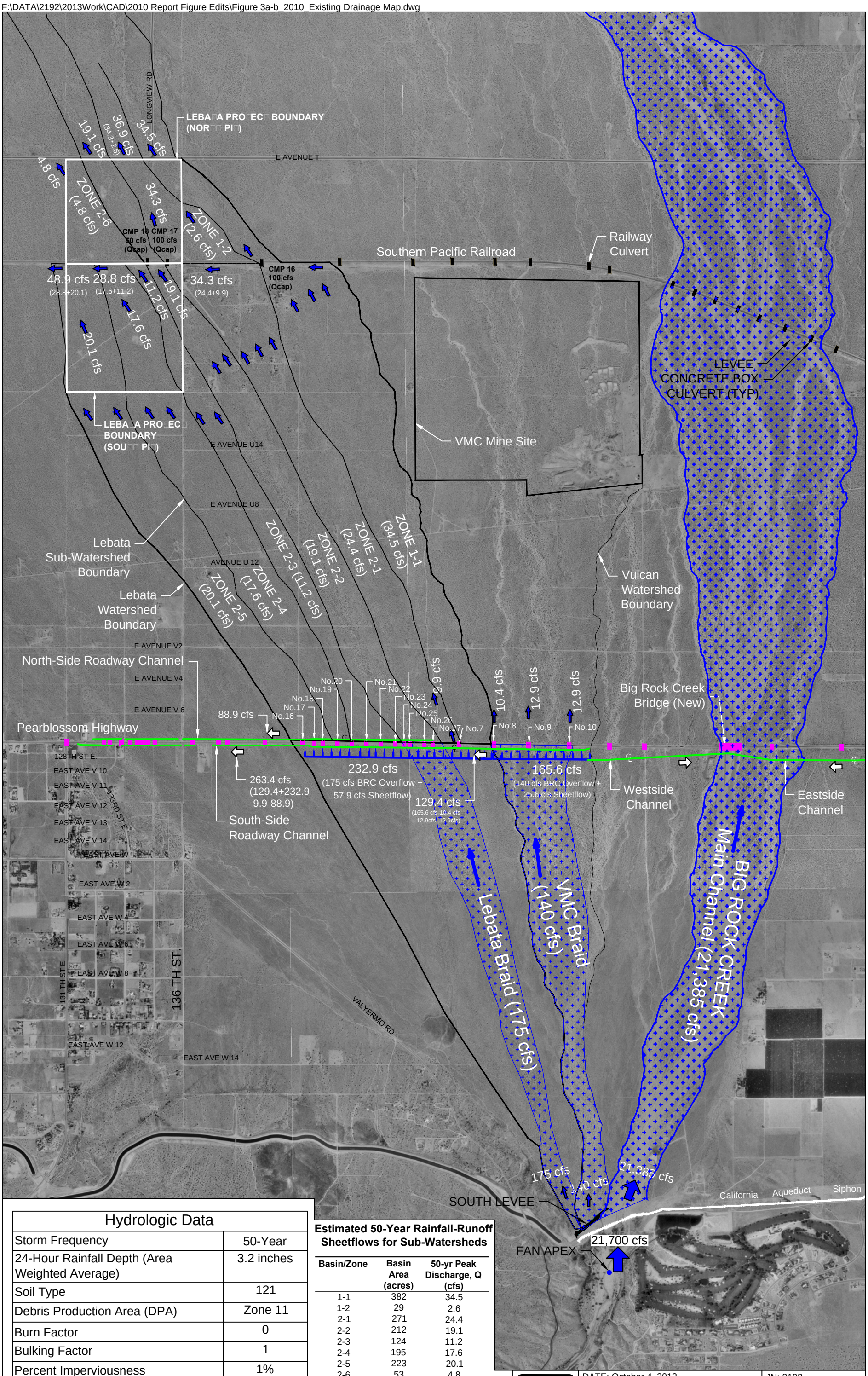

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
2-1	271	24.4
2-2	212	19.1
2-3	124	11.2
2-4	195	17.6
2-5	223	20.1
2-6	53	4.8
Total	1,489	134.4

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

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Lowered Facilities Alternative

Existing Offsite and Onsite Drainage

(Same as Figure 3a Except Different Background Map)

FIGURE 3b

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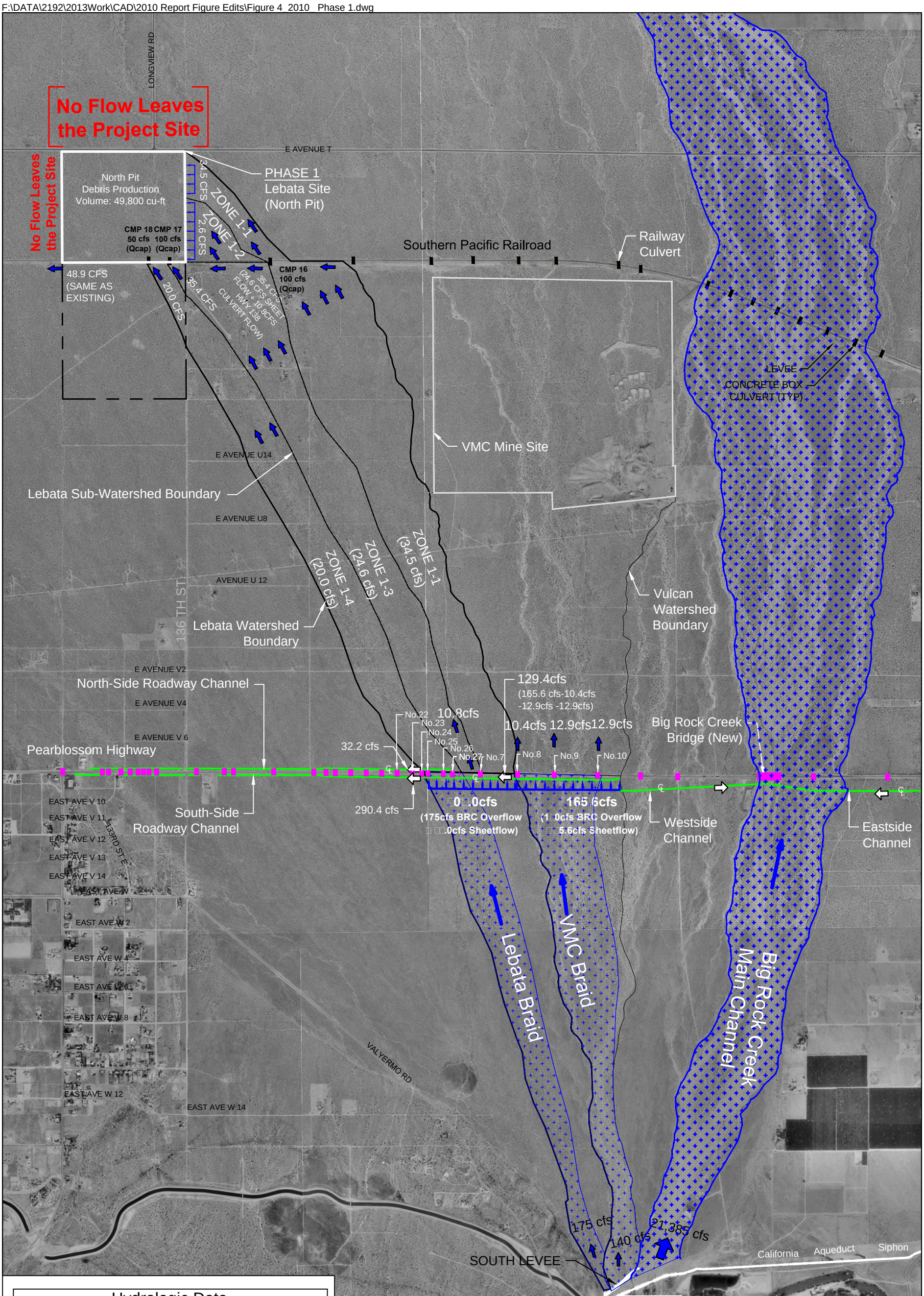

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
1-3	273	24.6
1-4	222	20.0
Total	906	81.7

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

N W E S

SCALE (Feet) 0 1000 2000

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Lowered Facilities Alternative

PHASE 1

Existing Offsite and Proposed Onsite Drainage

FIGURE

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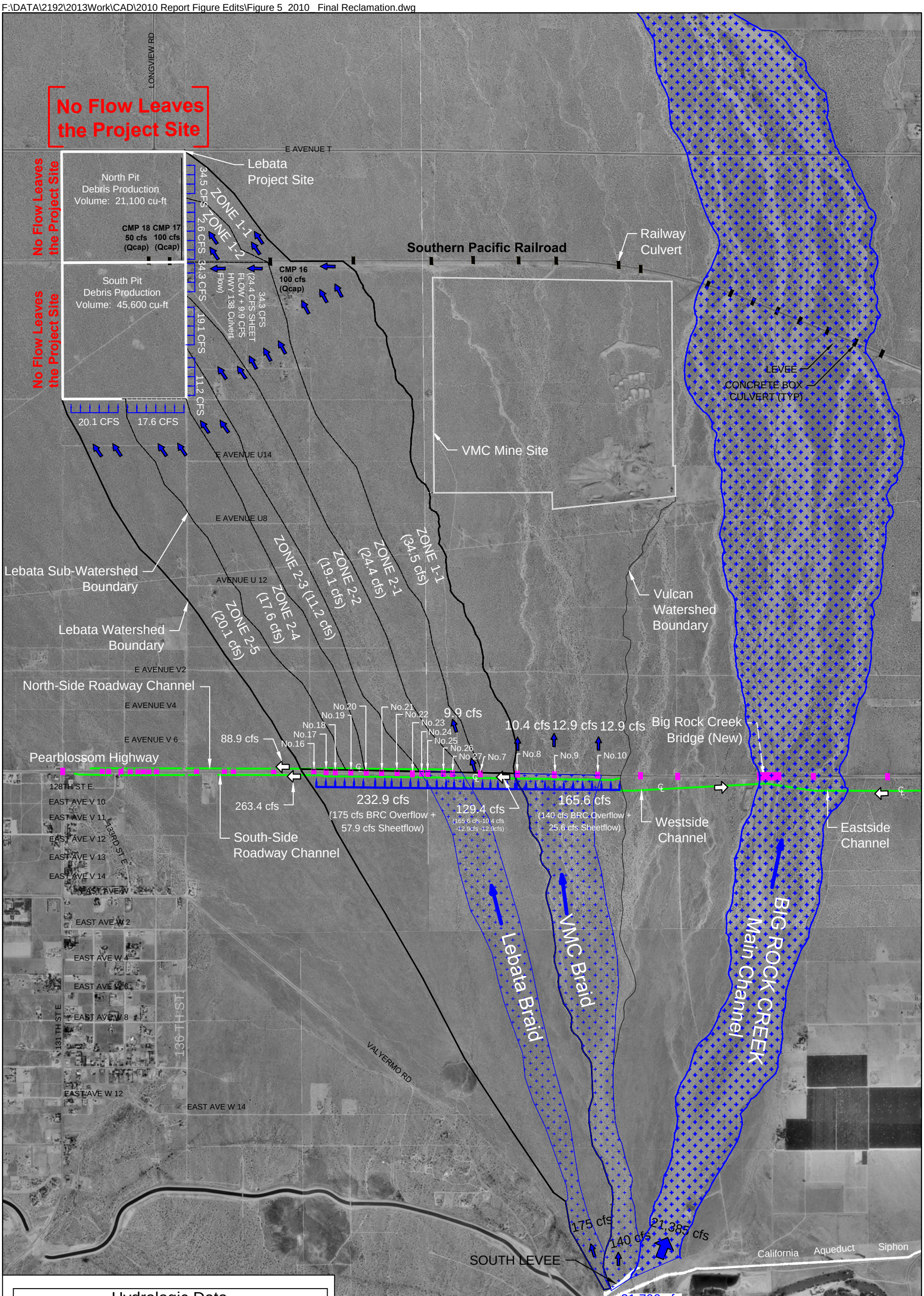

Hydrologic Data	
Storm Frequency	50-Year
24-Hour Rainfall Depth (Area Weighted Average)	3.2 inches
Soil Type	121
Debris Production Area (DPA)	Zone 11
Burn Factor	0
Bulking Factor	1
Percent Imperviousness	1%

Estimated 50-Year Rainfall-Runoff Sheetflows for Sub-Watersheds

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
2-1	271	24.4
2-2	212	19.1
2-3	124	11.2
2-4	195	17.6
2-5	223	20.1
Total	1,436	129.6

Legend

- Roadside Channel Flow/Center Line
- Pearblossom Highway Culvert
- Flow Direction
- Runoff flow direction
- Roadside Channel Flow

N W E S

SCALE (Feet) 0 1000 2000

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Lowered Facilities Alternative

Final Reclamation Existing Offsite and Proposed Onsite Drainage

FIGURE 5

2.2 PEARBLOSSOM HIGHWAY DRAINAGE FACILITIES DETAILS

Details of the Pearblossom Highway drainage improvements are summarized in Table 1. The two roadside channels are constructed as trapezoidal earthen channels with flow direction from east to west. There are thirteen culverts located in the Lebata watershed. Twelve of them (Nos. 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27) would convey the portion of intercepted flows from the south-side channel onto the north-side channel, and one (No. 7) would directly discharge to the Lebata mine site. Three others (Nos. 8, 9, 10) located in the Vulcan watershed would discharge a portion of the intercepted flows to the VMC mine site. All culverts are circular reinforced concrete pipes (RCP). In general, as long as the combined hydraulic capacity of the south-side channel and the north-side channel that are connected by the 12 culverts is greater than the total inflow coming from the south side of Pearblossom Highway, only the flow passing culvert No.7 could reach the Lebata mine site.

TABLE 1: DIMENSIONS AND CAPACITIES OF PEARBLOSSOM HIGHWAY DRAINAGE IMPROVEMENTS

Drainage Facility	Dimensions*	Capacity
Earthen Channel (South) (Trapezoidal)	Bottom width: 12 ft Side slope: 6H:1V Channel depth: 2.9 ft Bottom slope: 0.009	580 cfs
Earthen Channel (North) (Trapezoidal)	Bottom width: 12 ft Side slope: 6H:1V Channel depth: 2.4 ft Bottom slope: 0.009	390 cfs
Culverts Nos. 8, 16,17, 18 ,19, 20, 21, 22, 23,24, 25, 26, 27 (Circular)	3-ft diameter	40 cfs
Culverts No. 7, 9, 10 (Circular)	4-ft diameter	70 cfs

* Data source: As-built design plans of the Pearblossom Highway drainage improvements obtained from Caltrans.

2.3 HYDROLOGY ANALYSIS

To analyze the effects of the Pearblossom Highway drainage facilities on flood flows reaching the mine site, the flows intercepted by the south-side roadway channel in both Lebata watershed and Vulcan watershed need to be considered. Some of the intercepted flows from the Vulcan watershed would pass downstream along the channel. These flows are considered as inflows to the downstream part of the roadside channel that intercepts flows from the Lebata watershed, and are referred to as "roadside channel inflows."

The flows intercepted by the south-side roadway channel include the 50-year rainfall-generated local overland sheetflow produced by the drainage area of the Lebata site, from the apex of the alluvial fan at the mountain front to Pearblossom Highway , combined with the Capital Flood overflow from the Big Rock Creek which, in the event of failure of the flood control levee near the mountain front, could potentially escape from the main channel near the mountain front via the relict "Lebata Braid" [Note: The flood control levee near the mountain front was constructed from non-engineered fill]. The overflow from the Big Rock Creek main channel into the Lebata Braid is referred to as "Lebata Braid flow."

The roadside channel inflow is a portion of the flows intercepted from the 281-acre Vulcan watershed south of Pearblossom Highway. This flow would pass downstream along the channel, and is considered as inflow to the downstream part of the roadside channel that intercepts flows from the Lebata watershed. The flows intercepted from the Vulcan watershed south of Pearblossom Highway include the 50-year rainfall-runoff generated local overland sheetflow produced by the drainage area of the VMC site from the apex of the alluvial fan at the mountain front to Pearblossom Highway, combined with the Capital Flood overflow from the Big Rock Creek via the relict "VMC Braid" in the event of failure of the flood control levee near the mountain front. The overflow from the Big Rock Creek main channel into the VMC Braid is referred to as "VMC Braid flow."

The 2008 Report estimated that the Lebata Braid and Vulcan Braid flows are 175 cfs and 140 cfs, respectively.

To calculate the 50-year rainfall-generated sheetflow, the Los Angeles County Department Public Works (LACDPW) "Tc calculator" program was used. Using the Tc-calculator, the 2008 Report estimated the peak runoff rate to be 3.61 cfs (unburned and unbulked)[3] per 40-acre unit sub-area for the Lebata mine. The Big Rock alluvial fan is a relatively homogeneous area with soil type of 121 and a land surface slope of about 1.8 %. Using the same input parameter as Lebata watershed but a slightly higher weighted average of 50-year precipitation of 3.26 inches per 24 hours (3.2 inches per 24 hours for Lebata) inputted to Tc calculator, the peak flow rate for the VMC mine was found to be 3.7 cfs per 40-acre unit sub-area. The LA County's rainfall isohyte map for the alluvial fan shows higher precipitation in the south than the north. The reason that the Vulcan watershed has a little higher weighted average of 50-year precipitation than the Lebata watershed is because the Vulcan mine site is located more to the south which has higher rainfall as compared to the north.

Multiplying the peak runoff rate of 3.61 cfs per 40-acre unit sub-area by the ratio between the total local watershed area and the 40-acre unit sub-area, the amounts of sheetflow reaching Pearblossom Highway generated by the Lebata watershed from the mountain front to Pearblossom Highway during Phase 1 and Phase 2/ Final Reclamation are summarized in Table 2. Note that the upstream drainage area for Phase 1 is different from the other mining phases, since Phase 1 involves only the North Pit. Similarly, the sheetflow generated by the VMC watershed (277 acres) from the mountain front to Pearblossom Highway was estimated to be 25.6 cfs. Since there are no distinct conveyance channels and no distinct flow collection points in the alluvial fan, hydrologic routing or any potential attenuation effects are not considered in this calculation and, hence, the peak flow estimate is considered conservative.

[3] The alluvial fan below the mountain front has little vegetation and there is no need to include a burn factor in the peak flow estimate. The alluvial fan below the mountain front is in the Antelope Valley Debris Production Area Zone 11 (DPA-11) with a bulking factor of about 1.02 (Source: LA County 2006 Sedimentation Manual, Appendix B). Since the bulking factor is close to 1.0, there would be little difference between bulked flow and unbulked flow.

TABLE 2: SUMMARY OF CAPITAL FLOOD FLOWS REACHING PEARBLOSSOM HIGHWAY

Mining Phase	Drainage Area (acres)	Lebata Braid Flow (cfs)	Sheetflow from the Mountain Front to Pearblossom Highway(cfs)	Total Capital Flood Flow Intercepted by the South-side Channel (cfs)
Phase 1	322	175	29.0	204.0
Phase 2 and Final Reclamation	642	175	57.9	232.9

Note: Drainage areas were delineated based on the topography shown on the USGS Quad map.

2.4 HYDRAULIC ANALYSIS

The flow passing beneath the highway onto the north-side channel is related to the hydraulics of the south-side channel and the culverts. The hydraulics of the south-side channel was analyzed using Manning's Equation:

$$Q = A \cdot \frac{1.49}{n} \cdot R^{\frac{2}{3}} \cdot \sqrt{S} \qquad (1)$$

Where

Q = discharge in the channel (cfs)

A = flow area, which is a function of water depth (h in Figure 6) in the channel.

n = Manning's "n" or roughness coefficient. 0.03 was used in the analysis.

R = hydraulic radius, which is a function of water depth in the channel.

S = channel slope.

The culvert flow would be Type 2 culvert flow (Lindeburg, 2001). The following simplified equation that governs hydraulics through a Type 2 culvert flow (i.e., partially full, outlet controlled, critical depth at outlet) was used to calculate the culvert flow (see Figure 6):

$$Q = C_d \cdot A_c \cdot \sqrt{2g \cdot (h - d_c)} \qquad (2)$$

Where

Q = discharge through the culvert (cfs)

C_d = discharge coefficient (0.62)

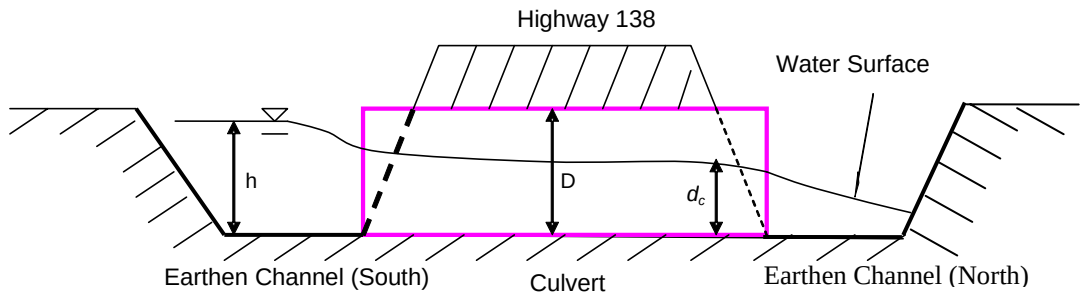
A_c = flow area at the critical section (ft^2). It is not the area of the culvert.

g = acceleration due to gravity (32.2 ft/sec^2)

h = water depth at the upstream of the culvert, which needs to be solved.

d_c = critical depth, which is a function of culvert size and discharge rate.

Figure 6 Sketch of Earthen Channel Cross Section and Type 2 Culvert Flow



The roadside channel inflow (i.e. an amount of flow that would remain in the south-side channel intercepted from the Vulcan watershed and would pass downstream along the channel to the Lebata watershed) was first analyzed. For a given Capital Flood flow of 165.6 cfs (25.6 cfs VMC sheetflow + 140 cfs Vulcan Braid flow) reaching the south side of Pearblossom Highway, applying equation (1) to the earthen channel (south) and equation (2) to the culverts, the water depth (h) at the upstream of the culverts (i.e. water depth in the earthen channel) and the flow distributions can be solved. About 129.4 cfs from the VMC watershed would remain in the earthen channel and pass downstream along the channel to the Lebata watershed.

Combining the roadside channel inflow of 129.4 cfs and the total Capital Flood flow of 204.0 cfs intercepted from the Lebata watershed by the south-side channel, the flows passing through the Pearblossom Highway drainage facilities estimated using the previously-described analysis method are summarized in Table 3 and Figures 4 and 5.

TABLE 3: CAPITAL FLOOD FLOWS OF PEARBLOSSOM HIGHWAY DRAINAGE IMPROVEMENTS WITHIN THE LEBATA WATERSHED

Flow Description	50-Year Capital Flow	
	Phase 1	Phase 2/ Final Reclamation
Total flow (intercepted flow from Lebata Braid Watershed plus roadside channel inflow from VMC Braid Watershed (129.4 cfs); see Figures 4 and 5)	333.4 cfs (204.0+129.4)	362.3 cfs (232.9+129.4)
Contained in the south-side channel	290.4 cfs	263.5 cfs
To north-side channel conveyed from 3-foot diameter culverts (Nos. 16,17, 18,19, 20, 21, 22, 23,24, 25, 26, 27)	32.2 cfs[1]	88.9 cfs[2]
To Lebata mine from a 4-foot diameter culvert (No.7)	10.8 cfs	9.9 cfs

Notes: [1] A total amount of flow that would pass through the four culverts (Nos 24, 25, 26, 27) with an individual flow rate of 8.06 cfs during Phase 1.

[2] A total amount of flow that would pass all twelve culverts with an individual flow rate of 7.01 cfs during Phase 2 and Final Reclamation Phase.

As shown in Table 3, about 9.9 cfs and 10.8 cfs of intercepted flows would discharge through Culvert No. 7 and these flows as sheetflow onto the mine site during Phase 1 and Phase2/Final Reclamation, respectively. And about 32.2 cfs and 88.9 cfs would pass to the north-side channel under Phase 1 and Phase2/Final Reclamation, respectively. Note that the estimated flow from a single culvert in Phase 2/ Final Reclamation is less than the flow from the same culvert in Phase 1. This is because more culverts are involved in Phase 2/Final Reclamation. However, the sum of the individual flows for all culverts in Phase 2/Reclamation is greater than that in Phase 1.

Comparison of the intercepted flows and the carrying capacities of the roadside channels shown in Table 4 indicates that the intercepted flows are less than the carrying capacity of the south-side channel, and the flows conveyed to the north-side channel are also less than its carrying capacity. Therefore, all intercepted flows would be contained in the channels without overtopping the channel banks. Only the flows passing culvert No.7 could reach the Lebata mine site.

TABLE 4: COMPARISON OF ROADSIDE CHANNEL CAPACITIES AND THE INTERCEPTED FLOWS

Roadside Channel	Capacity (cfs)	Capital Flood Flows Intercepted and Conveyed by the Roadside Channels (cfs)	
		Phase 1	Phase 2/ Final Reclamation
Earthen Channel (South) (Trapezoidal)	580	290.4	263.5
Earthen Channel (North) (Trapezoidal)	390	32.2	88.9

3.0 PROPOSED DRAINAGE CONCEPT FOR THE LOWERED FACILITIES ALTERNATIVE

3.1 OVERVIEW

The drainage concept for handling flows into the proposed mine site for the Lowered Facilities Alternative is similar to the concept described in the 2008 Report. With the reduction in the amount of Capital Flood flow entering the site due to the Pearblossom Highway improvements, the sizes and locations of the on-site drainage facilities would be slightly different for this alternative. Refer to Drainage Plan Sheets 1 through 5 for layout of drainage structures for the different mining phases. Figures 4 and 5 show the drainage flow patterns under proposed conditions of Phase 1 and Phase 2/Final Reclamation Phase, respectively.

The drainage system is designed in accordance with the LA County's Grading Guidelines, dated January 2008. The drainage facilities would incorporate a system of interceptor drains, which would be located along the top of the pits to collect and deliver sheetflows and deliver these flows to down drains, which convey flows down the 2H:1V side slopes to the bottom of the mine pit. The locations of down drains are at the downstream point of the sub-watersheds. Additional down drains are provided along the drainage terrace to capture runoff generated by the pit slopes and prevent soil erosion.

3.2 HYDROLOGIC DESIGN CONSIDERATIONS

As discussed in Section 2.0, the sheetflow from the mountain front to Pearblossom Highway and the Lebata Braid flow would be captured by the new drainage facilities on Pearblossom Highway. Only about 10.8 cfs and 9.9 cfs would flow through Culvert No. 7 onto the mine site as sheetflow during Phase 1 and Phase2/Final Reclamation Phase, respectively.

For drainage design purpose, the watershed from the northern border of Pearblossom Highway to the mine site was further divided into small sub-watersheds (See Figures 1 and 2). Using the Tc calculator, overland sheetflows contributed by these sub-watersheds are summarized in Tables 5 and 6.

TABLE 5: ESTIMATED 50 -YEAR RAINFALL-RUNOFF SHEETFLOWS FOR SUB-WATERSHEDS FROM THE NORTHERN BORDER OF PEARBLOSSOM HIGHWAY TO THE SITE BOUNDARY DURING PHASE 1

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
1-3	273	24.6
1-4	222	20.0
Total	906	81.7

Note: Drainage areas were delineated based on the topography shown on the USGS Quad map.

TABLE 6: ESTIMATED 50-YEAR RAINFALL-RUNOFF SHEETFLOWS FOR SUB-WATERSHEDS FROM THE NORTHERN BORDER OF PEARBLOSSOM HIGHWAY TO THE SITE BOUNDARY DURING PHASES 2 AND FINAL RECLAMATION

Basin/Zone	Basin Area (acres)	50-yr Peak Discharge, Q (cfs)
1-1	382	34.5
1-2	29	2.6
2-1	271	24.4
2-2	212	19.1
2-3	124	11.2
2-4	195	17.6
2-5	223	20.1
Total	1,436	129.6

Note: Drainage areas were delineated based on the topography shown on the USGS Quad map.

The flows tabulated in Tables 5 and 6 were used in the design and sizing of drainage facilities on the site. Note that Zone 1-1 is separated by the railway embankment. Runoff from the south-side of the railway would flow through an existing railroad culvert CMP 16 (100 cfs Capacity) to the North Pit. Similarly, during Phase 1 sheetflows from Zones 1-2 and 1-4 would pass through the existing culverts CMP 17 (100 cfs capacity) and CMP 18 (50 cfs capacity) into the North Pit via down drains.

3.3 HYDRAULIC DESIGN CONSIDERATIONS

3.3.1 Interceptor Drains

In accordance with the Grading Guidelines, interceptor drains were designed to have a 1-foot standard minimum depth and a minimum width of 3 feet at the inlet with 1.5H:1V side slopes. Water depth and velocity of the design interceptor drains was computed using Manning's Equation and the Continuity Equation (Refer to the 2008 Report). Table 7 summarizes the interceptor design hydraulics.

TABLE 7: INTERCEPTOR-DRAIN DESIGN AND HYDRAULICS

Interceptor	Capital Flow (cfs)	Design Flow Slope%	Natural Slope %	Velocity (fps)	Water Depth (ft)	Cut Depth at Outlet (ft)	Freeboard at Outlet (ft)
Zone 1-1	34.5	1.5	1.33	10.4	1.5	2.4	0.9
Zone 1-2	2.6	1.5	1.33	5.4	0.6	3.2	2.7
Zone 2-1	34.3[a]	2.0	1.73	11.5	1.4	2.7	1.3
Zone 2-2	19.1	2.0	1.73	9.9	1.1	1.3	0.2
Zone 2-3	11.2	2.0	1.73	8.7	0.9	3.7	2.8
Zone 2-4	17.6	1.0	0.75	7.5	1.3	4.0	2.8
Zone 2-5	20.1	1.0	0.75	7.8	1.3	3.9	2.6

Note: [a] Includes culvert flow (9.9 cfs) from Pearblossom Highway culvert No. 7 during Phase 2/Final Reclamation and the sheetflow (24.4 cfs) generated by Zone 2-1, totaling 34.3 cfs.

The 2008 LA County Grading Guidelines require the flow path slope of interceptor drains not to be less than 2 percent (%). Due to the natural slope of the project area, meeting 2 percent slope will require more than 10 feet cut depth at the interceptor outlets in the south side of the South Pit (Interceptors1-1 & 1-2) and the east side of the North Pit (Interceptors 2-4 & 2-5). This was judged unrealistic and a less than 2% slope for these two interceptor drains was used in the concept design (see Table 7). Although the flow path slopes of the interceptor drains along these sides are less than 2 %, the design path slopes have been shown to be sufficient enough to prevent sedimentation. Using Lauren's Critical Velocity Method as described in the 2008 Report, it is determined that flow velocities in these interceptor are greater than the required velocities to transport any sediment particles that would likely enter the interceptor drains (see Table 8).

TABLE 8: COMPARISON OF INTERCEPTOR FLOW VELOCITIES AND THE CRITICAL VELOCITY TO TRANSPORT THE SEDIMENTS USING LAURSEN'S METHOD

Interceptor	Capital Flow (cfs)	Flow Slope %	Flow Velocity (fps)	Critical Velocity (fps)
Zone 1-1	34.5	1.5	10.4	4.1
Zone 1-2	2.6	1.5	5.4	3.5
Zone 2-1	34.3[a]	2.0	11.5	4.0
Zone 2-2	19.1	2.0	9.9	3.9
Zone 2-3	11.2	2.0	8.7	3.8
Zone 2-4	17.6	1.0	7.5	3.9
Zone 2-5	20.1	1.0	7.8	4.0

[a] Includes culvert flow (9.9 cfs) from Pearblossom Highway culvert No. 7 during Phase 2/ Final Reclamation and the sheetflow (24.4 cfs) generated by Zone 2-1, totaling 34.3 cfs.

3.3.2 Down Drains

All down drains were designed in accordance with the minimum dimensions (1.5 foot depth and 3 foot width) provided in the 2008 Los Angeles County Grading Guidelines. Using Manning's Equation and the Continuity Equation, water depth and velocity of the design down drains which capture the offsite flows were computed and are summarized in Table 9.

TABLE 9: DOWN-DRAIN DESIGN FOR CAPITAL FLOOD FLOW

Down Drain	Capital Flood Flow(cfs)	Manning's n	Water Depth (ft)	Slope %	Velocity (fps)	Channel Depth (ft)	Freeboard (ft)
Zone 1-1	34.5	0.016	1.1	35	29.1	1.5	0.5
Zone 1-2	2.6	0.016	0.4	54	18.0	1.5	1.1
Zone 1-3	35.4[a]	0.016	1.0	54	34.5	1.5	0.5
Zone 1-4	20	0.016	0.8	54	29.9	1.5	0.7
Zone 2-1	34.3[b]	0.016	1.1	35	29.1	1.5	0.5
Zone 2-2	19.1	0.016	0.8	54	29.6	1.5	0.7
Zone 2-3	11.2	0.016	0.7	54	25.9	1.5	0.8
Zone 2-4	17.6	0.016	0.8	54	29.0	1.5	0.7
Zone 2-5	20.1	0.016	0.9	35	25.5	1.5	0.7

Note: [a] Includes culvert flow (10.8 cfs) from Pearblossom Highway culvert No. 7 during Phase 1 and the sheetflow (24.6 cfs) generated by Zone 1-3, totaling 35.4 cfs.
[b] Includes culvert flow (9.9 cfs) from Pearblossom Highway culvert No. 7 during Phase 2/Final Reclamation and the sheetflow (24.4 cfs) generated by Zone 2-1, totaling 34.3 cfs.

Note that Down Drains 1-3 & 1-4 which serving CMP17 and CMP18 would be eliminated during Phase 2 and Final Reclamation, since their flows would be captured by the South Pit. Additional down drains are provided along the drainage terrace, the road ramp, and the notch in the North Pit to capture on-site runoff generated by the facility areas and pit slopes. Two down drains would be constructed along the notch in the North Pit during Phase 1 to covey the on-site runoff generated by the plant facility area into the bottom of the North pit. During Final Reclamation, this notch would be filled and the two down drains along the notch would be removed to restore the Longview extension roadway.

3.3.3 Drainage Terrace / Terrace Drains

8-foot wide drainage terraces would be constructed on the pit slopes at 30-foot vertical depth intervals to prevent surface erosion. All terraces drains are required to have a minimum slope of 5 percent and a minimum depth of 1 foot. The terrace drains would be lined with crushed rock in consideration of the availability of these materials on site. The crushed rock was found to be stable enough to deliver the runoff flows generated by the pit slope surface (2008 Report).

3.3.4 Drain Canals

Drain canals would be constructed around the plant facility area and along the southern and western edges of the rail facility area in the North Pit to capture on-site runoff. The captured on-site runoff would be conveyed through down drains to the North Pit bottom. The drain canal would be V-shaped with minimum dimensions of 1-foot depth and 3-foot width and lined with crushed rock.

3.4 PIT INUNDATION, EMPTYING AND SEDIMENTATION

3.4.1 Flood Volume

The total Capital Flood volume consists of local runoff (including culvert flows from Pearblossom Highway), on-site runoff, and direct precipitation.

As discussed in the 2008 Report, the maximum 24-hour rainfall amounts during the four days of the 50-year design storm would be 0.32 inches, 1.28 inches, 1.12 inches, and 3.2 inches, totaling 5.92 inches (According to the LACDPW Hydrology Manual, the 50-year design storm occurs over a period of four days, with a maximum rainfall on the fourth day). The local runoff and on-site runoff volume were computed using the Tc calculator. Culvert flows from Pearblossom Highway were converted to equivalent drainage area in order for the Tc calculator to account for these flows in the runoff volume calculation. The flood volume generated by the direct precipitation is obtained by multiplying the pit open area by the total on-site rainfall of 5.18 inches (maximum 2.8 inches per 24-hr in the fourth day based on the rainfall isohyte map) during the 50-year design storm. Table 10 summarizes the flood volumes entering each pit during the different phases.

TABLE 10: FLOOD VOLUME ENTERING EACH PIT DURING PHASE 1 , PHASE 2, PHASE 3 AND FINAL RECLAMATION FOR LOWERED FACILITIES ALTERNATIVE

Mine Pit	Upstream Watershed Area (Acre)	Sheetflow Volume (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
Phase 1						
North Pit	1,026[a]	56 [a]	8	30	94	12
Phase 2						
North Pit	411	22	3	30	55	11
South Pit	1,135[b]	61[b]	3	65	129	13
Final Reclamation						
North Pit	411	22	3	30	55	11
South Pit	1,135[b]	61[b]	3	65	129	13

Notes: [a] Includes the equivalent area (120 acres) and flood volume (7ac-ft) that contributed the same amount of culvert flow during Phase 1
[b] Includes the equivalent area (113 acres) and flood volume (6ac-ft) that contributed the same amount of culvert flow during Phase 2/Final Reclamation.

The inundation depth is well below the proposed 80 ft depth of the mine pits. Thus, the Capital Flood volume inside the pits would not overflow. In addition, minimum two-foot-high MSHA-required safety berms would be installed along the tops of the mine pit slopes around the entire northern, eastern, southern, and western edges and pit entrance/exit ramps. Note that there would be no inundation volume accumulated in the bottom of the plant facility area, which would be

mined to a depth of 25 feet of the gravel layer. This is because direct precipitation is the primary source of water to the plant facility area and the vertical infiltration rate of gravel materials (1,134 feet per day) is much higher than the maximum rainfall intensity (2.8 inches per day) at the mine site. Any direct rainfall would be infiltrated to the surroundings at the same moment when the rainfall reaches the bottom of the plant facility area.

3.4.2 Emptying Time

Using Water Budget Analysis as discussed in the 2008 Report, emptying times after the Capital Flood for the Lowered Facilities Alternative are summarized in Table 11.

TABLE 11: CAPITAL FLOOD VOLUME AND PIT EMPTYING TIME

Mine Pit	Total Capital Flood Volume (acre-ft)	Emptying Time	
		Total (days)	After Capital Flood (days)
Phase 1			
North Pit	94	4	0
Phase 2			
North Pit	55	3	0
South Pit	129	8	4
Final Reclamation			
North Pit	55	3	0
South Pit	129	8	4

The estimated emptying time shown in Table 11 includes two columns, one is the total time required to empty the Capital Flood volume and the other is the emptying time after the Capital Flood event. The two columns have a difference in 4 days. This is because infiltration also occurs over the 4-day Capital Flood event. The analysis results show that all mining phases for the Lowered Facilities Alternative could be emptied within 4 days after the Capital Flood event.

3.4.3 Pit Sedimentation

All of the sediment transported into the pit by the Capital Flood inflow would be deposited on the pit floor. Table 12 summarizes the estimated volumes and depths of sediment deposited in the mine pits. The sedimentation analysis was based on the debris production rate of 1,300 cubic

yards per square mile in Debris Production Area Zone 11 obtained from LACDPW Sedimentation Manual (2006).

TABLE 12: MINE PIT SEDIMENTATION FOR EACH MINING PHASE

Mining Pit	Debris Production Volume		Pond Bottom Area	Deposited Sediment Layer Thickness
	(cu-yd)	(cu-ft)	(sq ft)	(ft)
Phase 1				
North Pit	1,846	49,842	939,391	0.05
Phase 2				
North Pit	780	21,060	804,156	0.03
South Pit	1,690	45,630	1,103,790	0.04
Final Reclamation				
North Pit	780	21,060	804,156	0.03
South Pit	1,690	45,630	1,103,790	0.04

The sediments would deposit in the bottom of pond where the vertical infiltration occurs. Since the mine pits will be mined to the surface of clay layer, which would have a lower permeability than the deposited sediments, sediment deposition on the clay layer in the mining pits would not have an affect on the vertical infiltration rate. Furthermore, the horizontal infiltration is more important with regard to pit empty time. Sediment deposition in the bottom of pit would not have an affect on the horizontal infiltration rate and the pit empty time.

3.5 IMPACT OF DRAINAGE CONCEPT ON ADJACENT PROPERTIES

The mine drainage concept would have no adverse impact on properties adjacent to and downstream of the mine during the Capital Flood. The interceptor drains located on the upstream (southern and eastern) sides of the mine pits are adequately sized to capture and convey any flows arriving at each interceptor drain for delivery to the down drains and subsequent discharge to the mine pits. Hence, there would be no backwater effects or associated increases in flood depths caused by the interceptor drains. Therefore, flooding on adjacent properties would not be impacted.

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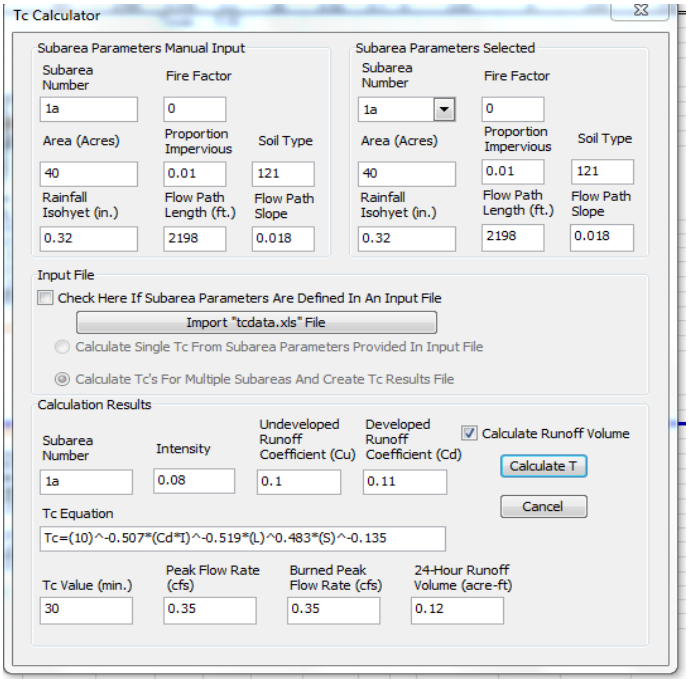
Appendix A - Miscellaneous Calculations

- Input and output files of the Tc Calculator for the Capital Flood event for a 40 acre subbasin (4 days).
- Tc Calculator-generated 4-day hydrographs for the Capital Flood event (i.e., 50-year storm event) for a 40 acre subbasin.
- Runoff volume calculation EXCEL spreadsheets for the Capital Flood event.
- Pit emptying time calculation EXCEL spreadsheets for the Capital Flood event.

Input and Output files of the Tc Calculator

Day 1



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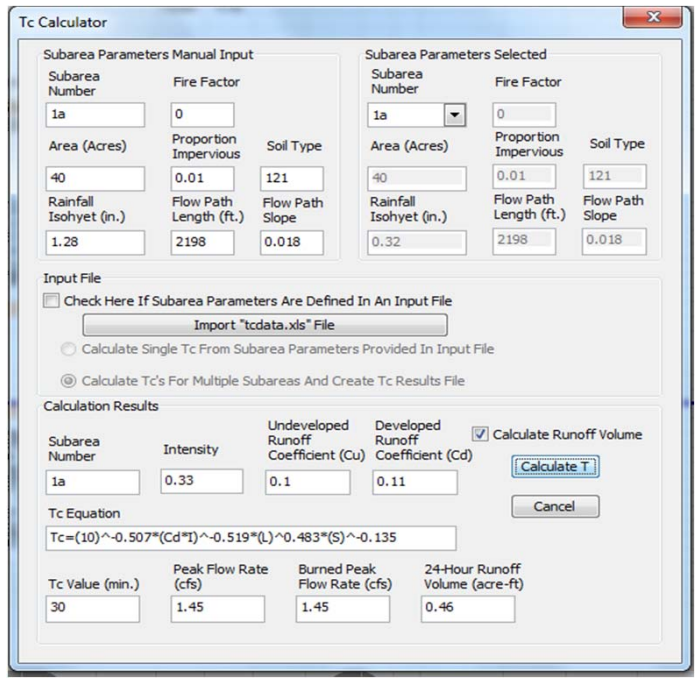

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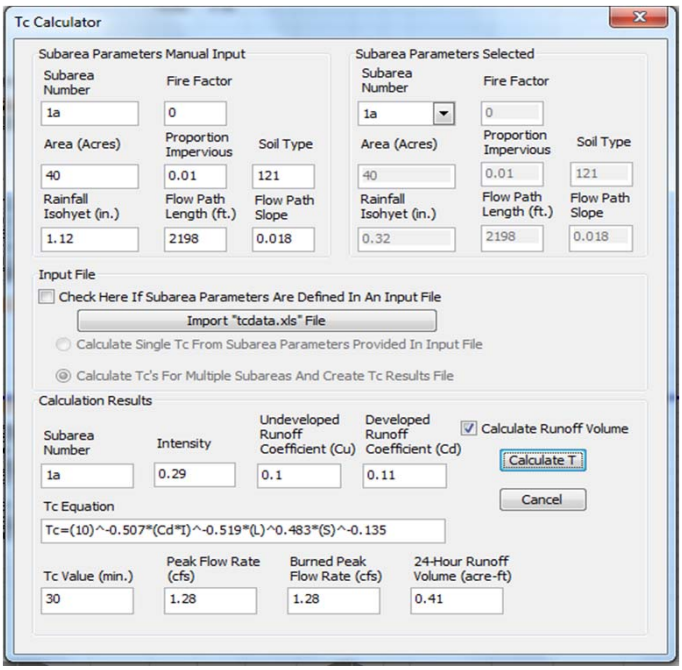
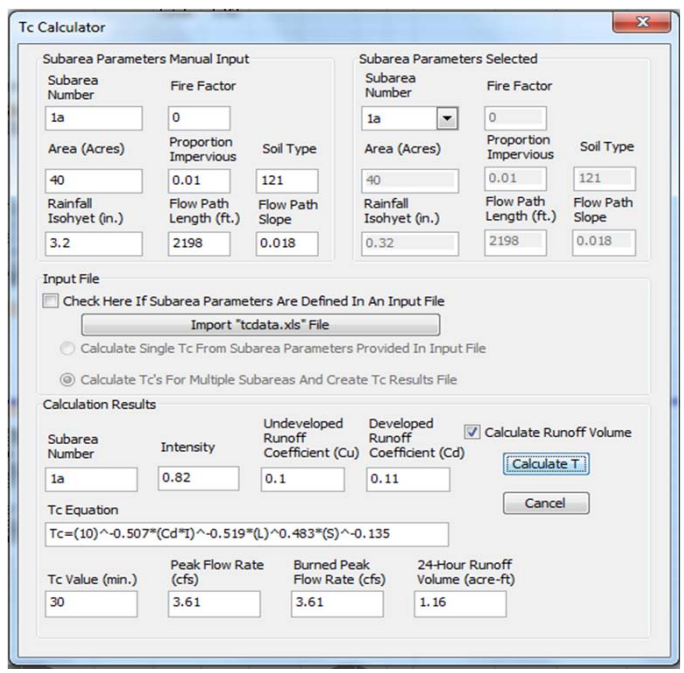
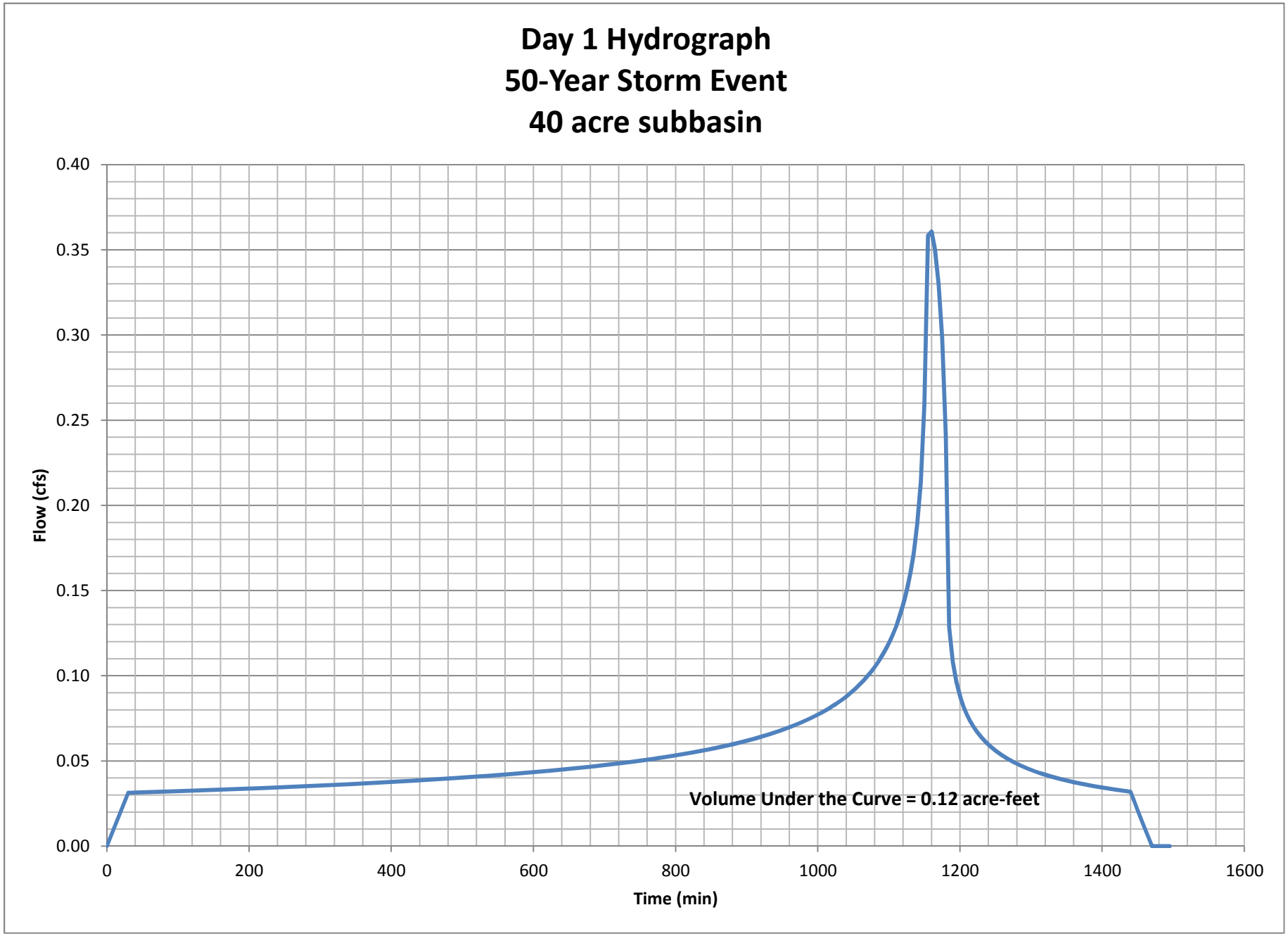
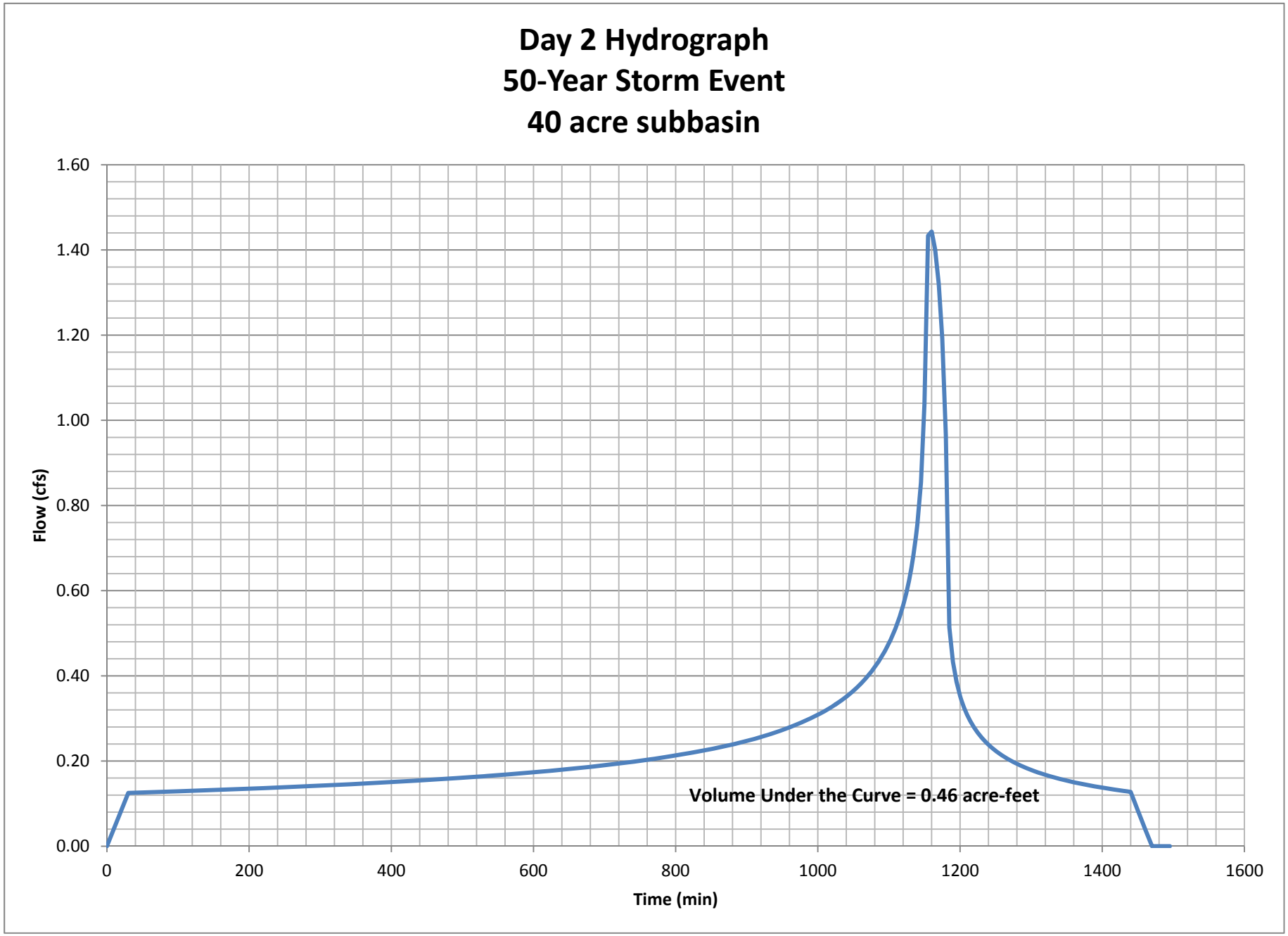
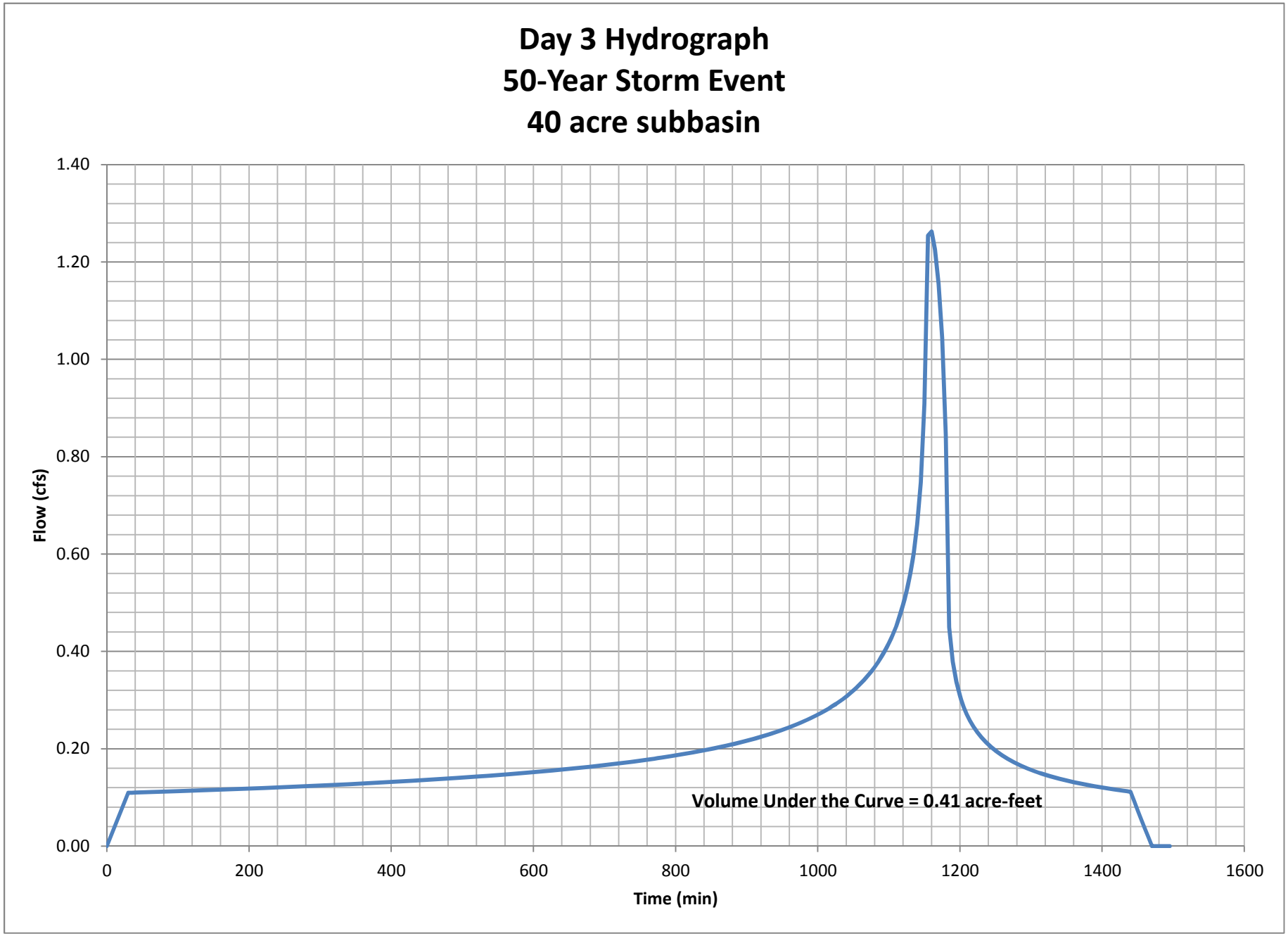


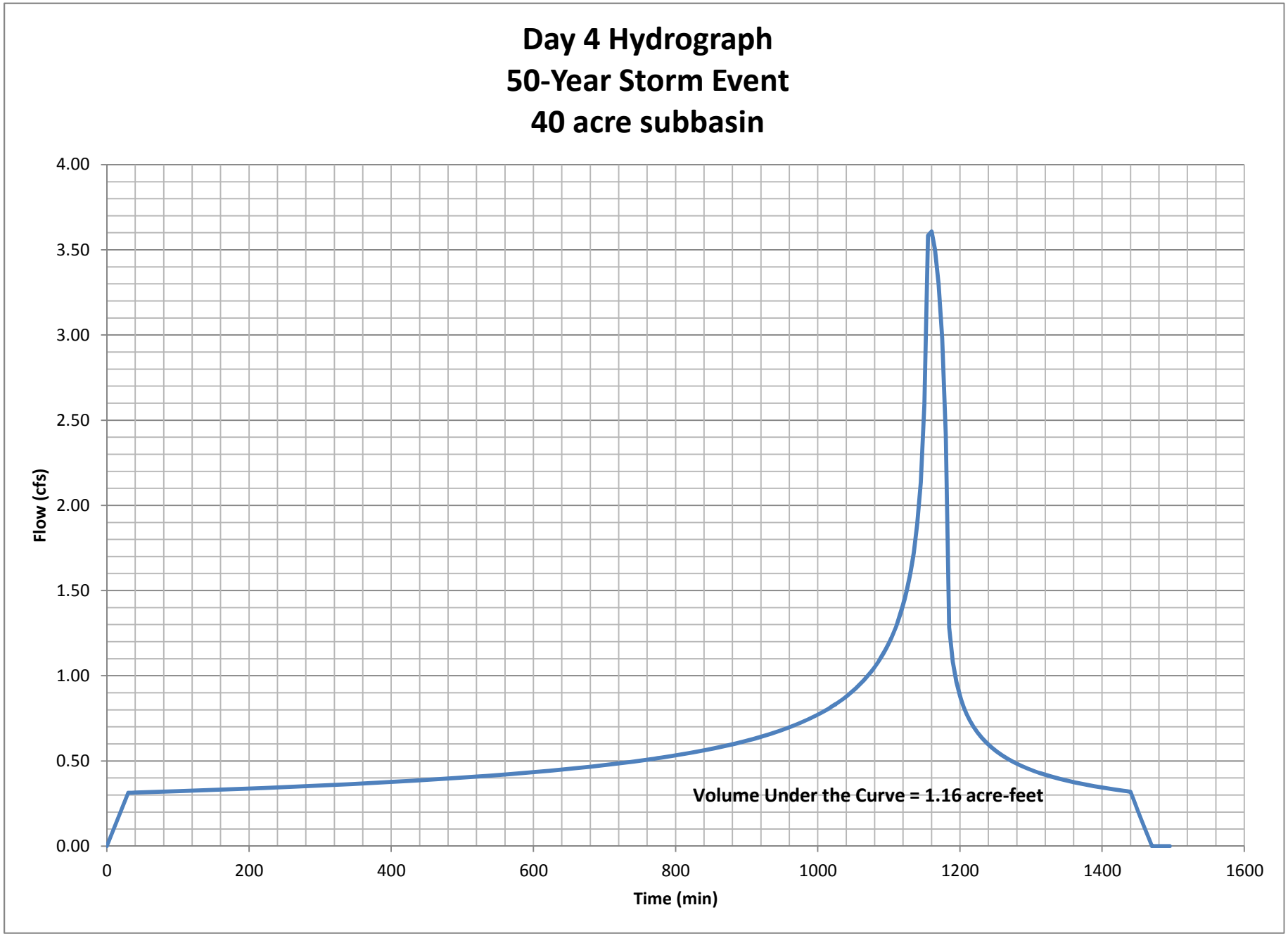
Day 4




Day 1 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.12 acre-feet


Day 2 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.46 acre-feet


Day 3 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 0.41 acre-feet


Day 4 Hydrograph
50-Year Storm Event
40 acre subbasin
Flow (cfs)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0
200
400
600
800
1000
1200
1400
1600
Time (min)
Volume Under the Curve = 1.16 acre-feet

Tc Calculator Outputs

Day	Project	Subarea	Area (acres)	Proportion Impervious	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)	Fire Factor	Burned flow rate (cfs)	Volume (acre-ft)	Volume per Ac-foot
1	Lebata	1a	40	0.01	50	121	2198	0.018	0.32	30	0.08	0.1	0.1	0.35	0	0.35	0.12	0.003
2	Lebata	1a	40	0.01	50	121	2198	0.018	1.28	30	0.33	0.1	0.1	1.45	0	1.45	0.46	0.0115
3	Lebata	1a	40	0.01	50	121	2198	0.018	1.12	30	0.29	0.1	0.1	1.28	0	1.28	0.41	0.01025
4	Lebata	1a	40	0.01	50	121	2198	0.018	3.2	30	0.82	0.1	0.1	3.61	0	3.61	1.16	0.029
								Totals	5.92									

Equivalent Area of the Culvert Flow

Flows (cfs)	Equivalent Area (ac)
10.8	120.0

Flood Volume Generated by Zone

Mining Pit	Zone	Basin Area (Acres)	Day 1 Flood Volume (ac-ft)	Day 2 Flood Volume (ac-ft)	Day 3 Flood Volume (ac-ft)	Day 4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
North	1 --1	382	1.1	4.4	3.9	11.1	20.5
North	1 --2	29	0.1	0.3	0.3	0.8	1.6
North	2--1	273	0.8	3.1	2.8	7.9	14.7
North	2--2	222	0.7	2.6	2.3	6.4	11.9
North	Culvert Flow	120	0.4	1.4	1.2	3.5	**6.5**
	Total	**906**	**3.1**	**11.8**	**10.5**	**29.8**	**55.2**

Total Sheetflow Volume

Pit	Area (acres)	Flood Volume (ac-ft)
North Pit	906	55.2

Direct Rainfall Volume

Day	%	Isohypte in North Pit	40 Acres Volume (acre-ft)	40 Acres NP Volume (acre-ft)	22 Acres SP Volume (acre-ft)
1	10%	0.28	0.1	0.25	0.18
2	40%	1.12	0.41	1	0.73
3	35%	0.98	0.35	0.87	0.64
4	100%	2.8	1.01	2.49	1.82
	Total	5.18	1.87	4.61	3.37
	Average	5.18			
				C=0.27	C=0.36

Phase	Top of the Pit Surface Area (acres)	Flood Volume (ac-ft)	
Phase1-NP	69.5	**30.0**	Large Pit

Direct Rainfall Volume = C*P/12*A
Where C=0.11, P=5.18 in

On-Site Runoff Volume

Phase	Area (acres)	Flood Volume (ac-ft)
Phase 1	41.4	4.8
Small Pond	29	3.3
	70	**8.1**

Notes:[1] NP contains about 8.86 ac cement road (13%)

Captial Flood Volume Received During Phase 1

	Sheetflow Volume (acre-ft)	Culvert Flow From Pearblossom Hwy (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)
Phase 1						
NP	**49**	**7**	**8**	**30**	**93**	**12**

Inundation depth was based on volume and elevation curve created by AutoCAD

Tc Calculator Outputs

Day	Project	Subarea	Area (acres)	Proportion Impervious	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flow rate (cfs)	Fire Factor	Burned flow rate (cfs)	Volume (acre-ft)	Volume per Ac-foot
1	Lebata	1a	40	0.01	50	121	2198	0.018	0.32	30	0.08	0.1	0.11	0.35	0	0.35	0.12	0.003
2	Lebata	1a	40	0.01	50	121	2198	0.018	1.28	30	0.33	0.1	0.11	1.45	0	1.45	0.46	0.0115
3	Lebata	1a	40	0.01	50	121	2198	0.018	1.12	30	0.29	0.1	0.11	1.28	0	1.28	0.41	0.01025
4	Lebata	1a	40	0.01	50	121	2198	0.018	3.2	30	0.82	0.1	0.11	3.61	0	3.61	1.16	0.029
								Totals	5.92									

Equivalent Area of the Culvert Flow

Flows (cfs)	Equivalent Area (ac)
9.93	110.3

Flood Volume Generated by Zone

Mining Pit	Zone	Basin Area (Acres)	Day 1 Flood Volume (ac-ft)	Day 2 Flood Volume (ac-ft)	Day 3 Flood Volume (ac-ft)	Day 4 Flood Volume (ac-ft)	Total Flood Volume (ac-ft)
North	1 --1	382	1.1	4.4	3.9	11.1	20.5
North	1 --2	29	0.1	0.3	0.3	0.8	1.6
South	2--1	271	0.8	3.1	2.8	7.8	14.5
South	2--2	212	0.6	2.4	2.2	6.1	11.4
South	2--3	124	0.4	1.4	1.3	3.6	6.7
South	2--4	195	0.6	2.2	2.0	5.7	10.5
South	2--5	223	0.7	2.6	2.3	6.5	12.0
	Culvert Flow	110	0.3	1.3	1.1	3.2	5.9
	Total	**1,436**	**4.6**	**17.8**	**15.8**	**44.8**	**83.1**

Total Sheetflow Volume

Pit	Area (acres)	Flood Volume (ac-ft)
North Pit	411	22.1
South Pit	1,025	61.0

Direct Rainfall Volume

Day	%	Isohypte in North Pit	Isohypte in South Pit	40 Acres Volume (acre-ft)	40 Acres NP Volume (acre-ft)	22 Acres SP Volume (acre-ft)
1	10%	0.28	0.285	0.1	0.25	0.18
2	40%	1.12	1.14	0.41	1	0.73
3	35%	0.98	0.9975	0.35	0.87	0.64
4	100%	2.8	2.85	1.01	2.49	1.82
	Total	5.18	5.2725	1.87	4.61	3.37
	Average	5.22625				
					C=0.27	C=0.36

Phase	Top of the Pit Surface Area (acres)	Flood Volume (ac-ft)	
Final Reclamation-NP	69.5	30.0	Large Pit
	28.6	12.3	Small Pond
Final Reclamation-SP	151.3	65.3	

Direct Rainfall Volume = C*P/12*A
Where C=0.11, P=5.18 in

On-Site Runoff Volume

Phase	Area (acres)	Flood Volume (ac-ft)		
Final Reclamation-NP[1]	41.4	4.8	3.3	1.4
Final Reclamation-SP[2]	22	3.4		

Notes:[1] NP contains about 8.86 ac cement road
[2] SP contains about 7.145 ac cement road

Captial Flood Volume Received During Final Phase

	Sheetflow Volume (acre-ft)	Culvert Flow From Pearblossom Hwy (acre-ft)	On-Site Runoff Volume (acre-ft)	On-Site Direct Rainfall Volume (acre-ft)	Total Capital Flood Volume (acre-ft)	Inundation Depth (ft)	
Final Configuration							
North Pit-1	22	0	3	30	55	11	
North Pit-2	0	0	1	12	14	X	
South Pit	55	6	3	65	130	13	Elev 2878'

Inundation depth was based on volume and elevation curve created by AutoCAD

Emptying Time

Lower Facilities Alternative

North Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ft	ft	ac-ft
1	93.0	2,857	4,536	0.8	0.01	36.6813	0.057	21.6	1	1.23	23.062	0.018	0.42	12	10	54.7
2	54.7	2,855	4,536	0.6	0.01	26.3994	0.057	15.4	1	0.88	16.433	0.018	0.30	10	9	27.1
3	27.1	2,854	4,536	0.5	0.01	21.4505	0.057	12.3	1	0.70	13.127	0.018	0.24	9	5	4.7
4	4.7	2,850	4,536	0.1	0.01	5.3559	0.057	2.5	1	0.14	2.704	0.018	0.05	5	3	0.0
5	0.0	2,848	4,536	0.0	0.01	1.5968	0.057	0.7	1	0.04	0.742	0.018	0.01	3	0	0.0
6	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A

Emptying Time

Lower Facilities Alternative

North Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ft	ft	ac-ft
1	55.0	2,855	4,536	0.6	0.01	26.3994	0.057	15.4	1	0.88	16.433	0.018	0.30	10	8	27.4
2	27.4	2,853	4,536	0.4	0.01	16.6843	0.057	9.1	1	0.52	9.826	0.018	0.18	8	7	10.0
3	10.0	2,852	4,536	0.3	0.01	12.3459	0.057	6.3	1	0.36	6.812	0.018	0.12	7	0	0.0
4	0.0		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A
5	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A
6	#N/A		4,536	#N/A	0.01	#N/A	0.057	#N/A	1	#N/A	#N/A	0.018	#N/A	0	0	#N/A

Emptying Time

Lower Facilities Alternative

South Pit

t	V_i	WS, Elev.	K_H	A_H	i_H	V_H loss	K_V	A_V	i_v	V_V loss	A_E	E	V_E Loss	Total Vloss	Initial Water Depth	Final Water Depth	Vfinal
day	ac-ft	ft	ft/day	ac	ft/ft	ac-ft	ft/day	ac	ft/ft	ac-ft	ac	ft/day	ac-ft	ac-ft	ft	ft	ac-ft
1	130.0	2,880	4536.0	0.7	0.0	32.6	0.1	25.3	1.0	1.4	26.7	0.0	0.5	34.5	13	11	95.5
2	95.5	2,878	4536.0	0.6	0.0	25.0	0.1	20.1	1.0	1.1	21.1	0.0	0.4	26.6	11	10	69.0
3	69.0	2,877	4536.0	0.5	0.0	21.5	0.1	17.4	1.0	1.0	18.3	0.0	0.3	22.8	10	8	46.2
4	46.2	2,875	4536.0	0.3	0.0	14.9	0.1	12.2	1.0	0.7	12.8	0.0	0.2	15.8	8	7	30.4
5	30.4	2,874	4536.0	0.3	0.0	12.0	0.1	9.8	1.0	0.6	10.3	0.0	0.2	12.7	7	6	17.7
6	17.7	**2,873**	4536.0	0.2	0.0	9.3	0.1	7.7	1.0	0.4	8.0	0.0	0.1	9.9	6	4	7.7
7	7.7	2,871	4536.0	0.1	0.0	5.1	0.1	4.1	1.0	0.2	4.3	0.0	0.1	5.4	4	3	2.3
8	2.3	2,870	4536.0	0.1	0.0	3.4	0.1	2.7	1.0	0.2	2.8	0.0	0.1	3.6	3	0	0.0
9	0.0		4536.0	#N/A	0.0	#N/A	0.1	#N/A	1.0	#N/A	#N/A	0.0	#N/A	#N/A	0	0	#N/A
10	#N/A		4536.0	#N/A	0.0	#N/A	0.1	#N/A	1.0	#N/A	#N/A	0.0	#N/A	#N/A	0	0	#N/A
11	#N/A		4536.0	#N/A	0.0	#N/A	0.1	#N/A	1.0	#N/A	#N/A	0.0	#N/A	#N/A	0	0	#N/A

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 9

Traffic Impact Analysis

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County of Los Angeles

LEBATA INC.
BIG ROCK CREEK
SURFACE MINING PROJECT
Traffic Impact Analysis

March 2013

AUSTIN-FOUST ASSOCIATES, INC.

FINAL

County Of Los Angeles

LEBATA INC. BIG ROCK CREEK SURFACE MINING PROJECT TRAFFIC IMPACT ANALYSIS

Prepared by:

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March 8, 2013

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1.0 INTRODUCTION

This report presents the results of a traffic analysis performed for the proposed Lebata Inc. Big Rock Creek Surface Mining Project consisting of mining operations, a ready-mix concrete plant, an asphaltic concrete plant, a Vac-Lite plant, and a raw cement transfer and aggregate distribution facility off Avenue T in the Antelope Valley in unincorporated Los Angeles County. This report has been prepared for submittal in support of the analysis of the proposed project.

1.1 PROJECT DESCRIPTION

The project site is an approximately 310-acre site located on the Big Rock Creek fan deposit, which extends northward from the San Gabriel Mountains for about eight miles off Avenue T in the Antelope Valley in unincorporated Los Angeles County. The site is located in a relatively remote and undisturbed area of the Antelope Valley on the south side of Avenue T between 126th Street East and 136th Street East. Figure 1-1 illustrates the location of the project site. The site is bisected by Union Pacific Railroad tracks. The surrounding land use is vacant land. A few homes are located about a mile east of the project boundary. A site plan is illustrated in Figure 1-2. The proposed project would be developed for mining, a ready-mix concrete plant, an asphaltic concrete plant, a Vac-Lite plant, and a raw cement transfer and aggregate distribution facility.

Regional access to the project site is provided from Pearblossom Highway (SR-138). The major roadways that provide access to the project site include 106th Street East approximately 2.75 miles west of the project site and Avenue T immediately north of the site.

1.2 ANALYSIS SCOPE

Project impacts are analyzed under existing, background and cumulative settings. Improvements, if necessary as a result of the proposed project, are then identified.

The proposed project is subject to analysis criteria contained in the Los Angeles County Traffic Impact Analysis Report Guidelines, as well as the Congestion Management Program (CMP) for the County of Los Angeles and Traffic Impact Study (TIS) guidelines from the California Department of

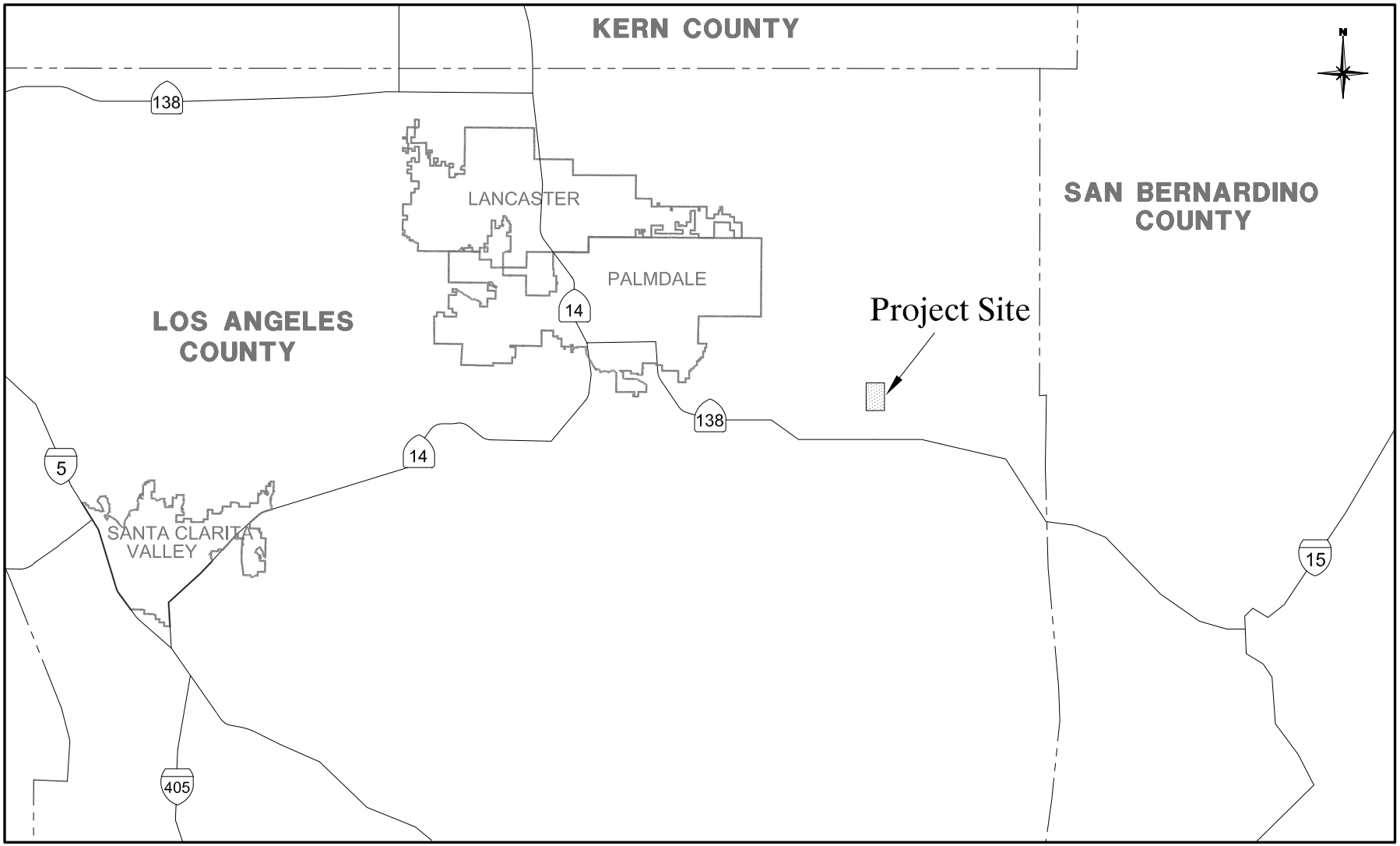


Figure 1-1

PROJECT VICINITY MAP

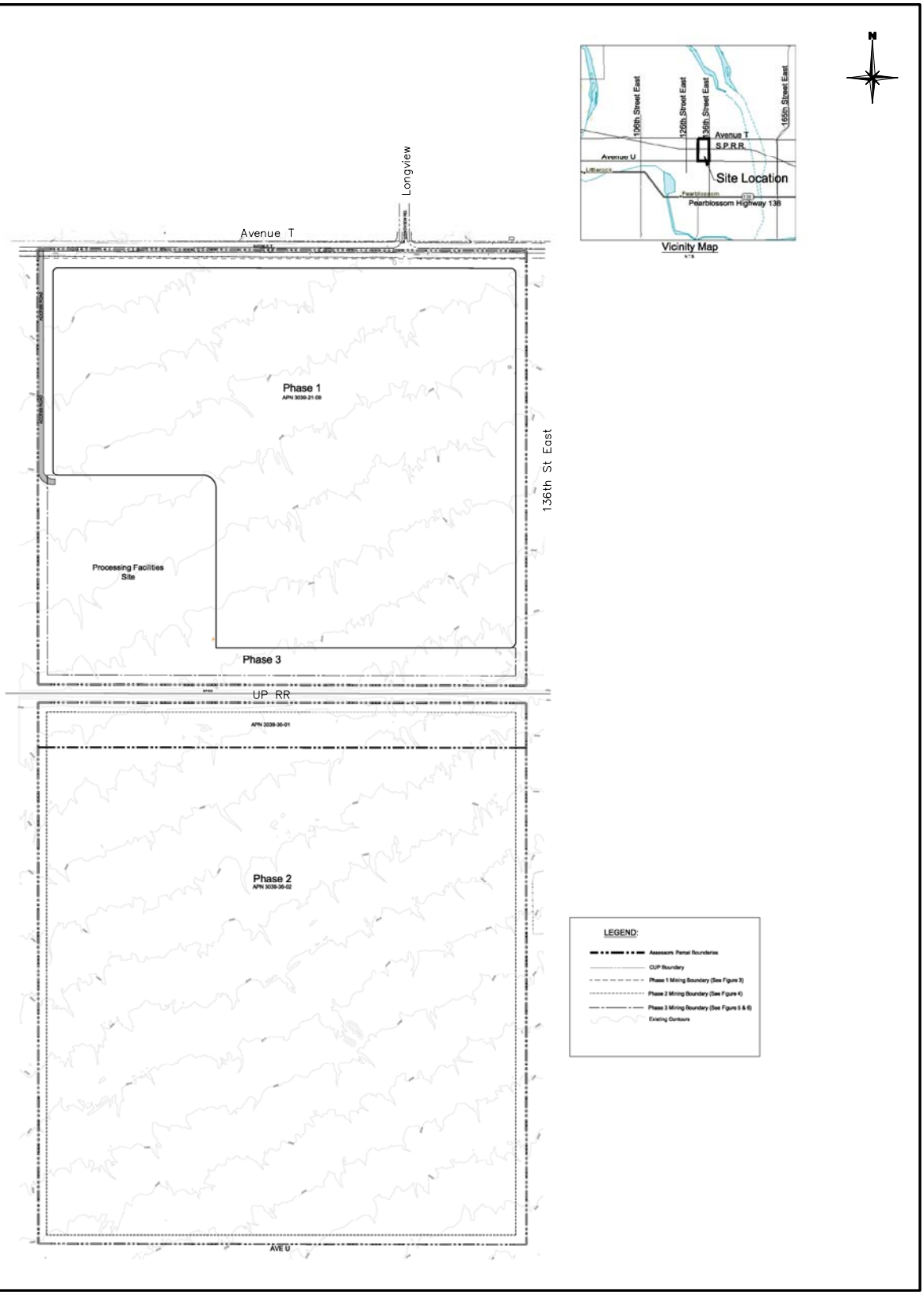


Figure 1-2

PROJECT SITE PLAN AND VICINITY MAP

Transportation (Caltrans). This traffic analysis examines the impacts of adding the new project-generated traffic to existing and future traffic on the surrounding arterial network.

1.3 LOS ANGELES COUNTY TRAFFIC IMPACT ANALYSIS METHODOLOGY

The proposed project is subject to analysis under the Los Angeles County Traffic Impact Analysis Report Guidelines. The County requires analysis of projects generating more than 500 daily trips, and specifies a study area within a one-mile radius of the project site. The proposed project will generate approximately 774 daily trips, and due to the long-distance nature of the truck traffic generated by the project, the study area includes intersections up to eight miles from the project site and freeway segments as far as 40 miles from the site.

Los Angeles County utilizes the intersection capacity utilization (ICU) methodology for analysis of signalized study intersections. The ICU is a means of representing the peak hour volume to capacity (V/C) ratio at signalized intersections. The County assumes a capacity of 1,600 vehicles per hour per lane (vphpl) and 2,880 vehicles per hour (vph) for dual left-turns lanes. Project impacts are considered significant if the project related V/C increase is .04 or more at level of service (LOS) “C”, .02 or more at LOS “D”, or .01 or more at LOS “E” or “F.” Traffic flow quality for each LOS is described in Table A-1 in Appendix A.

The ICU methodology assumes signalization of the intersection. Four study intersections are currently stop-controlled. For these study intersections, the Highway Capacity Manual (HCM) delay methodology was used to determine the intersection LOS and project impacts. Project impacts are considered significant if the project causes a stop-controlled intersection to worsen from LOS “A”, “B”, or “C” to LOS “D”, “E”, or “F”, increases the average delay at LOS “D” by 5 seconds per vehicle, or increases the average delay at LOS “E” or “F” by 2.5 seconds/vehicle.

The project’s impacts on two-lane roadways used for project access are also determined. Avenue T is a two-lane roadway that provides the main access to the project site. Tables 1-1 and 1-2 summarize the County’s significant impact thresholds for intersections and two-lane roadways, respectively.

Table 1-1

SIGNIFICANT IMPACT THRESHOLDS – INTERSECTIONS

Preproject		
LOS	**V/C**	**Project V/C Increase**
C	0.71 to 0.80	0.04 or more
D	0.81 to 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

Source: Los Angeles County Traffic Impact Analysis Report Guidelines.

Preproject		
LOS	**Delay**	**Project Delay Increase**
C	0 to 25 sec/veh	Cause LOS "D" or worse
D	25.1 to 35 sec/veh	5 sec/veh or more
E/F	35.1 sec/veh or more	2.5 sec/veh or more

Source: County of Los Angeles Department of Public Works Staff

Table 1-2

SIGNIFICANT IMPACT THRESHOLDS – TWO-LANE ROADWAYS

Directional Split	**Total Capacity (PCPH)**	**Percentages Increase in Passenger Car Per Hour (PCPH) by Project Preproject LOS**		
		C	**D**	**E/F**
50/50	2,800	4	2	1
60/40	2,650	4	2	1
70/30	2,500	4	2	1
80/20	2,300	4	2	1
90/10	2,100	4	2	1
100/0	2,000	4	2	1

Source: Los Angeles County Traffic Impact Analysis Report Guidelines.

1.3.1 Los Angeles County Congestion Management Program

The proposed project is subject to a CMP analysis if the project is not determined to be exempt under the CMP guidelines for the County of Los Angeles. The goals of the CMP are to reduce traffic congestion and provide a mechanism for coordinating land use development and transportation decisions. Each development project is required to be analyzed for impacts from measurable project-generated traffic and determine if the impacts will cause CMP intersections or links to exceed their LOS standards, thereby requiring feasible mitigation measures to maintain the adopted LOS standard.

CMP monitoring intersections where the project will add 50 or more trips during the AM or PM weekday peak hours shall be analyzed. In addition, mainline freeway monitoring locations where the project will add 150 or more trips in either direction during the AM or PM weekday peak hours shall be included. Although the project adds less than 50 peak hour trips to any intersection, CMP monitoring intersections which are included in this analysis are Fort Tejon Road at Pearblossom Highway/Avenue T and 82nd Street East at Pearblossom Highway. No CMP mainline freeway monitoring locations are included in this analysis since the project adds significantly less than 150 peak hour trips to any mainline freeway segment.

The CMP utilizes the ICU methodology for determining project impacts, with the same capacity assumptions outlined above. For purposes of the CMP, a significant impact occurs when the proposed project increases the V/C ratio by .02 or more, causing or worsening LOS "F" at the intersection.

1.3.2 State of California (CALTRANS) Traffic Impact Study Guidelines

The proposed project is also subject to analysis under Caltrans guidelines. Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" for freeway roadway segments and ramps using the guidelines in Table A-2 in Appendix A from the Caltrans *Guide for Preparation of Traffic Impact Studies, State of California, December 2002*.

These guidelines require preparation of a TIS based upon the following criteria:

1. Generates over 100 peak hour trips assigned to a State highway facility.
2. Generates 50 to 100 peak hour trips assigned to a State highway facility – and, affected State highway facilities are experiencing noticeable delay; approaching unstable traffic flow conditions (LOS "C" or "D").

3. Generates 1 to 49 peak hour trips assigned to a State highway facility – the following are examples that may require a full TIS or some lesser analysis:

    a. Affected State highway facilities experiencing significant delay; unstable or forced traffic flow conditions (LOS "E" or "F").

    b. The potential risk for a traffic incident is significantly increased (i.e., congestion related collisions, non-standard sight distance considerations, increase in traffic conflict points, etc.).

    c. Change in local circulation networks that impact a State highway facility (i.e., direct access to State highway facility, a non-standard highway geometric design, etc.).

Note, later in this report the project's peak hour trip generation will show to be 18 vph, only a portion of which will utilize State highway facilities, which means this project falls into Category 3 above.

1.4 STUDY AREA ANALYSIS LOCATIONS

The project will provide a source for Portland Concrete Cement (PCC) grade aggregate throughout southern California, and on-going construction projects will derive materials 24 hours a day from sources available, even if long distance hauling is required. A generalized market demand has been identified with the project serving the PCC grade aggregate material needs for Los Angeles County, Riverside County, San Bernardino County and Orange County locations. Providing a regional source for PCC grade aggregate serves to reduce haul distances and the associated impacts. Based on these guidelines and the major market areas for aggregate materials, seven intersections and six State highway facility segments along the expected truck routes within the project's sphere of influence have been included in the traffic impact analysis for the AM and PM peak hours. These intersections and State highway segments are summarized in the following list:

Intersections

1. Fort Tejon Rd (SR-138) & Pearblossom Hwy/Ave T
2. 82nd St East & Pearblossom Hwy (SR-138)
3. 106th St East & Pearblossom Hwy (SR-138)
4. 106th St East & Ave T
5. 116th St East & Ave T
6. 165th St East & Ave T
7. 165th St East & Pearblossom Hwy (SR-138)

State Highway Segments

1. SR-138 w/o Ave T
2. SR-138 e/o Ave T
3. SR-138 w/o I-15 Junction
4. SR-14 s/o SR-138 Junction
5. SR-14 n/o I-5 Junction
6. I-5 s/o SR-14 Junction

1.5 ANALYSIS METHODOLOGY

Traffic volumes generated by the proposed development are incrementally added to future forecast volumes before evaluating the project impacts to intersection and State highway segment level of service and capacity.

In conformance with the County of Los Angeles requirements, AM and PM peak hour intersection operations at signalized locations are evaluated using ICU methodology. Stop-controlled and Caltrans locations are analyzed using methodology contained in the HCM.

Overall traffic mitigation improvements, if any, are recommended based on the intersection and State highway segment LOS analyses. The principal objectives were to determine the anticipated traffic impacts that would likely result from the proposed project, and to recommend improvements and modifications necessary to improve roadway capacities and operational efficiencies to mitigate those impacts attributed directly to project traffic.

The traffic impact analysis guidelines require identification of traffic impacts under background (i.e., opening day) and cumulative conditions.

1.6 DEFINITIONS

Certain terms used throughout this report are defined below to clarify their intended meaning:

ADT	Average Daily Traffic.
Delay	Seconds of delay. HCM uses the calculated seconds of delay for movements to determine total intersection seconds of delay and the level of service.
LOS	Level of Service. A scale used to evaluate circulation system performance based on intersection seconds of delay values or volume/capacity ratios of arterial segments. The levels range from "A" to "F", with LOS "A" representing free flow traffic and LOS "F" representing severe traffic congestion.
Measurable Traffic	A traffic volume resulting in a one percent (1%) increase in the volume/capacity ratio of the sum of all critical movements.

Peak Hour	This typically refers to the hour during the AM peak period (typically 6 AM - 9 AM) or the PM peak period (typically 4 PM - 6 PM) in which the greatest number of vehicle trips are generated by a given land use or are traveling on a given roadway.
Trips	Expressed in terms of vehicle trip ends (TE) where a trip end is a one-way vehicular movement either entering or departing the study site.
Trip Rates	A representative trip generation rate that is applied to a particular land use to calculate both AM and PM peak hour and ADT trips by land use.
VPD	Vehicles per Day. This has the same meaning as ADT but is generally used in a trip generation context rather than in reference to the highway volume of an arterial segment.
VPH	Vehicles per Hour.
V/C	Volume to Capacity Ratio. This is typically described as a percentage of capacity utilized by existing or projected traffic on a segment of arterial or an intersection turn movement.

1.7 REFERENCES

1. "Trip Generation, Seventh Edition," Institute of Transportation Engineers, 2003.
2. "Highway Capacity Manual 2000," Transportation Research Board, National Research.
3. "Guide for Preparation of Traffic Impact Studies," State of California, December 2002.
4. "Congestion Management Program for the County of Los Angeles," Metropolitan Transportation Authority, 2004.
5. "North County Combined Highway Corridors Study-Final Report," Parsons Transportation Group, June 2004.
6. "Existing and Future Conditions Final Report-North County Combined Highway Corridor Study-Part II State Route 138," Parsons Transportation Group, March 2003.
7. "Appendices-Existing and Future Conditions Final Report-North County Combined Highway Corridor Study-Part II State Route 138," Parsons Transportation Group, March 2003.

2.0 TRANSPORTATION SETTING

This chapter describes the transportation setting for the traffic analysis. First, the existing circulation roadway network is discussed and existing traffic volumes and levels of service are summarized. Then background (opening day) conditions are derived based on forecasts presented in the *North County Combined Highway Corridors Study – Final Report* and the Los Angeles County Congestion Management Program.

2.1 SURROUNDING HIGHWAY NETWORK

The proposed project is located in a relatively remote and undisturbed area of the Antelope Valley off Avenue T in unincorporated Los Angeles County. Project traffic will access the site from a roadway with a connection to Avenue T. Avenue T is a two-lane undivided arterial with a 55-mph speed limit in the project vicinity. West of Fort Tejon Road (approximately eight miles west of the site), Avenue T becomes Pearblossom Highway.

Regional access to the project vicinity is provided by 106th Street East at Pearblossom Highway (SR-138) approximately six miles southwest of the site. Pearblossom Highway varies from two lanes to four lanes from east of 165th Street East to Avenue T. West of the intersection with Avenue T, Pearblossom Highway becomes a four-lane divided highway and is no longer designated as SR-138. SR-138 continues north and west along Fort Tejon Road, 47th Street East, and Palmdale Boulevard.

2.2 EXISTING TRAFFIC CONDITIONS

Seven intersections were identified for analysis, two of which are Congestion Management Program (CMP) monitoring intersections. Existing peak hour intersection volumes are from counts taken in March 2007 and August 2008 (Appendix F). The "peak hour" volume is determined from the highest four consecutive fifteen-minute periods between 7:00 and 9:00 AM and between 4:00 and 6:00 PM at each intersection, and might not be the same one-hour period from one intersection to the next. For example, the AM peak hour volume for the intersection of Fort Tejon Road at Pearblossom Highway/Avenue T occurs from 7:00 to 8:00 whereas the peak hour volume at 82nd Street at Pearblossom Highway occurs from 8:00 to 9:00. This ensures that the analysis evaluates the worst-case peak hour condition at each intersection.

Counts were collected for the approach volumes at 106th Street at Avenue T, 106th Street at Pearblossom Highway, 116th Street at Avenue T, and 165th Street at Avenue T. The turning movement volumes for these intersections were estimated from the percentage of traffic from each leg and adjusted to balance the flow of traffic between adjacent intersections.

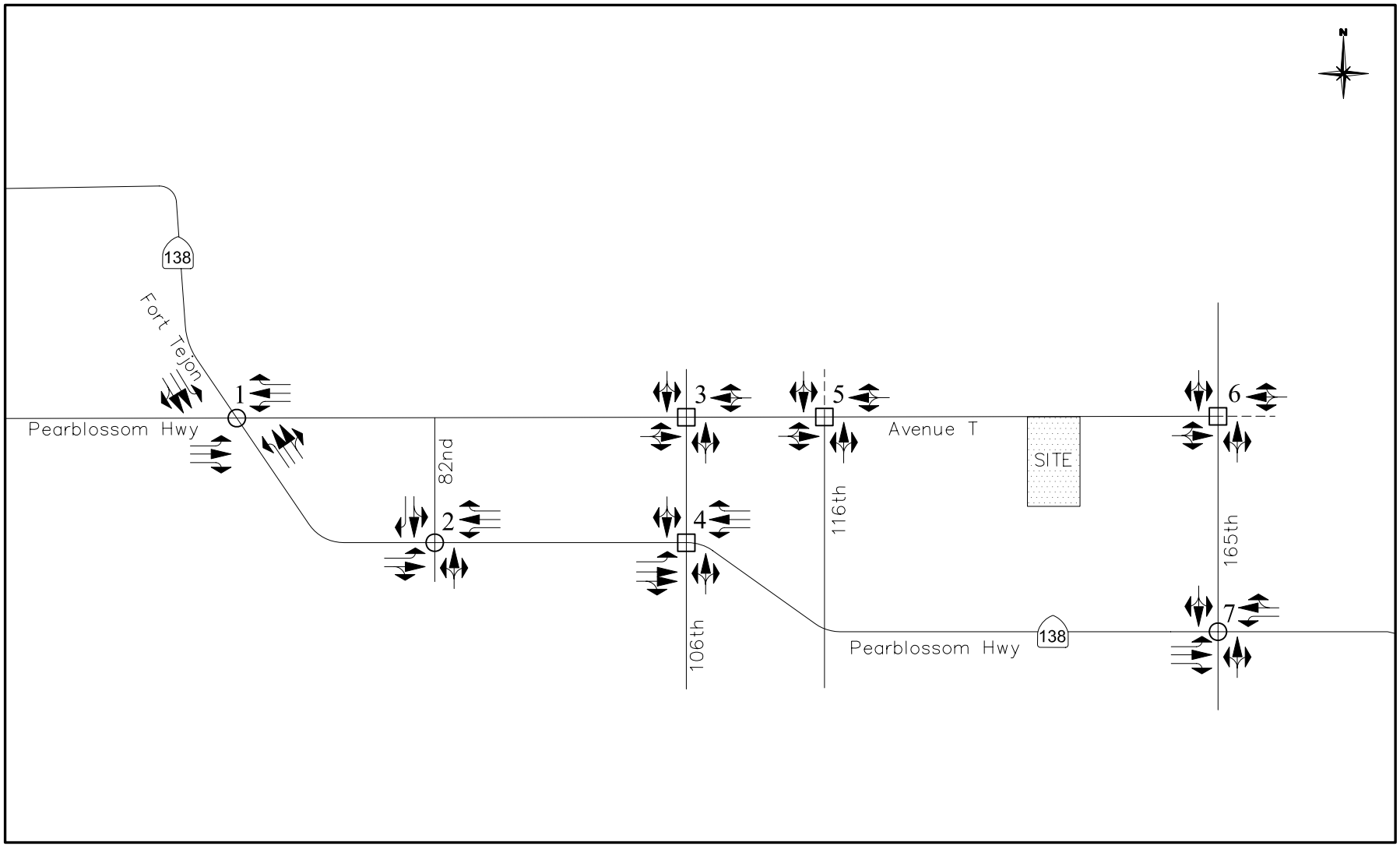
Traffic counts were collected in 2012 to verify that the original count data is still valid. The results of the 2012 traffic counts reveal that traffic volumes overall in the study area have decreased since 2007 and 2008; therefore, the traffic analysis is based on the original count data to provide a more conservative impact analysis.

Figure 2-1 illustrates the locations of the study intersections and the existing traffic control at each location. Existing AM and PM peak hour volumes are illustrated in Figure 2-2. In addition, six State highway segments were included in the analysis. Existing State highway traffic volumes are from the most current count data available from Caltrans.

Existing levels of service (LOS) for the study intersections are presented in Table 2-1 (actual ICU calculations are included in Appendix A and delay calculations are included in Appendix B). The LOS is a scale used to evaluate circulation system performance based on volume/capacity (V/C) ratios. The levels range from “A” to “F”, with LOS “A” representing free flow traffic and LOS “F” representing severe traffic congestion. As discussed in Chapter 1.0, signalized intersections are evaluated using intersection capacity utilization (ICU) methodology and stop-controlled intersections are evaluated using Highway Capacity Manual (HCM) delay methodology.

An examination of Table 2-1 reveals that the study intersections are currently operating at LOS “D” or better during the AM and PM peak hours.

State highway segment LOS is summarized in Table 2-2 (actual State highway segment density calculations are included in Appendix C). All study area State highway segments currently operate at LOS “D” or better, with the exception of southbound I-5 south of SR-14 which currently operates at LOS “F” during the peak hour.

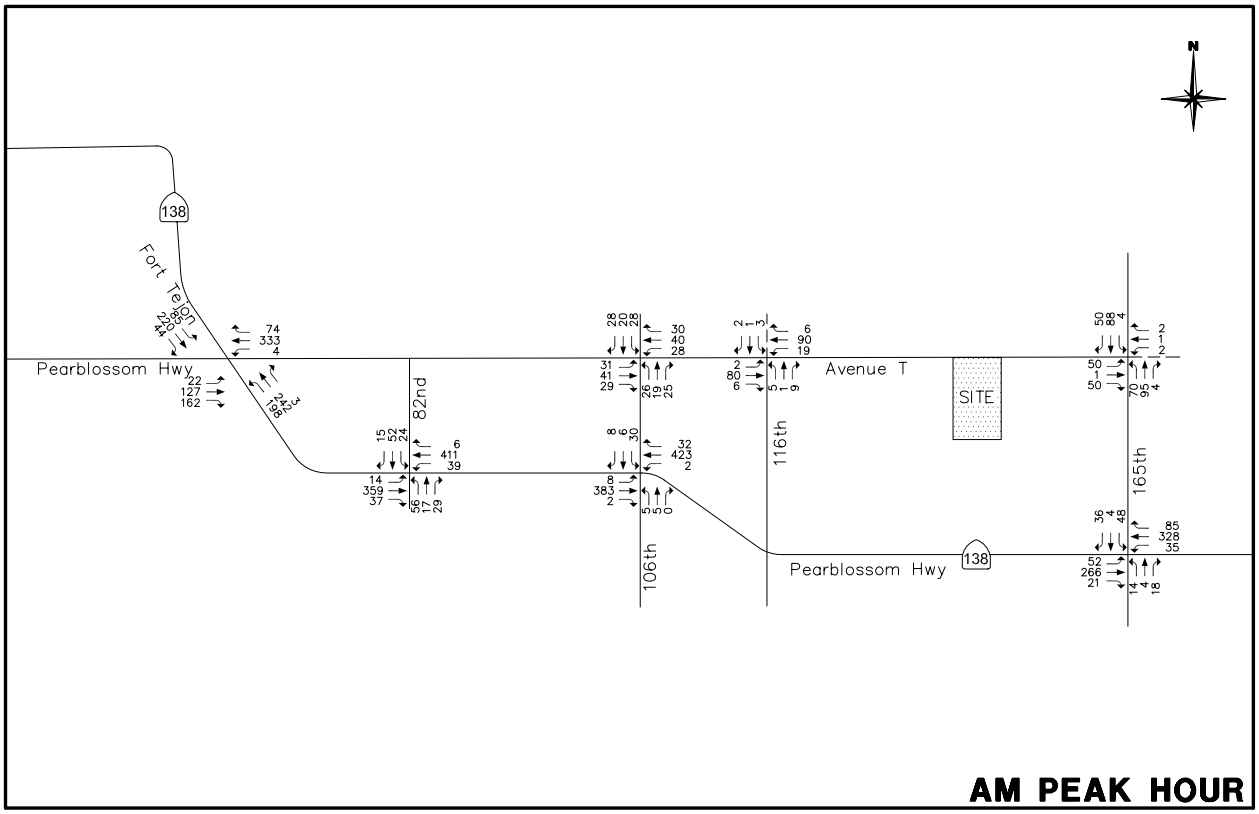


Legend

- ○ Signalized study intersection
- □ Stop-controlled study intersection
- – – – – Dirt road

Figure 2-1

STUDY INTERSECTION LOCATION
AND EXISTING INTERSECTION CONTROL



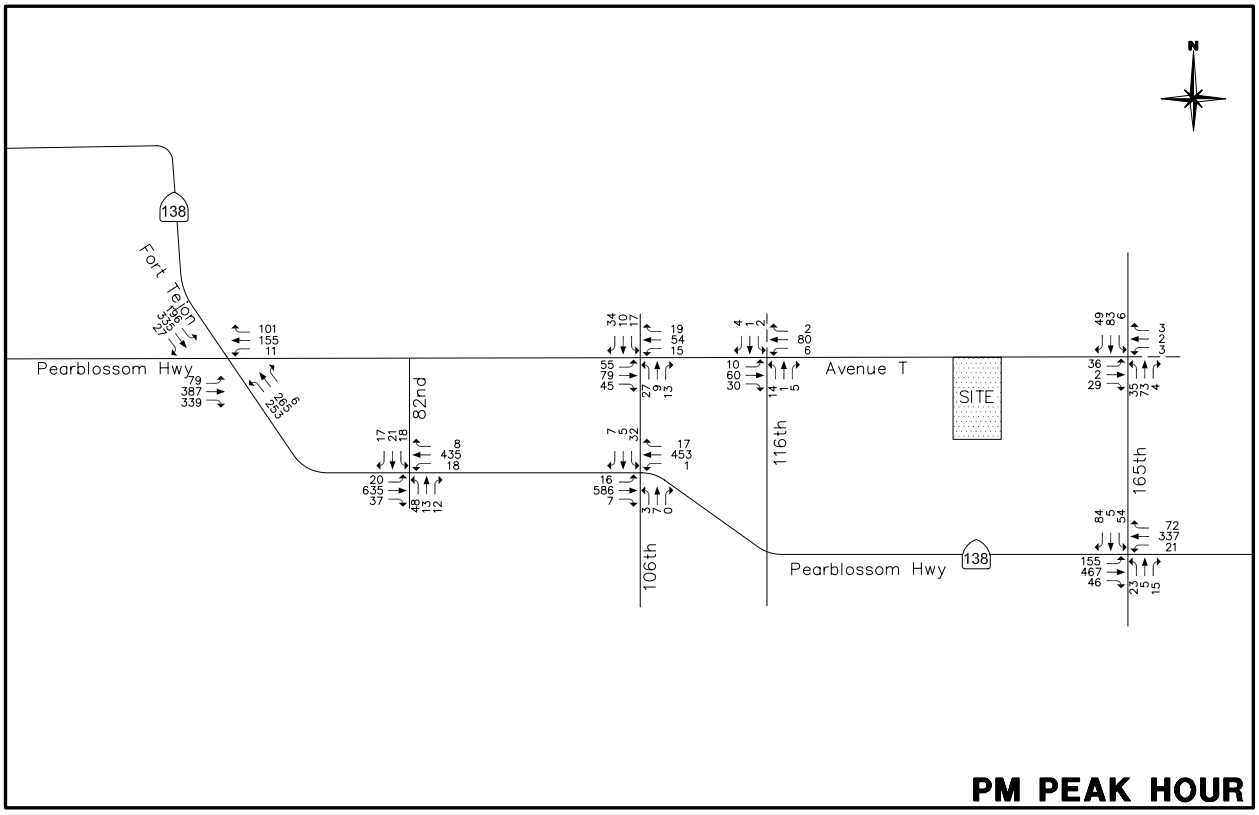


Figure 2-2

EXISTING
PEAK HOUR INTERSECTION VOLUMES

Table 2-1

INTERSECTION LOS SUMMARY – EXISTING CONDITIONS

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		ICU/Delay	LOS	ICU/Delay	LOS
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	.56	A	.66	B
2. 82nd St & Pearblossom Hwy	Signal	.52	A	.67	B
3. 106th St & Ave T	Stop	8	A	8	A
4. 106th St & Pearblossom Hwy	Stop	20	C	27	D
5. 116th St & Ave T	Stop	10	A	10	A
6. 165th St & Ave T	Stop	11	B	10	B
7. 165th St & Pearblossom Hwy	Signal	.46	A	.54	A

Level of services ranges:

Signalized		Stop-Controlled	
.00 – .60	A	0.0 – 10.0 sec/veh	A
.61 – .70	B	10.1 – 15.0 sec/veh	B
.71 – .80	C	15.1 – 25.0 sec/veh	C
.81 – .90	D	25.1 – 35.0 sec/veh	D
.91 – 1.00	E	35.1 – 50.0 sec/veh	E
Above 1.00	F	Above 50.0 sec/veh	F

Note: Signalized intersection LOS based on ICU, stop-controlled intersection LOS based on delay (sec/veh).

Table 2-2

STATE HIGHWAY SEGMENT LOS SUMMARY – EXISTING CONDITIONS

Roadway Segment	Terrain	Dir	Number of Lanes	Percent Trucks	Peak Hour Volume	Density (pc/mi/ln)	LOS
SR-138 w/o Ave T	Level	EB	2	10	743	6.2	A
		WB	2	12	908	7.6	A
SR-138 e/o Ave T	Level	EB	2	9	810	6.7	A
		WB	2	10	990	8.3	A
SR-138 w/o I-15	Level	EB	1	9	833	13.8	B
		WB	1	9	1,018	16.9	B
SR-14 s/o SR-138	Rolling	NB	2	10	2,970	28.5	D
		SB	3	10	3,630	22.2	C
SR-14 n/o I-5	Rolling	NB	6	10	5,670	17.2	B
		SB	5	10	6,930	26.0	C
I-5 s/o SR-14	Rolling	NB	6	11	9,315	31.1	D
		SB	6	11	11,385	**	F*

* Denotes exceeds LOS "D"
** Denotes exceeds programmed calculated threshold range

Level of service ranges:

Freeway Density	
0 – 11.0 pc/mi/ln	A
11.1 – 18.0 pc/mi/ln	B
18.1 – 26.0 pc/mi/ln	C
26.1 – 35.0 pc/mi/ln	D
35.1 – 45.0 pc/mi/ln	E
Above 45.0 pc/mi/ln	F

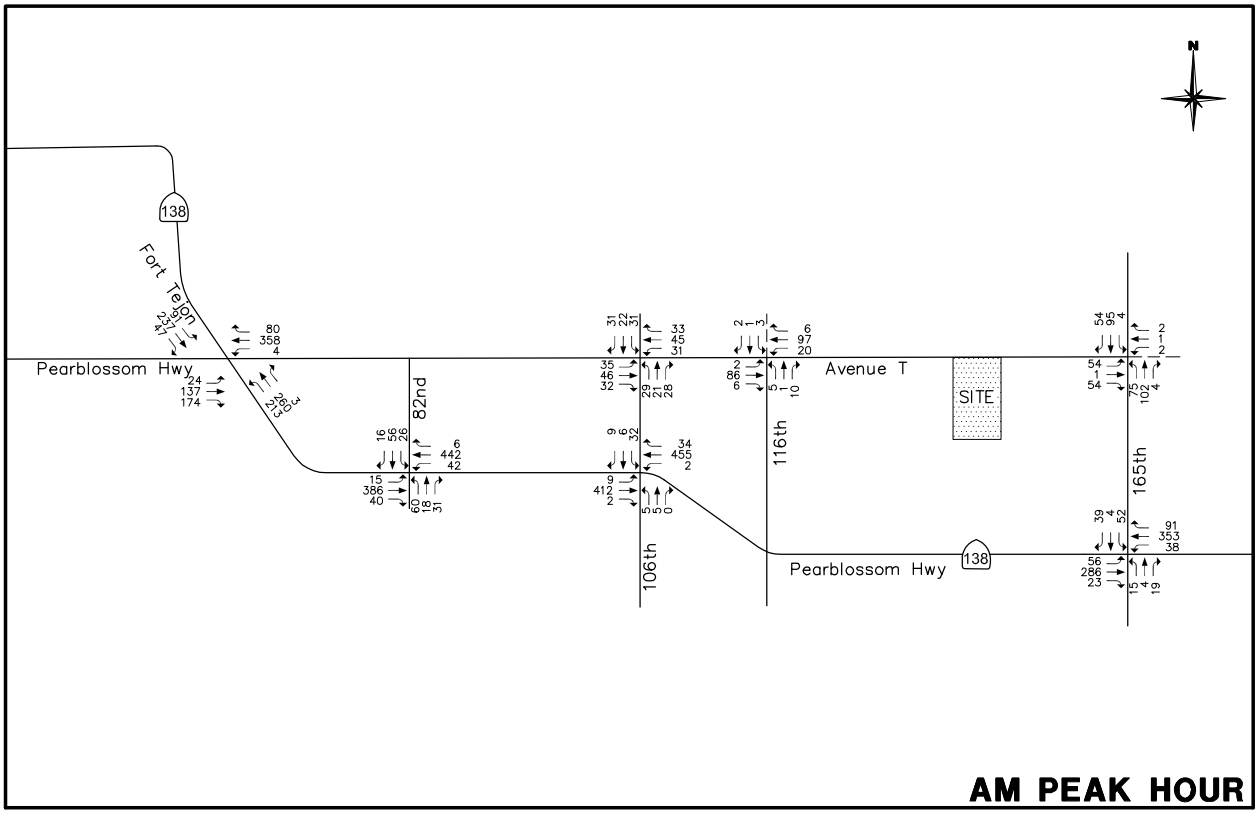
pc/mi/ln = passenger cars per mile per lane

Note: Calculation of roadway segment LOS based on density is a surrogate for the speed-based LOS used by Caltrans for traffic operational analysis. LOS "F(1)" through "F(3)" designations are assigned where severely congested (less than 25 mph) conditions prevail for more than one hour, converted to an estimate of peak hour demand in the table above. Note that calculated LOS "F" traffic demands may therefore be greater than observed traffic volumes.

2.3 BACKGROUND TRAFFIC CONDITIONS

The proposed project is located in an undeveloped area of Los Angeles County. The opening year of the project is anticipated to be 2014. The County of Los Angeles CMP projects approximately 3.8 percent per year growth in this area. To determine the short-range background peak hour intersection volumes, a 3.8 percent annual growth factor was applied to the existing volumes. Figure 2-3 illustrates the short-range background AM and PM peak hour volumes, and Table 2-3 summarizes the short-range background LOS for the study intersections. All of the study locations will operate at LOS "D" or better under short-range no-project conditions.

The short-range background State highway segment volumes were estimated using a straight-line growth curve derived from year 2007 volumes to year 2025 volumes identified in *North County Combined Highway Corridors Study - Final Report*. The LOS for State highway segments are summarized in Table 2-4. An examination of Table 2-4 reveals that the study area State highway segments will operate at LOS "D" or better during the peak hour under short-range background conditions with the exceptions of SR-14 south of SR-138 and I-5 south of SR-14.



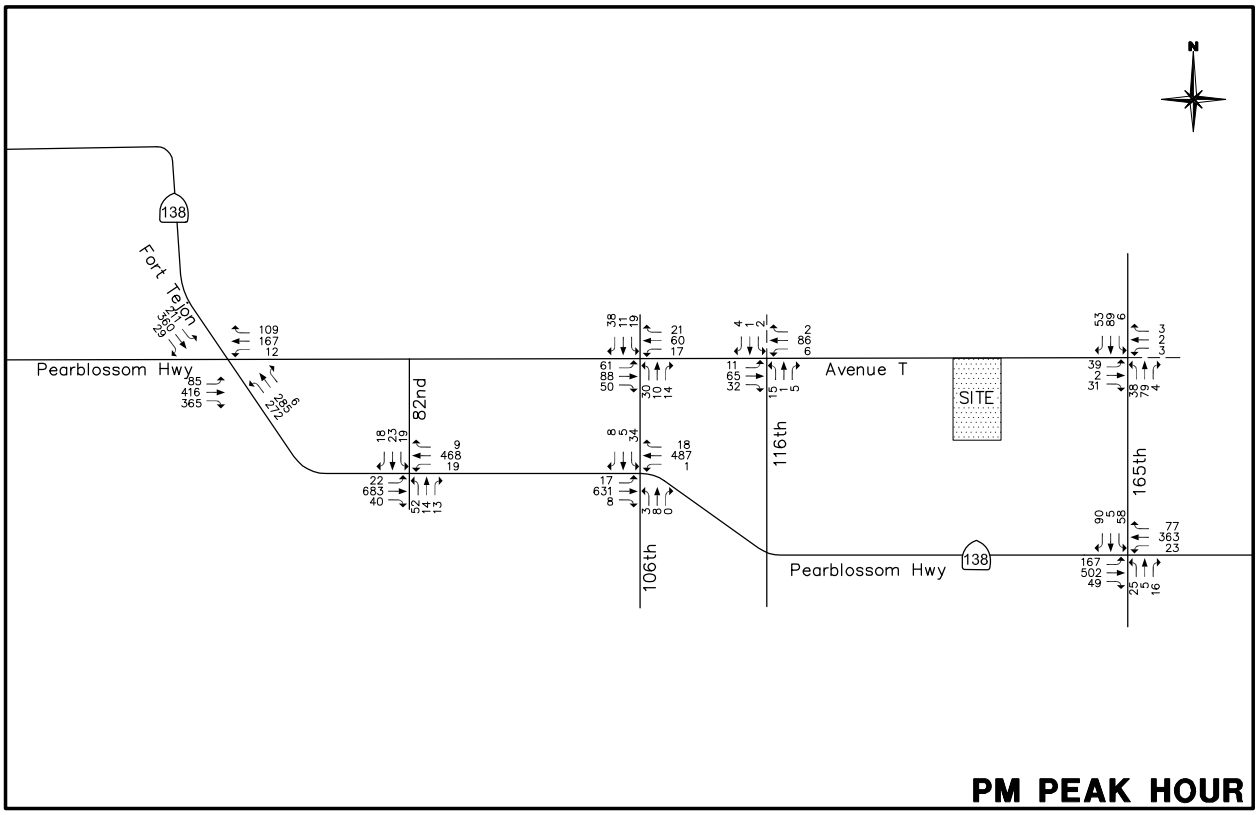


Figure 2-3

SHORT-RANGE NO-PROJECT
PEAK HOUR INTERSECTION VOLUMES

Table 2-3

INTERSECTION LOS SUMMARY –SHORT-RANGE BACKGROUND CONDITIONS

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		ICU/Delay	LOS	ICU/Delay	LOS
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	.59	A	.70	B
2. 82nd St & Pearblossom Hwy	Signal	.55	A	.70	B
3. 106th St & Ave T	Stop	8	A	8	A
4. 106th St & Pearblossom Hwy	Stop	22	C	30	D
5. 116th St & Ave T	Stop	10	A	10	A
6. 165th St & Ave T	Stop	12	B	11	B
7. 165th St & Pearblossom Hwy	Signal	.47	A	.56	A

Level of services ranges:	Signalized	Stop-Controlled
	.00 – .60 A	0.0 – 10.0 sec/veh A
	.61 – .70 B	10.1 – 15.0 sec/veh B
	.71 – .80 C	15.1 – 25.0 sec/veh C
	.81 – .90 D	25.1 – 35.0 sec/veh D
	.91 – 1.00 E	35.1 – 50.0 sec/veh E
	Above 1.00 F	Above 50.0 sec/veh F

Note: Signalized intersection LOS based on ICU, stop-controlled intersection LOS based on delay (sec/veh).

Table 2-4

STATE HIGHWAY SEGMENT LOS SUMMARY – SHORT-RANGE BACKGROUND CONDITIONS

Roadway Segment	Terrain	Dir	Number of Lanes	Percent Trucks	Peak Hour Volume	Density (pc/mi/Ln)	LOS
SR-138 w/o Ave T	Level	EB	2	10	900	7.5	A
		WB	2	12	1,040	8.7	A
SR-138 e/o Ave T	Level	EB	2	9	1,070	8.9	A
		WB	2	10	1,220	10.2	A
SR-138 w/o I-15	Level	EB	1	9	1,190	19.7	C
		WB	1	9	1,290	21.5	C
SR-14 s/o SR-138	Rolling	NB	2	10	3,650	41.7	E*
		SB	3	10	4,210	26.4	D
SR-14 n/o I-5	Rolling	NB	6	10	6,590	20.1	C
		SB	5	10	7,780	30.5	D
I-5 s/o SR-14	Rolling	NB	6	11	12,900	**	F*
		SB	6	11	15,080	**	F*

* Denotes exceeds LOS "D"
** Denotes exceeds programmed calculated threshold range

Level of service ranges:

Freeway Density	
0 – 11.0 pc/mi/ln	A
11.1 – 18.0 pc/mi/ln	B
18.1 – 26.0 pc/mi/ln	C
26.1 – 35.0 pc/mi/ln	D
35.1 – 45.0 pc/mi/ln	E
Above 45.0 pc/mi/ln	F

pc/mi/ln = passenger cars per mile per lane

Note: Calculation of roadway segment LOS based on density is a surrogate for the speed-based LOS used by Caltrans for traffic operational analysis. LOS "F(1)" through "F(3)" designations are assigned where severely congested (less than 25 mph) conditions prevail for more than one hour, converted to an estimate of peak hour demand in the table above. Note that calculated LOS "F" traffic demands may therefore be greater than observed traffic volumes.

3.0 TRAFFIC FORECAST

This chapter describes the potential impacts of the proposed project upon the surrounding arterial network. Traffic generated by development of the proposed project is added to the short-term background volumes presented in the previous chapter, and the resulting capacity impacts are assessed. Project impacts under future buildout conditions are also examined.

3.1 PROJECT DESCRIPTION

As stated in Chapter 1.0, the proposed project consists of a mining operation, a ready-mix concrete plant, an asphaltic concrete plant, a Vac-Lite plant, and a raw cement transfer and aggregate distribution facility on a 310-acre site in the Antelope Valley off Avenue T in unincorporated Los Angeles County.

Approximately 26.6 acres of the project area will be used for the rock processing and concrete ready mix and asphalt plants, and for the Raw Cement and Aggregate Transfer and Distribution Facility. The Raw Cement Transfer and Distribution Facility will be located in an area alongside the railroad tracks. It is anticipated that raw cement will be delivered to the site from Sacramento by rail and stockpiled in on-site silos. The raw cement will be used on-site by the ready-mixed concrete plant and/or transported by truck to third parties or operator-owned concrete plants in the greater Los Angeles, San Bernardino, and Riverside areas.

3.1.1 Hours and Days of Operation and Employment

The Project will operate up to 303 days/year, employing approximately 156 people full time, working two to three shifts. Proposed operating hours are noted in Table 3-1.

Table 3-1

DAYS AND HOURS OF OPERATION

Activity	Days of the Week	Normal Hours of Operation
Mining Excavation	Mon.-Sat.	4:00 AM to 10:00 PM (during daylight hours)
Aggregate Processing	Mon.-Sat.	24 hours per day
Ready-Mixed Concrete Plant operations	Mon.-Sat.	24 hours per day
Vac-Lite Plant operations	Mon.-Sat.	24 hours per day
Asphaltic Concrete Plant operations	Mon.-Sat.	24 hours per day
Cement Transfer Station operations	Mon.-Sat.	24 hours per day
Raw Cement Distribution operations	Mon.-Sat.	24 hours per day
Equipment Fueling and Maintenance	7 days	24 hours per day
Loading, Trucks Entering or Departing	Mon.-Sat.	24 hours per day

Note: Contracts often require that the suppliers of PCC-grade aggregate provide materials on a 24-hour basis. In addition, these projects may necessitate County approval of Sunday operations on a project-specific basis. These contracts involve large-scale projects, such as highway resurfacing by Caltrans, major public works road projects, and U.S. Army Corps of Engineer projects, among others.

3.1.2 Vehicle Trips

Production levels will vary over time and project-related truck traffic will vary accordingly. To estimate truck traffic, two different rates of production are described: (1) Annual Average; and (2) Annual Peak. The daily truck trip estimates for both scenarios presented below in Table 3-2 are "worst case" and are based on the following assumptions:

- 25-ton capacity haul trucks are used for outgoing deliveries of aggregate products;
- 8-cubic yard trucks are used for outgoing deliveries of ready-mixed concrete products;
- Railcars are used to deliver raw cement to the project;
- 25-ton capacity hauls trucks are used for outgoing deliveries of bulk raw cement;
- 20-ton capacity hauls trucks are used for outgoing deliveries of asphalt;
- 24-hour aggregate processing operating day; and
- 80 percent of the haul trucks making customer deliveries will deliver materials to the greater Los Angeles area, while 20 percent will travel to the Riverside/San Bernardino market area.

Table 3-2 TRUCK TRIPS		
	Average Daily Loads	**Peak Daily Loads**
Truck Trips – Outgoing Deliveries		
Aggregate Products	70	112
Ready-Mixed Concrete	55	82
Asphaltic Concrete	33	50
Raw Cement	35	32
Truck Trips – Incoming Deliveries		
Fly Ash and Ad-Mixtures	7	7
Raw Cement for Ready-Mixed Concrete Plant	0	0
Asphaltic Oil	2	3
Fuel, Service Vehicles, Other	15	15
TOTAL	**217**	**301**

All finished products will be stockpiled, and products will be transported off-site via haul trucks with a 25-ton capacity. Daily production levels will vary based on market demand. Peak daily production will be limited to the physical capabilities of the processing equipment, which is capable of processing 650 tons per hour.

3.1.3 Trip Generation

This analysis evaluates project impacts during the peak hour of adjacent street traffic which is assumed to occur from 7:00 to 8:00 AM and 5:00 to 6:00 PM; although, the background intersection peak hour volumes actually represent the highest four consecutive fifteen-minute periods between 7:00 to 9:00 AM and 4:00 to 6:00 PM at each intersection as discussed in the previous chapter. This ensures a worst-case analysis of the project impacts.

Project trips will consist of employee trips and truck trips. Employee shifts will be scheduled to avoid employee traffic during the weekday peak hours of 7:00 to 9:00 AM and 4:00 to 6:00 PM. The truck trips will be comprised of owner-operated plant deliveries and outside customer deliveries.

Ten other owner-operated plants in Los Angeles, Riverside, San Bernardino, and Ventura Counties will be receiving deliveries from the proposed project. A fleet of haul trucks will be used to make scheduled deliveries to these other plants on a daily basis. Each haul truck will make two daily deliveries, a morning delivery and an evening delivery, with the exception of 11 haul trucks that will

make three daily deliveries to the plant in Sun Valley. The morning deliveries will leave the proposed project between 5:00 AM and 5:20 AM. Trucks will be loaded and parked on-site the night before and will be ready to leave when the drivers arrive at 5:00 AM. The entire fleet of haul trucks will be on the road by 5:20 AM and will be out of the study area before the AM peak period begins (7:00 AM). The haul trucks will make their deliveries and return to the project site before the PM peak period begins (4:00 PM) to be loaded for the evening deliveries. Drivers for the evening deliveries will arrive and begin their deliveries after the PM peak period ends (6:00 PM).

A relatively small amount of project truck traffic will consist of deliveries to outside customers. These deliveries will occur throughout the morning. Approximately 27 daily deliveries are assumed to outside customers with approximately nine deliveries occurring during the AM peak hour (7:00 to 8:00 AM). No deliveries to outside customers are assumed during the PM peak hour (5:00 to 6:00 PM).

Assumptions made regarding the truck delivery schedule are summarized in Table 3-3.

The project will operate up to 303 days per year, employing 156 people, including plant operators and truck drivers, working two or three shifts per day, six days per week depending on the type of facility. The maximum number of employees working per shift will be 88. The number of employees by shift and type of facility operations are as follows:

- Aggregate Surface Mining and Processing Facilities (19 roundtrips: 19 employees, two shifts, followed by a maintenance shift)
- Ready-Mixed Concrete Plant (26 roundtrips: 26 employees, two shifts)
- Asphalt Mixing Plant (five roundtrips: five employees, one shift)
- Raw Cement and Aggregate Transfer and Distribution Facility (90 roundtrips: 90 employees, three shifts)
- Shop, maintenance and sales (16 roundtrips: 16 employees, two shifts)

The project is forecast to generate 18 truck trips in the AM peak hour (7:00 to 8:00 AM) and no truck trips during the PM peak hour (5:00 to 6:00 PM). Employee shifts will be scheduled so that no employee trips occur during the AM or PM peak periods. The total trip generation is summarized in Table 3-4.

Table 3-3

TRUCK DELIVERY SUMMARY

Destination	Pre-AM Peak Hour (12:00 AM – 7:00 AM)		AM Peak Hour (7:00 AM - 8:00 AM)		Mid-Day (8:00 AM – 5:00 PM)		PM Peak Hour (5:00 PM – 6:00 PM)		Post-PM Peak Hour (6:00 PM – 12:00 AM)		Total
	In	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	
Gardena plant	0	20	0	0	20	0	0	0	19	19	78
Long Beach plant	0	10	0	0	10	0	0	0	9	9	38
Torrance plant	0	5	0	0	5	0	0	0	5	5	20
Los Angeles plant	0	29	0	0	29	0	0	0	28	28	114
Downey plant	0	2	0	0	2	0	0	0	2	2	8
Sun Valley plant	0	11	0	0	22	11	0	0	11	11	66
Lancaster plant	0	0	0	0	0	0	0	0	4	4	8
Ventura plant	0	7	0	0	7	0	0	0	7	7	28
Perris plant	0	6	0	0	6	0	0	0	6	6	24
Rialto plant	0	6	0	0	6	0	0	0	6	6	24
Outside Customers	0	9	9	9	18	9	0	0	0	0	54
Total	0	105	9	9	125	20	0	0	97	97	462

Table 3-4

TRIP GENERATION SUMMARY

Land Use	Amount	Unit	AM Peak Hour (7:00 AM – 8:00 AM)			PM Peak Hour (5:00 PM – 6:00 PM)			ADT
			In	Out	Total	In	Out	Total	
TRIP GENERATION									
PROPOSED PROJECT									
Mining Facility	1	SITE	9	9	18	0	0	0	462
Employee	156*	EMP	0	0	0	0	0	0	312
TOTAL			9	9	18	0	0	0	774

* 24 hours operation with 2-3 shifts

3.1.4 Trip Distribution

Approximately 88 percent of the haul trucks making deliveries to the owner-operated plants are oriented toward the Los Angeles area and 12 percent are oriented toward the Riverside/San Bernardino area. The general directional distribution of outside customer delivery truck traffic is determined by market demand, but typically 80 percent of the trucks will deliver materials to the greater Los Angeles market area, while 20 percent will travel to the Riverside/San Bernardino market area. The trucks oriented toward the greater Los Angeles market area will travel from the Antelope Valley Freeway (SR-14) along SR-138, 106th Street East, and Avenue T to the project site. The trucks oriented toward the Riverside/San Bernardino market area will travel from I-15 along SR-138, 165th Street East, and Avenue T to the site. Employee trips will be oriented toward residential areas in the region and are not limited to truck routes.

Figure 3-1 illustrates the general project truck distribution, and Figure 3-2 illustrates the general employee distribution. Peak hour and daily project trips are illustrated in Figure 3-3.

3.1.5 Passenger-Car Equivalent Factor

Vehicles larger than passenger cars have a proportionately greater effect on traffic flow; therefore, for the impact analysis, each project truck vehicle count was given more weight by applying the

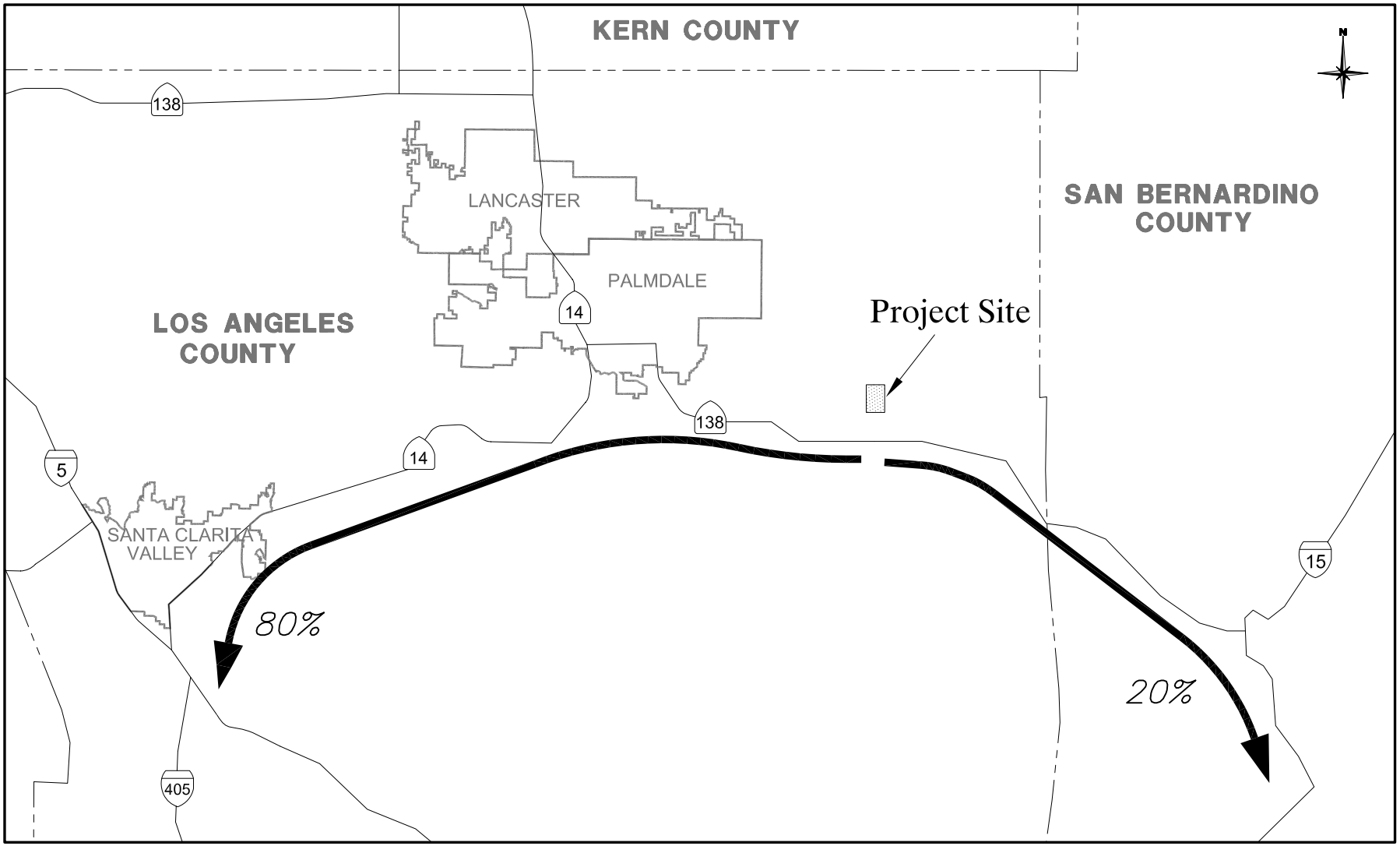


Figure 3-1

PROJECT TRIP DISTRIBUTION
- TRUCKS

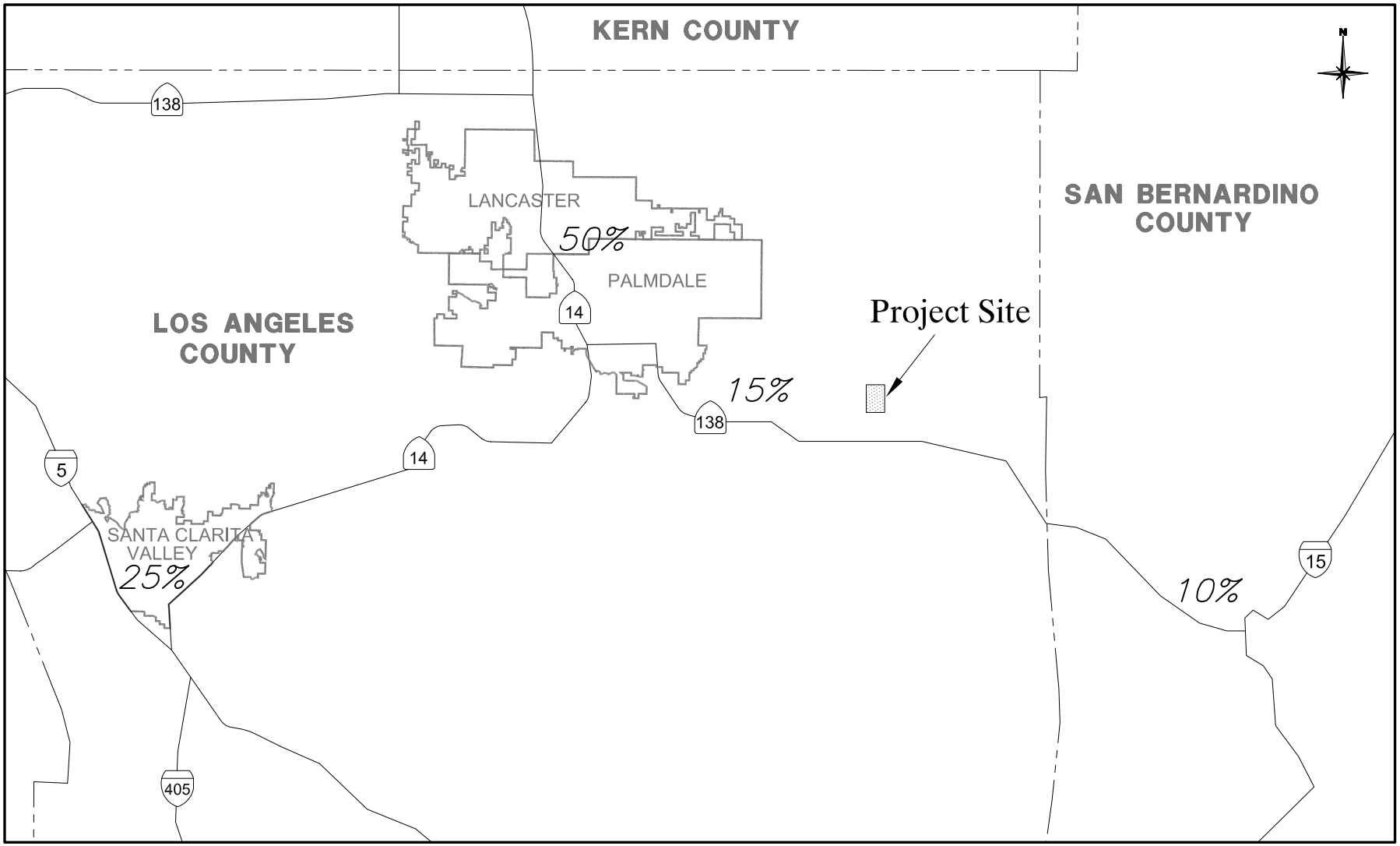


Figure 3-2

PROJECT TRIP DISTRIBUTION
- EMPLOYEES

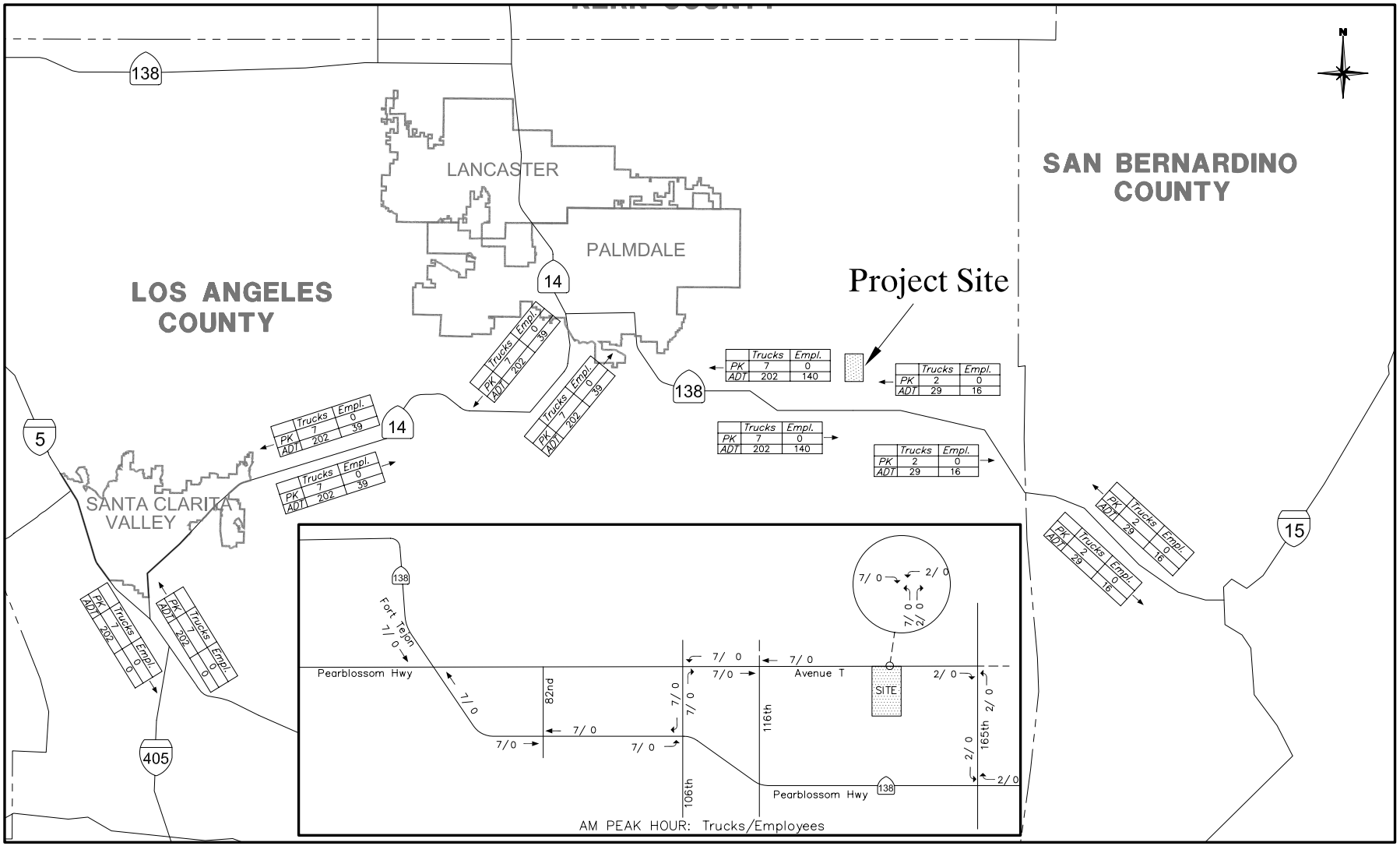


Figure 3-3

PROJECT-GENERATED VOLUMES

passenger car equivalent (PCE) factors contained in the Highway Capacity Manual (HCM), which are summarized in Table 3-5. The freeway PCE factors are different from the PCE factor used at intersections. A PCE of 2.0 is used at intersections under level terrain conditions.

Table 3-5

PASSENGER-CAR EQUIVALENT FACTOR
ON EXTENDED GENERAL FREEWAY SEGMENTS

Factor	Type of Terrain		
	Level	**Rolling**	**Mountainous**
E_T (trucks and buses)	1.5	2.5	4.5
E_R (RVs)	1.2	2.0	4.0

Source: Highway Capacity Manual 2000 – Exhibit 21-8

The six respective State highway segments have been defined in Table 3-6 as either level, rolling, or mountainous based on the terrain. Peak hour project truck trips used in this analysis on the freeway segments have been converted to PCE volumes based on the State highway segment terrain and the corresponding PCE factor from Table 3-5. Project truck trips at intersections have been converted to PCE volumes based on a PCE factor of 2.0.

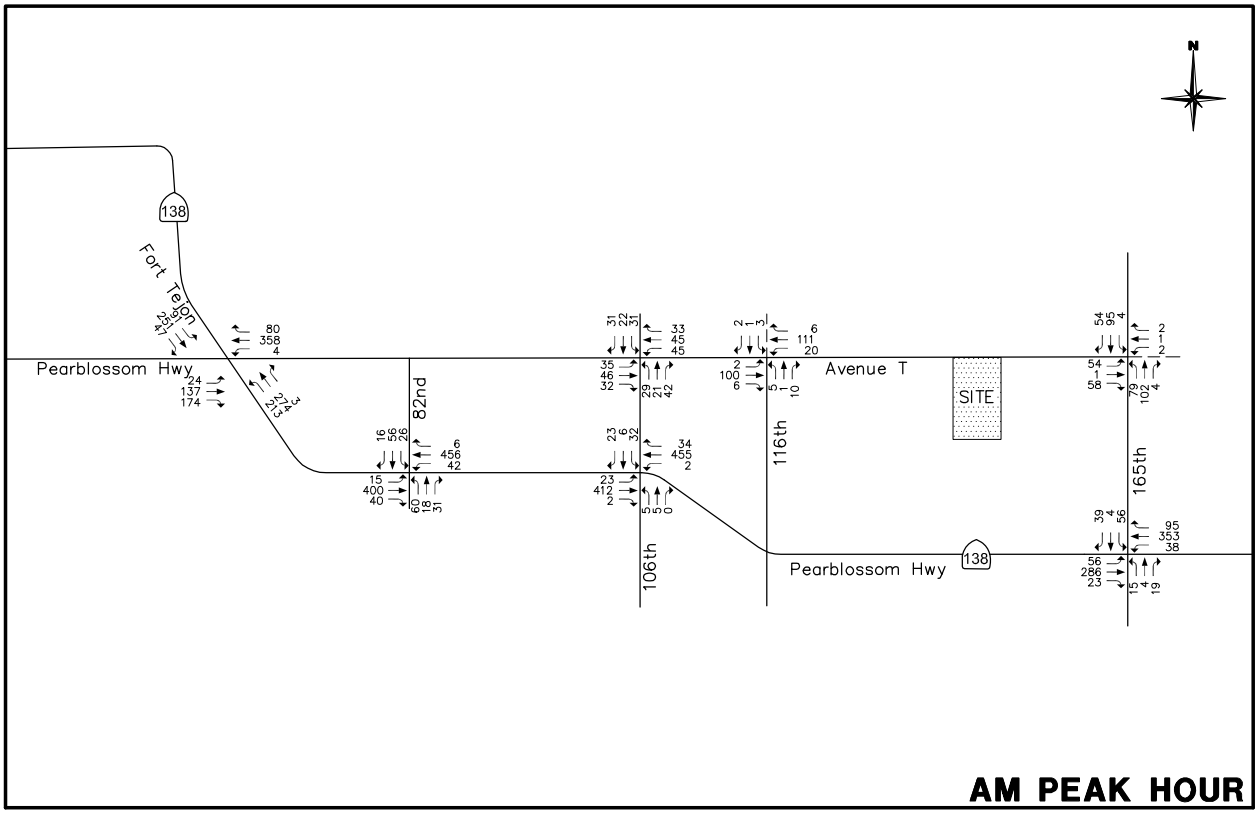
Table 3-6

PROJECT PASSENGER-CAR EQUIVALENT VOLUMES

State Highway Segment	Terrain Type	Project Distribution	Project Truck Volume	PCE Factor	Project PCE Volume
SR-138 w/o Ave T	Level	80%	14	1.5	21
SR-138 e/o Ave T	Level	20%	14	1.5	21
SR-138 w/o I-15	Level	20%	4	1.5	6
SR-14 s/o SR-138	Rolling	80%	14	2.5	35
SR-14 n/o I-5	Rolling	80%	14	2.5	35
I-5 s/o SR-14	Rolling	80%	14	2.5	35

3.2 BACKGROUND PLUS PROJECT TRAFFIC IMPACTS

Background-plus-project volumes were generated by adding the project PCE volumes to the AM and PM peak hour short-range background (project opening year) volumes. Figure 3-4 illustrates the



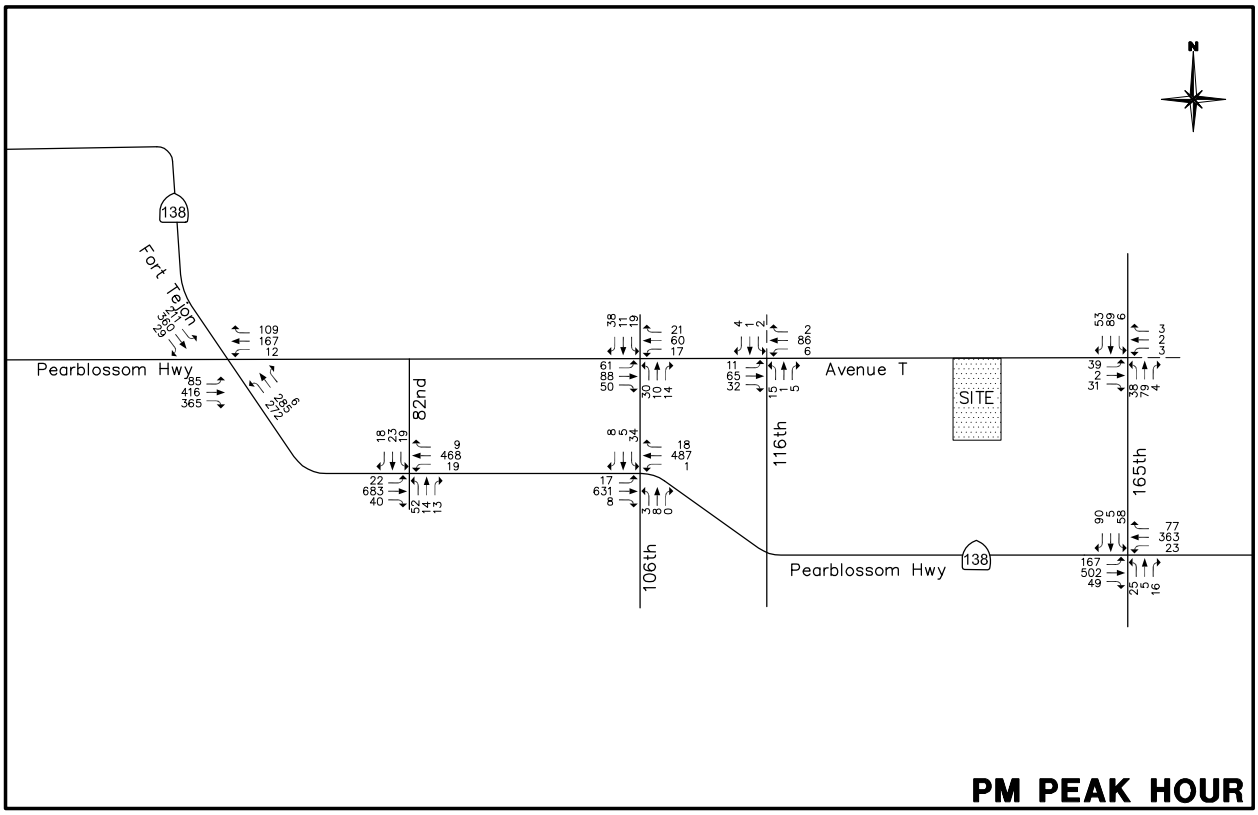


Figure 3-4

SHORT-RANGE WITH-PROJECT (PCE)
PEAK HOUR INTERSECTION VOLUMES

short-range background-plus-project peak hour volumes. Background and background-plus-project intersection LOS are presented in Table 3-7 (actual ICU and delay calculations are included in Appendix A and Appendix B, respectively). As discussed in Chapter 1.0, the County of Los Angeles defines a significant impact at a signalized intersection as a project-related volume/capacity (V/C) increase of .04 or more at LOS "C", .02 or more at LOS "D", or .01 or more at LOS "E" or "F." At stop-controlled intersections, a significant impact is defined as a worsening from LOS "A", "B", or "C" to LOS "D", "E", or "F", an increase in the average delay at LOS "D" by 5 seconds per vehicle, or an increase in the average delay at LOS "E" or "F" by 2.5 seconds/vehicle as a result of the proposed project. The results summarized in Table 3-7 reveal that addition of project traffic does not cause a significant impact to any of the study intersections.

The project's impacts on the two-lane roadway that provides the main access to the project site are summarized in Table 3-8. As this table indicates, Avenue T west and east of the project site will operate at LOS "A" with the addition of project traffic, and the project has no significant impact on these two-lane roadway segments.

Table 3-9 summarizes the State highway segments LOS (actual State highway segment density calculations are included in Appendix C). A significant impact on the State highway segments is defined as a change from LOS "A", "B", or "C" to LOS "D", "E", or "F." Two segments will operate at LOS "D", one segment will operate at LOS "E", and two segments will operate at LOS "F"; however, the project does not cause the segments to operate at LOS "D", "E", or "F." The project has no significant impact on the State highway segments.

Peak hour intersection delay for the study intersections along SR-138 under Caltrans jurisdiction is summarized in Table 3-10 (actual delay calculations are included in Appendix B). As this table shows, the intersection of 106th Street East at Pearblossom Highway will operate at LOS "D" during the AM peak hour and LOS "E" during the PM peak hour; however, the project does not cause a change in the LOS at this location and, therefore, does not create a significant impact. The proposed project does not cause a significant impact to the study intersections under Caltrans guidelines.

3.3 SHORT-RANGE CUMULATIVE TRAFFIC IMPACTS

Related projects consisting of pending, approved, and recorded projects in the vicinity of the project site were obtained from the Los Angeles County Department of Regional Planning. The County's

Table 3-7

INTERSECTION LOS SUMMARY – SHORT-RANGE WITH-PROJECT CONDITIONS

		Short-Range No-Project				Short-Range with Project					
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		Project Increase	
Intersection	**Control Type**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**AM**	**PM**
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	.59	A	.70	B	.59	A	.70	B	.00	.00
2. 82nd St & Pearblossom Hwy	Signal	.55	A	.70	B	.56	A	.70	B	.01	.00
3. 106th St E & Ave T	Stop	8	A	8	A	8	A	8	A	0	0
4. 106th St E & Pearblossom Hwy	Stop	22	C	30	D	23	C	30	D	1	0
5. 116th St & Ave T	Stop	10	A	10	A	10	B	10	A	0	0
6. 165th St & Ave T	Stop	12	B	11	B	12	B	11	B	0	0
7. 165th St & Pearblossom Hwy	Signal	.47	A	.56	A	.47	A	.56	A	.00	.00

Level of services ranges:

Signalized		Stop-Controlled	
.00 – .60	A	0.0 – 10.0 sec/veh	A
.61 – .70	B	10.1 – 15.0 sec/veh	B
.71 – .80	C	15.1 – 25.0 sec/veh	C
.81 – .90	D	25.1 – 35.0 sec/veh	D
.91 – 1.00	E	35.1 – 50.0 sec/veh	E
Above 1.00	F	Above 50.0 sec/veh	F

Note: Signalized intersection LOS based on ICU, stop-controlled intersection LOS based on delay (sec/veh).

Table 3-8

TWO-LANE ROADWAYS – SHORT-RANGE WITH-PROJECT CONDITIONS

	AM Peak Hour					PM Peak Hour					
Roadway	**Directional Split**	**Total Capacity (PCPH)**	**Short-Range No-Project Volume**	**LOS**	**Project PCE Volume**	**Directional Split**	**Total Capacity (PCPH)**	**Short-Range No-Project Volume**	**LOS**	**Project PCE Volume**	**Significant Project Impact?**
Ave T w/o Site	60/40	2,650	240	A	21	60/40	2,650	200	A	0	No
Ave T e/o Site	60/40	2,650	240	A	6	60/40	2,650	200	A	0	No

PCPH = passenger cars per hour
PCE = passenger car equivalent

Table 3-9

STATE HIGHWAY SEGMENT LOS SUMMARY – SHORT-RANGE WITH-PROJECT CONDITIONS

Roadway Segment	Terrain	Dir	Number of Lanes	Percent Trucks	Short-Range No-Project Peak Hour Volume	Density (pc/mi/ln)	LOS	Project PCE Volume	Short-Range with-Project Peak Hour Volume	Density (pc/mi/ln)	LOS	Significant Project Impact?
SR-138 w/o Ave T	Level	EB	2	10	900	7.5	A	11	911	7.6	A	No
		WB	2	12	1,040	8.7	A	11	1,051	8.8	A	No
SR-138 e/o Ave T	Level	EB	2	9	1,070	8.9	A	11	1,081	9.0	A	No
		WB	2	10	1,220	10.2	A	11	1,231	10.3	A	No
SR-138 w/o I-15	Level	EB	1	9	1,190	19.7	C	3	1,193	19.8	C	No
		WB	1	9	1,290	21.5	C	3	1,293	21.5	C	No
SR-14 s/o SR-138	Rolling	NB	2	10	3,650	41.7	E*	18	3,668	42.2	E*	No
		SB	3	10	4,210	26.4	D	18	4,228	26.5	D	No
SR-14 n/o I-5	Rolling	NB	6	10	6,590	20.1	C	18	6,608	20.1	C	No
		SB	5	10	7,780	30.5	D	18	7,798	30.7	D	No
I-5 s/o SR-14	Rolling	NB	6	11	12,900	**	F*	18	12,918	**	F*	No
		SB	6	11	15,080	**	F*	18	15,098	**	F*	No

* Denotes exceeds LOS "D"
** Denotes exceeds programmed calculated threshold range

Level of service ranges:

Freeway Density	
0 – 11.0 pc/mi/ln	A
11.1 – 18.0 pc/mi/ln	B
18.1 – 26.0 pc/mi/ln	C
26.1 – 35.0 pc/mi/ln	D
35.1 – 45.0 pc/mi/ln	E
Above 45.0 pc/mi/ln	F

pc/mi/ln = passenger cars per mile per lane

Note: Calculation of roadway segment LOS based on density is a surrogate for the speed-based LOS used by Caltrans for traffic operational analysis. LOS "F(1)" through "F(3)" designations are assigned where severely congested (less than 25 mph) conditions prevail for more than one hour, converted to an estimate of peak hour demand in the table above. Note that calculated LOS "F" traffic demands may therefore be greater than observed traffic volumes.

Table 3-10

INTERSECTION LOS SUMMARY – CALTRANS LOCATIONS

Intersection	Control Type	Short-Range No-Project				Short-Range with Project			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	17	B	20	C	17	B	20	C
2. 82nd St & Pearblossom Hwy	Signal	7	A	8	A	7	A	8	A
4. 106th St E & Pearblossom Hwy	Stop	22	C	30	D	23	C	30	D
7. 165th St & Pearblossom Hwy	Signal	8	A	6	A	8	A	6	A

Level of services ranges:

Signalized		Stop-Controlled	
0.0 – 10.0 sec/veh	A	0.0 – 10.0 sec/veh	A
10.1 – 20.0 sec/veh	B	10.1 – 15.0 sec/veh	B
20.1 – 35.0 sec/veh	C	15.1 – 25.0 sec/veh	C
35.1 – 55.0 sec/veh	D	25.1 – 35.0 sec/veh	D
55.1 – 80.0 sec/veh	E	35.1 – 50.0 sec/veh	E
Above 80.0 sec/veh	F	Above 50.0 sec/veh	F

Traffic Impact Analysis guidelines indicate that related projects within 1½ miles of the proposed project site shall be included; however, due to the relatively remote location of the site, active projects consisting of more than 10 dwelling units within approximately five miles of the site were included. Table 3-11 summarizes the related projects included in this analysis, and Figure 3-5 illustrates the locations of the related projects.

Table 3-11

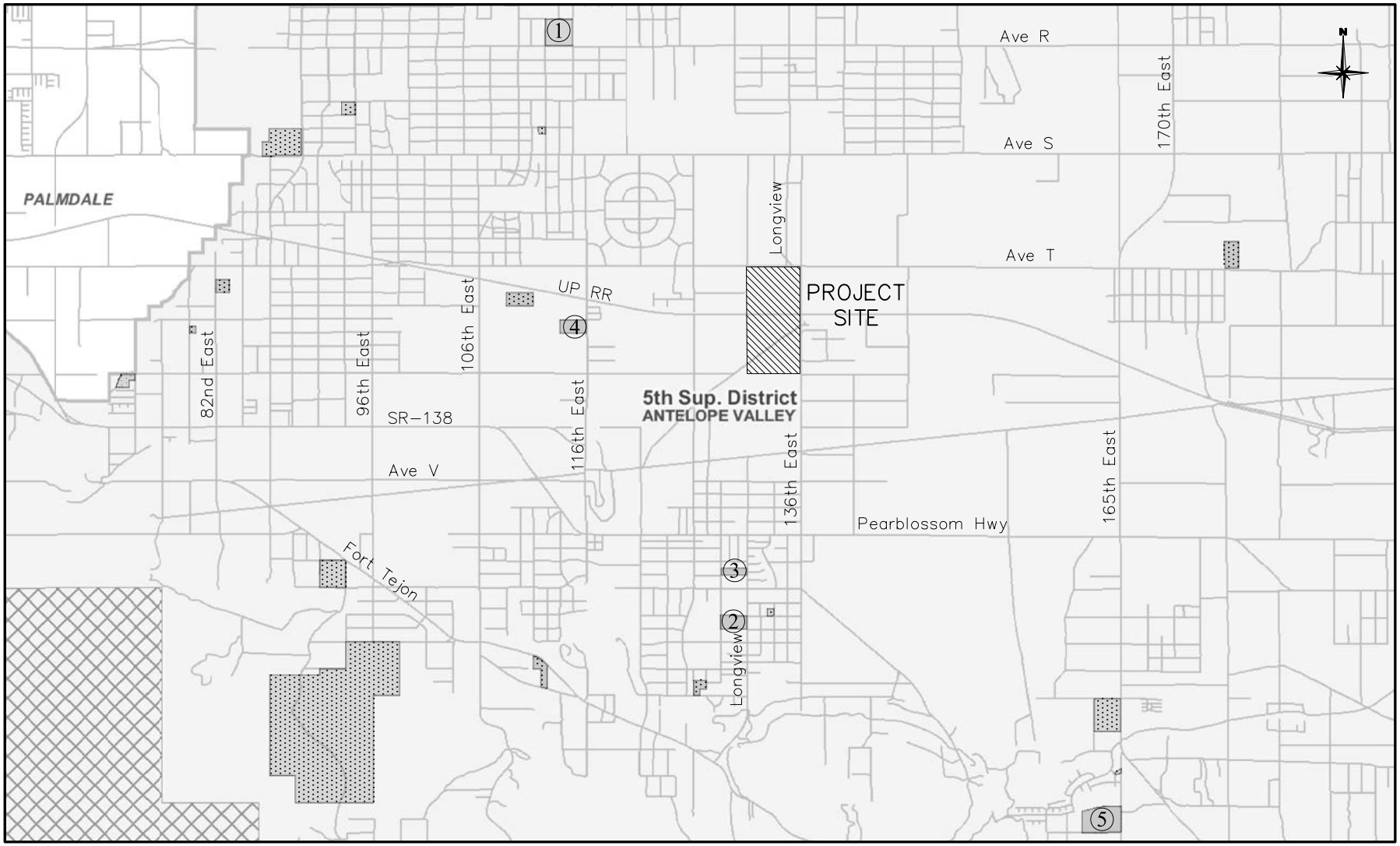
RELATED PROJECTS SUMMARY

Project	Description	Status
1. TR49916	38 Dwelling Units	Approved
2. TR48471	25 Dwelling Units	Pending
3. TR47068	16 Dwelling Units	Pending
4. TR068193	17 Dwelling Units	Pending
5. TR47296	161 Dwelling Units	Pending

Traffic from the related projects was distributed over the surrounding circulation system and was added to the short-range with-project volumes to obtain short-range cumulative conditions. The short-range cumulative peak hour volumes are illustrated in Figure 3-6. Tables 3-12 and 3-13 summarize intersection and State highway segment LOS, respectively, under short-range cumulative conditions. The related projects have a significant impact at the intersection of 82nd Street and Pearblossom Highway during the PM peak hour, and a significant impact at the intersection of 106th Street and Pearblossom Highway during the AM and PM peak hours. Improvements to mitigate cumulative impacts have been identified at 82nd Street and Pearblossom Highway and at 106th Street and Pearblossom Highway.

At the intersection of 82nd Street and Pearblossom Highway, the related projects have a significant impact during the PM peak hour (i.e., related projects increase the ICU value by .06 at LOS “C”). Addition of a second eastbound through lane will mitigate cumulative impacts at 82nd Street and Pearblossom Highway. The proposed project does not add any PM peak hour traffic to the intersection of 82nd Street and Pearblossom Highway, and has a zero percent share at this location.

At the intersection of 106th Street and Pearblossom Highway, the related projects have a significant impact during the AM peak hour (i.e., related projects worsen the LOS from “C” to “D”) and during the PM peak hour (i.e., related projects increase the delay by 8 seconds at LOS “D”). Restriping



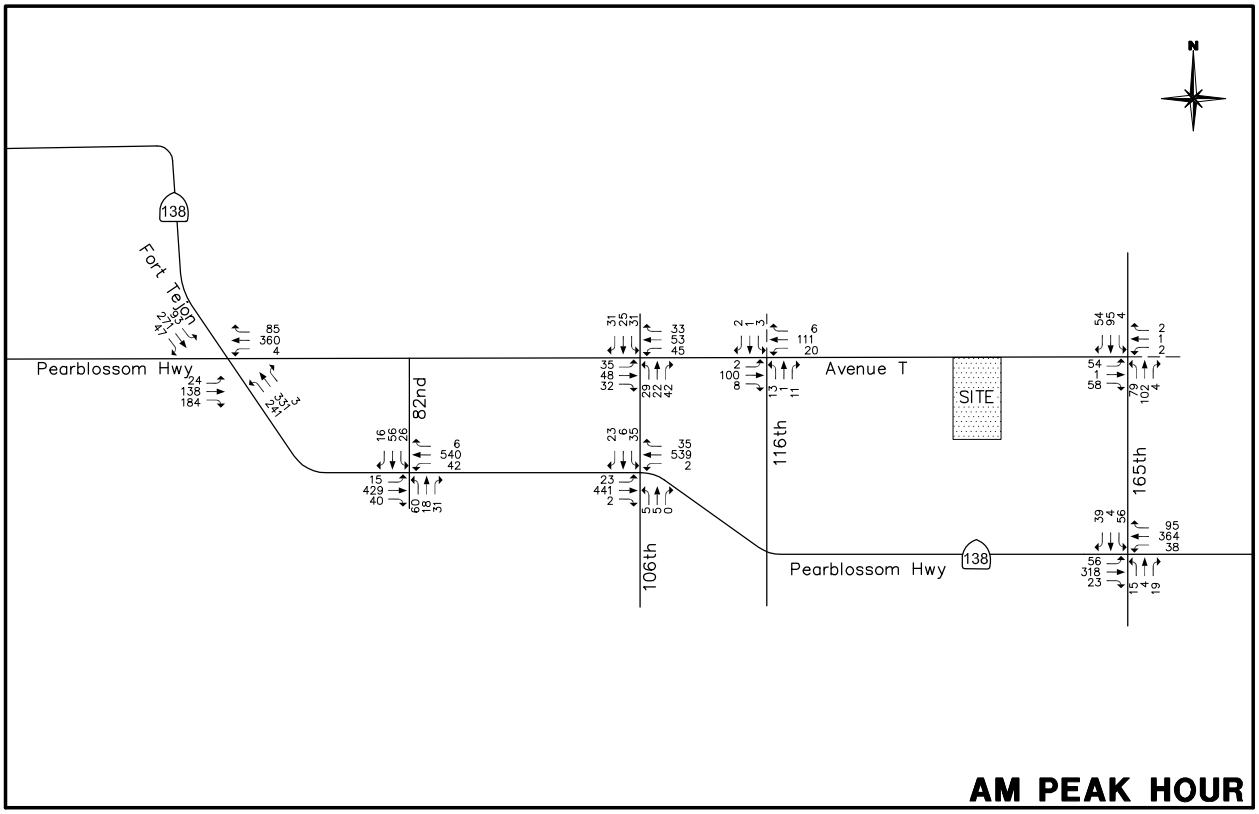
Legend

(X) See Table 3-10

Inactive or less than 10 dwelling units

Figure 3-5

RELATED PROJECTS LOCATIONS



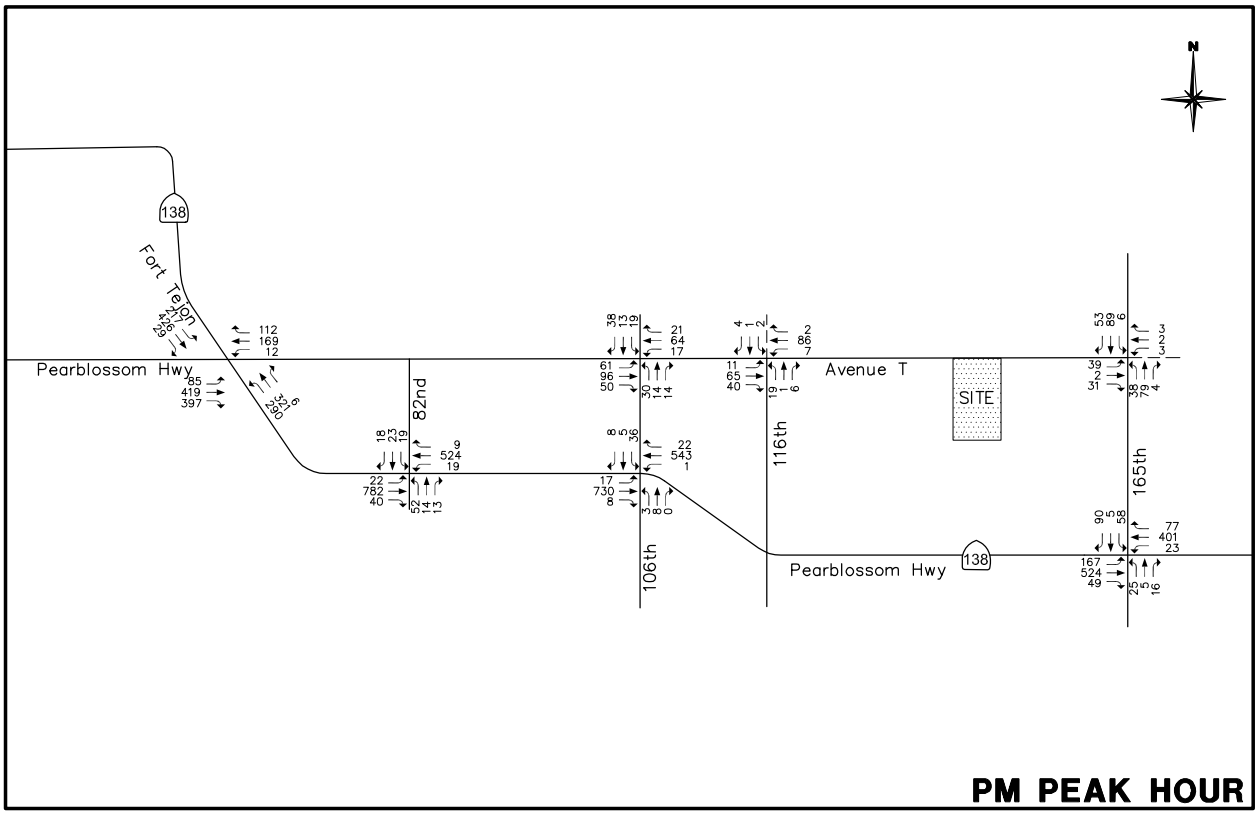


Figure 3-6

SHORT-RANGE WITH-PROJECT (PCE) + RELATED PEAK HOUR INTERSECTION VOLUMES

Table 3-12

INTERSECTION LOS SUMMARY – SHORT-RANGE CUMULATIVE CONDITIONS

		Short-Range with Project				Short-Range with Project + Related					
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		Cumulative Increase	
Intersection	**Control Type**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**AM**	**PM**
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	.59	A	.70	B	.63	B	.73	C	.04	.03
2. 82nd St & Pearblossom Hwy	Signal	.56	A	.70	B	.61	B	.76	C	.05	.06
3. 106th St E & Ave T	Stop	8	A	8	A	8	A	8	A	0	0
4. 106th St E & Pearblossom Hwy	Stop	23	C	30	D	28	D	38	E	5	8
5. 116th St & Ave T	Stop	10	B	10	A	10	B	10	A	0	0
6. 165th St & Ave T	Stop	12	B	11	B	12	B	11	B	0	0
7. 165th St & Pearblossom Hwy	Signal	.47	A	.56	A	.48	A	.58	A	.01	.02

Level of services ranges:

Signalized		Stop-Controlled	
.00 – .60	A	0.0 – 10.0 sec/veh	A
.61 – .70	B	10.1 – 15.0 sec/veh	B
.71 – .80	C	15.1 – 25.0 sec/veh	C
.81 – .90	D	25.1 – 35.0 sec/veh	D
.91 – 1.00	E	35.1 – 50.0 sec/veh	E
Above 1.00	F	Above 50.0 sec/veh	F

Note: Signalized intersection LOS based on ICU, stop-controlled intersection LOS based on delay (sec/veh).

Table 3-13

STATE HIGHWAY SEGMENT LOS SUMMARY – SHORT-RANGE CUMULATIVE CONDITIONS

Roadway Segment	Terrain	Dir	Number of Lanes	Percent Trucks	Peak Hour Short-Range with Project Volume	Density (pc/mi/Ln)	LOS	Peak Hour Short-Range with Project + Related Volume	Density (pc/mi/ln)	LOS
SR-138 w/o Ave T	Level	EB	2	10	911	7.6	A	983	8.2	A
		WB	2	12	1,051	8.8	A	1,113	9.4	A
SR-138 e/o Ave T	Level	EB	2	9	1,081	9.0	A	1,180	9.8	A
		WB	2	10	1,231	10.3	A	1,315	11.0	A
SR-138 w/o I-15	Level	EB	1	9	1,193	19.8	C	1,225	20.3	C
		WB	1	9	1,293	21.5	C	1,331	22.2	C
SR-14 s/o SR-138	Rolling	NB	2	10	3,668	42.2	E*	3,686	42.8	E*
		SB	3	10	4,228	26.5	D	4,244	26.7	D
SR-14 n/o I-5	Rolling	NB	6	10	6,608	20.1	C	6,626	20.2	C
		SB	5	10	7,798	30.7	D	7,814	30.8	D
I-5 s/o SR-14	Rolling	NB	6	11	12,918	**	F*	12,927	**	F*
		SB	6	11	15,098	**	F*	15,106	**	F*

* Denotes exceeds LOS "D"
** Denotes exceeds programmed calculated threshold range

Level of service ranges:

Freeway Density	
0 – 11.0 pc/mi/ln	A
11.1 – 18.0 pc/mi/ln	B
18.1 – 26.0 pc/mi/ln	C
26.1 – 35.0 pc/mi/ln	D
35.1 – 45.0 pc/mi/ln	E
Above 45.0 pc/mi/ln	F

pc/mi/ln = passenger cars per mile per lane

Note: Calculation of roadway segment LOS based on density is a surrogate for the speed-based LOS used by Caltrans for traffic operational analysis. LOS "F(1)" through "F(3)" designations are assigned where severely congested (less than 25 mph) conditions prevail for more than one hour, converted to an estimate of peak hour demand in the table above. Note that calculated LOS "F" traffic demands may therefore be greater than observed traffic volumes.

the westbound right-turn lane as a shared through/right-turn lane will mitigate the cumulative impacts. The project has a 19.3 percent share during the AM peak hour at this location.

The results of the cumulative conditions mitigation are summarized in Table 3-14 (actual ICU and delay calculations are included in Appendix A and Appendix B, respectively).

3.4 SECOND-HIGHEST PEAK HOUR PROJECT IMPACT ANALYSIS

Los Angeles County Staff requested that an analysis of project impacts during the 8:00 to 9:00 AM and the 4:00 to 5:00 PM periods be included in addition to the peak hour (7:00 to 8:00 AM and 5:00 to 6:00 PM) analysis. Table 3-15 summarizes this second peak hour trip generation for the proposed project. These trips are distributed and assigned to the circulation system using the same assumptions as the peak hour traffic presented earlier, and added to the peak hour background volumes. By using the peak hour background volumes, the project's worst-case project impacts during the second peak hour are identified.

Table 3-15

TRIP GENERATION SUMMARY – SECOND PEAK HOUR

			AM Peak Hour (8:00 AM – 9:00 AM)			**PM Peak Hour (4:00 PM – 5:00 PM)**		
Land Use	**Amount**	**Unit**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
TRIP GENERATION								
PROPOSED PROJECT								
Mining Facility	1	SITE	4	4	8	0	0	0
Employee	156*	EMP	0	0	0	0	0	0
TOTAL			4	4	8	0	0	0

* 24 hours operation with 2-3 shifts

Tables 3-16, 3-17, 3-18, and 3-19 present the results of this second peak hour analysis. As these tables show, the project has no significant impact during the second peak hour.

Table 3-14

INTERSECTION LOS SUMMARY – SHORT-RANGE MITIGATED CUMULATIVE CONDITIONS

		Short-Range with Project				**Short-Range with Project + Related**				**Short-Range with Project + Related with Mitigation**				**Project Share**	
		AM Peak Hour		**PM Peak Hour**		**AM Peak Hour**		**PM Peak Hour**		**AM Peak Hour**		**PM Peak Hour**			
Intersection	**Control Type**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**AM**	**PM**
2. 82nd St & Pearblossom Hwy	Signal	--	--	.70	B	--	--	.76	C	--	--	.58	A	--	0%
4. 106th St E & Pearblossom Hwy	Stop	23	C	30	D	28	D	38	E	22	C	33	D	19.3 %	0%

Level of services ranges:

Signalized	Stop-Controlled
.00 – .60 A	0.0 – 10.0 sec/veh A
.61 – .70 B	10.1 – 15.0 sec/veh B
.71 – .80 C	15.1 – 25.0 sec/veh C
.81 – .90 D	25.1 – 35.0 sec/veh D
.91 – 1.00 E	35.1 – 50.0 sec/veh E
Above 1.00 F	Above 50.0 sec/veh F

Note: Signalized intersection LOS based on ICU, stop-controlled intersection LOS based on delay (sec/veh).
Project share determined from the percentage of PCE project trips of the total increase over existing peak hour intersection volume.

Table 3-16

INTERSECTION LOS SUMMARY – SHORT-RANGE WITH-PROJECT CONDITIONS – SECOND PEAK HOUR

		Short-Range No-Project				Short-Range with Project – 2nd Peak Hour					
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		Project Increase	
Intersection	**Control Type**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**ICU/ Delay**	**LOS**	**AM**	**PM**
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	.59	A	.70	B	.59	A	.70	B	.00	.00
2. 82nd St & Pearblossom Hwy	Signal	.55	A	.70	B	.55	A	.70	B	.00	.00
3. 106th St E & Ave T	Stop	8	A	8	A	8	A	8	A	0	0
4. 106th St E & Pearblossom Hwy	Stop	22	C	30	D	23	C	30	D	1	0
5. 116th St & Ave T	Stop	10	A	10	A	10	A	10	A	0	0
6. 165th St & Ave T	Stop	12	B	11	B	12	B	11	B	0	0
7. 165th St & Pearblossom Hwy	Signal	.47	A	.56	A	.47	A	.56	A	.00	.00

Level of services ranges:

Signalized		Stop-Controlled	
.00 – .60	A	0.0 – 10.0 sec/veh	A
.61 – .70	B	10.1 – 15.0 sec/veh	B
.71 – .80	C	15.1 – 25.0 sec/veh	C
.81 – .90	D	25.1 – 35.0 sec/veh	D
.91 – 1.00	E	35.1 – 50.0 sec/veh	E
Above 1.00	F	Above 50.0 sec/veh	F

Note: Signalized intersection LOS based on ICU, stop-controlled intersection LOS based on delay (sec/veh).

Table 3-17

TWO-LANE ROADWAYS – SHORT-RANGE WITH-PROJECT CONDITIONS – SECOND PEAK HOUR

	AM Peak Hour					PM Peak Hour					
Roadway	**Directional Split**	**Total Capacity (PCPH)**	**Short-Range No-Project Volume**	**LOS**	**Project 2nd Peak Hour PCE Volume**	**Directional Split**	**Total Capacity (PCPH)**	**Short-Range No-Project Volume**	**LOS**	**Project 2nd Peak Hour PCE Volume**	**Significant Project Impact?**
Ave T w/o Site	60/40	2,650	240	A	9	60/40	2,650	200	A	0	No
Ave T e/o Site	60/40	2,650	240	A	3	60/40	2,650	200	A	0	No

PCPH = passenger cars per hour
PCE = passenger car equivalent

Table 3-18

STATE HIGHWAY SEGMENT LOS SUMMARY – SHORT-RANGE WITH-PROJECT CONDITIONS – SECOND PEAK HOUR

Roadway Segment	Terrain	Dir	Number of Lanes	Percent Trucks	Short-Range No-Project Peak Hour Volume	Density (pc/mi/ln)	LOS	Project 2nd Peak Hour PCE Volume	Short-Range with-Project 2nd Peak Hour Volume	Density (pc/mi/ln)	LOS	Significant Project Impact?
SR-138 w/o Ave T	Level	EB	2	10	900	7.5	A	5	905	7.5	A	No
		WB	2	12	1,040	8.7	A	5	1,045	8.8	A	No
SR-138 e/o Ave T	Level	EB	2	9	1,070	8.9	A	5	1,075	8.9	A	No
		WB	2	10	1,220	10.2	A	5	1,225	10.2	A	No
SR-138 w/o I-15	Level	EB	1	9	1,190	19.7	C	2	1,192	19.8	C	No
		WB	1	9	1,290	21.5	C	2	1,292	21.5	C	No
SR-14 s/o SR-138	Rolling	NB	2	10	3,650	41.7	E*	8	3,658	42.0	E*	No
		SB	3	10	4,210	26.4	D	8	4,218	26.5	D	No
SR-14 n/o I-5	Rolling	NB	6	10	6,590	20.1	C	8	6,598	20.1	C	No
		SB	5	10	7,780	30.5	D	8	7,788	30.6	D	No
I-5 s/o SR-14	Rolling	NB	6	11	12,900	**	F*	8	12,908	**	F*	No
		SB	6	11	15,080	**	F*	8	15,088	**	F*	No

* Denotes exceeds LOS "D"
** Denotes exceeds programmed calculated threshold range

Level of service ranges:

Freeway Density	
0 – 11.0 pc/mi/ln	A
11.1 – 18.0 pc/mi/ln	B
18.1 – 26.0 pc/mi/ln	C
26.1 – 35.0 pc/mi/ln	D
35.1 – 45.0 pc/mi/ln	E
Above 45.0 pc/mi/ln	F

pc/mi/ln = passenger cars per mile per lane

Note: Calculation of roadway segment LOS based on density is a surrogate for the speed-based LOS used by Caltrans for traffic operational analysis. LOS "F(1)" through "F(3)" designations are assigned where severely congested (less than 25 mph) conditions prevail for more than one hour, converted to an estimate of peak hour demand in the table above. Note that calculated LOS "F" traffic demands may therefore be greater than observed traffic volumes.

Table 3-19

INTERSECTION LOS SUMMARY – CALTRANS LOCATIONS – SECOND PEAK HOUR

Intersection	Control Type	Short-Range No-Project				Short-Range with Project – 2nd Peak Hour			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	17	B	20	C	17	B	20	C
2. 82nd St & Pearblossom Hwy	Signal	7	A	8	A	7	A	8	A
4. 106th St E & Pearblossom Hwy	Stop	22	C	30	D	23	C	30	D
7. 165th St & Pearblossom Hwy	Signal	8	A	6	A	8	A	6	A

Level of services ranges:

Signalized		Stop-Controlled	
0.0 – 10.0 sec/veh	A	0.0 – 10.0 sec/veh	A
10.1 – 20.0 sec/veh	B	10.1 – 15.0 sec/veh	B
20.1 – 35.0 sec/veh	C	15.1 – 25.0 sec/veh	C
35.1 – 55.0 sec/veh	D	25.1 – 35.0 sec/veh	D
55.1 – 80.0 sec/veh	E	35.1 – 50.0 sec/veh	E
Above 80.0 sec/veh	F	Above 50.0 sec/veh	F

3.5 2030 BUILDOUT CONDITIONS

The *North County Combined Highway Corridors Study - Final Report* developed individual plans, or Locally Preferred Strategies (LPS), for the three north County corridors. The plans were initially segregated based on their ability to serve their respective travel markets. Each corridor is unique in function, capacity, operational and safety issues. The I-5 Freeway is a *goods movement corridor* linking the Central Valley with the Ports of Los Angeles and Long Beach, while SR-14 may be generally described as a *commute corridor*. The geography of SR-138 makes it a *bypass corridor*, which could help avoid congestion in the central region by routing traffic around congested Los Angeles freeways. Ultimately, the three North County Corridors must function together to serve the collective transportation needs in northern Los Angeles County.

The *North County Combined Highway Corridors Study – Final Report* included an analysis of future regional travel patterns along the three corridor systems. It identified locations and opportunities for operational applications such as reversible carpool/HOV lanes in locations where traffic has pronounced directional imbalances and the need for continuity in the system south of the I-5/SR-14 Interchange, called the I-5 "throat," where nearly all north County traffic must travel to reach the Los Angeles Basin.

An integrated multi-modal long-range corridor plan was developed to serve the long-range demands of the north County. The combined recommendations will allow the three north County corridors to function together in a seamless system to serve the diverse transportation needs in northern Los Angeles County.

3.5.1 Long-Range Improvements

<u>The SR-138 Plan,</u> as modified for corridor integration includes:

- Widening existing SR-138 to four lanes from Pearblossom Highway east to the San Bernardino County line.

- Construction of a limited access High Desert Corridor (HDC), a brand new freeway/expressway between I-5 and I-15. The east-west segment between SR-14 and I-15 would be an eight-lane freeway (including an HOV lane in each direction) from SR-14 past the Palmdale Airport to 50th

Street East along an alignment paralleling P-8 in Palmdale; a six-lane freeway/expressway from 50th Street East to 240th Street East; and a 4/6-lane expressway from 240th Street East past the planned Southern California Logistics Airport to I-15 and beyond.

- Between I-5 and SR-14, the HDC would be a six-lane freeway or expressway along the current SR-138 alignment.

- A north-south HDC expressway would begin at SR-14 and Avenue D, jog south to Avenue E at the Old Sierra Highway, head south along 90th Street East, jog southeast to intersect with the east-west HDC at 126th Street East, and continue south to the existing SR-138 near 150th Street East. This north-south HDC expressway would complement SR-14 in carrying through traffic around the Palmdale and Lancaster communities.

Figure 3-7 illustrates the general location of the east-west HDC and the north-south HDC.

The I-5 Plan, as modified for corridor integration includes:

- Doubling the current four lanes to a total of eight lanes in each direction between SR-14 and SR-126 West. Two of these lanes would be for HOVs, two lanes for trucks, and four lanes for general use.

- North of SR-126 West, extend one new HOV lane to Lake Hughes and add a new truck lane to the existing four lanes in each direction.

- North of Lake Hughes to the Kern County Line, add a new truck lane in each direction to the existing four lanes.

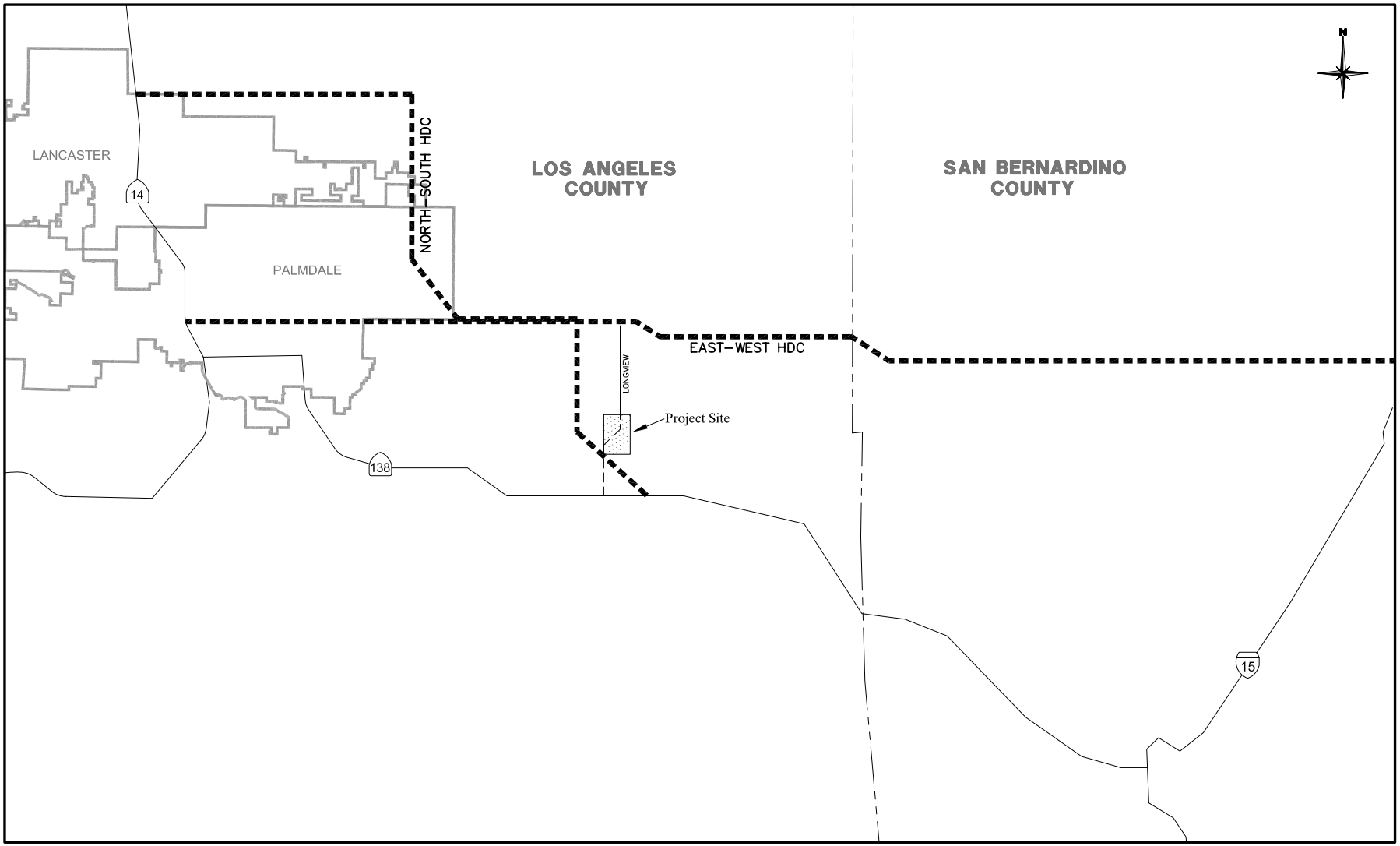
The SR-14 Plan, as modified for corridor integration includes:

- Create three reversible HOV lanes (achieved by converting two existing HOV lanes and adding one new HOV lane) plus the existing 4/6 lanes in each direction between I-5 and Pearblossom Highway.

- Create two reversible HOV lanes (achieved by converting programmed HOV lanes) plus the existing/committed 3/4 lanes between Pearblossom Highway and Avenue P.

- Add a general-purpose lane between San Fernando Road and Sand Canyon.

- Add a truck lane from I-5 to Placerita Canyon. North of Avenue P, add one new lane to the two to three current lanes. The new lane would be designated for HOV use north to Avenue L and for general-purpose use from Avenue L to the Kern County line.



Legend

– – – – – – – Future roadway

Figure 3-7

HIGH DESERT CORRIDOR LOCATION MAP

3.5.2 Short-Range Improvements

Short-range improvements emphasize right-of-way protection and implementation of key high priority early actions that address the most critical near-term bottlenecks, as well as safety, operational, and connectivity needs.

The SR-138 Plan

- Complete the work currently under way to improve SR-138 from one lane in each direction to two lanes in each direction from Avenue T to the San Bernardino County Line.

- Complete right-of-way acquisition along Avenue P-8 from SR-14 to 50th Street. Preserve the right-of-way needed to ultimately implement the proposed improvements identified for the long-range plan by purchasing and preserving new right-of-way along several area roadways.

- Complete the work currently under way to construct the four lane expressway along the HDC from US 395 to the existing SR-18.

The I-5 Plan

- Add an HOV lane and a truck lane in each direction from the I-5/SR-14 interchange to Calgrove Boulevard.

- Add an HOV lane in each direction from Calgrove Boulevard to the I-5/SR-126 separation.

The SR-14 Plan

- Create three HOV reversible lanes (achieved by converting two existing HOV lanes and adding one new HOV lane) from the I-5/SR-14 interchange to Pearblossom Highway. Create two HOV reversible lanes (achieved by converting programmed HOV lanes) from Pearblossom Highway to Avenue P.

- Create three continuous mix flow lanes (2-3 existing plus 0-1 new lane) in each direction from Sand Canyon Road to Avenue P.

3.5.3 Future Corridor Analysis

Extending I-5 Corridor improvements to the south through the I-5/SR-14 interchange and continuing down to the I-5/I-405 split including:

- Added Truck Lanes – one new truck lane plus two existing truck lanes between SR-14 and I-210 and two new truck lanes from I-210 to I-405.

- Added HOV Lanes – three new HOV lanes plus one programmed HOV lane between SR-14 and I-405, to be operated as a reversible four lane HOV facility.

- Added Mixed Flow Lanes – three new mixed flow lanes plus six existing mixed flow lanes from SR-14 to I-210, three new mixed flow lanes plus four mixed flow lanes from I-210 to I-405, three of the mixed flow lanes could be operated as a reversible connector between SR-14 and I-405.

In addition to the future improvements and proposed HDC expressways discussed above, completion of the County's Circulation Plan includes the extension of Longview Road from Avenue T to Pearblossom Highway. Longview Road currently terminates at Avenue T opposite the project site. Extending Longview Road south of Avenue T would require construction of the roadway through the project site, making the site infeasible for the proposed project.

The HDC system discussed above consists of an east-west component from SR-14 to I-15 and a north-south component from Avenue D to Pearblossom Highway (illustrated in Figure 3-7). The north-south HDC expressway would follow 126th Street East south of the future east-west HDC expressway (located along Palmdale Boulevard). This north-south HDC expressway would be located within ¾ mile of the future Longview Road extension. However, the status of the north-south HDC expressway is in doubt.

Buildout volumes with the HDC system were obtained from *North County Combined Highway Corridors Study – Final Report.* The north-south HDC expressway is forecast to carry approximately 34,800 annual daily traffic (ADT) in the project vicinity under buildout conditions. A volume of 35,000 ADT can be accommodated by a four-lane arterial. Therefore, if the north-south HDC expressway is not built, then 126th Street East built as a four lane arterial would be sufficient to carry the demand.

Based on buildout volume projections, the extension of Longview Road is not required in addition to a four lane arterial or expressway at 126th Street East to accommodate the demand. However, in the short-term, until the HDC system is built, construction of Longview Road as a two lane roadway along the project's western boundary will be adequate. Construction of the extension of Longview Road at the project's western boundary will result in a jog at Avenue T; however, the volume on Longview Road will not create a significant problem.

The project proposes the deletion of a portion of Longview Road from the Los Angeles County Highway Master Plan. This deletion requires a plan amendment to the Highway Master Plan which requires approval by the County's Interdepartmental Engineering Committee (IEC). Approval of the project will require the IEC's approval of the plan amendment.

3.6 SITE ACCESS AND INTERNAL CIRCULATION

As previously noted, the proposed project consists of a mining and a ready-mix concrete plant operating on a 310-acre site off Avenue T in unincorporated Los Angeles County.

Approximately 26.6 acres of the project area will be used for the rock processing and concrete ready mix and asphalt plants, and for the Raw Cement and Aggregate Transfer and Distribution Facility. The Raw Cement Transfer and Distribution Facility will be located in an area alongside the railroad tracks. Cement will be delivered to the site from Sacramento by rail and the raw cement will be used on-site by the ready-mixed concrete plant and/or transported by truck to third parties or operator-owned concrete plants in the greater Los Angeles, San Bernardino, and Riverside areas.

It is anticipated that the traffic to and from the site will mainly utilize Avenue T to 106th Street East or 165th Street East to Pearblossom Highway. At that point the traffic will utilize Pearblossom Highway to and from the west (80 percent) and Pearblossom Highway to and from the east (20 percent) to reach their ultimate destinations. There will be some occasional local deliveries, but the majority (over 90 percent) of the project's traffic will use Pearblossom Highway.

3.7 SIGNAL WARRANT ANALYSIS

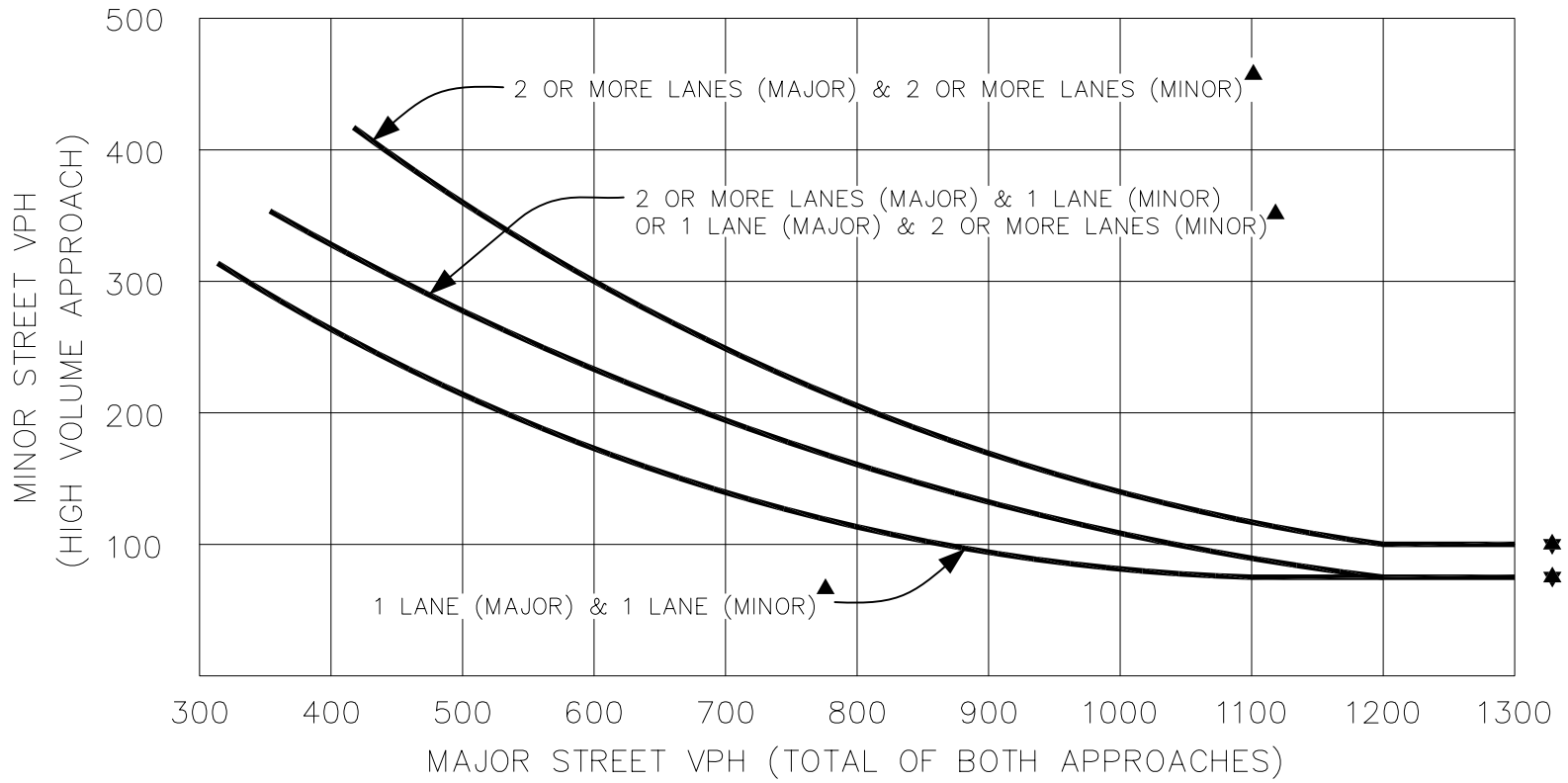
Four of the study intersections are currently stop-controlled. These intersections were investigated for satisfaction of Caltrans Peak Hour Signal Warrant. Table 3-20 and Figure 3-8 summarize the results of the Signal Warrant Analysis. The total two-way approach volume on the major street is plotted against the higher approach volume on the minor street on the graph. If the point falls above the line representing the number of lanes at the intersection, then a traffic signal is warranted. The study intersections do not have sufficient peak hour traffic under short-range with-project and short-range cumulative conditions to satisfy the signal warrant.

Table 3-20

PEAK HOUR SIGNAL WARRANT ANALYSYS SUMMARY

Intersection	AM Peak Hour		PM Peak Hour		Warrant Satisfied?*
	Major St Volume	Minor St Volume	Major St Volume	Minor St Volume	
Short-Range with Project					
3. 106th St & Ave T	229	85	297	68	No
4. 106th St & Pearblossom Hwy	921	54	1,162	47	No
5. 116th St & Ave T	231	16	202	21	No
6. 165th St & Ave T	336	111	269	72	No
Short-Range with Project + Related					
3. 106th St & Ave T	239	87	309	70	No
4. 106th St & Pearblossom Hwy	1,035	57	1,321	49	No
5. 116th St & Ave T	233	25	211	26	No
6. 165th St & Ave T	336	111	269	72	No

* Refer to Figure 3-7



▲ NOTE: THESE CURVES ARE RECOMMENDED FOR USE IN AREAS OF RURAL CLASSIFICATION (i.e. POSTED SPEED LIMIT ON THE MAJOR STREET IS 64 km/hr OR 40 MPH OR HIGHER OR COMMUNITY LESS THAN 10,000 POPULATION).

✸ NOTE: 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES, AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH ONE LANE.

Source: MUTCD – Figure 4C–4

Figure 3-8

SIGNAL WARRANT ANALYSIS

3.8 ROADWAY TRAFFIC INDEX ANALYSIS

The traffic index (TI) values for roadways along the project truck routes were determined to ensure the integrity of the roadways. Table 3-21 summarizes the 10 year and 20 year TI values under no-project and with-project conditions (actual TI calculations are included in Appendix E). The TI value is used with the soil's R value to determine the appropriate pavement design. The soil in the study area hasan R value of 80. With a very high R value of 80, the pavement design is relatively insensitive to the roadway's TI value; therefore, a standard pavement design of four inches of AC over six inches of aggregate base is sufficient to accommodate the future traffic loads.

Table 3-21

TRAFFIC INDEX (TI) VALUE SUMMARY

Location	Existing ADT Volume	10 Year TI		20 Year TI	
		No-Project	with Project	No-Project	with-Project
1. Ave T e/o 116th St	1,500[1]	7.0	9.5	7.5	11.0
2. Ave T w/o 165th St	1,600[1]	7.0	8.0	7.5	9.0
3. 106th St s/o of Ave T	1,200[1]	6.5	9.5	7.5	11.0
4. 165th St s/o of Ave T	3,000[1]	7.5	8.0	8.5	9.0
5. SR-138 w/o 106th St	17,300[2]	9.0	10.0	10.0	11.5
6. SR-138 e/o 165th St	17,900[2]	9.0	9.5	10.5	10.5

Count Source:
[1] 2008 TDS count (Appendix F)
[2] 2007 Caltrans

Assumptions:
7% trucks
Truck axle breakdown per Caltrans
3.8% annual growth

4.0 SUMMARY AND CONCLUSIONS

This chapter provides a summation of the primary findings and conclusions of the traffic impact analysis prepared for the proposed mining operation.

The project site is an approximately 310-acre site located on the Big Rock Creek fan deposit, which extends northward from the San Gabriel Mountains for about eight miles off Avenue T in the Antelope Valley in unincorporated Los Angeles County. The site is located in a relatively remote and undisturbed area of the Antelope Valley on the south side of Avenue T between 126th Street and 136th Street. The site is bisected by Union Pacific Railroad tracks. The surrounding land use is vacant land. A few homes are located about a mile east of the project boundary. The proposed project would be developed for mining, a ready-mix concrete plant, an asphaltic concrete plant, a Vac-Lite plant, and a raw cement transfer and aggregate distribution facility.

Project traffic will access the site from a roadway with a connection to Avenue T.

Regional access to the project vicinity is provided by 106th Street East at the Pearblossom Highway approximately six miles southwest of the site.

The proposed project will generate 774 trips daily, of which 18 trips will be generated during the AM peak hour.

Existing peak hour intersection volumes are from counts taken in March 2007 and August 2008. Existing freeway traffic volumes are from the most current count data that was available from Caltrans.

A capacity analysis for the seven critical intersections within the vicinity of the proposed project for existing, short-range background conditions and short-range cumulative conditions was conducted which reveals that the project has no significant impact on the seven study intersections or the six State highway sections.

Related projects have a significant impact under short-range cumulative conditions at the intersections of 82nd Street and Pearblossom Highway and 106th Street and Pearblossom Highway.

Improvements have been identified to mitigate cumulative impacts. The project has a zero percent share at 82nd Street and Pearblossom Highway and a 19.3 percent share at 106th Street and Pearblossom Highway.

This analysis recommends that the project contribute a fair-share contribution to the proposed roadway improvements for the SR-138, SR-14 and I-5 Freeways based upon the fact it does add additional traffic, albeit minimally so (404 ADT and 14 peak hour trips).

Appendix A

INTERSECTION CAPACITY UTILIZATION

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values. ICU calculations were performed for the intersections shown in Figure A-1. For simplicity, signalization is assumed at each intersection. Precise ICU calculations of existing non-signalized intersections would require a more detailed analysis.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A capacity of 1600 vehicles per hour (VPH) per lane is assumed together with a .10 clearance interval. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both thru and right-turn traffic (typically with a width of 19 feet from curb to outside of thru-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

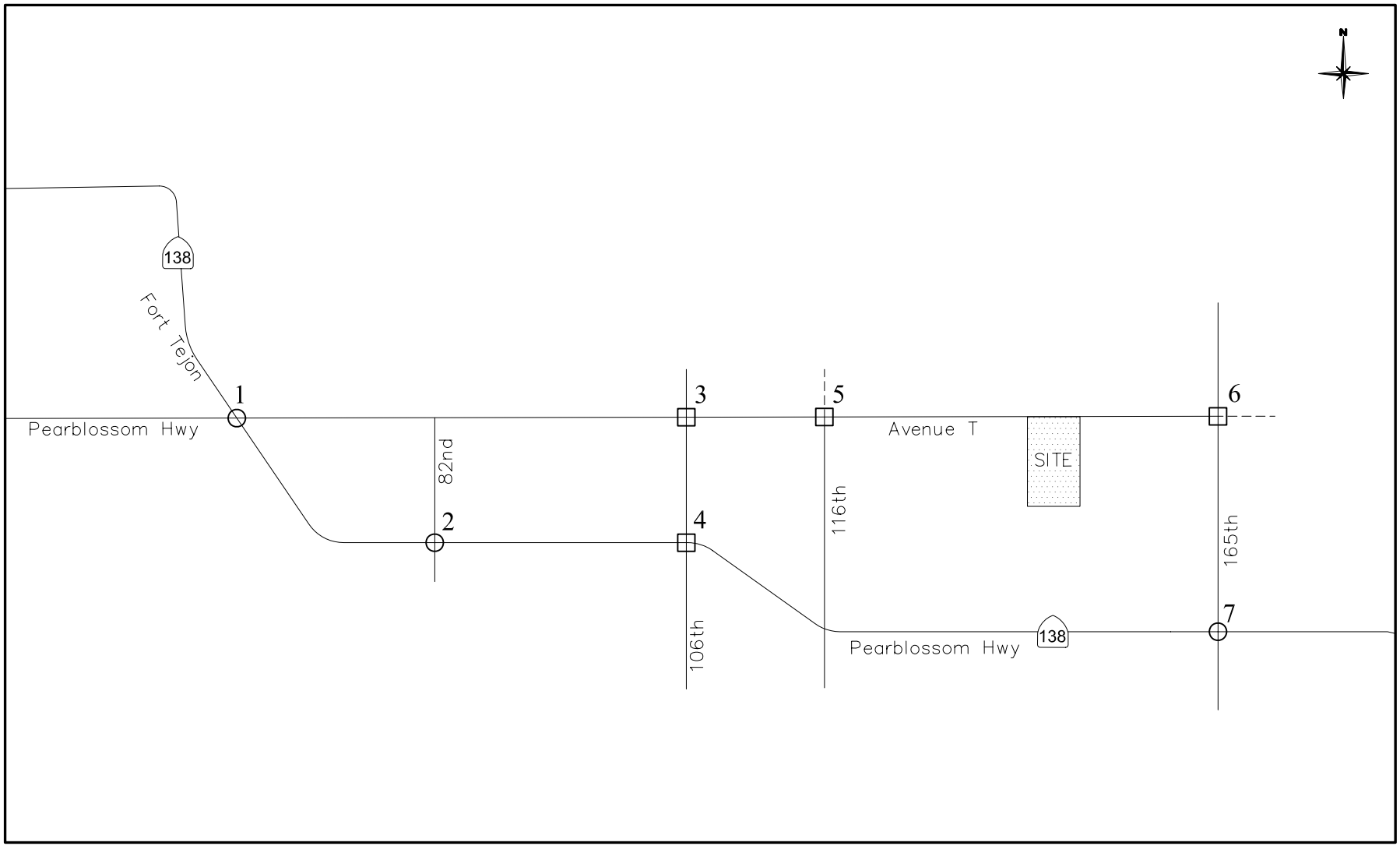
Example For Northbound Right

1. Right-Turn-On-Green (RTOG)

If NBT is critical move, then:
RTOG = V/C (NBT)
Otherwise,
RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

If WBL is critical move, then:
RTOR = V/C (WBL)
Otherwise,
RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)



Legend

- ○ Signalized study intersection
- □ Stop-controlled study intersection
- - - - Dirt road

Figure A-1

STUDY INTERSECTION LOCATION

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)
RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability For NBR

RTC = RTOG + factor x RTOR
Where factor = RTOR saturation flow factor (75%)

Right-turn adjustment is then as follows: Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C, therefore the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/thru, thru/right, left/thru/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example for Shared Left/Thru Lane

1. Average Lane Volume (ALV)

$$ALV = \frac{\text{Left-Turn Volume + Thru Volume}}{\text{Total Left + Thru Approach Lanes (including shared lane)}}$$

2. ALV for Each Approach

$$\text{ALV (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}$$

$$\text{ALV (Thru)} = \frac{\text{Thru Volume}}{\text{Thru Approach Lanes (including shared lane)}}$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and thru V/C ratios for this case are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}$$

$$\text{V/C (Thru)} = \frac{\text{Thru Volume}}{\text{Thru Approach Capacity (excluding shared lane)}}$$

Similarly, if ALV (Thru) is greater than ALV then full dedication to the thru approach is warranted, and left-turn and thru V/C ratios are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}$$

$$\text{V/C (Thru)} = \frac{\text{Thru Volume}}{\text{Thru Approach Capacity (including shared lane)}}$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Thru) are both less than ALV, the left/thru lane is assumed to be truly shared and each left, left/thru or thru approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/thru V/C ratio is calculated as follows:

$$\text{V/C (Left/Thru)} = \frac{\text{Left-Turn Volume + Thru Volume}}{\text{Total Left + Thru Approach Capacity (including shared lane)}}$$

This V/C (Left/Thru) ratio is assigned as the V/C (Thru) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Thru) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn (including shared lane), then:

V/C (Left) = V/C (Thru)

If approach has only one left-turn lane (shared lane), then:

$$V/C\ (Left) = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared thru/right lanes. If full dedication of a shared thru/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity availability if the option to include right-turns in the V/C ratio calculations is selected. If the V/C value that is determined using the shared lane methodology described here is reduced due to RTOR and RTOG capacity availability, the V/C value for the thru/right lanes is posted in brackets.

When an approach contains more than one shared lane (e.g., left/thru and thru/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.

Table A-1

SUMMARY OF LEVEL OF SERVICE DESCRIPTIONS – INTERSECTIONS

In general, V/C ratios cannot be greater than 1.00 for existing conditions, unless the lane capacity assumptions are too low. Also, if future demand projections are considered for analytical purposes, a ratio greater than 1.00 might be obtained, indicating that the projected demand would exceed the capacity.

LOS	DESCRIPTION	V/C Ratio
A Free Flow	Delay – Very slight or no delay. If signalized, conditions are such that no approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Maneuverability – Turning movements are easily made and nearly all drivers find freedom of operation.	0.00 – 0.60
B Stable Flow	Delay – Slight delay. If signalized, an occasional approach phase is fully utilized. Maneuverability – Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	0.61 – 0.70
C Stable Flow	Delay – Acceptable delay. If signalized, a few drivers arriving at the end of a queue may occasionally have to wait through one signal cycle. Maneuverability – Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	0.71 – 0.80
D Approaching Unstable Flow	Delay – Tolerable delay. Delays may be substantial during short periods, but excessive back-ups do not occur. Maneuverability – Maneuverability is severely limited during short periods due to temporary back-ups.	0.81 – 0.90
E Unstable Flow	Delay – Intolerable delay. Delay may be great up to several signal cycles. Maneuverability – There are typically long queues of vehicles waiting upstream of the intersection.	0.91 – 1.00
F Forced Flow	Delay – Excessive delay. Maneuverability – Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	> 1.00

Source: Highway Capacity Manual 2000, Transportation Research Board, National Research Council

Table A-2

CALTRANS TIA GUIDELINES

BASIC FREEWAY SEGMENTS @ 65 mi/hr

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum V/C	Maximum Service Flow Rate (pc/hr/ln)
A	11	65.0	0.30	710
B	18	65.0	0.50	1170
C	26	64.6	0.71	1680
D	35	59.7	0.89	2090
E	45	52.3	1.00	2350

SIGNALIZED INTERSECTIONS and RAMP TERMINALS

LOS	Control Delay per Vehicle (sec/veh)
A	10
B	≤10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

MULTI-LANE HIGHWAYS @ 55 mi/hr

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum V/C	Maximum Service Flow Rate (pc/hr/ln)
A	11	55.0	0.29	600
B	18	55.0	0.47	990
C	26	54.9	0.68	1430
D	35	52.9	0.88	1850
E	41	51.2	1.00	2100

Dotted line represents the transition between LOS “C” and LOS “D”

1. Fort Tejon & Pearblossom Hwy/Ave T

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	198	.12*	253	.16*
NBT	2	3200	242	.08	265	.08
NBR	0	0	3		6	
SBL	1	1600	85	.05	196	.12
SBT	2	3200	220	.08*	335	.11*
SBR	0	0	44		27	
EBL	1	1600	22	.05*	79	.05
EBT	1	1600	127	.08	387	.24*
EBR	1	1600	162	.10	339	.21
WBL	1	1600	4	.05	11	.05*
WBT	1	1600	333	.21*	155	.10
WBR	1	1600	74	.05	101	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.66**

Short-Range No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	213	.13*	272	.17*
NBT	2	3200	260	.08	285	.09
NBR	0	0	3		6	
SBL	1	1600	91	.06	211	.13
SBT	2	3200	237	.09*	360	.12*
SBR	0	0	47		29	
EBL	1	1600	24	.05*	85	.05
EBT	1	1600	137	.09	416	.26*
EBR	1	1600	174	.11	365	.23
WBL	1	1600	4	.05	12	.05*
WBT	1	1600	358	.22*	167	.10
WBR	1	1600	80	.05	109	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.70**

Short-Range with Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	213	.13*	272	.17*
NBT	2	3200	274	.09	285	.09
NBR	0	0	3		6	
SBL	1	1600	91	.06	211	.13
SBT	2	3200	251	.09*	360	.12*
SBR	0	0	47		29	
EBL	1	1600	24	.05*	85	.05
EBT	1	1600	137	.09	416	.26*
EBR	1	1600	174	.11	365	.23
WBL	1	1600	4	.05	12	.05*
WBT	1	1600	358	.22*	167	.10
WBR	1	1600	80	.05	109	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.70**

Short-Range with Project + Related

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	241	.15*	290	.18*
NBT	2	3200	331	.10	321	.10
NBR	0	0	3		6	
SBL	1	1600	93	.06	217	.14
SBT	2	3200	271	.10*	426	.14*
SBR	0	0	47		29	
EBL	1	1600	24	.05*	85	.05
EBT	1	1600	138	.09	419	.26*
EBR	1	1600	184	.12	397	.25
WBL	1	1600	4	.05	12	.05*
WBT	1	1600	360	.23*	169	.11
WBR	1	1600	85	.05	112	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.73**

1. Fort Tejon & Pearblossom Hwy/Ave T

Short-Range with Project (2nd Peak Hour)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	213	.13*	272	.17*
NBT	2	3200	266	.08	285	.09
NBR	0	0	3		6	
SBL	1	1600	91	.06	211	.13
SBT	2	3200	243	.09*	360	.12*
SBR	0	0	47		29	
EBL	1	1600	24	.05*	85	.05
EBT	1	1600	137	.09	416	.26*
EBR	1	1600	174	.11	365	.23
WBL	1	1600	4	.05	12	.05*
WBT	1	1600	358	.22*	167	.10
WBR	1	1600	80	.05	109	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.59**		**.70**

Short-Range with Project (2nd Peak Hour) + Related

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1600	241	.15*	290	.18*
NBT	2	3200	323	.10	321	.10
NBR	0	0	3		6	
SBL	1	1600	93	.06	217	.14
SBT	2	3200	263	.10*	426	.14*
SBR	0	0	47		29	
EBL	1	1600	24	.05*	85	.05
EBT	1	1600	138	.09	419	.26*
EBR	1	1600	184	.12	397	.25
WBL	1	1600	4	.05	12	.05*
WBT	1	1600	360	.23*	169	.11
WBR	1	1600	85	.05	112	.07
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.63**		**.73**

2. 82nd St & Pearblossom Hwy

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	56		48	{.05}*
NBT	1	1600	17	.06*	13	.05
NBR	0	0	29		12	
SBL	0	0	24	{.05}*	18	
SBT	1	1600	52	.05	21	.05*
SBR	1	1600	15	.05	17	.05
EBL	1	1600	14	.05*	20	.05
EBT	1	1600	359	.25	635	.42*
EBR	0	0	37		37	
WBL	1	1600	39	.05	18	.05*
WBT	1	1600	411	.26*	435	.27
WBR	1	1600	6	.05	8	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.67**

Short-Range No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	60		52	{.05}*
NBT	1	1600	18	.07*	14	.05
NBR	0	0	31		13	
SBL	0	0	26	{.05}*	19	
SBT	1	1600	56	.05	23	.05*
SBR	1	1600	16	.05	18	.05
EBL	1	1600	15	.05*	22	.05
EBT	1	1600	386	.27	683	.45*
EBR	0	0	40		40	
WBL	1	1600	42	.05	19	.05*
WBT	1	1600	442	.28*	468	.29
WBR	1	1600	6	.05	9	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.70**

Short-Range with Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	60		52	{.05}*
NBT	1	1600	18	.07*	14	.05
NBR	0	0	31		13	
SBL	0	0	26	{.05}*	19	
SBT	1	1600	56	.05	23	.05*
SBR	1	1600	16	.05	18	.05
EBL	1	1600	15	.05*	22	.05
EBT	1	1600	400	.28	683	.45*
EBR	0	0	40		40	
WBL	1	1600	42	.05	19	.05*
WBT	1	1600	456	.29*	468	.29
WBR	1	1600	6	.05	9	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.70**

Short-Range with Project + Related

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	60		52	{.05}*
NBT	1	1600	18	.07*	14	.05
NBR	0	0	31		13	
SBL	0	0	26	{.05}*	19	
SBT	1	1600	56	.05	23	.05*
SBR	1	1600	16	.05	18	.05
EBL	1	1600	15	.05*	22	.05
EBT	1	1600	429	.29	782	.51*
EBR	0	0	40		40	
WBL	1	1600	42	.05	19	.05*
WBT	1	1600	540	.34*	524	.33
WBR	1	1600	6	.05	9	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.76**

2. 82nd St & Pearblossom Hwy

Short-Range w/Proj + Related w/Cumulative Mitigation

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	60		52	{.05}*
NBT	1	1600	18	.07*	14	.05
NBR	0	0	31		13	
SBL	0	0	26	{.05}*	19	
SBT	1	1600	56	.05	23	.05*
SBR	1	1600	16	.05	18	.05
EBL	1	1600	15	.05*	22	.05*
EBT	2	3200	429	.15	782	.26
EBR	0	0	40		40	
WBL	1	1600	42	.05	19	.05
WBT	1	1600	540	.34*	524	.33*
WBR	1	1600	6	.05	9	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.61**		**.58**

Short-Range with Project (2nd Peak Hour)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	60		52	{.05}*
NBT	1	1600	18	.07*	14	.05
NBR	0	0	31		13	
SBL	0	0	26	{.05}*	19	
SBT	1	1600	56	.05	23	.05*
SBR	1	1600	16	.05	18	.05
EBL	1	1600	15	.05*	22	.05
EBT	1	1600	392	.27	683	.45*
EBR	0	0	40		40	
WBL	1	1600	42	.05	19	.05*
WBT	1	1600	448	.28*	468	.29
WBR	1	1600	6	.05	9	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.55**		**.70**

Short-Range with Project (2nd Peak Hour) + Related

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	60		52	{.05}*
NBT	1	1600	18	.07*	14	.05
NBR	0	0	31		13	
SBL	0	0	26	{.05}*	19	
SBT	1	1600	56	.05	23	.05*
SBR	1	1600	16	.05	18	.05
EBL	1	1600	15	.05*	22	.05
EBT	1	1600	421	.29	782	.51*
EBR	0	0	40		40	
WBL	1	1600	42	.05	19	.05*
WBT	1	1600	532	.33*	524	.33
WBR	1	1600	6	.05	9	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.60**		**.76**

7. 165th St & Pearblossom Hwy

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	14	{.05}*	23	{.05}*
NBT	1	1600	4	.05	5	.05
NBR	0	0	18		15	
SBL	0	0	48		54	
SBT	1	1600	4	.05*	5	.05*
SBR	d	1600	36	.05	84	.05
EBL	1	1600	52	.05*	155	.10
EBT	1	1600	266	.17	467	.29*
EBR	1	1600	21	.05	46	.05
WBL	1	1600	35	.05	21	.05*
WBT	1	1600	328	.21*	337	.21
WBR	d	1600	85	.05	72	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.46**		**.54**

Short-Range No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	15	{.05}*	25	{.05}*
NBT	1	1600	4	.05	5	.05
NBR	0	0	19		16	
SBL	0	0	52		58	
SBT	1	1600	4	.05*	5	.05*
SBR	d	1600	39	.05	90	.06
EBL	1	1600	56	.05*	167	.10
EBT	1	1600	286	.18	502	.31*
EBR	1	1600	23	.05	49	.05
WBL	1	1600	38	.05	23	.05*
WBT	1	1600	353	.22*	363	.23
WBR	d	1600	91	.06	77	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.47**		**.56**

Short-Range with Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	15	{.05}*	25	{.05}*
NBT	1	1600	4	.05	5	.05
NBR	0	0	19		16	
SBL	0	0	56		58	
SBT	1	1600	4	.05*	5	.05*
SBR	d	1600	39	.05	90	.06
EBL	1	1600	56	.05*	167	.10
EBT	1	1600	286	.18	502	.31*
EBR	1	1600	23	.05	49	.05
WBL	1	1600	38	.05	23	.05*
WBT	1	1600	353	.22*	363	.23
WBR	d	1600	95	.06	77	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.47**		**.56**

Short-Range with Project + Related

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	15	{.05}*	25	{.05}*
NBT	1	1600	4	.05	5	.05
NBR	0	0	19		16	
SBL	0	0	56		58	
SBT	1	1600	4	.05*	5	.05*
SBR	d	1600	39	.05	90	.06
EBL	1	1600	56	.05*	167	.10
EBT	1	1600	318	.20	524	.33*
EBR	1	1600	23	.05	49	.05
WBL	1	1600	38	.05	23	.05*
WBT	1	1600	364	.23*	401	.25
WBR	d	1600	95	.06	77	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.58**

7. 165th St & Pearblossom Hwy

Short-Range with Project (2nd Peak Hour)

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	15	{.05}*	25	{.05}*
NBT	1	1600	4	.05	5	.05
NBR	0	0	19		16	
SBL	0	0	54		58	
SBT	1	1600	4	.05*	5	.05*
SBR	d	1600	39	.05	90	.06
EBL	1	1600	56	.05*	167	.10
EBT	1	1600	286	.18	502	.31*
EBR	1	1600	23	.05	49	.05
WBL	1	1600	38	.05	23	.05*
WBT	1	1600	353	.22*	363	.23
WBR	d	1600	93	.06	77	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.47**		**.56**

Short-Range with Project (2nd Peak Hour) + Related

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	15	{.05}*	25	{.05}*
NBT	1	1600	4	.05	5	.05
NBR	0	0	19		16	
SBL	0	0	54		58	
SBT	1	1600	4	.05*	5	.05*
SBR	d	1600	39	.05	90	.06
EBL	1	1600	56	.05*	167	.10
EBT	1	1600	318	.20	524	.33*
EBR	1	1600	23	.05	49	.05
WBL	1	1600	38	.05	23	.05*
WBT	1	1600	364	.23*	401	.25
WBR	d	1600	93	.06	77	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.48**		**.58**

Appendix B

INTERSECTION DELAY WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3289		1687	3368	
Flt Permitted	0.37	1.00	1.00	0.67	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	665	1776	1509	1184	1776	1509	1687	3289		1687	3368	
Volume (vph)	22	127	162	4	333	74	85	220	44	198	242	3
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	141	180	4	370	82	94	244	49	220	269	3
RTOR Reduction (vph)	0	0	126	0	0	57	0	29	0	0	1	0
Lane Group Flow (vph)	24	141	54	4	370	25	94	264	0	220	271	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	13.8	13.8	13.8	13.8	13.8	13.8	4.4	11.6		8.3	15.5	
Effective Green, g (s)	13.8	13.8	13.8	13.8	13.8	13.8	4.4	11.6		8.3	15.5	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.10	0.25		0.18	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	201	536	456	358	536	456	162	835		306	1142	
v/s Ratio Prot		0.08			c0.21		0.06	c0.08		c0.13	c0.08	
v/s Ratio Perm	0.04		0.04	0.00		0.02						
v/c Ratio	0.12	0.26	0.12	0.01	0.69	0.05	0.58	0.32		0.72	0.24	
Uniform Delay, d1	11.6	12.1	11.5	11.2	14.1	11.3	19.8	13.8		17.6	10.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	0.0	3.8	0.0	5.2	0.2		7.8	0.1	
Delay (s)	11.8	12.4	11.7	11.2	17.9	11.4	25.0	14.1		25.5	11.0	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		12.0			16.7			16.7			17.4	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	45.7	Sum of lost time (s)	16.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1751		1687	1776	1509		1662			1748	1509
Flt Permitted	0.45	1.00		0.47	1.00	1.00		0.79			0.88	1.00
Satd. Flow (perm)	798	1751		830	1776	1509		1352			1560	1509
Volume (vph)	14	359	37	39	411	6	56	17	29	24	52	15
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	16	399	41	43	457	7	62	19	32	27	58	17
RTOR Reduction (vph)	0	7	0	0	0	4	0	23	0	0	0	12
Lane Group Flow (vph)	16	433	0	43	457	3	0	90	0	0	85	5
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	12.4	12.4		12.4	12.4	12.4		7.4			7.4	7.4
Effective Green, g (s)	12.4	12.4		12.4	12.4	12.4		7.4			7.4	7.4
Actuated g/C Ratio	0.45	0.45		0.45	0.45	0.45		0.27			0.27	0.27
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	356	781		370	792	673		360			415	402
v/s Ratio Prot		0.25			c0.26							
v/s Ratio Perm	0.02			0.05		0.00		c0.07			0.05	0.00
v/c Ratio	0.04	0.55		0.12	0.58	0.00		0.25			0.20	0.01
Uniform Delay, d1	4.4	5.7		4.5	5.7	4.3		8.0			7.9	7.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	0.9		0.1	1.0	0.0		0.4			0.2	0.0
Delay (s)	4.4	6.5		4.6	6.8	4.3		8.4			8.2	7.5
Level of Service	A	A		A	A	A		A			A	A
Approach Delay (s)		6.4			6.6			8.4			8.1	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	27.8	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	31	41	29	28	40	30	26	19	25	28	20	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	33	43	31	29	42	32	27	20	26	29	21	29

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	106	103	74	80
Volume Left (vph)	33	29	27	29
Volume Right (vph)	31	32	26	29
Hadj (s)	-0.08	-0.09	-0.11	-0.11
Departure Headway (s)	4.3	4.3	4.4	4.3
Degree Utilization, x	0.13	0.12	0.09	0.10
Capacity (veh/h)	804	797	779	777
Control Delay (s)	7.9	7.9	7.8	7.8
Approach Delay (s)	7.9	7.9	7.8	7.8
Approach LOS	A	A	A	A

Intersection Summary	
Delay	7.8
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	8	383	2	2	423	32	5	5	0	30	6	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	403	2	2	445	34	5	5	0	32	6	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	479			405			882	904	203	671	872	445
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	479			405			882	904	203	671	872	445
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	98	100	91	98	98
cM capacity (veh/h)	1080			1150			231	273	804	335	285	560

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	8	269	136	2	445	34	11	46
Volume Left	8	0	0	2	0	0	5	32
Volume Right	0	0	2	0	0	34	0	8
cSH	1080	1700	1700	1150	1700	1700	250	352
Volume to Capacity	0.01	0.16	0.08	0.00	0.26	0.02	0.04	0.13
Queue Length 95th (ft)	1	0	0	0	0	0	3	11
Control Delay (s)	8.4	0.0	0.0	8.1	0.0	0.0	20.0	16.8
Lane LOS	A			A			C	C
Approach Delay (s)	0.2			0.0			20.0	16.8
Approach LOS							C	C

Intersection Summary	
Average Delay	1.1
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	80	6	19	90	6	5	1	9	3	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	84	6	20	95	6	5	1	9	3	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	101			91			232	233	87	239	233	98
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	101			91			232	233	87	239	233	98
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	99	100	100	100
cM capacity (veh/h)	1491			1505			712	658	971	699	658	958

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	93	121	16	6
Volume Left	2	20	5	3
Volume Right	6	6	9	2
cSH	1491	1505	842	760
Volume to Capacity	0.00	0.01	0.02	0.01
Queue Length 95th (ft)	0	1	1	1
Control Delay (s)	0.2	1.3	9.4	9.8
Lane LOS	A	A	A	A
Approach Delay (s)	0.2	1.3	9.4	9.8
Approach LOS			A	A

Intersection Summary	
Average Delay	1.6
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	1	50	2	1	2	70	95	4	4	88	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	1	53	2	1	2	74	100	4	4	93	53
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	379	379	119	430	403	102	145			104		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	379	379	119	430	403	102	145			104		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	100	94	100	100	100	95			100		
cM capacity (veh/h)	552	523	933	484	507	953	1437			1487		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	106	5	178	149
Volume Left	53	2	74	4
Volume Right	53	2	4	53
cSH	692	609	1437	1487
Volume to Capacity	0.15	0.01	0.05	0.00
Queue Length 95th (ft)	14	1	4	0
Control Delay (s)	11.1	11.0	3.4	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.1	11.0	3.4	0.2
Approach LOS	B	B		

Intersection Summary	
Average Delay	4.3
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1623			1697	1509
Flt Permitted	0.53	1.00	1.00	0.58	1.00	1.00		0.90			0.76	1.00
Satd. Flow (perm)	938	1776	1509	1028	1776	1509		1488			1353	1509
Volume (vph)	52	266	21	35	328	85	14	4	18	48	4	36
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	58	296	23	39	364	94	16	4	20	53	4	40
RTOR Reduction (vph)	0	0	15	0	0	62	0	13	0	0	0	26
Lane Group Flow (vph)	58	296	8	39	364	32	0	27	0	0	57	14
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	8.7	8.7	8.7	8.7	8.7	8.7		8.8			8.8	8.8
Effective Green, g (s)	8.7	8.7	8.7	8.7	8.7	8.7		8.8			8.8	8.8
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34		0.35			0.35	0.35
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	320	606	515	351	606	515		514			467	521
v/s Ratio Prot		0.17			c0.20							
v/s Ratio Perm	0.06		0.01	0.04		0.02		0.02			c0.04	0.01
v/c Ratio	0.18	0.49	0.02	0.11	0.60	0.06		0.05			0.12	0.03
Uniform Delay, d1	5.9	6.6	5.6	5.8	7.0	5.7		5.6			5.7	5.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.3	0.6	0.0	0.1	1.7	0.1		0.0			0.1	0.0
Delay (s)	6.2	7.3	5.6	5.9	8.6	5.7		5.6			5.8	5.5
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		7.0			7.9			5.6			5.7	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	25.5	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3336		1687	3362	
Flt Permitted	0.65	1.00	1.00	0.27	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1152	1776	1509	486	1776	1509	1687	3336		1687	3362	
Volume (vph)	79	387	339	11	155	101	196	335	27	253	265	6
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	88	430	377	12	172	112	218	372	30	281	294	7
RTOR Reduction (vph)	0	0	263	0	0	78	0	11	0	0	3	0
Lane Group Flow (vph)	88	430	114	12	172	34	218	391	0	281	298	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	15.6	15.6	15.6	15.6	15.6	15.6	8.1	12.3		11.6	15.8	
Effective Green, g (s)	15.6	15.6	15.6	15.6	15.6	15.6	8.1	12.3		11.6	15.8	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.16	0.24		0.23	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	349	538	457	147	538	457	265	797		380	1031	
v/s Ratio Prot		c0.24			0.10		0.13	c0.12		c0.17	c0.09	
v/s Ratio Perm	0.08		0.08	0.02		0.02						
v/c Ratio	0.25	0.80	0.25	0.08	0.32	0.07	0.82	0.49		0.74	0.29	
Uniform Delay, d1	13.5	16.5	13.5	12.8	13.9	12.8	21.0	16.9		18.5	13.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	8.1	0.3	0.2	0.3	0.1	18.3	0.5		7.4	0.2	
Delay (s)	13.9	24.6	13.8	13.1	14.2	12.9	39.3	17.4		25.9	13.7	
Level of Service	B	C	B	B	B	B	D	B		C	B	
Approach Delay (s)		19.0			13.7			25.1			19.6	
Approach LOS		B			B			C			B	

Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	51.5	Sum of lost time (s)	16.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1761		1687	1776	1509		1681			1735	1509
Flt Permitted	0.45	1.00		0.25	1.00	1.00		0.78			0.85	1.00
Satd. Flow (perm)	791	1761		438	1776	1509		1362			1513	1509
Volume (vph)	20	635	37	18	435	8	48	13	12	18	21	17
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	706	41	20	483	9	53	14	13	20	23	19
RTOR Reduction (vph)	0	4	0	0	0	4	0	10	0	0	0	15
Lane Group Flow (vph)	22	743	0	20	483	5	0	70	0	0	43	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	20.2	20.2		20.2	20.2	20.2		7.7			7.7	7.7
Effective Green, g (s)	20.2	20.2		20.2	20.2	20.2		7.7			7.7	7.7
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56		0.21			0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	445	991		246	999	849		292			325	324
v/s Ratio Prot		c0.42			0.27							
v/s Ratio Perm	0.03			0.05		0.00		c0.05			0.03	0.00
v/c Ratio	0.05	0.75		0.08	0.48	0.01		0.24			0.13	0.01
Uniform Delay, d1	3.5	5.9		3.6	4.7	3.4		11.7			11.4	11.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.0	3.2		0.1	0.4	0.0		0.4			0.2	0.0
Delay (s)	3.6	9.1		3.7	5.1	3.4		12.1			11.6	11.1
Level of Service	A	A		A	A	A		B			B	B
Approach Delay (s)		8.9			5.0			12.1			11.4	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	55	79	45	15	54	19	27	9	13	17	10	34
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	58	83	47	16	57	20	28	9	14	18	11	36

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	188	93	52	64
Volume Left (vph)	58	16	28	18
Volume Right (vph)	47	20	14	36
Hadj (s)	-0.06	-0.06	-0.01	-0.24
Departure Headway (s)	4.2	4.3	4.6	4.3
Degree Utilization, x	0.22	0.11	0.07	0.08
Capacity (veh/h)	829	794	731	766
Control Delay (s)	8.4	7.8	7.9	7.7
Approach Delay (s)	8.4	7.8	7.9	7.7
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.1
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	16	586	7	1	453	17	3	7	0	32	5	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	617	7	1	477	18	3	7	0	34	5	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	495			624			1143	1151	312	825	1137	477
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			624			1143	1151	312	825	1137	477
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	96	100	87	97	99
cM capacity (veh/h)	1065			953			148	193	684	254	197	534

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	17	411	213	1	477	18	11	46
Volume Left	17	0	0	1	0	0	3	34
Volume Right	0	0	7	0	0	18	0	7
cSH	1065	1700	1700	953	1700	1700	177	267
Volume to Capacity	0.02	0.24	0.13	0.00	0.28	0.01	0.06	0.17
Queue Length 95th (ft)	1	0	0	0	0	0	5	15
Control Delay (s)	8.4	0.0	0.0	8.8	0.0	0.0	26.6	21.3
Lane LOS	A			A			D	C
Approach Delay (s)	0.2			0.0			26.6	21.3
Approach LOS							D	C

Intersection Summary	
Average Delay	1.2
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	60	30	6	80	2	14	1	5	2	1	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	63	32	6	84	2	15	1	5	2	1	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	86			95			203	199	79	204	214	85
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	86			95			203	199	79	204	214	85
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	100	100	100
cM capacity (veh/h)	1510			1499			745	689	982	743	676	974

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	105	93	21	7
Volume Left	11	6	15	2
Volume Right	32	2	5	4
cSH	1510	1499	789	846
Volume to Capacity	0.01	0.00	0.03	0.01
Queue Length 95th (ft)	1	0	2	1
Control Delay (s)	0.8	0.5	9.7	9.3
Lane LOS	A	A	A	A
Approach Delay (s)	0.8	0.5	9.7	9.3
Approach LOS			A	A

Intersection Summary	
Average Delay	1.8
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	36	2	29	3	2	3	35	73	4	6	83	49
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	38	2	31	3	2	3	37	77	4	6	87	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	283	281	113	310	304	79	139			81		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	283	281	113	310	304	79	139			81		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	97	99	100	100	97			100		
cM capacity (veh/h)	651	609	940	606	591	982	1445			1517		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	71	8	118	145
Volume Left	38	3	37	6
Volume Right	31	3	4	52
cSH	749	702	1445	1517
Volume to Capacity	0.09	0.01	0.03	0.00
Queue Length 95th (ft)	8	1	2	0
Control Delay (s)	10.3	10.2	2.5	0.4
Lane LOS	B	B	A	A
Approach Delay (s)	10.3	10.2	2.5	0.4
Approach LOS	B	B		

Intersection Summary	
Average Delay	3.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1649			1698	1509
Flt Permitted	0.54	1.00	1.00	0.40	1.00	1.00		0.83			0.72	1.00
Satd. Flow (perm)	957	1776	1509	710	1776	1509		1411			1275	1509
Volume (vph)	155	467	46	21	337	72	23	5	15	54	5	84
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	172	519	51	23	374	80	26	6	17	60	6	93
RTOR Reduction (vph)	0	0	26	0	0	41	0	13	0	0	0	70
Lane Group Flow (vph)	172	519	25	23	374	39	0	36	0	0	66	23
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	14.4	14.4	14.4	14.4	14.4	14.4		7.3			7.3	7.3
Effective Green, g (s)	14.4	14.4	14.4	14.4	14.4	14.4		7.3			7.3	7.3
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48		0.25			0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	464	861	732	344	861	732		347			313	371
v/s Ratio Prot		c0.29			0.21							
v/s Ratio Perm	0.18		0.02	0.03		0.03		0.03			c0.05	0.02
v/c Ratio	0.37	0.60	0.03	0.07	0.43	0.05		0.10			0.21	0.06
Uniform Delay, d1	4.8	5.6	4.0	4.1	5.0	4.0		8.7			8.9	8.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.5	1.2	0.0	0.1	0.4	0.0		0.1			0.3	0.1
Delay (s)	5.3	6.8	4.0	4.2	5.3	4.1		8.8			9.2	8.6
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		6.2			5.1			8.8			8.9	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	29.7	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3290		1687	3369	
Flt Permitted	0.34	1.00	1.00	0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	609	1776	1509	1173	1776	1509	1687	3290		1687	3369	
Volume (vph)	24	137	174	4	358	80	91	237	47	213	260	3
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	152	193	4	398	89	101	263	52	237	289	3
RTOR Reduction (vph)	0	0	133	0	0	61	0	29	0	0	1	0
Lane Group Flow (vph)	27	152	60	4	398	28	101	286	0	237	291	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	14.6	14.6	14.6	14.6	14.6	14.6	4.5	11.5		8.6	15.6	
Effective Green, g (s)	14.6	14.6	14.6	14.6	14.6	14.6	4.5	11.5		8.6	15.6	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.10	0.25		0.18	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	190	555	472	367	555	472	163	810		311	1125	
v/s Ratio Prot		0.09			c0.22		0.06	c0.09		c0.14	0.09	
v/s Ratio Perm	0.04		0.04	0.00		0.02						
v/c Ratio	0.14	0.27	0.13	0.01	0.72	0.06	0.62	0.35		0.76	0.26	
Uniform Delay, d1	11.5	12.1	11.5	11.1	14.2	11.2	20.3	14.5		18.1	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	0.0	4.4	0.1	6.8	0.3		10.5	0.1	
Delay (s)	11.9	12.3	11.6	11.1	18.6	11.3	27.1	14.8		28.6	11.5	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		11.9			17.2			17.8			19.1	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1751		1687	1776	1509		1662			1748	1509
Flt Permitted	0.42	1.00		0.43	1.00	1.00		0.79			0.88	1.00
Satd. Flow (perm)	739	1751		770	1776	1509		1343			1556	1509
Volume (vph)	15	386	40	42	442	6	60	18	31	26	56	16
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	429	44	47	491	7	67	20	34	29	62	18
RTOR Reduction (vph)	0	7	0	0	0	4	0	25	0	0	0	13
Lane Group Flow (vph)	17	466	0	47	491	3	0	96	0	0	91	5
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	13.4	13.4		13.4	13.4	13.4		7.7			7.7	7.7
Effective Green, g (s)	13.4	13.4		13.4	13.4	13.4		7.7			7.7	7.7
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46		0.26			0.26	0.26
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	340	806		355	818	695		355			412	399
v/s Ratio Prot		0.27			c0.28							
v/s Ratio Perm	0.02			0.06		0.00		c0.07			0.06	0.00
v/c Ratio	0.05	0.58		0.13	0.60	0.00		0.27			0.22	0.01
Uniform Delay, d1	4.3	5.8		4.5	5.9	4.2		8.5			8.4	7.9
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	1.0		0.2	1.2	0.0		0.4			0.3	0.0
Delay (s)	4.4	6.8		4.7	7.1	4.2		8.9			8.6	7.9
Level of Service	A	A		A	A	A		A			A	A
Approach Delay (s)		6.7			6.9			8.9			8.5	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	29.1	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	46	32	31	45	33	29	21	28	31	22	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	48	34	33	47	35	31	22	29	33	23	33

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	119	115	82	88
Volume Left (vph)	37	33	31	33
Volume Right (vph)	34	35	29	33
Hadj (s)	-0.07	-0.09	-0.11	-0.11
Departure Headway (s)	4.4	4.3	4.4	4.4
Degree Utilization, x	0.14	0.14	0.10	0.11
Capacity (veh/h)	790	784	763	761
Control Delay (s)	8.1	8.0	7.9	8.0
Approach Delay (s)	8.1	8.0	7.9	8.0
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.0
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	9	412	2	2	455	34	5	5	0	32	6	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	434	2	2	479	36	5	5	0	34	6	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	515			436			949	973	218	722	938	479
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515			436			949	973	218	722	938	479
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	98	100	89	98	98
cM capacity (veh/h)	1047			1120			205	248	786	307	260	533

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	9	289	147	2	479	36	11	49
Volume Left	9	0	0	2	0	0	5	34
Volume Right	0	0	2	0	0	36	0	9
cSH	1047	1700	1700	1120	1700	1700	225	326
Volume to Capacity	0.01	0.17	0.09	0.00	0.28	0.02	0.05	0.15
Queue Length 95th (ft)	1	0	0	0	0	0	4	13
Control Delay (s)	8.5	0.0	0.0	8.2	0.0	0.0	21.8	18.0
Lane LOS	A			A			C	C
Approach Delay (s)	0.2			0.0			21.8	18.0
Approach LOS							C	C

Intersection Summary	
Average Delay	1.2
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	86	6	20	97	6	5	1	10	3	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	91	6	21	102	6	5	1	11	3	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	108			97			248	248	94	256	248	105
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108			97			248	248	94	256	248	105
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	99	100	100	100
cM capacity (veh/h)	1482			1497			695	644	963	680	644	949

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	99	129	17	6
Volume Left	2	21	5	3
Volume Right	6	6	11	2
cSH	1482	1497	836	743
Volume to Capacity	0.00	0.01	0.02	0.01
Queue Length 95th (ft)	0	1	2	1
Control Delay (s)	0.2	1.3	9.4	9.9
Lane LOS	A	A	A	A
Approach Delay (s)	0.2	1.3	9.4	9.9
Approach LOS			A	A

Intersection Summary	
Average Delay	1.6
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	54	1	54	2	1	2	75	102	4	4	95	54
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	57	1	57	2	1	2	79	107	4	4	100	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	407	406	128	462	433	109	157			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	407	406	128	462	433	109	157			112		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	94	100	100	100	94			100		
cM capacity (veh/h)	528	503	922	457	486	944	1423			1478		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	115	5	191	161
Volume Left	57	2	79	4
Volume Right	57	2	4	57
cSH	669	584	1423	1478
Volume to Capacity	0.17	0.01	0.06	0.00
Queue Length 95th (ft)	15	1	4	0
Control Delay (s)	11.5	11.2	3.4	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	11.2	3.4	0.2
Approach LOS	B	B		

Intersection Summary	
Average Delay	4.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1623			1696	1509
Flt Permitted	0.49	1.00	1.00	0.57	1.00	1.00		0.89			0.75	1.00
Satd. Flow (perm)	871	1776	1509	1008	1776	1509		1482			1339	1509
Volume (vph)	56	286	23	38	353	91	15	4	19	52	4	39
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	62	318	26	42	392	101	17	4	21	58	4	43
RTOR Reduction (vph)	0	0	17	0	0	66	0	14	0	0	0	28
Lane Group Flow (vph)	62	318	9	42	392	35	0	28	0	0	62	15
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	9.0	9.0	9.0	9.0	9.0	9.0		8.8			8.8	8.8
Effective Green, g (s)	9.0	9.0	9.0	9.0	9.0	9.0		8.8			8.8	8.8
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.34			0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	304	620	526	352	620	526		505			457	515
v/s Ratio Prot		0.18			c0.22							
v/s Ratio Perm	0.07		0.01	0.04		0.02		0.02			c0.05	0.01
v/c Ratio	0.20	0.51	0.02	0.12	0.63	0.07		0.06			0.14	0.03
Uniform Delay, d1	5.9	6.7	5.5	5.7	7.0	5.6		5.7			5.9	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.3	0.7	0.0	0.2	2.1	0.1		0.0			0.1	0.0
Delay (s)	6.2	7.4	5.5	5.9	9.1	5.7		5.8			6.0	5.7
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		7.1			8.2			5.8			5.9	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	25.8	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3336		1687	3363	
Flt Permitted	0.63	1.00	1.00	0.25	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1117	1776	1509	443	1776	1509	1687	3336		1687	3363	
Volume (vph)	85	416	365	12	167	109	211	360	29	272	285	6
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	462	406	13	186	121	234	400	32	302	317	7
RTOR Reduction (vph)	0	0	275	0	0	82	0	9	0	0	2	0
Lane Group Flow (vph)	94	462	131	13	186	39	234	423	0	302	322	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	10.9	12.3		13.1	14.5	
Effective Green, g (s)	17.9	17.9	17.9	17.9	17.9	17.9	10.9	12.3		13.1	14.5	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.20	0.22		0.24	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	362	575	488	143	575	488	333	742		400	882	
v/s Ratio Prot		c0.26			0.10		0.14	c0.13		c0.18	0.10	
v/s Ratio Perm	0.08		0.09	0.03		0.03						
v/c Ratio	0.26	0.80	0.27	0.09	0.32	0.08	0.70	0.57		0.76	0.36	
Uniform Delay, d1	13.8	17.1	13.9	13.0	14.1	13.0	20.7	19.1		19.6	16.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	8.0	0.3	0.3	0.3	0.1	6.6	1.0		7.9	0.3	
Delay (s)	14.2	25.1	14.2	13.3	14.5	13.1	27.3	20.2		27.5	16.9	
Level of Service	B	C	B	B	B	B	C	C		C	B	
Approach Delay (s)		19.4			13.9			22.7			22.0	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1761		1687	1776	1509		1682			1737	1509
Flt Permitted	0.42	1.00		0.22	1.00	1.00		0.78			0.85	1.00
Satd. Flow (perm)	743	1761		386	1776	1509		1355			1517	1509
Volume (vph)	22	683	40	19	468	9	52	14	13	19	23	18
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	759	44	21	520	10	58	16	14	21	26	20
RTOR Reduction (vph)	0	4	0	0	0	4	0	11	0	0	0	16
Lane Group Flow (vph)	24	799	0	21	520	6	0	77	0	0	47	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	22.2	22.2		22.2	22.2	22.2		8.0			8.0	8.0
Effective Green, g (s)	22.2	22.2		22.2	22.2	22.2		8.0			8.0	8.0
Actuated g/C Ratio	0.58	0.58		0.58	0.58	0.58		0.21			0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	432	1023		224	1032	877		284			318	316
v/s Ratio Prot		c0.45			0.29							
v/s Ratio Perm	0.03			0.05		0.00		c0.06			0.03	0.00
v/c Ratio	0.06	0.78		0.09	0.50	0.01		0.27			0.15	0.01
Uniform Delay, d1	3.5	6.1		3.5	4.7	3.4		12.7			12.3	12.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	3.9		0.2	0.4	0.0		0.5			0.2	0.0
Delay (s)	3.5	10.1		3.7	5.1	3.4		13.2			12.5	12.0
Level of Service	A	B		A	A	A		B			B	B
Approach Delay (s)		9.9			5.0			13.2			12.4	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	61	88	50	17	60	21	30	10	14	19	11	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	93	53	18	63	22	32	11	15	20	12	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	209	103	57	72
Volume Left (vph)	64	18	32	20
Volume Right (vph)	53	22	15	40
Hadj (s)	-0.06	-0.06	-0.01	-0.25
Departure Headway (s)	4.3	4.4	4.7	4.4
Degree Utilization, x	0.25	0.13	0.07	0.09
Capacity (veh/h)	817	781	713	748
Control Delay (s)	8.7	8.0	8.1	7.9
Approach Delay (s)	8.7	8.0	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.3
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	631	8	1	487	18	3	8	0	34	5	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	664	8	1	513	19	3	8	0	36	5	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	532			673			1230	1238	336	887	1223	513
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	532			673			1230	1238	336	887	1223	513
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	95	100	84	97	98
cM capacity (veh/h)	1032			914			127	171	659	227	175	507

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	443	230	1	513	19	12	49
Volume Left	18	0	0	1	0	0	3	36
Volume Right	0	0	8	0	0	19	0	8
cSH	1032	1700	1700	914	1700	1700	156	242
Volume to Capacity	0.02	0.26	0.14	0.00	0.30	0.01	0.07	0.20
Queue Length 95th (ft)	1	0	0	0	0	0	6	19
Control Delay (s)	8.5	0.0	0.0	8.9	0.0	0.0	29.9	23.7
Lane LOS	A			A			D	C
Approach Delay (s)	0.2			0.0			29.9	23.7
Approach LOS							D	C

Intersection Summary	
Average Delay	1.3
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	65	32	6	86	2	15	1	5	2	1	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	68	34	6	91	2	16	1	5	2	1	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	93			102			217	214	85	218	229	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			102			217	214	85	218	229	92
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	100	100	100
cM capacity (veh/h)	1502			1490			728	676	974	726	662	966

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	114	99	22	7
Volume Left	12	6	16	2
Volume Right	34	2	5	4
cSH	1502	1490	772	833
Volume to Capacity	0.01	0.00	0.03	0.01
Queue Length 95th (ft)	1	0	2	1
Control Delay (s)	0.8	0.5	9.8	9.4
Lane LOS	A	A	A	A
Approach Delay (s)	0.8	0.5	9.8	9.4
Approach LOS			A	A

Intersection Summary	
Average Delay	1.8
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	39	2	31	3	2	3	38	79	4	6	89	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	2	33	3	2	3	40	83	4	6	94	56
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304	302	122	333	327	85	149			87		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304	302	122	333	327	85	149			87		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	96	99	100	100	97			100		
cM capacity (veh/h)	629	592	930	582	572	974	1432			1509		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	8	127	156
Volume Left	41	3	40	6
Volume Right	33	3	4	56
cSH	729	682	1432	1509
Volume to Capacity	0.10	0.01	0.03	0.00
Queue Length 95th (ft)	9	1	2	0
Control Delay (s)	10.5	10.3	2.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	10.3	2.5	0.3
Approach LOS	B	B		

Intersection Summary	
Average Delay	3.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1648			1698	1509
Flt Permitted	0.51	1.00	1.00	0.37	1.00	1.00		0.83			0.71	1.00
Satd. Flow (perm)	906	1776	1509	655	1776	1509		1401			1262	1509
Volume (vph)	167	502	49	23	363	77	25	5	16	58	5	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	186	558	54	26	403	86	28	6	18	64	6	100
RTOR Reduction (vph)	0	0	27	0	0	43	0	14	0	0	0	76
Lane Group Flow (vph)	186	558	27	26	403	43	0	38	0	0	70	24
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	15.4	15.4	15.4	15.4	15.4	15.4		7.4			7.4	7.4
Effective Green, g (s)	15.4	15.4	15.4	15.4	15.4	15.4		7.4			7.4	7.4
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50		0.24			0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	453	888	755	328	888	755		337			303	363
v/s Ratio Prot		c0.31			0.23							
v/s Ratio Perm	0.21		0.02	0.04		0.03		0.03			c0.06	0.02
v/c Ratio	0.41	0.63	0.04	0.08	0.45	0.06		0.11			0.23	0.07
Uniform Delay, d1	4.8	5.6	3.9	4.0	5.0	4.0		9.1			9.4	9.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.6	1.4	0.0	0.1	0.4	0.0		0.2			0.4	0.1
Delay (s)	5.5	7.0	3.9	4.1	5.4	4.0		9.3			9.8	9.1
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		6.4			5.1			9.3			9.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3294		1687	3369	
Flt Permitted	0.34	1.00	1.00	0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	603	1776	1509	1173	1776	1509	1687	3294		1687	3369	
Volume (vph)	24	137	174	4	358	80	91	251	47	213	274	3
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	152	193	4	398	89	101	279	52	237	304	3
RTOR Reduction (vph)	0	0	133	0	0	61	0	27	0	0	1	0
Lane Group Flow (vph)	27	152	60	4	398	28	101	304	0	237	306	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	14.6	14.6	14.6	14.6	14.6	14.6	4.5	11.8		8.6	15.9	
Effective Green, g (s)	14.6	14.6	14.6	14.6	14.6	14.6	4.5	11.8		8.6	15.9	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.10	0.25		0.18	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	187	552	469	364	552	469	162	827		309	1140	
v/s Ratio Prot		0.09			c0.22		0.06	c0.09		c0.14	0.09	
v/s Ratio Perm	0.04		0.04	0.00		0.02						
v/c Ratio	0.14	0.28	0.13	0.01	0.72	0.06	0.62	0.37		0.77	0.27	
Uniform Delay, d1	11.7	12.2	11.6	11.2	14.4	11.4	20.4	14.5		18.2	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.3	0.1	0.0	4.6	0.1	7.3	0.3		10.8	0.1	
Delay (s)	12.0	12.5	11.8	11.2	19.0	11.4	27.7	14.8		29.1	11.4	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		12.1			17.6			17.8			19.1	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	47.0	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1752		1687	1776	1509		1662			1748	1509
Flt Permitted	0.40	1.00		0.42	1.00	1.00		0.79			0.88	1.00
Satd. Flow (perm)	712	1752		745	1776	1509		1345			1557	1509
Volume (vph)	15	400	40	42	456	6	60	18	31	26	56	16
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	444	44	47	507	7	67	20	34	29	62	18
RTOR Reduction (vph)	0	7	0	0	0	4	0	25	0	0	0	13
Lane Group Flow (vph)	17	481	0	47	507	3	0	96	0	0	91	5
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	13.8	13.8		13.8	13.8	13.8		7.8			7.8	7.8
Effective Green, g (s)	13.8	13.8		13.8	13.8	13.8		7.8			7.8	7.8
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47		0.26			0.26	0.26
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	332	817		347	828	704		354			410	398
v/s Ratio Prot		0.27			c0.29							
v/s Ratio Perm	0.02			0.06		0.00		c0.07			0.06	0.00
v/c Ratio	0.05	0.59		0.14	0.61	0.00		0.27			0.22	0.01
Uniform Delay, d1	4.3	5.8		4.5	5.9	4.2		8.6			8.5	8.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	1.1		0.2	1.3	0.0		0.4			0.3	0.0
Delay (s)	4.4	6.9		4.7	7.3	4.2		9.1			8.8	8.1
Level of Service	A	A		A	A	A		A			A	A
Approach Delay (s)		6.8			7.0			9.1			8.7	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	29.6	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	46	32	45	45	33	29	21	42	31	22	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	48	34	47	47	35	31	22	44	33	23	33

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	119	129	97	88
Volume Left (vph)	37	47	31	33
Volume Right (vph)	34	35	44	33
Hadj (s)	-0.07	-0.05	-0.18	-0.11
Departure Headway (s)	4.4	4.4	4.4	4.5
Degree Utilization, x	0.15	0.16	0.12	0.11
Capacity (veh/h)	778	770	766	749
Control Delay (s)	8.2	8.2	8.0	8.0
Approach Delay (s)	8.2	8.2	8.0	8.0
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.1
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	412	2	2	455	34	5	5	0	32	6	23
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	434	2	2	479	36	5	5	0	34	6	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	515			436			994	1002	218	751	967	479
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515			436			994	1002	218	751	967	479
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			97	98	100	88	97	95
cM capacity (veh/h)	1047			1120			183	235	786	289	246	533

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	24	289	147	2	479	36	11	64
Volume Left	24	0	0	2	0	0	5	34
Volume Right	0	0	2	0	0	36	0	24
cSH	1047	1700	1700	1120	1700	1700	206	342
Volume to Capacity	0.02	0.17	0.09	0.00	0.28	0.02	0.05	0.19
Queue Length 95th (ft)	2	0	0	0	0	0	4	17
Control Delay (s)	8.5	0.0	0.0	8.2	0.0	0.0	23.4	17.9
Lane LOS	A			A			C	C
Approach Delay (s)	0.4			0.0			23.4	17.9
Approach LOS							C	C

Intersection Summary	
Average Delay	1.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	100	6	20	111	6	5	1	10	3	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	105	6	21	117	6	5	1	11	3	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	123			112			277	278	108	286	278	120
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123			112			277	278	108	286	278	120
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	99	100	100	100
cM capacity (veh/h)	1464			1478			665	620	945	650	620	931

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	114	144	17	6
Volume Left	2	21	5	3
Volume Right	6	6	11	2
cSH	1464	1478	812	717
Volume to Capacity	0.00	0.01	0.02	0.01
Queue Length 95th (ft)	0	1	2	1
Control Delay (s)	0.1	1.2	9.5	10.1
Lane LOS	A	A	A	B
Approach Delay (s)	0.1	1.2	9.5	10.1
Approach LOS			A	B

Intersection Summary	
Average Delay	1.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	54	1	58	2	1	2	79	102	4	4	95	54
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	57	1	61	2	1	2	83	107	4	4	100	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	415	415	128	474	441	109	157			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	415	415	128	474	441	109	157			112		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	93	100	100	100	94			100		
cM capacity (veh/h)	520	496	922	445	479	944	1423			1478		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	119	5	195	161
Volume Left	57	2	83	4
Volume Right	61	2	4	57
cSH	669	575	1423	1478
Volume to Capacity	0.18	0.01	0.06	0.00
Queue Length 95th (ft)	16	1	5	0
Control Delay (s)	11.5	11.3	3.6	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	11.3	3.6	0.2
Approach LOS	B	B		

Intersection Summary	
Average Delay	4.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1623			1696	1509
Flt Permitted	0.49	1.00	1.00	0.57	1.00	1.00		0.89			0.75	1.00
Satd. Flow (perm)	869	1776	1509	1008	1776	1509		1481			1333	1509
Volume (vph)	56	286	23	38	353	95	15	4	19	56	4	39
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	62	318	26	42	392	106	17	4	21	62	4	43
RTOR Reduction (vph)	0	0	17	0	0	69	0	14	0	0	0	28
Lane Group Flow (vph)	62	318	9	42	392	37	0	28	0	0	66	15
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	9.1	9.1	9.1	9.1	9.1	9.1		8.9			8.9	8.9
Effective Green, g (s)	9.1	9.1	9.1	9.1	9.1	9.1		8.9			8.9	8.9
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.34			0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	304	622	528	353	622	528		507			456	517
v/s Ratio Prot		0.18			c0.22							
v/s Ratio Perm	0.07		0.01	0.04		0.02		0.02			c0.05	0.01
v/c Ratio	0.20	0.51	0.02	0.12	0.63	0.07		0.06			0.14	0.03
Uniform Delay, d1	5.9	6.7	5.5	5.7	7.0	5.6		5.7			5.9	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.3	0.7	0.0	0.2	2.1	0.1		0.0			0.1	0.0
Delay (s)	6.2	7.4	5.5	5.9	9.1	5.7		5.8			6.1	5.7
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		7.1			8.2			5.8			5.9	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	26.0	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3336		1687	3363	
Flt Permitted	0.63	1.00	1.00	0.25	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1117	1776	1509	443	1776	1509	1687	3336		1687	3363	
Volume (vph)	85	416	365	12	167	109	211	360	29	272	285	6
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	462	406	13	186	121	234	400	32	302	317	7
RTOR Reduction (vph)	0	0	275	0	0	82	0	9	0	0	2	0
Lane Group Flow (vph)	94	462	131	13	186	39	234	423	0	302	322	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	10.9	12.3		13.1	14.5	
Effective Green, g (s)	17.9	17.9	17.9	17.9	17.9	17.9	10.9	12.3		13.1	14.5	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.20	0.22		0.24	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	362	575	488	143	575	488	333	742		400	882	
v/s Ratio Prot		c0.26			0.10		0.14	c0.13		c0.18	0.10	
v/s Ratio Perm	0.08		0.09	0.03		0.03						
v/c Ratio	0.26	0.80	0.27	0.09	0.32	0.08	0.70	0.57		0.76	0.36	
Uniform Delay, d1	13.8	17.1	13.9	13.0	14.1	13.0	20.7	19.1		19.6	16.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	8.0	0.3	0.3	0.3	0.1	6.6	1.0		7.9	0.3	
Delay (s)	14.2	25.1	14.2	13.3	14.5	13.1	27.3	20.2		27.5	16.9	
Level of Service	B	C	B	B	B	B	C	C		C	B	
Approach Delay (s)		19.4			13.9			22.7			22.0	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1761		1687	1776	1509		1682			1737	1509
Flt Permitted	0.42	1.00		0.22	1.00	1.00		0.78			0.85	1.00
Satd. Flow (perm)	743	1761		386	1776	1509		1355			1517	1509
Volume (vph)	22	683	40	19	468	9	52	14	13	19	23	18
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	759	44	21	520	10	58	16	14	21	26	20
RTOR Reduction (vph)	0	4	0	0	0	4	0	11	0	0	0	16
Lane Group Flow (vph)	24	799	0	21	520	6	0	77	0	0	47	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	22.2	22.2		22.2	22.2	22.2		8.0			8.0	8.0
Effective Green, g (s)	22.2	22.2		22.2	22.2	22.2		8.0			8.0	8.0
Actuated g/C Ratio	0.58	0.58		0.58	0.58	0.58		0.21			0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	432	1023		224	1032	877		284			318	316
v/s Ratio Prot		c0.45			0.29							
v/s Ratio Perm	0.03			0.05		0.00		c0.06			0.03	0.00
v/c Ratio	0.06	0.78		0.09	0.50	0.01		0.27			0.15	0.01
Uniform Delay, d1	3.5	6.1		3.5	4.7	3.4		12.7			12.3	12.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	3.9		0.2	0.4	0.0		0.5			0.2	0.0
Delay (s)	3.5	10.1		3.7	5.1	3.4		13.2			12.5	12.0
Level of Service	A	B		A	A	A		B			B	B
Approach Delay (s)		9.9			5.0			13.2			12.4	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	61	88	50	17	60	21	30	10	14	19	11	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	93	53	18	63	22	32	11	15	20	12	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	209	103	57	72
Volume Left (vph)	64	18	32	20
Volume Right (vph)	53	22	15	40
Hadj (s)	-0.06	-0.06	-0.01	-0.25
Departure Headway (s)	4.3	4.4	4.7	4.4
Degree Utilization, x	0.25	0.13	0.07	0.09
Capacity (veh/h)	817	781	713	748
Control Delay (s)	8.7	8.0	8.1	7.9
Approach Delay (s)	8.7	8.0	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.3
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	631	8	1	487	18	3	8	0	34	5	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	664	8	1	513	19	3	8	0	36	5	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	532			673			1230	1238	336	887	1223	513
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	532			673			1230	1238	336	887	1223	513
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	95	100	84	97	98
cM capacity (veh/h)	1032			914			127	171	659	227	175	507

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	443	230	1	513	19	12	49
Volume Left	18	0	0	1	0	0	3	36
Volume Right	0	0	8	0	0	19	0	8
cSH	1032	1700	1700	914	1700	1700	156	242
Volume to Capacity	0.02	0.26	0.14	0.00	0.30	0.01	0.07	0.20
Queue Length 95th (ft)	1	0	0	0	0	0	6	19
Control Delay (s)	8.5	0.0	0.0	8.9	0.0	0.0	29.9	23.7
Lane LOS	A			A			D	C
Approach Delay (s)	0.2			0.0			29.9	23.7
Approach LOS							D	C

Intersection Summary	
Average Delay	1.3
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	65	32	6	86	2	15	1	5	2	1	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	68	34	6	91	2	16	1	5	2	1	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	93			102			217	214	85	218	229	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			102			217	214	85	218	229	92
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	100	100	100
cM capacity (veh/h)	1502			1490			728	676	974	726	662	966

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	114	99	22	7
Volume Left	12	6	16	2
Volume Right	34	2	5	4
cSH	1502	1490	772	833
Volume to Capacity	0.01	0.00	0.03	0.01
Queue Length 95th (ft)	1	0	2	1
Control Delay (s)	0.8	0.5	9.8	9.4
Lane LOS	A	A	A	A
Approach Delay (s)	0.8	0.5	9.8	9.4
Approach LOS			A	A

Intersection Summary	
Average Delay	1.8
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	39	2	31	3	2	3	38	79	4	6	89	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	2	33	3	2	3	40	83	4	6	94	56
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304	302	122	333	327	85	149			87		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304	302	122	333	327	85	149			87		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	96	99	100	100	97			100		
cM capacity (veh/h)	629	592	930	582	572	974	1432			1509		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	8	127	156
Volume Left	41	3	40	6
Volume Right	33	3	4	56
cSH	729	682	1432	1509
Volume to Capacity	0.10	0.01	0.03	0.00
Queue Length 95th (ft)	9	1	2	0
Control Delay (s)	10.5	10.3	2.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	10.3	2.5	0.3
Approach LOS	B	B		

Intersection Summary	
Average Delay	3.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1648			1698	1509
Flt Permitted	0.51	1.00	1.00	0.37	1.00	1.00		0.83			0.71	1.00
Satd. Flow (perm)	906	1776	1509	655	1776	1509		1401			1262	1509
Volume (vph)	167	502	49	23	363	77	25	5	16	58	5	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	186	558	54	26	403	86	28	6	18	64	6	100
RTOR Reduction (vph)	0	0	27	0	0	43	0	14	0	0	0	76
Lane Group Flow (vph)	186	558	27	26	403	43	0	38	0	0	70	24
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	15.4	15.4	15.4	15.4	15.4	15.4		7.4			7.4	7.4
Effective Green, g (s)	15.4	15.4	15.4	15.4	15.4	15.4		7.4			7.4	7.4
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50		0.24			0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	453	888	755	328	888	755		337			303	363
v/s Ratio Prot		c0.31			0.23							
v/s Ratio Perm	0.21		0.02	0.04		0.03		0.03			c0.06	0.02
v/c Ratio	0.41	0.63	0.04	0.08	0.45	0.06		0.11			0.23	0.07
Uniform Delay, d1	4.8	5.6	3.9	4.0	5.0	4.0		9.1			9.4	9.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.6	1.4	0.0	0.1	0.4	0.0		0.2			0.4	0.1
Delay (s)	5.5	7.0	3.9	4.1	5.4	4.0		9.3			9.8	9.1
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		6.4			5.1			9.3			9.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3299		1687	3370	
Flt Permitted	0.33	1.00	1.00	0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	591	1776	1509	1172	1776	1509	1687	3299		1687	3370	
Volume (vph)	24	138	184	4	360	85	93	271	47	241	331	3
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	153	204	4	400	94	103	301	52	268	368	3
RTOR Reduction (vph)	0	0	141	0	0	65	0	24	0	0	1	0
Lane Group Flow (vph)	27	153	63	4	400	29	103	329	0	268	370	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	4.7	12.0		9.3	16.6	
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	4.7	12.0		9.3	16.6	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.10	0.25		0.19	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	184	552	469	364	552	469	164	820		325	1158	
v/s Ratio Prot		0.09			c0.23		0.06	c0.10		c0.16	0.11	
v/s Ratio Perm	0.05		0.04	0.00		0.02						
v/c Ratio	0.15	0.28	0.14	0.01	0.72	0.06	0.63	0.40		0.82	0.32	
Uniform Delay, d1	12.0	12.6	12.0	11.5	14.8	11.7	21.0	15.2		18.7	11.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.3	0.1	0.0	4.7	0.1	7.3	0.3		15.5	0.2	
Delay (s)	12.4	12.8	12.1	11.5	19.5	11.8	28.3	15.5		34.2	11.8	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		12.4			18.0			18.4			21.2	
Approach LOS		B			B			B			C	

Intersection Summary

HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	48.3	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1753		1687	1776	1509		1662			1748	1509
Flt Permitted	0.33	1.00		0.40	1.00	1.00		0.79			0.88	1.00
Satd. Flow (perm)	585	1753		706	1776	1509		1344			1558	1509
Volume (vph)	15	429	40	42	540	6	60	18	31	26	56	16
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	477	44	47	600	7	67	20	34	29	62	18
RTOR Reduction (vph)	0	6	0	0	0	3	0	25	0	0	0	14
Lane Group Flow (vph)	17	515	0	47	600	4	0	96	0	0	91	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	16.4	16.4		16.4	16.4	16.4		8.1			8.1	8.1
Effective Green, g (s)	16.4	16.4		16.4	16.4	16.4		8.1			8.1	8.1
Actuated g/C Ratio	0.50	0.50		0.50	0.50	0.50		0.25			0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	295	885		356	896	761		335			388	376
v/s Ratio Prot		0.29			c0.34							
v/s Ratio Perm	0.03			0.07		0.00		c0.07			0.06	0.00
v/c Ratio	0.06	0.58		0.13	0.67	0.00		0.29			0.23	0.01
Uniform Delay, d1	4.1	5.6		4.3	6.0	4.0		9.9			9.7	9.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	1.0		0.2	1.9	0.0		0.5			0.3	0.0
Delay (s)	4.2	6.6		4.4	7.9	4.0		10.3			10.0	9.2
Level of Service	A	A		A	A	A		B			B	A
Approach Delay (s)		6.5			7.6			10.3			9.9	
Approach LOS		A			A			B			A	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	32.5	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	48	32	45	53	33	29	22	42	31	25	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	51	34	47	56	35	31	23	44	33	26	33

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	121	138	98	92
Volume Left (vph)	37	47	31	33
Volume Right (vph)	34	35	44	33
Hadj (s)	-0.07	-0.05	-0.17	-0.11
Departure Headway (s)	4.4	4.4	4.4	4.5
Degree Utilization, x	0.15	0.17	0.12	0.11
Capacity (veh/h)	772	766	759	742
Control Delay (s)	8.2	8.3	8.0	8.1
Approach Delay (s)	8.2	8.3	8.0	8.1
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.2
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	441	2	2	539	35	5	5	0	35	6	23
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	464	2	2	567	37	5	5	0	37	6	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	604			466			1113	1122	233	855	1086	567
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	604			466			1113	1122	233	855	1086	567
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			96	97	100	85	97	95
cM capacity (veh/h)	970			1091			148	199	769	242	209	466

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	24	309	157	2	567	37	11	67
Volume Left	24	0	0	2	0	0	5	37
Volume Right	0	0	2	0	0	37	0	24
cSH	970	1700	1700	1091	1700	1700	170	287
Volume to Capacity	0.02	0.18	0.09	0.00	0.33	0.02	0.06	0.23
Queue Length 95th (ft)	2	0	0	0	0	0	5	22
Control Delay (s)	8.8	0.0	0.0	8.3	0.0	0.0	27.6	21.3
Lane LOS	A			A			D	C
Approach Delay (s)	0.4			0.0			27.6	21.3
Approach LOS							D	C

Intersection Summary	
Average Delay	1.7
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	441	2	2	539	35	5	5	0	35	6	23
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	464	2	2	567	37	5	5	0	37	6	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	604			466			829	1122	233	873	1105	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	604			466			829	1122	233	873	1105	302
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	97	100	84	97	97
cM capacity (veh/h)	970			1091			243	199	769	234	204	694

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	24	309	157	2	378	226	11	67
Volume Left	24	0	0	2	0	0	5	37
Volume Right	0	0	2	0	0	37	0	24
cSH	970	1700	1700	1091	1700	1700	219	302
Volume to Capacity	0.02	0.18	0.09	0.00	0.22	0.13	0.05	0.22
Queue Length 95th (ft)	2	0	0	0	0	0	4	21
Control Delay (s)	8.8	0.0	0.0	8.3	0.0	0.0	22.3	20.3
Lane LOS	A			A			C	C
Approach Delay (s)	0.4			0.0			22.3	20.3
Approach LOS							C	C

Intersection Summary	
Average Delay	1.6
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	100	8	20	111	6	13	1	11	3	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	105	8	21	117	6	14	1	12	3	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	123			114			278	279	109	288	280	120
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	123			114			278	279	109	288	280	120
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	99	100	100	100
cM capacity (veh/h)	1464			1476			663	619	944	647	618	931

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	116	144	26	6
Volume Left	2	21	14	3
Volume Right	8	6	12	2
cSH	1464	1476	761	715
Volume to Capacity	0.00	0.01	0.03	0.01
Queue Length 95th (ft)	0	1	3	1
Control Delay (s)	0.1	1.2	9.9	10.1
Lane LOS	A	A	A	B
Approach Delay (s)	0.1	1.2	9.9	10.1
Approach LOS			A	B

Intersection Summary	
Average Delay	1.8
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	54	1	58	2	1	2	79	102	4	4	95	54
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	57	1	61	2	1	2	83	107	4	4	100	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	415	415	128	474	441	109	157			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	415	415	128	474	441	109	157			112		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	93	100	100	100	94			100		
cM capacity (veh/h)	520	496	922	445	479	944	1423			1478		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	119	5	195	161
Volume Left	57	2	83	4
Volume Right	61	2	4	57
cSH	669	575	1423	1478
Volume to Capacity	0.18	0.01	0.06	0.00
Queue Length 95th (ft)	16	1	5	0
Control Delay (s)	11.5	11.3	3.6	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	11.3	3.6	0.2
Approach LOS	B	B		

Intersection Summary	
Average Delay	4.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1623			1696	1509
Flt Permitted	0.48	1.00	1.00	0.54	1.00	1.00		0.89			0.75	1.00
Satd. Flow (perm)	844	1776	1509	966	1776	1509		1479			1331	1509
Volume (vph)	56	318	23	38	364	95	15	4	19	56	4	39
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	62	353	26	42	404	106	17	4	21	62	4	43
RTOR Reduction (vph)	0	0	17	0	0	68	0	14	0	0	0	28
Lane Group Flow (vph)	62	353	9	42	404	38	0	28	0	0	66	15
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	9.2	9.2	9.2	9.2	9.2	9.2		8.8			8.8	8.8
Effective Green, g (s)	9.2	9.2	9.2	9.2	9.2	9.2		8.8			8.8	8.8
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.34			0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	299	628	534	342	628	534		501			450	511
v/s Ratio Prot		0.20			c0.23							
v/s Ratio Perm	0.07		0.01	0.04		0.02		0.02			c0.05	0.01
v/c Ratio	0.21	0.56	0.02	0.12	0.64	0.07		0.06			0.15	0.03
Uniform Delay, d1	5.9	6.8	5.5	5.7	7.0	5.6		5.8			6.0	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.3	1.2	0.0	0.2	2.3	0.1		0.0			0.2	0.0
Delay (s)	6.2	7.9	5.5	5.8	9.3	5.6		5.8			6.1	5.8
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		7.5			8.3			5.8			6.0	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	26.0	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3342		1687	3364	
Flt Permitted	0.62	1.00	1.00	0.23	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1100	1776	1509	415	1776	1509	1687	3342		1687	3364	
Volume (vph)	85	419	397	12	169	112	217	426	29	290	321	6
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	466	441	13	188	124	241	473	32	322	357	7
RTOR Reduction (vph)	0	0	300	0	0	84	0	8	0	0	2	0
Lane Group Flow (vph)	94	466	141	13	188	40	241	497	0	322	362	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	18.3	18.3	18.3	18.3	18.3	18.3	11.1	13.1		14.0	16.0	
Effective Green, g (s)	18.3	18.3	18.3	18.3	18.3	18.3	11.1	13.1		14.0	16.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.19	0.23		0.24	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	351	566	481	132	566	481	326	763		411	938	
v/s Ratio Prot		c0.26			0.11		0.14	c0.15		c0.19	c0.11	
v/s Ratio Perm	0.09		0.09	0.03		0.03						
v/c Ratio	0.27	0.82	0.29	0.10	0.33	0.08	0.74	0.65		0.78	0.39	
Uniform Delay, d1	14.6	18.1	14.7	13.7	14.9	13.7	21.8	20.1		20.3	16.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	9.4	0.3	0.3	0.3	0.1	8.5	2.0		9.4	0.3	
Delay (s)	15.0	27.5	15.0	14.1	15.2	13.7	30.3	22.1		29.7	17.0	
Level of Service	B	C	B	B	B	B	C	C		C	B	
Approach Delay (s)		20.8			14.6			24.7			23.0	
Approach LOS		C			B			C			C	

Intersection Summary

HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	16.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1763		1687	1776	1509		1682			1737	1509
Flt Permitted	0.38	1.00		0.17	1.00	1.00		0.78			0.85	1.00
Satd. Flow (perm)	682	1763		310	1776	1509		1347			1513	1509
Volume (vph)	22	782	40	19	524	9	52	14	13	19	23	18
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	869	44	21	582	10	58	16	14	21	26	20
RTOR Reduction (vph)	0	3	0	0	0	4	0	11	0	0	0	16
Lane Group Flow (vph)	24	910	0	21	582	6	0	77	0	0	47	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	27.0	27.0		27.0	27.0	27.0		8.1			8.1	8.1
Effective Green, g (s)	27.0	27.0		27.0	27.0	27.0		8.1			8.1	8.1
Actuated g/C Ratio	0.63	0.63		0.63	0.63	0.63		0.19			0.19	0.19
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	427	1104		194	1113	945		253			284	284
v/s Ratio Prot		c0.52			0.33							
v/s Ratio Perm	0.04			0.07		0.00		c0.06			0.03	0.00
v/c Ratio	0.06	0.82		0.11	0.52	0.01		0.30			0.17	0.01
Uniform Delay, d1	3.1	6.2		3.2	4.5	3.0		15.1			14.7	14.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	5.1		0.2	0.4	0.0		0.7			0.3	0.0
Delay (s)	3.2	11.3		3.5	4.9	3.0		15.7			14.9	14.3
Level of Service	A	B		A	A	A		B			B	B
Approach Delay (s)		11.1			4.8			15.7			14.7	
Approach LOS		B			A			B			B	

Intersection Summary

HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	43.1	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	61	96	50	17	64	21	30	14	14	19	13	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	101	53	18	67	22	32	15	15	20	14	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	218	107	61	74
Volume Left (vph)	64	18	32	20
Volume Right (vph)	53	22	15	40
Hadj (s)	-0.05	-0.06	-0.01	-0.24
Departure Headway (s)	4.3	4.4	4.7	4.5
Degree Utilization, x	0.26	0.13	0.08	0.09
Capacity (veh/h)	811	774	706	738
Control Delay (s)	8.8	8.1	8.1	7.9
Approach Delay (s)	8.8	8.1	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.4
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	730	8	1	543	22	3	8	0	36	5	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	768	8	1	572	23	3	8	0	38	5	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	595			777			1393	1405	388	998	1386	572
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	595			777			1393	1405	388	998	1386	572
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			97	94	100	80	96	98
cM capacity (veh/h)	978			835			95	135	610	186	139	464

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	512	265	1	572	23	12	52
Volume Left	18	0	0	1	0	0	3	38
Volume Right	0	0	8	0	0	23	0	8
cSH	978	1700	1700	835	1700	1700	121	198
Volume to Capacity	0.02	0.30	0.16	0.00	0.34	0.01	0.10	0.26
Queue Length 95th (ft)	1	0	0	0	0	0	8	25
Control Delay (s)	8.8	0.0	0.0	9.3	0.0	0.0	37.8	29.4
Lane LOS	A			A			E	D
Approach Delay (s)	0.2			0.0			37.8	29.4
Approach LOS							E	D

Intersection Summary	
Average Delay	1.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	730	8	1	543	22	3	8	0	36	5	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	768	8	1	572	23	3	8	0	38	5	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	595			777			1107	1405	388	1009	1398	297
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	595			777			1107	1405	388	1009	1398	297
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	94	100	79	96	99
cM capacity (veh/h)	978			835			156	135	610	182	137	699

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	512	265	1	381	214	12	52
Volume Left	18	0	0	1	0	0	3	38
Volume Right	0	0	8	0	0	23	0	8
cSH	978	1700	1700	835	1700	1700	140	200
Volume to Capacity	0.02	0.30	0.16	0.00	0.22	0.13	0.08	0.26
Queue Length 95th (ft)	1	0	0	0	0	0	7	25
Control Delay (s)	8.8	0.0	0.0	9.3	0.0	0.0	32.9	29.2
Lane LOS	A			A			D	D
Approach Delay (s)	0.2			0.0			32.9	29.2
Approach LOS							D	D

Intersection Summary	
Average Delay	1.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	65	40	7	86	2	19	1	6	2	1	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	68	42	7	91	2	20	1	6	2	1	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	93			111			224	220	89	226	240	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			111			224	220	89	226	240	92
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	99	100	100	100
cM capacity (veh/h)	1502			1479			721	670	968	717	653	966

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	122	100	27	7
Volume Left	12	7	20	2
Volume Right	42	2	6	4
cSH	1502	1479	764	827
Volume to Capacity	0.01	0.00	0.04	0.01
Queue Length 95th (ft)	1	0	3	1
Control Delay (s)	0.8	0.6	9.9	9.4
Lane LOS	A	A	A	A
Approach Delay (s)	0.8	0.6	9.9	9.4
Approach LOS			A	A

Intersection Summary	
Average Delay	1.9
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	39	2	31	3	2	3	38	79	4	6	89	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	2	33	3	2	3	40	83	4	6	94	56
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304	302	122	333	327	85	149			87		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304	302	122	333	327	85	149			87		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	96	99	100	100	97			100		
cM capacity (veh/h)	629	592	930	582	572	974	1432			1509		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	8	127	156
Volume Left	41	3	40	6
Volume Right	33	3	4	56
cSH	729	682	1432	1509
Volume to Capacity	0.10	0.01	0.03	0.00
Queue Length 95th (ft)	9	1	2	0
Control Delay (s)	10.5	10.3	2.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	10.3	2.5	0.3
Approach LOS	B	B		

Intersection Summary	
Average Delay	3.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1648			1698	1509
Flt Permitted	0.47	1.00	1.00	0.35	1.00	1.00		0.83			0.71	1.00
Satd. Flow (perm)	834	1776	1509	622	1776	1509		1402			1264	1509
Volume (vph)	167	524	49	23	401	77	25	5	16	58	5	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	186	582	54	26	446	86	28	6	18	64	6	100
RTOR Reduction (vph)	0	0	27	0	0	42	0	14	0	0	0	76
Lane Group Flow (vph)	186	582	27	26	446	44	0	38	0	0	70	24
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	16.0	16.0	16.0	16.0	16.0	16.0		7.5			7.5	7.5
Effective Green, g (s)	16.0	16.0	16.0	16.0	16.0	16.0		7.5			7.5	7.5
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51		0.24			0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	424	902	766	316	902	766		334			301	359
v/s Ratio Prot		c0.33			0.25							
v/s Ratio Perm	0.22		0.02	0.04		0.03		0.03			c0.06	0.02
v/c Ratio	0.44	0.65	0.04	0.08	0.49	0.06		0.11			0.23	0.07
Uniform Delay, d1	4.9	5.7	3.9	4.0	5.1	3.9		9.4			9.7	9.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.7	1.6	0.0	0.1	0.4	0.0		0.2			0.4	0.1
Delay (s)	5.6	7.3	3.9	4.1	5.5	4.0		9.6			10.1	9.4
Level of Service	A	A	A	A	A	A		A			B	A
Approach Delay (s)		6.7			5.2			9.6			9.7	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	31.5	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3292		1687	3369	
Flt Permitted	0.34	1.00	1.00	0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	607	1776	1509	1173	1776	1509	1687	3292		1687	3369	
Volume (vph)	24	137	174	4	358	80	91	243	47	213	266	3
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	152	193	4	398	89	101	270	52	237	296	3
RTOR Reduction (vph)	0	0	133	0	0	61	0	28	0	0	1	0
Lane Group Flow (vph)	27	152	60	4	398	28	101	294	0	237	298	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	14.6	14.6	14.6	14.6	14.6	14.6	4.5	11.6		8.6	15.7	
Effective Green, g (s)	14.6	14.6	14.6	14.6	14.6	14.6	4.5	11.6		8.6	15.7	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.10	0.25		0.18	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	189	554	471	366	554	471	162	816		310	1130	
v/s Ratio Prot		0.09			c0.22		0.06	c0.09		c0.14	0.09	
v/s Ratio Perm	0.04		0.04	0.00		0.02						
v/c Ratio	0.14	0.27	0.13	0.01	0.72	0.06	0.62	0.36		0.76	0.26	
Uniform Delay, d1	11.6	12.1	11.5	11.1	14.3	11.3	20.3	14.5		18.1	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	0.0	4.4	0.1	7.3	0.3		10.7	0.1	
Delay (s)	11.9	12.4	11.7	11.1	18.7	11.3	27.6	14.8		28.8	11.5	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		12.0			17.3			17.9			19.1	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	46.8	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1751		1687	1776	1509		1662			1748	1509
Flt Permitted	0.41	1.00		0.43	1.00	1.00		0.79			0.88	1.00
Satd. Flow (perm)	728	1751		759	1776	1509		1343			1556	1509
Volume (vph)	15	392	40	42	448	6	60	18	31	26	56	16
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	436	44	47	498	7	67	20	34	29	62	18
RTOR Reduction (vph)	0	7	0	0	0	4	0	25	0	0	0	13
Lane Group Flow (vph)	17	473	0	47	498	3	0	96	0	0	91	5
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	13.6	13.6		13.6	13.6	13.6		7.7			7.7	7.7
Effective Green, g (s)	13.6	13.6		13.6	13.6	13.6		7.7			7.7	7.7
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46		0.26			0.26	0.26
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	338	813		352	824	700		353			409	397
v/s Ratio Prot		0.27			c0.28							
v/s Ratio Perm	0.02			0.06		0.00		c0.07			0.06	0.00
v/c Ratio	0.05	0.58		0.13	0.60	0.00		0.27			0.22	0.01
Uniform Delay, d1	4.3	5.8		4.5	5.8	4.2		8.6			8.5	8.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	1.1		0.2	1.3	0.0		0.4			0.3	0.0
Delay (s)	4.4	6.8		4.7	7.1	4.2		9.0			8.7	8.0
Level of Service	A	A		A	A	A		A			A	A
Approach Delay (s)		6.7			6.9			9.0			8.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	29.3	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	46	32	37	45	33	29	21	34	31	22	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	48	34	39	47	35	31	22	36	33	23	33

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	119	121	88	88
Volume Left (vph)	37	39	31	33
Volume Right (vph)	34	35	36	33
Hadj (s)	-0.07	-0.07	-0.14	-0.11
Departure Headway (s)	4.4	4.4	4.4	4.4
Degree Utilization, x	0.14	0.15	0.11	0.11
Capacity (veh/h)	785	777	765	756
Control Delay (s)	8.1	8.1	7.9	8.0
Approach Delay (s)	8.1	8.1	7.9	8.0
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.1
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	412	2	2	455	34	5	5	0	32	6	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	434	2	2	479	36	5	5	0	34	6	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	515			436			968	985	218	734	951	479
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	515			436			968	985	218	734	951	479
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			97	98	100	89	98	97
cM capacity (veh/h)	1047			1120			196	242	786	299	254	533

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	16	289	147	2	479	36	11	56
Volume Left	16	0	0	2	0	0	5	34
Volume Right	0	0	2	0	0	36	0	16
cSH	1047	1700	1700	1120	1700	1700	217	334
Volume to Capacity	0.02	0.17	0.09	0.00	0.28	0.02	0.05	0.17
Queue Length 95th (ft)	1	0	0	0	0	0	4	15
Control Delay (s)	8.5	0.0	0.0	8.2	0.0	0.0	22.5	17.9
Lane LOS	A			A			C	C
Approach Delay (s)	0.3			0.0			22.5	17.9
Approach LOS							C	C

Intersection Summary	
Average Delay	1.3
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	92	6	20	103	6	5	1	10	3	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	97	6	21	108	6	5	1	11	3	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	115			103			261	261	100	269	261	112
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115			103			261	261	100	269	261	112
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	99	100	100	100
cM capacity (veh/h)	1474			1489			682	634	956	667	634	942

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	105	136	17	6
Volume Left	2	21	5	3
Volume Right	6	6	11	2
cSH	1474	1489	826	732
Volume to Capacity	0.00	0.01	0.02	0.01
Queue Length 95th (ft)	0	1	2	1
Control Delay (s)	0.2	1.3	9.5	10.0
Lane LOS	A	A	A	A
Approach Delay (s)	0.2	1.3	9.5	10.0
Approach LOS			A	A

Intersection Summary	
Average Delay	1.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	54	1	56	2	1	2	77	102	4	4	95	54
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	57	1	59	2	1	2	81	107	4	4	100	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	411	411	128	468	437	109	157			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	411	411	128	468	437	109	157			112		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	94	100	100	100	94			100		
cM capacity (veh/h)	524	499	922	451	483	944	1423			1478		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	117	5	193	161
Volume Left	57	2	81	4
Volume Right	59	2	4	57
cSH	669	580	1423	1478
Volume to Capacity	0.17	0.01	0.06	0.00
Queue Length 95th (ft)	16	1	5	0
Control Delay (s)	11.5	11.3	3.5	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	11.3	3.5	0.2
Approach LOS	B	B		

Intersection Summary	
Average Delay	4.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1623			1696	1509
Flt Permitted	0.49	1.00	1.00	0.57	1.00	1.00		0.89			0.75	1.00
Satd. Flow (perm)	868	1776	1509	1008	1776	1509		1482			1338	1509
Volume (vph)	56	286	23	38	353	93	15	4	19	54	4	39
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	62	318	26	42	392	103	17	4	21	60	4	43
RTOR Reduction (vph)	0	0	17	0	0	67	0	14	0	0	0	28
Lane Group Flow (vph)	62	318	9	42	392	36	0	28	0	0	64	15
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	9.0	9.0	9.0	9.0	9.0	9.0		8.9			8.9	8.9
Effective Green, g (s)	9.0	9.0	9.0	9.0	9.0	9.0		8.9			8.9	8.9
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.34			0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	302	617	524	350	617	524		509			460	519
v/s Ratio Prot		0.18			c0.22							
v/s Ratio Perm	0.07		0.01	0.04		0.02		0.02			c0.05	0.01
v/c Ratio	0.21	0.52	0.02	0.12	0.64	0.07		0.06			0.14	0.03
Uniform Delay, d1	5.9	6.7	5.5	5.8	7.1	5.6		5.7			5.9	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.3	0.7	0.0	0.2	2.1	0.1		0.0			0.1	0.0
Delay (s)	6.3	7.4	5.6	5.9	9.2	5.7		5.7			6.0	5.7
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		7.1			8.3			5.7			5.9	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	25.9	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3336		1687	3363	
Flt Permitted	0.63	1.00	1.00	0.25	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1117	1776	1509	443	1776	1509	1687	3336		1687	3363	
Volume (vph)	85	416	365	12	167	109	211	360	29	272	285	6
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	462	406	13	186	121	234	400	32	302	317	7
RTOR Reduction (vph)	0	0	275	0	0	82	0	9	0	0	2	0
Lane Group Flow (vph)	94	462	131	13	186	39	234	423	0	302	322	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	10.9	12.3		13.1	14.5	
Effective Green, g (s)	17.9	17.9	17.9	17.9	17.9	17.9	10.9	12.3		13.1	14.5	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.20	0.22		0.24	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	362	575	488	143	575	488	333	742		400	882	
v/s Ratio Prot		c0.26			0.10		0.14	c0.13		c0.18	0.10	
v/s Ratio Perm	0.08		0.09	0.03		0.03						
v/c Ratio	0.26	0.80	0.27	0.09	0.32	0.08	0.70	0.57		0.76	0.36	
Uniform Delay, d1	13.8	17.1	13.9	13.0	14.1	13.0	20.7	19.1		19.6	16.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	8.0	0.3	0.3	0.3	0.1	6.6	1.0		7.9	0.3	
Delay (s)	14.2	25.1	14.2	13.3	14.5	13.1	27.3	20.2		27.5	16.9	
Level of Service	B	C	B	B	B	B	C	C		C	B	
Approach Delay (s)		19.4			13.9			22.7			22.0	
Approach LOS		B			B			C			C	

Intersection Summary

HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1761		1687	1776	1509		1682			1737	1509
Flt Permitted	0.42	1.00		0.22	1.00	1.00		0.78			0.85	1.00
Satd. Flow (perm)	743	1761		386	1776	1509		1355			1517	1509
Volume (vph)	22	683	40	19	468	9	52	14	13	19	23	18
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	759	44	21	520	10	58	16	14	21	26	20
RTOR Reduction (vph)	0	4	0	0	0	4	0	11	0	0	0	16
Lane Group Flow (vph)	24	799	0	21	520	6	0	77	0	0	47	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	22.2	22.2		22.2	22.2	22.2		8.0			8.0	8.0
Effective Green, g (s)	22.2	22.2		22.2	22.2	22.2		8.0			8.0	8.0
Actuated g/C Ratio	0.58	0.58		0.58	0.58	0.58		0.21			0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	432	1023		224	1032	877		284			318	316
v/s Ratio Prot		c0.45			0.29							
v/s Ratio Perm	0.03			0.05		0.00		c0.06			0.03	0.00
v/c Ratio	0.06	0.78		0.09	0.50	0.01		0.27			0.15	0.01
Uniform Delay, d1	3.5	6.1		3.5	4.7	3.4		12.7			12.3	12.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	3.9		0.2	0.4	0.0		0.5			0.2	0.0
Delay (s)	3.5	10.1		3.7	5.1	3.4		13.2			12.5	12.0
Level of Service	A	B		A	A	A		B			B	B
Approach Delay (s)		9.9			5.0			13.2			12.4	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	61	88	50	17	60	21	30	10	14	19	11	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	93	53	18	63	22	32	11	15	20	12	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	209	103	57	72
Volume Left (vph)	64	18	32	20
Volume Right (vph)	53	22	15	40
Hadj (s)	-0.06	-0.06	-0.01	-0.25
Departure Headway (s)	4.3	4.4	4.7	4.4
Degree Utilization, x	0.25	0.13	0.07	0.09
Capacity (veh/h)	817	781	713	748
Control Delay (s)	8.7	8.0	8.1	7.9
Approach Delay (s)	8.7	8.0	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.3
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	631	8	1	487	18	3	8	0	34	5	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	664	8	1	513	19	3	8	0	36	5	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	532			673			1230	1238	336	887	1223	513
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	532			673			1230	1238	336	887	1223	513
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	95	100	84	97	98
cM capacity (veh/h)	1032			914			127	171	659	227	175	507

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	443	230	1	513	19	12	49
Volume Left	18	0	0	1	0	0	3	36
Volume Right	0	0	8	0	0	19	0	8
cSH	1032	1700	1700	914	1700	1700	156	242
Volume to Capacity	0.02	0.26	0.14	0.00	0.30	0.01	0.07	0.20
Queue Length 95th (ft)	1	0	0	0	0	0	6	19
Control Delay (s)	8.5	0.0	0.0	8.9	0.0	0.0	29.9	23.7
Lane LOS	A			A			D	C
Approach Delay (s)	0.2			0.0			29.9	23.7
Approach LOS							D	C

Intersection Summary	
Average Delay	1.3
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	65	32	6	86	2	15	1	5	2	1	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	68	34	6	91	2	16	1	5	2	1	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	93			102			217	214	85	218	229	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			102			217	214	85	218	229	92
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	100	100	100
cM capacity (veh/h)	1502			1490			728	676	974	726	662	966

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	114	99	22	7
Volume Left	12	6	16	2
Volume Right	34	2	5	4
cSH	1502	1490	772	833
Volume to Capacity	0.01	0.00	0.03	0.01
Queue Length 95th (ft)	1	0	2	1
Control Delay (s)	0.8	0.5	9.8	9.4
Lane LOS	A	A	A	A
Approach Delay (s)	0.8	0.5	9.8	9.4
Approach LOS			A	A

Intersection Summary	
Average Delay	1.8
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	39	2	31	3	2	3	38	79	4	6	89	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	2	33	3	2	3	40	83	4	6	94	56
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304	302	122	333	327	85	149			87		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304	302	122	333	327	85	149			87		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	96	99	100	100	97			100		
cM capacity (veh/h)	629	592	930	582	572	974	1432			1509		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	8	127	156
Volume Left	41	3	40	6
Volume Right	33	3	4	56
cSH	729	682	1432	1509
Volume to Capacity	0.10	0.01	0.03	0.00
Queue Length 95th (ft)	9	1	2	0
Control Delay (s)	10.5	10.3	2.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	10.3	2.5	0.3
Approach LOS	B	B		

Intersection Summary	
Average Delay	3.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1648			1698	1509
Flt Permitted	0.51	1.00	1.00	0.37	1.00	1.00		0.83			0.71	1.00
Satd. Flow (perm)	906	1776	1509	655	1776	1509		1401			1262	1509
Volume (vph)	167	502	49	23	363	77	25	5	16	58	5	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	186	558	54	26	403	86	28	6	18	64	6	100
RTOR Reduction (vph)	0	0	27	0	0	43	0	14	0	0	0	76
Lane Group Flow (vph)	186	558	27	26	403	43	0	38	0	0	70	24
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	15.4	15.4	15.4	15.4	15.4	15.4		7.4			7.4	7.4
Effective Green, g (s)	15.4	15.4	15.4	15.4	15.4	15.4		7.4			7.4	7.4
Actuated g/C Ratio	0.50	0.50	0.50	0.50	0.50	0.50		0.24			0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	453	888	755	328	888	755		337			303	363
v/s Ratio Prot		c0.31			0.23							
v/s Ratio Perm	0.21		0.02	0.04		0.03		0.03			c0.06	0.02
v/c Ratio	0.41	0.63	0.04	0.08	0.45	0.06		0.11			0.23	0.07
Uniform Delay, d1	4.8	5.6	3.9	4.0	5.0	4.0		9.1			9.4	9.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.6	1.4	0.0	0.1	0.4	0.0		0.2			0.4	0.1
Delay (s)	5.5	7.0	3.9	4.1	5.4	4.0		9.3			9.8	9.1
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		6.4			5.1			9.3			9.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3297		1687	3370	
Flt Permitted	0.33	1.00	1.00	0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	595	1776	1509	1172	1776	1509	1687	3297		1687	3370	
Volume (vph)	24	138	184	4	360	85	93	263	47	241	323	3
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	153	204	4	400	94	103	292	52	268	359	3
RTOR Reduction (vph)	0	0	140	0	0	65	0	25	0	0	1	0
Lane Group Flow (vph)	27	153	64	4	400	29	103	319	0	268	361	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	4.7	11.8		9.3	16.4	
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	4.7	11.8		9.3	16.4	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.10	0.25		0.19	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	186	554	471	365	554	471	165	809		326	1149	
v/s Ratio Prot		0.09			c0.23		0.06	c0.10		c0.16	0.11	
v/s Ratio Perm	0.05		0.04	0.00		0.02						
v/c Ratio	0.15	0.28	0.14	0.01	0.72	0.06	0.62	0.39		0.82	0.31	
Uniform Delay, d1	11.9	12.5	11.9	11.4	14.7	11.6	20.9	15.2		18.6	11.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.3	0.1	0.0	4.6	0.1	7.2	0.3		15.3	0.2	
Delay (s)	12.3	12.7	12.0	11.4	19.3	11.7	28.0	15.5		33.9	11.9	
Level of Service	B	B	B	B	B	B	C	B		C	B	
Approach Delay (s)		12.3			17.8			18.4			21.2	
Approach LOS		B			B			B			C	

Intersection Summary

HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	48.1	Sum of lost time (s)	12.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1753		1687	1776	1509		1662			1748	1509
Flt Permitted	0.34	1.00		0.41	1.00	1.00		0.79			0.88	1.00
Satd. Flow (perm)	598	1753		720	1776	1509		1343			1557	1509
Volume (vph)	15	421	40	42	532	6	60	18	31	26	56	16
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	468	44	47	591	7	67	20	34	29	62	18
RTOR Reduction (vph)	0	6	0	0	0	3	0	25	0	0	0	14
Lane Group Flow (vph)	17	506	0	47	591	4	0	96	0	0	91	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	16.1	16.1		16.1	16.1	16.1		8.0			8.0	8.0
Effective Green, g (s)	16.1	16.1		16.1	16.1	16.1		8.0			8.0	8.0
Actuated g/C Ratio	0.50	0.50		0.50	0.50	0.50		0.25			0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	300	879		361	891	757		335			388	376
v/s Ratio Prot		0.29			c0.33							
v/s Ratio Perm	0.03			0.07		0.00		c0.07			0.06	0.00
v/c Ratio	0.06	0.58		0.13	0.66	0.00		0.29			0.23	0.01
Uniform Delay, d1	4.1	5.6		4.3	6.0	4.0		9.7			9.6	9.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	0.9		0.2	1.9	0.0		0.5			0.3	0.0
Delay (s)	4.2	6.5		4.4	7.8	4.0		10.2			9.9	9.1
Level of Service	A	A		A	A	A		B			A	A
Approach Delay (s)		6.4			7.6			10.2			9.8	
Approach LOS		A			A			B			A	

Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	32.1	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	35	48	32	37	53	33	29	22	34	31	25	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	51	34	39	56	35	31	23	36	33	26	33

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	121	129	89	92
Volume Left (vph)	37	39	31	33
Volume Right (vph)	34	35	36	33
Hadj (s)	-0.07	-0.07	-0.14	-0.11
Departure Headway (s)	4.4	4.4	4.4	4.5
Degree Utilization, x	0.15	0.16	0.11	0.11
Capacity (veh/h)	780	773	758	749
Control Delay (s)	8.2	8.2	8.0	8.0
Approach Delay (s)	8.2	8.2	8.0	8.0
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.1
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	441	2	2	539	35	5	5	0	35	6	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	16	464	2	2	567	37	5	5	0	37	6	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	604			466			1087	1105	233	838	1069	567
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	604			466			1087	1105	233	838	1069	567
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			97	97	100	85	97	97
cM capacity (veh/h)	970			1091			159	206	769	251	216	466

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	16	309	157	2	567	37	11	59
Volume Left	16	0	0	2	0	0	5	37
Volume Right	0	0	2	0	0	37	0	16
cSH	970	1700	1700	1091	1700	1700	179	280
Volume to Capacity	0.02	0.18	0.09	0.00	0.33	0.02	0.06	0.21
Queue Length 95th (ft)	1	0	0	0	0	0	5	19
Control Delay (s)	8.8	0.0	0.0	8.3	0.0	0.0	26.4	21.2
Lane LOS	A			A			D	C
Approach Delay (s)	0.3			0.0			26.4	21.2
Approach LOS							D	C

Intersection Summary	
Average Delay	1.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	92	8	20	103	6	13	1	11	3	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	97	8	21	108	6	14	1	12	3	1	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	115			105			262	262	101	271	263	112
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115			105			262	262	101	271	263	112
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	99	100	100	100
cM capacity (veh/h)	1474			1486			681	633	954	664	632	942

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	107	136	26	6
Volume Left	2	21	14	3
Volume Right	8	6	12	2
cSH	1474	1486	776	730
Volume to Capacity	0.00	0.01	0.03	0.01
Queue Length 95th (ft)	0	1	3	1
Control Delay (s)	0.2	1.3	9.8	10.0
Lane LOS	A	A	A	A
Approach Delay (s)	0.2	1.3	9.8	10.0
Approach LOS			A	A

Intersection Summary	
Average Delay	1.8
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	54	1	56	2	1	2	77	102	4	4	95	54
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	57	1	59	2	1	2	81	107	4	4	100	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	411	411	128	468	437	109	157			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	411	411	128	468	437	109	157			112		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	94	100	100	100	94			100		
cM capacity (veh/h)	524	499	922	451	483	944	1423			1478		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	117	5	193	161
Volume Left	57	2	81	4
Volume Right	59	2	4	57
cSH	669	580	1423	1478
Volume to Capacity	0.17	0.01	0.06	0.00
Queue Length 95th (ft)	16	1	5	0
Control Delay (s)	11.5	11.3	3.5	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	11.3	3.5	0.2
Approach LOS	B	B		

Intersection Summary	
Average Delay	4.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1623			1696	1509
Flt Permitted	0.48	1.00	1.00	0.55	1.00	1.00		0.89			0.75	1.00
Satd. Flow (perm)	846	1776	1509	968	1776	1509		1479			1333	1509
Volume (vph)	56	318	23	38	364	93	15	4	19	54	4	39
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	62	353	26	42	404	103	17	4	21	60	4	43
RTOR Reduction (vph)	0	0	17	0	0	67	0	14	0	0	0	29
Lane Group Flow (vph)	62	353	9	42	404	36	0	28	0	0	64	15
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	9.1	9.1	9.1	9.1	9.1	9.1		8.7			8.7	8.7
Effective Green, g (s)	9.1	9.1	9.1	9.1	9.1	9.1		8.7			8.7	8.7
Actuated g/C Ratio	0.35	0.35	0.35	0.35	0.35	0.35		0.34			0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	298	626	532	341	626	532		499			450	509
v/s Ratio Prot		0.20			c0.23							
v/s Ratio Perm	0.07		0.01	0.04		0.02		0.02			c0.05	0.01
v/c Ratio	0.21	0.56	0.02	0.12	0.65	0.07		0.06			0.14	0.03
Uniform Delay, d1	5.8	6.7	5.4	5.7	7.0	5.5		5.8			6.0	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.3	1.2	0.0	0.2	2.3	0.1		0.0			0.1	0.0
Delay (s)	6.2	7.9	5.5	5.8	9.3	5.6		5.8			6.1	5.7
Level of Service	A	A	A	A	A	A		A			A	A
Approach Delay (s)		7.5			8.3			5.8			6.0	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	25.8	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509	1687	3342		1687	3364	
Flt Permitted	0.62	1.00	1.00	0.23	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1100	1776	1509	415	1776	1509	1687	3342		1687	3364	
Volume (vph)	85	419	397	12	169	112	217	426	29	290	321	6
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	466	441	13	188	124	241	473	32	322	357	7
RTOR Reduction (vph)	0	0	300	0	0	84	0	8	0	0	2	0
Lane Group Flow (vph)	94	466	141	13	188	40	241	497	0	322	362	0
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Prot			Prot		
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	18.3	18.3	18.3	18.3	18.3	18.3	11.1	13.1		14.0	16.0	
Effective Green, g (s)	18.3	18.3	18.3	18.3	18.3	18.3	11.1	13.1		14.0	16.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.19	0.23		0.24	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	351	566	481	132	566	481	326	763		411	938	
v/s Ratio Prot		c0.26			0.11		0.14	c0.15		c0.19	c0.11	
v/s Ratio Perm	0.09		0.09	0.03		0.03						
v/c Ratio	0.27	0.82	0.29	0.10	0.33	0.08	0.74	0.65		0.78	0.39	
Uniform Delay, d1	14.6	18.1	14.7	13.7	14.9	13.7	21.8	20.1		20.3	16.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	9.4	0.3	0.3	0.3	0.1	8.5	2.0		9.4	0.3	
Delay (s)	15.0	27.5	15.0	14.1	15.2	13.7	30.3	22.1		29.7	17.0	
Level of Service	B	C	B	B	B	B	C	C		C	B	
Approach Delay (s)		20.8			14.6			24.7			23.0	
Approach LOS		C			B			C			C	

Intersection Summary

HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	16.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.98	1.00
Satd. Flow (prot)	1687	1763		1687	1776	1509		1682			1737	1509
Flt Permitted	0.38	1.00		0.17	1.00	1.00		0.78			0.85	1.00
Satd. Flow (perm)	682	1763		310	1776	1509		1347			1513	1509
Volume (vph)	22	782	40	19	524	9	52	14	13	19	23	18
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	869	44	21	582	10	58	16	14	21	26	20
RTOR Reduction (vph)	0	3	0	0	0	4	0	11	0	0	0	16
Lane Group Flow (vph)	24	910	0	21	582	6	0	77	0	0	47	4
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm			Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	27.0	27.0		27.0	27.0	27.0		8.1			8.1	8.1
Effective Green, g (s)	27.0	27.0		27.0	27.0	27.0		8.1			8.1	8.1
Actuated g/C Ratio	0.63	0.63		0.63	0.63	0.63		0.19			0.19	0.19
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	427	1104		194	1113	945		253			284	284
v/s Ratio Prot		c0.52			0.33							
v/s Ratio Perm	0.04			0.07		0.00		c0.06			0.03	0.00
v/c Ratio	0.06	0.82		0.11	0.52	0.01		0.30			0.17	0.01
Uniform Delay, d1	3.1	6.2		3.2	4.5	3.0		15.1			14.7	14.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	5.1		0.2	0.4	0.0		0.7			0.3	0.0
Delay (s)	3.2	11.3		3.5	4.9	3.0		15.7			14.9	14.3
Level of Service	A	B		A	A	A		B			B	B
Approach Delay (s)		11.1			4.8			15.7			14.7	
Approach LOS		B			A			B			B	

Intersection Summary

HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	43.1	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	61	96	50	17	64	21	30	14	14	19	13	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	101	53	18	67	22	32	15	15	20	14	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	218	107	61	74
Volume Left (vph)	64	18	32	20
Volume Right (vph)	53	22	15	40
Hadj (s)	-0.05	-0.06	-0.01	-0.24
Departure Headway (s)	4.3	4.4	4.7	4.5
Degree Utilization, x	0.26	0.13	0.08	0.09
Capacity (veh/h)	811	774	706	738
Control Delay (s)	8.8	8.1	8.1	7.9
Approach Delay (s)	8.8	8.1	8.1	7.9
Approach LOS	A	A	A	A

Intersection Summary	
Delay	8.4
HCM Level of Service	A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	17	730	8	1	543	22	3	8	0	36	5	8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	768	8	1	572	23	3	8	0	38	5	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	595			777			1393	1405	388	998	1386	572
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	595			777			1393	1405	388	998	1386	572
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			97	94	100	80	96	98
cM capacity (veh/h)	978			835			95	135	610	186	139	464

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	18	512	265	1	572	23	12	52
Volume Left	18	0	0	1	0	0	3	38
Volume Right	0	0	8	0	0	23	0	8
cSH	978	1700	1700	835	1700	1700	121	198
Volume to Capacity	0.02	0.30	0.16	0.00	0.34	0.01	0.10	0.26
Queue Length 95th (ft)	1	0	0	0	0	0	8	25
Control Delay (s)	8.8	0.0	0.0	9.3	0.0	0.0	37.8	29.4
Lane LOS	A			A			E	D
Approach Delay (s)	0.2			0.0			37.8	29.4
Approach LOS							E	D

Intersection Summary	
Average Delay	1.5
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	65	40	7	86	2	19	1	6	2	1	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	68	42	7	91	2	20	1	6	2	1	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	93			111			224	220	89	226	240	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			111			224	220	89	226	240	92
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	99	100	100	100
cM capacity (veh/h)	1502			1479			721	670	968	717	653	966

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	122	100	27	7
Volume Left	12	7	20	2
Volume Right	42	2	6	4
cSH	1502	1479	764	827
Volume to Capacity	0.01	0.00	0.04	0.01
Queue Length 95th (ft)	1	0	3	1
Control Delay (s)	0.8	0.6	9.9	9.4
Lane LOS	A	A	A	A
Approach Delay (s)	0.8	0.6	9.9	9.4
Approach LOS			A	A

Intersection Summary	
Average Delay	1.9
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	39	2	31	3	2	3	38	79	4	6	89	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	41	2	33	3	2	3	40	83	4	6	94	56
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304	302	122	333	327	85	149			87		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304	302	122	333	327	85	149			87		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	96	99	100	100	97			100		
cM capacity (veh/h)	629	592	930	582	572	974	1432			1509		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	8	127	156
Volume Left	41	3	40	6
Volume Right	33	3	4	56
cSH	729	682	1432	1509
Volume to Capacity	0.10	0.01	0.03	0.00
Queue Length 95th (ft)	9	1	2	0
Control Delay (s)	10.5	10.3	2.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	10.3	2.5	0.3
Approach LOS	B	B		

Intersection Summary	
Average Delay	3.4
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1687	1776	1509	1687	1776	1509		1648			1698	1509
Flt Permitted	0.47	1.00	1.00	0.35	1.00	1.00		0.83			0.71	1.00
Satd. Flow (perm)	834	1776	1509	622	1776	1509		1402			1264	1509
Volume (vph)	167	524	49	23	401	77	25	5	16	58	5	90
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	186	582	54	26	446	86	28	6	18	64	6	100
RTOR Reduction (vph)	0	0	27	0	0	42	0	14	0	0	0	76
Lane Group Flow (vph)	186	582	27	26	446	44	0	38	0	0	70	24
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	16.0	16.0	16.0	16.0	16.0	16.0		7.5			7.5	7.5
Effective Green, g (s)	16.0	16.0	16.0	16.0	16.0	16.0		7.5			7.5	7.5
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51		0.24			0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	424	902	766	316	902	766		334			301	359
v/s Ratio Prot		c0.33			0.25							
v/s Ratio Perm	0.22		0.02	0.04		0.03		0.03			c0.06	0.02
v/c Ratio	0.44	0.65	0.04	0.08	0.49	0.06		0.11			0.23	0.07
Uniform Delay, d1	4.9	5.7	3.9	4.0	5.1	3.9		9.4			9.7	9.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.7	1.6	0.0	0.1	0.4	0.0		0.2			0.4	0.1
Delay (s)	5.6	7.3	3.9	4.1	5.5	4.0		9.6			10.1	9.4
Level of Service	A	A	A	A	A	A		A			B	A
Approach Delay (s)		6.7			5.2			9.6			9.7	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	31.5	Sum of lost time (s)	8.0
Analysis Period (min)	15		

c Critical Lane Group

Appendix C

HCM FREEWAY SEGMENTS ANALYSIS WORKSHEETS

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	743	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	206	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	433	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	433	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	6.2	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	908	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	252	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	535	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	535	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	7.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	810	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	225	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	470	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	470	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	6.7	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	990	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	275	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	578	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	578	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.3	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1666	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	463	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	967	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	967	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	13.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2036	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	566	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1182	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1182	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	16.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2970	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	825	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1897	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1897	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	66.6	mi/h
Number of lanes, N	2	
Density, D	28.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	3630	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1008	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1546	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1546	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.7	mi/h
Number of lanes, N	3	
Density, D	22.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	5670	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1575	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1207	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1207	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	6930	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1925	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1771	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1771	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	68.2	mi/h
Number of lanes, N	5	
Density, D	26.0-	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	9315	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2588	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	2010	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2010	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	64.7	mi/h
Number of lanes, N	6	
Density, D	31.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Existing
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	11385	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	3163	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	2456	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2456	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	900	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	250	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	525	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	525	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	7.5	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1040	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	289	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	612	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	612	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.7	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1070	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	297	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	621	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	621	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1220	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	339	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	712	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	712	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	10.2	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2380	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	661	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1382	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1382	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2580	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	717	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1498	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1498	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.8	mi/h
Number of lanes, N	2	
Density, D	21.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	3650	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1014	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	2332	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2332	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	55.9	mi/h
Number of lanes, N	2	
Density, D	41.7	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	4210	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1169	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1793	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1793	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	67.9	mi/h
Number of lanes, N	3	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	6590	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1831	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1403	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1403	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	20.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	7780	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2161	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1988	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1988	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	65.1	mi/h
Number of lanes, N	5	
Density, D	30.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	12900	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	3583	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	2783	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2783	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range No-Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	15080	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	4189	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	3253	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	3253	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	911	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	253	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	531	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	531	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	7.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of Avenue T
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1051	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	292	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	619	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	619	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1081	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	300	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	628	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	628	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	9.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1231	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	342	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	718	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	718	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	10.3	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2386	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	663	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1385	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1385	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	19.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2586	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	718	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1501	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1501	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.8	mi/h
Number of lanes, N	2	
Density, D	21.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	3668	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1019	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	2343	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2343	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	55.5	mi/h
Number of lanes, N	2	
Density, D	42.2	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	4228	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1174	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1801	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1801	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	67.8	mi/h
Number of lanes, N	3	
Density, D	26.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	6608	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1836	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1407	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1407	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	20.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	7798	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2166	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1993	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1993	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	5	
Density, D	30.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	12918	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	3588	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	2787	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2787	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	15098	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	4194	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	3257	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	3257	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	983	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	273	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	573	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	573	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.2	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1113	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	309	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	655	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	655	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	9.4	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1180	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	328	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	685	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	685	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	9.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1315	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	365	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	767	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	767	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	11.0-	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2450	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	681	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1422	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1422	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	2	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2662	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	739	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1545	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1545	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.7	mi/h
Number of lanes, N	2	
Density, D	22.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	3686	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1024	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	2355	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2355	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	55.0	mi/h
Number of lanes, N	2	
Density, D	42.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	4244	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1179	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1808	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1808	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	67.8	mi/h
Number of lanes, N	3	
Density, D	26.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	6626	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1841	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1411	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1411	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	20.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	7814	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2171	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1997	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1997	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	5	
Density, D	30.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	12927	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	3591	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	2789	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2789	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	15106	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	4196	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	3259	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	3259	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	905	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	251	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	528	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	528	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	7.5	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1045	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	290	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	615	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	615	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1075	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	299	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	624	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	624	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1225	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	340	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	715	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	715	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	10.2	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2384	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	662	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1384	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1384	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	19.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2584	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	718	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1500	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1500	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.8	mi/h
Number of lanes, N	2	
Density, D	21.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	3658	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1016	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	2337	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2337	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	55.7	mi/h
Number of lanes, N	2	
Density, D	42.0	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	4218	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1172	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1797	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1797	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	67.9	mi/h
Number of lanes, N	3	
Density, D	26.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	6598	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1833	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1405	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1405	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	20.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	7788	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2163	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1990	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1990	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	5	
Density, D	30.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	12908	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	3586	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	2785	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2785	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour)
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	15088	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	4191	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	3255	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	3255	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	977	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	271	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	570	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	570	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	8.1	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1107	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	308	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	652	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	652	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	9.3	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1174	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	326	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	682	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	682	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	9.7	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	east of Avenue T
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	1309	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	364	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	764	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	764	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	10.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	EB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2449	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	680	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1422	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1422	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	2	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	WB SR-138
From/To:	west of I-15
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	2661	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	739	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1545	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1545	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.7	mi/h
Number of lanes, N	2	
Density, D	22.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	3676	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1021	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	2349	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2349	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	55.3	mi/h
Number of lanes, N	2	
Density, D	42.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	south of SR-138
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related

Description: Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	4234	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1176	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1803	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1803	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	67.8	mi/h
Number of lanes, N	3	
Density, D	26.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related

Description: Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	6616	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	1838	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1409	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1409	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	20.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB SR-14
From/To:	north of I-5
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related

Description: Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	7804	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	2168	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.870	
Driver population factor, fp	1.00	
Flow rate, vp	1994	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	5	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1994	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	5	
Density, D	30.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	NB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	12917	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	3588	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	2787	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2787	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.4

Operational Analysis

Analysis Time Period:	Peak Hour
Freeway/Direction:	SB I-5
From/To:	south of SR-14
Jurisdiction:	
Analysis Year:	Short-Range with Project (2nd Peak Hour) + Related
Description:	Big Rock Creek Project

Flow Inputs and Adjustments

Volume, V	15096	veh/h
Peak-hour factor, PHF	0.90	
Peak 15-min volume, v15	4193	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Rolling	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	2.5	
Recreational vehicle PCE, ER	2.0	
Heavy vehicle adjustment, fHV	0.858	
Driver population factor, fp	1.00	
Flow rate, vp	3257	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	6	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	0.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	3257	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	6	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Appendix D

TRAFFIC FORECAST PREPARATION

Table D-1

GENERAL TRAFFIC VOLUME GROWTH FACTORS

Area	**2001**	**2005**	**2010**	**2015**	**2020**	**2025**
Central	1.000	1.050	1.112	1.174	1.234	1.297
San Gabriel Valley	1.000	1.033	1.074	1.115	1.156	1.197
Gateway	1.000	1.028	1.063	1.099	1.134	1.169
South Bay	1.000	1.026	1.058	1.091	1.123	1.155
Westside	1.000	1.036	1.082	1.127	1.173	1.219
Malibu	1.000	1.091	1.204	1.318	1.431	1.545
San Fernando Valley	1.000	1.035	1.079	1.123	1.167	1.211
Arroyo Verdugo	1.000	1.037	1.083	1.129	1.176	1.222
North County	1.000	1.196	1.441	1.686	1.930	2.175
Average Annual Growth		.039/yr	.041/yr	.034/yr	.029/yr	.025/yr

Source: Congestion Management Program for the County of Los Angeles, 2004.

Table D-2

DERIVATION OF STATE HIGHWAY SEGMENTS ADT AND PEAK HOUR VOLUMES

Roadway Segment	Dir	2007 ADT Volume	2025 ADT Volume	Average Annual ADT Increase	Short-Range ADT Volume	2007 Peak Hour Volume	2025 Peak Hour Volume	Average Annual Peak Hour Increase	Short-Range Peak Hour Volume
SR-138 w/o Ave T	EB	8,595	22,300	760	10,880	743	1,800	53	900
	WB	10,505	23,800	740	12,730	908	1,800	45	1,040
SR-138 e/o Ave T	EB	9,090	28,700	1,090	12,360	810	2,500	85	1,070
	WB	11,110	30,000	1,050	14,260	990	2,500	76	1,220
SR-138 w/o I-15	EB	8,325	29,900	1,200	11,930	833	3,200	118	1,190
	WB	10,175	29,500	1,070	13,390	1,018	2,800	89	1,290
SR-14 s/o SR-138	NB	37,350	70,900	1,860	42,930	2,970	7,500	227	3,650
	SB	45,650	73,500	1,550	50,300	3,630	7,500	194	4,210
SR-14 n/o I-5	NB	76,050	97,900	1,210	79,680	5,670	11,800	307	6,590
	SB	92,950	101,000	450	94,300	6,930	12,600	284	7,780
I-5 s/o SR-14	NB	122,400	310,500	10,450	153,750	9,315	33,200	1,194	12,900
	SB	149,600	320,700	9,510	178,130	11,385	36,000	1,231	15,080

Source:
2007 Volumes – Caltrans.
2025 Volumes – “SR-138 Major Investment Study” August 2003.

Appendix E

TRAFFIC INDEX CALCULATIONS

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *Avenue T e/o 116th Street - No-Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*7.0*
2009-2029	*7.5*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*1,500*	3.8	--	7.0%	
2018	*2,178*	3.8	0	7.0%	10 Yr TI
2028	*3,163*	--	0	7.0%	20 Yr TI

TRUCK AXLE BREAKDOWN: EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*65*	65	61.9%
3	*24*	24	22.9%
4	*4*	4	3.8%
5	*12*	12	11.4%
TOTALS:	105	105	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	61.9%	65	19,500	61.9%	94	28,200
3	920	22.9%	24	22,080	22.9%	35	32,200
4	1320	3.8%	4	5,280	3.8%	6	7,920
5	4080	11.4%	12	48,960	11.4%	17	69,360
		100%	105	95,820	100%	152	137,680

EWL = 1,167,500
10 YR TI = 7.0
UL = 11.8%
LL = 1.9%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	61.9%	65	19,500	61.9%	137	41,100
3	920	22.9%	24	22,080	22.9%	51	46,920
4	1320	3.8%	4	5,280	3.8%	8	10,560
5	4080	11.4%	12	48,960	11.4%	25	102,000
		100%	105	95,820	100%	221	200,580

EWL = 2,964,000
20 YR TI = 7.5
UL = 4.8%
LL = 0.1%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *Avenue T e/o 116th Street - with Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*9.5*
2009-2029	*11.0*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*2,184*	3.8	--	23.3%	
2018	*3,171*	3.8	0	23.3%	10 Yr TI
2028	*4,605*	--	0	23.3%	20 Yr TI

TRUCK AXLE BREAKDOWN: EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*65*	65	12.8%
3	*24*	24	4.7%
4	*4*	4	0.8%
5	*416*	416	81.7%
TOTALS:	509	509	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	12.8%	65	19,500	12.8%	94	28,200
3	920	4.7%	24	22,080	4.7%	35	32,200
4	1320	0.8%	4	5,280	0.8%	6	7,920
5	4080	81.7%	416	1,697,280	81.7%	604	2,464,320
		100%	509	1,744,140	100%	739	2,532,640

EWL =	21,383,900
10 YR TI =	9.5
UL =	5.3%
LL =	-3.2%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	12.8%	65	19,500	12.8%	137	41,100
3	920	4.7%	24	22,080	4.7%	51	46,920
4	1320	0.8%	4	5,280	0.8%	8	10,560
5	4080	81.7%	416	1,697,280	81.7%	877	3,578,160
		100%	509	1,744,140	100%	1073	3,676,740

EWL =	54,208,800
20 YR TI =	11.0
UL =	6.4%
LL =	3.6%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *Avenue T w/o 165th Street - No-Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*7.0*
2009-2029	*7.5*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*1,600*	3.8	--	7.0%	
2018	*2,323*	3.8	0	7.0%	10 Yr TI
2028	*3,373*	--	0	7.0%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*69*	69	61.6%
3	*26*	26	23.2%
4	*5*	5	4.5%
5	*12*	12	10.7%
TOTALS:	112	112	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	61.6%	69	20,700	61.6%	100	30,000
3	920	23.2%	26	23,920	23.2%	38	34,960
4	1320	4.5%	5	6,600	4.5%	7	9,240
5	4080	10.7%	12	48,960	10.7%	17	69,360
		100%	112	100,180	100%	162	143,560

EWL = 1,218,700
10 YR TI = 7.0
UL = 11.1%
LL = 1.1%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	61.6%	69	20,700	61.6%	145	43,500
3	920	23.2%	26	23,920	23.2%	55	50,600
4	1320	4.5%	5	6,600	4.5%	11	14,520
5	4080	10.7%	12	48,960	10.7%	25	102,000
		100%	112	100,180	100%	236	210,620

EWL = 3,108,000
20 YR TI = 7.5
UL = 4.5%
LL = -0.3%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *Avenue T w/o 165th Street - with Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*8.0*
2009-2029	*9.0*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*1,690*	3.8	--	10.1%	
2018	*2,454*	3.8	0	10.1%	10 Yr TI
2028	*3,563*	--	0	10.1%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*69*	69	40.6%
3	*26*	26	15.3%
4	*5*	5	2.9%
5	*70*	70	41.2%
TOTALS:	170	170	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	40.6%	69	20,700	40.6%	100	30,000
3	920	15.3%	26	23,920	15.3%	38	34,960
4	1320	2.9%	5	6,600	2.9%	7	9,240
5	4080	41.2%	70	285,600	41.2%	102	416,160
		100%	170	336,820	100%	247	490,360

EWL = 4,135,900
10 YR TI = 8.0
UL = 9.2%
LL = 0.2%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	40.6%	69	20,700	40.6%	145	43,500
3	920	15.3%	26	23,920	15.3%	55	50,600
4	1320	2.9%	5	6,600	2.9%	11	14,520
5	4080	41.2%	70	285,600	41.2%	148	603,840
		100%	170	336,820	100%	359	712,460

EWL = 10,492,800
20 YR TI = 9.0
UL = 6.4%
LL = 3.0%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *106th Street s/o Avenue T - No-Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*6.5*
2009-2029	*7.5*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*1,200*	3.8	--	6.8%	
2018	*1,742*	3.8	0	6.8%	10 Yr TI
2028	*2,530*	--	0	6.8%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*52*	52	63.4%
3	*19*	19	23.2%
4	*3*	3	3.7%
5	*8*	8	9.8%
TOTALS:	82	82	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	63.4%	52	15,600	63.4%	76	22,800
3	920	23.2%	19	17,480	23.2%	28	25,760
4	1320	3.7%	3	3,960	3.7%	4	5,280
5	4080	9.8%	8	32,640	9.8%	12	48,960
		100%	82	69,680	100%	120	102,800

EWL =	862,400
10 YR TI =	6.5
UL =	7.4%
LL =	-5.0%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	63.4%	52	15,600	63.4%	110	33,000
3	920	23.2%	19	17,480	23.2%	40	36,800
4	1320	3.7%	3	3,960	3.7%	6	7,920
5	4080	9.8%	8	32,640	9.8%	17	69,360
		100%	82	69,680	100%	173	147,080

EWL =	2,167,600
20 YR TI =	7.5
UL =	7.0%
LL =	2.9%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *106th Street s/o Avenue T - with Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*9.5*
2009-2029	*11.0*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*1,634*	3.8	--	29.7%	
2018	*2,373*	3.8	0	29.7%	10 Yr TI
2028	*3,445*	--	0	29.7%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*52*	52	10.7%
3	*19*	19	3.9%
4	*3*	3	0.6%
5	*412*	412	84.8%
TOTALS:	486	486	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	10.7%	52	15,600	10.7%	76	22,800
3	920	3.9%	19	17,480	3.9%	28	25,760
4	1320	0.6%	3	3,960	0.6%	4	5,280
5	4080	84.8%	412	1,680,960	84.8%	598	2,439,840
		100%	486	1,718,000	100%	706	2,493,680

EWL =	21,058,400
10 YR TI =	9.5
UL =	5.6%
LL =	-2.9%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	10.7%	52	15,600	10.7%	110	33,000
3	920	3.9%	19	17,480	3.9%	40	36,800
4	1320	0.6%	3	3,960	0.6%	6	7,920
5	4080	84.8%	412	1,680,960	84.8%	869	3,545,520
		100%	486	1,718,000	100%	1025	3,623,240

EWL =	53,412,400
20 YR TI =	11.0
UL =	6.5%
LL =	3.8%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *165th Street s/o Avenue T - No-Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*7.5*
2009-2029	*8.5*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*3,000*	3.8	--	7.0%	
2018	*4,356*	3.8	0	7.0%	10 Yr TI
2028	*6,325*	--	0	7.0%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*130*	130	61.9%
3	*49*	49	23.3%
4	*9*	9	4.3%
5	*22*	22	10.5%
TOTALS:	210	210	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	61.9%	130	39,000	61.9%	189	56,700
3	920	23.3%	49	45,080	23.3%	71	65,320
4	1320	4.3%	9	11,880	4.3%	13	17,160
5	4080	10.5%	22	89,760	10.5%	32	130,560
		100%	210	185,720	100%	305	269,740

EWL =	2,277,300
10 YR TI =	7.5
UL =	10.3%
LL =	0.9%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	61.9%	130	39,000	61.9%	274	82,200
3	920	23.3%	49	45,080	23.3%	103	94,760
4	1320	4.3%	9	11,880	4.3%	19	25,080
5	4080	10.5%	22	89,760	10.5%	46	187,680
		100%	210	185,720	100%	442	389,720

EWL =	5,754,400
20 YR TI =	8.5
UL =	7.3%
LL =	3.8%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *165th Street s/o Avenue T - with Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*8.0*
2009-2029	*9.0*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*3,090*	3.8	--	8.7%	
2018	*4,487*	3.8	0	8.7%	10 Yr TI
2028	*6,515*	--	0	8.7%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*130*	130	48.5%
3	*49*	49	18.3%
4	*9*	9	3.4%
5	*80*	80	29.9%
TOTALS:	268	268	100%

6A-12N =	3.22
12N-6P =	2.39
6A-6P =	1.37
7A-1P =	2.95
7-9A &	
2-6P =	2.36
6-9A &	
3-6P =	2.58

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	48.5%	130	39,000	48.5%	189	56,700
3	920	18.3%	49	45,080	18.3%	71	65,320
4	1320	3.4%	9	11,880	3.4%	13	17,160
5	4080	29.9%	80	326,400	29.9%	116	473,280
		100%	268	422,360	100%	389	612,460

EWL =	5,174,100
10 YR TI =	8.0
UL =	5.6%
LL =	-4.8%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	48.5%	130	39,000	48.5%	274	82,200
3	920	18.3%	49	45,080	18.3%	103	94,760
4	1320	3.4%	9	11,880	3.4%	19	25,080
5	4080	29.9%	80	326,400	29.9%	169	689,520
		100%	268	422,360	100%	565	891,560

EWL =	13,139,200
20 YR TI =	9.0
UL =	4.8%
LL =	1.0%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *SR-138 w/o 106th Street - No-Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*9.0*
2009-2029	*10.0*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*17,300*	3.8	--	7.0%	
2018	*25,120*	3.8	0	7.0%	10 Yr TI
2028	*36,475*	--	0	7.0%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*751*	751	62.1%
3	*280*	280	23.2%
4	*50*	50	4.1%
5	*128*	128	10.6%
TOTALS:	1209	1209	100%

6A-12N =	3.14
12N-6P =	2.47
6A-6P =	1.38
7A-1P =	3.01
7-9A &	
2-6P =	2.41
6-9A &	
3-6P =	2.51

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	62.1%	751	225,300	62.1%	1090	327,000
3	920	23.2%	280	257,600	23.2%	407	374,440
4	1320	4.1%	50	66,000	4.1%	73	96,360
5	4080	10.6%	128	522,240	10.6%	186	758,880
		100%	1209	1,071,140	100%	1756	1,556,680

EWL =	13,139,100
10 YR TI =	9.0
UL =	6.1%
LL =	-2.7%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	62.1%	751	225,300	62.1%	1583	474,900
3	920	23.2%	280	257,600	23.2%	590	542,800
4	1320	4.1%	50	66,000	4.1%	105	138,600
5	4080	10.6%	128	522,240	10.6%	270	1,101,600
		100%	1209	1,071,140	100%	2548	2,257,900

EWL =	33,290,400
20 YR TI =	10.0
UL =	4.3%
LL =	0.9%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *SR-138 w/o 106th Street - with Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*10.0*
2009-2029	*11.5*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*17,734*	3.8	--	9.1%	
2018	*25,750*	3.8	0	9.1%	10 Yr TI
2028	*37,390*	--	0	9.1%	20 Yr TI

TRUCK AXLE BREAKDOWN: EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*751*	751	46.6%
3	*280*	280	17.4%
4	*50*	50	3.1%
5	*532*	532	33.0%
TOTALS:	1613	1613	100%

6A-12N =	3.14
12N-6P =	2.47
6A-6P =	1.38
7A-1P =	3.01
7-9A &	
2-6P =	2.41
6-9A &	
3-6P =	2.51

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	46.6%	751	225,300	46.6%	1090	327,000
3	920	17.4%	280	257,600	17.4%	407	374,440
4	1320	3.1%	50	66,000	3.1%	73	96,360
5	4080	33.0%	532	2,170,560	33.0%	772	3,149,760
		100%	1613	2,719,460	100%	2342	3,947,560

EWL =	33,335,100
10 YR TI =	10.0
UL =	4.9%
LL =	-3.2%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	46.6%	751	225,300	46.6%	1583	474,900
3	920	17.4%	280	257,600	17.4%	590	542,800
4	1320	3.1%	50	66,000	3.1%	105	138,600
5	4080	33.0%	532	2,170,560	33.0%	1122	4,577,760
		100%	1613	2,719,460	100%	3400	5,734,060

EWL =	84,535,200
20 YR TI =	11.5
UL =	5.9%
LL =	3.2%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *SR-138 e/o 165th Street - No-Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*9.0*
2009-2029	*10.5* *

* - TRAFFIC INDEX ADJUSTED UPWARDS

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*17,900*	3.8	--	7.0%	
2018	*25,991*	3.8	0	7.0%	10 Yr TI
2028	*37,740*	--	0	7.0%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*777*	777	62.1%
3	*290*	290	23.2%
4	*52*	52	4.2%
5	*132*	132	10.6%
TOTALS:	1251	1251	100%

6A-12N =	3.14
12N-6P =	2.47
6A-6P =	1.38
7A-1P =	3.01
7-9A & 2-6P =	2.41
6-9A & 3-6P =	2.51

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	62.1%	777	233,100	62.1%	1128	338,400
3	920	23.2%	290	266,800	23.2%	421	387,320
4	1320	4.2%	52	68,640	4.2%	76	100,320
5	4080	10.6%	132	538,560	10.6%	192	783,360
		100%	1251	1,107,100	100%	1817	1,609,400

EWL =	13,582,500
10 YR TI =	9.0
UL =	5.5%
LL =	-3.5%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	62.1%	777	233,100	62.1%	1638	491,400
3	920	23.2%	290	266,800	23.2%	611	562,120
4	1320	4.2%	52	68,640	4.2%	110	145,200
5	4080	10.6%	132	538,560	10.6%	278	1,134,240
		100%	1251	1,107,100	100%	2637	2,332,960

EWL =	34,400,600
20 YR TI =	10.0
UL =	4.1%
LL =	0.5%

LOS ANGELES COUNTY PUBLIC WORKS DEPARTMENT
TRAFFIC INDEX CALCULATIONS

LOCATION: *SR-138 e/o 165th Street - with Project*
THOMAS GUIDE REF: *0* REQUESTED BY: *0*

PREPARED: *Austin-Foust Associates, Inc.* DATE: *16-Apr-09*

CHECKED: ___ DATE: _____

TIME PERIOD	TRAFFIC INDEX
2009-2019	*9.5*
2009-2029	*10.5*

INPUT DATA:

YEAR	ADT	GROWTH	ADD VOLUME	% TRUCKS	COMMENTS
2008	*17,990*	3.8	--	7.3%	
2018	*26,122*	3.8	0	7.3%	10 Yr TI
2028	*37,930*	--	0	7.3%	20 Yr TI

TRUCK AXLE BREAKDOWN:

EXPANSION FACTOR = 1.00

# OF AXLES	TRUCK AXLE COUNT	24 HOUR VOLUME	TAB (%)
2	*777*	777	59.4%
3	*290*	290	22.2%
4	*52*	52	4.0%
5	*190*	190	14.5%
TOTALS:	1309	1309	100%

6A-12N =	3.14
12N-6P =	2.47
6A-6P =	1.38
7A-1P =	3.01
7-9A &	
2-6P =	2.41
6-9A &	
3-6P =	2.51

CALCULATIONS:

2008 TO 2018

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2018 EWL
2	300	59.4%	777	233,100	59.4%	1128	338,400
3	920	22.2%	290	266,800	22.2%	421	387,320
4	1320	4.0%	52	68,640	4.0%	76	100,320
5	4080	14.5%	190	775,200	14.5%	276	1,126,080
		100%	1309	1,343,740	100%	1901	1,952,120

EWL =	16,479,300
10 YR TI =	9.5
UL =	9.5%
LL =	2.1%

2008 TO 2028

AXLE	FACTOR	TAB	NUMBER	2008 EWL	TAB	NUMBER	2028 EWL
2	300	59.4%	777	233,100	59.4%	1638	491,400
3	920	22.2%	290	266,800	22.2%	611	562,120
4	1320	4.0%	52	68,640	4.0%	110	145,200
5	4080	14.5%	190	775,200	14.5%	401	1,636,080
		100%	1309	1,343,740	100%	2760	2,834,800

EWL =	41,785,400
20 YR TI =	10.5
UL =	5.6%
LL =	2.5%

Appendix F

TRAFFIC COUNT DATA

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : FORT TEJON RD/PEARBLOSSOM HWY
E/W ST: PEARBLOSSOM HWY/AVENUE T
CITY: PALMDALE

FILENAME: 0880501
DATE: 8/14/08
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	1	2	0	1	2	0	1	1	1	1	1	1	
7:00 AM	51	57	1	19	48	22	4	31	50	2	91	21	397
15 AM	47	56	1	22	61	9	8	25	44	2	99	12	386
30 AM	46	51	1	19	38	3	4	23	21	0	61	19	286
45 AM	54	78	0	25	73	10	6	48	47	0	82	22	445
8:00 AM	40	60	1	20	51	12	5	19	34	1	68	20	331
15 AM	60	50	2	16	37	7	5	26	38	1	57	32	331
30 AM	54	56	1	13	46	11	5	28	49	2	58	33	356
45 AM	52	76	1	13	60	11	5	35	41	2	63	22	381

PEAK HOUR BEGINS AT: 700 AM — PHF: 0.85

VOLUMES =	198	242	3	85	220	44	22	127	162	4	333	74	1514

FILENAME: 0880501P
DATE: 8/14/08
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	48	62	1	33	89	6	6	78	86	0	49	24	482
15 PM	61	77	1	36	95	1	19	71	96	0	35	26	518
30 PM	63	61	0	41	79	4	15	106	90	2	39	23	523
45 PM	60	74	0	42	79	13	14	84	86	1	48	18	519
5:00 PM	71	67	4	57	91	7	27	105	88	3	36	34	590
15 PM	59	63	2	56	86	3	23	92	75	5	32	26	522
30 PM	50	57	1	25	83	3	24	78	68	4	37	41	471
45 PM	39	59	2	41	88	3	31	81	77	3	28	17	469

PEAK HOUR BEGINS AT: 1630 PM — PHF: 0.91

VOLUMES =	253	265	6	196	335	27	79	387	339	11	155	101	2154

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : 82ND ST
E/W ST: PEARBLOSSOM HWY
CITY: PALMDALE

FILENAME: 0880502
DATE: 8/14/08
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	0	1	0	0	1	1	1	1	0	1	1	1	
7:00 AM	4	1	0	0	1	3	1	82	5	3	80	0	180
15 AM	12	0	2	0	1	3	3	90	9	2	88	1	211
30 AM	1	1	2	3	0	2	2	95	3	5	108	2	224
45 AM	10	1	1	2	2	1	4	91	14	2	103	1	232
8:00 AM	9	0	3	3	3	3	3	96	9	6	94	1	230
15 AM	5	1	3	2	4	5	2	71	2	5	106	1	207
30 AM	10	1	7	10	9	2	6	83	12	13	111	4	268
45 AM	32	15	16	9	36	5	3	109	14	15	100	0	354

PEAK HOUR BEGINS AT: PHF: 0.75
800 AM

VOLUMES =	56	17	29	24	52	15	14	359	37	39	411	6	1059

FILENAME: 0880502P
DATE: 8/14/08
DAY: THURSDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM	12	7	4	4	12	4	4	169	10	9	93	2	330
15 PM	14	2	4	5	4	7	5	155	8	3	114	3	324
30 PM	13	1	1	3	2	4	5	138	9	3	111	3	293
45 PM	9	3	3	6	3	2	6	173	10	3	117	0	335
5:00 PM	8	3	0	8	3	5	5	136	10	1	103	3	285
15 PM	5	5	2	6	0	5	5	143	12	4	93	1	281
30 PM	4	3	5	5	0	3	2	123	11	2	107	1	266
45 PM	10	1	1	5	2	5	5	145	12	1	76	2	265

PEAK HOUR BEGINS AT: PHF: 0.96
1600 PM

VOLUMES =	48	13	12	18	21	17	20	635	37	18	435	8	1282

COMMENTS:

TRAFFIC DATA SERVICES, INC. LOCATION CODE 03704.B01

LOCATION - 106TH @ AVE T N-LEG AVERAGED VOLUMES FOR - WEDNESDAY 3/7/07 TO THURSDAY 3/8/07

AM							PM						
TIME	SB				TOTAL		TIME	SB				TOTAL	
12:00 - 12:15	1		-		1		12:00 - 12:15	7		-		7	
12:15 - 12:30	2		-		2		12:15 - 12:30	11		-		11	
12:30 - 12:45	2		-		2		12:30 - 12:45	6		-		6	
12:45 - 1:00	0	5	-	-	0	5	12:45 - 1:00	8	32	-	-	8	32
1:00 - 1:15	0		-		0		1:00 - 1:15	16		-		16	
1:15 - 1:30	0		-		0		1:15 - 1:30	16		-		16	
1:30 - 1:45	1		-		1		1:30 - 1:45	12		-		12	
1:45 - 2:00	1	2	-	-	1	2	1:45 - 2:00	18	62	-	-	18	62
2:00 - 2:15	2		-		2		2:00 - 2:15	15		-		15	
2:15 - 2:30	2		-		2		2:15 - 2:30	8		-		8	
2:30 - 2:45	0		-		0		2:30 - 2:45	29		-		29	
2:45 - 3:00	0	4	-	-	0	4	2:45 - 3:00	28	80	-	-	28	80
3:00 - 3:15	1		-		1		3:00 - 3:15	14		-		14	
3:15 - 3:30	0		-		0		3:15 - 3:30	18		-		18	
3:30 - 3:45	6		-		6		3:30 - 3:45	16		-		16	
3:45 - 4:00	0	7	-	-	0	7	3:45 - 4:00	28	76	-	-	28	76
4:00 - 4:15	1		-		1		4:00 - 4:15	16		-		16	
4:15 - 4:30	6		-		6		4:15 - 4:30	11		-		11	
4:30 - 4:45	9		-		9		4:30 - 4:45	16		-		16	
4:45 - 5:00	7	23	-	-	7	23	4:45 - 5:00	15	58	-	-	15	58
5:00 - 5:15	3		-		3		5:00 - 5:15	18		-		18	
5:15 - 5:30	8		-		8		5:15 - 5:30	12		-		12	
5:30 - 5:45	8		-		8		5:30 - 5:45	14		-		14	
5:45 - 6:00	12	31	-	-	12	31	5:45 - 6:00	16	60	-	-	16	60
6:00 - 6:15	7		-		7		6:00 - 6:15	12		-		12	
6:15 - 6:30	11		-		11		6:15 - 6:30	10		-		10	
6:30 - 6:45	13		-		13		6:30 - 6:45	18		-		18	
6:45 - 7:00	14	45	-	-	14	45	6:45 - 7:00	12	52	-	-	12	52
7:00 - 7:15	20		-		20		7:00 - 7:15	10		-		10	
7:15 - 7:30	29		-		29		7:15 - 7:30	7		-		7	
7:30 - 7:45	10		-		10		7:30 - 7:45	10		-		10	
7:45 - 8:00	20	79	-	-	20	79	7:45 - 8:00	6	33	-	-	6	33
8:00 - 8:15	17		-		17		8:00 - 8:15	4		-		4	
8:15 - 8:30	21		-		21		8:15 - 8:30	4		-		4	
8:30 - 8:45	23		-		23		8:30 - 8:45	4		-		4	
8:45 - 9:00	16	77	-	-	16	77	8:45 - 9:00	2	14	-	-	2	14
9:00 - 9:15	10		-		10		9:00 - 9:15	7		-		7	
9:15 - 9:30	17		-		17		9:15 - 9:30	6		-		6	
9:30 - 9:45	9		-		9		9:30 - 9:45	5		-		5	
9:45 - 10:00	15	51	-	-	15	51	9:45 - 10:00	6	24	-	-	6	24
10:00 - 10:15	9		-		9		10:00 - 10:15	3		-		3	
10:15 - 10:30	8		-		8		10:15 - 10:30	1		-		1	
10:30 - 10:45	9		-		9		10:30 - 10:45	2		-		2	
10:45 - 11:00	8	34	-	-	8	34	10:45 - 11:00	4	10	-	-	4	10
11:00 - 11:15	4		-		4		11:00 - 11:15	0		-		0	
11:15 - 11:30	9		-		9		11:15 - 11:30	2		-		2	
11:30 - 11:45	8		-		8		11:30 - 11:45	0		-		0	
11:45 - 12:00	11	32	-	-	11	32	11:45 - 12:00	0	2	-	-	0	2
TOTALS		390		-		390			503		-		503
ADT'S									893		-		893

TRAFFIC DATA SERVICES, INC. LOCATION CODE 03704.002

LOCATION - 106TH @ AVE T E-LEG AVERAGED VOLUMES FOR - WEDNESDAY 3/7/07 TO THURSDAY 3/8/07

AM TIME	WB		TOTAL		PM TIME	WB		TOTAL	
12:00 - 12:15	1	-	1		12:00 - 12:15	14	-	14	
12:15 - 12:30	1	-	1		12:15 - 12:30	14	-	14	
12:30 - 12:45	1	-	1		12:30 - 12:45	10	-	10	
12:45 - 1:00	1	4 - -	1	4	12:45 - 1:00	32	70 - -	32	70
1:00 - 1:15	0	-	0		1:00 - 1:15	18	-	18	
1:15 - 1:30	0	-	0		1:15 - 1:30	20	-	20	
1:30 - 1:45	1	-	1		1:30 - 1:45	20	-	20	
1:45 - 2:00	1	2 - -	1	2	1:45 - 2:00	19	77 - -	19	77
2:00 - 2:15	6	-	6		2:00 - 2:15	20	-	20	
2:15 - 2:30	1	-	1		2:15 - 2:30	18	-	18	
2:30 - 2:45	2	-	2		2:30 - 2:45	8	-	8	
2:45 - 3:00	2	11 - -	2	11	2:45 - 3:00	20	66 - -	20	66
3:00 - 3:15	2	-	2		3:00 - 3:15	16	-	16	
3:15 - 3:30	4	-	4		3:15 - 3:30	28	-	28	
3:30 - 3:45	11	-	11		3:30 - 3:45	34	-	34	
3:45 - 4:00	14	31 - -	14	31	3:45 - 4:00	35	113 - -	35	113
4:00 - 4:15	14	-	14		4:00 - 4:15	9	-	9	
4:15 - 4:30	23	-	23		4:15 - 4:30	15	-	15	
4:30 - 4:45	16	-	16		4:30 - 4:45	30	-	30	
4:45 - 5:00	24	77 - -	24	77	4:45 - 5:00	24	78 - -	24	78
5:00 - 5:15	21	-	21		5:00 - 5:15	19	-	19	
5:15 - 5:30	23	-	23		5:15 - 5:30	15	-	15	
5:30 - 5:45	20	-	20		5:30 - 5:45	16	-	16	
5:45 - 6:00	22	86 - -	22	86	5:45 - 6:00	16	66 - -	16	66
6:00 - 6:15	36	-	36		6:00 - 6:15	18	-	18	
6:15 - 6:30	37	-	37		6:15 - 6:30	18	-	18	
6:30 - 6:45	28	-	28		6:30 - 6:45	11	-	11	
6:45 - 7:00	29	130 - -	29	130	6:45 - 7:00	14	61 - -	14	61
7:00 - 7:15	18	-	18		7:00 - 7:15	9	-	9	
7:15 - 7:30	24	-	24		7:15 - 7:30	14	-	14	
7:30 - 7:45	16	-	16		7:30 - 7:45	7	-	7	
7:45 - 8:00	28	86 - -	28	86	7:45 - 8:00	11	41 - -	11	41
8:00 - 8:15	13	-	13		8:00 - 8:15	12	-	12	
8:15 - 8:30	26	-	26		8:15 - 8:30	6	-	6	
8:30 - 8:45	27	-	27		8:30 - 8:45	10	-	10	
8:45 - 9:00	26	92 - -	26	92	8:45 - 9:00	12	40 - -	12	40
9:00 - 9:15	19	-	19		9:00 - 9:15	4	-	4	
9:15 - 9:30	32	-	32		9:15 - 9:30	5	-	5	
9:30 - 9:45	18	-	18		9:30 - 9:45	3	-	3	
9:45 - 10:00	18	87 - -	18	87	9:45 - 10:00	4	16 - -	4	16
10:00 - 10:15	16	-	16		10:00 - 10:15	4	-	4	
10:15 - 10:30	10	-	10		10:15 - 10:30	5	-	5	
10:30 - 10:45	20	-	20		10:30 - 10:45	5	-	5	
10:45 - 11:00	15	61 - -	15	61	10:45 - 11:00	4	18 - -	4	18
11:00 - 11:15	12	-	12		11:00 - 11:15	2	-	2	
11:15 - 11:30	18	-	18		11:15 - 11:30	0	-	0	
11:30 - 11:45	22	-	22		11:30 - 11:45	0	-	0	
11:45 - 12:00	14	66 - -	14	66	11:45 - 12:00	0	2 - -	0	2
TOTALS		733 -		733			648 -		648
ADT'S							1,381 -		1,381

TRAFFIC DATA SERVICES, INC. LOCATION CODE 03704.003

LOCATION - 106TH @ AVE T S-LEG AVERAGED VOLUMES FOR - WEDNESDAY 3/7/07 TO THURSDAY 3/8/07

AM						PM					
TIME	NB			TOTAL		TIME	NB			TOTAL	
12:00 - 12:15	0		-	0		12:00 - 12:15	7		-	7	
12:15 - 12:30	1		-	1		12:15 - 12:30	2		-	2	
12:30 - 12:45	0		-	0		12:30 - 12:45	4		-	4	
12:45 - 1:00	1	2	- -	1	2	12:45 - 1:00	5	18	- -	5	18
1:00 - 1:15	0		-	0		1:00 - 1:15	4		-	4	
1:15 - 1:30	1		-	1		1:15 - 1:30	5		-	5	
1:30 - 1:45	0		-	0		1:30 - 1:45	8		-	8	
1:45 - 2:00	1	2	- -	1	2	1:45 - 2:00	10	27	- -	10	27
2:00 - 2:15	0		-	0		2:00 - 2:15	12		-	12	
2:15 - 2:30	0		-	0		2:15 - 2:30	14		-	14	
2:30 - 2:45	0		-	0		2:30 - 2:45	10		-	10	
2:45 - 3:00	0	0	- -	0	0	2:45 - 3:00	15	51	- -	15	51
3:00 - 3:15	0		-	0		3:00 - 3:15	16		-	16	
3:15 - 3:30	0		-	0		3:15 - 3:30	8		-	8	
3:30 - 3:45	0		-	0		3:30 - 3:45	9		-	9	
3:45 - 4:00	1	1	- -	1	1	3:45 - 4:00	13	46	- -	13	46
4:00 - 4:15	0		-	0		4:00 - 4:15	6		-	6	
4:15 - 4:30	2		-	2		4:15 - 4:30	9		-	9	
4:30 - 4:45	0		-	0		4:30 - 4:45	14		-	14	
4:45 - 5:00	0	2	- -	0	2	4:45 - 5:00	11	40	- -	11	40
5:00 - 5:15	3		-	3		5:00 - 5:15	12		-	12	
5:15 - 5:30	1		-	1		5:15 - 5:30	13		-	13	
5:30 - 5:45	5		-	5		5:30 - 5:45	4		-	4	
5:45 - 6:00	6	15	- -	6	15	5:45 - 6:00	11	40	- -	11	40
6:00 - 6:15	9		-	9		6:00 - 6:15	10		-	10	
6:15 - 6:30	7		-	7		6:15 - 6:30	5		-	5	
6:30 - 6:45	9		-	9		6:30 - 6:45	8		-	8	
6:45 - 7:00	12	37	- -	12	37	6:45 - 7:00	8	31	- -	8	31
7:00 - 7:15	34		-	34		7:00 - 7:15	5		-	5	
7:15 - 7:30	15		-	15		7:15 - 7:30	8		-	8	
7:30 - 7:45	4		-	4		7:30 - 7:45	7		-	7	
7:45 - 8:00	8	61	- -	8	61	7:45 - 8:00	4	24	- -	4	24
8:00 - 8:15	17		-	17		8:00 - 8:15	12		-	12	
8:15 - 8:30	17		-	17		8:15 - 8:30	9		-	9	
8:30 - 8:45	9		-	9		8:30 - 8:45	8		-	8	
8:45 - 9:00	15	58	- -	15	58	8:45 - 9:00	1	30	- -	1	30
9:00 - 9:15	15		-	15		9:00 - 9:15	8		-	8	
9:15 - 9:30	7		-	7		9:15 - 9:30	4		-	4	
9:30 - 9:45	5		-	5		9:30 - 9:45	4		-	4	
9:45 - 10:00	4	31	- -	4	31	9:45 - 10:00	1	17	- -	1	17
10:00 - 10:15	2		-	2		10:00 - 10:15	3		-	3	
10:15 - 10:30	5		-	5		10:15 - 10:30	1		-	1	
10:30 - 10:45	3		-	3		10:30 - 10:45	1		-	1	
10:45 - 11:00	4	14	- -	4	14	10:45 - 11:00	0	5	- -	0	5
11:00 - 11:15	4		-	4		11:00 - 11:15	2		-	2	
11:15 - 11:30	4		-	4		11:15 - 11:30	1		-	1	
11:30 - 11:45	5		-	5		11:30 - 11:45	1		-	1	
11:45 - 12:00	10	23	- -	10	23	11:45 - 12:00	0	4	- -	0	4
TOTALS		246	-		246			333	-		333
ADT'S								579	-		579

TRAFFIC DATA SERVICES, INC. LOCATION CODE 03704.004

LOCATION - 106TH @ AVE T W-LEG AVERAGED VOLUMES FOR - WEDNESDAY 3/7/07 TO THURSDAY 3/8/07

AM TIME	EB				TOTAL		PM TIME	EB				TOTAL	
12:00 - 12:15	3		-		3		12:00 - 12:15	23		-		23	
12:15 - 12:30	10		-		10		12:15 - 12:30	14		-		14	
12:30 - 12:45	5		-		5		12:30 - 12:45	14		-		14	
12:45 - 1:00	3	21	-	-	3	21	12:45 - 1:00	22	73	-	-	22	73
1:00 - 1:15	4		-		4		1:00 - 1:15	35		-		35	
1:15 - 1:30	6		-		6		1:15 - 1:30	34		-		34	
1:30 - 1:45	1		-		1		1:30 - 1:45	16		-		16	
1:45 - 2:00	4	15	-	-	4	15	1:45 - 2:00	18	103	-	-	18	103
2:00 - 2:15	6		-		6		2:00 - 2:15	20		-		20	
2:15 - 2:30	2		-		2		2:15 - 2:30	24		-		24	
2:30 - 2:45	2		-		2		2:30 - 2:45	38		-		38	
2:45 - 3:00	2	12	-	-	2	12	2:45 - 3:00	40	122	-	-	40	122
3:00 - 3:15	0		-		0		3:00 - 3:15	40		-		40	
3:15 - 3:30	0		-		0		3:15 - 3:30	23		-		23	
3:30 - 3:45	2		-		2		3:30 - 3:45	45		-		45	
3:45 - 4:00	4	6	-	-	4	6	3:45 - 4:00	46	154	-	-	46	154
4:00 - 4:15	6		-		6		4:00 - 4:15	36		-		36	
4:15 - 4:30	3		-		3		4:15 - 4:30	38		-		38	
4:30 - 4:45	8		-		8		4:30 - 4:45	40		-		40	
4:45 - 5:00	10	27	-	-	10	27	4:45 - 5:00	42	156	-	-	42	156
5:00 - 5:15	4		-		4		5:00 - 5:15	43		-		43	
5:15 - 5:30	7		-		7		5:15 - 5:30	54		-		54	
5:30 - 5:45	22		-		22		5:30 - 5:45	36		-		36	
5:45 - 6:00	14	47	-	-	14	47	5:45 - 6:00	42	175	-	-	42	175
6:00 - 6:15	12		-		12		6:00 - 6:15	29		-		29	
6:15 - 6:30	14		-		14		6:15 - 6:30	24		-		24	
6:30 - 6:45	16		-		16		6:30 - 6:45	30		-		30	
6:45 - 7:00	22	64	-	-	22	64	6:45 - 7:00	37	120	-	-	37	120
7:00 - 7:15	41		-		41		7:00 - 7:15	23		-		23	
7:15 - 7:30	22		-		22		7:15 - 7:30	22		-		22	
7:30 - 7:45	13		-		13		7:30 - 7:45	22		-		22	
7:45 - 8:00	25	101	-	-	25	101	7:45 - 8:00	15	82	-	-	15	82
8:00 - 8:15	18		-		18		8:00 - 8:15	18		-		18	
8:15 - 8:30	22		-		22		8:15 - 8:30	21		-		21	
8:30 - 8:45	25		-		25		8:30 - 8:45	12		-		12	
8:45 - 9:00	12	77	-	-	12	77	8:45 - 9:00	18	69	-	-	18	69
9:00 - 9:15	14		-		14		9:00 - 9:15	12		-		12	
9:15 - 9:30	17		-		17		9:15 - 9:30	6		-		6	
9:30 - 9:45	18		-		18		9:30 - 9:45	21		-		21	
9:45 - 10:00	10	59	-	-	10	59	9:45 - 10:00	12	51	-	-	12	51
10:00 - 10:15	20		-		20		10:00 - 10:15	9		-		9	
10:15 - 10:30	18		-		18		10:15 - 10:30	9		-		9	
10:30 - 10:45	17		-		17		10:30 - 10:45	5		-		5	
10:45 - 11:00	16	71	-	-	16	71	10:45 - 11:00	12	35	-	-	12	35
11:00 - 11:15	22		-		22		11:00 - 11:15	12		-		12	
11:15 - 11:30	17		-		17		11:15 - 11:30	6		-		6	
11:30 - 11:45	16		-		16		11:30 - 11:45	8		-		8	
11:45 - 12:00	23	78	-	-	23	78	11:45 - 12:00	4	30	-	-	4	30
TOTALS		578	-		578				1,170	-		1,170	
ADT'S									1,748	-		1,748	

TRAFFIC DATA SERVICES, INC
SUMMARY OF VEHICULAR TURNING MOVEMENTS

N/S ST : 106TH ST
E/W ST: PEARBLOSSOM HWY (SR-138)
CITY: PALMDALE

FILENAME: 0370401
DATE: 3/08/07
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
LANES:	0	1	0	0	1	0	1	1	0	1	1	1	
7:00 AM	2	11	0	10	1	3	4	51	2	0	68	16	168
15 AM	0	2	0	9	8	4	1	65	5	0	93	4	191
30 AM	3	1	0	5	2	4	1	72	0	0	108	4	200
45 AM	3	1	0	9	1	1	1	105	2	0	116	9	248
8:00 AM	1	2	0	6	0	4	2	95	0	0	129	9	248
15 AM	0	1	0	9	2	1	1	78	0	0	72	8	172
30 AM	1	1	0	6	3	2	4	105	0	2	106	6	236
45 AM	0	0	0	9	0	4	3	102	2	0	91	6	217

PEAK HOUR BEGINS AT: 745 AM — PHF: 0.91

VOLUMES =	5	5	0	30	6	8	8	383	2	2	423	32	904

FILENAME: 0370401P
DATE: 3/08/07
DAY: THURSDAY

PERIOD BEGINS	NORTHBOUND NL	NT	NR	SOUTHBOUND SL	ST	SR	EASTBOUND EL	ET	ER	WESTBOUND WL	WT	WR	Total
4:00 PM	1	0	0	11	0	0	4	186	1	0	124	3	330
15 PM	0	1	0	7	0	1	4	119	1	1	84	4	222
30 PM	1	1	0	9	2	6	3	157	3	0	150	7	339
45 PM	1	5	0	5	3	0	5	124	2	0	95	3	243
5:00 PM	1	3	0	10	1	3	6	146	0	0	117	4	291
15 PM	0	2	2	5	3	3	5	128	3	0	77	2	230
30 PM	3	0	0	6	2	0	2	134	0	0	76	3	226
45 PM	0	3	0	4	3	1	5	112	2	1	81	4	216

PEAK HOUR BEGINS AT: 1600 PM — PHF: 0.84

VOLUMES =	3	7	0	32	5	7	16	586	7	1	453	17	1134

COMMENTS:

LOCATION - 116TH @ AVE T

15 MINUTE VOLUMES

AM TIME	N. LEG (SB)	E. LEG (WB)	S. LEG (NB)	W. LEG (EB)	TOTAL	PM TIME	N. LEG (SB)	E. LEG (WB)	S. LEG (NB)	W. LEG (EB)	TOTAL
12:00 - 12:15	0	3	0	3	6	12:00 - 12:15	2	8	1	10	21
12:15 - 12:30	0	2	2	0	4	12:15 - 12:30	2	5	2	20	29
12:30 - 12:45	0	0	0	4	4	12:30 - 12:45	0	6	3	14	23
12:45 - 1:00	0	3	0	3	6	12:45 - 1:00	0	2	3	9	14
1:00 - 1:15	0	2	0	3	5	1:00 - 1:15	0	6	2	12	20
1:15 - 1:30	0	0	0	5	5	1:15 - 1:30	0	6	2	13	21
1:30 - 1:45	0	0	0	4	4	1:30 - 1:45	1	6	3	19	29
1:45 - 2:00	0	0	0	2	2	1:45 - 2:00	4	4	3	10	21
2:00 - 2:15	0	1	0	0	1	2:00 - 2:15	0	5	4	16	25
2:15 - 2:30	1	0	0	1	2	2:15 - 2:30	1	8	3	11	23
2:30 - 2:45	0	3	0	0	3	2:30 - 2:45	1	9	11	33	54
2:45 - 3:00	0	2	0	0	2	2:45 - 3:00	1	8	1	24	34
3:00 - 3:15	1	1	0	1	3	3:00 - 3:15	3	12	3	18	36
3:15 - 3:30	0	0	0	4	4	3:15 - 3:30	2	8	3	18	31
3:30 - 3:45	0	5	0	0	5	3:30 - 3:45	0	8	9	29	46
3:45 - 4:00	0	10	0	7	17	3:45 - 4:00	1	10	4	28	43
4:00 - 4:15	0	11	0	1	12	4:00 - 4:15	4	8	4	26	42
4:15 - 4:30	0	10	0	2	12	4:15 - 4:30	0	11	5	16	32
4:30 - 4:45	0	14	2	6	22	4:30 - 4:45	2	14	8	28	52
4:45 - 5:00	0	18	0	5	23	4:45 - 5:00	1	3	3	24	31
5:00 - 5:15	0	16	0	6	22	5:00 - 5:15	2	10	6	25	43
5:15 - 5:30	0	17	4	6	27	5:15 - 5:30	0	10	0	24	34
5:30 - 5:45	0	19	4	11	34	5:30 - 5:45	0	8	1	26	35
5:45 - 6:00	0	23	2	8	33	5:45 - 6:00	0	8	4	23	35
6:00 - 6:15	0	14	4	9	27	6:00 - 6:15	0	8	1	27	36
6:15 - 6:30	0	14	0	11	25	6:15 - 6:30	0	12	1	23	36
6:30 - 6:45	0	13	3	15	31	6:30 - 6:45	0	8	2	20	30
6:45 - 7:00	2	24	4	13	43	6:45 - 7:00	0	9	2	20	31
7:00 - 7:15	0	28	6	6	40	7:00 - 7:15	2	13	2	26	43
7:15 - 7:30	3	15	3	9	30	7:15 - 7:30	2	6	1	20	29
7:30 - 7:45	2	16	2	10	30	7:30 - 7:45	0	9	0	24	33
7:45 - 8:00	0	18	4	15	37	7:45 - 8:00	0	3	8	14	25
8:00 - 8:15	1	14	3	17	35	8:00 - 8:15	0	6	0	16	22
8:15 - 8:30	0	18	4	14	36	8:15 - 8:30	0	2	2	8	12
8:30 - 8:45	0	9	3	12	24	8:30 - 8:45	2	8	1	6	17
8:45 - 9:00	2	18	3	11	34	8:45 - 9:00	0	4	0	18	22
9:00 - 9:15	2	8	1	18	29	9:00 - 9:15	2	6	1	4	13
9:15 - 9:30	0	10	1	8	19	9:15 - 9:30	0	6	1	16	23
9:30 - 9:45	1	11	0	10	22	9:30 - 9:45	0	6	2	13	21
9:45 - 10:00	0	9	4	12	25	9:45 - 10:00	0	2	1	7	10
10:00 - 10:15	2	10	2	12	26	10:00 - 10:15	0	3	2	6	11
10:15 - 10:30	2	6	4	12	24	10:15 - 10:30	0	2	0	5	7
10:30 - 10:45	0	7	3	10	20	10:30 - 10:45	2	2	2	3	9
10:45 - 11:00	1	6	2	7	16	10:45 - 11:00	0	2	0	11	13
11:00 - 11:15	0	6	1	17	24	11:00 - 11:15	0	2	1	5	8
11:15 - 11:30	0	4	1	7	12	11:15 - 11:30	0	1	0	3	4
11:30 - 11:45	2	6	1	13	22	11:30 - 11:45	0	1	0	5	6
11:45 - 12:00	0	4	3	9	16	11:45 - 12:00	0	1	3	7	11
TOTALS							59	753	197	1,142	2,151

LOCATION - 165TH @ AVE T 15 MINUTE VOLUMES

AM						PM					
TIME	N. LEG (SB)	E. LEG (WB)	S. LEG (NB)	W. LEG (EB)	TOTAL	TIME	N. LEG (SB)	E. LEG (WB)	S. LEG (NB)	W. LEG (EB)	TOTAL
12:00 - 12:15	4	1	7	2	14	12:00 - 12:15	15	0	15	8	38
12:15 - 12:30	6	0	6	1	13	12:15 - 12:30	22	2	20	8	52
12:30 - 12:45	3	0	5	3	11	12:30 - 12:45	26	3	10	3	42
12:45 - 1:00	2	0	1	4	7	12:45 - 1:00	17	0	13	8	38
1:00 - 1:15	6	0	1	2	9	1:00 - 1:15	22	0	17	15	54
1:15 - 1:30	1	0	2	4	7	1:15 - 1:30	15	3	26	7	51
1:30 - 1:45	4	0	4	2	10	1:30 - 1:45	23	0	6	6	35
1:45 - 2:00	3	0	1	1	5	1:45 - 2:00	22	6	32	14	74
2:00 - 2:15	4	0	4	1	9	2:00 - 2:15	28	2	35	8	73
2:15 - 2:30	3	0	4	0	7	2:15 - 2:30	17	2	28	7	54
2:30 - 2:45	1	0	1	0	2	2:30 - 2:45	32	3	26	14	75
2:45 - 3:00	2	0	0	0	2	2:45 - 3:00	30	2	22	22	76
3:00 - 3:15	4	2	6	1	13	3:00 - 3:15	48	0	34	14	96
3:15 - 3:30	7	0	0	1	8	3:15 - 3:30	26	4	28	11	69
3:30 - 3:45	5	0	4	4	13	3:30 - 3:45	48	2	26	15	91
3:45 - 4:00	12	2	6	7	27	3:45 - 4:00	42	3	34	28	107
4:00 - 4:15	13	1	5	1	20	4:00 - 4:15	48	4	34	17	103
4:15 - 4:30	14	0	7	2	23	4:15 - 4:30	33	2	38	14	87
4:30 - 4:45	26	0	28	6	60	4:30 - 4:45	27	2	18	20	67
4:45 - 5:00	30	1	10	1	42	4:45 - 5:00	30	0	22	16	68
5:00 - 5:15	30	0	31	5	66	5:00 - 5:15	28	0	20	16	64
5:15 - 5:30	18	0	23	6	47	5:15 - 5:30	32	0	36	20	88
5:30 - 5:45	31	0	16	6	53	5:30 - 5:45	32	0	18	20	70
5:45 - 6:00	21	1	26	2	50	5:45 - 6:00	33	0	18	16	67
6:00 - 6:15	17	1	23	6	47	6:00 - 6:15	24	4	19	17	64
6:15 - 6:30	24	0	38	9	71	6:15 - 6:30	14	4	19	17	54
6:30 - 6:45	36	0	37	11	84	6:30 - 6:45	26	0	16	9	51
6:45 - 7:00	38	4	28	7	77	6:45 - 7:00	20	0	15	17	52
7:00 - 7:15	18	3	33	5	59	7:00 - 7:15	11	0	30	16	57
7:15 - 7:30	29	5	18	7	59	7:15 - 7:30	14	1	12	11	38
7:30 - 7:45	34	0	25	7	66	7:30 - 7:45	6	2	18	20	46
7:45 - 8:00	32	2	14	6	54	7:45 - 8:00	7	2	5	14	28
8:00 - 8:15	24	2	18	7	51	8:00 - 8:15	19	4	14	13	50
8:15 - 8:30	18	3	18	10	49	8:15 - 8:30	14	1	12	9	36
8:30 - 8:45	16	2	16	8	42	8:30 - 8:45	15	0	9	7	31
8:45 - 9:00	26	0	21	8	55	8:45 - 9:00	6	0	9	10	25
9:00 - 9:15	20	4	16	10	50	9:00 - 9:15	14	0	5	7	26
9:15 - 9:30	17	0	17	10	44	9:15 - 9:30	9	0	6	6	21
9:30 - 9:45	16	0	16	6	38	9:30 - 9:45	12	4	3	10	29
9:45 - 10:00	15	2	6	8	31	9:45 - 10:00	2	1	7	6	16
10:00 - 10:15	26	2	14	4	46	10:00 - 10:15	8	0	10	4	22
10:15 - 10:30	14	0	12	18	44	10:15 - 10:30	8	0	6	2	16
10:30 - 10:45	13	0	24	8	45	10:30 - 10:45	4	0	6	1	11
10:45 - 11:00	22	0	12	8	42	10:45 - 11:00	4	0	12	5	21
11:00 - 11:15	11	0	8	10	29	11:00 - 11:15	3	0	5	10	18
11:15 - 11:30	12	2	29	6	49	11:15 - 11:30	8	0	6	0	14
11:30 - 11:45	28	0	16	9	53	11:30 - 11:45	6	0	8	4	18
11:45 - 12:00	22	0	22	4	48	11:45 - 12:00	4	0	3	4	11
TOTALS							1,732	103	1,510	800	4,145

TRAFFIC DATA SERVICES, INC. MACHINE COUNT DATA

LOCATION - 165TH @ PEARBLOSSUM 15 MINUTE VOLUMES

AM TIME	N. LEG (SB)	E. LEG (WB)	S. LEG (NB)	W. LEG (EB)	TOTAL	PM TIME	N. LEG (SB)	E. LEG (WB)	S. LEG (NB)	W. LEG (EB)	TOTAL
12:00 - 12:15	2	18	1	18	39	12:00 - 12:15	16	105	7	98	226
12:15 - 12:30	7	31	1	12	51	12:15 - 12:30	23	90	5	118	236
12:30 - 12:45	3	22	0	24	49	12:30 - 12:45	21	98	6	112	237
12:45 - 1:00	2	20	0	12	34	12:45 - 1:00	18	124	9	126	277
1:00 - 1:15	4	14	1	20	39	1:00 - 1:15	27	80	8	93	208
1:15 - 1:30	2	12	0	10	24	1:15 - 1:30	15	103	11	106	235
1:30 - 1:45	4	12	0	16	32	1:30 - 1:45	13	107	14	126	260
1:45 - 2:00	2	28	0	19	49	1:45 - 2:00	26	130	8	103	267
2:00 - 2:15	6	11	1	10	28	2:00 - 2:15	16	126	10	129	281
2:15 - 2:30	1	24	0	13	38	2:15 - 2:30	16	116	12	82	226
2:30 - 2:45	0	16	0	8	24	2:30 - 2:45	40	116	6	134	296
2:45 - 3:00	0	18	0	12	30	2:45 - 3:00	34	108	5	134	281
3:00 - 3:15	4	19	1	9	33	3:00 - 3:15	41	106	9	148	304
3:15 - 3:30	6	25	2	20	53	3:15 - 3:30	32	123	9	175	339
3:30 - 3:45	4	20	3	16	43	3:30 - 3:45	46	114	8	164	332
3:45 - 4:00	2	23	1	17	43	3:45 - 4:00	42	113	4	156	315
4:00 - 4:15	8	43	2	26	79	4:00 - 4:15	47	118	16	198	379
4:15 - 4:30	8	68	2	23	101	4:15 - 4:30	34	114	7	168	323
4:30 - 4:45	9	74	3	40	126	4:30 - 4:45	38	108	14	162	322
4:45 - 5:00	26	110	7	48	191	4:45 - 5:00	24	90	5	140	259
5:00 - 5:15	28	122	6	49	205	5:00 - 5:15	32	115	11	144	302
5:15 - 5:30	12	146	4	38	200	5:15 - 5:30	31	101	8	134	274
5:30 - 5:45	18	99	6	48	171	5:30 - 5:45	32	84	4	115	235
5:45 - 6:00	20	106	15	58	199	5:45 - 6:00	28	92	14	132	266
6:00 - 6:15	11	146	10	51	218	6:00 - 6:15	25	64	8	122	219
6:15 - 6:30	18	118	12	62	210	6:15 - 6:30	19	78	6	112	215
6:30 - 6:45	26	130	13	74	243	6:30 - 6:45	20	84	6	106	216
6:45 - 7:00	21	114	10	58	203	6:45 - 7:00	20	78	2	69	169
7:00 - 7:15	14	98	8	88	208	7:00 - 7:15	13	91	1	110	215
7:15 - 7:30	22	115	10	82	229	7:15 - 7:30	12	44	3	78	137
7:30 - 7:45	22	125	11	76	234	7:30 - 7:45	8	94	3	91	196
7:45 - 8:00	30	110	7	94	241	7:45 - 8:00	10	62	2	66	140
8:00 - 8:15	21	87	10	108	226	8:00 - 8:15	16	56	2	62	136
8:15 - 8:30	20	97	12	118	247	8:15 - 8:30	13	36	2	57	108
8:30 - 8:45	11	90	14	84	199	8:30 - 8:45	8	60	3	60	131
8:45 - 9:00	22	104	10	96	232	8:45 - 9:00	10	48	0	72	130
9:00 - 9:15	11	88	6	91	196	9:00 - 9:15	18	45	0	48	111
9:15 - 9:30	24	106	10	90	230	9:15 - 9:30	10	48	0	64	122
9:30 - 9:45	11	108	13	118	250	9:30 - 9:45	9	73	1	49	132
9:45 - 10:00	12	94	12	75	193	9:45 - 10:00	9	42	3	33	87
10:00 - 10:15	18	86	15	90	209	10:00 - 10:15	6	73	0	38	117
10:15 - 10:30	19	106	9	94	228	10:15 - 10:30	6	42	1	31	80
10:30 - 10:45	12	99	20	94	225	10:30 - 10:45	6	48	0	46	100
10:45 - 11:00	18	88	6	90	202	10:45 - 11:00	4	42	1	32	79
11:00 - 11:15	12	72	5	96	185	11:00 - 11:15	3	32	1	33	69
11:15 - 11:30	18	98	10	124	250	11:15 - 11:30	9	36	2	30	77
11:30 - 11:45	18	116	9	94	237	11:30 - 11:45	1	31	0	27	59
11:45 - 12:00	24	98	6	90	218	11:45 - 12:00	3	24	0	24	51
TOTALS							1,563	7,486	561	7,360	16,970

APPENDIX 9 ADDENDUM

Lebata Big Rock Creek Project - 2012 Update

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Stantec Consulting Services Inc.
19 Technology Drive Suite 200
Irvine CA 92618-2334
Tel: (949) 923-6000
Fax: (949) 923-6121

February 08, 2012
File: AFA 1134.003

Sespe Consulting, Inc.
468 Poli Street, Suite 2E
Ventura, CA 93001

Attention: **Lou Merzario**

Reference: **Lebata Big Rock Creek Project – 2012 Update**

Dear Lou:

New peak hour volumes were collected for the study intersections in the Lebata Inc. Big Rock Creek Surface Mining Project Traffic Impact Analysis (May 2010), prepared by Austin-Foust Associates, to determine if the original conclusions based on 2007/2008 traffic data are still valid. Attached is a comparison of the 2007/2008 and 2012 intersection capacity utilization (ICU) values for the Lebata Inc. Big Rock Creek project. Although the Traffic Impact Analysis establishes the level of service (LOS) at stop-controlled intersections on vehicle delay, the ICU value is used here to compare the old and new data at all of the study intersections to show the relative increase or decrease in traffic.

The original Traffic Impact Analysis found a cumulative impact at two intersections (82nd Street & Pearblossom Highway, 106th Street & Pearblossom Highway), but this table shows that the peak hour volumes at these two intersections have decreased since the original analysis was performed. In addition, at the two intersections where there is a small increase in existing traffic during the PM peak hour (165th Street & Avenue T, 165th Street & Pearblossom Hwy), the intersections operate at LOS "B" or better with the addition of background growth, the proposed project, and cumulative projects (as shown in Table 3-12 of the Traffic Impact Analysis), and the proposed project and cumulative projects have no significant impact.

Therefore, our recommendation is that the original Traffic Impact Analysis (May 2010) represents the more conservative analysis of project impacts in the study area, and the original conclusions remain valid.

Respectfully,

STANTEC CONSULTING SERVICES INC.

Cathy Lawrence, P.E.
Transportation Engineer
Tel: (949) 923-6064
Cathy.Lawrence@stantec.com

Attachment: Table 1
ICU Calculation Worksheets

cal c:\users\clawrence\documents\let_big_rock_creek_2012_update_020812.docx

ATTACHMENTS

Table 1
EXISTING CONDITIONS COMPARISON

		2007/2008 Volumes				2012 Volumes					
	Control	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		Change	
Intersection	Type	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	AM	PM
1. Fort Tejon & Pearblossom Hwy/Ave T	Signal	.56	A	.66	B	.52	A	.59	B	-.04	-.07
2. 82nd St & Pearblossom Hwy*	Signal	.52	A	.67	B	.50	A	.62	B	-.02	-.05
3. 106th St E & Ave T	Stop	.32	A	.37	A	.30	A	.33	A	-.02	-.04
4. 106th St E & Pearblossom Hwy*	Stop	.51	A	.53	A	.50	A	.49	A	-.01	-.04
5. 116th St & Ave T	Stop	.33	A	.32	A	.30	A	.30	A	-.03	-.02
6. 165th St & Ave T	Stop	.41	A	.36	A	.31	A	.37	A	-.10	+.01
7. 165th St & Pearblossom Hwy	Signal	.46	A	.54	A	.46	A	.58	A	.00	+.04

* Indicates cumulative impact in Traffic Analysis

Level of services ranges:

Signalized		Stop-Controlled	
.00 – .60	A	0.0 – 10.0 sec/veh	A
.61 – .70	B	10.1 – 15.0 sec/veh	B
.71 – .80	C	15.1 – 25.0 sec/veh	C
.81 – .90	D	25.1 – 35.0 sec/veh	D
.91 – 1.00	E	35.1 – 50.0 sec/veh	E
Above 1.00	F	Above 50.0 sec/veh	F

Note: Signalized intersection LOS based on ICU, stop-controlled intersection LOS based on delay (sec/veh) in Traffic Impact Analysis – ICU used for this comparison.

1. Fort Tejon & Pearblossom Hwy/Ave T

2007/2008 Volumes

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1600	198	.12*	253	.16*
NBT	2	3200	242	.08	265	.08
NBR	0	0	3		6	
SBL	1	1600	85	.05	196	.12
SBT	2	3200	220	.08*	335	.11*
SBR	0	0	44		27	
EBL	1	1600	22	.05*	79	.05
EBT	1	1600	127	.08	387	.24*
EBR	1	1600	162	.10	339	.21
WBL	1	1600	4	.05	11	.05*
WBT	1	1600	333	.21*	155	.10
WBR	1	1600	74	.05	101	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.56**		**.66**

2012 Volumes

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	1	1600	216	.14*	237	.15*
NBT	2	3200	238	.08	256	.08
NBR	0	0	3		2	
SBL	1	1600	76	.05	154	.10
SBT	2	3200	190	.06*	363	.12*
SBR	0	0	15		8	
EBL	1	1600	23	.05*	43	.05
EBT	1	1600	124	.08	274	.17*
EBR	1	1600	169	.11	256	.16
WBL	1	1600	1	.05	4	.05*
WBT	1	1600	276	.17*	132	.08
WBR	1	1600	80	.05	100	.06
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.59**

2. 82nd St & Pearblossom Hwy

2007/2008 Volumes

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	56		48	{.05}*
NBT	1	1600	17	.06*	13	.05
NBR	0	0	29		12	
SBL	0	0	24	{.05}*	18	
SBT	1	1600	52	.05	21	.05*
SBR	1	1600	15	.05	17	.05
EBL	1	1600	14	.05*	20	.05
EBT	1	1600	359	.25	635	.42*
EBR	0	0	37		37	
WBL	1	1600	39	.05	18	.05*
WBT	1	1600	411	.26*	435	.27
WBR	1	1600	6	.05	8	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.52**		**.67**

2012 Volumes

			AM PK HOUR		PM PK HOUR	
	LANES	CAPACITY	VOL	V/C	VOL	V/C
NBL	0	0	30	{.05}*	39	{.05}*
NBT	1	1600	25	.05	6	.05
NBR	0	0	26		7	
SBL	0	0	16		12	
SBT	1	1600	44	.05*	8	.05*
SBR	1	1600	14	.05	31	.05
EBL	1	1600	15	.05*	33	.05
EBT	1	1600	292	.21	560	.37*
EBR	0	0	48		33	
WBL	1	1600	31	.05	12	.05*
WBT	1	1600	407	.25*	418	.26
WBR	1	1600	6	.05	10	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.50**		**.62**

3. 106th St & Ave T

2007/2008 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	70	.05*	49	.05*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	76	.05*	61	.05*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	101	.06*	179	.11*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	98	.06*	88	.06*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION .32 .37

2012 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	37	.05*	43	.05*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	71	.05*	61	.05*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	67	.05*	122	.08*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	71	.05*	54	.05*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION .30 .33

4. 106th St & Pearblossom Hwy

2007/2008 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	5	{.05}*	3	{.05}*
NBT	1	1600	5	.05	7	.05
NBR	0	0	0		0	
SBL	0	0	30		32	
SBT	1	1600	6	.05*	5	.05*
SBR	0	0	8		7	
EBL	1	1600	8	.05*	16	.05*
EBT	2	3200	383	.12	586	.19
EBR	0	0	2		7	
WBL	1	1600	2	.05	1	.05
WBT	1	1600	423	.26*	453	.28*
WBR	1	1600	32	.05	17	.05
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .51 .53

2012 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	1	{.05}*	8	{.05}*
NBT	1	1600	5	.05	6	.05
NBR	0	0	2		1	
SBL	0	0	27		19	
SBT	1	1600	1	.05*	11	.05*
SBR	0	0	10		4	
EBL	1	1600	12	.05*	12	.05*
EBT	2	3200	308	.10	531	.17
EBR	0	0	1		7	
WBL	1	1600	0	.00	1	.05
WBT	1	1600	399	.25*	385	.24*
WBR	1	1600	13	.05	19	.05
Clearance Interval				.10*		.10*

TOTAL CAPACITY UTILIZATION .50 .49

5. 116th St & Ave T

2007/2008 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	15	.05*	20	.05*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	6	.05*	7	.05*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	88	.06*	100	.06*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	115	.07*	88	.06*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION **.33** **.32**

2012 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	9	.05*	18	.05*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	5	.05*	3	.05*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	58	.05*	86	.05*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	58	.05*	41	.05*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION **.30** **.30**

6. 165th St & Ave T

2007/2008 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	169	.11*	112	.07*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	142	.09*	138	.09*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	101	.06*	67	.05*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	5	.05*	8	.05*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION **.41** **.36**

2012 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1600	81	.05*	111	.07*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1600	101	.06*	164	.10*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	1	1600	33	.05*	70	.05*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1600	13	.05*	18	.05*
WBR	0	0	0		0	
Clearance Interval				.10*		.10*

Note: Assumes N/S Split Phasing
Note: Assumes E/W Split Phasing

TOTAL CAPACITY UTILIZATION **.31** **.37**

7. 165th St & Pearblossom Hwy

2007/2008 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	14	{.05}*	23	{.05}*
NBT	1	1600	4	.05	5	.05
NBR	0	0	18		15	
SBL	0	0	48		54	
SBT	1	1600	4	.05*	5	.05*
SBR	d	1600	36	.05	84	.05
EBL	1	1600	52	.05*	155	.10
EBT	1	1600	266	.17	467	.29*
EBR	1	1600	21	.05	46	.05
WBL	1	1600	35	.05	21	.05*
WBT	1	1600	328	.21*	337	.21
WBR	d	1600	85	.05	72	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.46**		**.54**

2012 Volumes

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	18	{.05}*	36	{.05}*
NBT	1	1600	8	.05	4	.05
NBR	0	0	2		2	
SBL	0	0	59		130	
SBT	1	1600	6	.05*	8	.09*
SBR	d	1600	17	.05	13	.05
EBL	1	1600	7	.05*	8	.05
EBT	1	1600	202	.13	457	.29*
EBR	1	1600	12	.05	24	.05
WBL	1	1600	4	.05	3	.05*
WBT	1	1600	331	.21*	285	.18
WBR	d	1600	79	.05	78	.05
Clearance Interval				.10*		.10*
TOTAL CAPACITY UTILIZATION				**.46**		**.58**

APPENDIX 9 SECOND ADDENDUM

Deletion of Longview Road from Los Angeles County Master Plan of Highways Traffic Study

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Deletion of Longview Road from Los Angeles County Master Plan of Highways Traffic Study

August 2012

Prepared For:
Sespe Consulting, Inc.

2073006790

Deletion of Longview Road from Los Angeles County Master Plan of Highways

Traffic Study

Located in the County of Los Angeles

August 14, 2012

Prepared for:

Sespe Consulting, Inc.

468 Poli Street, Suite 2E

Ventura, CA 93001

Submitted by:

Stantec Consulting Services Inc.

19 Technology Drive, Suite 200

Irvine, CA 92618

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1.0 Introduction

The Master Plan of Highways was developed by the Department of Public Works and designates roadways in Los Angeles County by their planned capacity. Categories include Major Highway, Secondary Highway, Limited Secondary Highway, Parkway, and Expressway. Longview Road from Palmdale Boulevard to Pearblossom Highway is classified as a Secondary Highway on the Master Plan of Highways; however, the segment of Longview Road between Avenue T and Pearblossom Highway has not been built. This report summarizes the results of an analysis of the potential deletion of Longview Road from the Master Plan of Highways.

2.0 Project Description

Longview Road is a north-south roadway located approximately nine miles east of the City of Palmdale in unincorporated Los Angeles County. Currently, the 2 ½-mile segment of Longview Road south of Palmdale Boulevard is paved as a two-lane roadway and terminates at Avenue T. Another two-mile segment of Longview Road (County Highway N6) is paved as a two-lane road south of Pearblossom Highway which terminates at Fort Tejon Road. The two existing segments of Longview Road are off-set by approximately 2,000 feet, which would require the connecting segment of Longview Road between Avenue T and Pearblossom Highway to be built with a reverse curve. Figure 1 illustrates the location of Longview Road and the surrounding roadways.

Longview Road is classified as a Secondary Highway on the County's Master Plan of Highways. This classification specifies that the roadway be built to four lanes with a capacity of 36,000 average daily traffic (ADT).

3.0 Surrounding Highway Network

The segment of Longview Road under consideration is located in north Los Angeles County east of the City of Palmdale. The study area is largely undeveloped and generally laid out in a north-south/east-west grid system, with numerous dirt roads throughout the area. Roads that are paved include Pearblossom Highway, Palmdale Boulevard, Avenue T, 116th Street, and 165th Street. A handful of other paved roads exist south of Pearblossom Highway between 116th Street and Longview Road that provide local access to residential tracts.

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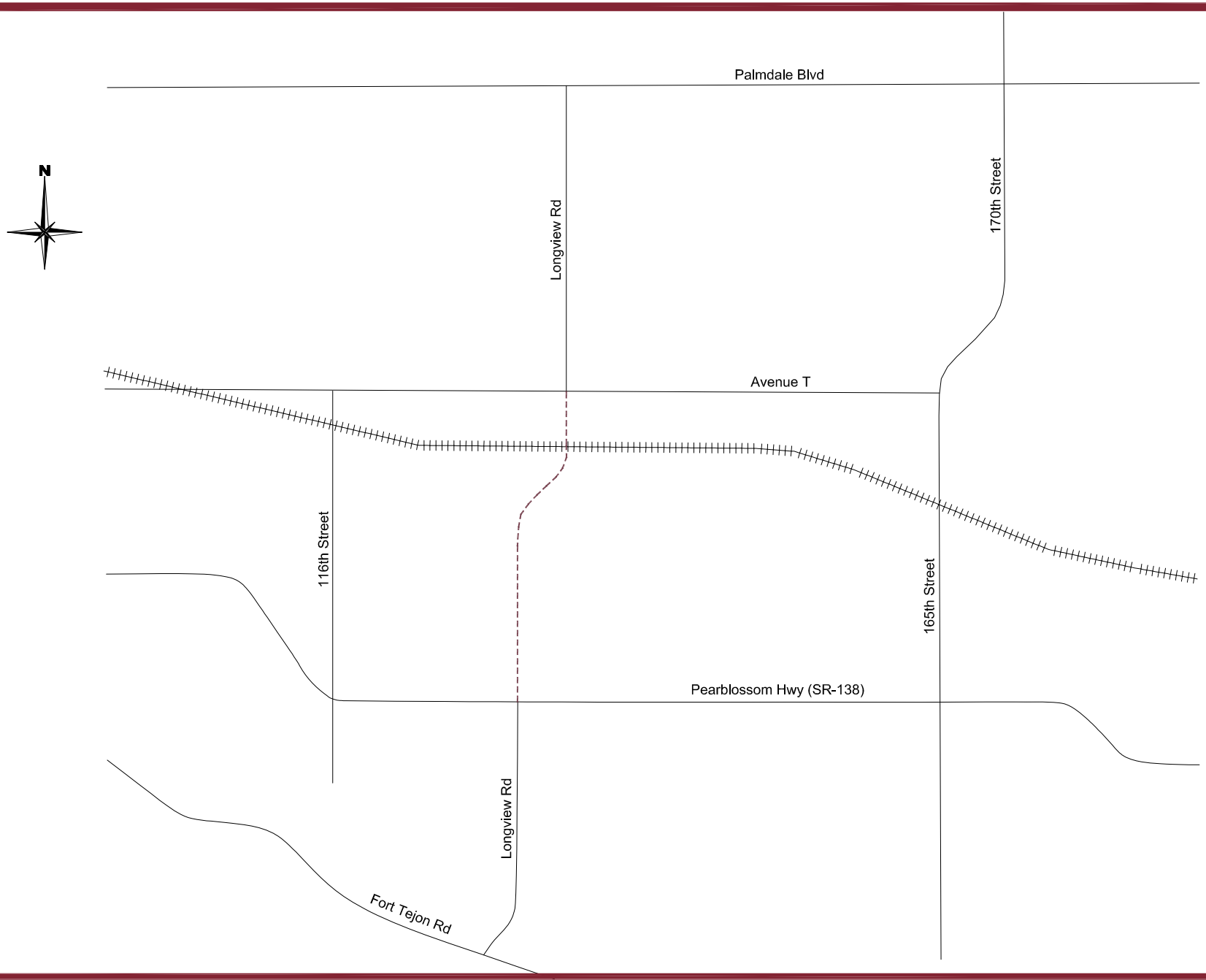

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Study Area

Figure 1

Pearblossom Highway (State Route 138) runs east-west through the study area providing a connection from Antelope Valley Freeway (SR-14) in Palmdale to Antelope Highway and I-15 east of the study area. Pearblossom Highway varies from two to four lanes, with the section west of 116th Street four lanes, the section between 116th Street and Longview Road two lanes, and the section between Longview Road and 165th Street four lanes wide. Pearblossom Highway narrows to two lanes east of 165th Street. Pearblossom Highway has a speed limit of 55 mph in the study area, and traffic signals are located at Longview Road and 165th Street.

East Palmdale Boulevard is an undivided two-lane roadway that runs east-west through the study area. Traffic along Palmdale Boulevard is controlled by a stop sign on the side streets at intersections between 110th Street and 170th Street. A signal controls traffic at the 110th Street intersection, and an all-way stop sign controls traffic at the 170th Street intersection. The speed limit on Palmdale Boulevard is 55 mph.

Avenue T is an undivided two-lane east-west roadway with a speed limit of 55 mph. Tee-intersections at 116th Street and Longview Road are controlled by a stop sign on the side street. The intersection of Avenue T and 165th Street is controlled by a stop sign on Avenue T.

116th Street is located approximately two miles west of Longview Road. 116th Street is paved as a two-lane undivided road between Avenue T and Pearblossom Highway, and is a dirt road north of Avenue T and south of Pearblossom Highway. The speed limit on 116th Street is not posted.

165th Street is located approximately three miles east of Longview Road. 165th Street is a north-south two-lane undivided road. North of Avenue T, 165th Street veers to the east to join with 170th Street which continues north of the study area. The speed limit on 165th Street is 55 mph.

4.0 Traffic Impact Analysis

Existing 24-hour ADT counts were collected in the study area in July 2012. Figure 2 illustrates the existing ADT volumes in the study area (actual data sheets are included in the Appendix). Longview Road currently carries approximately 450 ADT north of Avenue T and 1,620 ADT south of Pearblossom Highway. The streets parallel to Longview Road, 116th Street and 165th Street, currently carry 390 ADT and 3,140 ADT, respectively. Avenue T carries 1,790 ADT west of Longview Road and 1,550 ADT east of Longview Road. Pearblossom Highway currently carries 14,000 ADT west of Longview Road and 12,700 ADT east of Longview Road. Table 1 summarizes the existing conditions in the study area. The roads in the study area are currently operating at level of service (LOS) A, with the exception of the two-lane section of Pearblossom Highway west of Longview Road, which is currently operating at LOS C.

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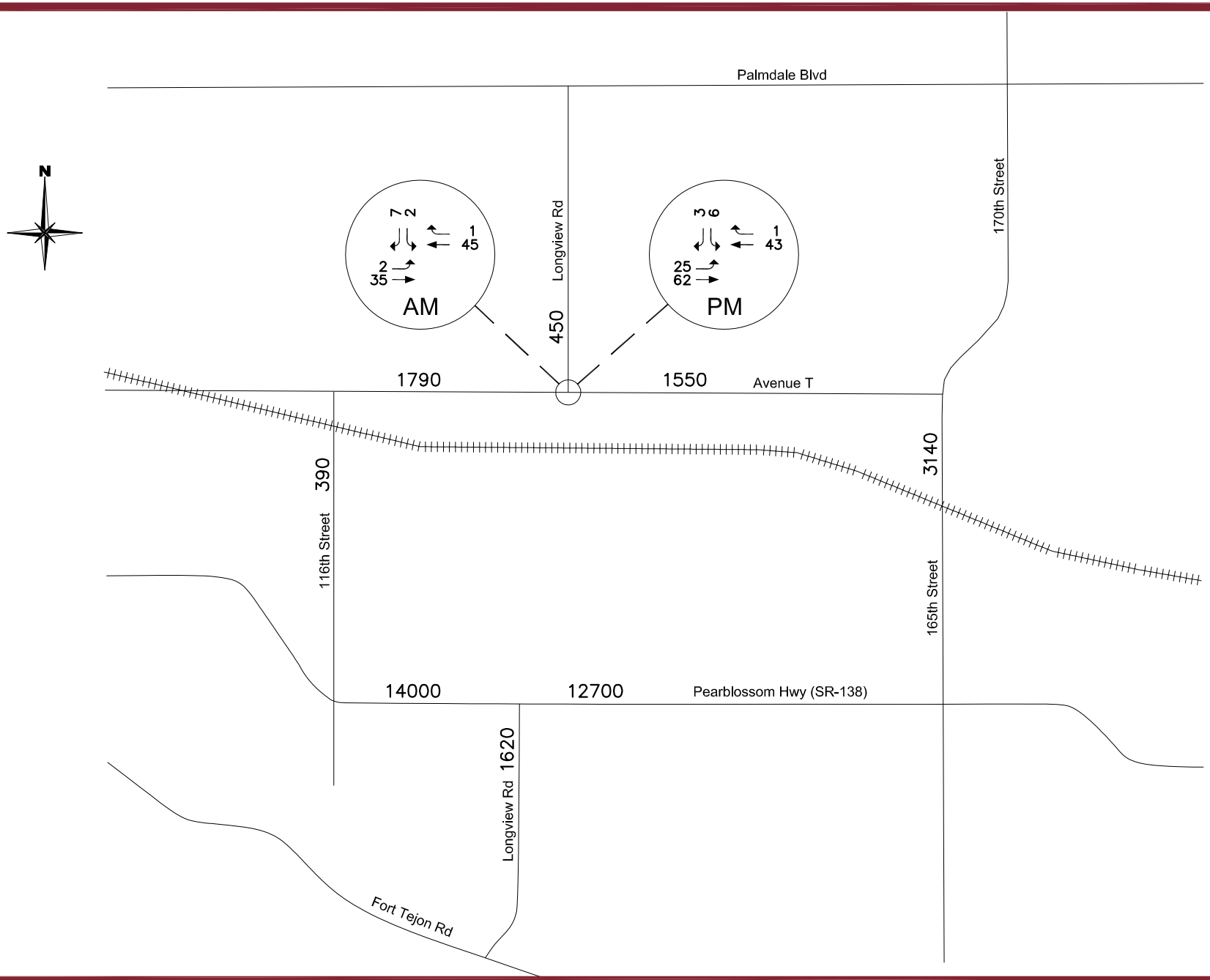

Existing Volumes

Figure 2

Table 1 Existing ADT Volume and Level of Service Summary

Roadway	Lanes	Capacity	2012 ADT
Longview n/o Avenue T	2U	15,000	450/A
Longview s/o Pearblossom Hwy	2U	15,000	1,620/A
116th St s/o Avenue T	2U	15,000	390/A
165th St s/o Avenue T	2U	15,000	3,140/A
Avenue T w/o Longview	2U	15,000	1,790/A
Avenue T e/o Longview	2U	15,000	1,550/A
Pearblossom Hwy w/o Longview	2D	18,000	14,000/C
Pearblossom Hwy e/o Longview	4D	36,000	12,700/A
Capacity: 2U – 2-lane undivided 15,000 ADT 2D – 2-lane divided 18,000 ADT 4D – 4-lane divided 36,000 ADT			

Future volume forecasts were determined from traffic volume growth factors provided in the Los Angeles County Congestion Management Program (CMP). The study area is at the boundary between two Regional Statistical Areas (RSA) identified in the CMP. The traffic growth factors from year 2010 to year 2035 vary from 1.553 to 2.172 for the two RSA. To analyze the worst case, the higher 2.172 growth factor was applied to existing volumes to obtain year 2035 volumes. Figure 3 illustrates the year 2035 volumes on the existing roadway system. As this figure shows, the volume on 116th Street would increase to 900 ADT and the volume on 165th Street would increase to 6,800 ADT. The future volumes in the study area would be well within the LOS C capacity of the existing roadways, with the exception of the two-lane section of Pearblossom Highway west of Longview Road which would operate at LOS F.

Traffic was redistributed to the circulation system to analyze the impact of the extension of Longview Road south of Avenue T. Figure 4 illustrates the year 2035 volumes with the extension of Longview Road, and Table 1 summarizes the LOS without and with the extension. As this table shows, the ADT on the new section of Longview Road would be approximately 1,400 ADT and would operate at LOS A under 2035 conditions. Traffic on the other roadways in the study area would decrease as a result of the extension of Longview Road; however, the decrease in volume would not result in a significant improvement in the LOS at any of the locations. Pearblossom Highway west of Longview Road would continue to operate at LOS F with the extension of Longview Road, and Pearblossom Highway east of Longview Road would operate at LOS C. All other roadways in the study area would operate at LOS A with or without the extension of Longview Road.

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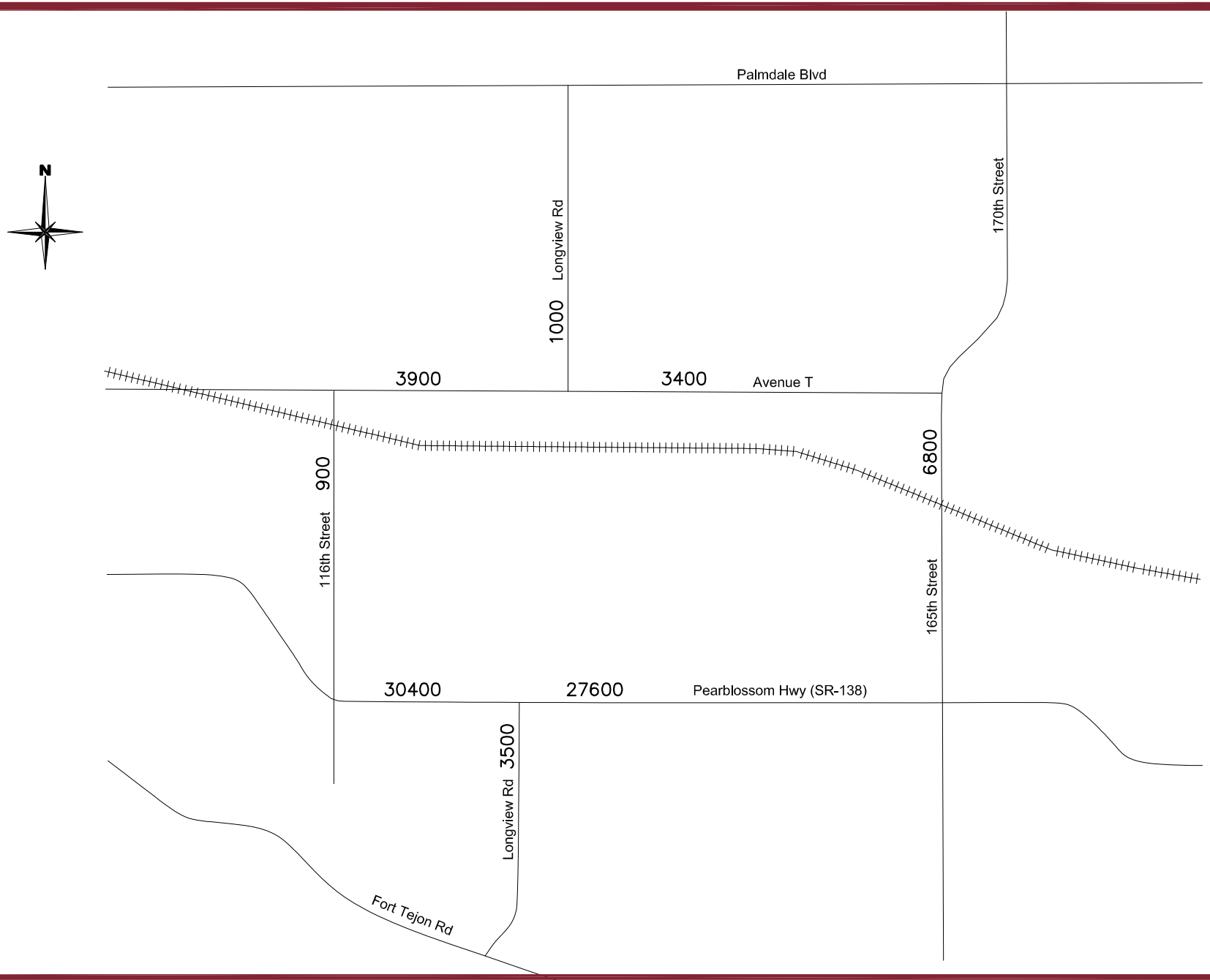

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2035 Volumes
Existing Circulation System

Figure 3

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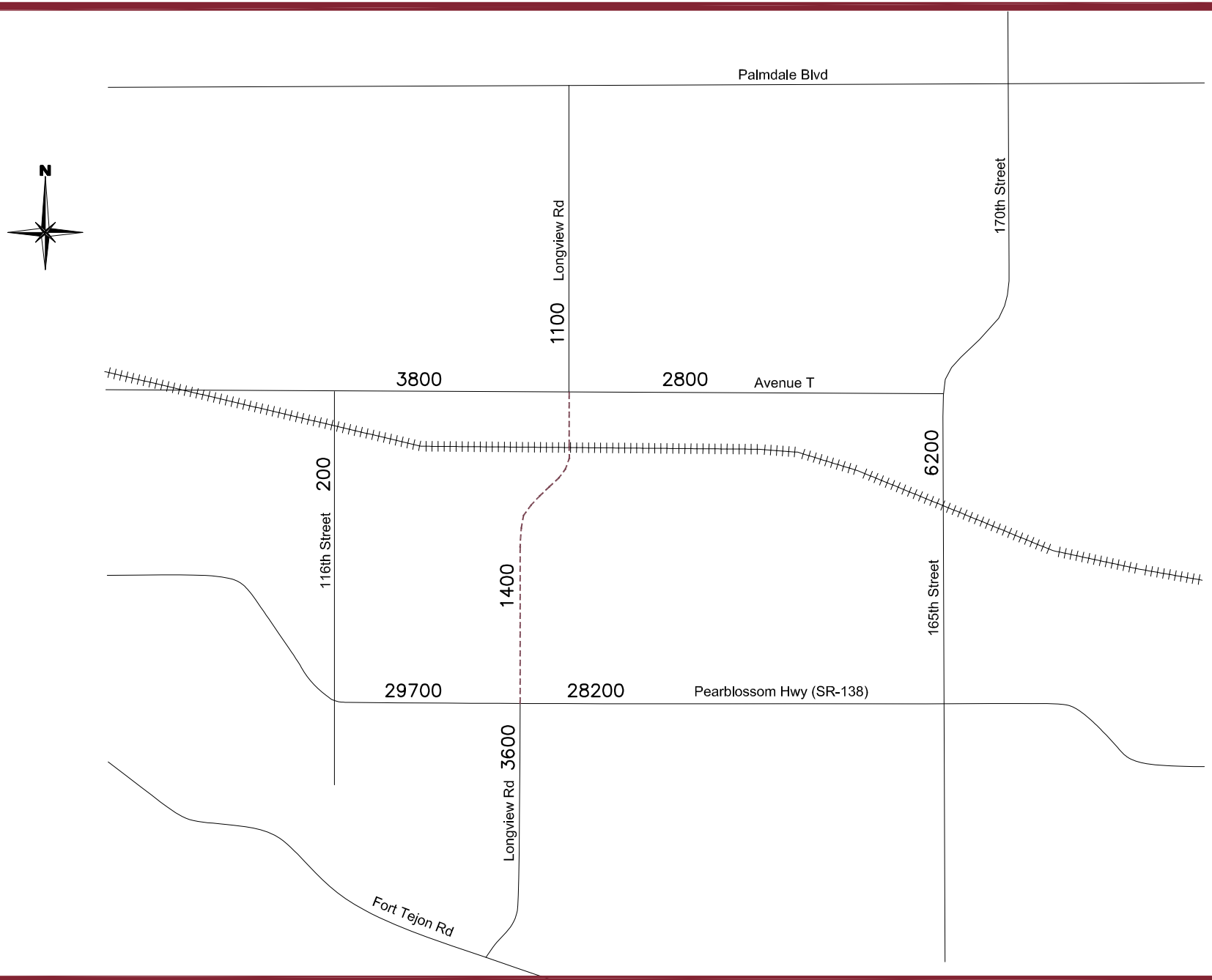

2035 Volumes
With Longview Road Extension

Figure 4

Table 2 Future ADT Volume and Level of Service Summary

Roadway	Lanes	Capacity	2035 ADT Existing Circulation System	2035 ADT With Longview Rd Extension
Longview n/o Avenue T	2U	15,000	1,000/A	1,100/A
Longview s/o Pearblossom Hwy	2U	15,000	3,500/A	3,600/A
116th St s/o Avenue T	2U	15,000	900/A	200/A
165th St s/o Avenue T	2U	15,000	6,800/A	6,200/A
Avenue T w/o Longview	2U	15,000	3,900/A	3,800/A
Avenue T e/o Longview	2U	15,000	3,400/A	2,800/A
Pearblossom Hwy w/o Longview	2D	18,000	30,400/F	29,700/F
Pearblossom Hwy e/o Longview	4D	36,000	27,600/C	28,200/C
Longview s/o Avenue T	4D	36,000	—	1,400/A
Capacity: 2U – 2-lane undivided 15,000 ADT 2D – 2-lane divided 18,000 ADT 4D – 4-lane divided 36,000 ADT				

With only a modest volume of traffic expected (1,400 ADT), the extension of Longview Road and its inclusion on the Master Plan of Highways is deemed not necessary. In fact, roadways with such low daily volumes are not normally included on typical county arterial plans. There is sufficient capacity on the existing parallel north-south roadways to accommodate the forecasted volumes at LOS A without the extension of Longview Road south of Avenue T.

5.0 Summary and Conclusions

The projected 2035 future traffic volumes in the study area can easily be accommodated by the existing roadway system without the extension of Longview Road, and Longview Road should be deleted from the Master Plan of Highways. The cost of constructing the extension, which would include a substantial curvature in alignment, would not be offset by any significant improvement in the resulting level of service. The levels of service on existing roadways will not be significantly impacted by the deletion of Longview Road from the Master Plan of Highways.

APPENDIX
Count Data

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : LONGVIEW RD N/O
: AVE T
CITY : PALMDALE

Site: 071201.001
Date: 07/10/12

Interval	NB				SB				Combined				Day: Tuesday
Begin	AM		PM		AM		PM		AM		PM		
12:00	0	4	2	8	0	1	4	6	0	5	6	14	
12:15	1		2		0		1		1		3		
12:30	0		3		0		1		0		4		
12:45	3		1		1		0		4		1		
01:00	0	2	0	6	0	2	1	10	0	4	1	16	
01:15	2		3		1		2		3		5		
01:30	0		2		0		1		0		3		
01:45	0		1		1		6		1		7		
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04:00	2	4	9	21	3	20	7	14	5	24	16	35	
04:15	1		3		4		1		5		4		
04:30	0		6		7		4		7		10		
04:45	1		3		6		2		7		5		
05:00	1	4	6	16	6	18	2	7	7	22	8	23	
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11:15	4		2		4		0		8		2		
11:30	3		2		1		0		4		2		
11:45	2		1		2		0		4		1		
Totals	63		141		104		103		167		244		
Split%	37.7		57.8		62.3		42.2						
Day Totals		204				207				411			
Day Splits		49.6				50.4							
Peak Hour	08:45		06:15		04:15		03:00		04:15		03:45		
Volume	11		28		23		28		26		49		
Factor	0.69		0.88		0.82		0.47		0.93		0.64		

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : LONGVIEW RD N/O
: AVE T
CITY : PALMDALE

Site: 071201.001
Date: 07/11/12

Day: Wednesday

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Split%	30.8		57.7		69.2		42.3					
Day Totals		190				218				408		
Day Splits		46.6				53.4						
Peak Hour	08:45		04:15		04:45		03:00		07:00		03:45	
Volume	15		26		21		24		31		41	
Factor	0.75		0.59		0.75		0.46		0.77		0.60	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : LONGVIEW RD N/O
: AVE T
CITY : PALMDALE

Site: 071201.001
Date: 07/12/12

Day: Thursday

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Split%	30.6		60.9		69.4		39.1					
Day Totals		224				222				446		
Day Splits		50.2				49.8						
Peak Hour	06:30		04:45		04:30		03:15		04:30		03:45	
Volume	8		31		22		28		27		46	
Factor	0.67		0.77		0.79		0.50		0.75		0.77	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : AVE T W/O
: LONGVIEW RD
CITY : PALMDALE

Site: 071201.002
Date: 07/10/12

Day: Tuesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
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12:45	5		13		4		10		9		23	
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03:15	6		15		4		8		10		23	
03:30	5		14		3		8		8		22	
03:45	1		20		4		15		5		35	
04:00	3	20	22	84	6	47	10	40	9	67	32	124
04:15	1		18		12		13		13		31	
04:30	6		22		17		8		23		30	
04:45	10		22		12		9		22		31	
05:00	8	22	33	88	16	60	6	26	24	82	39	114
05:15	4		22		13		9		17		31	
05:30	6		20		16		6		22		26	
05:45	4		13		15		5		19		18	
06:00	8	33	23	80	14	69	10	32	22	102	33	112
06:15	9		22		14		9		23		31	
06:30	6		15		16		5		22		20	
06:45	10		20		25		8		35		28	
07:00	6	20	25	61	14	50	5	23	20	70	30	84
07:15	2		12		10		8		12		20	
07:30	8		16		10		7		18		23	
07:45	4		8		16		3		20		11	
08:00	8	33	14	53	18	70	9	29	26	103	23	82
08:15	6		14		10		10		16		24	
08:30	10		16		26		4		36		20	
08:45	9		9		16		6		25		15	
09:00	8	35	7	33	16	57	5	19	24	92	12	52
09:15	8		14		14		6		22		20	
09:30	8		9		9		2		17		11	
09:45	11		3		18		6		29		9	
10:00	8	29	4	14	24	61	3	12	32	90	7	26
10:15	10		5		13		1		23		6	
10:30	8		4		12		4		20		8	
10:45	3		1		12		4		15		5	
11:00	14	47	3	20	6	63	0	9	20	110	3	29
11:15	12		7		17		2		29		9	
11:30	14		3		20		5		34		8	
11:45	7		7		20		2		27		9	
Totals	278		658		507		350		785		1,008	
Split%	35.4		65.3		64.6		34.7					
Day Totals		936				857				1,793		
Day Splits		52.2				47.8						
Peak Hour	11:00		04:30		08:30		01:30		11:00		04:15	
Volume	47		99		72		49		110		131	
Factor	0.84		0.75		0.69		0.68		0.81		0.84	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : AVE T W/O
: LONGVIEW RD
CITY : PALMDALE

Site: 071201.002
Date: 07/11/12

Day: Wednesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	0	8	16	43	7	11	6	46	7	19	22	89
12:15	1		6		0		14		1		20	
12:30	3		9		0		14		3		23	
12:45	4		12		4		12		8		24	
01:00	2	8	4	45	2	3	9	28	4	11	13	73
01:15	1		14		0		5		1		19	
01:30	3		12		1		8		4		20	
01:45	2		15		0		6		2		21	
02:00	1	8	14	46	1	5	12	33	2	13	26	79
02:15	1		12		0		13		1		25	
02:30	2		10		0		4		2		14	
02:45	4		10		4		4		8		14	
03:00	0	4	22	72	1	14	10	44	1	18	32	116
03:15	0		17		3		10		3		27	
03:30	0		20		6		12		6		32	
03:45	4		13		4		12		8		25	
04:00	1	25	14	76	6	45	9	50	7	70	23	126
04:15	3		18		10		16		13		34	
04:30	5		18		13		10		18		28	
04:45	16		26		16		15		32		41	
05:00	6	30	26	96	10	66	9	38	16	96	35	134
05:15	12		16		10		10		22		26	
05:30	4		26		20		14		24		40	
05:45	8		28		26		5		34		33	
06:00	5	31	22	84	12	63	9	33	17	94	31	117
06:15	4		16		17		10		21		26	
06:30	13		27		14		4		27		31	
06:45	9		19		20		10		29		29	
07:00	8	36	16	48	18	61	4	27	26	97	20	75
07:15	8		12		12		10		20		22	
07:30	6		8		12		8		18		16	
07:45	14		12		19		5		33		17	
08:00	8	48	10	37	14	43	9	23	22	91	19	60
08:15	10		5		12		4		22		9	
08:30	14		12		12		5		26		17	
08:45	16		10		5		5		21		15	
09:00	13	42	8	37	14	48	4	18	27	90	12	55
09:15	12		17		12		4		24		21	
09:30	10		6		14		3		24		9	
09:45	7		6		8		7		15		13	
10:00	8	24	5	15	9	51	1	7	17	75	6	22
10:15	0		3		11		0		11		3	
10:30	10		1		18		4		28		5	
10:45	6		6		13		2		19		8	
11:00	10	46	9	25	8	31	5	13	18	77	14	38
11:15	10		5		10		2		20		7	
11:30	12		3		3		2		15		5	
11:45	14		8		10		4		24		12	
Totals	310		624		441		360		751		984	
Split%	41.3		63.4		58.7		36.6					
Day Totals		934				801				1,735		
Day Splits		53.8				46.2						
Peak Hour	08:30		05:00		05:30		04:00		06:15		04:45	
Volume	55		96		75		50		103		142	
Factor	0.86		0.86		0.72		0.78		0.89		0.87	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : AVE T W/O
: LONGVIEW RD
CITY : PALMDALE

Site: 071201.002
Date: 07/12/12
Day: Thursday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	5	14	14	36	7	15	12	41	12	29	26	77
12:15	3		7		3		3		6		10	
12:30	3		12		2		14		5		26	
12:45	3		3		3		12		6		15	
01:00	3	8	6	38	3	6	12	48	6	14	18	86
01:15	1		9		2		12		3		21	
01:30	0		7		0		8		0		15	
01:45	4		16		1		16		5		32	
02:00	2	4	6	60	0	1	10	36	2	5	16	96
02:15	1		22		1		6		2		28	
02:30	1		15		0		10		1		25	
02:45	0		17		0		10		0		27	
03:00	1	4	18	77	2	9	10	60	3	13	28	137
03:15	1		27		1		19		2		46	
03:30	0		15		2		16		2		31	
03:45	2		17		4		15		6		32	
04:00	2	25	20	87	8	48	7	42	10	73	27	129
04:15	3		24		13		11		16		35	
04:30	12		18		17		12		29		30	
04:45	8		25		10		12		18		37	
05:00	7	29	18	101	10	58	7	32	17	87	25	133
05:15	6		24		14		8		20		32	
05:30	6		26		18		10		24		36	
05:45	10		33		16		7		26		40	
06:00	8	33	21	85	16	67	5	27	24	100	26	112
06:15	8		24		10		10		18		34	
06:30	11		18		18		6		29		24	
06:45	6		22		23		6		29		28	
07:00	10	35	10	51	16	54	7	27	26	89	17	78
07:15	8		18		16		8		24		26	
07:30	13		12		12		6		25		18	
07:45	4		11		10		6		14		17	
08:00	6	31	11	46	17	64	7	25	23	95	18	71
08:15	10		12		11		4		21		16	
08:30	4		14		15		12		19		26	
08:45	11		9		21		2		32		11	
09:00	6	36	12	34	12	63	6	15	18	99	18	49
09:15	8		8		14		4		22		12	
09:30	8		9		25		4		33		13	
09:45	14		5		12		1		26		6	
10:00	3	19	4	23	12	35	5	16	15	54	9	39
10:15	9		7		6		6		15		13	
10:30	6		5		10		4		16		9	
10:45	1		7		7		1		8		8	
11:00	17	52	5	24	8	34	0	15	25	86	5	39
11:15	13		6		8		8		21		14	
11:30	16		8		12		2		28		10	
11:45	6		5		6		5		12		10	
Totals	290		662		454		384		744		1,046	
Split%	39.0		63.3		61.0		36.7					
Day Totals		952				838				1,790		
Day Splits		53.2				46.8						
Peak Hour	11:00		05:15		06:30		03:00		06:30		03:00	
Volume	52		104		73		60		108		137	
Factor	0.76		0.79		0.79		0.79		0.93		0.74	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : AVE T E/O
: LONGVIEW RD
CITY : PALMDALE

Site: 071201.003
Date: 07/10/12

Day: Tuesday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	1	8	6	31	0	6	9	42	1	14	15	73
12:15	3		7		4		12		7		19	
12:30	1		6		0		11		1		17	
12:45	3		12		2		10		5		22	
01:00	3	5	14	35	0	7	10	44	3	12	24	79
01:15	1		6		2		16		3		22	
01:30	1		10		4		12		5		22	
01:45	0		5		1		6		1		11	
02:00	0	5	12	40	1	5	10	51	1	10	22	91
02:15	2		12		0		12		2		24	
02:30	2		7		2		10		4		17	
02:45	1		9		2		19		3		28	
03:00	1	10	10	40	0	8	20	77	1	18	30	117
03:15	4		6		4		15		8		21	
03:30	3		8		3		12		6		20	
03:45	2		16		1		30		3		46	
04:00	6	38	10	40	0	13	20	75	6	51	30	115
04:15	10		13		0		16		10		29	
04:30	14		8		6		19		20		27	
04:45	8		9		7		20		15		29	
05:00	11	45	5	22	9	21	28	73	20	66	33	95
05:15	10		9		4		20		14		29	
05:30	13		5		5		17		18		22	
05:45	11		3		3		8		14		11	
06:00	12	60	8	27	8	31	16	56	20	91	24	83
06:15	12		11		8		16		20		27	
06:30	14		2		6		12		20		14	
06:45	22		6		9		12		31		18	
07:00	16	41	5	17	5	19	19	47	21	60	24	64
07:15	10		4		2		9		12		13	
07:30	7		6		8		14		15		20	
07:45	8		2		4		5		12		7	
08:00	16	62	9	30	7	29	10	42	23	91	19	72
08:15	10		12		4		12		14		24	
08:30	22		4		12		14		34		18	
08:45	14		5		6		6		20		11	
09:00	14	55	4	17	6	30	4	28	20	85	8	45
09:15	14		6		9		14		23		20	
09:30	9		2		5		7		14		9	
09:45	18		5		10		3		28		8	
10:00	22	51	3	13	7	28	3	11	29	79	6	24
10:15	11		1		10		4		21		5	
10:30	10		4		8		3		18		7	
10:45	8		5		3		1		11		6	
11:00	4	55	0	9	12	37	3	15	16	92	3	24
11:15	14		2		10		4		24		6	
11:30	21		5		9		2		30		7	
11:45	16		2		6		6		22		8	
Totals	435		321		234		561		669		882	
Split%	65.0		36.4		35.0		63.6					
Day Totals		756				795				1,551		
Day Splits		48.7				51.3						
Peak Hour	06:15		03:30		11:00		04:30		08:30		03:45	
Volume	64		47		37		87		97		132	
Factor	0.73		0.73		0.77		0.78		0.71		0.72	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : AVE T E/O
: LONGVIEW RD
CITY : PALMDALE

Site: 071201.003
Date: 07/11/12
Day: Wednesday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	5	13	6	44	1	3	14	37	6	16	20	81
12:15	0		12		1		3		1		15	
12:30	0		14		1		10		1		24	
12:45	8		12		0		10		8		22	
01:00	2	3	7	27	2	6	5	38	4	9	12	65
01:15	0		6		0		12		0		18	
01:30	1		8		2		8		3		16	
01:45	0		6		2		13		2		19	
02:00	1	7	10	26	1	4	16	45	2	11	26	71
02:15	0		11		1		12		1		23	
02:30	1		2		1		8		2		10	
02:45	5		3		1		9		6		12	
03:00	1	10	7	40	0	2	16	70	1	12	23	110
03:15	1		13		0		15		1		28	
03:30	5		9		0		16		5		25	
03:45	3		11		2		23		5		34	
04:00	5	38	9	48	1	24	15	66	6	62	24	114
04:15	10		15		4		14		14		29	
04:30	11		10		6		15		17		25	
04:45	12		14		13		22		25		36	
05:00	5	53	9	36	8	30	16	79	13	83	25	115
05:15	10		10		11		13		21		23	
05:30	16		11		3		24		19		35	
05:45	22		6		8		26		30		32	
06:00	12	54	8	25	4	29	15	60	16	83	23	85
06:15	14		8		3		13		17		21	
06:30	12		3		13		20		25		23	
06:45	16		6		9		12		25		18	
07:00	16	48	5	25	6	34	9	37	22	82	14	62
07:15	11		8		6		11		17		19	
07:30	9		8		6		5		15		13	
07:45	12		4		16		12		28		16	
08:00	13	43	6	20	8	43	7	30	21	86	13	50
08:15	12		4		10		5		22		9	
08:30	14		5		14		9		28		14	
08:45	4		5		11		9		15		14	
09:00	14	43	1	11	12	40	5	28	26	83	6	39
09:15	10		4		12		12		22		16	
09:30	15		2		10		5		25		7	
09:45	4		4		6		6		10		10	
10:00	8	40	0	3	8	22	4	13	16	62	4	16
10:15	10		0		0		2		10		2	
10:30	14		2		10		1		24		3	
10:45	8		1		4		6		12		7	
11:00	8	28	5	13	10	46	7	17	18	74	12	30
11:15	10		2		10		3		20		5	
11:30	2		2		14		1		16		3	
11:45	8		4		12		6		20		10	
Totals	380		318		283		520		663		838	
Split%	57.3		37.9		42.7		62.1					
Day Totals		698				803				1,501		
Day Splits		46.5				53.5						
Peak Hour	05:30		04:00		08:30		05:00		07:45		04:45	
Volume	64		48		49		79		99		119	
Factor	0.73		0.80		0.88		0.76		0.88		0.83	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : AVE T E/O
: LONGVIEW RD
CITY : PALMDALE

Site: 071201.003
Date: 07/12/12
Day: Thursday

Interval	WB				EB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	5	12	12	39	2	11	10	27	7	23	22	66
12:15	4		3		3		6		7		9	
12:30	1		14		4		6		5		20	
12:45	2		10		2		5		4		15	
01:00	3	9	8	45	3	6	5	31	6	15	13	76
01:15	2		12		1		8		3		20	
01:30	0		8		0		8		0		16	
01:45	4		17		2		10		6		27	
02:00	0	0	8	30	0	2	4	49	0	2	12	79
02:15	0		6		2		18		2		24	
02:30	0		8		0		13		0		21	
02:45	0		8		0		14		0		22	
03:00	2	8	10	56	0	2	16	71	2	10	26	127
03:15	0		19		1		26		1		45	
03:30	2		13		0		12		2		25	
03:45	4		14		1		17		5		31	
04:00	5	38	4	38	2	21	26	76	7	59	30	114
04:15	11		11		2		18		13		29	
04:30	16		12		10		12		26		24	
04:45	6		11		7		20		13		31	
05:00	8	51	5	24	6	26	15	71	14	77	20	95
05:15	10		9		5		16		15		25	
05:30	16		6		5		16		21		22	
05:45	17		4		10		24		27		28	
06:00	12	57	4	21	6	29	16	63	18	86	20	84
06:15	8		8		6		18		14		26	
06:30	18		4		12		14		30		18	
06:45	19		5		5		15		24		20	
07:00	11	46	6	23	9	31	10	44	20	77	16	67
07:15	17		8		7		15		24		23	
07:30	9		5		11		12		20		17	
07:45	9		4		4		7		13		11	
08:00	15	56	7	17	6	28	9	36	21	84	16	53
08:15	8		2		9		9		17		11	
08:30	13		7		5		12		18		19	
08:45	20		1		8		6		28		7	
09:00	12	58	4	15	5	29	8	24	17	87	12	39
09:15	12		4		6		5		18		9	
09:30	26		5		6		6		32		11	
09:45	8		2		12		5		20		7	
10:00	10	32	4	14	3	17	3	15	13	49	7	29
10:15	6		4		6		5		12		9	
10:30	10		5		5		2		15		7	
10:45	6		1		3		5		9		6	
11:00	6	30	0	16	16	49	4	18	22	79	4	34
11:15	8		8		12		3		20		11	
11:30	10		3		16		6		26		9	
11:45	6		5		5		5		11		10	
Totals	397		338		251		525		648		863	
Split%	61.3		39.2		38.7		60.8					
Day Totals		735				776				1,511		
Day Splits		48.6				51.4						
Peak Hour	08:45		03:00		11:00		03:15		06:30		03:15	
Volume	70		56		49		81		98		131	
Factor	0.67		0.74		0.77		0.78		0.82		0.73	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : 116TH ST S/O
: AVE T
CITY : PALMDALE

Site: 071201.004
Date: 07/10/12

Day: Tuesday

Interval	NB				SB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	0	0	1	9	0	3	0	5	0	3	1	14
12:15	0		1		1		2		1		3	
12:30	0		4		0		2		0		6	
12:45	0		3		2		1		2		4	
01:00	0	0	4	13	3	3	4	13	3	3	8	26
01:15	0		5		0		4		0		9	
01:30	0		2		0		1		0		3	
01:45	0		2		0		4		0		6	
02:00	2	4	1	15	0	1	2	15	2	5	3	30
02:15	0		4		1		2		1		6	
02:30	2		6		0		2		2		8	
02:45	0		4		0		9		0		13	
03:00	0	1	4	20	0	1	2	13	0	2	6	33
03:15	0		7		0		3		0		10	
03:30	1		7		1		3		2		10	
03:45	0		2		0		5		0		7	
04:00	2	3	2	8	1	12	4	10	3	15	6	18
04:15	0		3		2		3		2		6	
04:30	1		2		1		1		2		3	
04:45	0		1		8		2		8		3	
05:00	1	5	1	7	3	12	1	10	4	17	2	17
05:15	2		0		2		4		4		4	
05:30	0		2		2		1		2		3	
05:45	2		4		5		4		7		8	
06:00	1	7	1	3	5	8	0	3	6	15	1	6
06:15	2		1		0		1		2		2	
06:30	3		1		1		2		4		3	
06:45	1		0		2		0		3		0	
07:00	4	12	2	4	6	12	0	6	10	24	2	10
07:15	1		1		2		3		3		4	
07:30	4		0		2		3		6		3	
07:45	3		1		2		0		5		1	
08:00	0	2	1	2	1	4	1	3	1	6	2	5
08:15	2		0		0		1		2		1	
08:30	0		0		0		1		0		1	
08:45	0		1		3		0		3		1	
09:00	4	12	0	3	2	6	0	0	6	18	0	3
09:15	2		3		1		0		3		3	
09:30	5		0		2		0		7		0	
09:45	1		0		1		0		2		0	
10:00	1	12	0	3	2	9	0	4	3	21	0	7
10:15	1		1		2		1		3		2	
10:30	2		0		3		0		5		0	
10:45	8		2		2		3		10		5	
11:00	2	8	1	2	1	5	0	0	3	13	1	2
11:15	2		0		1		0		3		0	
11:30	2		1		1		0		3		1	
11:45	2		0		2		0		4		0	
Totals	66		89		76		82		142		171	
Split%	46.5		52.0		53.5		48.0					
Day Totals		155				158				313		
Day Splits		49.5				50.5						
Peak Hour	10:30		02:45		04:45		02:45		07:00		02:45	
Volume	14		22		15		17		24		39	
Factor	0.44		0.79		0.47		0.47		0.60		0.75	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : 116TH ST S/O
: AVE T
CITY : PALMDALE

Site: 071201.004
Date: 07/11/12
Day: Wednesday

Interval	NB				SB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	0	0	4	11	0	1	4	15	0	1	8	26
12:15	0		2		1		4		1		6	
12:30	0		1		0		3		0		4	
12:45	0		4		0		4		0		8	
01:00	0	0	4	11	1	1	1	6	1	1	5	17
01:15	0		2		0		1		0		3	
01:30	0		1		0		1		0		2	
01:45	0		4		0		3		0		7	
02:00	1	1	5	27	0	0	1	11	1	1	6	38
02:15	0		10		0		4		0		14	
02:30	0		7		0		1		0		8	
02:45	0		5		0		5		0		10	
03:00	3	3	0	14	0	1	3	10	3	4	3	24
03:15	0		5		0		1		0		6	
03:30	0		3		0		4		0		7	
03:45	0		6		1		2		1		8	
04:00	2	5	2	9	0	16	3	7	2	21	5	16
04:15	2		3		2		1		4		4	
04:30	0		2		5		2		5		4	
04:45	1		2		9		1		10		3	
05:00	2	5	0	8	2	14	1	8	4	19	1	16
05:15	0		0		2		3		2		3	
05:30	1		5		5		2		6		7	
05:45	2		3		5		2		7		5	
06:00	4	13	3	6	3	17	0	8	7	30	3	14
06:15	3		1		3		3		6		4	
06:30	2		2		4		2		6		4	
06:45	4		0		7		3		11		3	
07:00	2	13	2	3	2	6	0	2	4	19	2	5
07:15	6		0		1		1		7		1	
07:30	4		1		1		1		5		2	
07:45	1		0		2		0		3		0	
08:00	6	15	4	9	1	7	0	3	7	22	4	12
08:15	2		5		0		3		2		8	
08:30	1		0		4		0		5		0	
08:45	6		0		2		0		8		0	
09:00	4	11	0	3	2	7	1	5	6	18	1	8
09:15	3		1		0		0		3		1	
09:30	4		1		1		2		5		3	
09:45	0		1		4		2		4		3	
10:00	1	16	2	3	4	11	0	5	5	27	2	8
10:15	2		1		2		1		4		2	
10:30	6		0		3		2		9		2	
10:45	7		0		2		2		9		2	
11:00	4	13	3	7	3	16	0	2	7	29	3	9
11:15	2		1		4		0		6		1	
11:30	4		1		4		1		8		2	
11:45	3		2		5		1		8		3	
Totals	95		111		97		82		192		193	
Split%	49.5		57.5		50.5		42.5					
Day Totals		206				179				385		
Day Splits		53.5				46.5						
Peak Hour	10:15		02:00		04:15		12:00		10:30		02:00	
Volume	19		27		18		15		31		38	
Factor	0.68		0.68		0.50		0.94		0.86		0.68	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : 116TH ST S/O
: AVE T
CITY : PALMDALE

Site: 071201.004
Date: 07/12/12

Day: Thursday

Interval	NB				SB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	0	0	4	13	0	1	1	7	0	1	5	20
12:15	0		4		0		2		0		6	
12:30	0		4		1		4		1		8	
12:45	0		1		0		0		0		1	
01:00	0	0	6	18	0	1	2	10	0	1	8	28
01:15	0		1		1		2		1		3	
01:30	0		5		0		4		0		9	
01:45	0		6		0		2		0		8	
02:00	0	0	3	19	0	0	3	17	0	0	6	36
02:15	0		4		0		9		0		13	
02:30	0		7		0		1		0		8	
02:45	0		5		0		4		0		9	
03:00	1	4	3	17	0	3	5	12	1	7	8	29
03:15	0		6		0		4		0		10	
03:30	0		5		2		2		2		7	
03:45	3		3		1		1		4		4	
04:00	1	3	3	8	1	7	1	12	2	10	4	20
04:15	2		2		0		4		2		6	
04:30	0		1		2		6		2		7	
04:45	0		2		4		1		4		3	
05:00	4	6	3	10	4	14	4	9	8	20	7	19
05:15	0		1		1		2		1		3	
05:30	1		3		3		3		4		6	
05:45	1		3		6		0		7		3	
06:00	0	6	0	1	4	7	0	6	4	13	0	7
06:15	3		1		0		1		3		2	
06:30	3		0		0		2		3		2	
06:45	0		0		3		3		3		3	
07:00	3	15	0	4	3	8	1	7	6	23	1	11
07:15	6		3		3		2		9		5	
07:30	3		1		1		2		4		3	
07:45	3		0		1		2		4		2	
08:00	0	3	1	3	4	8	1	4	4	11	2	7
08:15	1		1		0		1		1		2	
08:30	0		1		3		2		3		3	
08:45	2		0		1		0		3		0	
09:00	2	19	1	2	1	10	1	3	3	29	2	5
09:15	5		0		2		0		7		0	
09:30	4		1		6		2		10		3	
09:45	8		0		1		0		9		0	
10:00	1	8	0	1	9	15	0	4	10	23	0	5
10:15	0		0		0		1		0		1	
10:30	5		1		2		1		7		2	
10:45	2		0		4		2		6		2	
11:00	2	10	2	6	2	14	0	0	4	24	2	6
11:15	0		3		2		0		2		3	
11:30	6		1		7		0		13		1	
11:45	2		0		3		0		5		0	
Totals	74		102		88		91		162		193	
Split%	45.7		52.8		54.3		47.2					
Day Totals		176				179				355		
Day Splits		49.6				50.4						
Peak Hour	09:00		02:30		09:15		02:15		09:15		02:15	
Volume	19		21		18		19		36		38	
Factor	0.59		0.75		0.50		0.53		0.90		0.73	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : 165TH ST S/O
: AVE T
CITY : PALMDALE

Site: 071201.005
Date: 07/10/12
Day: Tuesday

Interval	NB				SB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	6	20	15	56	2	9	19	60	8	29	34	116
12:15	8		9		4		29		12		38	
12:30	2		8		1		4		3		12	
12:45	4		24		2		8		6		32	
01:00	2	17	18	87	4	12	10		6	29	28	45
01:15	8		34		2		*		10		16	
01:30	3		16		3		*		6		0	
01:45	4		19		3		*		7		1	
02:00	1	12	22	66	6	12	*		7	24	2	2
02:15	6		20		0		*		6		0	
02:30	2		10		4		*		6		0	
02:45	3		14		2		*		5		0	
03:00	4	19	20	89	5	21	*		9	40	2	7
03:15	3		21		2		*		5		1	
03:30	6		22		6		*		12		4	
03:45	6		26		8		*		14		0	
04:00	7	34	26	92	4	40	*		11	74	4	7
04:15	10		22		6		*		16		1	
04:30	10		26		14		*		24		0	
04:45	7		18		16		*		23		2	
05:00	30	116	17	79	11	63	*		41	179	0	7
05:15	31		26		9		*		40		2	
05:30	33		20		24		*		57		5	
05:45	22		16		19		*		41		0	
06:00	28	108	28	81	20	82	*		48	190	4	13
06:15	28		14		14		*		42		0	
06:30	30		26		26		*		56		8	
06:45	22		13		22		*		44		1	
07:00	27	89	18	57	14	53	*		41	142	0	1
07:15	26		14		9		*		35		0	
07:30	16		14		18		*		34		1	
07:45	20		11		12		*		32		0	
08:00	31	102	19	45	22	79	*		53	181	0	0
08:15	24		10		20		*		44		0	
08:30	21		14		18		*		39		0	
08:45	26		2		19		*		45		0	
09:00	18	95	16	42	16	77	*		34	172	2	2
09:15	32		11		20		*		52		0	
09:30	25		8		17		*		42		0	
09:45	20		7		24		*		44		0	
10:00	28	88	9	31	26	83	*		54	171	0	2
10:15	24		10		18		*		42		0	
10:30	20		8		24		*		44		2	
10:45	16		4		15		*		31		0	
11:00	14	81	1	13	15	71	*		29	152	*	
11:15	18		2		18		*		36		0	
11:30	28		5		20		*		48		0	
11:45	21		5		18		*		39		0	
Totals	781		738		602		70		1,383		202	
Split%	56.5		365.3		43.5		34.7					
Day Totals		1,519				672				1,585		
Day Splits		95.8				42.4						
Peak Hour	05:00		03:45		09:45		*		09:15		12:00	
Volume	116		100		92		*		192		116	
Factor	0.88		0.96		0.88		*		0.89		0.76	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : 165TH ST S/O
: AVE T
CITY : PALMDALE

Site: 071201.005
Date: 07/11/12

Day: Wednesday

Interval	NB				SB		Combined			
Begin	AM		PM		AM	PM	AM		PM	
12:00	4	24	13	79	*	*	0	0	0	0
12:15	0		18		0	*	0		0	
12:30	16		28		*	*	0		0	
12:45	4		20		*	*	0		0	
01:00	1	21	24	76	*	*	*		0	2
01:15	12		20		*	*	0		0	
01:30	2		16		*	*	0		0	
01:45	6		16		*	*	0		2	
02:00	6	19	16	48	*	*	0	0	0	0
02:15	4		7		*	*	0		0	
02:30	4		16		*	*	0		0	
02:45	5		9		*	*	0		0	
03:00	2	11	33	113	*	*	0	0	0	0
03:15	2		18		*	*	0		0	
03:30	4		31		*	*	0		0	
03:45	3		31		*	*	0		0	
04:00	10	48	21	97	*	*	0	2	0	0
04:15	12		18		*	*	0		0	
04:30	10		38		*	*	0		0	
04:45	16		20		*	*	2		0	
05:00	25	107	26	99	*	*	0	1	0	0
05:15	29		30		*	*	0		0	
05:30	21		22		*	*	0		0	
05:45	32		21		*	*	1		0	
06:00	21	114	24	63	*	*	0	0	0	0
06:15	26		17		*	*	0		0	
06:30	32		10		*	*	0		0	
06:45	35		12		*	*	0		0	
07:00	26	93	7	43	*	*	0	7	0	0
07:15	30		20		*	*	4		0	
07:30	19		6		*	*	0		0	
07:45	18		10		*	*	3		0	
08:00	16	68	15	44	*	*	0	5	0	0
08:15	14		16		*	*	0		0	
08:30	18		7		*	*	1		0	
08:45	20		6		*	*	4		0	
09:00	22	74	8	36	*	*	11	32	0	0
09:15	22		13		*	*	20		0	
09:30	18		10		*	*	1		0	
09:45	12		5		*	*	0		0	
10:00	18	72	6	25	*	*	0	0	0	0
10:15	22		4		*	*	0		0	
10:30	13		5		*	*	0		0	
10:45	19		10		*	*	0		0	
11:00	22	72	4	22	*	*	0	0	0	0
11:15	10		8		*	*	0		0	
11:30	32		6		*	*	0		0	
11:45	8		4		*	*	0		0	
Totals	723		745		0	0	47		2	
Split%	1,538.3		7,250.0		0.0	0.0				
Day Totals		1,468			0			49		
Day Splits		2,995.9			0.0					
Peak Hour	06:30		04:30		*	*	08:30		01:00	
Volume	123		114		*	*	36		2	
Factor	0.88		0.75		*	*	0.45		0.25	

TRAFFIC DATA SERVICES, INC.

200 Technology Dr., Suite K
Irvine, CA 92618

STREET : 165TH ST S/O
: AVE T
CITY : PALMDALE

Site: 071201.005
Date: 07/12/12

Interval	NB				SB		Combined				Day: Thursday
Begin	AM		PM		AM	PM	AM		PM		
12:00	5	13	15	66	*	*	0	0	0	0	
12:15	2		18		*	*	0		0		
12:30	2		20		*	*	0		0		
12:45	4		13		*	*	0		0		
01:00	0	23	22	96	0	*	0	0	0	0	
01:15	17		22		*	*	0		0		
01:30	4		22		*	*	0		0		
01:45	2		30		*	*	0		0		
02:00	2	6	22	113	*	*	0		0	0	
02:15	0		13		0	*	0		0		
02:30	3		38		*	*	0		0		
02:45	1		40		*	*	*		0		
03:00	2	13	28	106	*	*	0	0	0	0	
03:15	3		28		*	*	0		0		
03:30	4		24		*	*	0		0		
03:45	4		26		*	*	0		0		
04:00	4	35	31	100	*	*	0	0	0	0	
04:15	13		22		*	*	0		0		
04:30	11		26		*	*	0		0		
04:45	7		21		*	*	0		0		
05:00	28	110	25	104	*	*	0	0	0	0	
05:15	26		32		*	*	0		0		
05:30	34		24		*	*	0		0		
05:45	22		23		*	*	0		0		
06:00	20	128	16	75	*	*	0	0	0	0	
06:15	34		24		*	*	0		0		
06:30	38		15		*	*	0		0		
06:45	36		20		*	*	0		0		
07:00	19	70	26	71	*	*	0	0	0	0	
07:15	19		16		*	*	0		0		
07:30	20		18		*	*	0		0		
07:45	12		11		*	*	0		0		
08:00	16	71	18	52	*	*	0	0	0	0	
08:15	14		9		*	*	0		0		
08:30	17		16		*	*	0		0		
08:45	24		9		*	*	0		0		
09:00	14	86	10	43	*	*	0	0	0	0	
09:15	30		13		*	*	0		0		
09:30	22		10		*	*	0		0		
09:45	20		10		*	*	0		0		
10:00	26	60	6	21	*	*	0	0	0	0	
10:15	12		6		*	*	0		0		
10:30	10		6		*	*	0		0		
10:45	12		3		*	*	0		0		
11:00	18	78	4	31	*	*	0	0	0	0	
11:15	17		11		*	*	0		0		
11:30	13		6		*	*	0		0		
11:45	30		10		*	*	0		0		
Totals	693		878		0	0	0		0		
Split%	*		*		*	*					
Day Totals		1,571				0			0		
Day Splits		0.0				0.0					
Peak Hour	06:00		02:30		*	*	*		*		
Volume	128		134		*	*	*		*		
Factor	0.84		0.84		*	*	*		*		

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200 Technology Dr., Suite K
Irvine, CA 92618

STREET : LONGVIEW ST S/O
: PEARBLOSSOM HWY
CITY : PALMDALE

Site: 071201.006
Date: 07/10/12
Day: Tuesday

Interval	NB				SB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	0	1	15	36	2	6	7	43	2	7	22	79
12:15	1		6		2		13		3		19	
12:30	0		10		1		13		1		23	
12:45	0		5		1		10		1		15	
01:00	1	2	17	47	0	2	16	58	1	4	33	105
01:15	0		14		0		14		0		28	
01:30	1		10		2		13		3		23	
01:45	0		6		0		15		0		21	
02:00	0	1	11	48	0	1	16	60	0	2	27	108
02:15	0		12		0		18		0		30	
02:30	0		14		1		10		1		24	
02:45	1		11		0		16		1		27	
03:00	0	4	10	65	0	1	38	85	0	5	48	150
03:15	2		22		0		20		2		42	
03:30	2		14		1		22		3		36	
03:45	0		19		0		5		0		24	
04:00	4	17	13	50	0	2	12	47	4	19	25	97
04:15	3		17		0		7		3		24	
04:30	4		14		2		6		6		20	
04:45	6		6		0		22		6		28	
05:00	6	32	18	69	1	3	11	17	7	35	29	86
05:15	9		26		1		4		10		30	
05:30	6		12		1		2		7		14	
05:45	11		13		0		0		11		13	
06:00	5	41	12	45	3	22	0	10	8	63	12	55
06:15	10		11		4		3		14		14	
06:30	10		13		4		6		14		19	
06:45	16		9		11		1		27		10	
07:00	16	49	9	43	9	28	2	10	25	77	11	53
07:15	13		9		5		2		18		11	
07:30	8		16		10		4		18		20	
07:45	12		9		4		2		16		11	
08:00	8	43	14	32	7	36	5	7	15	79	19	39
08:15	13		8		8		0		21		8	
08:30	12		4		6		0		18		4	
08:45	10		6		15		2		25		8	
09:00	13	41	6	25	4	30	5	7	17	71	11	32
09:15	8		4		8		0		16		4	
09:30	7		9		8		2		15		11	
09:45	13		6		10		0		23		6	
10:00	16	57	2	8	8	42	2	4	24	99	4	12
10:15	17		1		10		0		27		1	
10:30	15		1		14		0		29		1	
10:45	9		4		10		2		19		6	
11:00	15	40	2	7	7	46	0	2	22	86	2	9
11:15	8		2		7		0		15		2	
11:30	12		2		14		0		26		2	
11:45	5		1		18		2		23		3	
Totals	328		475		219		350		547		825	
Split%	60.0		57.6		40.0		42.4					
Day Totals		803				569				1,372		
Day Splits		58.5				41.5						
Peak Hour	09:45		05:00		11:00		02:45		09:45		02:45	
Volume	61		69		46		96		103		153	
Factor	0.90		0.66		0.64		0.63		0.89		0.80	

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Irvine, CA 92618

STREET : LONGVIEW ST S/O
: PEARBLOSSOM HWY
CITY : PALMDALE

Site: 071201.006
Date: 07/11/12

Day: Wednesday

Interval	NB				SB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	2	5	15	47	3	5	*		5	10	0	0
12:15	1		10		2		*		3		0	
12:30	1		14		0		*		1		0	
12:45	1		8		0		*		1		0	
01:00	1	9	14	54	2	9	*		3	18	2	2
01:15	6		16		7		*		13		0	
01:30	2		14		0		*		2		0	
01:45	0		10		0		*		0		0	
02:00	0	2	11	46	0	0	*		0	2	0	0
02:15	0		6		0		*		0		0	
02:30	1		13		0		*		1		0	
02:45	1		16		0		*		1		0	
03:00	0	6	13	44	0	0	*		0	6	0	0
03:15	1		13		0		*		1		0	
03:30	4		10		0		*		4		0	
03:45	1		8		0		*		1		0	
04:00	4	27	10	57	1	5	*		5	32	0	0
04:15	8		19		4		*		12		0	
04:30	5		14		0		*		5		0	
04:45	10		14		0		*		10		0	
05:00	6	29	18	57	0	0	*		6	29	0	0
05:15	5		13		0		*		5		0	
05:30	11		16		0		*		11		0	
05:45	7		10		0		*		7		0	
06:00	6	37	9	46	0	3	*		6	40	0	0
06:15	11		12		1		*		12		0	
06:30	11		12		0		*		11		0	
06:45	9		13		2		*		11		0	
07:00	16	54	11	51	2	9	*		18	63	0	0
07:15	12		14		2		*		14		0	
07:30	16		12		4		*		20		0	
07:45	10		14		1		*		11		0	
08:00	6	33	6	31	4	5	*		10	38	0	0
08:15	15		7		1		*		16		0	
08:30	6		14		0		*		6		0	
08:45	6		4		0		*		6		0	
09:00	11	50	9	24	3	3	*		14	53	0	0
09:15	12		4		6		*		18		0	
09:30	12		8		6		*		18		0	
09:45	15		3		*		*		3		0	
10:00	17	42	4	12	*		*		0	0	0	0
10:15	6		2		*		*		0		0	
10:30	12		4		*		*		0		0	
10:45	7		2		*		*		0		0	
11:00	16	45	2	4	*		*		0	0	0	
11:15	11		0		*		0		0		0	
11:30	11		1		*		*		0		*	
11:45	7		1		*		*		0		*	
Totals	339		473		51		0		291		2	
Split%	116.5		3,650.0		17.5		0.0					
Day Totals		812				51				293		
Day Splits		277.1				17.4						
Peak Hour	09:15		04:15		*		*		06:45		12:15	
Volume	56		65		*		*		63		2	
Factor	0.82		0.86		*		*		0.79		0.25	

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200 Technology Dr., Suite K
Irvine, CA 92618

STREET : LONGVIEW ST S/O
: PEARBLOSSOM HWY
CITY : PALMDALE

Site: 071201.006
Date: 07/12/12

Interval	NB				SB		Combined				Day: Thursday
Begin	AM		PM		AM	PM	AM		PM		
12:00	0	1	12	48	0	*	0		0	3	
12:15	0		14		0	*	0		2		
12:30	1		8		*	*	*		1		
12:45	0		14		0	*	0		0		
01:00	3	4	10	46	*	*	0		0	0	
01:15	0		10		0	*	0		0		
01:30	0		14		0	*	0		0		
01:45	1		12		*	*	*		0		
02:00	3	5	15	45	*	*	0	0	0	0	
02:15	0		14		0	*	0		0		
02:30	0		8		0	*	0		0		
02:45	2		8		*	*	0		0		
03:00	2	8	17	53	*	*	0		0	0	
03:15	1		14		*	*	*		0		
03:30	4		13		*	*	0		0		
03:45	1		9		*	*	*		0		
04:00	4	21	20	60	*	*	0	0	0	0	
04:15	5		19		*	*	0		0		
04:30	8		12		*	*	0		0		
04:45	4		9		*	*	0		0		
05:00	4	26	15	44	*	*	0	0	0	0	
05:15	6		7		*	*	0		0		
05:30	9		11		*	*	0		0		
05:45	7		11		*	*	0		0		
06:00	11	56	12	42	*	*	0	0	0	0	
06:15	12		8		*	*	0		0		
06:30	14		11		*	*	0		0		
06:45	19		11		*	*	0		0		
07:00	14	40	13	36	*	*	0	0	0	0	
07:15	12		12		*	*	0		0		
07:30	8		5		*	*	0		0		
07:45	6		6		*	*	0		0		
08:00	9	50	7	34	*	*	0	0	0	0	
08:15	17		7		*	*	0		0		
08:30	13		7		*	*	0		0		
08:45	11		13		*	*	0		0		
09:00	10	39	9	21	*	*	0	0	0	0	
09:15	9		5		*	*	0		0		
09:30	9		5		*	*	0		0		
09:45	11		2		*	*	0		0		
10:00	7	43	3	14	*	*	0	0	0		
10:15	12		6		*	*	0		0		
10:30	12		1		*	*	0		*		
10:45	12		4		*	*	0		0		
11:00	13	43	3	7	*	*	0	0	0		
11:15	10		1		*	*	0		*		
11:30	14		3		*	*	0		0		
11:45	6		0		*	0	0		0		
Totals	336		450		0	0	0		3		
Split%	*		5,000.0		*	0.0					
Day Totals		786				0			3		
Day Splits		26,200.0				0.0					
Peak Hour	06:15		03:30		*	*	*		12:00		
Volume	59		61		*	*	*		3		
Factor	0.78		0.76		*	*	*		0.38		

TRAFFIC DATA SERVICES, INC.
(949) 679-3703
Summary of Vehicular Turning Movements

N/S ST : LONGVIEW RD
E/W ST: AVE T
CITY: PALMDALE

FILENAME: 071201001
DATE: 7/11/12
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
LANES:	X	X	X	0	1	0	0	1	X	X	1	0	
7:00 AM				0		4	0	6			8	2	20
15 AM				0		3	1	5			10	2	21
30 AM				1		4	1	3			7	1	17
45 AM				1		1	1	10			11	0	24
8:00 AM				1		6	1	6			7	0	21
15 AM				0		0	0	10			14	1	25
30 AM				0		0	0	9			13	0	22
45 AM				0		3	2	7			6	0	18
PEAK HOUR BEGINS AT: 745 AM													PHF: 0.92
VOLUMES =	0	0	0	2	0	7	2	35	0	0	45	1	92

FILENAME: 071201001P
DATE: 7/11/12
DAY: WEDNESDAY

PERIOD	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
BEGINS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	Total
4:00 PM				8		2	2	12			10	0	34
15 PM				2		1	5	13			12	1	34
30 PM				2		0	4	12			10	0	28
45 PM				1		0	5	19			15	0	40
5:00 PM				1		2	11	18			6	0	38
15 PM				0		2	3	7			8	1	21
30 PM				0		3	2	20			13	0	38
45 PM				2		0	3	25			6	1	37
PEAK HOUR BEGINS AT: 1615 PM													PHF: 0.88
VOLUMES =	0	0	0	6	0	3	25	62	0	0	43	1	140

COMMENTS:

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 10

Air Quality and Climate Change Impact Assessment

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SESPE CONSULTING, INC.
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AIR QUALITY AND CLIMATE CHANGE IMPACT ASSESSMENT

Lebata, Inc.
Big Rock Creek Project
12600 Block of Avenue T
Unincorporated Los Angeles County, California

October 7, 2013

Prepared for: Lebata, Inc.
c/o McGee & Associates
23 Corporate Plaza, Suite 230
Newport Beach, CA 92660

Prepared by: SESPE Consulting, Inc.
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AIR QUALITY AND CLIMATE CHANGE IMPACT ASSESSMENT
Big Rock Creek Project

October 7, 2013

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I. Potential to Emit Calculations

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AIR QUALITY AND CLIMATE CHANGE IMPACT ASSESSMENT
Big Rock Creek Project
Los Angeles County, California

October 7, 2013

EXECUTIVE SUMMARY

This Air Quality and Climate Change Impact Assessment (AQCCIA) presents regulatory review and air emission calculations for equipment associated with the construction and operation of the Big Rock Creek Project (Project). The Antelope Valley Air Quality Management District's (AVAQMD) California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (Guidelines, August 2011) methodologies are used in this AQCCIA.

The proposed Project is located within unincorporated Los Angeles County (Figure 1, Appendix A). The extraction rate of unprocessed material over the life of the Project is expected to range between 1,000,000 to 2,500,000 tons per year. Annual sales will not exceed 2,000,000 tons per year. For the purposes of this assessment, the peak yearly mining rate of 2,500,000 tons (i.e. 2,000,000 tons produced) is used to determine the significance of air quality impacts. Processed aggregate will be sold directly or used on site in the Project's hot mix asphalt (HMA) and ready-mixed concrete (RMC) plants. Cement for the RMC plant and for direct resale may be shipped to the site via rail. Stationary emission sources associated with Project operation includes the aggregate plant, HMA plant, RMC plant, asphaltic oil heaters, cement receiving facility, Vac-Lite plant, and emergency generator. Recycled asphalt pavement (RAP) may be produced on-site by a portable plant as a substitute for virgin aggregate. Rubberized asphalt equipment may operate in conjunction with the asphalt plant and related emissions are assumed to be offset by reduced asphalt plant operation as is typically conditioned on stationary source permits. Mobile emission sources associated with Project operations include on road haul trucks, off road mobile equipment, worker commutes, and trains. Project sources of fugitive dust include material drops, travel on paved roads, and travel on unpaved roads/disturbed surface areas.

In order to reduce all air quality impacts to less than the levels of significance, this AQCCIA proposes the following operation phase mitigations:

- The mining process will be modified so that aggregate material is excavated using a dragline and loaded into a portable primary crusher using an excavator. This modification eliminates off road equipment (one dozer, one loader, and two off road haul trucks) from the process and yields a reduction in combustion, fugitive dust, and greenhouse gas emissions.
- Unpaved roads will be controlled by the application of chemical dust suppressants and maintained in a controlled state by watering or other means. This aggressive control reduces fugitive dust emissions from travel over unpaved roads.
- Blue Smoke Control equipment will be used to collect vapors from the asphalt plant's mixing drum, drag conveyor, silos, and loading area. This reduces the amount of odor and VOC emissions that occur as a result of the asphalt plant.

This AQCCIA finds that:

- Project construction phase criteria pollutant emissions are less than the thresholds of significance with standard mitigations.
- Project direct and indirect operation phase criteria pollutant emissions are less than the thresholds of significance with mitigation.
- Project cumulative impacts, including greenhouse gas (GHG) emissions, are less than thresholds of significance without mitigation.
- The Project conforms to applicable air quality management and municipal plans.
- The Project results in a Class II impact on air quality, significant but mitigable.

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AIR QUALITY AND CLIMATE CHANGE IMPACT ASSESSMENT
Big Rock Creek Project
Los Angeles County, California

October 7, 2013

1.0 INTRODUCTION

This Air Quality and Climate Change Impact Assessment (AQCCIA) presents regulatory review and air emission calculations for equipment and activities associated with construction and operation of the Big Rock Creek Project (Project) located in unincorporated Los Angeles County (Figure 1, Appendix A). This AQCCIA has been prepared for use in a California Environmental Quality Act (CEQA) environmental analysis.

This AQCCIA follows methodologies outlined in the Antelope Valley Air Quality Management District's (AVAQMD) California Environmental Quality Act (CEQA) and Federal Conformity Guidelines (Guidelines, August 2011). A Health Risk Assessment (HRA) dated March 8, 2012 supplements this AQCCIA.

2.0 PROJECT DESCRIPTION

Lebata, Inc. (Applicant) proposes to construct an aggregate surface mining and processing facility, ready-mixed concrete plant (RMC), asphalt mixing plant, Vac-Lite plant, and raw cement transfer and aggregate distribution facility on an approximately 310 acre parcel in Los Angeles County, California. The parcel is currently vacant but is bisected by a railroad track. The surrounding area is relatively remote and undisturbed.

The proposed Project is located in unincorporated Los Angeles County. Access will be gained from Avenue T. Figure 1 (Appendix A) shows the location of the Project. A complete Project Description is located in Section 3.0 of the Draft EIR. Elements of the Project Description that are considered vital for the preparation of this AQCCIA are presented in this section.

2.1 Construction Activities

Construction activities including grading, building and paving are estimated to take six months.

2.2 Operation Activities

A site plan (Figure 2 in Appendix A) illustrates the location of the stationary equipment. The following are the main activities proposed for the Project:

- **Aggregate Surface Mining**. Raw aggregate will be piled using a bulldozer, loaded into off road haul trucks using a loader, and transported to the primary crusher (see Sections 7.1.11 and 7.1.12). Mitigations discussed in Section 8.2 modify this mining process. Recycled asphalt pavement (RAP) may be produced on-site by a portable crushing plant as a substitute for virgin

aggregate.

- **Aggregate Processing and Distribution**. Aggregate will be crushed, sorted, and conveyed into stockpiles by the processing equipment (see Section 7.1.1). Stockpiled material will be used in the asphalt mixing plant, the RMC plant, and sold directly. Water will be used to control fugitive dust emissions. Aggregate distribution is conducted by on road haul trucks (see Section 7.2.3).
- **Ready-Mix Concrete Processing and Distribution**. Loaders will deliver processed aggregate to the RMC plant (see Section 7.1.2). Materials will then be conveyed from aggregate hoppers, cement silos, a fly ash silo, and a water tank. The concrete is loaded into concrete mix trucks and mixed during travel. Emissions will be controlled by silos equipped with filter vents and a baghouse on the truck loading equipment. Concrete distribution is conducted by on road concrete haul trucks (see Section 7.2.3).
- **Asphalt Processing and Distribution**. The Project will utilize a modular asphalt mixing plant capable of using both recycled asphalt pavement (RAP) and ground crumb rubber. The plant consists of aggregate feed hoppers and conveyors, a drying drum, a mixing drum, asphalt oil tanks, asphalt tank heaters, and asphalt silos (see Sections 7.1.3 and 7.1.4). Aggregate will be transferred from stockpiles to several hoppers by a loader and conveyed to the plant where a continuous counter-flow drum mix process is used to heat the aggregate. Once the aggregate is heated, it is transferred to the mixing drum where it is combined with heated asphalt oil. Finally, the asphalt is conveyed to, and stored in, heated silos. Rubberized asphalt equipment may operate in conjunction with the asphalt plant and related emissions are assumed to be offset by reduced asphalt plant operation as is typically conditioned on stationary source permits. Emissions will be controlled by using a baghouse on the drying drum, low NOx propane gas burners, and by Blue Smoke Control to collect and filter fugitive emissions from the mixing drum, conveyors, and silos. Asphalt distribution is conducted by on road asphalt haul trucks (see Section 7.2.3).
- **Vac-Lite Processing and Distribution**. "Vac-Lite" is a strong, durable, porous glass pumice aggregate of volcanic origin (see Section 7.1.5). Bottom dump trucks will deliver the volcanic aggregate to the Project and dump it into a grizzly hopper/screen. The material will be conveyed to a silo where it will be treated with high pressure water and cement. Once processed, the material will be drained of water and conveyed to radial stockpiles for shipment via truck (see Section 7.2.3).
- **Raw Cement Transfer Process**. Cement will be transferred using a distribution facility (see Sections 7.1.6 and 7.1.10). Raw cement will be delivered to the Project by rail (or truck) and stored onsite in silos. It will then be used by the RMC plant (12%) or sold and trucked to other RMC plants (88%). Emissions will be controlled by fabric filters on the silos and pneumatic loading and unloading of the cement.
- **Scale house and on-road vehicle travel**. Grid electricity at the scale house will be backed up by a diesel generator (see Section 7.1.7). Traveling of diesel trucks results in engine and road dust emissions. Road dust on-site will be controlled by watering (unpaved) and daily sweeping (paved). Trackout will be controlled by a rumble grate followed by sufficient length of paved internal road (see Sections 7.1.8 and 7.1.12). Workers travel to and from the Project (see Section 7.1.9).

Project Throughputs

The proposed material throughput is presented in Table 1. This AQCCIA uses peak yearly throughput to calculate direct and indirect emissions from stationary and mobile equipment. Aggregate tonnage is the amount mined. Aggregate production would be 20% less, or 2,000,000 tons per year.

Table 1: Material Throughput

Parameter	Aggregate (tpy)	Ready-Mix Concrete (yd^3/yr)	Asphalt (tpy)	Vac-Lite (tpy)	Cement (tpy)
Peak Annual	2,500,000	225,000	300,000	30,000	300,000

Project Equipment

This AQCCIA is based on the off road equipment operation presented in Table 2. Note that the determination of operation hours is discussed in Section 7.1.11.

Table 2: Project Off-Road Equipment

Equipment Type	Maximum Annual Hours of Operation
140 H Grader	606
980G Loader (Aggregate Plant)	3,188
980G Loader (HMA Plant)	615
Water Truck	2,424
Street Sweeper	606
Hitachi Excavator	1,872
966G Loader (RMC / Vac-Lite Plants)	1,397
D8R Dozer*	1,212
980G Loader (Pit)**	4,444
773 Truck (#1)*	4,444
773 Truck (#2)*	4,444

* Mitigation eliminates this equipment and add a dragline/crane to the list (see Section 8.2).
** Mitigation is assumed to reduce hours of operation for this loader to be equal to plant operating hours (3,188 hr/yr).

Lowered Facilities Alternative

The Lowered Facilities Alternative alters the design of the mine in order to accommodate a planned roadway that may be constructed. In that case, the on-site facilities would be placed in approximately the same location as the project but the phasing is changed so that the facilities would be placed into a mined pit. This affects the distance of travel by on-road trucks while operating on-site. Other emissions sources would not experience as change under the Lowered Facilities Alternative as compared to the Project described above.

3.0 REGULATORY SETTING

The Project is located in the Antelope Valley area of unincorporated Los Angeles County, California (Figure 1, Appendix A). The Project is in the southernmost portion of the Mojave Desert Air Basin (MDAB), which encompasses the northern, desert part of Los Angeles County. Air Quality in the Project area is within the jurisdiction of the AVAQMD.

This AQCCIA has been prepared to satisfy CEQA requirements. CEQA (Public Resources Code (PRC) §§21000 - 21177) was enacted by the California State Legislature in 1970. Its purpose is to help ensure that governmental decision makers and the public are fully informed of potential significant environmental effects of proposed projects and activities. CEQA also requires that significant environmental impacts be avoided or reduced where feasible. In addition, if an Environmental Impact Report (EIR) is prepared, alternatives that accomplish most of the Project objectives, and reduce the Project's adverse environmental effects, must be considered. When there are no feasible alternatives, and no feasible mitigation measures available to reduce the project's significant impact to a less than significant level, a statement of overriding considerations can be adopted, which enables a public agency to approve a project despite significant environmental effects.

CEQA applies to activities directly undertaken by governmental agencies, activities financed in whole or in part by governmental agencies, and private activities that require approval from governmental agencies. There are several basic steps in the CEQA process:

- An agency determines whether a project is subject to CEQA or exempt from CEQA analysis.
- If the project is subject to CEQA, the agency prepares an Initial Study to determine whether the project may have a significant effect on the environment.
- If the project will not have a significant effect, the agency prepares a Negative Declaration (ND).
- If the project can be modified to avoid or reduce the effects to less than significant levels, the agency prepares a Mitigated Negative Declaration (MND).
- If the Initial Study shows that the project may have a significant effect, and the effects may not be able to be reduced to a less than significant level with mitigation, the agency prepares an Environmental Impact Report (EIR).

A Draft EIR is a detailed report that analyzes the environmental effects of a project, identifies potential measures to mitigate identified significant adverse environmental effects, and potential project alternatives that reduce or eliminate the project's adverse environmental effects. A Final EIR consists of the records produced during the public environmental review process that describe the project effects and rationale used by the Lead Agency in approving the EIR.

As discussed in Section 4.1 of the Draft EIR, the following nomenclature is used to describe various levels of impact within this EIR:

- **Class I Impacts** – Significant environmental impacts that cannot be mitigated to a less than significant level. Pursuant to Section 15092(b) of the CEQA Guidelines, the County must issue a Statement of Overriding Considerations for these impacts prior to approving the Project. Mitigation Measures designed to minimize these impacts are described.

- **Class II Impacts** – Significant environmental impacts that can be mitigated to a less than significant level with the implementation of the Mitigation Measures identified in this EIR. Prior to approving the Project, the County must make specific "findings" pursuant to Section 15091(a) of CEQA Guidelines.
- **Class III Impacts** – Environmental impacts that are potentially adverse, but are less than significant. While not required under CEQA, Recommended Conditions of Approval designed to minimize these adverse impacts may be described.
- **Class IV Impacts** – Beneficial Impacts.

3.1 Air Quality Regulations

The Federal Clean Air and the California Clean Air Acts each contain comprehensive frameworks for air quality planning and regulation. Title 40 of the Code of Federal Regulations and Title 17 of the California Code of Regulations contain requirements that have been promulgated under authority granted to US Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) by the Acts.

3.1.1 Criteria Air Pollutants

Criteria air pollutants include sulfur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM), carbon monoxide (CO), lead (Pb), and ground-level ozone (O3). Ambient air quality standards (AAQS) are developed by EPA and CARB for each of the criteria pollutants.

Primary AAQS are designed to protect human health, with an adequate margin of safety to protect sensitive populations such as children, the elderly, and individuals suffering from respiratory disease. Secondary AAQS are designed to protect public welfare from any known or anticipated adverse effects of a pollutant (e.g. building facades, visibility, crops, and domestic animals).

AAQS and related monitoring programs are among the many devices established by air quality regulations (40 CFR 50 - 51). Geographic areas called "attainment areas" are classified by US EPA and CARB based on whether they have attained the AAQSs. An "attainment area" is an area in which pollutant concentrations are less than the AAQS while "non-attainment areas" have yet to reduce pollution levels below the AAQS. State and federal AAQS are shown in Table 3

In order to work towards attainment, each state and air district containing federal non-attainment areas is required to develop a written plan for cleaning the air in those areas. The plans developed are called state implementation plans (SIP) and air quality management plans (AQMP). California's SIP contains mobile source and consumer product emission control strategies proposed by CARB and a compilation of stationary and area source strategies that have been developed by local air districts under CARB supervision. Through these plans, the states and local air districts outline efforts that they will make to reduce air pollutant concentrations and bring their areas back into federal attainment. AVAQMD's attainment status is presented in Table 4.

California AAQS (CAAQS) are more stringent than the National AAQS (NAAQS) but have less severe consequences when they are exceeded. Existing law requires district plans for attaining CAAQS to assess the cost-effectiveness of available and proposed emission control measures.

Table 3: State and Federal AAQS

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes here: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf Last checked on June 24, 2013

In 2004, a list of readily available, feasible, and cost-effective particulate matter (PM) control measures was published by CARB as required by Senate Bill 656 (2003, Sher). Each non-attainment air district has considered the list of measures, developed an implementation schedule for measures they plan to adopt, and most have made new rules as a result. AVAQMD's implementation schedule was adopted on August 16, 2005.

Table 4: AVAQMD Attainment Status

Pollutant	Federal Designation	California Designation
One-hour Ozone	---	Non-attainment (Extreme)
Eight-hour Ozone	Non-attainment (Moderate)	Non-attainment (Severe-17)
Particulate Matter (PM_{10})	Unclassified	Non-attainment
Particulate Matter ($PM_{2.5}$)	Unclassified/attainment	Unclassified
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Attainment/unclassified	Attainment/unclassified
Sulfur Dioxide	Attainment/unclassified	Attainment/unclassified
Lead	Attainment	Attainment
Sulfates	---	Unclassified
Hydrogen Sulfide	---	Unclassified
Visibility Reducing Particles	---	Unclassified
Sources: http://www.arb.ca.gov/desig/adm/adm.htm http://www.epa.gov/air/oaqps/greenbk/index.html		(last checked 12/30/2011)

3.1.2 Toxic Air Contaminants

Toxic air contaminants (TAC) are pollutants listed by the State of California that pose acute, chronic, and/or cancer health risks to exposed individuals. Hazardous air pollutants (HAP) are pollutants listed by federal EPA that pose acute, chronic, and/or cancer health risks to exposed individuals.

The Office of Environmental Health Hazard Assessment (OEHHA) is responsible for developing the scientific basis for listing TACs while CARB is responsible for implementing air toxic control measures (ATCM). Assembly Bill 1807 (AB1807) was passed in 1983 and requires California to identify and control TACs. TACs are formally identified through a detailed process which starts when a chemical's risk to human health and the environment are above certain criteria. Once TACs are identified, the emission sources, controls, technologies and costs are reviewed to determine if regulation is needed to reduce emissions. In 1993, AB1807 was amended by passage of AB2728 which requires the State to list the 189 federal HAPs in the TAC list.

In 1987, AB2588 air toxics "hot spots" program was established. It requires facilities to report their TAC emissions, determine localized health risk impacts, and notify nearby residents of significant risks. The program was amended in 1992 to require facilities to reduce any significant risks through the development of a risk management plan. The Hotspots Analysis and Reporting Program (HARP) is a tool that is used to assist with calculating TAC emission inventories and performing health risk assessments under the AB2588 Program.

Diesel particulate matter (DPM) is identified as a TAC and accounts for roughly 70% of the cancer risk from air pollution in urban areas where on-road sources dominate the inventory. Diesel engines are a ubiquitous source and thus it is not surprising that stationary source TAC effects "are generally much lower than region-wide risk levels, region-wide risks tend to overwhelm any potential local 'hot spots.'" (SCAQMD Mates II, Section 6.3).

CARB has promulgated air toxic control measures (ATCM) for both on-road and off-road diesel engines. Recently published EMFAC2011 and OFFROAD2011 models each contain the effects of control measures and turnover on the statewide and regional fleets.

3.1.3 Prevention of Significant Deterioration for Greenhouse Gases

On December 7, 2009, US EPA Administrator Lisa Jackson signed a final action, under Section 202(a) of the Clean Air Act, finding that six key greenhouse gases constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to the climate change problem (US EPA, 2009). The "endangerment finding" allowed EPA to begin regulating the six GHGs that are identified. Key effects that EPA claims support the determination that GHGs endanger public health include:

> *"**Temperature**. There is evidence that the number of extremely hot days is already increasing. Severe heat waves are projected to intensify, which can increase heat-related mortality and sickness. Fewer deaths from exposure to extreme cold is a possible benefit of moderate temperature increases. Recent evidence suggests, however, that the net impact on mortality is more likely to be a danger because heat is already the leading cause of weather-related deaths in the United States.*
>
> ***Air Quality**. Climate change is expected to worsen regional ground-level ozone pollution. Exposure to ground-level ozone has been linked to respiratory health problems ranging from decreased lung function and aggravated asthma to increased emergency department visits, hospital admissions, and even premature death. The impact on particulate matter remains less certain.*
>
> ***Climate-Sensitive Diseases and Aeroallergens**. • Potential ranges of certain diseases affected by temperature and precipitation changes, including tick-borne diseases and food and water-borne pathogens, are expected to increase. • Climate change could impact the production, distribution, dispersion and allergenicity of aeroallergens and the growth and distribution of weeds, grasses, and trees that produce them. These changes in aeroallergens and subsequent human exposures could affect the prevalence and severity of allergy symptoms.*
>
> ***Vulnerable Populations and Environmental Justice**. • Certain parts of the population may be especially vulnerable to climate impacts, including the poor, the elderly, those already in poor health, the disabled, those living alone, and/or indigenous populations dependent on one or a few resources. • Environmental justice issues are clearly raised through examples such as warmer temperatures in urban areas having a more direct impact on those without air-conditioning.*
>
> ***Extreme Events**. • Storm impacts are likely to be more severe, especially along the Gulf and Atlantic coasts. Heavy rainfall events are expected to increase, increasing the risk of flooding, greater runoff and erosion, and thus the potential for adverse water quality effects. These projected trends can increase the number of people at risk from suffering disease and injury due to floods, storms, droughts and fires."* (US EPA, 2009).

Subsequent to the endangerment finding, GHGs became regulated under the Clean Air Act (CAA). On May 13, 2010 EPA finalized the GHG Tailoring Rule which sets emissions thresholds to define when a Prevention Significant Deterioration (PSD) permit is required for new and modified sources. AVAQMD has not been delegated authority to implement PSD requirements and so the EPA would administrate permitting for major sources of attainment pollutants (e.g. GHGs, CO, and NO_2).

The CAA major source thresholds for criteria pollutants such as lead, sulfur dioxide and nitrogen dioxide, are 100 and 250 tons per year (tpy) depending on pollutant. While these thresholds are appropriate for criteria pollutants, they are not feasible for GHGs because GHGs are emitted in much higher quantities.

Under the GHG Tailoring Rule, PSD permitting requirements will cover for the first time new construction projects that emit GHG emissions of at least 100,000 tpy even if they do not exceed the permitting thresholds for any other pollutant. Modifications at existing facilities that increase GHG emissions by at least 75,000 tpy will be subject to permitting requirements, even if they do not significantly increase emissions of any other pollutant.

3.1.4 Local

The Project is located within the jurisdictional boundary of AVAQMD. The *Antelope Valley AQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines* (Guidelines, August 2011) were published in order to provide lead agencies, consultants, and project applicants with a framework and uniform methods for preparing air quality evaluations for environmental documents. This AQCCIA follows the methodologies outlined in the Guidelines.

The AVAQMD has a series of rules aimed at controlling emission from stationary sources of air pollution. The Project will be required to obtain stationary source permits from AVAQMD before construction and operation of those sources. The Project will also be required to comply with a number of rules:

- **Regulation IV – Prohibitions.** Rule 401 limits opacity of visible emissions. Rule 402 prohibits air pollutants from becoming a nuisance. Rule 403 includes performance standards for particulate matter emissions (e.g. no visible dust beyond the property line) and best available control measures that must be employed.
- **Regulation IX – New Sources Performance Standards (NSPS)**. This rule is enacted to adopt by reference all the applicable provisions regarding standards of performance for new stationary sources as set forth in 40 Code of Federal Regulations, Part 60 (40 CFR 60). Parts of the CFR section applicable to the Project include Part I that applies to hot mix asphalt plants and Part OOO which applies to non-metallic mineral processing plants.
- **Regulation XIII – New Source Review (NSR)**. NSR requires that new stationary sources of non-attainment air pollutants to be equipped with the best available control technology (BACT), which is the most stringent emission control technology achieved in practice. In addition, NSR requires that any new or modified facility with the potential to emit pollutants in levels in excess of the thresholds indicated in the rule offset a portion of its emissions.
- **Regulation XIV – Toxics and Other Non-Criteria Pollutants**. This regulation includes NSR for toxic air contaminants as well as other rules that implement air toxic control measures (ATCM). For instance, the purpose of Rule 1414 is to prevent the future sale and use of asbestos-containing serpentine material for surfacing applications in the South Coast Air Basin.

3.2 Climate Change Regulations

Climate change regulation and guidance is under development and the subject of ongoing litigation as stakeholders challenge regulatory reforms by local, regional and state government entities. CEQA greenhouse gas (GHG) regulations from the Governor's Office of Planning and Research (OPR) have been adopted. Potentially applicable laws, regulations, and executive orders are discussed in the upcoming sections of this document followed by a discussion of available guidance for evaluating climate change impacts under CEQA.

3.2.1 Laws, Regulations, and Executive Orders

California has passed several bills and the Governor has signed at least three executive orders aimed at reducing GHG emissions and related climate change impacts. The most prominent of these is Assembly Bill 32 (Nunez, 2006) - the "California Global Warming Solutions Act of 2006" (AB 32). Among other things, it is designed to reduce California's statewide GHG emissions to 1990 levels by 2020.

AB 32 states that it is the intent of the Legislature that CARB design emissions reduction measures to meet the statewide emissions limits for GHG in a manner that minimizes costs and maximizes benefits for California's economy, improves and modernizes California's energy infrastructure and maintains electric system reliability, maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality.

CARB approved the Scoping Plan at the Board hearing on December 12, 2008. The Scoping Plan contains the main strategies that California will use to reduce GHGs as required by AB 32. On August 24, 2011, CARB approved the Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document (2011 Supplement) which incorporates present year circumstances:

- **Development of measure-specific regulations already in effect**. The 2011 Supplement adopted by the Board includes estimates of reductions anticipated by 2020. These regulations, which reflect ARB's progress towards reducing statewide GHG emissions, include comprehensive documentation detailing the data sources and methods used to develop measures in the Scoping Plan. Each regulation's Initial Statement of Reasons (ISOR) contains the information necessary to evaluate how the reduction was calculated. All ISOR documents are available on ARB's website.
- **Severe and prolonged economic downturn**. The revised measure-specific emission reductions consider the economic downturn through the use of an updated GHG emission forecast. The updated forecast was developed using average emissions over a three-year period (2006-2008) projected to 2020. For energy consuming sectors, the projection is based on future demand for electricity and transportation fuels described in the California Energy Commission's 2009 Integrated Energy Policy Report (IEPR). The IEPR accounts for the recession using economic and demographic data. The 2009 IEPR document is available on the California Energy Commission's website.

The 2008 Scoping Plan called for approximately 29% reduction in GHG emissions statewide. This value was updated in the 2011 Supplement to approximately 16% reduction statewide. Control measures contained in the Scoping Plan that may affect Project emissions include, but are not limited to:

- **Transportation Measures**. These measures propose to reduce GHG's from vehicles by making vehicles more efficient, reducing the carbon content of the fuels, and reducing the vehicle miles traveled. Thus, vehicles would emit less GHG emissions in the future.

  a. Light Duty Vehicle GHG Standard (T-1). This measure implements AB 1493 (Pavley) standards and planned second phase of the program. Align zero-emission vehicle, and alternative and renewable fuel and vehicle technology programs with long-term climate change goals.

  b. Low Carbon Fuel Standard (T-2). This measure will reduce the carbon intensity of California's transportation fuels by at least ten percent (10%) by 2020. On December 29, 2011, a U.S. District Judge issued a preliminary injunction that ruled the CARB's low-carbon fuel regulations violated the U.S. Constitution's commerce clause by discriminating against crude oil and biofuels producers located outside California. CARB has said it will appeal the decision.

  c. Vehicle Efficiency Measures (T-4). This includes measures such as sustainable tire practices, properly inflating vehicle's tires, and possibly fuel-efficient tire standards.

- **Energy Measures**. These measures propose that utility operators replace some fossil fuel electricity generation capacity with renewable sources and reinforces incentives that are offered by local governments to encourage the placement of solar panels on new and existing structures. The Renewables Portfolio Standard (RPS) increases renewables from 12% in the baseline year(s) to 20% in 2020. The Renewable Electricity Standard (RES) is a separate measure that requires 33% renewables by 2020. The RES is implemented by the CEC and CPUC under SBX1-2, signed by Governor Brown in April 2011. Thus, electricity used by the Project will be less GHG intensive in the future.

- **Green Buildings (GB-1)**. Energy use from buildings in California is the second largest contributor to GHG emissions. This measure sets energy efficiency standards which will help reduce energy use and therefore GHG's. The California Building Standards Commission (CBSC) has adopted Green Building Standards Codes of 2008 and 2010. The 2008 Code regulates outdoor water use. The ARB encourages local governments to raise the bar by adopting "beyond-code" green building requirements. To assist this effort, State government would develop and regularly tighten voluntary standards, written in GBSC language for easy adoption by local jurisdictions.

- **Water**. Approximately one-fifth of the electricity and one-third of the non-power plant natural gas consumed in the state are associated with water delivery, treatment and use. Six reduction measures are proposed including three measures to reduce energy requirements associated with providing reliable water supplies at the urban end use and two measures are aimed at reducing the amount of non-renewable electricity associated with conveying and treating water. The final measure focuses on providing sustainable funding for implementing these actions.

Senate Bill 375 (SB 375) "Transportation planning: travel demand models: sustainable communities strategy: environmental review" was signed by the Governor on September 30, 2008. According to the Governor's press release:

> "*SB 375 requires the ARB to develop regional greenhouse gas emission reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035. The 18 [metropolitan planning organizations] MPOs in California will prepare a "sustainable*

communities strategy" to reduce the amount of vehicle miles traveled (VMT) in their respective regions and demonstrate the ability for the region to attain ARB's targets.

- *ARB would later determine if each region is on track to meet their targets.*
- *Builders also would get relief from certain environmental reviews under California Environmental Quality Act if they build projects consistent with the new sustainable community strategies.*
- *In addition, cities would get extra time -- eight years instead of five -- to update housing plans required by the state.*" (www.gov.ca.gov)

SB 375 is most concerned with automobile and light truck traffic, but the goal of reducing GHGs covers all transportation sources based on the need for sustainable communities.

> *"each transportation planning agency … shall prepare and adopt a regional transportation plan directed at achieving a coordinated and balanced regional transportation system, including, but not limited to, mass transportation, highway, railroad, maritime, bicycle, pedestrian, goods movement, and aviation facilities and services."* (Section 65080(a), underline added.)

The regional transportation plan is to be an internally consistent document and include a sustainable communities strategy (SCS).

> "*The sustainable communities strategy shall …(v) gather and consider the best practically available scientific information regarding resource areas and farmland in the region ….*" (Section 65080(b)(2)(B)(v), underline added.)

Resource areas include:

> "*areas of the state designated by the State Mining and Geology Board as areas of statewide or regional significance pursuant to Section 2790 of the Public Resources Code, and lands under Williamson Act contracts.*" (Section 65080.01(a)(4).)

Thus, SB 375 recognizes construction aggregate as a regionally significant resource that requires special consideration in transportation and land use planning efforts. Lastly, the MPOs:

> "*shall consider financial incentives for cities and counties that have resource areas*." (Section 65080(b)(4)(C).)

3.2.2 Guidance for Evaluating Climate Change Impacts under CEQA

The AVAQMD Guidelines contain a significance threshold for GHG emissions of 100,000 tons per year that is compared to emissions totals later in this AQCCIA.

Methods used and judgments made in the inventorying of emissions are informed by the CEQA amendments adopted by the California Natural Resources Agency (Resources Agency) on December 29, 2009. The amendments, which formally became incorporated into the Guidelines on March 18, 2010,

modified fourteen (14) sections of the State CEQA Guidelines, with notable amendments including the following new sections/subsections:

§15064.4. Determining the Significance of Impacts from Greenhouse Gas Emissions.

(a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

(1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or

(2) Rely on a qualitative analysis or performance based standards.

(b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

15126.4.(c) Mitigation Measures Related to Greenhouse Gas Emissions.

Consistent with section 15126.4(a), lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Measures to mitigate the significant effects of greenhouse gas emissions may include, among others:

(1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;

(2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures, such as those described in Appendix F;

(3) Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions;

(4) Measures that sequester greenhouse gases;

(5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.

4.0 ENVIRONMENTAL SETTING

Under CEQA, environmental setting includes physical as well as economic and social aspects of the environment in the Project vicinity. The environment is affected by emissions from day-to-day activities, including criteria air pollutants, air toxics, and GHGs.

4.1 Criteria Air Pollutants

Criteria air pollutants are monitored by the State and AVAQMD to ensure progress towards, or maintenance of, attainment with AAQS (see Table 3 and Table 4). The "AVAQMD 2004 Ozone Attainment Plan (State and Federal)" and "List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health & Safety Code §39614(d)" present control measures that will be implemented to reduce non-attainment pollutant concentrations and result in eventual attainment. Excerpts from each of these documents and the Guidelines discussing key aspects of environmental setting and trends are presented below.

> *"The jurisdiction of the AVAQMD covers 1300 square miles of wide arid valley with primarily desert like terrain and contains 400,000 persons. The District is a mixture of urban areas, primarily located in the cities of Lancaster and Palmdale, and outlying agricultural operations.*
>
> *The climate in the AVAQMD is desert. The cool moist costal air from the South Coast Air Basin is blocked by the San Gabriel and San Bernardino mountain ranges. The area is characterized by hot, dry summers and mild winters with annual rainfall averaging 2 to 5 inches per year. Meteorology tends to be influenced by a moderately intense anticyclonic circulation except during frontal activity (storms) in the winter. During the winter there are an average to 20-30 frontal systems. In the summer the AVAQMD is usually influenced by a Pacific Subtropical High cell that sits off the coast of California. The prevailing winds are out of the west and south, resulting in a general west to east flow*

across the AVAQMD." (Page 2, List and Implementation Schedule for District Measures to Reduce PM).

"The Antelope Valley is downwind of the Los Angeles basin, and to a lesser extent, is downwind of the San Joaquin Valley. Prevailing winds transport ozone and ozone precursors from both regions into and through the Antelope Valley during the summer ozone season. These transport couplings have been officially recognized by CARB.[1] *Local Antelope Valley emissions contribute to exceedances of both the NAAQS and CAAQS for ozone, but the Antelope Valley would be in attainment of both standards without the influence of this transported air pollution from upwind regions.*

[1] *"Ozone Transport: 2001 Review," April 2001, CARB identifies the South Coast Air Basin as having an overwhelming and significant impact on the Mojave Desert Air Basin (which includes the Antelope Valley) and the San Joaquin Valley as having an overwhelming impact on the MDAB." (Page 6, Ozone Attainment Plan).*

"The AVAQMD's PM tends to be primarily fugitive dust. This dust appears to be generated by both local sources and by region-wide dust during moderate to high wind episodes. These regional episodes tend to be multi-district and sometimes interstate in scope. The AVAQMD has identified the local source of fugitive dust to be primarily unpaved road travel, construction and local disturbed areas of soil concentrating in the urban populated areas within the district, and seasonal agricultural operations." (Page 2. "List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health & Safety Code §39614(d)").

"The MDAB is classified as a dry-hot desert climate (BWh), with portions classified as dry-very hot desert (BWhh), to indicate at least three months have maximum average temperatures over 100.4° F." (Page 4, Guidelines.)

4.2 Toxic Air Contaminants

DPM is the main TAC of concern for this project and statewide because it accounts for a majority of the cancer risk from pollutants in ambient air. CARB risk maps show that ambient air in urban areas of AVAQMD exhibits a total cancer risk of between 100 and 250 excess cancer cases per one million people exposed.

4.3 Greenhouse Gases

GHGs in the atmosphere contribute to climate change. Historically, the California Energy Commission (CEC) has maintained an inventory of California's statewide GHG emissions Table 5 provides a summary of the 2004 statewide GHG emissions by sector.

Table 5: California's GHG Emissions (MMTCO2e/yr)

Sector	1990 Actual [Target]	2008 Actual	2020 BAU – 2008 Scoping Plan	2020 BAU – 2011 Update
Transportation	150.67	174.99	225.4	192
Electricity	108.05	116.35	139.2	118
Commercial and Residential	44.09	43.13	46.7	40
Industry	96.18	92.66	100.5	85
Recycling and Waste	6.26	6.71	7.7	7
High GWP	3.17	15.65	46.9	40
Agriculture	23.62	28.06	29.8	25
Forestry Net Emissions	-4.7	0.19	0.0	0.0
Emissions Total	**427**	**477.74**	**596**	**507**

Appendix F, Climate Change Scoping Plan, December 2008.
http://www.arb.ca.gov/cc/inventory/archive/tables/ghg_inventory_ipcc_90-04_all_2007-11-19.pdf
http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-08_2010-05-12.pdf
http://www.arb.ca.gov/cc/scopingplan/document/Supplement_to_SP_FED.pdf (Details by sector estimated based upon ratio to total.)

4.4 Inelastic Demand

Construction aggregate is essential to modern society. It is used in the construction of streets, buildings, and many other forms of infrastructure. Life as we now know it would not be possible without this resource. According to the Department of Conservation's Map Sheet 52 – Aggregate Availability in California (Susan Kohler, 2006 and Clinkenbeard, 2012), California's 50-year aggregate demand (the amount of aggregate needed over the next 50 years) of 13,536 million tons far exceeds its permitted supply of 4,343 million tons. This situation is amplified by the decreasing supply of permitted reserves, which have dropped by 2,505 million tons from 2001 (Kohler, 2006). The insufficient supply is especially problematic in southern California; where aggregate is shipped long distances across county lines to satisfy the large demand in the Los Angeles, Ventura, and San Diego areas.

This Project is expected to supply aggregate and related construction materials to the Palmdale, San Fernando, San Gabriel, and San Bernardino production-consumption areas (see Kohler, 2006 for information about production-consumption areas). The 50-year aggregate demand in all of these areas is not satisfied by currently permitted supply, as illustrated by Table 6. In order to satisfy the demands of an increasing southern California population, more aggregate reserves will need to be mined.

Table 6: Surrounding 50-Year Supply/Demand Situation

Production-Consumption Area	50-Year Supply (Million Tons)		50-Year Demand (Million Tons)		Percent of Demand Satisfied	
	2006	2012	2006	2012	2006	2012
Palmdale	181	152	665	577	27%	26%
San Fernando Valley	88	77	457	476	19%	16%
San Gabriel Valley	370	322	1,148	809	32%	40%
San Bernardino Valley	262	241	1,074	993	24%	24%
Total	901	792	3,344	2,855	27%	28%
Source: Map Sheet 52, California Geological Survey (Kohler, 2006; revised and Clinkenbeard, 2012).						

The demand for aggregate, asphalt, and concrete is inelastic. Inelastic demand means that neither the supply nor the price of aggregate influences its demand. In fact, aggregate demand is most closely related to population which is used by the CGS in estimating 50-Year Demand. Population is also used to estimate existing and future year demand in this AQCCIA. Population forecasts for the market areas served by the Project are presented in Table 7.

Table 7: Population Forecasts for the Project Market Area

LOCATION	2010	2012	2020	2035
OUTSIDE LA COUNTY	2,150,836	n/a	2,427,067	2,876,309
LA CITY	1,730,818	n/a	n/a	n/a
LA COUNTY	126,361	n/a	n/a	n/a
TOTAL	4,008,015	4,130,903	4,622,455	5,600,178
Appendix B describes how these population estimates were made.				

This Project will not affect demand for construction materials but will affect the supply. Initially, the Project will replace existing haul truck traffic related to the delivery of aggregate that is occurring in the existing physical setting rather than generate new trips. In addition, there is a real possibility that the average trip length will be reduced. These concepts are supported by Dr. Peter Berck's Working Paper No. 994 – A Note on the Environmental Costs of Aggregate (Department of Agricultural and Resource Economics and Policy, Division of Agriculture and Natural Resources, University of California at Berkeley, January 2005, Appendix B). An excerpt of this paper follows:

The opening of a new quarry for aggregates will change the pattern of transportation of aggregates in the area served by the quarry. In this note, we will show that, so long as aggregate producers are cost minimizing, the new pattern of transportation requires less truck transport than the pattern of transportation that existed before the opening of the new quarry. Since the costs of providing aggregates falls, it is reasonable to assume that the price of delivered aggregates also will fall. This note also shows that the demand expansion effect is of very small magnitude. Since the demand increase from a new quarry is quite small, the dominant effect is that the quarries are on average closer to the users of aggregates and, as a result, the truck mileage for aggregate hauling decreases. To summarize the effects of a new quarry project:

a) The project in itself will not significantly increase the demand for construction materials in the region through market forces, which include the downward pressure on pricing.

b) Truck traffic (i.e. vehicle miles traveled) in the region will not increase and may decrease as a result of the project.

As a result, the effect of a new quarry project will be to reduce the air emissions from aggregate trucking. The reduction in emissions should be included as a positive impact of a quarry project in any analysis of the environmental consequences of a new quarry.

Caltrans has issued the fact sheet titled, "Construction Aggregate Supply Limitations – Some Estimates of Economic Impact" (Fact Sheet, November 2011) that expands upon the ideas in Dr. Berck's paper. The Fact Sheet (Appendix B) estimates financial and environmental costs associated with adequacy and cost-effectiveness limitations that currently affect the aggregate supply in California.

In summary, haul truck trips related to the delivery of aggregate already occur in the existing physical setting to satisfy current demand. The inelasticity of aggregate demand also applies to products that utilize aggregate as the primary component, such as ready mix concrete and hot mix asphalt. Future growth in population will result in growth in aggregate demand over current levels. The Project is assessed for its fair share of the future increase in aggregate and other building materials consumed in the market that will be served. This basis for analysis is consistent with that taken in the approved Handley Ranch Quarry DEIR (Monterey County, State Clearinghouse No. 2002041005, May 2003) and affects the quantification of off-site haul truck emissions (Section 7.2).

5.0 SIGNIFICANCE THRESHOLDS

AVAQMD significance thresholds are presented in the Guidelines:

"*Any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The District will clarify upon request which threshold is most appropriate for a given project; in general, the emissions comparison (criteria number 1) is sufficient:*

1. *Generates total emissions (direct and indirect) exceeding the thresholds given in [Table 8 below]; and/or,*
2. *Generates a violation of any ambient air quality standard when added to the local*

background; and/or,

3. *Does not conform with the applicable attainment or maintenance plan(s);*[1] *and/or*
4. *Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.*[*]

[*] *Refer to the Sensitive Receptor Land Use discussion above [Industrial projects within 1,000 feet of a sensitive receptor require health risk assessment].*

[1] *A project is deemed to not exceed this threshold, and hence not be significant, if it is consistent with the existing land use plan. Zoning changes, specific plans, general plan amendments and similar land use plan changes which do not increase dwelling unit density, do not increase vehicle trips, and do not increase vehicle miles traveled are also deemed to not exceed this threshold.*

A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that a multi-phased project (such as a project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value."

Table 8: AVAQMD Significance Thresholds

Pollutant	AVAQMD Annual Threshold (tons)	AVAQMD Daily Threshold (lb)
Greenhouse Gases (CO_2e)	100,000	548,000
Carbon Monoxide (CO)	100	548
Oxides of Nitrogen (NOx)	25	137
Volatile Organic Compounds (VOC)	25	137
Oxides of Sulfur (SOx)	25	137
Particulate Matter (PM_{10})	15	82
Particulate Matter ($PM_{2.5}$)	15	82
Hydrogen Sulfide (H_2S)	10	54
Lead (Pb)	0.6	3

The AVAQMD significance threshold for GHGs (100,000 tons/yr), while higher than other screening criteria (e.g. SCAQMD 10,000 $MTCO_2e$/yr), is applied because it is supported by substantial evidence and most directly applicable to the Project. Specifically, 100,000 tons/year of GHG emissions from a single facility constitutes a major source that requires a federal operating permit. Similarly, the AVAQMD NOx significance threshold of 25 tons/year is equal to the major source threshold applicable to areas designated severe non-attainment for ozone.

Other air districts (primarily Mojave Desert, South Coast, and Ventura) will experience travel of haul trucks carrying materials to and from the Project within their boundaries. Table 9 presents thresholds for the other districts.

Table 9: Significance Thresholds of Other Air Districts

District	Units	VOC	NOx	CO	SOx	PM10	PM2.5
MDAQMD	TPY	25	25	100	25	15	15
SCAQMD	lb/day	55	55	550	150	150	55

6.0 CONSTRUCTION PHASE IMPACTS

This section discusses the methodologies used to calculate construction phase emissions impacts.

6.1 Construction Emission Calculations

Construction emissions were calculated using CARB's URBEMIS2007 model version 9.2.0 (Appendix C). A 30.4 acre portion of land will require grading to prepare for the construction of the facility. The following phases and URBEMIS2007 default assumptions were utilized to calculate emissions:

- Mass site grading, which is performed by 1 grader, 1 dozer, 2 loaders, and 1 water truck. The default emission factor of 20 lbs/acre-day is used.
- Fine site grading, which is performed by 1 grader, 1 dozer, 2 loaders, and 1 water truck. The default emission factor of 20 lbs/acre-day is used.
- Paving, which is performed by 4 cement and mortar mixers, 1 paver, 2 pieces of paving equipment, and 1 roller.
- Building construction, which is performed by 1 crane, 2 forklifts, 1 generator, 1 loader, and 3 welders.

URBEMIS2007 is an older model that produces conservatively high results as compared to what would be estimated by newer models (e.g. CalEEMod and OFFROAD2011). In addition, construction phase is short and should have less significant effects on air quality than the Project operation phase. Therefore, the older URBEMIS2007 results are retained even through newer models exist.

In addition, the following control measures are assumed:

- Disturbed surface areas and unpaved roads will be watered twice daily.
- Vehicle speed will be limited to 15 mph on unpaved roads.
- Low sulfur diesel fuel will be used in all equipment.

6.2 Construction Emissions Results and Significance Determination

Table 10 presents results of the construction emissions calculations and presents significance determination for each pollutant. As discussed in Section 5.0, the pound per day threshold is used because construction lasts for less than one year.

Table 10: Construction Emissions

Peak Day Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Unmitigated Total	15.88	132.53	158.67	0.23	154.04	33.62
Mitigated Total	15.88	129.80	158.67	0.23	69.43	15.22
Threshold	137	137	548	137	82	82
Significant?	No	No	No	No	No	No

7.0 UNMITIGATED PROJECT IMPACTS

Operation phase emissions impacts are addressed in this section. Localized impacts from Toxic Air Contaminants are presented in the Project's Air Quality Health Risk Assessment (March 8, 2012). Table 11 summarizes the 2014 unmitigated emissions and compares them to the significance thresholds.

Table 11: Peak Year Unmitigated Emissions (tpy)

Source	VOC	NOx	CO	SOx	PM10	PM2.5
Agg Plant					3.68	1.06
RMC Plant					0.78	0.23
Asphalt Plant	2.45	1.88	3.45	0.04	3.45	3.38
Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
VacLite					0.01	0.00
Cement Transfer					0.10	0.03
Generator	0.00	0.02	0.01	0.00	0.00	0.00
Haul Trucks (off-site)	0.25	2.16	1.25	0.01	0.16	0.00
Road Dust (off-site)					1.23	0.30
Haul Trucks (on-site)	0.20	2.33	0.72	0.00	0.05	0.01
Worker Commute	0.63	0.74	8.78	0.01	0.15	0.06
Train	0.03	1.14	0.11	0.07	0.02	0.02
Off Road	2.28	34.08	45.38		1.39	1.28
Fugitive Dust					39.51	4.66
Total:	**5.87**	**43.09**	**60.13**	**0.15**	50.56	11.06
Significance Threshold	25	25	100	25	15	15
POTENTIALLY SIGNIFICANT	No	Yes*	No	No	Yes*	No
* Mitigated impacts (Section 9.0) are less than significant						

Project significance in this AQCCIA is based upon emissions from sources discussed in the following subsections. Stationary source emissions calculations are presented in Appendix D. Mobile source emissions characteristics change over time and calculations are presented in Appendix E. Fugitive dust source emissions are calculated in Appendix F. Greenhouse gas emissions are presented in Appendix G.

The Lowered Facilities Alternative is assessed for affected sources

7.1 Direct Sources

For this project, direct sources include only those sources which occur on-site. Off-site sources (e.g. on-road trucks) are assumed to be affected indirectly by the Project.

7.1.1 Aggregate Plant Emissions

Aggregate is mined and transported to the aggregate plant using off road equipment (Section 7.1.11). Unprocessed aggregate is transferred by haul trucks to hoppers and then conveyed to a jaw crusher (note that the mitigations in Section 8.2 modify this process). After crushing, the aggregate is conveyed to a surge pile. From the surge pile, an underground conveyor will transfer the aggregate onto a conveyor to be screened. From there, the material is stock piled or conveyed through another series of crushers and screens until it is appropriately sized. About 40% of the aggregate will go through a wet screening process. Water spray sufficient to maintain at least 3% moisture at all other processing points will be utilized. Fines will be conveyed to a backfill area. Emissions are based on the material throughput and emission factors from AP42. Emissions from wet operations and underground transfers are zero. See Appendix D for emission calculations.

7.1.2 Ready-Mixed Concrete Plant Emissions

Approximately 225,000 yd^3 of concrete will be produced during the peak year of operation. This corresponds to approximately 360,600 tpy. The concrete is made of 78% aggregate material (281,300 tons), which will be transferred by loader from stockpiles to the ready-mixed concrete plant's aggregate storage area. From the storage bin it will be conveyed to a hopper and then loaded into the mixer. Cement and flyash make up 14% of concrete. About 63,000 tpy of cement and flyash will be pneumatically loaded into silos. It will then be conveyed via a closed system to the hopper. Water and admixtures will be added to the aggregate, cement, and flyash in the mixer to produce the product, which will then be loaded out into concrete trucks. Emissions from this process are based on material throughputs and emission factors from AP42. See Appendix D for emission calculations.

7.1.3 Asphalt Plant Emissions

Operation of the asphalt plant includes several sources of air emissions. Emission calculations are included in Appendix D for the following sources.

- **Dryer/mixer emissions**. Wet aggregate is dried prior to being sent to the mixer where it is combined with asphaltic oil. The low NOx propane burner used during the drying process has a rating of 100 MMBtu/hr. The burner will comply with BACT which is assumed to be consistency with AVAQMD Rule 1146(c)(1) which limits NOx emissions to less than 0.05 lb/MMBtu. PM_{10} emissions from the dryer and mixer will be controlled by a knock out box and a baghouse (fabric filter). This control technology is assumed to provide an overall control efficiency of 89.9% for particulate material (90% capture efficiency and 99.9% control efficiency). In addition, emissions from the mixer are recirculated through the dryer burner to achieve 88.2% control of

VOCs (90% capture and 98% control). AP42 emission factors are used.

- **Silo loading emissions**. PM_{10} emissions from silo loading will be controlled by a Blue Smoke Control filtration system. As per manufacturer specifications, this system is assumed to provide 95% control of PM_{10} emissions. Blue smoke filtration will control emissions of some semi-volatiles, but these effects are not quantified in this analysis. AP42 emission factors are used.
- **Asphalt load out emissions**. PM_{10} emissions from load out will be controlled by a Blue Smoke Control filtration system. The system is assumed to provide 95% control of PM_{10}. Blue smoke filtration will control emissions of some semi-volatiles, but these effects are not quantified in this analysis. AP42 emission factors are used.

7.1.4 Oil Heater Emissions

Asphalt oil must be heated in order to flow as a liquid. To keep the oil from hardening in the oil storage tank, oil heaters will be used twenty-four (24) hours per day, 365 days per year. The emission calculations are based on a burner firing at 1.2 MMBtu/hr, or 10,512 MMBtu/yr. This corresponds to approximately 115,000 gallons of propane each year. AP42 Table 1.5-1 emission factors are used. Emission calculations are included in Appendix D.

7.1.5 Vac-Lite Plant Emissions

Volcanic aggregate is delivered to the plant via bottom dump haul truck. The haul trucks will dump the aggregate onto a grizzly hopper/screen, which will then load onto a conveyor. The unprocessed material will be conveyed into a vessel where it will be treated with high pressure water and cement. The processed material will then be conveyed to a stock pile. Stock piled material will either be loaded immediately into haul trucks for delivery or kept wet for later delivery. Since the plant will run on electricity, the only emissions that occur from operation of the Vac-Lite plant are particulates. The peak year throughput of 30,000 tons and the emission factors from AP42 are used to calculate particulate emissions in Appendix D. Note that once the material enters the processing vessel, it is wet and, therefore, does not have any PM emissions. Emissions before that point are controlled using water spray sufficient to maintain 3% moisture in the aggregate.

7.1.6 Cement Loading Emissions

Cement is purchased from an outside source and would be delivered to the plant via train. During the peak year, 300,000 tpy will be pneumatically unloaded from the train into an elevated silo. About 82% of this (246,000 tpy) is sold as raw cement during the peak year (as opposed to 88% in the average year). All cement loading and unloading transfer points are controlled by a fabric filter. AP42 emission factors are used. Emission calculations are included in Appendix D.

7.1.7 Generator Emissions

The diesel generator will only be used for emergency situations and will run for testing a maximum of fifty (50) hours per year. Emissions calculations are based on the fifty (50) hours per year run time with an emission factor equivalent to the Tier 2 off road equipment standards. Emission calculations are included in Appendix D.

7.1.8 On-Site On Road Haul Truck Emissions

On road haul trucks travel several routes through the facility depending upon what material they carry.

Vehicles are assumed to operate at 15 mph and each vehicle is assumed to idle for five minutes while on-site. Vehicle activity also creates road dust. Both running exhaust and road dust emissions are dependent on the distance traveled. The Project running emissions were compared to the Lowered Facilities Alternative running emissions calculated in Appendix E to show that the Lowered Facilities Alternative results in slightly greater travel distances and emissions. Therefore, this AQCCIA conservatively assumes that the Lowered Facilities Alternative emissions from on-site truck operation are also representative of the Project emissions which are slightly less.

7.1.9 Worker Commute Emissions

One hundred and fifty-six (156) employees, including plant operators and truck drivers, will make one round trip (i.e. commute to and from work) per day for 303 days per year (47,268 round trips per year). The plant will operate two or three shifts per day, six days per week, with a maximum of 88 employees working per shift. Travel distances were approximated using the assumption that the employees will be commuting from Palmdale and Lancaster. Emission factors were developed using EMFAC2011 for gasoline powered, light duty auto vehicles operating in AVAQMD. Emission calculations are included in Appendix E.

7.1.10 Rail Emissions

Emissions due to haul of cement by train are based on the number of trips required annually to supply 300,000 tpy of cement and emission factors from CARB's Locomotive Emission Study (January 1991). Emissions are calculated for each of the following segments:

- **Incoming**. Trains approach the facility from the north, spending 41.5 minutes cruising at a speed of 40 mph (notch 5) in the AVAQMD jurisdiction, and 10 minutes braking.
- **Idling**. Trains idle for 30 minutes while the cement transfer facility silos are filled.
- **Outgoing**. Trains leave the facility heading south, spending 14.5 minutes accelerating (increasing from notch 1 to notch 5), and 48.5 minutes cruising at 40 mph in the AVAQMD jurisdiction.

7.1.11 Off Road Equipment Emissions

Off road vehicles are used to mine, load, and transport materials as well as to maintain on site roads. Project off road equipment includes:

- One grader to maintain roads and surfaces;
- One loader serving the aggregate plant;
- One loader serving the asphalt plant;
- One loader serving the RMC plant;
- One loader serving the aggregate pit operations (the mitigations in Section 8.2 eliminate this piece of equipment);
- One water truck to wet roads and surfaces;
- One street sweeper to control dust on paved roads;

- One articulated truck for material transport in the plant;
- One excavator used in mining operations;
- One dozer used in mining operations (the mitigations in Section 8.2 eliminate this piece of equipment); and
- Two off road trucks for material transport in the pit (the mitigations in Section 8.2 eliminate these pieces of equipment).

Note that, in addition to the above indicated changes, the mitigations presented in Section 8.2 add a crane (i.e. drag line) to the equipment list. Hours of operation for the loaders, pit haul trucks, and excavator are based on cycle time analysis using Caterpillar Performance Handbook Edition 37 methodologies. For the remaining equipment, hours of operation are assumed based on the project description and yearly throughputs. Vehicle horsepowers are based on manufacturer specifications for units described by the Applicant where known and CalEEMod defaults. Load factors are based on OFFROAD2011 defaults. Emission factors are based on the equipment type, engine model year, and engine horsepower. Welding and fuel service/maintenance vehicles are not included because their use is incidental and often in place of more heavy equipment.

Emissions from off road equipment decrease over time, due to the ATCM regulations (Section 3.1.2). Emissions for each year of Project operation are calculated in Appendix E in order to determine the year with the largest amount of Project induced emissions from mobile sources.

7.1.12 Fugitive Dust

Project activities that produce fugitive dust include:

- Material loading;
- Material drops/unloading;
- Movement of vehicles on paved roads; and
- Movement of both on and off road vehicles on unpaved roads/disturbed areas.

Emissions from material loading and unloading are calculated based on the amount of material moved and AP42 emission factors, assuming 3% moisture content in the materials. Emissions from vehicle travel on unpaved roads are based on VMT and the AP42 emission factors. Emissions from vehicle travel on paved roads are based on VMT and an emission factor determined by equation in AP-42 Section 13.2.1 (January 2011). Emission calculations are included in Appendix F.

7.2 Indirect Sources

Indirect impacts are the result of changes that occur due to the existence of the Project, but are not a part of the Project. According to the Guidelines, indirect impacts include:

- Construction of support infrastructures;
- Housing constructed and/or occupied by mine employees; and
- Changes in traffic/circulation patterns.

7.2.1 Worker Related Emissions

The Project will only employ 156 people, most of whom are expected to already live in the surrounding areas. If a portion of the employees do move into the area, the magnitude of the population increase is expected to be within the bounds of normal population growth. Furthermore, the Project is not growth inducing, as discussed in Section 4.4. For these reasons, the construction of support infrastructures and/or housing in exceedence of what is necessary to accommodate normal growth is not expected.

7.2.2 Off-Site Electricity Generation Emissions

The Project facilities, including conveyors, will run primarily on electricity. This will cause an indirect source of emissions at the power plant where the electricity is produced. Indirect impacts from electricity usage are quantified for the GHG impact assessment.

7.2.3 Haul Truck Emissions

As discussed in Section 4.4, aggregate demand is inelastic and, therefore, this Project will not have an effect on demand. Furthermore, haul truck trips already exist to meet the current demand. Initially, this Project will not generate new haul truck trips, it will replace existing trips. This concept extends to material which is made with aggregate as the primary ingredient, such as concrete and asphalt.

Demand for aggregate and related materials increases as the population grows and emissions from material transport have a corresponding increase. The Project would not satisfy all demand resulting from future population growth but would be responsible for its fair share of future increases in aggregate consumption and impacts resulting from new trips beyond those already occurring in the existing physical setting. For this reason, haul emissions associated with the Project's market share of this increase in demand are calculated and utilized to determine Project significance for pollutants effects that are assessed on a regional or larger scale. Potential to emit approach was also used to calculate haul truck emissions and those results are disclosed in Appendix I.

Project generated haul truck emissions for the first year of operation are assumed to be zero, because Project trips replace existing trips originating elsewhere. The increase in annual aggregate demand after the first year of operation is calculated based on population estimates for the Project's Market Area (Table 7) and the statewide average rate of consumption reported in Map Sheet 52 (2006) of 6.6 tons per person per year. The Project's fair share of this growth is calculated based on the ratio of Project peak production (2 MMtpy) to demand in the Project's Market Area (27 MMtpy). This value is then used to calculate emissions from haul trucks. This approach is consistent with that used in the approved Handley Ranch DEIR (State Clearinghouse No. 2002041005, May 2003). Emission calculations and more information regarding this approach are included in Appendices B and E.

Vehicle miles traveled (VMT) are calculated using a VMT/ton aggregate factor (2.73 VMT/ton aggregate overall and less within each air district). This value is determined based on conservative estimates of delivery and import distance. Only emissions occurring within AVAQMD (2.21 VMT/ton) jurisdiction are included in the regional criteria pollutant threshold comparisons (i.e. Table 11 and Table 13). GHG emissions impacts are evaluated for the entire length of the haul (i.e. Table 12 and Table 14). VMT due to imports of raw materials are included because they are governed by the aggregate throughput. The calculation for the VMT/ton aggregate factor is included in Appendix E. Truck trips associated with the Vac-Lite plant are not directly included in the calculations because they are assumed to replace other trips (aggregate, RMC, or asphalt) and thus do not increase the number of trips.

Emissions are calculated using the Project's share of increased aggregate demand projected for the region, the VMT/ton factor, and emission factors from EMFAC2011. As time passes, haul truck emissions per VMT reduce due to cleaner burning fuel and engines. Emissions from on road haul truck activity are calculated for each project year in order to determine the year with the largest amount of Project induced emissions.

7.3 Greenhouse Gasses

GHG emissions are generated by stationary and mobile equipment. Stationary sources include propane combustion in the asphalt plant, propane combustion in the asphaltic oil heaters, and diesel combustion in the emergency generator. Mobile sources include off road equipment, on road haul trucks, and worker commutes. GHG emissions have been calculated based on the CCAR's General Reporting Protocol (GRP v3.1) methodologies. The results of these calculations are presented in Table 12. Emission calculations are presented in Appendix G.

Table 12: Unmitigated Greenhouse Gas Emissions (metric tonnes/year)

Source	CO_2	CH_4	N_2O	CO_2e
Stationary Source Total	5,366	0.28	0.09	5,401
Mobile Source Total	5,531	0.16	0.24	5,608
Electricity Use	---	---	---	729
Water Use	---	---	---	36
Total Activities	---	---	---	11,774
Threshold (converted from tons)*	---	---	---	90,700
Significant?	---	---	---	No

* Note: multiply tons by 90.7% to calculate metric tonnes (i.e. threshold is 100,000 tons per year).

7.4 Conformance with the Air Quality Plans

A Project is considered non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. In order to demonstrate consistency with the AQMP, a project must demonstrate consistency with the population forecasts contained therein. Since this Project is not growth inducing, it is expected to remain consistent with the AQMP population forecasts. Furthermore, the Project will remain consistent with the control strategies outlined in the AQMP by complying with stationary source BACT requirements and regulations promulgated by local, state and federal air agencies.

In order to eliminate conformity impacts, the Project will:

- Reduce emissions to less than the significance thresholds;
- Meet AVAQMD New Source Review standards; and
- Follow zoning specifications as required for permitting.

8.0 MITIGATION MEASURES

For each potential adverse impact, mitigation measures are identified to reduce impacts below the applicable threshold of significance.

8.1 Construction Phase

Mitigation measures that are assumed in the construction emissions quantification (Section 6.0) and may be implemented to ensure consistency with this analysis:

AQ1. Disturbed surface areas and unpaved roads will be watered twice daily.
AQ2. Vehicle speed will be limited to 15 mph on unpaved roads.
AQ3. Low sulfur diesel fuel will be used in all equipment.

8.2 Operation Phase

As shown in Table 11, unmitigated emissions of NOx and PM10 exceed the significance thresholds. These impacts would be mitigated by changing the mining process. Rather than loading mine haul trucks, material would be piled using a dragline and then loaded into a portable crusher by an excavator. The following changes to the off road equipment would be required before the amount mined exceeds 800,000 tons per year:

- The D8R dozer is eliminated;
- The 980G loader used in the pit is eliminated;
- The two 773 trucks used to transport material in the pit are eliminated; and
- A crane, equipped with a drag line, is required.

NOx emissions assessed herein and cancer risk impacts assessed in the HRA would each be reduced to less than significant levels, by proposed mitigation measures AQ4 and AQ5 which reflect the above equipment list changes:

AQ4. Aggregate material will be excavated using a dragline and portable crusher prior to exceeding 800,000 tons per year of material fed to the Aggregate Plant.
AQ5. The portable primary crusher will be located in the pit and off road haul trucks will not be used in the pit.

Fugitive dust emissions are also reduced as a result of AQ5 due to the elimination of off road truck travel on unpaved roads. PM_{10} and $PM_{2.5}$ emissions (i.e. fugitive dust) would be further reduced to less than significant levels by proposed mitigation measure AQ6:

AQ6. Unpaved roads will be controlled by the application of chemical dust suppressants and maintained in a controlled state by watering or other means.

Odor will be caused by the asphalt plant due to emissions of oil mist (i.e. blue smoke). Blue smoke filtration technology will be used to control emissions and related odor as discussed in proposed mitigation measure AQ7:

AQ7. Blue Smoke Control equipment will be used to collect vapors from the asphalt plant's mixing drum, drag conveyor, silos, and loading area.

9.0 MITIGATED PROJECT IMPACTS

As a result of the mitigation measures presented in Section 8.0, emissions of criteria pollutants and GHGs decrease. As discussed in Section 8.2, mitigation measures AQ4 and AQ5 result in a modified off road equipment list. Also, as discussed in Section 8.2, mitigation measures AQ5 and AQ6 result in a reduction of fugitive dust emissions. Table 13 presents the resulting emissions. Note that, due to the modified equipment list and the phasing in of the off road ATCM regulations, the Project year with the largest emissions is 2015. A timeline illustrating this effect is presented in Appendix H, along with remaining mitigated emission calculations.

Table 13: Mitigated Emissions (tpy)

Source	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Aggregate Plant					3.68	1.06
RMC Plant					0.78	0.23
Asphalt Plant	2.45	1.88	3.45	0.04	3.45	3.38
Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
Cement Transfer Facility					0.01	0.00
Vac-Lite Plant					0.10	0.03
Emergency Generators	0.00	0.02	0.01	0.00	0.00	0.00
Haul Trucks (off-site)	0.25	2.16	1.25	0.01	0.16	0.00
Road Dust (off-site)					1.23	0.30
Haul Trucks (on-site)	0.17	0.94	0.63	0.00	0.01	0.01
Worker Commutes	0.63	0.74	8.78	0.01	0.15	0.06
Haul Train	0.03	1.14	0.11	0.07	0.02	0.02
Off Road Equipment	0.83	12.26	20.34	0	0.48	0.44
Fugitive Dust					4.13	0.53
TOTAL	**4.39**	**19.9**	**35.00**	**0.15**	**14.2**	**6.09**
Significance Threshold	25	25	100	25	15	*10
SIGNIFICANT	No	No	No	No	No	No
Mitigation Reduction	1.48	23.21	25.13	0.00	36.33	4.97
% Reduction	25%	54%	42%	0%	72%	45%

Mitigation measures AQ4 and AQ5 were developed to mitigate criteria pollutants but also have a co-benefit of mitigating GHG emissions. Mitigated GHG emissions are presented in Table 14 and the emission calculations are included in Appendix H.

Table 14: Mitigated Greenhouse Gas Emissions (metric tons/year)

Source	CO_2	CH_4	N_2O	CO_2e
Stationary Source Total	5,366	0.28	0.09	5,401
Mobile Source Total	4,118	0.13	0.16	4,170
Electricity Use	---	---	---	729
Water Use	---	---	---	36
Total Activities	---	---	---	10,336
Threshold (converted from tons)*	---	---	---	90,700
Significant?	---	---	---	No

* Note: multiply tons by 90.7% to calculate metric tonnes (i.e. threshold is 100,000 tons per year).

10.0 CUMULATIVE IMPACTS

CEQA addresses cumulative significance in the following rule text:

> *"A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact." (14 CCR 15130).*

By their nature, air quality significance thresholds assess cumulative effects. Impact of the Project on regional ozone and particulate matter concentrations would be less than cumulatively considerable because Project-related emissions do not exceed the tons per year significance thresholds. The Project's contribution remains less than cumulatively considerable when the effects are combined with the effects of all other mining projects in the region because the tons per year thresholds (i.e. amount that is cumulatively considerable) are not exceeded. No other mines exist in the immediate vicinity of the Project that would contribute to local concentrations of pollutants. As discussed in Sections 4.4 and 7.2, mobile source activity produces the majority of ozone precursor emissions and will be minimized by addition of a new mine as well as controlled by implementation of CARB regulations. Thus, the Project will be expected to implement its fair share of measures designed to alleviate the cumulative impacts that occur on regional ozone and particulate matter concentrations. The Project's impact on these cumulative effects is less than cumulatively considerable.

11.0 FINDINGS

This AQCCIA finds that:

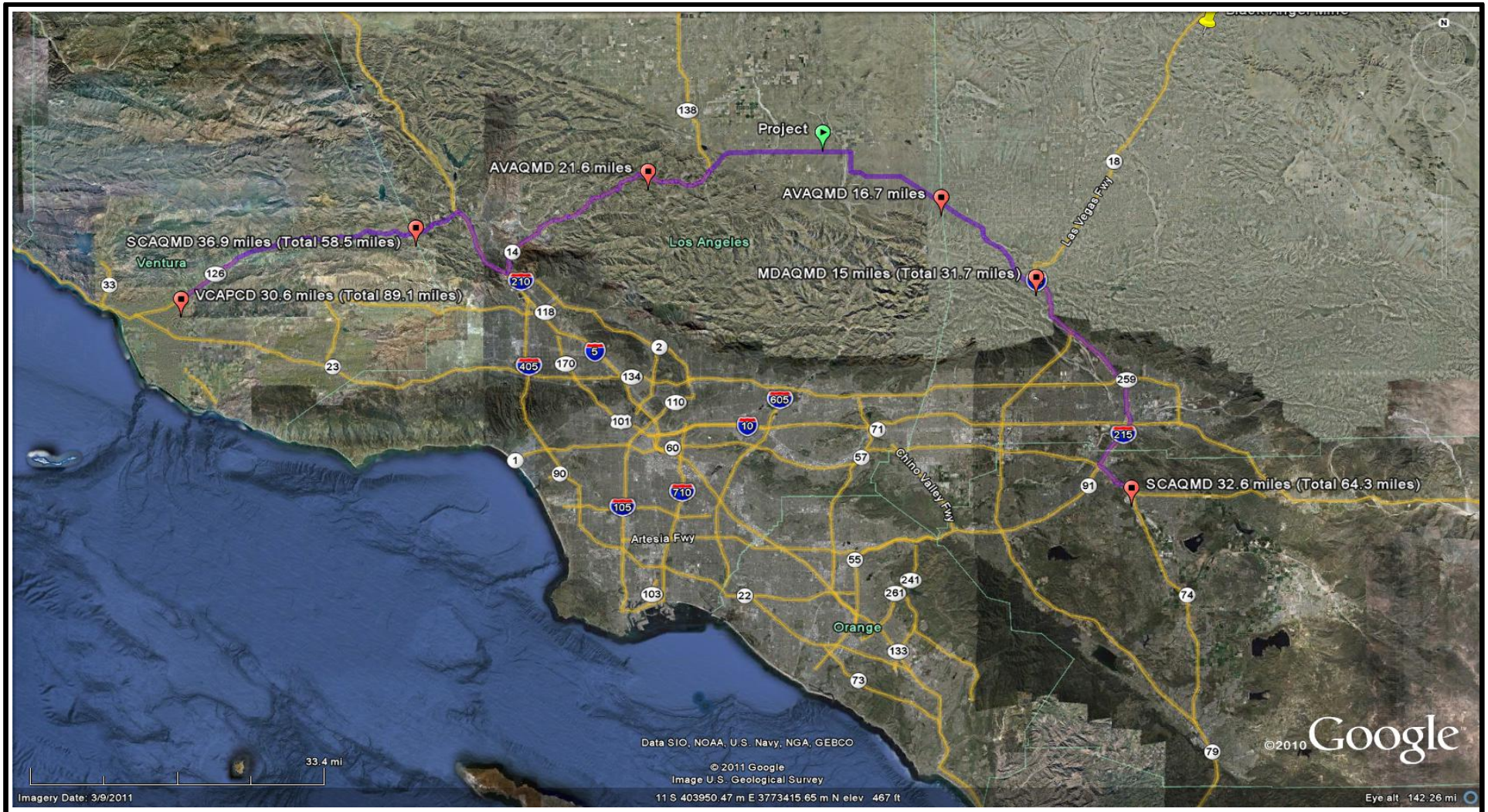
- Project construction phase criteria pollutant emissions are less than the thresholds of significance with standard mitigations.
- Project direct and indirect operation phase criteria pollutant emissions are less than the thresholds of significance with mitigation.
- Project cumulative impacts, including greenhouse gas (GHG) emissions, are less than thresholds of significance without mitigation.
- The Project conforms to applicable air quality management and municipal plans.
- The Project results in a Class II impact on air quality, significant but mitigable.

12.0 REFERENCES

The following resources were used in the preparation of this AQCCIA:

- 2004 Ozone Attainment Plan (State and Federal), AVAQMD (http://www.avaqmd.ca.gov/index.aspx?page=3)
- 2009 Integrated Energy Policy Report, California Energy Commission (http://www.energy.ca.gov/2009_energypolicy/documents/)
- AB 32 Scoping Plan Functional Equivalent Document, CARB (August 2011) (http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm)
- AP-42, USEPA (http://www.epa.gov/ttn/chief)
- Assembly Bill No. 32, CARB (August 31, 2006) (www.arb.ca.gov/cc/docs/ab32text.pdf).
- California Climate Action Registry General Reporting Protocol, v 3.1, CCAR (http://www.climateregistry.org/tools/protocols/general-reporting-protocol.html).
- California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, AVAQMD (August 2011) (http://www.avaqmd.ca.gov/index.htm).
- Caterpillar Performance Handbook, Edition 37, Caterpillar (February 2007).
- EMFAC2011 (September 19, 2011) (http://www.arb.ca.gov/msei/msei.htm).
- Handley Ranch Quarry DEIR, County of Monterey (May 2003).
- In Use Off Road Diesel Vehicle Regulations, CARB (http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm).
- Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004, California Energy Commission (December 2006), (http://www.climatechange.ca.gov/policies/greenhouse_gas_inventory/index.html).
- List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health & Safety Code §39614(d) (http://www.avaqmd.ca.gov/index.aspx?page=3)
- Locomotive Emission Study, CARB (January 1991).
- Map Sheet 52 Aggregate Availability in California, Department of Conservation (2006, 2012).
- OFFROAD2011 (October 2011), which was produced by the California Air Resources Board (CARB) to calculate off road equipment emission inventories (http://www.arb.ca.gov/msei/msei.htm).
- Roseville Rail Yard Study, CARB (October 2004) (http://www.arb.ca.gov/diesel/documents/rrstudy.htm).
- URBEMIS2007 model version 9.2.0 (a.k.a. “Urban Emissions Model” or URBEMIS) California Air Pollution Control Officers Association (http://www.urbemis.com)
- Working Paper No 994, A Note on the Environmental Costs of Aggregates, Peter Berck, Department of Agricultural and Resource Economics and Policy, University of California and Berkeley (January 2005).

Appendix A
Figures

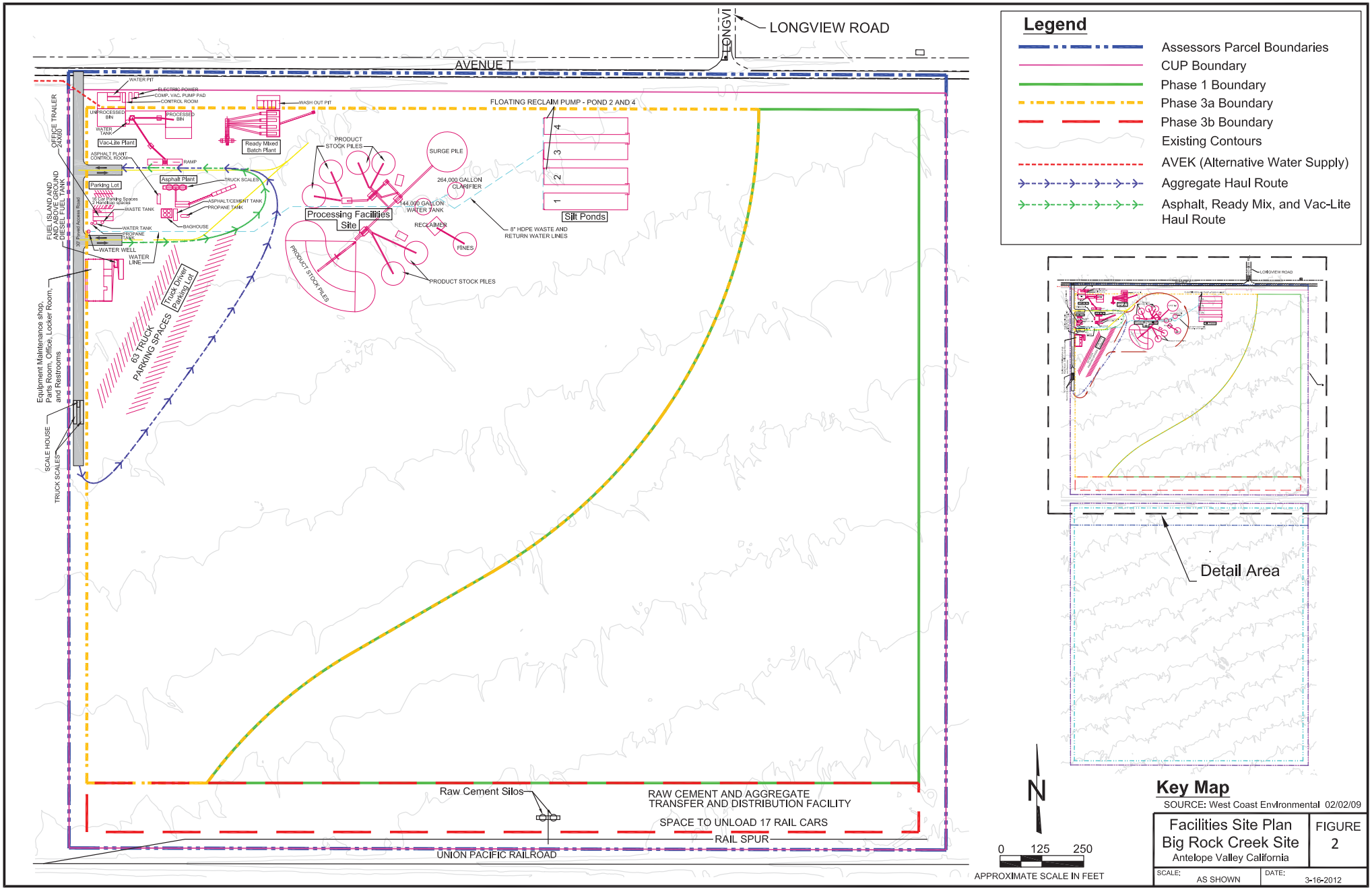


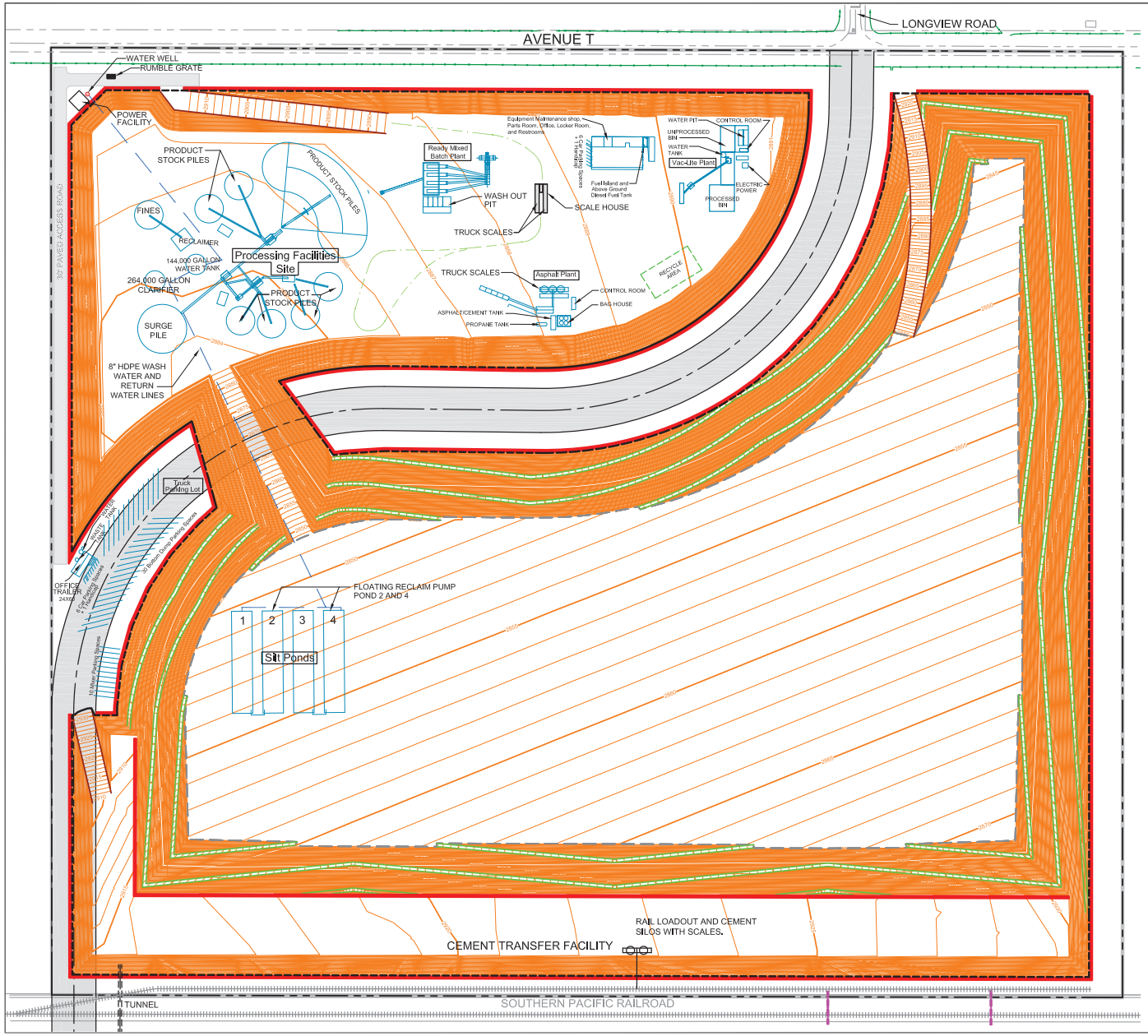
This figure shows the Project location and maximum haul distance that may occur.

N

SESPE CONSULTING, INC.

FIGURE 1	Site Location Map Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	2/7/12
SCALE:	AS SHOWN	DRAWN BY:	SDC


LONGVIEW ROAD
AVENUE T
WATER PIT
ELECTRIC POWER
COMP, VAC, PUMP PAD
CONTROL ROOM
WASH OUT PIT
FLOATING RECLAIM PUMP - POND 2 AND 4
UNPROCESSED BIN
PROCESSED BIN
WATER TANK
Vac-Lite Plant
Ready Mixed Batch Plant
PRODUCT STOCK PILES
SURGE PILE
264,000 GALLON CLARIFIER
144,000 GALLON WATER TANK
RECLAIMER
FINES
8" HDPE WASTE AND RETURN WATER LINES
Silt Ponds
1
2
3
4
OFFICE TRAILER 24X60
ASPHALT PLANT CONTROL ROOM
RAMP
Asphalt Plant
TRUCK SCALES
Parking Lot
30 Car Parking Spaces 2 Handicap spaces
WASTE TANK
ASPHALT/CEMENT TANK
PROPANE TANK
BAGHOUSE
WATER TANK
PROPANE TANK
WATER WELL
WATER LINE
FUEL ISLAND AND AND ABOVE GROUND DIESEL FUEL TANK
Processing Facilities Site
PRODUCT STOCK PILES
PRODUCT STOCK PILES
Truck Driver Parking Lot
63 TRUCK PARKING SPACES
Equipment Maintenance shop, Parts Room, Office, Locker Room, and Restrooms
SCALE HOUSE
TRUCK SCALES
Raw Cement Silos
RAW CEMENT AND AGGREGATE TRANSFER AND DISTRIBUTION FACILITY
SPACE TO UNLOAD 17 RAIL CARS
RAIL SPUR
UNION PACIFIC RAILROAD
N
0 125 250
APPROXIMATE SCALE IN FEET
Legend
Assessors Parcel Boundaries
CUP Boundary
Phase 1 Boundary
Phase 3a Boundary
Phase 3b Boundary
Existing Contours
AVEK (Alternative Water Supply)
Aggregate Haul Route
Asphalt, Ready Mix, and Vac-Lite Haul Route
Detail Area
Key Map
SOURCE: West Coast Environmental 02/02/09
Facilities Site Plan
Big Rock Creek Site
Antelope Valley California
FIGURE 2
SCALE: AS SHOWN
DATE: 3-16-2012



LEGEND

- ASSESSORS PARCEL BOUNDARIES
- CUP BOUNDARY
- APPROXIMATE MAXIMUM MINING CONTOURS **(see Mining/Grading plans for detail)**
- PROPOSED LONGVIEW ROAD EXTENSION (750' RADIUS)

0 250 500

APPROXIMATE SCALE IN FEET

*** This figure shows Facility Layout/Design. For contour detail please refer to Mining/Grading plans.**

Lowered Facilities Alternative Facilities Site Plan Big Rock Creek Site Antelope Valley, California	FIGURE 3
SCALE: AS SHOWN	DATE: 7-30-2010

Appendix B
Inelastic Demand Position Paper

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AND POLICY
DIVISION OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF CALIFORNIA AT BERKELEY

WORKING PAPER NO. 994

A NOTE ON THE ENVIRONMENTAL COSTS OF AGGREGATES

by

Peter Berck

California Agricultural Experiment Station
Giannini Foundation of Agricultural Economics
January 2005

A Note on the Environmental Costs of Aggregates

by Peter Berck*
January 10, 2005

Abstract:

The opening of a new site for the production of aggregates has both direct and indirect impacts on the environment. The indirect impacts include changes in the environmental costs of hauling aggregates and possible changes in the level of construction activity. In this note, we show that the most likely effect of a new aggregate site is to reduce the truck miles used for aggregate hauling, which is an environmental benefit. We also show that the change in construction activity induced by a new site is likely to be extremely small.

* Peter Berck is Professor of Agricultural and Resource Economics. I would like to thank Atanu Dey for able research assistance. The remaining errors are mine.

A Note on the Environmental Costs of Aggregates

The opening of a new quarry for aggregates will change the pattern of transportation of aggregates in the area served by the quarry. In this note, we will show that, so long as aggregate producers are cost minimizing, the new pattern of transportation requires less truck transport than the pattern of transportation that existed before the opening of the new quarry. Since the costs of providing aggregates falls, it is reasonable to assume that the price of delivered aggregates also will fall. This note also shows that the demand expansion effect is of very small magnitude. Since the demand increase from a new quarry is quite small, the dominant effect is that the quarries are on average closer to the users of aggregates and, as a result, the truck mileage for aggregate hauling decreases. To summarize the effects of a new quarry project:

a) The project in itself will not significantly increase the demand for construction materials in the region through market forces, which include the downward pressure on pricing.

b) Truck traffic (i.e. vehicle miles traveled) in the region will not increase and may decrease as a result of the project.

As a result, the effect of a new quarry project will be to reduce the air emissions from aggregate trucking. The reduction in emissions should be included as a positive impact of a quarry project in any analysis of the environmental consequences of a new quarry.

The remainder of this note provides a brief description of the economics of construction materials and explains why these points must be true.

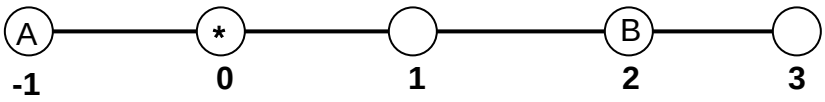
Based upon the available evidence, a project would decrease haul distances for aggregates and would therefore decrease emissions from trucks, rather than increase them.

There are two economic facts that are important to understand in evaluating the likely addition or subtraction to truck traffic from a new quarry. One is the economics of location. The second is the demand for aggregates, which is the quantity of aggregates used as a function of price.

That a new site leads to smaller haul distance is a matter of geometry and economics. Transportation is a major element in the cost of delivered aggregate, so new sites are chosen, within the limits placed by the natural availability of aggregates, to minimize transport costs.

An example should make this fact clear. Consider diagram 1. Circles represent aggregate-using projects of equal size. The five projects shown are located at miles marked –1, 0, 1, 2, and 3. Two of the project sites are marked with the letters A and B, and they are potential locations for aggregate production. The location at mile 0 is an existing aggregate production site and it is marked by an asterisk (*). The scale is in miles. For simplicity, each project uses one unit of aggregate.

Diagram 1



With only one aggregate production site at mile 0, the miles traveled to supply the five projects is seven: zero miles for project at mile 0, one mile for each for the projects at mile –1 and 1, two miles for the project at 2 and three miles for the project at 3 for a total of 7 miles. If an additional aggregate production site is started at A, the miles traveled decreases to six, because there is no transportation required for the aggregate-using project at A and all other projects are served by the original site. However, if the new site is placed at B instead of being placed at A, transport distance falls to three miles because then two projects have aggregate production at their location and thus have zero

transportation requirements, and the three remaining sites each require a one-mile transport. Each aggregate production site supplies 2.5 units of aggregates, that is, half the total required by the five projects. Since cost depends on distance and, markets minimize costs, the free market system always will choose a point like B, the one with the lowest cost. In this case it is also the lowest transport distance.

Other forms of industrial organization lead to higher prices being charged for aggregates, but the effect of additional suppliers is to lower prices and haul distances. Appendix A elucidates the case where the price depends upon the delivered costs of the second most efficient producer.

The second issue for the siting of aggregate production is the possibility that lower delivered costs lead to more projects or more use of aggregates in existing projects. The degree to which decrease in the price of a good, in this case construction material, leads to an increase in the quantity of that material used is described by the elasticity of demand. The elasticity of demand is the percent increase in use caused by a one percent decrease in price.

A search of the economic literature found no articles estimating a positive elasticity of demand for aggregates. A review by the Susan Kohler[†] finds that only population and not price is correlated with aggregate usage. In other words, a reduction in the price of aggregate does not lead to an increase in demand for it.

While it is a theoretical possibility that the quantity of aggregates demanded (that is, the quantity used in projects) is responsive to price, two facts about construction make this unlikely. First, the cost of aggregates is usually a tenth or less of the cost of a project. Second, the building of projects -- housing, roads, and commercial construction -- is not very sensitive to the costs of producing them.

[†] *Map Sheet 52. Aggregate Availability in California.* by Susan L. Kohler. California Department of Conservation. California Geological Survey. Sacramento. 2002.

Although we have not found literature on the elasticity of demand for either public projects or contract construction, there is an empirical literature on the elasticity of demand for housing[‡]. In these studies, a one percent change in the price leads to about a half percent change in the quantity of housing consumed. Public projects, like roads, are budgeted, often from specials funds, like road taxes. In that case, a one percent decrease in the costs of *all* projects in a taxing jurisdiction would lead to a one percent increase in the quantity of roads built. Since aggregates are very expensive to ship, the quarry being considered likely would only change the costs of nearby road construction, perhaps for just one county.

For example, Monterey County has a population of 400,000 while the state population is 33.9 million people.[§] Assuming that road construction is roughly proportional to population, about 1.2 percent of road construction would be in Monterey. So, if a new quarry in Monterrey decreased the price of aggregates in Monterrey by 1 percent and left the price the same in the rest of the state, then the average price in the whole state would fall by about 0.01 percent, which is negligible. A project that affects only a small part of a taxing jurisdiction has only a small effect on that jurisdiction's costs and can have no major affect on the quantity of services supplied by that jurisdiction.

We know of no evidence of elasticities for construction work as high as one. We estimate the elasticity of demand for projects using aggregates to be much less than one, likely under a half in the private sector and near zero in the public sector.

Given that projects will be built, there is some possibility of substituting of other structural materials for aggregates in buildings. However these substitute materials too would be trucked. The realistic possibility for roads is that there are no materials to substitute for aggregates. I do not believe this pathway to greater use of aggregates in building would be triggered by the transport savings from a new aggregate source or that it would result in an increase in net truck miles.

[‡] Hanushek, Eric A., John Quigley. "What is the price elasticity of housing demand?" *Review of Economics and Statistics.* August, 1980.
[§] Population figures are for the year 2000.

Since a change in price of aggregates does not lead to either a substantial substitution of other materials for aggregates or a substantial increase in the quantity of projects, the demand for aggregates is very inelastic. This inelasticity of demand is exactly the reason that the State of California can use a fixed per-capita consumption rate for forecasting the need for construction materials.

An example will make clear how the transport advantage and elasticity of demand arguments fit together. Let us consider a new quarry that, through its transportation advantage over existing quarries, would save 12.5 miles of trucking on each and every project in the study area. We shall assume that the average truck haul pre-project was 25 miles.

According to the *Map Sheet 52: Aggregate Availability in California,* the cost of construction aggregate doubles every 25-35 miles from the point of production. The following calculations are carried out assuming that a 25 mile haul doubles the cost. Assuming that a unit of aggregate costs $1 at the production site, then its delivered cost at a project site 25 miles away is $2. If the haul distance were to be reduced to 12.5 miles due to a new quarry, then half of the transportation costs – or $0.50 – would be saved. This represents a cost savings of 25 percent in the delivered cost of aggregate and is entirely due to a 50 percent decrease in miles traveled.

The only way for a new quarry to influence the quantity of construction is through the price of aggregates. This example presents the competitive case, where the delivered price decreases by the full amount of the transport cost savings. In the competitive case, the effect on the quantity of construction will be extremely moderate, as demonstrated below. (Appendix A presents a less than perfectly competitive example.)

In keeping with the fact that the cost of aggregate accounts for less than 10 percent of the total cost of a construction project, a price reduction of 25 percent on aggregate is a cost saving of 2.5 percent or less on the project. Let us assume a very liberal price elasticity of

demand for construction of 0.5. In other words, 2.5 percent reduction in the cost of construction would lead to 1.25 percent increase in the quantity of construction demanded. This increased quantity of delivered aggregate leads to additional truck haul miles. The number of increased miles from the increased aggregate sales is 1.25 percent of the original quantity times the new haul distance which is 50% of the original distance. Therefore, the percentage increase in truck haul miles occasioned by a decrease in aggregate price will be 0.625 percent because the new aggregate location is only half as far away.

In this example, the new quarry saves 50 percent of truck trip miles through location and contributes 0.625 percent of new truck trip miles from demand increase. This leads to a net decrease of 49.375 percent in truck miles. The following Table 1 summarizes the net reduction of truck haul miles for three different scenarios – the new aggregate project site located at 12.5, 6.25, and 2.5 miles from a construction site.

Table 1

Distance to New Quarry (miles)	**Decrease in haul miles (%)**[**]	**Decrease in delivered aggregate cost (%)**	**Decrease in construction cost (%)**	**Increase in construction quantity (%)**	**Increase in haul miles from additional construction(%)**[††]	**Net decrease in miles hauled (%)**
12.5	50	25	2.5	1.25	0.62	**49.4**
6.25	25	37.5	3.75	1.85	0.46	**74.5**
2.5 miles	90	45	4.5	2.25	0.22	**89.8**

There is a general rule to be deduced from the example: The percent decrease in cost for the delivery of aggregates equals the percent decrease in miles driven, while the increase in the use of aggregates equals the elasticity of demand for a final product (such as roads) times the cost share of aggregates in making the product times the decrease in cost. Since the elasticity of demand for a final product is much less than one, and the cost

[**] This decrease is with respect to the pre-project haul miles.
[††] This increase is with respect to the pre-project haul miles.

share of aggregates in making the product is about 8 percent, a new quarry must decrease truck miles and decrease NOX and other emissions from trucks.

Appendix A

Spatial Models with Imperfect Competition

When a producer has a price advantage over other producers because of lower transport costs, the producer can exploit that advantage by charging consumers a price greater than its marginal cost. Marginal cost is the cost of producing one incremental unit.
In this appendix, I will briefly investigate one model of spatial competition that is derived from a classical model of Hotelling [‡‡]

In Hotelling's model, two stores (which are analogous to production sites) can relocate at no cost and then compete based on price. Since consumers are some distance from the store, they see the price of a product as the amount they pay for the product plus the cost of travel. They go to the store with the least total cost (cost of product plus cost of travel). The stores seek to make the most money they can make. The price the consumer will pay is the largest price that the store the consumer goes to can charge without losing the customer to the other store.[§§] In Hotelling's model, the two stores will locate next to each other, split the market in half, and charge the competitive price. While the pricing rule of the Hotelling model may well apply to aggregates, the assumption of complete location flexibility is not applicable.

Returning to the model of diagram 1, shown above., I now consider the effects on pricing of adding one aggregate production site with competition in prices. Consider the case where both aggregate production sites and aggregate-using projects exist at location A and *. The production site at * would be willing to supply the project at location A at its marginal cost of production (mc) plus the cost of transport for one mile, for a total of mc + 1 c. This is higher than the marginal plus transport costs that production site A has for

[5] Hotelling, Harold. 1929. "Stability in Competition." Economic Journal 39:41-57
[6] Salop, Steven C. 1979. "Monopolistic Competition with Outside Goods." *The Bell Journal of Economics.* Salop models the competition between stores in terms of quantity, so that the price for consumers near a store is determined as a monopolist would determine price. With a very low elasticity of demand as is true for aggregates, the price competition model of Hotelling seems more appropriate.

supplying the project at A. However, the site at A can charge up to mc+c without losing the customer. The site charges mc+c while its costs are mc and makes c units of pure profit. The site at * prices in the same way—a price just high enough to avoid the site at A from taking the customer. For the sites to the right of *, the prices are mc+2, mc+3, and mc+ 4. In each case, this is the highest price site * can charge without losing the customer to site A.

In this model, one of the best places for a new site would be at B. The new site would sell ½ unit to the project between it and * at a price of mc + c, a whole unit to the project located at B at a price of mc + 2c (the price at which the site at * would be willing to supply aggregate), and a whole unit to the project located to its right at a price of mc + 3c. The result of adding the new site would be that the price for each project to the right of the project at * fell by c.

With competitive (marginal cost) pricing as described in the body of the note, the addition of the new site at B would result in the prices paid by projects decreasing by four, while with imperfect competition as described in this appendix, the new site would result in the prices paid by projects decreasing only by three. Compared to the competitive case cited above, the imperfect competition example results in smaller changes in prices and therefore a larger decrease in truck traffic.

Construction Aggregate Supply Limitations
Some Estimates of Economic Impact–November 2011

- Aggregates are low-value, heavy-weight building materials used in construction, including sand, gravel, crushed stone, and recycled concrete. Aggregates are mined and either used as raw material (for example, as foundations) or serve as composite materials in the production of concrete and asphalt. The main end markets for aggregates include private residential construction (34 percent), commercial construction (17 percent), and public infrastructure projects (43 percent, including 26 percent for public highways, streets and transit).

- Aggregates are usually shipped from quarries or production sites close to their end market because transportation is a major element in the cost of delivered aggregates and the cost depends on the distance of the delivery. According to the industry, shipping costs for aggregates can outweigh production costs if the material is trucked more than 20 miles.[1] Permitting new aggregate sites would lead to shorter haul distance to minimize transport/shipping cost.

- According to the California Geological Survey (CGS), California has an estimated 74 billion tons of aggregate resources underlying mineral lands classified by the State Geologist. However, only about six to seven percent have actually been permitted by local agencies for mining activities. Permitting of mining sites is difficult and time consuming due to environmental, land development, and zoning laws, and could take between five and ten years. At the current rate of production, available aggregate supply in some areas in the State could be depleted in a decade.

- According to the California Department of Finance, housing construction activity in California more than doubled between 1996-2005, the longest sustained growth period in recent history; but experienced more than 80 percent decline during 2006-2009 (from 209 to 36 thousand units). Despite a 23 percent rebound in housing construction spending in 2010, overall construction industry in California remains depressed. This has contributed to a significant reduction in both production and value of construction aggregate in recent years.

- According to the CGS, California produced 133.5 million tons (valued at $1.4 billion) of construction sand, gravel, and crushed stone in 2009, compared to 237.3 million tons (valued at $1.9 billion) in 2006, an almost 44 percent drop since 2006. The transportation of 133.5 million tons of construction aggregates generates about 5.3 million truckloads (@ 25 tons per truck), or a total of 10.7 million truck trips a year (including empty trucks returning to the aggregate sites) related to the transportation of construction aggregates in the State.

- According to the Teichert Construction and West Coast Aggregates, Inc. the average hauling distance for aggregates in California may be as high as 50 miles. Truck transportation accounts for about 99 percent of shipping aggregates for 40 miles or less.[2] At an average 50-mile distance, the total aggregate-truck VMT would be 535 million miles per year (10.7 million trucks x 50 miles).

- Let us assume that permitting additional mining facilities would reduce the average hauling distance from 50 to 35 miles statewide. Using an average hauling distance of 35 miles, the total annual aggregate-truck miles of travel would be 375 million miles (10.7 million trucks x 35 miles). The 15-mile shorter hauling distance would reduce aggregate-truck miles of travel by 160 million miles per year (535-375), and annual diesel fuel consumption by 20 million gallons [using California Air Resources Board (CARB) diesel fuel consumption rate of 0.13 gallons per vehicle-mile at 55-60 mph speed].

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[1] Therese Dunphy, "Evening the Playing Field," *Aggregates Manager*, August 2006.
[2] Tina Grady Barbaccia, "Off-highway Transportation," *Aggregates Manager*, July 2006.

- A recent University of California, Berkeley study[3] confirms that the most likely, and dominant, effect of the opening of new sites for the production of construction aggregates would be a reduction in truck miles of travel for hauling aggregates (i.e., new quarry will be located closer to the users to minimize transportation costs), thus a reduction in emissions from trucks.

- Based on the CARB emission factors estimates, and assuming an average 55-60 miles per hour speed, a reduction of 160 million miles of truck travel (or 20 million gallons of diesel fuel consumption) would reduce truck emissions (CO, NOx, PM10, SOx, VOC, and CO2) by about 22,436 tons a year.

- The total transportation cost of aggregates (at $0.10 per ton per mile) shipped 35-miles average distance throughout California would be $936 million (10.7 million trucks x 25 tons x 35 miles x $0.1), and over $1.3 billion if shipped an average distance of 50 miles. The statewide transportation cost savings of reduced hauling distance would amount to $376 million a year (or a 30 percent cost savings).

- The California Department of Transportation (Caltrans) estimates that on average, about $2.5 billion is spent on State and local capital outlay projects each year, and on average, aggregates account for 8-10 percent of total project costs, or about $250 million annually. A 30 percent increase/decrease in shipping cost of aggregates would increase/decrease the total annual project costs by $75 million per year.

- The reduction in aggregate-related truck miles of travel would also reduce traffic congestion and traffic accidents on roads, but these impacts would be difficult to estimate. An additional benefit from truck trip reduction would be reduced pavement deterioration. Caltrans expects to spend about $700 million annually on pavement rehabilitation projects. Assuming trucks account for 60 percent of the pavement damage on the State highways, and aggregate-trucks on average account for 5 percent of all heavy truck travel on the State highways, the trucks shipping aggregates would account for about $20 million of cost savings in the pavement rehabilitation each year.

- Project delays due to lack of aggregate supply in the area, would also result in project cost escalation and reduced user benefits (reduced travel time and accidents) that would have otherwise been generated. A delay of 10 percent of the projects (or $250 million in capital outlay expenditures) for one year would increase the cost of the State and local capital outlay program by $13 million a year (at 5 percent average cost escalation factor).

- Generalizing, and pro rating, the user benefits estimated for the 2008 Interregional Transportation Improvement Program projects, a delay of ten percent of the capital outlay program for one year could also cost California about $97 million in increased roadway congestion and traffic accidents.

In conclusion, the overall picture may indicate that the concerns over the limited supply of construction aggregates may have eased for now due to the severe housing decline and economic slowdown. However, over the long run, with the eventual housing and economic rebound, the supply-demand imbalance will continue for many areas. Meanwhile, for some specific localities and construction projects, the challenge of adequate and cost-effective supply of construction aggregates persists.

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[3] Peter Berck, "A Note on the Environmental Costs of Aggregates," *Working Paper No. 994*, Dept. of Agricultural and Resource Economics and Policy, University of California, Berkeley, January 2005.

SUMMARY OF POPULATION ESTIMATES

	2010	2012	2020	2035
OUTSIDE LA COUNTY	2,150,836	n/a	2,427,067	2,876,309
LA CITY	1,730,818	n/a	n/a	n/a
LA COUNTY	126,361	n/a	n/a	n/a
TOTAL	4,008,015	4,130,903.14	4,622,455	5,600,178

n/a = not available

SCAG RTP 2012 POPULATION FOR MARKET AREA

SUBREGION	CITY	2008	2010	2012	2020	2035
NORTH LOS ANGELES COUNTY	Lancaster city	144,293	147,826.17	151,359.33	165,492	191,995
NORTH LOS ANGELES COUNTY	Palmdale city	148,778	153,935	159,091.00	179,717	206,586
NORTH LOS ANGELES COUNTY	Santa Clarita city	176,590	181,409	186,227.33	205,502	241,494
NORTH LOS ANGELES COUNTY	Unincorporated	139,497	145,144	150,790.33	173,377	231,072
CITY OF LOS ANGELES	San Fernando city	25,188	25,337	25,486.33	26,083	27,200
ARROYO VERDUGO	Burbank city	107,747	109,514	111,280.33	118,347	121,199
ARROYO VERDUGO	Glendale city	206,642	208,034	209,426.33	214,995	225,391
ARROYO VERDUGO	La Canada Flintridge city	21,187	21,219	21,250.00	21,376	21,605
ARROYO VERDUGO	Unincorporated	18,137	18,185	18,232.00	18,422	20,156
WESTSIDE CITIES COG	Beverly Hills city	35,932	36,106	36,279.33	36,974	38,282
LAS VIRGENES MALIBU COG	Agoura Hills city	23,270	23,285	23,299.67	23,359	24,322
LAS VIRGENES MALIBU COG	Calabasas city	23,663	23,851	24,039.00	24,791	25,351
LAS VIRGENES MALIBU COG	Hidden Hills city	2,008	2,009	2,010.33	2,015	2,025
LAS VIRGENES MALIBU COG	Malibu city	13,668	13,910	14,151.00	15,117	16,930
LAS VIRGENES MALIBU COG	Westlake Village city	8,836	8,893	8,949.67	9,177	9,600
LAS VIRGENES MALIBU COG	Unincorporated	16,326	17,235	18,144.67	21,782	54,972
L.A. COUNTY TOTAL		**1,111,762**	**1,135,889**	**1,160,017**	**1,256,526**	**1,458,180**
SAN BERNARDINO ASSOC. GOV.	Adelanto city	28,139	31,110	34,081.67	45,967	68,252
SAN BERNARDINO ASSOC. GOV.	Apple Valley town	69,758	72,617	75,476.67	86,914	112,988
SAN BERNARDINO ASSOC. GOV.	Barstow city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Big Bear Lake city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Chino city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Chino Hills city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Colton city	51,640	53,403	55,166.67	62,220	73,266
SAN BERNARDINO ASSOC. GOV.	Fontana city	188,173	193,703	199,232.67	221,352	257,703
SAN BERNARDINO ASSOC. GOV.	Grand Terrace city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Hesperia city	87,722	89,380	91,038.00	97,670	132,056
SAN BERNARDINO ASSOC. GOV.	Highland city	52,274	53,732	55,190.67	61,024	70,923
SAN BERNARDINO ASSOC. GOV.	Loma Linda city	22,559	23,282	24,005.33	26,898	31,886
SAN BERNARDINO ASSOC. GOV.	Montclair city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Needles city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Ontario city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Rancho Cucamonga city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Redlands city	71,509	72,909	74,309.33	79,910	92,272
SAN BERNARDINO ASSOC. GOV.	Rialto city	99,585	101,826	104,067.00	113,031	128,229
SAN BERNARDINO ASSOC. GOV.	San Bernardino city	204,366	208,771	213,175.67	230,795	261,041
SAN BERNARDINO ASSOC. GOV.	Twentynine Palms city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Upland city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Victorville city	108,103	114,213	120,322.00	144,760	189,513
SAN BERNARDINO ASSOC. GOV.	Yucaipa city	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Yucca Valley town	-	-	-	-	-
SAN BERNARDINO ASSOC. GOV.	Unincorporated	-	-	-	-	-
S.B. COUNTY TOTAL		**983,828**	**1,014,947**	**1,046,066**	**1,170,541**	**1,418,129**

City of Los Angeles Neighborhood	2010 Total Population	In Market?	2010 Population in Project Market
Arleta (Panorama City/Pacoima)	36,232	Y	36,232
Arlington Heights (Mid-City/Harvard Heights)	20,914	N	-
Atwater Village (Glassell Park)	14,101	Y	14,101
Baldwin Hills (Crenshaw Manor)	26,303	N	-
Bel Air (Beverly Glen)	8,261	N	-
Beverly Crest (Hollywood)	7,861	N	-
Beverly Glen	4,341	N	-
Boyle Heights (Central City East)	89,397	N	-
Brentwood (Pacific Palisades/Topanga State Park)	32,540	N	-
Byzantine-Latino Quarter (Koreatown)	24,219	N	-
Cahuega Pass (Hollywood)	3,748	Y	3,748
Canoga Park (Winnetka/West Hills)	48,672	Y	48,672
Central City East (Lincoln Heights/Boyle Heights)	10,029	N	-
Chatsworth (Northridge)	30,984	Y	30,984
Cheviot Hills (South Robertson/Rancho Park)	9,023	N	-
Chinatown & Historic L.A. (Echo Park/Downtown)	10,968	N	-
Country Club Heights (Wilshire Center/Wilshire Park)	8,415	N	-
Country Club Park (Country Club Heights)	6,795	N	-
Crenshaw	10,450	N	-
Crenshaw Manor (West Adams)	1,737	N	-
Cypress Park	6,142	N	-
Del Rey (Playa Vista)	27,614	N	-
Downtown (Westlake/Southeast LA/Pico-Union)	43,343	N	-
Eagle Rock (Highland Park)	22,239	Y	22,239
East Hollywood (Rampart Village/Hollywood)	45,897	N	-
Echo Park (Silver Lake/Little Filipinotown/Downtown/Elysian Valley)	39,772	N	-
El Sereno (Lincoln Heights)	40,641	N	-
Elysian Valley	3,132	N	-
Encino (Tarzana)	45,918	Y	45,918
Fairfax (Miracle Mile)	18,560	N	-
Glassell Park (Eagle Rock)	21,734	Y	21,734
Granada Hills (North Hills/Mission Hills)	55,977	Y	55,977
Hancock Park (Larchmont Village/La Brea Hancock/Windsor Square/Fa	11,174	N	-
Harbor City	24,281	N	-
Harbor Gateway (Unincorporated Area)	45,735	N	-
Hermon (Highland Park)	6,727	Y	6,727
Highland Park (Eagle Rock)	50,490	Y	50,490
Historic West Adams (University Park)	20,341	N	-
Hollywood (Melrose/Hancock Park/Griffith Park/East Hollywood)	110,435	Y	110,435
Hyde Park	26,176	N	-

City of Los Angeles Neighborhood	2010 Total Population	In Market?	2010 Population in Project Market
Jefferson Park (West Adams Terrace-Kinney Heights/Berkeley Square)	24,668	N	-
Koreatown (Wilshire Center)	45,767	N	-
La Tuna Canyon (Shadow Hills)	3,851	Y	3,851
Lake Balboa (Encino)	41,075	Y	41,075
Lake View Terrace (Shadow Hills)	13,610	Y	13,610
Larchmont Village (Maplewood-St Andrews)	7,265	Y	7,265
Leimert Park (Jefferson Park/Arlington Park)	11,809	N	-
Lincoln Heights (Montecito Heights/Boyle Heights)	30,604	N	-
Los Feliz (Silver Lake/Hollywood)	35,388	Y	35,388
Mar Vista (West LA)	41,956	N	-
Marina Peninsula	4,337	N	-
Melrose	10,997	N	-
Mid-City (Wilshire Vista Heights/Pico Park/Wilshire Vista/Picfair Village	35,040	N	-
Mid-City West	15,202	N	-
Mid-Wilshire (Fremont Place/Windsor Village/Wilshire Park/Country Cl	6,065	N	-
Miracle Mile (Redondo Sycamore/Sycamore Square/Carthay)	15,024	N	-
Mission Hills	22,762	Y	22,762
Montecito Heights (Monterey Hills)	3,848	N	-
Monterey Hills	3,732	N	-
Mount Washington (Highland Park/Sycamore Grove/Glassell Park/Eagl	23,276	N	-
North Hills	54,086	Y	54,086
North Hollywood (West Toluca Lake/Sun Valley/Toluca Lake/Toluca Te	118,397	Y	118,397
Northridge (Winnetka)	78,512	Y	78,512
Olympic Park (Mid-City/Wilshire Vista Heights/Pico Park/Brookside/Syc	10,467	N	-
Pacific Palisades (Topanga State Park/Woodland Hills)	24,303	N	-
Pacoima (Lake View Terrace)	73,932	Y	73,932
Palms (Westside Village/Mar Vista/South Robertson)	29,572	N	-
Panorama City	66,149	Y	66,149
Picfair Village (Wilshire Vista)	5,060	N	-
Pico Union (Westlake)	19,692	N	-
Playa del Rey (Westchester/Playa Vista)	16,231	N	-
Playa Vista (Del Rey)	9,181	N	-
Porter Ranch	21,060	Y	21,060
Rampart Village	5,426	Y	5,426
Rancho Park	5,366	N	-
Reseda (Tarzana/Woodland Hills)	68,392	Y	68,392
San Pedro (Wilmington)	77,282	N	-
Shadow Hills (Lake View Terrace/La Tuna Canyon)	3,819	Y	3,819
Sherman Oaks (Valley Glen/Valley Village)	68,658	Y	68,658
Silver Lake (Little Filipinotown/Echo Park/Elysian Valley)	35,122	Y	35,122

City of Los Angeles Neighborhood	2010 Total Population	In Market?	2010 Population in Project Market
South Carthay	3,289	N	-
South Los Angeles (Southeast LA/Harbor Gateway)	185,616	N	-
South Robertson (Mid-City/Picfair Village/Cheviot Hills)	46,879	N	-
Southeast Los Angeles (South LA/Harbor Gateway/Downtown)	230,298	N	-
Studio City (West Toluca Lake/Valley Village/Sherman Oaks)	41,836	Y	41,836
Sun Valley (Shadow Hills/Pacoima/North Hollywood)	53,501	Y	53,501
Sunland (Tujunga)	13,564	Y	13,564
Sycamore Grove (Montecito Heights/Lincoln Heights)	4,668	N	-
Sylmar	78,897	Y	78,897
Tarzana (Woodland Hills/Reseda)	31,416	Y	31,416
Terminal Island	1,262	N	-
Toluca Lake (Toluca Woods)	6,641	Y	6,641
Topanga State Park	173	Y	173
Tujunga (La Tuna Canyon)	30,069	Y	30,069
University Hills	5,093	N	-
University Park (South LA/Historic West Adams/Byzantine-Latino Quar	27,317	N	-
Valley Glen (Valley Village/Sherman Oaks/North Hollywood)	39,912	Y	39,912
Valley Village (North Hollywood)	19,533	Y	19,533
Van Nuys (Valley Glen/Lake Balboa)	92,708	Y	92,708
Venice	32,625	N	-
Watts	39,593	N	-
West Adams	24,642	N	-
West Hills (Woodland Hills/Ventura County)	38,615	Y	38,615
West Los Angeles (Rancho Park/Century City)	46,055	N	-
Westchester-LAX (Playa del Rey)	34,944	N	-
Western Heights (West Adams Terrace-Kinney Heights-Berkeley Square	6,074	N	-
Western Wiltern (Wilshire Center)	7,766	N	-
Westlake (Little Filipinotown)	80,041	N	-
Westside Village (Mar Vista)	9,984	N	-
Westwood (West LA)	51,485	N	-
Wilmington	52,525	N	-
Wilshire Center (Westlake/East Hollywood)	67,877	N	-
Windsor Square (St Andrews Square)	7,182	N	-
Winnetka (Chatsworth/Canoga Park)	48,570	Y	48,570
Woodland Hills (Winnetka/Canoga Park)	70,622	Y	70,622
TOTAL	**3,789,573**		**1,730,818**

http://www.laalmanac.com/population/po24la.htm#where

Unincorporated LA County Communities	2010 Census	In Market?	2010 Population in Project Market
Acton	7,596	Y	7596
Agua Dulce	3,342	Y	3342
Alondra Park	8,592	N	0
Altadena	42,777	N	0
Avocado Heights	15,411	N	0
Castaic	19,015	Y	19015
Charter Oak	9,310	N	0
Citrus	10,866	N	0
Del Aire	10,001	N	0
Desert View Highlands	2,360	Y	2360
East La Mirada	9,757	N	0
East Los Angeles	126,496	N	0
East Pasadena	6,144	N	0
East Rancho Dominguez	15,135	N	0
East San Gabriel	14,874	N	0
Elizabeth Lake	1,756	Y	1756
Florence-Graham	63,387	N	0
Green Valley	1,027	Y	1027
Hacienda Heights	54,038	N	0
Hasley Canyon	1,137	Y	1137
La Crescenta-Montrose	19,653	Y	19653
Ladera Heights	6,498	N	0
Lake Hughes	649	Y	649
Lake Los Angeles	12,328	Y	12328
Lennox	22,753	N	0
Leona Valley	1,607	Y	1607
Littlerock	1,377	Y	1377
Marina del Rey	8,866	N	0
Mayflower Village	5,515	N	0
Pearblossom	3,723	Y	3723
Quartz Hill	10,912	Y	10912
Rose Hills	2,803	N	0
Rowland Heights	48,993	N	0
San Pasqual	2,041	N	0
South Monrovia Island	6,777	N	0
South San Gabriel	8,070	N	0
South San Jose Hills	20,551	N	0
South Whittier	57,156	N	0
Stevenson Ranch	17,557	Y	17557
Sun Village	11,565	Y	11565
Topanga	8,289	Y	8289
Val Verde	2,468	Y	2468
Valinda	22,822	N	0
View Park-Windsor Hills	11,075	N	0
Vincent	15,922	N	0
Walnut Park	15,966	N	0
West Athens	8,729	N	0
West Carson	21,699	N	0
West Puente Valley	22,636	N	0
West Rancho Dominguez	5,669	N	0
West Whittier-Los Nietos	25,540	N	0
Westmont	31,853	N	0
Willowbrook	35,983	N	0
TOTAL	**921,066**		**126,361**

Appendix C
Construction Phase Emission Calculations

9/30/2008 12:47:04 PM

Urbemis 2007 Version 9.2.0

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\zuleger_GL\Application Data\Urbemis\Version9a\Projects\MCG100_2.urb9
Project Name: MCG100

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 1/1/2008-1/26/2008 Number Active Days: 23	4.67	37.83	20.49	0.00	**152.01**	2.03	**154.04**	**31.75**	1.87	**33.62**	3,163.04
Mass Grading 01/01/2008-01/26/2008	4.67	37.83	20.49	0.00	152.01	2.03	154.04	31.75	1.87	33.62	3,163.04
Time Slice 1/28/2008-3/1/2008 Number Active Days: 30	4.67	37.83	20.49	0.00	**152.01**	2.03	**154.04**	**31.75**	1.87	**33.62**	3,163.04
Fine Grading 01/28/2008-03/01/2008	4.67	37.83	20.49	0.00	152.01	2.03	154.04	31.75	1.87	33.62	3,163.04
Time Slice 3/3/2008-3/8/2008 Number Active Days: 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 03/03/2008-03/08/2008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 3/10/2008-3/29/2008 Number Active Days: 18	4.63	24.93	14.41	0.01	0.04	1.79	1.83	0.01	1.64	1.66	2,340.78
Asphalt 03/10/2008-03/29/2008	4.63	24.93	14.41	0.01	0.04	1.79	1.83	0.01	1.64	1.66	2,340.78
Time Slice 3/31/2008-5/3/2008 Number Active Days: 30	**15.88**	**132.53**	**158.67**	**0.23**	0.89	**6.49**	7.38	0.31	**5.95**	6.26	**24,936.82**
Building 03/31/2008-05/03/2008	15.88	132.53	158.67	0.23	0.89	6.49	7.38	0.31	5.95	6.26	24,936.82

Phase Assumptions

Phase: Fine Grading 1/28/2008 - 3/1/2008 - Default Fine Site Grading/Excavation Description
Total Acres Disturbed: 30.4
Maximum Daily Acreage Disturbed: 7.6
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/1/2008 - 1/26/2008 - Default Mass Site Grading/Excavation Description
Total Acres Disturbed: 30.4
Maximum Daily Acreage Disturbed: 7.6
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 3/3/2008 - 3/8/2008 - Default Trenching Description
Off-Road Equipment:

Phase: Paving 3/10/2008 - 3/29/2008 - Default Paving Description
Acres to be Paved: 7.6
Off-Road Equipment:
4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 3/31/2008 - 5/3/2008 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

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Urbemis 2007 Version 9.2.0

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\zuleger_GL\Application Data\Urbemis\Version9a\Projects\MCG100_3.urb9

Project Name: MCG100

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 1/1/2008-1/26/2008 Number Active Days: 22	4.67	32.17	20.49	0.00	62.09	1.02	63.11	12.97	0.94	13.90	3,163.04
Mass Grading 01/01/2008-01/26/2008	4.67	32.17	20.49	0.00	62.09	1.02	63.11	12.97	0.94	13.90	3,163.04
Time Slice 1/28/2008-3/1/2008 Number Active Days: 30	4.67	32.17	20.49	0.00	68.41	1.02	69.43	14.29	0.94	15.22	3,163.04
Fine Grading 01/28/2008-03/01/2008	4.67	32.17	20.49	0.00	68.41	1.02	69.43	14.29	0.94	15.22	3,163.04
Time Slice 3/3/2008-3/8/2008 Number Active Days: 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 03/03/2008-03/08/2008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 3/10/2008-3/29/2008 Number Active Days: 18	4.63	22.47	14.41	0.01	0.04	1.09	1.13	0.01	1.00	1.01	2,340.78
Asphalt 03/10/2008-03/29/2008	4.63	22.47	14.41	0.01	0.04	1.09	1.13	0.01	1.00	1.01	2,340.78
Time Slice 3/31/2008-5/3/2008 Number Active Days: 30	**15.88**	129.80	**158.67**	**0.23**	0.89	5.82	6.72	0.31	5.34	5.65	**24,936.82**
Building 03/31/2008-05/03/2008	15.88	129.80	158.67	0.23	0.89	5.82	6.72	0.31	5.34	5.65	24,936.82

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/28/2008 - 3/1/2008 -
For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation
PM10: 55% PM25: 55%
For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation
PM10: 55% PM25: 55%
For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces
NOX: 15% PM10: 50% PM25: 50%
For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
The following mitigation measures apply to Phase: Mass Grading 1/1/2008 - 1/26/2008 -
For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation
PM10: 55% PM25: 55%
For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph
PM10: 44% PM25: 44%
For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation
PM10: 55% PM25: 55%
For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces
NOX: 15% PM10: 50% PM25: 50%
For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
The following mitigation measures apply to Phase: Paving 3/10/2008 - 3/29/2008 - Default
For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Paving Equipment, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions
NOX: 15% PM10: 50% PM25: 50%
The following mitigation measures apply to Phase: Building Construction 3/31/2008 -
For Cranes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Forklifts, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Generator Sets, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%
For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces
NOX: 15% PM10: 50% PM25: 50%
For Welders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:
NOX: 15% PM10: 50% PM25: 50%

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Phase Assumptions

Phase: Fine Grading 1/28/2008 - 3/1/2008 - Default Fine Site Grading/Excavation
Total Acres Disturbed: 30.4
Maximum Daily Acreage Disturbed: 7.6
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 1/1/2008 - 1/26/2008 - Default Mass Site Grading/Excavation
Total Acres Disturbed: 30.4
Maximum Daily Acreage Disturbed: 7.6
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 3/3/2008 - 3/8/2008 - Default Trenching Description
Off-Road Equipment:

Phase: Paving 3/10/2008 - 3/29/2008 - Default Paving Description
Acres to be Paved: 7.6
Off-Road Equipment:
4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 3/31/2008 - 5/3/2008 - Default Building Construction
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Appendix D
Stationary Source Emission Calculations

Stationary Source Emissions Summary

	Project	Tons Per Year					
		VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Stationary	Agg Plant					3.68	1.06
	RMC Plant					0.78	0.23
	Asphalt Plant	2.45	1.88	3.45	0.04	3.45	3.38
	Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
	VacLite					0.01	0.00
	Cement Transfer					0.10	0.03
	Generator	0.00	0.02	0.01		0.00	0.00
	Total:	**2.48**	**2.64**	**3.90**	**0.04**	**8.06**	**4.73**

	Mitigated Project	Tons Per Year					
		VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Stationary	Agg Plant					3.68	1.06
	RMC Plant					0.78	0.23
	Asphalt Plant	2.45	1.88	3.45	0.04	3.45	3.38
	Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
	VacLite					0.01	0.00
	Cement Transfer					0.10	0.03
	Generator	0.00	0.02	0.01		0.00	0.00
	Total:	**2.48**	**2.64**	**3.90**	**0.04**	**8.06**	**4.73**
	Percent Change from Mitigation:	0%	0%	0%	0%	0%	0%

Notes: Stationary sources are controlled as required for new sources including best available control technology. Stationary sources emit pollutants at the same rates for both the Project and the Lowered Facilities Alternative. Stationary sources are unaffected by proposed mitigations.

Aggregate Plant Emissions

Description	% of Total	Throughput (tpy)	Emission Factor[1] (lb/ton)	Annual PM_{10} (tpy)	Annual $PM_{2.5}$[2] (tpy)
Hopper to conveyor	100%	2,500,000	0.000046	0.058	0.02
Conveyor to crusher	100%	2,500,000	0.000046	0.058	0.02
Jaw crushing	100%	2,500,000	0.000540	0.675	0.20
Conveyor to conveyor	100%	2,500,000	0.000046	0.058	0.02
Conveyor to storage pile	100%	2,500,000	0.000046	0.058	0.02
(underground)	100%	2,500,000	0.000000	0.000	0.00
Conveyor to screen	100%	2,500,000	0.000046	0.058	0.02
Screening	130%	3,250,000	0.000740	1.203	0.36
Conveyor to crusher	30%	750,000	0.000046	0.017	0.01
Crushing	30%	750,000	0.000540	0.203	0.06
Conveyor to screen	30%	750,000	0.000046	0.017	0.01
Conveyor to screen	60%	1,500,000	0.000046	0.035	0.01
Screening	60%	1,500,000	0.000740	0.555	0.17
Conveyor to crusher	15%	375,000	0.000046	0.009	0.00
Crushing	15%	375,000	0.000740	0.139	0.00
Conveyor to screen	15%	375,000	0.000046	0.009	0.00
Conveyor to storage pile	15%	375,000	0.000046	0.009	0.00
Conveyor to screen	30%	750,000	0.000046	0.017	0.01
Screening	30%	750,000	0.000740	0.278	0.08
Conveyor to storage pile	15%	375,000	0.000046	0.009	0.00
Conveyor to storage pile	15%	375,000	0.000046	0.009	0.00
Fines conveyor to backfill	20%	500,000	0.000740	0.185	0.06
Conveyor to wet screen	40%	1,000,000	0.000046	0.023	0.01
Wet screening	40%	1,000,000	0.000000	0.000	0.00
Conveyor to storage pile	15%	375,000	0.000000	0.000	0.00
Conveyor to storage pile	15%	375,000	0.000000	0.000	0.00
Screw conveyor to conveyor	10%	250,000	0.000000	0.000	0.00
Conveyor to storage pile	10%	250,000	0.000000	0.000	0.00
			Annual Emissions (tpy):	3.68	1.06
			Plant Emission Factors (lb/ton):	0.0029	0.00085

Throughput (tons)
2,500,000 Annual

PM_{10} Emission Factors [1]:	E.F. (lb/ton)	Control Method
conveyor transfer point	0.000046	water spray
screening	0.00074	controlled (lb/ton)
crushing	0.00054	controlled (lb/ton)
wet processing	0	saturation

$PM_{2.5}$ Fraction of PM_{10}
0.292
0.3
0.3

[1] Emission factors for controlled emissions as defined in AP-42 Section 11.19.2 dated 8/04 and Section 13.2 for loader drop of aggregate with 3% moisture.

[2] $PM_{2.5}$ emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Mineral Process Loss: Loading and Unloading Bulk Materials and Mineral Products: Crushing, Screening, Blasting, Loading, Unloading.

Ready Mix Concrete Plant Emission Calculations

Equipment / Emission Unit Description	Throughput (tpy)	Emission Factor	EF Unit	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions[1] (tpy)	Emission Source Comments
Conveyor transfer to aggregate storage bin	369,675	0.000046	lb PM10 / ton aggregate	0.009	0.002	AP42, table 11.19.2-2, 8/04, conveyor transfer point. AP42 emission factor of 0.000046 lb/ton. Aggregate kept moist.
Discharge from aggregate storage bin to belt conveyor	369,675	0.000046	lb PM10 / ton aggregate	0.009	0.002	
Pneumatic transfer of cement to controlled silo	55,238	0.000340	lb PM10 / ton cement	0.009	0.003	AP42 Table 11.12-2 (June 2006). Cement unloading to elevated storage silo controlled by fabric filter.
Pneumatic transfer of cement supplements to controlled silo	8,213	0.004900	lb PM10 / ton cement supplement	0.020	0.006	AP42 Table 11.12-2 (June 2006). Cement supplement unloading to elevated storage silo controlled by fabric filter.
Cement / flyash conveyed with cement batcher screw	55,238	NA	NA	0.000	0.000	Closed system
Weigh hopper loading (aggregate and cement / flyash)	369,675	0.000028	lb PM10 / ton aggregate	0.005	0.002	AP42 Table 11.12-2 (June 2006). Weigh hopper loading, with 99% control from fabric filter.
Mixer	55,238	0.0263	lb PM10 / ton cement and cement supplement	0.726	0.212	AP42 Table 11.12-2 (June 2006). Controlled truck mixing. Materials fed dry.
Load out	452,700	NA	NA	0.000	0.000	Material is wet
			Annual Emissions (tpy)	0.778	0.227	
			Plant Emissions Factors (lb/cy)	0.00692	0.00202	

Throughput Information

Annual Production =	225,000	yd^3
Density of Concrete =	2.01	$tons/yd^3$
Annual Concrete Production =	452,700	tons
Amount of Sand and Gravel =	369,675	tons
Amount of Cement =	55,238	tons
Amount of Cement Supplements =	8,213	tons

Aggregate accounts for: 1.643 tons per cubic yard

AP-42 Table 11.12-2, Footnote a.

1865	lb gravel	46%
1421	lb sand	35%
491	lb cement	12%
73	lb supplement	2%
174	lb water	4%
4024	lb concrete	100%

Asphalt Plant Emissions

Yearly Asphalt Plant Emissions

	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$ [4]
Dryer/Mixer Emissions						
E.F. (lb/ton)[1]	0.0082				0.023	
E.F. (lb/10^3 gal)[2]		4.575	7.5	0.095		
Control Factor	88.2%	0%			0.0%	
Emissions (tons/yr)	0.15	1.88	3.1	0.039	3.45	3.38
Silo Fill Emissions						
E.F. (lb/ton)[3]	0.0115		0.0012		0.0006	
Control Factor					95%	
Emissions (tons/yr)	1.7183		0.1770		0.0044	0.0013
Load Out Emissions						
E.F. (lb/ton)[3]	0.0039		0.0013		0.0005	
Control Factor					95%	
Emissions (tons/yr)	0.5864		0.2024		0.00039	0.00011
Total Peak Yearly (tpy)	**2.45**	**1.88**	**3.45**	**0.04**	**3.45**	**3.38**

Assumptions:

Plant Throughput (tons/yr) =	300,000	Maximum Hourly Plant throughput (tph):	400
Plant Rating (MMBtu/hr) =	100	Operation/Year at Max Throughput (hrs/yr):	750
Conversion Factor (btu/gal) =	91,500	Yearly Fuel Usage (10^3gal/yr):	820
Hourly Fuel Usage (gal/hr):	1,093		

Control Factors:

Unit	PM_{10}	VOCs	NOx	Reference
Dryer/Mixer	0.00%	88.20%	0%	Dryer and mixer PM10 emissions are controlled by a knock out box and a baghouse (89.9% = 90% capture and 99.9% control). VOC and NOx emissions are controlled by flue gas recirculation of the mixer exhaust through the dryer (88.2% = 90% capture and 98% control for VOC, NOx per AVAQMD Rule 1146).
Silo Loading	95%	---	---	Emissions are vented to a blue smoke filtration system which has 95% control efficiency per manufacturer specifications. Some condensable VOC's are controlled, but the VOC control factor is conservatively assumed to be 0%.
Product Load Out	95%	---	---	

[1] Batch process emission factor from AP42 Table 11.1-6 used for VOCs since mixing occurs after dryer in both batch and proposed process, natural gas EF used because propane EF does not exist. Factor accounts for additional VOCs beyond fuel burning. Drum process emission factor from AP42 11.1 used for PM_{10} (controlled by fabric filter) since proposed dryer is a drum dryer.

[2] AP42 Table 1.5-1 for propane combustion emission factors (average of industrial and commercial). SOx EF based on 185 ppmw Sulfur standard in propane. NOx emissions factor from AVAQMD Rule 1146(c)(1) is 0.05 lb/MMBtu.

[3] Silo filling and plant load-out emission factors from AP42 section 11.1 Tables 11.1-14,16 (3/04)

[4] $PM_{2.5}$ emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds" from October, 2006, Mineral Process Loss: Loading and Unloading Bulk Materials and External Combustion: Gaseous Fuel-Petroleum and Industrial Process Heater Only.

Asphaltic Oil Storage Heater Emissions

Parameter	Units	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$[3]
Emission Factor [1]	lb/Kgal	0.5	13	7.5	0.09	0.6	--
Annual Emissions[2]	tpy	0.03	0.75	0.43	0.01	0.034	0.034
Daily Emissions	lb/day	0.16	4.09	2.36	0.03	0.19	0.18
Hourly Emissions	lb/hr	0.01	0.17	0.10	0.00	0.01	0.01

Assumptions:

Heater Rating (MMBtu/hr) =	1.2	Fuel Use (Kgal/yr) =	114.89
Energy Use (MMBtu/yr)[2] =	10,512	Fuel Use (Kgal/day) =	0.31
Conversion Factor (btu/gal) =	91,500	Fuel Use (Kgal/hr) =	0.013

1 Emission factors from AP42 Table 1.5-1 for propane fueled industrial boilers

[2] Emission calculations assume a burner firing at maximum heat (1.2 MMbtu/hr) input rate 24 hr/day and 365 day/yr.

[3] $PM_{2.5}$ Emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, External Combustion: Gaseous Fuel-Petroleum and Industrial Process Heater Only.

Vac-Lite Plant Emissions

Description	Throughput (tpy)	Emission Factor[1] (lb/ton)	Annual PM_{10} (tpy)	Annual $PM_{2.5}$[2] (tpy)
Grizzly Screen/Hopper	30,000	0.00074	0.011	0.0032
Conveyor to Conveyor	30,000	0.000046	0.001	0.0002
Conveyor to Vessel	30,000	0.000046	0.001	0.0002
Vessel to Conveyor (wet)	30,000	0	0.000	0.0000
Conveyor to Conveyor (wet)	30,000	0	0.000	0.0000
Conveyor to storage pile (wet)	30,000	0	0.000	0.0000
		Annual Emissions (tpy):	0.012	0.0036
		Plant emission factors (lb/ton):	0.00083	0.00024

Controlled PM_{10} Emission Factors from 08/04 AP-42 Table 11.19.2-2[1]:			**$PM_{2.5}$ Fraction of PM_{10}**
conveyor transfer point	0.000046	controlled (lb/ton)	0.292
screening	0.00074	controlled (lb/ton)	0.3
crushing	0.00054	controlled (lb/ton)	0.3
wet processing	0	controlled (lb/ton)	

[1] Emission factors for controlled emissions as defined in AP-42 Section 11.19.2 dated 8/04 and Section 13.2 for loader drop of aggregate with 3% moisture

[2] $PM_{2.5}$ emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Mineral Process Loss: Loading and Unloading Bulk Materials and Mineral Products: Crushing, Screening, Blasting, Loading, Unloading.

Cement Transfer Facility Emission Calculations

Source	Throughput (tpy)[1]	Emission Factor (lb/ton)[2]	PM_{10} Emissions (tpy)	$PM_{2.5}$ Emissions[3] (tpy)
Train Unloading to Silos	300,000	0.000340	0.051	0.015
Transfer to Haul Trucks	300,000	0.000340	0.051	0.015
		Annual (tpy):	0.102	0.030

[1] Cement is loaded into trucks whether it is used on-site or sold.

[2] EF from AP42, Table 11.12-2, 10/01, cement unloading to elevated storage silo, controlled by fabric filter

[3] $PM_{2.5}$ Emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Mineral Process Loss: Loading and Unloading Bulk Materials.

Emergency Generator Testing Emissions

Parameter	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$[2]
Emission Factor (g/bhp-hr)[1]	0.7	6.5	4.9	---	0.6	--
Emissions (tpy)	0.002	0.018	0.013	---	0.002	0.002

Assumptions:

Generator Fuel =	Diesel
Generator Power (hp) =	49
Testing (hrs/year) =	50

[1] Emission factors assumed to be equivalent to Tier 2 standards for off road mobile equipment
[2] PM2.5 Emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Internal Combustion: Distillate and Diesel-Electric Generation.

Appendix E
Mobile Source Emission Calculations

AVAQMD Emissions Summary

	Unmitigated (2014)	Tons Per Year					
		VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Mobile	Haul Trucks (off-site)	0.25	2.16	1.25	0.01	0.15	0.14
Mobile	Haul Trucks (on-site)	0.20	2.33	0.72	0.00	0.05	0.04
Mobile	Worker Commute	0.63	0.74	8.78	0.01	0.15	0.06
Mobile	Train	0.03	1.14	0.11	0.07	0.02	0.02
Mobile	Off Road	2.28	34.08	45.38	0.00	1.39	1.28
	Total:	**3.39**	**40.45**	**56.23**	**0.10**	**1.76**	**1.54**
	800,000 tons per year Total:	**3.39**	**16.18**	**56.23**	**0.10**	**1.76**	**1.54**

	Mitigated (2015)	Tons Per Year					
		VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Mobile	Haul Trucks (off-site)	0.25	2.16	1.25	0.01	0.15	0.14
Mobile	Haul Trucks (on-site)	0.20	2.33	0.72	0.00	0.05	0.04
Mobile	Worker Commute	0.63	0.74	8.78	0.01	0.15	0.06
Mobile	Train	0.03	1.14	0.11	0.07	0.02	0.02
Mobile	Off Road	0.83	12.26	20.34	0.00	0.48	0.44
	Total:	**1.95**	**18.63**	**31.19**	**0.10**	**0.85**	**0.70**
	Percent Change from Mitigation:	-43%	-54%	-45%	0%	-52%	-54%

Emissions Summary for Other Districts

	Tons per Year					
	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
MDAQMD						
Emissions (tpy)	0.02	0.16	0.09	0.00	0.01	0.01
Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	No	No	No	No	No
SCAQMD	Pounds per Day					
Emissions (lb/day)	0.48	2.4	4.2	0.03	0.30	0.27
Thresholds	55	55	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Notes: Emissions from haul trucks traveling offsite represent the Project's fair share of regional growth. Discussion about the regional aggregates market and inelastic demand for aggregates is discussed in Section 7.1.8. Total emissions from haul trucks traveling on-site were assessed for the Project and for the Lowered Facilities Alternative in order to determine tha the Lowered Facilities Alternative has slightly higher emissions and is therefore presented in the summaries above. Emissions from other sources are unchanged by the Lowered Facilities Alternative. Mitigations AQ-4 and AQ-5 substitute a dragline and mobile conveyor system for the dozer and haul trucks resulting in missions reductions from offroad vehicles. Emissions at the 800,000 tons per year level specified in AQ4 are assumed to result in mobile emissions that are calculated by multiplying the unmitigated total by the ratio 800,000 to 2,000,000. The result is less than the full Project mitigated by both AQ4 and AQ5.

On Road Haul Truck Emissions

Project Year	Year	Population[1]	Aggregate Demand (tons)[2]	Growth from 2013 (tons)	Production: Tons / peak year shipped	Production: Cumulative Tons Produced	Production: Share of Growth (tons/yr)[3]	Emission Factors (lb/VMT): ROG	CO	NOx	CO_2	PM_{10}	SO_2
1	2012	4,130,900	27,263,940	0	0	0	0	0.001613	0.00764	0.02976	3.85641	0.00135	3.7E-05
2	2013	4,194,782	27,685,559	0	0	0	0	0.001445	0.0069	0.02776	3.87208	0.00118	3.7E-05
3	2014	4,258,663	28,107,178	421,619	2,000,000	2,000,000	30,001	0.001012	0.0049	0.02576	3.89366	0.0008	3.7E-05
4	2015	4,322,545	28,528,796	843,238	2,000,000	4,000,000	59,115	0.00086	0.0041	0.02262	3.90768	0.00064	3.7E-05
5	2016	4,386,427	28,950,415	1,264,856	2,000,000	6,000,000	87,381	0.000579	0.00284	0.01918	3.91919	0.00044	3.7E-05
6	2017	4,450,308	29,372,034	1,686,475	2,000,000	8,000,000	114,835	0.000552	0.00273	0.01715	3.91573	0.00041	3.7E-05
7	2018	4,514,190	29,793,653	2,108,094	2,000,000	10,000,000	141,513	0.000561	0.00279	0.01539	3.91215	0.0004	3.7E-05
8	2019	4,578,071	30,215,272	2,529,713	2,000,000	12,000,000	167,446	0.000568	0.00281	0.01399	3.91819	0.0004	3.7E-05
9	2020	4,641,953	30,636,890	2,951,332	2,000,000	14,000,000	192,665	0.00058	0.0029	0.01102	3.91855	0.0004	3.7E-05
10	2021	4,705,835	31,058,509	3,372,950	2,000,000	16,000,000	217,200	0.000608	0.00305	0.00803	3.92543	0.00039	3.7E-05
11	2022	4,769,716	31,480,128	3,794,569	2,000,000	18,000,000	241,077	0.000645	0.00325	0.00612	3.92615	0.00039	3.7E-05
12	2023	4,833,598	31,901,747	4,216,188	2,000,000	20,000,000	264,323	0.000611	0.00309	0.00539	3.91992	0.00038	3.7E-05
13	2024	4,897,480	32,323,366	4,637,807	2,000,000	22,000,000	286,963	0.000608	0.00313	0.00537	3.89916	0.00039	3.7E-05
14	2025	4,961,361	32,744,984	5,059,426	2,000,000	24,000,000	309,020	0.000609	0.00314	0.0054	3.89881	0.00039	3.7E-05
15	2026	5,025,243	33,166,603	5,481,044	2,000,000	26,000,000	330,516	0.00061	0.00314	0.00541	3.89868	0.00039	3.7E-05
16	2027	5,089,125	33,588,222	5,902,663	2,000,000	28,000,000	351,472	0.00061	0.00314	0.00541	3.89862	0.00039	3.7E-05
17	2028	5,153,006	34,009,841	6,324,282	2,000,000	30,000,000	371,909	0.000608	0.00313	0.0054	3.89841	0.00039	3.7E-05
18	2029	5,216,888	34,431,460	6,745,901	2,000,000	32,000,000	391,845	0.000607	0.00313	0.00539	3.89835	0.00039	3.7E-05
19	2030	5,280,769	34,853,078	7,167,520	2,000,000	34,000,000	411,299	0.000607	0.00312	0.00538	3.8984	0.00039	3.7E-05
20	2031	5,344,651	35,274,697	7,589,138	2,000,000	36,000,000	430,288	0.000623	0.00314	0.00543	3.92329	0.00039	3.7E-05
21	2032	5,408,533	35,696,316	8,010,757	840,000	36,840,000	188,508	0.000622	0.00314	0.00543	3.92332	0.00039	3.7E-05
22	2033	5,472,414	36,117,935	8,432,376	0	36,840,000	0	0.000622	0.00314	0.00542	3.92328	0.00039	3.7E-05
23	2034	5,536,296	36,539,553	8,853,995	0	36,840,000	0	0.000621	0.00314	0.00542	3.9232	0.00039	3.7E-05
24	2035	5,600,178	36,961,172	9,275,613	0	36,840,000	0	0.000621	0.00314	0.00541	3.92316	0.00039	3.7E-05

Assumptions:

36.84 MMTons will be sold.

[1] The 2012 population for Antelope Valley was estimated based on the SCAG data reported by Greater Antelope Valley Economic Alliance (2011 Roundtable Report) and is assumed to be equal to the Palmdale P-C Region population (http://www.aveconomy.org/files/2011%20GAVEA%20RTR.pdf).

[2] 6.6 tons per person, MS 52 (2006)

[3] Share of growth based on (facility throughput / regional demand for calendar year) X cumulative growth since 2012.

On Road Haul Truck Emissions

Project Year	Year	Project Emissions (tpy)							AVAQMD Emissions (tpy)						
		Share of Growth (VMT/yr)	ROG	CO	NOx	CO_2	PM_{10}	SO_2	AV Share of Project (VMT/yr)	ROG	CO	NOx	CO_2	PM_{10}	SO_2
1	2012	0	0	0	0	0	0	0.00	0	0.00	0.00	0.00	0	0.00	0.00
2	2013	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
3	2014	65,003	0.03	0.16	0.84	127	0.03	0.00	55,282	0.03	0.14	0.71	108	0.02	0.00
4	2015	128,084	0.06	0.26	1.45	250	0.04	0.00	108,930	0.05	0.22	1.23	213	0.03	0.00
5	2016	189,328	0.05	0.27	1.82	371	0.04	0.00	161,015	0.05	0.23	1.54	316	0.04	0.00
6	2017	248,813	0.07	0.34	2.13	487	0.05	0.00	211,605	0.06	0.29	1.81	414	0.04	0.00
7	2018	306,615	0.09	0.43	2.36	600	0.06	0.01	260,763	0.07	0.36	2.01	510	0.05	0.00
8	2019	362,804	0.10	0.51	2.54	711	0.07	0.01	308,549	0.09	0.43	2.16	604	0.06	0.01
9	2020	417,447	0.12	0.60	2.30	818	0.08	0.01	355,020	0.10	0.51	1.96	696	0.07	0.01
10	2021	470,606	0.14	0.72	1.89	924	0.09	0.01	400,229	0.12	0.61	1.61	786	0.08	0.01
11	2022	522,341	0.17	0.85	1.60	1025	0.10	0.01	444,228	0.14	0.72	1.36	872	0.09	0.01
12	2023	572,708	0.18	0.89	1.54	1122	0.11	0.01	487,063	0.15	0.75	1.31	955	0.09	0.01
13	2024	621,762	0.19	0.97	1.67	1212	0.12	0.01	528,781	0.16	0.83	1.42	1031	0.10	0.01
14	2025	669,552	0.20	1.05	1.81	1305	0.13	0.01	569,424	0.17	0.89	1.54	1110	0.11	0.01
15	2026	716,127	0.22	1.12	1.94	1396	0.14	0.01	609,034	0.19	0.96	1.65	1187	0.12	0.01
16	2027	761,533	0.23	1.20	2.06	1484	0.15	0.01	647,650	0.20	1.02	1.75	1262	0.13	0.01
17	2028	805,813	0.25	1.26	2.17	1571	0.16	0.01	685,309	0.21	1.07	1.85	1336	0.13	0.01
18	2029	849,009	0.26	1.33	2.29	1655	0.17	0.02	722,045	0.22	1.13	1.94	1407	0.14	0.01
19	2030	891,160	0.27	1.39	2.40	1737	0.17	0.02	757,892	0.23	1.18	2.04	1477	0.15	0.01
20	2031	932,303	0	1	3	1829	0	0	792882	0	1	2	1555	0	0
21	2032	408,439	0	1	1	801	0	0	347359	0	1	1	681	0	0
22	2033	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	2034	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	2035	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Assumptions:

See traffic calculations for derivation of the following:

2.17 VMT/ton produced by the Project in all air districts.

1.84 VMT/ton produced by the Project that occurs within AVAQMD.

On Road Haul Truck Emissions

Project Year	Year	MDAQMD Emissions (tpy)							SCAQMD Emissions (tons/yr)						
		MD Share of Project (VMT/yr)	ROG	CO	NOx	CO_2	PM_{10}	SO_2	SC Share of Project (VMT/yr)	ROG	CO	NOx	CO_2	PM_{10}	SO_2
1	2012	0	0.00	0.00	0.00	0	0.00	0.00	0	0.000	0.000	0.000	0	0.000	0.000
2	2013	0	0.00	0.00	0.00	0	0.00	0.00	0	0.000	0.000	0.000	-	0.000	0.000
3	2014	4,203	0.00	0.01	0.05	8	0.00	0.00	5,518	0.015	0.074	0.389	59	0.012	0.001
4	2015	8,282	0.00	0.02	0.09	16	0.00	0.00	10,872	0.026	0.122	0.674	116	0.019	0.001
5	2016	12,242	0.00	0.02	0.12	24	0.00	0.00	16,071	0.026	0.125	0.844	173	0.019	0.002
6	2017	16,089	0.00	0.02	0.14	31	0.00	0.00	21,120	0.032	0.158	0.992	227	0.024	0.002
7	2018	19,826	0.01	0.03	0.15	39	0.00	0.00	26,026	0.040	0.199	1.097	279	0.029	0.003
8	2019	23,460	0.01	0.03	0.16	46	0.00	0.00	30,796	0.048	0.237	1.180	331	0.034	0.003
9	2020	26,993	0.01	0.04	0.15	53	0.01	0.00	35,434	0.056	0.281	1.070	380	0.039	0.004
10	2021	30,430	0.01	0.05	0.12	60	0.01	0.00	39,946	0.066	0.334	0.878	430	0.043	0.004
11	2022	33,776	0.01	0.05	0.10	66	0.01	0.00	44,338	0.078	0.395	0.744	477	0.047	0.005
12	2023	37,032	0.01	0.06	0.10	73	0.01	0.00	48,613	0.081	0.412	0.717	522	0.051	0.005
13	2024	40,204	0.01	0.06	0.11	78	0.01	0.00	52,777	0.088	0.452	0.777	564	0.057	0.005
14	2025	43,294	0.01	0.07	0.12	84	0.01	0.00	56,833	0.095	0.488	0.841	607	0.061	0.006
15	2026	46,306	0.01	0.07	0.13	90	0.01	0.00	60,787	0.102	0.523	0.902	649	0.065	0.006
16	2027	49,242	0.02	0.08	0.13	96	0.01	0.00	64,641	0.108	0.556	0.958	690	0.070	0.007
17	2028	52,105	0.02	0.08	0.14	102	0.01	0.00	68,399	0.114	0.587	1.011	731	0.074	0.007
18	2029	54,899	0.02	0.09	0.15	107	0.01	0.00	72,066	0.120	0.617	1.063	770	0.077	0.007
19	2030	57,624	0.02	0.09	0.16	112	0.01	0.00	75,644	0.126	0.648	1.115	808	0.081	0.008
20	2031	60284	0	0	0	118	0	0	79136	0	1	1	851	0	0
21	2032	26410	0	0	0	52	0	0	34669	0	0	1	373	0	0
22	2033	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	2034	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	2035	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0.02	**0.09**	**0.16**	**118**	**0.01**	**0.00**		**0.13**	**0.68**	**1.18**	**850.61**	**0.085**	**0.008**

Assumptions:

See traffic calculations for derivation of the following:

0.14 VMT/ton produced by the Project that occurs within MDAQMD assuming 100% of materials traveling east.

0.18 VMT/ton produced by the Project that occurs within SCAQMD assuming 50% of materials travel there.

On Road Haul Truck Emissions

Project Year	Year	SC Peak Day	ROG	CO	NOx	CO_2	PM_{10}	SO_2
		SCAQMD Emissions (lb/day)						
1	2012	0	0.0	0.0	0.0	0	0.00	0.00
2	2013	0	0.0	0.0	0.0	0	0.00	0.00
3	2014	53	0.1	0.3	1.4	207	0.04	0.00
4	2015	105	0.1	0.4	2.4	410	0.07	0.00
5	2016	155	0.1	0.4	3.0	608	0.07	0.01
6	2017	204	0.1	0.6	3.5	799	0.08	0.01
7	2018	251	0.1	0.7	3.9	983	0.10	0.01
8	2019	297	0.2	0.8	4.2	1165	0.12	0.01
9	2020	342	0.2	1.0	3.8	1341	0.14	0.01
10	2021	386	0.2	1.2	3.1	1514	0.15	0.01
11	2022	428	0.3	1.4	2.6	1681	0.17	0.02
12	2023	469	0.3	1.5	2.5	1840	0.18	0.02
13	2024	510	0.3	1.6	2.7	1987	0.20	0.02
14	2025	549	0.3	1.7	3.0	2140	0.22	0.02
15	2026	587	0.4	1.8	3.2	2288	0.23	0.02
16	2027	624	0.4	2.0	3.4	2433	0.25	0.02
17	2028	660	0.4	2.1	3.6	2575	0.26	0.02
18	2029	696	0.4	2.2	3.7	2713	0.27	0.03
19	2030	730	0.4	2.3	3.9	2847	0.29	0.03
20	2031	764	0.5	2.4	4.1	2998	0.30	0.03
21	2032	335	0.2	1.1	1.8	1313	0.13	0.01
22	2033	0	0.0	0.0	0.0	0	0.00	0.00
23	2034	0	0.0	0.0	0.0	0	0.00	0.00
24	2035	0	0.0	0.0	0.0	0	0.00	0.00
			0.48	**2.40**	**4.16**	**2998**	**0.30**	**0.03**

Assumptions:

Maximum number of loads in one day (301) each travel the average distance (11.8 miles) in the SCAQMD as discussed in the Traffic spreadsheet. The ratio of annual fair share of growth to the maximum of 2,000,000 tons per year is used to scale the Project's fair share of increase in daily activity within SCAQMD.

TRAFFIC

Potential VMT per ton Produced

		Peak Year	#/trip	loads/yr	VMT/load	TOTAL VMT/yr	VMT/yr in AVAQMD	VMT/yr in MDAQMD	VMT in SCAQMD
Aggregate	Tons Produced	2,000,000							
Aggregate	Tons Shipped	1,354,325	29	46,701	51.06	2,384,546	1,925,944	280,205	178,397
RMC	Total CY	225,000	10	22,500	29.4	661,500	661,500	-	-
RMC	Total Tons	452,700				-			
RMC	Agg Tons	369,675				-			
RMC	Cement	55,238	29	1,905	29.4	55,999	55,999	-	-
RMC	Flyash/SCM/Admix.	8,213	29	283					
RMC	Water	19,575				-			
HMA	Total Tons	300,000	15	20,000	29.4	588,000	588,000	-	-
HMA	Agg Tons	276,000				-			
HMA	Oil Tons	24,000	29	828	55	45,517	28,601	-	16,916
Cement	Tons Shipped	244,763	29	8,440	55	464,205	291,689	-	172,515
Service/Fuel	Trips	4,545	1	4,545	29.4	133,623	133,623	-	-
		TOTAL		105,201		4,333,390	3,685,357	280,205	367,829

Effective Roundtrip Distance Traveled per Load

	Fraction	Avg. (mi)	AV (mi)	MD (mi)	SC (mi)
Westbound	80%	55	43.2	0	11.8
Eastbound	20%	35.3	33.4	30	-5.62
		51.06	41.2	6.0	3.8

loads/day	VMT/day in SCAQMD
301	3551.8

SCAQMD miles are negative going east because the average trip does not enter the District. SCAQMD is assessed assuming 100% of peak day loads (i.e. 301) head west traveling an average of 55 miles of which 11.8 miles is within SCAQMD.

VMT/ton Produced within Each Air Di	Average	AV	MD	SC
VMT per Average Roundtrip	51.06	35.0	6	6.57
VMT per tons produced (VMT/ton)	**2.17**	**1.84**	**0.14**	**0.18**

Lowered Facilities Alternative - On-site Haul Truck Running Emissions

	Acivity (trucks/yr)	Length (m)	Distance (VMT/yr)	ROG	CO	NOx	CO2	PM10	SOx
				Emissions (tpy)					
ENTRY - ALL	105,201	431	56,325	0.11	0.30	1.11	167.59	0.033	0.00
AGG	46,701	193	11,197	0.02	0.06	0.22	33.32	0.006	0.00
HMA	20,828	100	2,587	0.01	0.01	0.05	7.70	0.001	0.00
RECYC	-	146	-	-	-	-	-	-	-
QUEUE	8,440	358	3,753	0.01	0.02	0.07	11.17	0.002	0.00
TOTAL			73,863	0.14	0.40	1.46	219.78	0.043	0.0021

Note: RMC plant is located adjacent to the entry and so no additional distance is traveled by RMC trucks.

On-site Haul Truck Idling Emissions

Activity (Each truck idles 5 minutes)			Emissions Units	HC	CO	NOx	PM	CO2
	idle-hr/yr	8,767	tpy	0.058	0.319	0.64	0.002	67
	idle-hr/day	25.08	lb/day	0.331	1.825	3.64	0.012	384
	idle-hr/hr	5.98	lb/hr	0.079	0.435	0.87	0.003	92

Emissions Factors (EMFAC2011)

Calendar Year	15 mph Running (lb/VMT) ROG	CO	NOx	CO2	PM10	SOx	Idling (g/idle-hr) ROG	CO	NOx	PM	CO2
2014	0.0039	0.0107	0.0395	5.95	0.0012	5.74E-05	5.99	33.01	65.79	0.22	6,946

Sources: http://www.arb.ca.gov/msei/emfac2011_idling_emission_rates.xlsx HHDT
http://www.arb.ca.gov/emfac/ T7 tractor construction

Project - On-site Haul Truck Running Emissions

	Acivity (trucks/yr)	Length (m)	Distance (VMT/yr)	ROG	CO	NOx	CO2	PM10	SOx
				Emissions (tpy)					
ENTRY - ALL	105,201	114	14,937	0.03	0.08	0.29	44.45	0.009	0.00
AGG	46,701	610	35,365	0.07	0.19	0.70	105.23	0.020	0.00
HMA/RMC	45,516	297	16,803	0.03	0.09	0.33	50.00	0.010	0.00
RECYC	-	146	-	-	-	-	-	-	-
QUEUE	8,440	358	3,753	0.01	0.02	0.07	11.17	0.002	0.00
TOTAL			70,859	0.14	0.38	1.40	210.84	0.041	0.0020

On-site Haul Truck Idling Emissions

Activity (Each truck idles 5 minutes)			Emissions Units	HC	CO	NOx	PM	CO2
	idle-hr/yr	8,767	tpy	0.058	0.319	0.64	0.002	67
	idle-hr/day	25.08	lb/day	0.331	1.825	3.64	0.012	384
	idle-hr/hr	5.98	lb/hr	0.079	0.435	0.87	0.003	92

Emissions Factors (EMFAC2011)

Calendar	15 mph Running (lb/VMT)						Idling (g/idle-hr)				
Year	ROG	CO	NOx	CO2	PM10	SOx	ROG	CO	NOx	PM	CO2
2014	0.0039	0.0107	0.0395	5.95	0.0012	5.74E-05	5.99	33.01	65.79	0.22	6,946

Sources: http://www.arb.ca.gov/msei/emfac2011_idling_emission_rates.xlsx HHDT
http://www.arb.ca.gov/emfac/ T7 tractor construction

On Road Worker Commute Emissions

Pollutant	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
EF (g/VMT)[1]	0.2032502	0.237408	2.80951	0.0036131	0.047707221	0.020422	315.194
Roundtrips/year[2]	47,268						
Miles/roundtrip[3]	60.0						
Emissions (tpy)	0.63	0.74	8.78	0.01	0.15	0.06	984.49

[1] Emission factors from EMFAC2011 for gasoline LDA annual emissions in Mojave Desert portion of LA County.

[2] Yearly round trips based on 156 round trips per day and 303 days per year

[3] Assuming the majority of employees come from Palmdale and Lancaster

Haul Train Emission Calculations

Trains Destined for Project

Brake Distance[1] = 31

Speed	Miles Traveled	Time (mins)	EF[4] (g/hr) HC	Nox	CO	SO_2	PM_{10}	Emissions (lb/trip) HC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$[9]
Cruise (40 mph)[2]	27.67	41.5	415	20,572	1,786	1,307	337	0.63	31.37	2.72	1.99	0.51	0.47
Brake[3]	3.33	10.0	562	3,419	1,199	297	149	0.21	1.26	0.44	0.11	0.05	0.05
Total	**31.00**	**51.50**	---	---	---	---	---	**0.84**	**32.63**	**3.16**	**2.10**	**0.57**	**0.52**

Idle Time[5] = 30 minutes

Speed	Miles Traveled	Time (mins)	EF[4] (g/hr) HC	Nox	CO	SO_2	PM_{10}	Emissions (lb/trip) HC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$[9]
Idle	0	30.0	207	1277	503	83	44	**0.23**	**1.41**	**0.55**	**0.09**	**0.05**	**0.04**
						Annual (g/s)		0.0010	0.0061	0.0024	0.0004	0.00021	0.00019
						Daily (g/s)		0.001198	0.0074	0.0029	0.00048	0.00025	0.00023
						Hourly (g/s)		0.029	0.18	0.070	0.012	0.0061	0.0056

Accelerate Distance[1] = 36 miles

Speed	Miles Traveled[6]	Time (mins)[6]	EF[4] (g/hr) HC	Nox	CO	SO_2	PM_{10}	Emissions (lb/trip) HC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$[9]
Notch 1	0.15	2.9	146	2,414	272	154	36	0.02	0.26	0.03	0.02	0.00	0.00
Notch 2	0.44	2.9	190	5,121	360	364	115	0.02	0.55	0.04	0.04	0.01	0.01
Notch 3	0.73	2.9	248	9,163	551	647	208	0.03	0.99	0.06	0.07	0.02	0.02
Notch 4	1.03	2.9	321	14,608	1,087	943	248	0.03	1.57	0.12	0.10	0.03	0.02
Notch 5	1.31	2.9	415	20,572	1,786	1,307	337	0.04	2.21	0.19	0.14	0.04	0.03
Cruise (40 mph)[2]	32.34	48.5	415	20,572	1,786	1,307	337	0.74	36.67	3.18	2.33	0.60	0.55
Total	**36.00**	**63.2**	---	---	---	---	---	**0.88**	**42.25**	**3.62**	**2.70**	**0.70**	**0.65**

Amount of Trains:

Total cement import:	300,000	tpy
Rail car capacity[7]:	100	tons / car
Rail cars per trip:	100	cars / trip
Fraction of cars[8]:	10%	
Annual trips:	300	trips / year

	HC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$
Total Emissions Per Trip (lb/trip):	1.95	76.28	7.34	4.89	1.32	1.21
Project Related Emissions Per Trip (lb/trip)[10]:	0.19	7.63	0.73	0.49	0.13	0.12
Total Emissions Per Year (tpy):	**0.03**	**1.14**	**0.11**	**0.07**	**0.02**	**0.02**

[1] Distances are measured from the facility to the extent of Antelope Valley AQMD jurisdiction. Incomming from the north, outgoing to the south

[2] Cruise speed is assumed to be the maximum Notch 5 speed, according to CARB's Roseville Rail Yard Study (10/14/2004) pg D-19.

[3] Brake time to complete stop assumed

[4] Emission factors from CARB's Locomotive Emission Study (January 1991) for Union Pacific Line Haul (pg B-11)

[5] Required idle time to unload cement assumed

[6] Miles traveled and time in each notch during acceleration from CARB's Roseville Rail Yard Study (10/14/2004) pg D-19

[7] Rail car capacity based on Waste be Rail Inc - http://www.wbrinc.com/transport.html

[8] Fraction of cars filled with Project related materials is assumed

[9] PM2.5 Emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Trains: Hauling, Switching.

[10] Project related emissions per trip are 10% of the total trip emissions

Unmitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	TOTAL	42,231	12,796,040		0.3785	0.43	2.28	6.38	34.08	8.50	45.38	0.26	1.39	1.28	2,559	0.066	0.146	2,606
2013	TOTAL	42,231	12,796,040		0.3785	0.42	2.23	6.11	32.60	8.50	45.38	0.25	1.33	1.22	2,559	0.066	0.146	2,606
2014	TOTAL	42,231	12,796,040		0.3785	0.39	2.06	5.54	29.59	8.50	45.38	0.22	1.19	1.10	2,559	0.066	0.146	2,606
2015	TOTAL	42,231	12,796,040		0.3785	0.37	1.98	5.23	27.93	8.50	45.38	0.21	1.11	1.02	2,559	0.066	0.146	2,606
2016	TOTAL	42,231	12,796,040		0.3785	0.35	1.86	4.80	25.62	8.50	45.38	0.19	1.02	0.94	2,559	0.066	0.146	2,606
2017	TOTAL	42,231	12,796,040		0.3785	0.33	1.75	4.38	23.40	8.50	45.38	0.17	0.93	0.86	2,559	0.066	0.146	2,606
2018	TOTAL	42,231	12,796,040		0.3785	0.29	1.54	3.73	19.94	8.50	45.38	0.15	0.78	0.72	2,559	0.066	0.146	2,606
2019	TOTAL	42,231	12,796,040		0.3785	0.27	1.43	3.30	17.63	8.50	45.38	0.13	0.69	0.63	2,559	0.066	0.146	2,606
2020	TOTAL	42,231	12,796,040		0.3785	0.25	1.35	3.00	16.02	8.50	45.38	0.12	0.63	0.58	2,559	0.066	0.146	2,606
2021	TOTAL	42,231	12,796,040		0.3785	0.24	1.26	2.59	13.85	8.50	45.38	0.10	0.56	0.51	2,559	0.066	0.146	2,606
2022	TOTAL	42,231	12,796,040		0.3785	0.21	1.12	2.15	11.48	8.50	45.38	0.09	0.46	0.42	2,559	0.066	0.146	2,606
2023	TOTAL	42,231	12,796,040		0.3785	0.20	1.09	2.00	10.69	8.50	45.38	0.08	0.43	0.39	2,559	0.066	0.146	2,606
2024	TOTAL	42,231	12,796,040		0.3785	0.20	1.07	1.89	10.09	8.50	45.38	0.07	0.40	0.36	2,559	0.066	0.146	2,606
2025	TOTAL	42,231	12,796,040		0.3785	0.18	0.97	1.60	8.55	8.50	45.38	0.06	0.33	0.30	2,559	0.066	0.146	2,606
2026	TOTAL	42,231	12,796,040		0.3785	0.18	0.97	1.54	8.23	8.50	45.38	0.06	0.32	0.29	2,559	0.066	0.146	2,606
2027	TOTAL	42,231	12,796,040		0.3785	0.18	0.95	1.44	7.69	8.50	45.38	0.05	0.29	0.27	2,559	0.066	0.146	2,606
2028	TOTAL	42,231	12,796,040		0.3785	0.18	0.95	1.41	7.51	8.50	45.38	0.05	0.29	0.26	2,559	0.066	0.146	2,606
2029	TOTAL	42,231	12,796,040		0.3785	0.17	0.92	1.28	6.84	8.50	45.38	0.05	0.26	0.24	2,559	0.066	0.146	2,606
2012	140 H Grader	2.0	606	185	0.4087	0.35	0.02	6.45	0.33	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	25
2013	140 H Grader	2.0	606	185	0.4087	0.35	0.02	6.42	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	25
2014	140 H Grader	2.0	606	185	0.4087	0.36	0.02	6.41	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	25
2015	140 H Grader	2.0	606	185	0.4087	0.37	0.02	6.40	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	25
2016	140 H Grader	2.0	606	185	0.4087	0.37	0.02	6.33	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	25
2017	140 H Grader	2.0	606	185	0.4087	0.37	0.02	6.17	0.31	8.50	0.43	0.20	0.01	0.01	24.2	0.0006	0.0014	25
2018	140 H Grader	2.0	606	185	0.4087	0.36	0.02	5.89	0.30	8.50	0.43	0.19	0.01	0.01	24.2	0.0006	0.0014	25
2019	140 H Grader	2.0	606	185	0.4087	0.33	0.02	5.45	0.28	8.50	0.43	0.18	0.01	0.01	24.2	0.0006	0.0014	25
2020	140 H Grader	2.0	606	185	0.4087	0.33	0.02	5.25	0.27	8.50	0.43	0.17	0.01	0.01	24.2	0.0006	0.0014	25
2021	140 H Grader	2.0	606	185	0.4087	0.31	0.02	4.92	0.25	8.50	0.43	0.16	0.01	0.01	24.2	0.0006	0.0014	25
2022	140 H Grader	2.0	606	185	0.4087	0.29	0.01	4.37	0.22	8.50	0.43	0.14	0.01	0.01	24.2	0.0006	0.0014	25
2023	140 H Grader	2.0	606	185	0.4087	0.26	0.01	3.87	0.20	8.50	0.43	0.13	0.01	0.01	24.2	0.0006	0.0014	25
2024	140 H Grader	2.0	606	185	0.4087	0.24	0.01	3.46	0.17	8.50	0.43	0.11	0.01	0.01	24.2	0.0006	0.0014	25
2025	140 H Grader	2.0	606	185	0.4087	0.21	0.01	2.88	0.15	8.50	0.43	0.09	0.00	0.00	24.2	0.0006	0.0014	25
2026	140 H Grader	2.0	606	185	0.4087	0.19	0.01	2.45	0.12	8.50	0.43	0.08	0.00	0.00	24.2	0.0006	0.0014	25
2027	140 H Grader	2.0	606	185	0.4087	0.18	0.01	2.11	0.11	8.50	0.43	0.07	0.00	0.00	24.2	0.0006	0.0014	25
2028	140 H Grader	2.0	606	185	0.4087	0.17	0.01	1.92	0.10	8.50	0.43	0.06	0.00	0.00	24.2	0.0006	0.0014	25
2029	140 H Grader	2.0	606	185	0.4087	0.17	0.01	1.74	0.09	8.50	0.43	0.06	0.00	0.00	24.2	0.0006	0.0014	25

Unmitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	980G Loader (Agg)	10.5	3,188	414	0.3618	0.36	0.19	5.62	2.96	8.50	4.47	0.21	0.11	0.10	252.3	0.0065	0.0144	257
2013	980G Loader (Agg)	10.5	3,188	414	0.3618	0.36	0.19	5.51	2.90	8.50	4.47	0.21	0.11	0.10	252.3	0.0065	0.0144	257
2014	980G Loader (Agg)	10.5	3,188	414	0.3618	0.35	0.18	5.24	2.76	8.50	4.47	0.20	0.10	0.10	252.3	0.0065	0.0144	257
2015	980G Loader (Agg)	10.5	3,188	414	0.3618	0.35	0.18	5.07	2.67	8.50	4.47	0.19	0.10	0.09	252.3	0.0065	0.0144	257
2016	980G Loader (Agg)	10.5	3,188	414	0.3618	0.33	0.17	4.68	2.46	8.50	4.47	0.18	0.09	0.09	252.3	0.0065	0.0144	257
2017	980G Loader (Agg)	10.5	3,188	414	0.3618	0.31	0.16	4.31	2.27	8.50	4.47	0.16	0.09	0.08	252.3	0.0065	0.0144	257
2018	980G Loader (Agg)	10.5	3,188	414	0.3618	0.28	0.15	3.77	1.98	8.50	4.47	0.14	0.07	0.07	252.3	0.0065	0.0144	257
2019	980G Loader (Agg)	10.5	3,188	414	0.3618	0.26	0.13	3.33	1.75	8.50	4.47	0.12	0.07	0.06	252.3	0.0065	0.0144	257
2020	980G Loader (Agg)	10.5	3,188	414	0.3618	0.24	0.13	3.05	1.61	8.50	4.47	0.11	0.06	0.05	252.3	0.0065	0.0144	257
2021	980G Loader (Agg)	10.5	3,188	414	0.3618	0.22	0.12	2.63	1.39	8.50	4.47	0.10	0.05	0.05	252.3	0.0065	0.0144	257
2022	980G Loader (Agg)	10.5	3,188	414	0.3618	0.20	0.10	2.19	1.15	8.50	4.47	0.08	0.04	0.04	252.3	0.0065	0.0144	257
2023	980G Loader (Agg)	10.5	3,188	414	0.3618	0.18	0.10	1.88	0.99	8.50	4.47	0.07	0.04	0.03	252.3	0.0065	0.0144	257
2024	980G Loader (Agg)	10.5	3,188	414	0.3618	0.17	0.09	1.71	0.90	8.50	4.47	0.06	0.03	0.03	252.3	0.0065	0.0144	257
2025	980G Loader (Agg)	10.5	3,188	414	0.3618	0.16	0.08	1.44	0.76	8.50	4.47	0.05	0.03	0.03	252.3	0.0065	0.0144	257
2026	980G Loader (Agg)	10.5	3,188	414	0.3618	0.16	0.08	1.32	0.69	8.50	4.47	0.05	0.03	0.02	252.3	0.0065	0.0144	257
2027	980G Loader (Agg)	10.5	3,188	414	0.3618	0.15	0.08	1.17	0.62	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	257
2028	980G Loader (Agg)	10.5	3,188	414	0.3618	0.15	0.08	1.11	0.58	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	257
2029	980G Loader (Agg)	10.5	3,188	414	0.3618	0.15	0.08	1.03	0.54	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	257
2012	980G Loader (HMA)	2.0	615	414	0.3618	0.36	0.04	5.62	0.57	8.50	0.86	0.21	0.02	0.02	48.7	0.0012	0.0028	50
2013	980G Loader (HMA)	2.0	615	414	0.3618	0.36	0.04	5.51	0.56	8.50	0.86	0.21	0.02	0.02	48.7	0.0012	0.0028	50
2014	980G Loader (HMA)	2.0	615	414	0.3618	0.35	0.04	5.24	0.53	8.50	0.86	0.20	0.02	0.02	48.7	0.0012	0.0028	50
2015	980G Loader (HMA)	2.0	615	414	0.3618	0.35	0.04	5.07	0.52	8.50	0.86	0.19	0.02	0.02	48.7	0.0012	0.0028	50
2016	980G Loader (HMA)	2.0	615	414	0.3618	0.33	0.03	4.68	0.48	8.50	0.86	0.18	0.02	0.02	48.7	0.0012	0.0028	50
2017	980G Loader (HMA)	2.0	615	414	0.3618	0.31	0.03	4.31	0.44	8.50	0.86	0.16	0.02	0.02	48.7	0.0012	0.0028	50
2018	980G Loader (HMA)	2.0	615	414	0.3618	0.28	0.03	3.77	0.38	8.50	0.86	0.14	0.01	0.01	48.7	0.0012	0.0028	50
2019	980G Loader (HMA)	2.0	615	414	0.3618	0.26	0.03	3.33	0.34	8.50	0.86	0.12	0.01	0.01	48.7	0.0012	0.0028	50
2020	980G Loader (HMA)	2.0	615	414	0.3618	0.24	0.02	3.05	0.31	8.50	0.86	0.11	0.01	0.01	48.7	0.0012	0.0028	50
2021	980G Loader (HMA)	2.0	615	414	0.3618	0.22	0.02	2.63	0.27	8.50	0.86	0.10	0.01	0.01	48.7	0.0012	0.0028	50
2022	980G Loader (HMA)	2.0	615	414	0.3618	0.20	0.02	2.19	0.22	8.50	0.86	0.08	0.01	0.01	48.7	0.0012	0.0028	50
2023	980G Loader (HMA)	2.0	615	414	0.3618	0.18	0.02	1.88	0.19	8.50	0.86	0.07	0.01	0.01	48.7	0.0012	0.0028	50
2024	980G Loader (HMA)	2.0	615	414	0.3618	0.17	0.02	1.71	0.17	8.50	0.86	0.06	0.01	0.01	48.7	0.0012	0.0028	50
2025	980G Loader (HMA)	2.0	615	414	0.3618	0.16	0.02	1.44	0.15	8.50	0.86	0.05	0.01	0.00	48.7	0.0012	0.0028	50
2026	980G Loader (HMA)	2.0	615	414	0.3618	0.16	0.02	1.32	0.13	8.50	0.86	0.05	0.00	0.00	48.7	0.0012	0.0028	50
2027	980G Loader (HMA)	2.0	615	414	0.3618	0.15	0.02	1.17	0.12	8.50	0.86	0.04	0.00	0.00	48.7	0.0012	0.0028	50
2028	980G Loader (HMA)	2.0	615	414	0.3618	0.15	0.02	1.11	0.11	8.50	0.86	0.04	0.00	0.00	48.7	0.0012	0.0028	50
2029	980G Loader (HMA)	2.0	615	414	0.3618	0.15	0.02	1.03	0.11	8.50	0.86	0.04	0.00	0.00	48.7	0.0012	0.0028	50

Unmitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	Water Truck	8.0	2,424	330	0.3819	0.48	0.16	6.84	2.30	8.50	2.86	0.29	0.10	0.09	161.4	0.0041	0.0092	164
2013	Water Truck	8.0	2,424	330	0.3819	0.46	0.15	6.44	2.17	8.50	2.86	0.28	0.09	0.09	161.4	0.0041	0.0092	164
2014	Water Truck	8.0	2,424	330	0.3819	0.42	0.14	5.79	1.95	8.50	2.86	0.25	0.08	0.08	161.4	0.0041	0.0092	164
2015	Water Truck	8.0	2,424	330	0.3819	0.42	0.14	5.57	1.88	8.50	2.86	0.24	0.08	0.07	161.4	0.0041	0.0092	164
2016	Water Truck	8.0	2,424	330	0.3819	0.39	0.13	5.13	1.73	8.50	2.86	0.22	0.07	0.07	161.4	0.0041	0.0092	164
2017	Water Truck	8.0	2,424	330	0.3819	0.37	0.12	4.64	1.56	8.50	2.86	0.20	0.07	0.06	161.4	0.0041	0.0092	164
2018	Water Truck	8.0	2,424	330	0.3819	0.30	0.10	3.66	1.23	8.50	2.86	0.15	0.05	0.05	161.4	0.0041	0.0092	164
2019	Water Truck	8.0	2,424	330	0.3819	0.27	0.09	3.17	1.07	8.50	2.86	0.13	0.04	0.04	161.4	0.0041	0.0092	164
2020	Water Truck	8.0	2,424	330	0.3819	0.24	0.08	2.66	0.89	8.50	2.86	0.10	0.03	0.03	161.4	0.0041	0.0092	164
2021	Water Truck	8.0	2,424	330	0.3819	0.22	0.07	2.23	0.75	8.50	2.86	0.09	0.03	0.03	161.4	0.0041	0.0092	164
2022	Water Truck	8.0	2,424	330	0.3819	0.19	0.06	1.72	0.58	8.50	2.86	0.07	0.02	0.02	161.4	0.0041	0.0092	164
2023	Water Truck	8.0	2,424	330	0.3819	0.18	0.06	1.55	0.52	8.50	2.86	0.06	0.02	0.02	161.4	0.0041	0.0092	164
2024	Water Truck	8.0	2,424	330	0.3819	0.18	0.06	1.44	0.48	8.50	2.86	0.06	0.02	0.02	161.4	0.0041	0.0092	164
2025	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.20	0.40	8.50	2.86	0.05	0.02	0.01	161.4	0.0041	0.0092	164
2026	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.12	0.38	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	164
2027	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.07	0.36	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	164
2028	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.02	0.34	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	164
2029	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.02	0.34	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	164
2012	Street Sweeper	2.0	606	320	0.4556	0.56	0.05	8.92	0.87	8.50	0.83	0.36	0.04	0.03	46.7	0.0012	0.0027	48
2013	Street Sweeper	2.0	606	320	0.4556	0.52	0.05	8.43	0.82	8.50	0.83	0.33	0.03	0.03	46.7	0.0012	0.0027	48
2014	Street Sweeper	2.0	606	320	0.4556	0.53	0.05	8.48	0.83	8.50	0.83	0.34	0.03	0.03	46.7	0.0012	0.0027	48
2015	Street Sweeper	2.0	606	320	0.4556	0.54	0.05	8.53	0.83	8.50	0.83	0.34	0.03	0.03	46.7	0.0012	0.0027	48
2016	Street Sweeper	2.0	606	320	0.4556	0.54	0.05	8.58	0.84	8.50	0.83	0.34	0.03	0.03	46.7	0.0012	0.0027	48
2017	Street Sweeper	2.0	606	320	0.4556	0.54	0.05	8.23	0.80	8.50	0.83	0.33	0.03	0.03	46.7	0.0012	0.0027	48
2018	Street Sweeper	2.0	606	320	0.4556	0.37	0.04	5.44	0.53	8.50	0.83	0.21	0.02	0.02	46.7	0.0012	0.0027	48
2019	Street Sweeper	2.0	606	320	0.4556	0.25	0.02	3.62	0.35	8.50	0.83	0.13	0.01	0.01	46.7	0.0012	0.0027	48
2020	Street Sweeper	2.0	606	320	0.4556	0.22	0.02	3.14	0.31	8.50	0.83	0.10	0.01	0.01	46.7	0.0012	0.0027	48
2021	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	2.22	0.22	8.50	0.83	0.07	0.01	0.01	46.7	0.0012	0.0027	48
2022	Street Sweeper	2.0	606	320	0.4556	0.16	0.02	2.03	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	48
2023	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	2.04	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	48
2024	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	2.04	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	48
2025	Street Sweeper	2.0	606	320	0.4556	0.18	0.02	2.04	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	48
2026	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	1.79	0.17	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	48
2027	Street Sweeper	2.0	606	320	0.4556	0.18	0.02	1.79	0.17	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	48
2028	Street Sweeper	2.0	606	320	0.4556	0.16	0.02	1.34	0.13	8.50	0.83	0.05	0.00	0.00	46.7	0.0012	0.0027	48
2029	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.85	0.08	8.50	0.83	0.04	0.00	0.00	46.7	0.0012	0.0027	48

Unmitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	Hitachi 850	6.2	1,872	460	0.3819	0.25	0.09	4.67	1.69	8.50	3.08	0.15	0.06	0.05	173.7	0.0045	0.0099	177
2013	Hitachi 850	6.2	1,872	460	0.3819	0.22	0.08	4.19	1.52	8.50	3.08	0.13	0.05	0.04	173.7	0.0045	0.0099	177
2014	Hitachi 850	6.2	1,872	460	0.3819	0.21	0.08	3.77	1.37	8.50	3.08	0.12	0.04	0.04	173.7	0.0045	0.0099	177
2015	Hitachi 850	6.2	1,872	460	0.3819	0.21	0.08	3.70	1.34	8.50	3.08	0.12	0.04	0.04	173.7	0.0045	0.0099	177
2016	Hitachi 850	6.2	1,872	460	0.3819	0.21	0.08	3.58	1.30	8.50	3.08	0.12	0.04	0.04	173.7	0.0045	0.0099	177
2017	Hitachi 850	6.2	1,872	460	0.3819	0.18	0.07	2.89	1.05	8.50	3.08	0.10	0.03	0.03	173.7	0.0045	0.0099	177
2018	Hitachi 850	6.2	1,872	460	0.3819	0.17	0.06	2.41	0.87	8.50	3.08	0.08	0.03	0.03	173.7	0.0045	0.0099	177
2019	Hitachi 850	6.2	1,872	460	0.3819	0.15	0.06	2.11	0.77	8.50	3.08	0.07	0.03	0.02	173.7	0.0045	0.0099	177
2020	Hitachi 850	6.2	1,872	460	0.3819	0.15	0.05	1.91	0.69	8.50	3.08	0.07	0.02	0.02	173.7	0.0045	0.0099	177
2021	Hitachi 850	6.2	1,872	460	0.3819	0.14	0.05	1.72	0.62	8.50	3.08	0.06	0.02	0.02	173.7	0.0045	0.0099	177
2022	Hitachi 850	6.2	1,872	460	0.3819	0.13	0.05	1.37	0.50	8.50	3.08	0.05	0.02	0.02	173.7	0.0045	0.0099	177
2023	Hitachi 850	6.2	1,872	460	0.3819	0.13	0.05	1.23	0.45	8.50	3.08	0.05	0.02	0.02	173.7	0.0045	0.0099	177
2024	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.05	1.17	0.43	8.50	3.08	0.04	0.02	0.01	173.7	0.0045	0.0099	177
2025	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.04	1.09	0.40	8.50	3.08	0.04	0.01	0.01	173.7	0.0045	0.0099	177
2026	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.04	0.99	0.36	8.50	3.08	0.04	0.01	0.01	173.7	0.0045	0.0099	177
2027	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.04	0.97	0.35	8.50	3.08	0.04	0.01	0.01	173.7	0.0045	0.0099	177
2028	Hitachi 850	6.2	1,872	460	0.3819	0.11	0.04	0.90	0.33	8.50	3.08	0.03	0.01	0.01	173.7	0.0045	0.0099	177
2029	Hitachi 850	6.2	1,872	460	0.3819	0.11	0.04	0.84	0.31	8.50	3.08	0.03	0.01	0.01	173.7	0.0045	0.0099	177
2012	966G Loader (RMC)	4.6	1,397	330	0.3618	0.36	0.07	5.63	1.04	8.50	1.56	0.21	0.04	0.04	88.2	0.0023	0.0050	90
2013	966G Loader (RMC)	4.6	1,397	330	0.3618	0.36	0.07	5.30	0.97	8.50	1.56	0.21	0.04	0.04	88.2	0.0023	0.0050	90
2014	966G Loader (RMC)	4.6	1,397	330	0.3618	0.35	0.06	4.90	0.90	8.50	1.56	0.20	0.04	0.03	88.2	0.0023	0.0050	90
2015	966G Loader (RMC)	4.6	1,397	330	0.3618	0.35	0.06	4.74	0.87	8.50	1.56	0.19	0.04	0.03	88.2	0.0023	0.0050	90
2016	966G Loader (RMC)	4.6	1,397	330	0.3618	0.33	0.06	4.24	0.78	8.50	1.56	0.18	0.03	0.03	88.2	0.0023	0.0050	90
2017	966G Loader (RMC)	4.6	1,397	330	0.3618	0.31	0.06	3.85	0.71	8.50	1.56	0.16	0.03	0.03	88.2	0.0023	0.0050	90
2018	966G Loader (RMC)	4.6	1,397	330	0.3618	0.28	0.05	3.24	0.60	8.50	1.56	0.14	0.03	0.02	88.2	0.0023	0.0050	90
2019	966G Loader (RMC)	4.6	1,397	330	0.3618	0.26	0.05	2.80	0.52	8.50	1.56	0.12	0.02	0.02	88.2	0.0023	0.0050	90
2020	966G Loader (RMC)	4.6	1,397	330	0.3618	0.24	0.04	2.46	0.45	8.50	1.56	0.11	0.02	0.02	88.2	0.0023	0.0050	90
2021	966G Loader (RMC)	4.6	1,397	330	0.3618	0.22	0.04	2.05	0.38	8.50	1.56	0.10	0.02	0.02	88.2	0.0023	0.0050	90
2022	966G Loader (RMC)	4.6	1,397	330	0.3618	0.20	0.04	1.56	0.29	8.50	1.56	0.08	0.02	0.01	88.2	0.0023	0.0050	90
2023	966G Loader (RMC)	4.6	1,397	330	0.3618	0.18	0.03	1.39	0.26	8.50	1.56	0.07	0.01	0.01	88.2	0.0023	0.0050	90
2024	966G Loader (RMC)	4.6	1,397	330	0.3618	0.17	0.03	1.30	0.24	8.50	1.56	0.06	0.01	0.01	88.2	0.0023	0.0050	90
2025	966G Loader (RMC)	4.6	1,397	330	0.3618	0.16	0.03	1.12	0.21	8.50	1.56	0.05	0.01	0.01	88.2	0.0023	0.0050	90
2026	966G Loader (RMC)	4.6	1,397	330	0.3618	0.16	0.03	1.03	0.19	8.50	1.56	0.05	0.01	0.01	88.2	0.0023	0.0050	90
2027	966G Loader (RMC)	4.6	1,397	330	0.3618	0.15	0.03	0.98	0.18	8.50	1.56	0.04	0.01	0.01	88.2	0.0023	0.0050	90
2028	966G Loader (RMC)	4.6	1,397	330	0.3618	0.15	0.03	0.90	0.17	8.50	1.56	0.04	0.01	0.01	88.2	0.0023	0.0050	90
2029	966G Loader (RMC)	4.6	1,397	330	0.3618	0.15	0.03	0.84	0.16	8.50	1.56	0.04	0.01	0.01	88.2	0.0023	0.0050	90

Unmitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	D8R Dozer	4.0	1,212	310	0.4288	0.41	0.07	6.95	1.23	8.50	1.51	0.27	0.05	0.04	85.1	0.0022	0.0049	87
2013	D8R Dozer	4.0	1,212	310	0.4288	0.41	0.07	6.85	1.22	8.50	1.51	0.26	0.05	0.04	85.1	0.0022	0.0049	87
2014	D8R Dozer	4.0	1,212	310	0.4288	0.40	0.07	6.61	1.17	8.50	1.51	0.26	0.05	0.04	85.1	0.0022	0.0049	87
2015	D8R Dozer	4.0	1,212	310	0.4288	0.40	0.07	6.45	1.15	8.50	1.51	0.25	0.04	0.04	85.1	0.0022	0.0049	87
2016	D8R Dozer	4.0	1,212	310	0.4288	0.39	0.07	6.21	1.10	8.50	1.51	0.24	0.04	0.04	85.1	0.0022	0.0049	87
2017	D8R Dozer	4.0	1,212	310	0.4288	0.37	0.07	5.91	1.05	8.50	1.51	0.23	0.04	0.04	85.1	0.0022	0.0049	87
2018	D8R Dozer	4.0	1,212	310	0.4288	0.33	0.06	5.15	0.91	8.50	1.51	0.20	0.04	0.03	85.1	0.0022	0.0049	87
2019	D8R Dozer	4.0	1,212	310	0.4288	0.31	0.06	4.63	0.82	8.50	1.51	0.18	0.03	0.03	85.1	0.0022	0.0049	87
2020	D8R Dozer	4.0	1,212	310	0.4288	0.29	0.05	4.26	0.76	8.50	1.51	0.17	0.03	0.03	85.1	0.0022	0.0049	87
2021	D8R Dozer	4.0	1,212	310	0.4288	0.28	0.05	3.86	0.69	8.50	1.51	0.15	0.03	0.02	85.1	0.0022	0.0049	87
2022	D8R Dozer	4.0	1,212	310	0.4288	0.25	0.04	3.24	0.57	8.50	1.51	0.13	0.02	0.02	85.1	0.0022	0.0049	87
2023	D8R Dozer	4.0	1,212	310	0.4288	0.23	0.04	2.92	0.52	8.50	1.51	0.12	0.02	0.02	85.1	0.0022	0.0049	87
2024	D8R Dozer	4.0	1,212	310	0.4288	0.22	0.04	2.65	0.47	8.50	1.51	0.11	0.02	0.02	85.1	0.0022	0.0049	87
2025	D8R Dozer	4.0	1,212	310	0.4288	0.20	0.04	2.27	0.40	8.50	1.51	0.10	0.02	0.02	85.1	0.0022	0.0049	87
2026	D8R Dozer	4.0	1,212	310	0.4288	0.20	0.03	2.08	0.37	8.50	1.51	0.09	0.02	0.01	85.1	0.0022	0.0049	87
2027	D8R Dozer	4.0	1,212	310	0.4288	0.19	0.03	1.92	0.34	8.50	1.51	0.08	0.01	0.01	85.1	0.0022	0.0049	87
2028	D8R Dozer	4.0	1,212	310	0.4288	0.18	0.03	1.78	0.32	8.50	1.51	0.08	0.01	0.01	85.1	0.0022	0.0049	87
2029	D8R Dozer	4.0	1,212	310	0.4288	0.18	0.03	1.66	0.30	8.50	1.51	0.07	0.01	0.01	85.1	0.0022	0.0049	87
2012	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.36	0.26	5.63	4.13	8.50	6.24	0.21	0.16	0.14	351.7	0.0090	0.0201	358
2013	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.36	0.27	5.30	3.89	8.50	6.24	0.21	0.15	0.14	351.7	0.0090	0.0201	358
2014	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.35	0.26	4.90	3.60	8.50	6.24	0.20	0.14	0.13	351.7	0.0090	0.0201	358
2015	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.35	0.25	4.74	3.48	8.50	6.24	0.19	0.14	0.13	351.7	0.0090	0.0201	358
2016	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.33	0.24	4.24	3.11	8.50	6.24	0.18	0.13	0.12	351.7	0.0090	0.0201	358
2017	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.31	0.23	3.85	2.82	8.50	6.24	0.16	0.12	0.11	351.7	0.0090	0.0201	358
2018	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.28	0.20	3.24	2.38	8.50	6.24	0.14	0.10	0.10	351.7	0.0090	0.0201	358
2019	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.26	0.19	2.80	2.05	8.50	6.24	0.12	0.09	0.08	351.7	0.0090	0.0201	358
2020	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.24	0.18	2.46	1.81	8.50	6.24	0.11	0.08	0.08	351.7	0.0090	0.0201	358
2021	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.22	0.16	2.05	1.51	8.50	6.24	0.10	0.07	0.07	351.7	0.0090	0.0201	358
2022	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.20	0.14	1.56	1.15	8.50	6.24	0.08	0.06	0.06	351.7	0.0090	0.0201	358
2023	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.18	0.13	1.39	1.02	8.50	6.24	0.07	0.05	0.05	351.7	0.0090	0.0201	358
2024	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.17	0.13	1.30	0.95	8.50	6.24	0.06	0.05	0.04	351.7	0.0090	0.0201	358
2025	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.16	0.12	1.12	0.82	8.50	6.24	0.05	0.04	0.04	351.7	0.0090	0.0201	358
2026	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.16	0.11	1.03	0.76	8.50	6.24	0.05	0.04	0.03	351.7	0.0090	0.0201	358
2027	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.15	0.11	0.98	0.72	8.50	6.24	0.04	0.03	0.03	351.7	0.0090	0.0201	358
2028	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.15	0.11	0.90	0.66	8.50	6.24	0.04	0.03	0.03	351.7	0.0090	0.0201	358
2029	980G Loader (Pit Agg)	14.7	4,444	414	0.3618	0.15	0.11	0.84	0.62	8.50	6.24	0.04	0.03	0.03	351.7	0.0090	0.0201	358

Unmitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	773 Truck #1	14.7	4,444	740	0.3819	0.48	0.66	6.85	9.48	8.50	11.77	0.29	0.41	0.37	663.7	0.0170	0.0379	676
2013	773 Truck #1	14.7	4,444	740	0.3819	0.47	0.65	6.58	9.12	8.50	11.77	0.28	0.39	0.36	663.7	0.0170	0.0379	676
2014	773 Truck #1	14.7	4,444	740	0.3819	0.42	0.58	5.84	8.08	8.50	11.77	0.24	0.33	0.31	663.7	0.0170	0.0379	676
2015	773 Truck #1	14.7	4,444	740	0.3819	0.39	0.54	5.37	7.44	8.50	11.77	0.22	0.30	0.28	663.7	0.0170	0.0379	676
2016	773 Truck #1	14.7	4,444	740	0.3819	0.36	0.50	4.88	6.75	8.50	11.77	0.20	0.27	0.25	663.7	0.0170	0.0379	676
2017	773 Truck #1	14.7	4,444	740	0.3819	0.34	0.47	4.48	6.20	8.50	11.77	0.18	0.25	0.23	663.7	0.0170	0.0379	676
2018	773 Truck #1	14.7	4,444	740	0.3819	0.30	0.42	3.88	5.37	8.50	11.77	0.15	0.21	0.19	663.7	0.0170	0.0379	676
2019	773 Truck #1	14.7	4,444	740	0.3819	0.28	0.39	3.50	4.85	8.50	11.77	0.14	0.19	0.17	663.7	0.0170	0.0379	676
2020	773 Truck #1	14.7	4,444	740	0.3819	0.27	0.38	3.22	4.46	8.50	11.77	0.13	0.17	0.16	663.7	0.0170	0.0379	676
2021	773 Truck #1	14.7	4,444	740	0.3819	0.26	0.35	2.81	3.89	8.50	11.77	0.11	0.16	0.14	663.7	0.0170	0.0379	676
2022	773 Truck #1	14.7	4,444	740	0.3819	0.23	0.32	2.38	3.30	8.50	11.77	0.09	0.13	0.12	663.7	0.0170	0.0379	676
2023	773 Truck #1	14.7	4,444	740	0.3819	0.23	0.32	2.29	3.18	8.50	11.77	0.09	0.12	0.11	663.7	0.0170	0.0379	676
2024	773 Truck #1	14.7	4,444	740	0.3819	0.22	0.31	2.19	3.04	8.50	11.77	0.08	0.12	0.11	663.7	0.0170	0.0379	676
2025	773 Truck #1	14.7	4,444	740	0.3819	0.20	0.28	1.83	2.54	8.50	11.77	0.07	0.10	0.09	663.7	0.0170	0.0379	676
2026	773 Truck #1	14.7	4,444	740	0.3819	0.21	0.29	1.82	2.53	8.50	11.77	0.07	0.10	0.09	663.7	0.0170	0.0379	676
2027	773 Truck #1	14.7	4,444	740	0.3819	0.20	0.28	1.70	2.36	8.50	11.77	0.06	0.09	0.08	663.7	0.0170	0.0379	676
2028	773 Truck #1	14.7	4,444	740	0.3819	0.21	0.28	1.73	2.39	8.50	11.77	0.06	0.09	0.08	663.7	0.0170	0.0379	676
2029	773 Truck #1	14.7	4,444	740	0.3819	0.19	0.27	1.55	2.15	8.50	11.77	0.06	0.08	0.07	663.7	0.0170	0.0379	676
2012	773 Truck #2	14.7	4,444	740	0.3819	0.48	0.66	6.85	9.48	8.50	11.77	0.29	0.41	0.37	663.7	0.0170	0.0379	676
2013	773 Truck #2	14.7	4,444	740	0.3819	0.47	0.65	6.58	9.12	8.50	11.77	0.28	0.39	0.36	663.7	0.0170	0.0379	676
2014	773 Truck #2	14.7	4,444	740	0.3819	0.42	0.58	5.84	8.08	8.50	11.77	0.24	0.33	0.31	663.7	0.0170	0.0379	676
2015	773 Truck #2	14.7	4,444	740	0.3819	0.39	0.54	5.37	7.44	8.50	11.77	0.22	0.30	0.28	663.7	0.0170	0.0379	676
2016	773 Truck #2	14.7	4,444	740	0.3819	0.36	0.50	4.88	6.75	8.50	11.77	0.20	0.27	0.25	663.7	0.0170	0.0379	676
2017	773 Truck #2	14.7	4,444	740	0.3819	0.34	0.47	4.48	6.20	8.50	11.77	0.18	0.25	0.23	663.7	0.0170	0.0379	676
2018	773 Truck #2	14.7	4,444	740	0.3819	0.30	0.42	3.88	5.37	8.50	11.77	0.15	0.21	0.19	663.7	0.0170	0.0379	676
2019	773 Truck #2	14.7	4,444	740	0.3819	0.28	0.39	3.50	4.85	8.50	11.77	0.14	0.19	0.17	663.7	0.0170	0.0379	676
2020	773 Truck #2	14.7	4,444	740	0.3819	0.27	0.38	3.22	4.46	8.50	11.77	0.13	0.17	0.16	663.7	0.0170	0.0379	676
2021	773 Truck #2	14.7	4,444	740	0.3819	0.26	0.35	2.81	3.89	8.50	11.77	0.11	0.16	0.14	663.7	0.0170	0.0379	676
2022	773 Truck #2	14.7	4,444	740	0.3819	0.23	0.32	2.38	3.30	8.50	11.77	0.09	0.13	0.12	663.7	0.0170	0.0379	676
2023	773 Truck #2	14.7	4,444	740	0.3819	0.23	0.32	2.29	3.18	8.50	11.77	0.09	0.12	0.11	663.7	0.0170	0.0379	676
2024	773 Truck #2	14.7	4,444	740	0.3819	0.22	0.31	2.19	3.04	8.50	11.77	0.08	0.12	0.11	663.7	0.0170	0.0379	676
2025	773 Truck #2	14.7	4,444	740	0.3819	0.20	0.28	1.83	2.54	8.50	11.77	0.07	0.10	0.09	663.7	0.0170	0.0379	676
2026	773 Truck #2	14.7	4,444	740	0.3819	0.21	0.29	1.82	2.53	8.50	11.77	0.07	0.10	0.09	663.7	0.0170	0.0379	676
2027	773 Truck #2	14.7	4,444	740	0.3819	0.20	0.28	1.70	2.36	8.50	11.77	0.06	0.09	0.08	663.7	0.0170	0.0379	676
2028	773 Truck #2	14.7	4,444	740	0.3819	0.21	0.28	1.73	2.39	8.50	11.77	0.06	0.09	0.08	663.7	0.0170	0.0379	676
2029	773 Truck #2	14.7	4,444	740	0.3819	0.19	0.27	1.55	2.15	8.50	11.77	0.06	0.08	0.07	663.7	0.0170	0.0379	676

0.367	lb/hp-hr
2000	lb/ton
453.59237	g/lb
2205	lb/MT
7.05	lb/gal diesel
1000	kg/MT

[1] Horsepowers based on engine specs and URBEMIS2007 default for the water truck

[2] Load factors are from OFFROAD2011.

[4] Emissions factors are average for type and size of equipment as determined using OFFROAD2011.
Emissions factors for the Project fleet by year incorporate load factor.

[5] PM2.5 emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Off-Road Equipment: Diesel.

[6] Future year NOx emissions are calculated using fleet average emission factors from the off road ATCM regulation.
See the "Off Road and On Road Emission Profile" spreadsheet for more information.

Emission Facto	CCAR GRPv3.1	Table #	GWP
10.15	kg CO2/gal	C.3	1
0.26	g N2O/gal	C.6	21
0.58	g CH4/gal	C.6	310

Mitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	TOTAL	19,013	5,760,955		0.2939	0.48	0.89	7.59	14.16	10.90	20.34	0.29	0.54	0.50	1,147	0.03	0.07	1,157
2013	TOTAL	19,013	5,760,955		0.2939	0.47	0.87	7.22	13.47	10.90	20.34	0.28	0.52	0.48	1,147	0.03	0.07	1,157
2014	TOTAL	19,013	5,760,955		0.2939	0.45	0.84	6.75	12.61	10.90	20.34	0.26	0.49	0.45	1,147	0.03	0.07	1,157
2015	TOTAL	19,013	5,760,955		0.2939	0.45	0.83	6.57	12.26	10.90	20.34	0.26	0.48	0.44	1,147	0.03	0.07	1,157
2016	TOTAL	19,013	5,760,955		0.2939	0.43	0.80	6.12	11.42	10.90	20.34	0.24	0.45	0.41	1,147	0.03	0.07	1,157
2017	TOTAL	19,013	5,760,955		0.2939	0.40	0.75	5.57	10.39	10.90	20.34	0.22	0.41	0.38	1,147	0.03	0.07	1,157
2018	TOTAL	19,013	5,760,955		0.2939	0.35	0.66	4.65	8.67	10.90	20.34	0.18	0.34	0.31	1,147	0.03	0.07	1,157
2019	TOTAL	19,013	5,760,955		0.2939	0.32	0.59	4.02	7.50	10.90	20.34	0.16	0.29	0.27	1,147	0.03	0.07	1,157
2020	TOTAL	19,013	5,760,955		0.2939	0.30	0.56	3.59	6.71	10.90	20.34	0.14	0.26	0.24	1,147	0.03	0.07	1,157
2021	TOTAL	19,013	5,760,955		0.2939	0.27	0.51	3.08	5.75	10.90	20.34	0.12	0.23	0.21	1,147	0.03	0.07	1,157
2022	TOTAL	19,013	5,760,955		0.2939	0.24	0.46	2.49	4.65	10.90	20.34	0.10	0.19	0.18	1,147	0.03	0.07	1,157
2023	TOTAL	19,013	5,760,955		0.2939	0.23	0.43	2.21	4.13	10.90	20.34	0.09	0.17	0.16	1,147	0.03	0.07	1,157
2024	TOTAL	19,013	5,760,955		0.2939	0.22	0.41	2.05	3.83	10.90	20.34	0.08	0.15	0.14	1,147	0.03	0.07	1,157
2025	TOTAL	19,013	5,760,955		0.2939	0.21	0.38	1.77	3.31	10.90	20.34	0.07	0.13	0.12	1,147	0.03	0.07	1,157
2026	TOTAL	19,013	5,760,955		0.2939	0.20	0.37	1.62	3.03	10.90	20.34	0.06	0.12	0.11	1,147	0.03	0.07	1,157
2027	TOTAL	19,013	5,760,955		0.2939	0.20	0.36	1.51	2.82	10.90	20.34	0.06	0.11	0.10	1,147	0.03	0.07	1,157
2028	TOTAL	19,013	5,760,955		0.2939	0.19	0.36	1.40	2.60	10.90	20.34	0.06	0.10	0.10	1,147	0.03	0.07	1,157
2029	TOTAL	19,013	5,760,955		0.2939	0.14	0.35	0.93	2.41	7.84	20.34	0.04	0.10	0.09	1,147	0.03	0.07	1,157
2012	140 H Grader	2.0	606	185	0.4087	0.35	0.02	6.45	0.33	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	24
2013	140 H Grader	2.0	606	185	0.4087	0.35	0.02	6.42	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	24
2014	140 H Grader	2.0	606	185	0.4087	0.36	0.02	6.41	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	24
2015	140 H Grader	2.0	606	185	0.4087	0.37	0.02	6.40	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	24
2016	140 H Grader	2.0	606	185	0.4087	0.37	0.02	6.33	0.32	8.50	0.43	0.21	0.01	0.01	24.2	0.0006	0.0014	24
2017	140 H Grader	2.0	606	185	0.4087	0.37	0.02	6.17	0.31	8.50	0.43	0.20	0.01	0.01	24.2	0.0006	0.0014	24
2018	140 H Grader	2.0	606	185	0.4087	0.36	0.02	5.89	0.30	8.50	0.43	0.19	0.01	0.01	24.2	0.0006	0.0014	24
2019	140 H Grader	2.0	606	185	0.4087	0.33	0.02	5.45	0.28	8.50	0.43	0.18	0.01	0.01	24.2	0.0006	0.0014	24
2020	140 H Grader	2.0	606	185	0.4087	0.33	0.02	5.25	0.27	8.50	0.43	0.17	0.01	0.01	24.2	0.0006	0.0014	24
2021	140 H Grader	2.0	606	185	0.4087	0.31	0.02	4.92	0.25	8.50	0.43	0.16	0.01	0.01	24.2	0.0006	0.0014	24
2022	140 H Grader	2.0	606	185	0.4087	0.29	0.01	4.37	0.22	8.50	0.43	0.14	0.01	0.01	24.2	0.0006	0.0014	24
2023	140 H Grader	2.0	606	185	0.4087	0.26	0.01	3.87	0.20	8.50	0.43	0.13	0.01	0.01	24.2	0.0006	0.0014	24
2024	140 H Grader	2.0	606	185	0.4087	0.24	0.01	3.46	0.17	8.50	0.43	0.11	0.01	0.01	24.2	0.0006	0.0014	24
2025	140 H Grader	2.0	606	185	0.4087	0.21	0.01	2.88	0.15	8.50	0.43	0.09	0.00	0.00	24.2	0.0006	0.0014	24
2026	140 H Grader	2.0	606	185	0.4087	0.19	0.01	2.45	0.12	8.50	0.43	0.08	0.00	0.00	24.2	0.0006	0.0014	24
2027	140 H Grader	2.0	606	185	0.4087	0.18	0.01	2.11	0.11	8.50	0.43	0.07	0.00	0.00	24.2	0.0006	0.0014	24
2028	140 H Grader	2.0	606	185	0.4087	0.17	0.01	1.92	0.10	8.50	0.43	0.06	0.00	0.00	24.2	0.0006	0.0014	24
2029	140 H Grader	2.0	606	185	0.4087	0.17	0.01	1.74	0.09	8.50	0.43	0.06	0.00	0.00	24.2	0.0006	0.0014	24

Mitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	980G Loader (Agg)	10.5	3,188	414	0.3618	0.36	0.19	5.62	2.96	8.50	4.47	0.21	0.11	0.10	252.3	0.0065	0.0144	255
2013	980G Loader (Agg)	10.5	3,188	414	0.3618	0.36	0.19	5.51	2.90	8.50	4.47	0.21	0.11	0.10	252.3	0.0065	0.0144	255
2014	980G Loader (Agg)	10.5	3,188	414	0.3618	0.35	0.18	5.24	2.76	8.50	4.47	0.20	0.10	0.10	252.3	0.0065	0.0144	255
2015	980G Loader (Agg)	10.5	3,188	414	0.3618	0.35	0.18	5.07	2.67	8.50	4.47	0.19	0.10	0.09	252.3	0.0065	0.0144	255
2016	980G Loader (Agg)	10.5	3,188	414	0.3618	0.33	0.17	4.68	2.46	8.50	4.47	0.18	0.09	0.09	252.3	0.0065	0.0144	255
2017	980G Loader (Agg)	10.5	3,188	414	0.3618	0.31	0.16	4.31	2.27	8.50	4.47	0.16	0.09	0.08	252.3	0.0065	0.0144	255
2018	980G Loader (Agg)	10.5	3,188	414	0.3618	0.28	0.15	3.77	1.98	8.50	4.47	0.14	0.07	0.07	252.3	0.0065	0.0144	255
2019	980G Loader (Agg)	10.5	3,188	414	0.3618	0.26	0.13	3.33	1.75	8.50	4.47	0.12	0.07	0.06	252.3	0.0065	0.0144	255
2020	980G Loader (Agg)	10.5	3,188	414	0.3618	0.24	0.13	3.05	1.61	8.50	4.47	0.11	0.06	0.05	252.3	0.0065	0.0144	255
2021	980G Loader (Agg)	10.5	3,188	414	0.3618	0.22	0.12	2.63	1.39	8.50	4.47	0.10	0.05	0.05	252.3	0.0065	0.0144	255
2022	980G Loader (Agg)	10.5	3,188	414	0.3618	0.20	0.10	2.19	1.15	8.50	4.47	0.08	0.04	0.04	252.3	0.0065	0.0144	255
2023	980G Loader (Agg)	10.5	3,188	414	0.3618	0.18	0.10	1.88	0.99	8.50	4.47	0.07	0.04	0.03	252.3	0.0065	0.0144	255
2024	980G Loader (Agg)	10.5	3,188	414	0.3618	0.17	0.09	1.71	0.90	8.50	4.47	0.06	0.03	0.03	252.3	0.0065	0.0144	255
2025	980G Loader (Agg)	10.5	3,188	414	0.3618	0.16	0.08	1.44	0.76	8.50	4.47	0.05	0.03	0.03	252.3	0.0065	0.0144	255
2026	980G Loader (Agg)	10.5	3,188	414	0.3618	0.16	0.08	1.32	0.69	8.50	4.47	0.05	0.03	0.02	252.3	0.0065	0.0144	255
2027	980G Loader (Agg)	10.5	3,188	414	0.3618	0.15	0.08	1.17	0.62	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	255
2028	980G Loader (Agg)	10.5	3,188	414	0.3618	0.15	0.08	1.11	0.58	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	255
2029	980G Loader (Agg)	10.5	3,188	414	0.3618	0.15	0.08	1.03	0.54	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	255
2012	980G Loader (HMA)	2.0	615	414	0.3618	0.36	0.04	5.62	0.57	8.50	0.86	0.21	0.02	0.02	48.7	0.0012	0.0028	49
2013	980G Loader (HMA)	2.0	615	414	0.3618	0.36	0.04	5.51	0.56	8.50	0.86	0.21	0.02	0.02	48.7	0.0012	0.0028	49
2014	980G Loader (HMA)	2.0	615	414	0.3618	0.35	0.04	5.24	0.53	8.50	0.86	0.20	0.02	0.02	48.7	0.0012	0.0028	49
2015	980G Loader (HMA)	2.0	615	414	0.3618	0.35	0.04	5.07	0.52	8.50	0.86	0.19	0.02	0.02	48.7	0.0012	0.0028	49
2016	980G Loader (HMA)	2.0	615	414	0.3618	0.33	0.03	4.68	0.48	8.50	0.86	0.18	0.02	0.02	48.7	0.0012	0.0028	49
2017	980G Loader (HMA)	2.0	615	414	0.3618	0.31	0.03	4.31	0.44	8.50	0.86	0.16	0.02	0.02	48.7	0.0012	0.0028	49
2018	980G Loader (HMA)	2.0	615	414	0.3618	0.28	0.03	3.77	0.38	8.50	0.86	0.14	0.01	0.01	48.7	0.0012	0.0028	49
2019	980G Loader (HMA)	2.0	615	414	0.3618	0.26	0.03	3.33	0.34	8.50	0.86	0.12	0.01	0.01	48.7	0.0012	0.0028	49
2020	980G Loader (HMA)	2.0	615	414	0.3618	0.24	0.02	3.05	0.31	8.50	0.86	0.11	0.01	0.01	48.7	0.0012	0.0028	49
2021	980G Loader (HMA)	2.0	615	414	0.3618	0.22	0.02	2.63	0.27	8.50	0.86	0.10	0.01	0.01	48.7	0.0012	0.0028	49
2022	980G Loader (HMA)	2.0	615	414	0.3618	0.20	0.02	2.19	0.22	8.50	0.86	0.08	0.01	0.01	48.7	0.0012	0.0028	49
2023	980G Loader (HMA)	2.0	615	414	0.3618	0.18	0.02	1.88	0.19	8.50	0.86	0.07	0.01	0.01	48.7	0.0012	0.0028	49
2024	980G Loader (HMA)	2.0	615	414	0.3618	0.17	0.02	1.71	0.17	8.50	0.86	0.06	0.01	0.01	48.7	0.0012	0.0028	49
2025	980G Loader (HMA)	2.0	615	414	0.3618	0.16	0.02	1.44	0.15	8.50	0.86	0.05	0.01	0.00	48.7	0.0012	0.0028	49
2026	980G Loader (HMA)	2.0	615	414	0.3618	0.16	0.02	1.32	0.13	8.50	0.86	0.05	0.00	0.00	48.7	0.0012	0.0028	49
2027	980G Loader (HMA)	2.0	615	414	0.3618	0.15	0.02	1.17	0.12	8.50	0.86	0.04	0.00	0.00	48.7	0.0012	0.0028	49
2028	980G Loader (HMA)	2.0	615	414	0.3618	0.15	0.02	1.11	0.11	8.50	0.86	0.04	0.00	0.00	48.7	0.0012	0.0028	49
2029	980G Loader (HMA)	2.0	615	414	0.3618	0.15	0.02	1.03	0.11	8.50	0.86	0.04	0.00	0.00	48.7	0.0012	0.0028	49

Mitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	Water Truck	8.0	2,424	330	0.3819	0.48	0.16	6.84	2.30	8.50	2.86	0.29	0.10	0.09	161.4	0.0041	0.0092	163
2013	Water Truck	8.0	2,424	330	0.3819	0.46	0.15	6.44	2.17	8.50	2.86	0.28	0.09	0.09	161.4	0.0041	0.0092	163
2014	Water Truck	8.0	2,424	330	0.3819	0.42	0.14	5.79	1.95	8.50	2.86	0.25	0.08	0.08	161.4	0.0041	0.0092	163
2015	Water Truck	8.0	2,424	330	0.3819	0.42	0.14	5.57	1.88	8.50	2.86	0.24	0.08	0.07	161.4	0.0041	0.0092	163
2016	Water Truck	8.0	2,424	330	0.3819	0.39	0.13	5.13	1.73	8.50	2.86	0.22	0.07	0.07	161.4	0.0041	0.0092	163
2017	Water Truck	8.0	2,424	330	0.3819	0.37	0.12	4.64	1.56	8.50	2.86	0.20	0.07	0.06	161.4	0.0041	0.0092	163
2018	Water Truck	8.0	2,424	330	0.3819	0.30	0.10	3.66	1.23	8.50	2.86	0.15	0.05	0.05	161.4	0.0041	0.0092	163
2019	Water Truck	8.0	2,424	330	0.3819	0.27	0.09	3.17	1.07	8.50	2.86	0.13	0.04	0.04	161.4	0.0041	0.0092	163
2020	Water Truck	8.0	2,424	330	0.3819	0.24	0.08	2.66	0.89	8.50	2.86	0.10	0.03	0.03	161.4	0.0041	0.0092	163
2021	Water Truck	8.0	2,424	330	0.3819	0.22	0.07	2.23	0.75	8.50	2.86	0.09	0.03	0.03	161.4	0.0041	0.0092	163
2022	Water Truck	8.0	2,424	330	0.3819	0.19	0.06	1.72	0.58	8.50	2.86	0.07	0.02	0.02	161.4	0.0041	0.0092	163
2023	Water Truck	8.0	2,424	330	0.3819	0.18	0.06	1.55	0.52	8.50	2.86	0.06	0.02	0.02	161.4	0.0041	0.0092	163
2024	Water Truck	8.0	2,424	330	0.3819	0.18	0.06	1.44	0.48	8.50	2.86	0.06	0.02	0.02	161.4	0.0041	0.0092	163
2025	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.20	0.40	8.50	2.86	0.05	0.02	0.01	161.4	0.0041	0.0092	163
2026	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.12	0.38	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	163
2027	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.07	0.36	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	163
2028	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.02	0.34	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	163
2029	Water Truck	8.0	2,424	330	0.3819	0.16	0.05	1.02	0.34	8.50	2.86	0.04	0.01	0.01	161.4	0.0041	0.0092	163
2012	Street Sweeper	2.0	606	320	0.4556	0.56	0.05	8.92	0.87	8.50	0.83	0.36	0.04	0.03	46.7	0.0012	0.0027	47
2013	Street Sweeper	2.0	606	320	0.4556	0.52	0.05	8.43	0.82	8.50	0.83	0.33	0.03	0.03	46.7	0.0012	0.0027	47
2014	Street Sweeper	2.0	606	320	0.4556	0.53	0.05	8.48	0.83	8.50	0.83	0.34	0.03	0.03	46.7	0.0012	0.0027	47
2015	Street Sweeper	2.0	606	320	0.4556	0.54	0.05	8.53	0.83	8.50	0.83	0.34	0.03	0.03	46.7	0.0012	0.0027	47
2016	Street Sweeper	2.0	606	320	0.4556	0.54	0.05	8.58	0.84	8.50	0.83	0.34	0.03	0.03	46.7	0.0012	0.0027	47
2017	Street Sweeper	2.0	606	320	0.4556	0.54	0.05	8.23	0.80	8.50	0.83	0.33	0.03	0.03	46.7	0.0012	0.0027	47
2018	Street Sweeper	2.0	606	320	0.4556	0.37	0.04	5.44	0.53	8.50	0.83	0.21	0.02	0.02	46.7	0.0012	0.0027	47
2019	Street Sweeper	2.0	606	320	0.4556	0.25	0.02	3.62	0.35	8.50	0.83	0.13	0.01	0.01	46.7	0.0012	0.0027	47
2020	Street Sweeper	2.0	606	320	0.4556	0.22	0.02	3.14	0.31	8.50	0.83	0.10	0.01	0.01	46.7	0.0012	0.0027	47
2021	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	2.22	0.22	8.50	0.83	0.07	0.01	0.01	46.7	0.0012	0.0027	47
2022	Street Sweeper	2.0	606	320	0.4556	0.16	0.02	2.03	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	47
2023	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	2.04	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	47
2024	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	2.04	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	47
2025	Street Sweeper	2.0	606	320	0.4556	0.18	0.02	2.04	0.20	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	47
2026	Street Sweeper	2.0	606	320	0.4556	0.17	0.02	1.79	0.17	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	47
2027	Street Sweeper	2.0	606	320	0.4556	0.18	0.02	1.79	0.17	8.50	0.83	0.06	0.01	0.01	46.7	0.0012	0.0027	47
2028	Street Sweeper	2.0	606	320	0.4556	0.16	0.02	1.34	0.13	8.50	0.83	0.05	0.00	0.00	46.7	0.0012	0.0027	47
2029	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.85	0.08	8.50	0.83	0.04	0.00	0.00	46.7	0.0012	0.0027	47

Mitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	Hitachi 850	6.2	1,872	460	0.3819	0.25	0.09	4.67	1.69	8.50	3.08	0.15	0.06	0.05	173.7	0.0045	0.0099	175
2013	Hitachi 850	6.2	1,872	460	0.3819	0.22	0.08	4.19	1.52	8.50	3.08	0.13	0.05	0.04	173.7	0.0045	0.0099	175
2014	Hitachi 850	6.2	1,872	460	0.3819	0.21	0.08	3.77	1.37	8.50	3.08	0.12	0.04	0.04	173.7	0.0045	0.0099	175
2015	Hitachi 850	6.2	1,872	460	0.3819	0.21	0.08	3.70	1.34	8.50	3.08	0.12	0.04	0.04	173.7	0.0045	0.0099	175
2016	Hitachi 850	6.2	1,872	460	0.3819	0.21	0.08	3.58	1.30	8.50	3.08	0.12	0.04	0.04	173.7	0.0045	0.0099	175
2017	Hitachi 850	6.2	1,872	460	0.3819	0.18	0.07	2.89	1.05	8.50	3.08	0.10	0.03	0.03	173.7	0.0045	0.0099	175
2018	Hitachi 850	6.2	1,872	460	0.3819	0.17	0.06	2.41	0.87	8.50	3.08	0.08	0.03	0.03	173.7	0.0045	0.0099	175
2019	Hitachi 850	6.2	1,872	460	0.3819	0.15	0.06	2.11	0.77	8.50	3.08	0.07	0.03	0.02	173.7	0.0045	0.0099	175
2020	Hitachi 850	6.2	1,872	460	0.3819	0.15	0.05	1.91	0.69	8.50	3.08	0.07	0.02	0.02	173.7	0.0045	0.0099	175
2021	Hitachi 850	6.2	1,872	460	0.3819	0.14	0.05	1.72	0.62	8.50	3.08	0.06	0.02	0.02	173.7	0.0045	0.0099	175
2022	Hitachi 850	6.2	1,872	460	0.3819	0.13	0.05	1.37	0.50	8.50	3.08	0.05	0.02	0.02	173.7	0.0045	0.0099	175
2023	Hitachi 850	6.2	1,872	460	0.3819	0.13	0.05	1.23	0.45	8.50	3.08	0.05	0.02	0.02	173.7	0.0045	0.0099	175
2024	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.05	1.17	0.43	8.50	3.08	0.04	0.02	0.01	173.7	0.0045	0.0099	175
2025	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.04	1.09	0.40	8.50	3.08	0.04	0.01	0.01	173.7	0.0045	0.0099	175
2026	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.04	0.99	0.36	8.50	3.08	0.04	0.01	0.01	173.7	0.0045	0.0099	175
2027	Hitachi 850	6.2	1,872	460	0.3819	0.12	0.04	0.97	0.35	8.50	3.08	0.04	0.01	0.01	173.7	0.0045	0.0099	175
2028	Hitachi 850	6.2	1,872	460	0.3819	0.11	0.04	0.90	0.33	8.50	3.08	0.03	0.01	0.01	173.7	0.0045	0.0099	175
2029	Hitachi 850	6.2	1,872	460	0.3819	0.11	0.04	0.84	0.31	8.50	3.08	0.03	0.01	0.01	173.7	0.0045	0.0099	175
2012	966G Loader (RMC)	4.6	1,397	330	0.3618	0.36	0.07	5.63	1.04	8.50	1.56	0.21	0.04	0.04	88.2	0.0023	0.0050	89
2013	966G Loader (RMC)	4.6	1,397	330	0.3618	0.36	0.07	5.30	0.97	8.50	1.56	0.21	0.04	0.04	88.2	0.0023	0.0050	89
2014	966G Loader (RMC)	4.6	1,397	330	0.3618	0.35	0.06	4.90	0.90	8.50	1.56	0.20	0.04	0.03	88.2	0.0023	0.0050	89
2015	966G Loader (RMC)	4.6	1,397	330	0.3618	0.35	0.06	4.74	0.87	8.50	1.56	0.19	0.04	0.03	88.2	0.0023	0.0050	89
2016	966G Loader (RMC)	4.6	1,397	330	0.3618	0.33	0.06	4.24	0.78	8.50	1.56	0.18	0.03	0.03	88.2	0.0023	0.0050	89
2017	966G Loader (RMC)	4.6	1,397	330	0.3618	0.31	0.06	3.85	0.71	8.50	1.56	0.16	0.03	0.03	88.2	0.0023	0.0050	89
2018	966G Loader (RMC)	4.6	1,397	330	0.3618	0.28	0.05	3.24	0.60	8.50	1.56	0.14	0.03	0.02	88.2	0.0023	0.0050	89
2019	966G Loader (RMC)	4.6	1,397	330	0.3618	0.26	0.05	2.80	0.52	8.50	1.56	0.12	0.02	0.02	88.2	0.0023	0.0050	89
2020	966G Loader (RMC)	4.6	1,397	330	0.3618	0.24	0.04	2.46	0.45	8.50	1.56	0.11	0.02	0.02	88.2	0.0023	0.0050	89
2021	966G Loader (RMC)	4.6	1,397	330	0.3618	0.22	0.04	2.05	0.38	8.50	1.56	0.10	0.02	0.02	88.2	0.0023	0.0050	89
2022	966G Loader (RMC)	4.6	1,397	330	0.3618	0.20	0.04	1.56	0.29	8.50	1.56	0.08	0.02	0.01	88.2	0.0023	0.0050	89
2023	966G Loader (RMC)	4.6	1,397	330	0.3618	0.18	0.03	1.39	0.26	8.50	1.56	0.07	0.01	0.01	88.2	0.0023	0.0050	89
2024	966G Loader (RMC)	4.6	1,397	330	0.3618	0.17	0.03	1.30	0.24	8.50	1.56	0.06	0.01	0.01	88.2	0.0023	0.0050	89
2025	966G Loader (RMC)	4.6	1,397	330	0.3618	0.16	0.03	1.12	0.21	8.50	1.56	0.05	0.01	0.01	88.2	0.0023	0.0050	89
2026	966G Loader (RMC)	4.6	1,397	330	0.3618	0.16	0.03	1.03	0.19	8.50	1.56	0.05	0.01	0.01	88.2	0.0023	0.0050	89
2027	966G Loader (RMC)	4.6	1,397	330	0.3618	0.15	0.03	0.98	0.18	8.50	1.56	0.04	0.01	0.01	88.2	0.0023	0.0050	89
2028	966G Loader (RMC)	4.6	1,397	330	0.3618	0.15	0.03	0.90	0.17	8.50	1.56	0.04	0.01	0.01	88.2	0.0023	0.0050	89
2029	966G Loader (RMC)	4.6	1,397	330	0.3618	0.15	0.03	0.84	0.16	8.50	1.56	0.04	0.01	0.01	88.2	0.0023	0.0050	89

Mitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	Dragline	4.0	1,212	362	0.4288	0.41	0.09	6.95	1.44	8.50	1.76	0.27	0.06	0.05	99.4	0.0025	0.0057	100
2013	Dragline	4.0	1,212	362	0.4288	0.41	0.08	6.85	1.42	8.50	1.76	0.26	0.05	0.05	99.4	0.0025	0.0057	100
2014	Dragline	4.0	1,212	362	0.4288	0.40	0.08	6.61	1.37	8.50	1.76	0.26	0.05	0.05	99.4	0.0025	0.0057	100
2015	Dragline	4.0	1,212	362	0.4288	0.40	0.08	6.45	1.34	8.50	1.76	0.25	0.05	0.05	99.4	0.0025	0.0057	100
2016	Dragline	4.0	1,212	362	0.4288	0.39	0.08	6.21	1.29	8.50	1.76	0.24	0.05	0.05	99.4	0.0025	0.0057	100
2017	Dragline	4.0	1,212	362	0.4288	0.37	0.08	5.91	1.23	8.50	1.76	0.23	0.05	0.04	99.4	0.0025	0.0057	100
2018	Dragline	4.0	1,212	362	0.4288	0.33	0.07	5.15	1.07	8.50	1.76	0.20	0.04	0.04	99.4	0.0025	0.0057	100
2019	Dragline	4.0	1,212	362	0.4288	0.31	0.06	4.63	0.96	8.50	1.76	0.18	0.04	0.03	99.4	0.0025	0.0057	100
2020	Dragline	4.0	1,212	362	0.4288	0.29	0.06	4.26	0.88	8.50	1.76	0.17	0.03	0.03	99.4	0.0025	0.0057	100
2021	Dragline	4.0	1,212	362	0.4288	0.28	0.06	3.86	0.80	8.50	1.76	0.15	0.03	0.03	99.4	0.0025	0.0057	100
2022	Dragline	4.0	1,212	362	0.4288	0.25	0.05	3.24	0.67	8.50	1.76	0.13	0.03	0.02	99.4	0.0025	0.0057	100
2023	Dragline	4.0	1,212	362	0.4288	0.23	0.05	2.92	0.61	8.50	1.76	0.12	0.02	0.02	99.4	0.0025	0.0057	100
2024	Dragline	4.0	1,212	362	0.4288	0.22	0.05	2.65	0.55	8.50	1.76	0.11	0.02	0.02	99.4	0.0025	0.0057	100
2025	Dragline	4.0	1,212	362	0.4288	0.20	0.04	2.27	0.47	8.50	1.76	0.10	0.02	0.02	99.4	0.0025	0.0057	100
2026	Dragline	4.0	1,212	362	0.4288	0.20	0.04	2.08	0.43	8.50	1.76	0.09	0.02	0.02	99.4	0.0025	0.0057	100
2027	Dragline	4.0	1,212	362	0.4288	0.19	0.04	1.92	0.40	8.50	1.76	0.08	0.02	0.02	99.4	0.0025	0.0057	100
2028	Dragline	4.0	1,212	362	0.4288	0.18	0.04	1.78	0.37	8.50	1.76	0.08	0.02	0.01	99.4	0.0025	0.0057	100
2029	Dragline	4.0	1,212	362	0.4288	0.18	0.04	1.66	0.34	8.50	1.76	0.07	0.01	0.01	99.4	0.0025	0.0057	100
2012	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.36	0.19	5.63	2.96	8.50	4.47	0.21	0.11	0.10	252.3	0.0065	0.0144	255
2013	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.36	0.19	5.30	2.79	8.50	4.47	0.21	0.11	0.10	252.3	0.0065	0.0144	255
2014	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.35	0.18	4.90	2.58	8.50	4.47	0.20	0.10	0.10	252.3	0.0065	0.0144	255
2015	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.35	0.18	4.74	2.49	8.50	4.47	0.19	0.10	0.09	252.3	0.0065	0.0144	255
2016	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.33	0.17	4.24	2.23	8.50	4.47	0.18	0.09	0.09	252.3	0.0065	0.0144	255
2017	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.31	0.16	3.85	2.03	8.50	4.47	0.16	0.09	0.08	252.3	0.0065	0.0144	255
2018	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.28	0.15	3.24	1.71	8.50	4.47	0.14	0.07	0.07	252.3	0.0065	0.0144	255
2019	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.26	0.13	2.80	1.47	8.50	4.47	0.12	0.07	0.06	252.3	0.0065	0.0144	255
2020	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.24	0.13	2.46	1.30	8.50	4.47	0.11	0.06	0.05	252.3	0.0065	0.0144	255
2021	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.22	0.12	2.05	1.08	8.50	4.47	0.10	0.05	0.05	252.3	0.0065	0.0144	255
2022	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.20	0.10	1.56	0.82	8.50	4.47	0.08	0.04	0.04	252.3	0.0065	0.0144	255
2023	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.18	0.10	1.39	0.73	8.50	4.47	0.07	0.04	0.03	252.3	0.0065	0.0144	255
2024	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.17	0.09	1.30	0.68	8.50	4.47	0.06	0.03	0.03	252.3	0.0065	0.0144	255
2025	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.16	0.08	1.12	0.59	8.50	4.47	0.05	0.03	0.03	252.3	0.0065	0.0144	255
2026	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.16	0.08	1.03	0.54	8.50	4.47	0.05	0.03	0.02	252.3	0.0065	0.0144	255
2027	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.15	0.08	0.98	0.52	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	255
2028	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.15	0.08	0.90	0.47	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	255
2029	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.15	0.08	0.84	0.44	8.50	4.47	0.04	0.02	0.02	252.3	0.0065	0.0144	255

Mitigated Off-Road (Non-Road) Emissions Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[4] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[4] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[4] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[4] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[5] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	773 Truck	0	0	740	0.3819	0.48	0.00	6.85	0.00	8.50	0.00	0.29	0.00	0.00	0.0	0.0000	0.0000	0
2013	773 Truck	0	0	740	0.3819	0.47	0.00	6.58	0.00	8.50	0.00	0.28	0.00	0.00	0.0	0.0000	0.0000	0
2014	773 Truck	0	0	740	0.3819	0.42	0.00	5.84	0.00	8.50	0.00	0.24	0.00	0.00	0.0	0.0000	0.0000	0
2015	773 Truck	0	0	740	0.3819	0.39	0.00	5.37	0.00	8.50	0.00	0.22	0.00	0.00	0.0	0.0000	0.0000	0
2016	773 Truck	0	0	740	0.3819	0.36	0.00	4.88	0.00	8.50	0.00	0.20	0.00	0.00	0.0	0.0000	0.0000	0
2017	773 Truck	0	0	740	0.3819	0.34	0.00	4.48	0.00	8.50	0.00	0.18	0.00	0.00	0.0	0.0000	0.0000	0
2018	773 Truck	0	0	740	0.3819	0.30	0.00	3.88	0.00	8.50	0.00	0.15	0.00	0.00	0.0	0.0000	0.0000	0
2019	773 Truck	0	0	740	0.3819	0.28	0.00	3.50	0.00	8.50	0.00	0.14	0.00	0.00	0.0	0.0000	0.0000	0
2020	773 Truck	0	0	740	0.3819	0.27	0.00	3.22	0.00	8.50	0.00	0.13	0.00	0.00	0.0	0.0000	0.0000	0
2021	773 Truck	0	0	740	0.3819	0.26	0.00	2.81	0.00	8.50	0.00	0.11	0.00	0.00	0.0	0.0000	0.0000	0
2022	773 Truck	0	0	740	0.3819	0.23	0.00	2.38	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2023	773 Truck	0	0	740	0.3819	0.23	0.00	2.29	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2024	773 Truck	0	0	740	0.3819	0.22	0.00	2.19	0.00	8.50	0.00	0.08	0.00	0.00	0.0	0.0000	0.0000	0
2025	773 Truck	0	0	740	0.3819	0.20	0.00	1.83	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2026	773 Truck	0	0	740	0.3819	0.21	0.00	1.82	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2027	773 Truck	0	0	740	0.3819	0.20	0.00	1.70	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2028	773 Truck	0	0	740	0.3819	0.21	0.00	1.73	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2029	773 Truck	0	0	740	0.3819	0.19	0.00	1.55	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2012	773 Truck	0	0	740	0.3819	0.48	0.00	6.85	0.00	8.50	0.00	0.29	0.00	0.00	0.0	0.0000	0.0000	0
2013	773 Truck	0	0	740	0.3819	0.47	0.00	6.58	0.00	8.50	0.00	0.28	0.00	0.00	0.0	0.0000	0.0000	0
2014	773 Truck	0	0	740	0.3819	0.42	0.00	5.84	0.00	8.50	0.00	0.24	0.00	0.00	0.0	0.0000	0.0000	0
2015	773 Truck	0	0	740	0.3819	0.39	0.00	5.37	0.00	8.50	0.00	0.22	0.00	0.00	0.0	0.0000	0.0000	0
2016	773 Truck	0	0	740	0.3819	0.36	0.00	4.88	0.00	8.50	0.00	0.20	0.00	0.00	0.0	0.0000	0.0000	0
2017	773 Truck	0	0	740	0.3819	0.34	0.00	4.48	0.00	8.50	0.00	0.18	0.00	0.00	0.0	0.0000	0.0000	0
2018	773 Truck	0	0	740	0.3819	0.30	0.00	3.88	0.00	8.50	0.00	0.15	0.00	0.00	0.0	0.0000	0.0000	0
2019	773 Truck	0	0	740	0.3819	0.28	0.00	3.50	0.00	8.50	0.00	0.14	0.00	0.00	0.0	0.0000	0.0000	0
2020	773 Truck	0	0	740	0.3819	0.27	0.00	3.22	0.00	8.50	0.00	0.13	0.00	0.00	0.0	0.0000	0.0000	0
2021	773 Truck	0	0	740	0.3819	0.26	0.00	2.81	0.00	8.50	0.00	0.11	0.00	0.00	0.0	0.0000	0.0000	0
2022	773 Truck	0	0	740	0.3819	0.23	0.00	2.38	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2023	773 Truck	0	0	740	0.3819	0.23	0.00	2.29	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2024	773 Truck	0	0	740	0.3819	0.22	0.00	2.19	0.00	8.50	0.00	0.08	0.00	0.00	0.0	0.0000	0.0000	0
2025	773 Truck	0	0	740	0.3819	0.20	0.00	1.83	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2026	773 Truck	0	0	740	0.3819	0.21	0.00	1.82	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2027	773 Truck	0	0	740	0.3819	0.20	0.00	1.70	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2028	773 Truck	0	0	740	0.3819	0.21	0.00	1.73	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2029	773 Truck	0	0	740	0.3819	0.19	0.00	1.55	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0

0.367 lb/hp-hr
2000 lb/ton
453.59237 g/lb
2205 lb/MT
7.05 lb/gal diesel
1000 kg/MT

[1] Horsepowers based on engine specs provided by Applicant.

[2] Load factors are from OFFROAD2011.

[4] Emissions factors are average for type and size of equipment as determined using OFFROAD2011.
Emissions factors for the Project fleet by year incorporate load factor.

[5] PM2.5 emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Off-Road Equipment: Diesel.

[6] Future year NOx emissions are calculated using fleet average emission factors from the off road ATCM regulation.
See the "Off Road and On Road Emission Profile" spreadsheet for more information.

Emission F	AR GRPv3.1	Table #	GWP
10.15	kg CO2/gal	C.3	1
0.26	g N2O/gal	C.6	310
0.58	g CH4/gal	C.6	21

Loader Cycle Time Analysis

Assumptions	Aggregate Plant	Aggregate Plant	RMC Plant	HMA Plant
Parameters	**Load On Road Trucks**	**Load Off Road Trucks**	**Load RMC Plant**	**Load HMA Plant**
Loader Model	980G Loader	980G Loader	966G Loader	980G Loader
Travel Distance (avg) (meters)	47	25	91	91
Bucket Payload[1] (yd^3)	6.5	6.5	3.75	6.5
Bucket Payload in Tons	9.75	9.75	5.625	9.75
Material Type[2]	Mixed Moist Aggregates	Average Blasted	Mixed Moist Aggregates	Mixed Moist Aggregates
Bucket Fill Factor[2]	95%	75%	95%	95%
Job Efficiency[3] (work 50 min/hr)	83%	83%	83%	83%
Grade Resistance[4]	0%	0%	0%	0%
Rolling Resistance[4]	2%	3%	2%	2%
Total Resistance[4]	2%	3%	2%	2%

Cycle Time

Hydraulic Cycle Time (mins) [5]	**Load On Road Trucks**		**Load Off Road Trucks**		**Load RMC Plant**		**Load HMA Plant**	
Average Cycle Time [6]		0.50		0.50		0.50		0.50
Material Handler?	Yes	-0.05	Yes	-0.05	Yes	-0.05	Yes	-0.05
Materials:	Mixed	+0.02	6" and over	+0.03	Mixed	+0.02	Mixed	+0.02
Pile:	Conveyor piled>10'	0.00	Dumped by truck	+0.02	Conveyor piled>10'	0.00	Conveyor piled>10'	0.00
Truck Ownership:	Independent	+0.04	Common	-0.04	Independent	+0.04	Independent	+0.04
Operation Cycle:	Constant	-0.04	Constant	-0.04	Constant	-0.04	Constant	-0.04
Target Type:	N/A	0.00	N/A	0.00	N/A	0.00	N/A	0.00
Total Hydraulic Cycle Time		**0.47**		**0.42**		**0.47**		**0.47**

Total Cycle Time	**Load On Road Trucks**	**Load Off Road Trucks**	**Load RMC Plant**	**Load HMA Plant**
Hydraulic Cycle Time (min/cycle)	0.47	0.42	0.47	0.47
Travel with load[7] (min/cycle)	0.17	0.12	0.29	0.28
Travel empty[7] (min/cycle)	0.16	0.11	0.25	0.25
Total Cycle Time (min/cycle)	**0.80**	**0.65**	**1.01**	**1.00**

Rate Calculations

Production Calculations	**Load On Road Trucks**	**Load Off Road Trucks**	**Load RMC Plant**	**Load HMA Plant**
Cycles per Hour	62.5	76.9	49.5	50.0
Production Rate (tph)	579	563	265	463
Throughput (tpy)	1,845,325	2,500,000	369,675	285,000
Hours per Year	3,188	4,444	1,397	615

[1] Average of Caterpillar indicated range of 5 to 8 yd^3 for 980G loaders and 3.5 to 4 yd^3 for 966G loaders

[2] Material type and bucket fill factor from Caterpillar Performance Handbook Edition 37, February 2007 (CPH) page 27-1

[3] Job efficiency accounts for operator skill, minor repairs and adjustments, personnel delays, and delays caused by job layout. CPH suggested 50 minutes (83%) (CPH page 12-80)

[4] Resisitance from CPH pg 22-5 and 22-6 and "Typical Rolling Resistance Factors" table on page 27-1

[5] Guidelines for "Selecting a Machine" on page 12-79 and 12-80 of CPH were used to determine the hydraulic cycle time.

[6] Average cycle time for this type of equipment is tabulated on page 12-80 of CPH.

[7] Figures on pages 12-108,109 and pages 12-104,105 in CPH were used to estimate the travel times for the 980G loaders and 966G loaders, respectively.

Excavator Cycle Time Analysis

Assumptions

Excavator Bucket Size =	7.75	yd^3
Material Type =	Sand and Gravel	
Sand and Gravel density =	1.5	$tons/yd^3$

Hitachi EX1100 is comparable to an Caterpillar 385C

Cycle Time

From the Caterpillar Performance Handbook, Edition 37 (February 2007),
page 4-194 "Cycle Time Estimating Chart"
Based on the low end of the typical range due to the loose configuration of material to be moved.

Cycle Time =	0.35	minutes

Production Estimate

From the Caterpillar Performance Handbook, Edition 37 (February 2007),
page 4-201 "Production Estimating Tables"
Based on the 0.35 minute cycle time and a 7.75 yd^3 bucket

Production Rate =	1329	yd^3/hour
Production Rate =	1993.5	tons/hour
Job Efficiency* =	67%	
Production Rate =	1336	tons/hour

Operation Hours

Aggregate Throughput =	2,500,000	tpy
Operations =	1872	hours/year
Average Operations =	6.2	hours/day

* Job efficiency is estimated to be 40 minutes per hour to account for operator skill, minor delays, and periodic excavator transportation

Appendix F
Fugitive Dust Emission Calculations

Fugitive Dust Emissions Summary

		Tons Per Year					
Unmitigated		**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Fugitive Dust	Offsite Paved Roads	0	0	0	0	1.23	0.30
	Onsite Paved Roads	0	0	0	0	7.88	1.93
	Onsite Unpaved Roads (Processing)	0	0	0	0	11.19	0.22
	Onsite Unpaved Roads (Pit)	0	0	0	0	16.82	1.68
	Stockpiles	0	0	0	0	1.10	0.44
	Total:	**0**	**0**	**0**	**0**	**38.21**	**4.58**

		Tons Per Year					
Mitigated		**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Fugitive Dust	Offsite Paved Roads	0	0	0	0	1.23	0.30
	Onsite Paved Roads	0	0	0	0	1.10	0.27
	Onsite Unpaved Roads (Processing)	0	0	0	0	1.40	0.01
	Onsite Unpaved Roads (Pit)	0	0	0	0	0.00	0.00
	Stockpiles	0	0	0	0	1.10	0.44
	Total:	**0**	**0**	**0**	**0**	**4.83**	**1.02**
	Percent Change from Mitigation:	0%	0%	0%	0%	-87%	-78%

Notes: Results are presented for the Lowered Facilities Alternative because emissions are slightly greater than emissions from the Project which is a conservative approach. Supporting documentation is located in the on-road on-site emissions calculations presented in Appendix E. Offroad trucks have zero emissions after mitigation because they are eliminated by Mitigation Measures AQ4 and AQ5.

Offsite Paved Road Dust Emissions

		Tons per Year	
		PM10	PM2.5
Project	794,674 VMT/yr in AVAQMD	1.2	0.3
Potential to Emit	3,693,682 VMT/yr in AVAQMD	5.7	1.4

EF (lb/VMT) = k * $(sL)^{0.91}$ * $(W)^{1.02}$ * (1-P/4N)

	PM10	**PM2.5**
sL = silt loading (g/m^2) =	0.0395	0.0395
W_l = loaded truck wt (tons) =	40	40
W_u = unloaded truck wt (tons) =	11	11
k = particle size multiplier =	0.0022	0.00054
P = Number of rain days	33	33
N = Number of days in period	365	365
Loaded EF (lb/VMT) =	0.0049	0.00120
Unloaded EF (lb/VMT) =	0.0013	0.00032
Average EF (lb/VMT) =	**0.00310**	**0.00076**

Notes: Emissions factor equation is from AP42 Section 13.2.1 (Jan. 2011). Silt loading is CalEEMod default. Truck weights are maximum legal limit (i.e. 40 tons) and an assumption for average unloaded weight of 15 tons. VMT reflects the Project's fair share of the forecasted future increase in VMT for the region.

Paved Road Silt Loading

Road Type	Freeway	Major	Collector	Local	Composite Silt Loading (g/m2)
Silt Loading	0.02	0.035	0.32	0.32	
Fraction of All Traffic	0.285	0.465	0.181	0.069	0.1020
Fraction of Project Traffic	0.65	0.3	0.05	0	0.0395

Notes: Project trucks operate more regularly on freeways and major roads than on collector and local roads. The Project fleet activity on collector and local roads is assumed to 10% of total activity with 60% of activity on freeways and 30% on major roads.

"Lowered Facilities" Project Alternative Unmitigated Fugitive Dust Calculations

Peak Yearly Throughput and Truck Trip Summary

Parameter	Throughput		Truck Capacity		Trucks / Year
	Amount	Units	Amount	Units	
Processed Aggregate Sold	1,354,325	tpy	29	tons	46,701
Ready Mix Concrete	225,000	cy	10	cy	22,500
Hot Mix Asphalt	300,000	tpy	15	tons	20,000
Raw Cement Sold and Used	300,000	tpy	29	tons	10,345
Flyash/Admixtures Imported	8,213	tons	29	tons	283
Asphaltic Oil Imported	24,000	tpy	29	tons	828
Fuel and service vehicles	---	---	---	---	4,530
					105,186

Traffic emissions spreadsheet contains basis for throughputs.

Loading/Unloading Emissions

	Thrpt. (tpy)	PM10 (tpy)	PM2.5 (tpy)
Excavator to Truck	2,500,000	0.90	0.14
Truck to Hopper	2,500,000	0.90	0.14
Aggregate to asphalt plant	276,000	0.10	0.02
Aggregate to concrete plant	369,675	0.13	0.02
Processed aggregate to trucks	1,354,325	0.49	0.07
Vac Lite Product to trucks	30,000	0.01	0.00
Subtotal	7,030,000	2.53	0.38

Loading/Unloading EF 0.00072 lb PM10/ton
0.00011 lb PM2.5/ton

Travel Over Paved Roads

Location	Length (m)	Trips per year	VMT per year	PM10 tpy	PM2.5 tpy
Entry to Bottom of Ramp	270	105,186	35302	7.03	1.73
Queueing/Cement	330	10,345	4243	0.85	0.21
Subtotal		115,531	39,545	7.9	1.9

Paved Road EF 0.408 lb PM10/VMT Rain Adjustment
0.100 lb PM2.5/VMT 0.9774

Travel Over Unpaved Roads

	Length (m)	Trips per year	VMT per year	PM10 tpy	PM2.5 tpy
Bottom of Ramp to Scales/RMC/Flyash	140	94,842	16504	4.94	0.0987
Aggregates	200	46,701	11610	3.47	0.0695
HMA	110	20,828	2848	0.85	0.0170
Raw Cement (Total)	500	10,345	6429	1.92	0.0385
Subtotal			37391	11.19	0.2237

On-Road Truck on Unpaved Road EF 0.658 lb PM10/VMT Rain Adjustment
0.013 lb PM2.5/VMT 0.90959

Onsite Off-Road Truck VMT= 18,568 miles/year
Off-Road Truck on Unpaved Road EF 1.992 lb PM10/VMT
0.199 lb PM2.5/VMT

PM10 Emissions 16.82 tpy PM10
PM2.5 Emissions 1.68 tpy PM2.5

Windblown Dust

See stockpile spreadsheet for calculations **1.10 tpy PM10**
0.44 tpy PM2.5

Total Fugitive Emissions

PM10 Emissions 39.51 tpy PM10
PM2.5 Emissions 4.66 tpy PM2.5

Notes: Results are presented for the Lowered Facilities Alternative because emissions are slightly greater than emissions from the Project which is a conservative approach. Offroad trucks are assumed to have a 51 ton payload as calculated in DustEF spreadsheet and travel 2000 feet roundtrip pit to plant feed.

Lowered Facilities Alternative - Mitigated Fugitive Dust Calculations

Peak Yearly Throughput and Truck Trip Summary

Parameter	Throughput		Truck Capacity		Trucks /
	Amount	Units	Amount	Units	Year
Processed Aggregate Sold	1,354,325	tpy	29	tons	46,701
Ready Mix Concrete	225,000	cy	10	cy	22,500
Hot Mix Asphalt	300,000	tpy	15	tons	20,000
Raw Cement Sold and Used	300,000	tpy	29	tons	10,345
Flyash/Admixtures Imported	8,213	tons	29	tons	283
Asphaltic Oil Imported	24,000	tpy	29	tons	828
Fuel and service vehicles	---	---	---	---	4,530
					105,186

Traffic emissions spreadsheet contains basis for throughputs.

Loading/Unloading Emissions

	Thrpt. (tpy)	PM10 (tpy)	PM2.5 (tpy)
Excavator to Truck	0	0.00	0.00
Loader to Hopper	2,500,000	0.90	0.14
Aggregate to asphalt plant	276,000	0.10	0.02
Aggregate to concrete plant	369,675	0.13	0.02
Processed aggregate to trucks	1,354,325	0.49	0.07
Vac Lite Product to trucks	30,000	0.01	0.00
Subtotal	4,530,000	1.63	0.25

Loading/Unloading EF 0.00072 lb PM10/ton
0.00011 lb PM2.5/ton

Travel Over Paved Roads

Location	Length (m)	Trips per year	VMT per year	PM10 tpy	PM2.5 tpy
Entry to Bottom of Ramp (SLINE1)	270	105,186	35302	0.98	0.24
Queueing/Cement (SLINE4)	330	10,345	4243	0.12	0.03
Subtotal		115,531	39,545	1.1	0.3

Paved Road EF 0.057 lb PM10/VMT Rain Adjustment
0.0140 lb PM2.5/VMT 0.9774

Travel Over Unpaved Roads

	Length (m)	Trips per year	VMT per year	PM10 tpy	PM2.5 tpy
Bottom of Ramp to Scales/RMC/Flyash	140	94,842	16504	0.62	0.0048
Aggregates	200	46,701	11610	0.43	0.0034
HMA	110	20,828	2848	0.11	0.0008
Raw Cement (Total)	500	10,345	6429	0.24	0.0019
Subtotal			37391	1.40	0.0110

On-Road Truck on Unpaved Road EF 0.0822 lb PM10/VMT Rain Adjustment
0.0006 lb PM2.5/VMT 0.90959

Windblown Dust

See stockpile spreadsheet for calculations **1.10 tpy PM10**
0.44 tpy PM2.5

Total Fugitive Emissions

PM10 Emissions **4.13 tpy PM10**
PM2.5 Emissions **0.53 tpy PM2.5**

Notes: Results are presented for the Lowered Facilities Alternative because emissions are slightly greater than emissions from the Project which is a conservative approach. Offroad trucks are not shown because they are eliminated by Mitigation Measures AQ4 and AQ5. One drop is assumed to be eliminated by removal of the trucks.

Dust Emission Factors

Unpaved Roads AP-42, Section 13.2.2 (Nov. 2006)

EF= k * (S/12)^a * (W/3)^b

	PM10	PM2.5
k=	1.5	0.15
a=	0.9	0.9
b=	0.45	0.45

UNCONTROLLED

On-road Trucks
Sand and Gravel Plant S= 4.8 %

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	2.1	0.21
Empty =	11	1.2	0.12
Average =	25.5	1.6	0.16

Mine Haul Trucks
Quarry S= 10 %

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	90.5	5.9	0.6
Empty =	39.5	4.1	0.4
Average =	65.0	5.0	0.5

UNMITIGATED

Control Factor 60% water
S= 4.8 %

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	0.84	0.015
Empty =	11	0.47	0.011
Average =	25.5	0.66	0.013

Control Factor 60% water
S= 10 %

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	90.5	2.36	0.236
Empty =	39.5	1.62	0.162
Average =	65.0	1.99	0.199

MITIGATED

Control Factor 95% CDS+water+
S= 4.8 %

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	0.105	0.00073
Empty =	11	0.059	0.00056
Average =	25.5	0.082	0.00064

Paved Roads AP-42, Section 13.2.1 (Jan. 2011)

EF= k * (sL)^a * (W)^b

	PM10	PM2.5
k=	0.0022	0.00054
a=	0.91	0.91
b=	1.02	1.02

UNCONTROLLED

Quarry sL= 8.2 g/m^2

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	0.64	0.16
Empty =	11	0.17	0.04
Average =	25.5	0.41	0.10

UNMITIGATED

Control Factor: 0%
sL= 8.2 g/m^2

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	0.64	0.158
Empty =	11	0.17	0.042
Average =	25.5	0.41	0.100

MITIGATED

Control Factor: 86%
sL= 8.2 g/m^2

	Weight (tons)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	0.090	0.022
Empty =	11	0.024	0.006
Average =	25.5	0.057	0.014

Loading and Unloading AP42, Section 13.2.4 (Nov. 2006)

EF = k * 0.0032 * ((U/5)^(1.3)) / ((M/2)^1.4)

	PM10	PM2.5	
k =	0.35	0.053	unitless
U =	5.5	5.5	mph
M =	3	3	percent
EF =	0.00072	0.00011	lb/ton

Stockpile Emissions

Name of / Number	Material Type	Stockpile Exposed Surface acres	Silt Loading %	Moisture (uncontrolled) %
1	Surge Pile	0.40	20	1.5
2	Product Piles (6)	0.86	5	3
3	Radial Stacked Pile	1.2	5	3
4	Fines	0.10	75	30
5	Active Mining Area	0.25	20	1.5
			30	0.5

Stockpile Name / Number	Dust Controls: Water Spray check	Water Spray gal/acre/day	Wind Screen check	Other check	Other Specify	Efficiency (%)
1				x	Carryover from Pit	50
2				x	Carryover from Plant	75
3				x	Carryover from plant	75
4				x	Carryover from Wet Process	95
5				x	Water Truck in Pit	75
0						

Emission Factors (pounds per acres)

EmFac = J *1.7 * s/1.5 * (365 - P)/235 * I/15 * 365

J = Aerodynamic factor

s = Silt Loading (%)

P = Day per year with at least 0.01 inches of precipitation

I = Percent of time with wind speed >12mph (%)

Aerodynamic factor	
TSP =	1.0
PM_{10} =	0.5
$PM_{2.5}$ =	0.2

Stockpile	Throughput (acres): Material Type	Size (acres)	Emission Factor - Uncontrolled (pounds/acre): TSP	PM_{10}	$PM_{2.5}$	Fractionation Value: PM_{10}	$PM_{2.5}$
1	Surge Pile	0.3984	10769.416	5384.708	2153.883	0.500	0.200
2	Product Piles (6)	0.8606	2692.354	1346.177	538.471	0.500	0.200
3	Radial Stacked Pile	1.1952	2692.354	1346.177	538.471	0.500	0.200
4	Fines	0.1000	40385.309	20192.654	8077.062	0.500	0.200
5	Active Mining Area	0.2500	10769.416	5384.708	2153.883	0.500	0.200
0	0	0.0000	0.000	0.000	0.000	0.000	0.000
	TOTAL	2.804244047	5904.126	2952.063	1180.825	0.500	0.200
Number of Devices	5						

Stockpile	Controls: Type	Efficiency (%)	Emission Factor - Controlled (pounds/acre): TSP	PM_{10}	$PM_{2.5}$	Emissions (tpy) = Area * EmFac: TSP	PM_{10}	$PM_{2.5}$
1	Carryover from Pit	50.00	5384.708	2692.354	1076.942	1.073	0.536	0.215
2	Carryover from Plan	75.00	673.088	336.544	134.618	0.290	0.145	0.058
3	Carryover from plan	75.00	673.088	336.544	134.618	0.402	0.201	0.080
4	Carryover from Wet	95.00	2019.265	1009.633	403.853	0.101	0.050	0.020
5	Water Truck in Pit	75.00	2692.354	1346.177	538.471	0.337	0.168	0.067
0	None	0.00	0.000	0.000	0.000	0.000	0.000	0.000
	TOTAL	72.16	1570.521	785.260	314.104			
						TOTAL 2.202	1.101	0.440

http://www.mdaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=1169

Parameter	Value	Description	Default Value
Mean Wind Speed	7.7	mph	7.7
u	3.4	meters per second	
Precipitation	20.0	Day per year with at least 0.01 inches of precipitation	20.0
Wind Speed	13.3	Percent of time with wind speed >12mph (%)	13.3
Evaporation	75.0	Annual Pan Evaporation Rate in inches	75.0

Appendix G
Greenhouse Gas Emission Calculations

Greenhouse Gas Emission Calculations

Stationary Equipment			**Emissions (metric tons/year)**			
Propane	**Fuel Usage (gallon/yr)[1]**		**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Asphalt Plant	819,672		4,705	0.25	0.08	4,735
Oil Heaters	114,885		659	0.03	0.01	664
Diesel	**Operation (hrs/yr)**	**HP**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Generator	50	49	1.29	0.00	0.00	1.30
		Stationary Total:	**5,366**	**0.28**	**0.09**	**5,401**

Mobile Equipment		**Emissions (metric tons/year)**			
Off Road Activity	**HP-Hours/Year[2]**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
All Units (UNMITIGATED)	12,796,040	2559	0.07	0.15	2,606
On Road	**Distance (VMT/Year)[3]**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Haul Truck	922,872	1612	0.05	0.02	1,617
Worker Commutes	2,836,080	1360	0.05	0.08	1,385
	Mobile Total:	**5,531**	**0.16**	**0.24**	**5,608**

Water Use

312 acre-ft/yr, consumed
43,560 gal/acre-ft
11,111 kWh/MG, intensity for outdoor uses in So. Calif. (CEC, 2006)

151,006 kWh/yr
35.9 metric tons CO2e

Electricity Use

Unit	**Quantity**	**HP**	**Load Factor**	**hours**	**kWh/yr**	**metric tons CO2e/yr**
Jaw Crusher	1	200	0.25	3,846	143,381	34.1
Cone crushers	2	400	0.5	3,846	1,147,046	272.6
AGG Conveyors	18	25	0.5	3,846	645,213	153.3
AGG Screens	4	75	0.5	3,846	430,142	102.2
Asphalt Plant [4]	1				572,519	136.1
RMC - Conveyors [5]	6	25	0.5	1,000	55,919	13.3
RMC - Baghouse [5]	1	100	0.5	1,000	67,062	15.9
Vac-lite [5]	1				8,150	1.9
Scalehouse/buildings [6]	1	50	0.5	3,846	128,965	30.6
TOTAL					**3,069,432**	**729.4**

0.524 lb CO2e/kWh, PG&E factor used by San Joaquin APCD in asphalt plant BPS.
0.74558 kW/hp

Unmitigated Project Total (metric tons of CO2e/yr): 11,774
Tons per year: 13,246

Mitigated Greenhouse Gas Emission Calculations

Stationary Equipment			**Emissions (metric tons/year)**			
Propane	**Fuel Usage (gallon/yr)[1]**		**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Asphalt Plant	819,672		4,705	0.25	0.08	4,735
Oil Heaters	114,885		659	0.03	0.01	664
Diesel	**Operation (hrs/yr)**	**HP**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Generator	50	49	1.29	0.00	0.00	1.30
		Stationary Total:	**5,366**	**0.28**	**0.09**	**5,401**

Mobile Equipment		**Emissions (metric tons/year)**			
Off Road Activity	**HP-Hours/Year[2]**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
All Units (UNMITIGATED)	5,760,955	1147	0	0	1,168
On Road	**Distance (VMT/Year)[3]**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Haul Truck	922,872	1612	0.05	0.02	1,617
Worker Commutes	2,836,080	1360	0.05	0.08	1,385
	Mobile Total:	**4,118**	**0.13**	**0.16**	**4,170**

Water Use

312 acre-ft/yr, consumed
43,560 gal/acre-ft
11,111 kWh/MG, intensity for outdoor uses in So. Calif. (CEC, 2005)

151,006 kWh/yr
35.9 metric tons CO2e

Electricity Use

Unit	**Quantity**	**HP**	**Load Factor**	**hours**	**kWh/yr**	**metric tons CO2e/yr**
Jaw Crusher	1	200	0.25	3,846	143,381	34.1
Cone crushers	2	400	0.5	3,846	1,147,046	272.6
AGG Conveyors	18	25	0.5	3,846	645,213	153.3
AGG Screens	4	75	0.5	3,846	430,142	102.2
Asphalt Plant [4]	1				572,519	136.1
RMC - Conveyors [5]	6	25	0.5	1,000	55,919	13.3
RMC - Baghouse [5]	1	100	0.5	1,000	67,062	15.9
Vac-lite [5]	1				8,150	1.9
Scalehouse/buildings [6]	1	50	0.5	3,846	128,965	30.6
TOTAL					**3,069,432**	**729.4**

0.524 lb CO2e/kWh, PG&E factor used by San Joaquin APCD in asphalt plant BPS.
0.74558 kW/hp

Mitigated Project Total (metric tons of CO2e/yr): 10,336
Tons per year: 11,628

12.2% reduction over unmitigated GHG emissions

Emission Factors

Source	Unit	CO_2	CH_4	N_2O	Data Source
Propane	kg/gal	5.74	0.0003	0.0001	GRPv3.1 Tables C.7 and C.9
Stationary Diesel	kg/gal	10.15	0.0004	0.0001	GRPv3.1 Tables C.7 and C.9
Off Road Diesel	n/a	n/a	n/a	n/a	GRPv3.1 Tables C.3 and C.4
Haul Truck Diesel	g/VMT	1,746	0.0518	0.0173	EMFAC2011 model (Favley I+ LCFS) for Calendar Year 2012. CH_4 and N_2O emission factors from GRPv3.1.
Passenger Vehicle Gasoline	g/VMT	479	0.0178	0.0273	

Global Warming Potentials

Parameter	CO_2	CH_4	N_2O	Data Source
GWP	1	21	310	GRPv3.1

Density of diesel fuel (AP42, Appx. A): 7.05 lb fuel/gal
Brake specific fuel consumption (OFFROAD2011): 0.367 lb fuel/hp-hr

[1] Fuel usage for the asphalt plant based on hourly fuel usage and operation per year at maximum throughput. Fuel usage for oil heaters based on energy use in MMBtu/yr

[2] Hours per year for off road equipment are presented in Table 2 of the AQCCIA and the offroad emissions spreadsheet.

[3] VMT for haul trucks based on Applicant's share of growth in 2029 which is the final full year if mined at the peak rate of 2.5 Mmtpy. VMT for worker commutes based on 60.0 miles/trip, 156 trips per day, and 303 days per year.

[4] Asphalt plant electricity use is 1.0 lb-CO2e/ton as documented by the San Joaquin APCD draft Best Performance Standard (BPS).

[5] RMC hourly rate of 225 cy/hr is assumed. Vac-lite plant scaled by throughput from RMC plant emissions and density of concrete (4024 lb

[6] Scalehouse/building electricity use based on 50 hp emergency generator.

Other Notes: RAP crushing plant would substitute for aggregate plant activity and therefore is not quantified seperately.
Rubberized asphalt equipment would have emissions offset by reduced asphalt plant activity as would be required by APCD permit.
2006 CEC report, “Refining Estimates of Water-Related Energy Use in California,” is used in CalEEMod.

Appendix H
Project and Mitigated Emissions Summary

AVAQMD Emissions Summary

		Tons Per Year					
Unmitigated (2014)		**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Stationary	Agg Plant					3.68	1.06
	RMC Plant					0.78	0.23
	Asphalt Plant	2.45	1.88	3.45	0.04	3.45	3.38
	Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
	VacLite					0.01	0.00
	Cement Transfer					0.10	0.03
	Generator	0.00	0.02	0.01	0.00	0.00	0.00
Mobile	Haul Trucks (off-site)	0.25	2.16	1.25	0.01	0.16	0.00
	Road Dust (off-site)					1.23	0.30
	Haul Trucks (on-site)	0.20	2.33	0.72	0.00	0.05	0.01
	Worker Commute	0.63	0.74	8.78	0.01	0.15	0.06
	Train	0.03	1.14	0.11	0.07	0.02	0.02
	Off Road	2.28	34.08	45.38		1.39	1.28
Fug	Fugitive Dust					39.51	4.66
	Total:	**5.87**	**43.09**	**60.13**	**0.15**	**50.56**	**11.06**
	Threshold	25	25	100	25	15	15

		Tons Per Year					
Mitigated (2015)		**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Stationary	Agg Plant					3.68	1.06
	RMC Plant					0.78	0.23
	Asphalt Plant	2.45	1.88	3.45	0.04	3.45	3.38
	Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
	VacLite					0.01	0.00
	Cement Transfer					0.10	0.03
	Generator	0.00	0.02	0.01	0.00	0.00	0.00
Mobile	Haul Trucks (off-site)	0.25	2.16	1.25	0.01	0.16	0.00
	Road Dust (off-site)					1.23	0.30
	Haul Trucks (on-site)	0.17	0.94	0.63	0.00	0.01	0.01
	Worker Commute	0.63	0.74	8.78	0.01	0.15	0.06
	Train	0.03	1.14	0.11	0.07	0.02	0.02
	Off Road	0.83	12.26	20.34	0	0.48	0.44
Fug	Fugitive Dust					4.13	0.53
	Total:	**4.39**	**19.9**	**35.00**	**0.15**	**14.2**	**6.09**
	Threshold	25	25	100	25	15	15
	Reduction from Mitigation:	1.48	23.21	25.13	0.00	36.33	4.97
	Reduction from Mitigation:	25%	54%	42%	0%	72%	45%

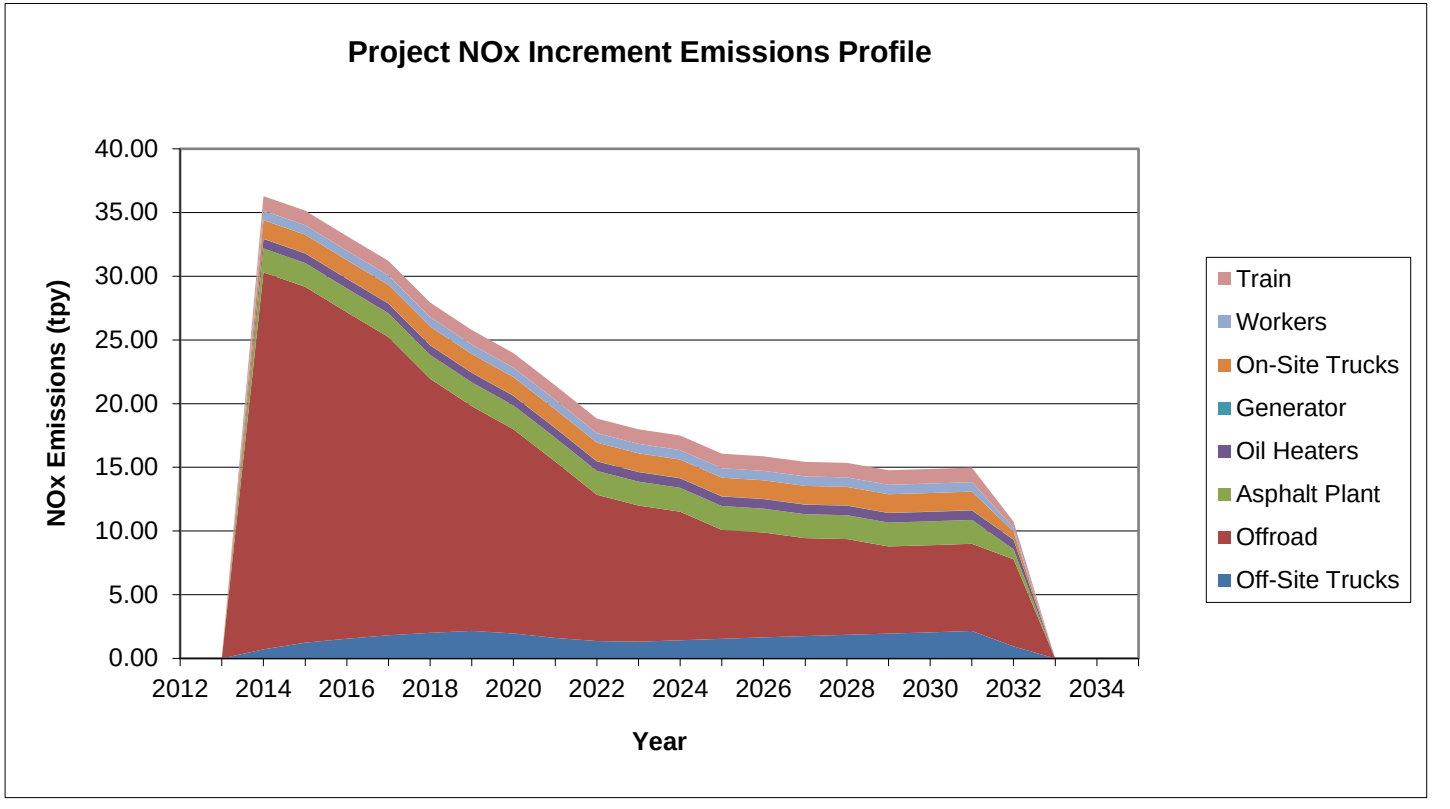
Construction Emissions (lbs/day) from URBEMIS2007

	Pounds per Day					
	VOC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$** [1]
Construction	14.4	115.5	140.31	0.2	60.88	13.44
Threshold	137	137	548	137	82	82

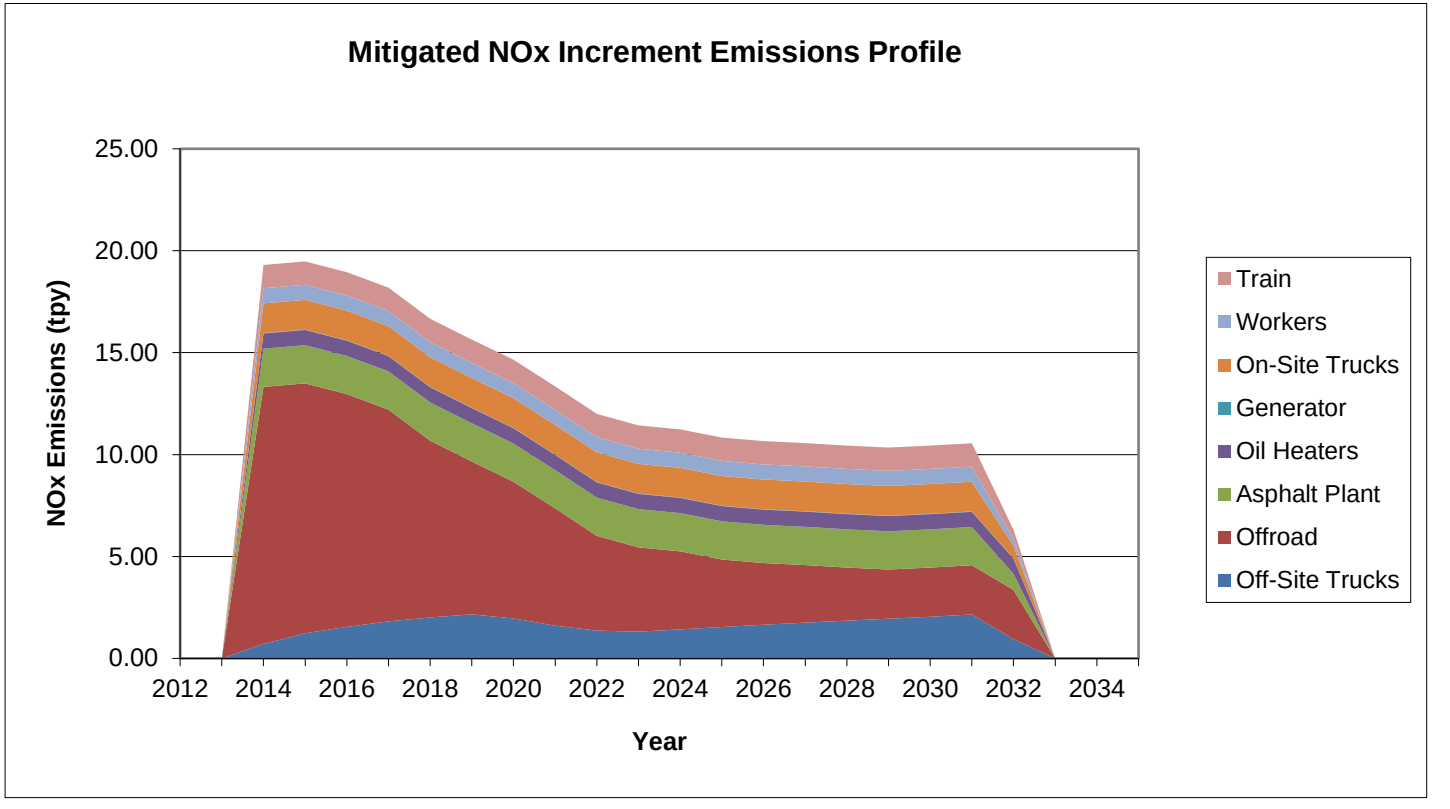
[1] PM2.5 Construction Emission is based on URBEMIS.
URBEMIS2007 emissions estimates are conservatively high as compared to OFFROAD2011.

Emissions Summary for Other Districts

	Pounds per Day					
	VOC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
MDAQMD						
Emissions (tpy)	0.02	0.16	0.09	0.00	0.01	0.01
Thresholds	25	25	100	25	15	15
Exceeds Threshold?	No	No	No	No	No	No
SCAQMD						
Emissions (lb/day)	0.48	2.4	4.2	0.03	0.30	0.27
Thresholds	55	55	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No



Emissions characteristics of off road mobile equipment and on road haul trucks change with time. OFFROAD2011 was used to determine the average engine emissions for each year of operation and equipment type / horsepower. On-road truck emissions reflect the Project's fair share of the increase in regional aggregates related transportation emissions as compared to baseline (2013) levels of aggregates related transportation emissions. Emissions of the Lowered Facilities Alternative are slightly greater due to greater on-site travel by on-road trucks and are conservatively assumed to also represent the Project.



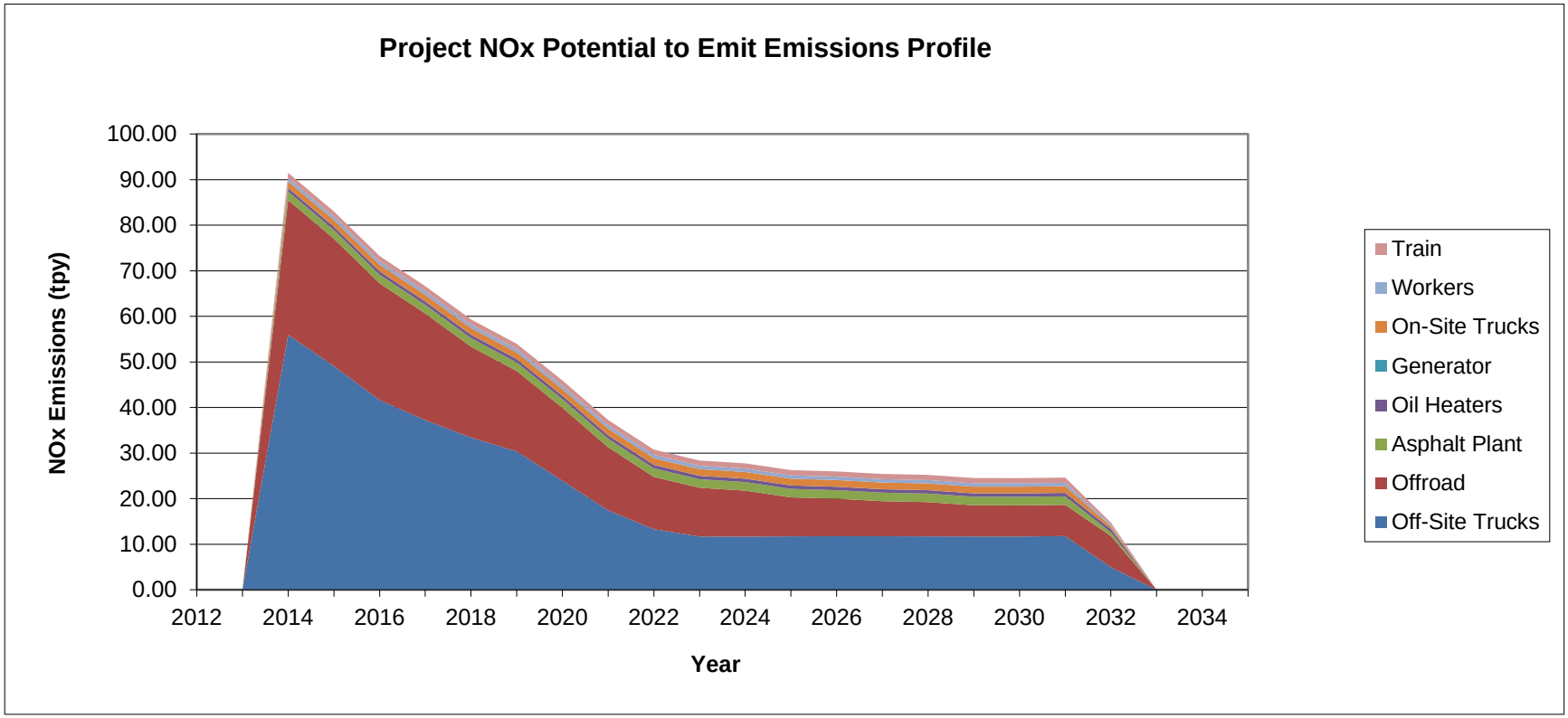
Emissions characteristics of off road mobile equipment and on road haul trucks change with time. OFFROAD2011 was used to determine the average engine emissions for each year of operation and equipment type / horsepower. On-road truck emissions reflect the Project's fair share of the increase in regional aggregates related transportation emissions as compared to baseline (2013) levels of aggregates related transportation emissions. Emissions of the Lowered Facilities Alternative are slightly greater due to greater on-site travel by on-road trucks and are conservatively assumed to also represent the Project.

Appendix I
Potential to Emit

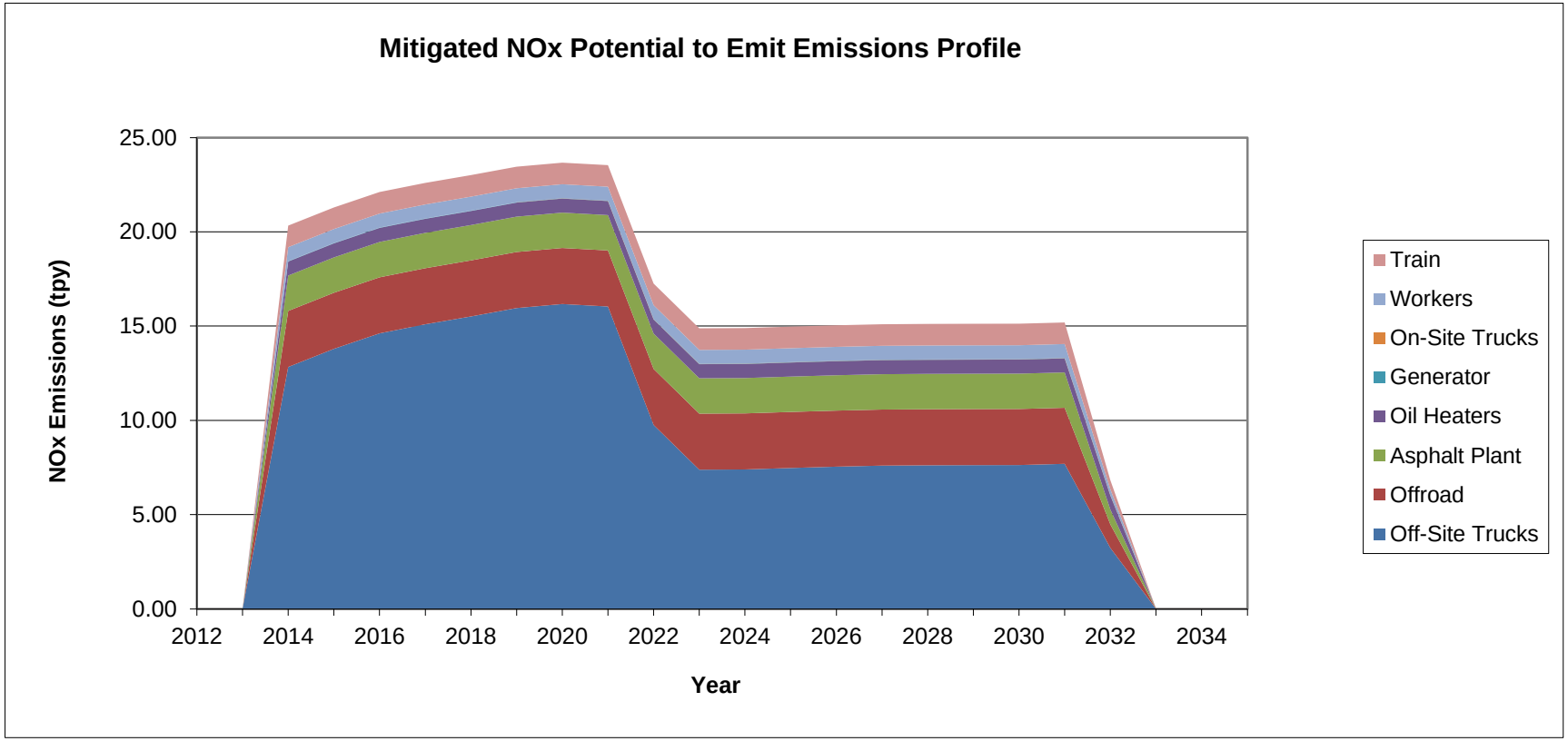
AVAQMD Potential to Emit Summary

		Tons Per Year					
Unmitigated (2014)		**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Stationary	Agg Plant					3.68	1.06
	RMC Plant					0.78	0.23
	Asphalt Plant	2.45	1.88	3.45	0.04	0.35	3.38
	Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
	VacLite					0.01	0.00
	Cement Transfer					0.10	0.03
	Generator	0.00	0.02	0.01		0.00	0.00
Mobile	Haul Trucks (off-site)	1.87	47.57	9.05	0.07	1.48	1.48
	Road Dust (off-site)	0.00	0.00	0.00	0.00	5.73	1.41
	Haul Trucks (on-site)	0.17	0.94	0.63	0.00	0.01	0.01
	Worker Commute	0.63	0.74	8.78	0.01	0.15	0.06
	Train	0.03	1.14	0.11	0.07	0.02	0.02
	Off Road	2.28	34.08	45.38	0.08	1.39	1.28
Fug	Fugitive Dust					39.51	4.66
	Total:	**7.46**	**87.11**	**67.85**	**0.28**	**53.24**	**13.65**
	Threshold	25	25	100	25	15	15

		Tons Per Year					
Mitigated (2020)		**VOC**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Stationary	Agg Plant					2.63	0.78
	RMC Plant					0.78	0.23
	Asphalt Plant	2.45	1.88	3.45	0.04	0.35	3.38
	Oil Heaters	0.03	0.75	0.43	0.01	0.03	0.03
	VacLite					0.01	0.00
	Cement Transfer					0.10	0.03
	Generator	0.00	0.02	0.01		0.00	0.00
Mobile	Haul Trucks (off-site)	1.40	16.17	6.96	0.07	0.87	0.87
	Road Dust (off-site)	0.00	0.00	0.00	0.00	5.73	1.41
	Haul Trucks (on-site)	0.17	0.94	0.63	0.00	0.01	0.01
	Worker Commute	0.63	0.74	8.78	0.01	0.15	0.06
	Train	0.03	1.14	0.11	0.07	0.02	0.02
	Off Road	0.21	2.97	6.73	0.03	0.02	0.02
Fug	Fugitive Dust					4.13	0.53
	Total:	**4.92**	**24.60**	**27.10**	**0.24**	**14.8**	**7.36**
	Threshold	25	25	100	25	15	15
	Reduction from Mitigation:	2.54	62.51	40.74	0.04	38.41	6.28
	Reduction from Mitigation:	34%	72%	60%	15%	72%	46%



Emissions characteristics of off road mobile equipment and on road haul trucks change with time. OFFROAD2011 was used to determine the average engine emissions for each year of operation and equipment type / horsepower. On-road truck emissions reflect the Project's potential to emit (PTE) which is considered to be a speculative result because it does not take into account the regional aggregates market or inelastic demand of aggregate. The Project's fair share of the increase in regional aggregates related transportation emissions as compared to baseline (2013) levels of aggregates related transportation emissions is the method used to determine incremental change in the environment due to the Project.



Emissions characteristics of off road mobile equipment and on road haul trucks change with time. OFFROAD2011 was used to determine the average engine emissions for each year of operation and equipment type / horsepower.

Haul truck emission factors also reduce over time due to developments in engine design, fuel standards, and emission standards. However, the Applicant will be using trucks with 2010 Model Year engines or better. It is assumed that the 2010 engines are used until the NOx emissions characteristics of the fleet are less than the 2010 Model Year NOx emissions at which point the Project is assumed to operate trucks that are fleet average. The fleet average NOx emissions are dramatically reduced between 2020 and 2023.

The on road and off road emissions are summed to determine the year of maximum impact. These calculations are done based on NOx emissions because NOx is the pollutant with the highest impact from diesel engines.

Potential to Emit

		Production		Emission Factors (lb/VMT)					
Project Year	Year	Tons / peak year shipped	Cumulative Tons Produced	ROG	CO	NOx	CO_2	PM_{10}	SO_2
1	2012	0	0	0.001613	0.00764	0.02976	3.85641	0.00135	3.7E-05
2	2013	0	0	0.001445	0.0069	0.02776	3.87208	0.00118	3.7E-05
3	2014	2,000,000	2,000,000	0.001012	0.0049	0.02576	3.89366	0.0008	3.7E-05
4	2015	2,000,000	4,000,000	0.00086	0.0041	0.02262	3.90768	0.00064	3.7E-05
5	2016	2,000,000	6,000,000	0.000579	0.00284	0.01918	3.91919	0.00044	3.7E-05
6	2017	2,000,000	8,000,000	0.000552	0.00273	0.01715	3.91573	0.00041	3.7E-05
7	2018	2,000,000	10,000,000	0.000561	0.00279	0.01539	3.91215	0.0004	3.7E-05
8	2019	2,000,000	12,000,000	0.000568	0.00281	0.01399	3.91819	0.0004	3.7E-05
9	2020	2,000,000	14,000,000	0.00058	0.0029	0.01102	3.91855	0.0004	3.7E-05
10	2021	2,000,000	16,000,000	0.000608	0.00305	0.00803	3.92543	0.00039	3.7E-05
11	2022	2,000,000	18,000,000	0.000645	0.00325	0.00612	3.92615	0.00039	3.7E-05
12	2023	2,000,000	20,000,000	0.000611	0.00309	0.00539	3.91992	0.00038	3.7E-05
13	2024	2,000,000	22,000,000	0.000608	0.00313	0.00537	3.89916	0.00039	3.7E-05
14	2025	2,000,000	24,000,000	0.000609	0.00314	0.0054	3.89881	0.00039	3.7E-05
15	2026	2,000,000	26,000,000	0.00061	0.00314	0.00541	3.89868	0.00039	3.7E-05
16	2027	2,000,000	28,000,000	0.00061	0.00314	0.00541	3.89862	0.00039	3.7E-05
17	2028	2,000,000	30,000,000	0.000608	0.00313	0.0054	3.89841	0.00039	3.7E-05
18	2029	2,000,000	32,000,000	0.000607	0.00313	0.00539	3.89835	0.00039	3.7E-05
19	2030	2,000,000	34,000,000	0.000607	0.00312	0.00538	3.8984	0.00039	3.7E-05
20	2031	2,000,000	36,000,000	0.000623	0.00314	0.00543	3.92329	0.00039	3.7E-05
21	2032	840,000	36,840,000	0.000622	0.00314	0.00543	3.92332	0.00039	3.7E-05
22	2033	0	36,840,000	0.000622	0.00314	0.00542	3.92328	0.00039	3.7E-05
23	2034	0	36,840,000	0.000621	0.00314	0.00542	3.9232	0.00039	3.7E-05
24	2035	0	36,840,000	0.000621	0.00314	0.00541	3.92316	0.00039	3.7E-05

Notes: It is not foreseeable that the Project would add 2,000,000 tons of product to the existing levels of production in the region but would rather substitute materials for materials produced elsewhere. Accordingly, potential to emit calculations are for disclosure purposes. Emissions factors above represent average T7 Tractor Construction for each

Potential to Emit **Haul Truck Emissions**

		Project Emissions (tpy)							AVAQMD Emissions (tpy)						
Project Year	**Year**	**PTE (VMT/yr)**	**ROG**	**CO**	**NOx**	**CO_2**	**PM_{10}**	**SO_2**	**AV Share of PTE (VMT/yr)**	**ROG**	**CO**	**NOx**	**CO_2**	**PM_{10}**	**SO_2**
1	2012	0	0	0	0	0	0	0.00	0	0.00	0.00	0.00	0	0.00	0.00
2	2013	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
3	2014	4,341,716	2.20	10.63	55.92	8453	1.74	0.08	3,693,682	1.87	9.05	47.57	7191	1.48	0.07
4	2015	4,341,716	1.87	8.89	49.10	8483	1.39	0.08	3,693,682	1.59	7.56	41.77	7217	1.18	0.07
5	2016	4,341,716	1.26	6.16	41.63	8508	0.95	0.08	3,693,682	1.07	5.24	35.42	7238	0.81	0.07
6	2017	4,341,716	1.20	5.93	37.22	8500	0.88	0.08	3,693,682	1.02	5.04	31.67	7232	0.75	0.07
7	2018	4,341,716	1.22	6.06	33.40	8493	0.88	0.08	3,693,682	1.04	5.16	28.41	7225	0.75	0.07
8	2019	4,341,716	1.23	6.11	30.36	8506	0.87	0.08	3,693,682	1.05	5.20	25.83	7236	0.74	0.07
9	2020	4,341,716	1.26	6.29	23.92	8507	0.87	0.08	3,693,682	1.07	5.35	20.35	7237	0.74	0.07
10	2021	4,341,716	1.32	6.63	17.43	8522	0.85	0.08	3,693,682	1.12	5.64	14.82	7250	0.73	0.07
11	2022	4,341,716	1.40	7.05	13.29	8523	0.84	0.08	3,693,682	1.19	6.00	11.31	7251	0.72	0.07
12	2023	4,341,716	1.33	6.71	11.69	8510	0.83	0.08	3,693,682	1.13	5.71	9.95	7239	0.71	0.07
13	2024	4,341,716	1.32	6.79	11.66	8465	0.85	0.08	3,693,682	1.12	5.78	9.92	7201	0.72	0.07
14	2025	4,341,716	1.32	6.81	11.72	8464	0.85	0.08	3,693,682	1.13	5.79	9.97	7200	0.72	0.07
15	2026	4,341,716	1.32	6.82	11.76	8463	0.85	0.08	3,693,682	1.13	5.80	10.00	7200	0.73	0.07
16	2027	4,341,716	1.32	6.81	11.75	8463	0.85	0.08	3,693,682	1.13	5.80	9.99	7200	0.73	0.07
17	2028	4,341,716	1.32	6.80	11.71	8463	0.85	0.08	3,693,682	1.12	5.78	9.97	7200	0.72	0.07
18	2029	4,341,716	1.32	6.79	11.69	8463	0.85	0.08	3,693,682	1.12	5.77	9.95	7200	0.72	0.07
19	2030	4,341,716	1.32	6.78	11.68	8463	0.85	0.08	3,693,682	1.12	5.77	9.94	7200	0.72	0.07
20	2031	4,341,716	1.35	6.83	11.79	8517	0.85	0.08	3,693,682	1.15	5.81	10.03	7246	0.72	0.07
21	2032	1,823,521	0.57	2.87	4.95	3577	0.36	0.03	1,551,347	0.48	2.44	4.21	3043	0.30	0.03
22	2033	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
23	2034	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
24	2035	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
			2.20	**10.63**	**55.92**	**8523.12**	**1.74**	**0.08**		**1.87**	**9.05**	**47.57**	**7250.98**	**1.48**	**0.07**

Assumptions:

See traffic calculations for derivation of the following:

2.17 VMT/ton produced by the Project in all air districts.

1.85 VMT/ton produced by the Project that occurs within AVAQMD.

Potential to Emit **Haul Truck Emissions**

Project Year	Year	MDAQMD Emissions (tpy)							SCAQMD Emissions (lb/day)						
		MD Share of PTE (VMT/yr)	ROG	CO	NOx	CO_2	PM_{10}	SO_2	SC Share of PTE (VMT/day)	ROG	CO	NOx	CO_2	PM_{10}	SO_2
1	2012	0	0.00	0.00	0.00	0	0.00	0.00	0	0.0	0.0	0	0	0.0	0.0
2	2013	0	0.00	0.00	0.00	0	0.00	0.00	0	0.0	0.0	0	0	0.0	0.0
3	2014	280,205	0.14	0.69	3.61	546	0.11	0.01	3,552	3.6	17.4	91	13,829	2.8	0.1
4	2015	280,205	0.12	0.57	3.17	547	0.09	0.01	3,552	3.1	14.5	80	13,879	2.3	0.1
5	2016	280,205	0.08	0.40	2.69	549	0.06	0.01	3,552	2.1	10.1	68	13,920	1.6	0.1
6	2017	280,205	0.08	0.38	2.40	549	0.06	0.01	3,552	2.0	9.7	61	13,908	1.4	0.1
7	2018	280,205	0.08	0.39	2.16	548	0.06	0.01	3,552	2.0	9.9	55	13,895	1.4	0.1
8	2019	280,205	0.08	0.39	1.96	549	0.06	0.01	3,552	2.0	10.0	50	13,917	1.4	0.1
9	2020	280,205	0.08	0.41	1.54	549	0.06	0.01	3,552	2.1	10.3	39	13,918	1.4	0.1
10	2021	280,205	0.09	0.43	1.12	550	0.06	0.01	3,552	2.2	10.8	29	13,942	1.4	0.1
11	2022	280,205	0.09	0.46	0.86	550	0.05	0.01	3,552	2.3	11.5	22	13,945	1.4	0.1
12	2023	280,205	0.09	0.43	0.75	549	0.05	0.01	3,552	2.2	11.0	19	13,923	1.4	0.1
13	2024	280,205	0.09	0.44	0.75	546	0.05	0.01	3,552	2.2	11.1	19	13,849	1.4	0.1
14	2025	280,205	0.09	0.44	0.76	546	0.05	0.01	3,552	2.2	11.1	19	13,848	1.4	0.1
15	2026	280,205	0.09	0.44	0.76	546	0.06	0.01	3,552	2.2	11.2	19	13,847	1.4	0.1
16	2027	280,205	0.09	0.44	0.76	546	0.06	0.01	3,552	2.2	11.1	19	13,847	1.4	0.1
17	2028	280,205	0.09	0.44	0.76	546	0.05	0.01	3,552	2.2	11.1	19	13,846	1.4	0.1
18	2029	280,205	0.09	0.44	0.75	546	0.05	0.01	3,552	2.2	11.1	19	13,846	1.4	0.1
19	2030	280,205	0.09	0.44	0.75	546	0.05	0.01	3,552	2.2	11.1	19	13,846	1.4	0.1
20	2031	280,205	0.09	0.44	0.76	550	0.05	0.01	3,552	2.2	11.2	19	13,935	1.4	0.1
21	2032	117,686	0.04	0.19	0.32	231	0.02	0.00	3,552	2.2	11.2	19	13,935	1.4	0.1
22	2033	0	0.00	0.00	0.00	0	0.00	0.00	0	0.0	0.0	0	0	0.0	0.0
23	2034	0	0.00	0.00	0.00	0	0.00	0.00	0	0.0	0.0	0	0	0.0	0.0
24	2035	0	0.00	0.00	0.00	0	0.00	0.00	0	0.0	0.0	0	0	0.0	0.0
			0.14	**0.69**	**3.61**	**550**	**0.11**	**0.01**		**3.59**	**17.40**	**91.49**	**13944.90**	**2.85**	**0.13**

Assumptions:

See traffic calculations for derivation of the following:

0.14 VMT/ton produced by the Project that occurs within MDAQMD assuming 100% of materials traveling east.

100% of loads travel west and into SCAQMD an average distance of 11.8 miles each on the peak day.

Potential to Emit **Mitigated Haul Truck Emissions**

		Production		Emission Factors (lb/VMT)					
Project Year	**Year**	**Tons / peak year shipped**	**Cumulative Tons Produced**	**ROG**	**CO**	**NOx**	**CO_2**	**PM_{10}**	**SO_2**
1	2012	0	0						
2	2013	0	0	0.000502	0.00252	0.00653	3.75497	0.0004	3.6E-05
3	2014	2,000,000	2,000,000	0.000526	0.00266	0.00695	3.73951	0.00041	3.6E-05
4	2015	2,000,000	4,000,000	0.000583	0.00289	0.00747	3.72623	0.00042	3.6E-05
5	2016	2,000,000	6,000,000	0.000633	0.00317	0.00791	3.71826	0.00043	3.7E-05
6	2017	2,000,000	8,000,000	0.000663	0.00332	0.00817	3.66379	0.00044	3.7E-05
7	2018	2,000,000	10,000,000	0.000695	0.00348	0.0084	3.60981	0.00045	3.7E-05
8	2019	2,000,000	12,000,000	0.000732	0.00363	0.00864	3.56329	0.00046	3.7E-05
9	2020	2,000,000	14,000,000	0.000759	0.00377	0.00875	3.48827	0.00047	3.7E-05
10	2021	2,000,000	16,000,000	0.000482	0.00243	0.00868	3.54286	0.00035	3.8E-05
11	2022	2,000,000	18,000,000	0.000559	0.00283	0.00528	3.54615	0.00034	3.8E-05
12	2023	2,000,000	20,000,000	0.000524	0.00267	0.004	3.53624	0.00034	3.7E-05
13	2024	2,000,000	22,000,000	0.000522	0.0027	0.004	3.5163	0.00034	3.7E-05
14	2025	2,000,000	24,000,000	0.000523	0.00271	0.00405	3.51486	0.00035	3.7E-05
15	2026	2,000,000	26,000,000	0.000525	0.00272	0.00408	3.51404	0.00035	3.7E-05
16	2027	2,000,000	28,000,000	0.000528	0.00273	0.00411	3.5139	0.00035	3.7E-05
17	2028	2,000,000	30,000,000	0.000529	0.00274	0.00412	3.51413	0.00035	3.7E-05
18	2029	2,000,000	32,000,000	0.000529	0.00274	0.00413	3.51458	0.00035	3.7E-05
19	2030	2,000,000	34,000,000	0.00053	0.00274	0.00413	3.51506	0.00035	3.7E-05
20	2031	2,000,000	36,000,000	0.000543	0.00276	0.00417	3.53763	0.00035	3.8E-05
21	2032	840,000	36,840,000	0.000543	0.00276	0.00417	3.53792	0.00035	3.8E-05
22	2033	0	36,840,000	0.000543	0.00276	0.00417	3.53816	0.00035	3.8E-05
23	2034	0	36,840,000	0.000544	0.00277	0.00418	3.53837	0.00035	3.8E-05
24	2035	0	36,840,000	0.000544	0.00277	0.00418	3.53857	0.00035	3.8E-05
25	2036	0	36,840,000	0.000544	0.00314	0.00541	3.92316	0.00039	3.7E-05

Notes: It is not foreseeable that the Project would add 2,000,000 tons of product to the existing levels of production in the region but would rather substitute materials for materials produced elsewhere. Accordingly, potential to emit calculations are for disclosure purposes. Emissions factors above represent model year 2010 or better trucks.

Potential to Emit **Mitigated Haul Truck Emissions**

		Project Emissions (tpy)							AVAQMD Emissions (tpy)						
Project Year	**Year**	**PTE (VMT/yr)**	**ROG**	**CO**	**NOx**	**CO_2**	**PM_{10}**	**SO_2**	**AV Share of PTE (VMT/yr)**	**ROG**	**CO**	**NOx**	**CO_2**	**PM_{10}**	**SO_2**
1	2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2014	4,341,716	1.14	5.77	15.08	8118	0.88	0.08	3,693,682	0.97	4.91	12.83	6906	0.75	0.07
4	2015	4,341,716	1.26	6.27	16.21	8089	0.91	0.08	3,693,682	1.08	5.34	13.79	6882	0.78	0.07
5	2016	4,341,716	1.37	6.87	17.18	8072	0.93	0.08	3,693,682	1.17	5.85	14.61	6867	0.79	0.07
6	2017	4,341,716	1.44	7.20	17.74	7954	0.95	0.08	3,693,682	1.22	6.13	15.09	6766	0.81	0.07
7	2018	4,341,716	1.51	7.55	18.23	7836	0.98	0.08	3,693,682	1.28	6.42	15.51	6667	0.83	0.07
8	2019	4,341,716	1.59	7.89	18.75	7735	1.00	0.08	3,693,682	1.35	6.71	15.96	6581	0.85	0.07
9	2020	4,341,716	1.65	8.18	19.00	7573	1.02	0.08	3,693,682	1.40	6.96	16.17	6442	0.87	0.07
10	2021	4,341,716	1.05	5.28	18.85	7691	0.76	0.08	3,693,682	0.89	4.49	16.04	6543	0.65	0.07
11	2022	4,341,716	1.21	6.15	11.47	7698	0.74	0.08	3,693,682	1.03	5.23	9.75	6549	0.63	0.07
12	2023	4,341,716	1.14	5.81	8.68	7677	0.73	0.08	3,693,682	0.97	4.94	7.38	6531	0.63	0.07
13	2024	4,341,716	1.13	5.87	8.69	7633	0.75	0.08	3,693,682	0.96	4.99	7.39	6494	0.64	0.07
14	2025	4,341,716	1.14	5.88	8.78	7630	0.75	0.08	3,693,682	0.97	5.00	7.47	6491	0.64	0.07
15	2026	4,341,716	1.14	5.90	8.87	7628	0.75	0.08	3,693,682	0.97	5.02	7.54	6490	0.64	0.07
16	2027	4,341,716	1.15	5.93	8.93	7628	0.76	0.08	3,693,682	0.97	5.04	7.60	6490	0.64	0.07
17	2028	4,341,716	1.15	5.94	8.95	7629	0.76	0.08	3,693,682	0.98	5.05	7.62	6490	0.64	0.07
18	2029	4,341,716	1.15	5.95	8.96	7630	0.76	0.08	3,693,682	0.98	5.06	7.62	6491	0.64	0.07
19	2030	4,341,716	1.15	5.95	8.97	7631	0.76	0.08	3,693,682	0.98	5.07	7.63	6492	0.64	0.07
20	2031	4,341,716	1.18	5.99	9.04	7680	0.76	0.08	3,693,682	1.00	5.10	7.69	6533	0.64	0.07
21	2032	1,823,521	0.49	2.52	3.80	3226	0.32	0.03	1,551,347	0.42	2.14	3.23	2744	0.27	0.03
22	2033	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
23	2034	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
24	2035	0	0.00	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00
25	2036	0	0.00	0.00	0.00	0	0.00	0.00	0	0	0	0	0	0	0
			1.65	**8.18**	**19.00**	**8117.94**	**1.02**	**0.08**		**1.40**	**6.96**	**16.17**	**6906**	**0.87**	**0.07**

Assumptions:

See traffic calculations for derivation of the following:

2.17 VMT/ton produced by the Project in all air districts.

1.85 VMT/ton produced by the Project that occurs within AVAQMD.

Potential to Emit **Mitigated Haul Truck Emissions**

		MDAQMD Emissions (tpy)							SCAQMD Emissions (lb/day)							
Project Year	**Year**	**MD Share of PTE (VMT/yr)**	**ROG**	**CO**	**NOx**	**CO_2**	**PM_{10}**	**SO_2**	**Loads per Day**	**SC Share of PTE (VMT/day)**	**ROG**	**CO**	**NOx**	**CO_2**	**PM_{10}**	**SO_2**
1	2012	0	0.00	0.00	0.00	0	0.00	0.00	0	0	0.0	0.0	0	0	0.0	0.0
2	2013	0	0.00	0.00	0.00	0	0.00	0.00	0	0	0.0	0.0	0	0	0.0	0.0
3	2014	280,205	0.07	0.37	0.97	524	0.06	0.01	301	3,552	1.9	9.4	25	13,282	1.4	0.1
4	2015	280,205	0.08	0.40	1.05	522	0.06	0.01	301	3,552	2.1	10.3	27	13,235	1.5	0.1
5	2016	280,205	0.09	0.44	1.11	521	0.06	0.01	301	3,552	2.2	11.2	28	13,207	1.5	0.1
6	2017	280,205	0.09	0.46	1.15	513	0.06	0.01	301	3,552	2.4	11.8	29	13,013	1.6	0.1
7	2018	280,205	0.10	0.49	1.18	506	0.06	0.01	301	3,552	2.5	12.4	30	12,821	1.6	0.1
8	2019	280,205	0.10	0.51	1.21	499	0.06	0.01	301	3,552	2.6	12.9	31	12,656	1.6	0.1
9	2020	280,205	0.11	0.53	1.23	489	0.07	0.01	301	3,552	2.7	13.4	31	12,390	1.7	0.1
10	2021	280,205	0.07	0.34	1.22	496	0.05	0.01	301	3,552	1.7	8.6	31	12,584	1.2	0.1
11	2022	280,205	0.08	0.40	0.74	497	0.05	0.01	301	3,552	2.0	10.1	19	12,595	1.2	0.1
12	2023	280,205	0.07	0.37	0.56	495	0.05	0.01	301	3,552	1.9	9.5	14	12,560	1.2	0.1
13	2024	280,205	0.07	0.38	0.56	493	0.05	0.01	301	3,552	1.9	9.6	14	12,489	1.2	0.1
14	2025	280,205	0.07	0.38	0.57	492	0.05	0.01	301	3,552	1.9	9.6	14	12,484	1.2	0.1
15	2026	280,205	0.07	0.38	0.57	492	0.05	0.01	301	3,552	1.9	9.7	15	12,481	1.2	0.1
16	2027	280,205	0.07	0.38	0.58	492	0.05	0.01	301	3,552	1.9	9.7	15	12,481	1.2	0.1
17	2028	280,205	0.07	0.38	0.58	492	0.05	0.01	301	3,552	1.9	9.7	15	12,481	1.2	0.1
18	2029	280,205	0.07	0.38	0.58	492	0.05	0.01	301	3,552	1.9	9.7	15	12,483	1.2	0.1
19	2030	280,205	0.07	0.38	0.58	492	0.05	0.01	301	3,552	1.9	9.7	15	12,485	1.2	0.1
20	2031	280,205	0.08	0.39	0.58	496	0.05	0.01	301	3,552	1.9	9.8	15	12,565	1.2	0.1
21	2032	117,686	0.03	0.16	0.25	208	0.02	0.00	301	3,552	1.9	9.8	15	12,566	1.2	0.1
22	2033	0	0.00	0.00	0.00	0	0.00	0.00	301	3,552	1.9	9.8	15	12,567	1.2	0.1
23	2034	0	0.00	0.00	0.00	0	0.00	0.00	301	3,552	1.9	9.8	15	12,568	1.2	0.1
24	2035	0	0.00	0.00	0.00	0	0.00	0.00	301	3,552	1.9	9.8	15	12,568	1.2	0.1
25	2036	0	0.00	0.00	0.00	0	0.00	0.00	301	3,552	1.9	11.1	19	13,934	1.4	0.1
			0.11	**0.53**	**1.23**	**523.91**	**0.07**	**0.01**			**2.70**	**13.38**	**31.09**	**13934.27**	**1.67**	**0.13**

Assumptions:

See traffic calculations for derivation of the following:

0.14 VMT/ton produced by the Project that occurs within MDAQMD assuming 100% of materials traveling east.

100% of loads travel west and into SCAQMD an average distance of 11.8 miles each on the peak day.

Super-Mitigated Off-Road (Non-Road) Emissions Calculations to be Assessed in Potential to Emit Calculations

						VOC		NOx		CO		PM_{10}		$PM_{2.5}$[4]	CO2	N2O	CH4	CO2e
Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	EF[3] (g/hp-hr)	Emiss. (tpy)	EF[3] (g/hp-hr)	Emiss. (tpy)	EF[3] (g/hp-hr)	Emiss. (tpy)	EF[3] (g/hp-hr)	Emiss. (tpy)	Emiss. (tpy)	(MT)	(MT)	(MT)	(MT)
2012	TOTAL	19,013	5,760,955		0.2939	0.11	0.20	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2013	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2014	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2015	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2016	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2017	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2018	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2019	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2020	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2021	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2022	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2023	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2024	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2025	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2026	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2027	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2028	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2029	TOTAL	19,013	5,760,955		0.2939	0.11	0.21	1.59	2.97	3.60	6.73	0.01	0.019	0.019	1,147	0.03	0.07	1,157
2012	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2013	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2014	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2015	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2016	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2017	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2018	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2019	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2020	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2021	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2022	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2023	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2024	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2025	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2026	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2027	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2028	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24
2029	140 H Grader	2.0	606	185	0.4087	0.08	0.00	1.29	0.07	2.60	0.13	0.008	0.000	0.000	24.2	0.0006	0.0014	24

Super-Mitigated Off-Road (Non-Road) Emissions Calculations to be Assessed in Potential to Emit Calculations

Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	VOC EF[3] (g/hp-hr)	VOC Emiss. (tpy)	NOx EF[3] (g/hp-hr)	NOx Emiss. (tpy)	CO EF[3] (g/hp-hr)	CO Emiss. (tpy)	PM_{10} EF[3] (g/hp-hr)	PM_{10} Emiss. (tpy)	$PM_{2.5}$[4] Emiss. (tpy)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2012	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2013	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2014	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2015	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2016	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2017	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2018	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2019	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2020	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2021	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2022	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2023	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2024	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2025	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2026	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2027	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2028	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2029	980G Loader (Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2012	980G Loader (HMA)	2.0	615	414	0.3618	0.08	0.01	1.29	0.13	2.60	0.26	0.008	0.001	0.001	48.7	0.0012	0.0028	49
2013	980G Loader (HMA)	2.0	615	414	0.3618	0.08	0.01	1.29	0.13	2.60	0.26	0.008	0.001	0.001	48.7	0.0012	0.0028	49
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2012	Water Truck	8.0	2,424	330	0.3819	0.08	0.03	1.29	0.43	2.60	0.88	0.008	0.003	0.003	161.4	0.0041	0.0092	163
2013	Water Truck	8.0	2,424	330	0.3819	0.08	0.03	1.29	0.43	2.60	0.88	0.008	0.003	0.003	161.4	0.0041	0.0092	163
2014	Water Truck	8.0	2,424	330	0.3819	0.08	0.03	1.29	0.43	2.60	0.88	0.008	0.003	0.003	161.4	0.0041	0.0092	163
2015	Water Truck	8.0	2,424	330	0.3819	0.08	0.03	1.29	0.43	2.60	0.88	0.008	0.003	0.003	161.4	0.0041	0.0092	163
2016	Water Truck	8.0	2,424	330	0.3819	0.08	0.03	1.29	0.43	2.60	0.88	0.008	0.003	0.003	161.4	0.0041	0.0092	163
2017	Water Truck	8.0	2,424	330	0.3819	0.08	0.03	1.29	0.43	2.60	0.88	0.008	0.003	0.003	161.4	0.0041	0.0092	163
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2012	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2013	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2014	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2015	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2016	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2017	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2018	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2019	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2020	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2021	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2022	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2023	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
2024	Street Sweeper	2.0	606	320	0.4556	0.14	0.01	0.13	0.01	7.80	0.76	0.002	0.000	0.000	46.7	0.0012	0.0027	47
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2012	Hitachi 850	6.2	1,872	460	0.3819	0.08	0.03	1.29	0.47	2.60	0.94	0.008	0.003	0.003	173.7	0.0045	0.0099	175
2013	Hitachi 850	6.2	1,872	460	0.3819	0.08	0.03	1.29	0.47	2.60	0.94	0.008	0.003	0.003	173.7	0.0045	0.0099	175
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2012	966G Loader (RMC)	4.6	1,397	330	0.3618	0.08	0.01	1.29	0.24	2.60	0.48	0.008	0.001	0.001	88.2	0.0023	0.0050	89
2013	966G Loader (RMC)	4.6	1,397	330	0.3618	0.08	0.01	1.29	0.24	2.60	0.48	0.008	0.001	0.001	88.2	0.0023	0.0050	89
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2012	Dragline	4.0	1,212	362	0.4288	0.08	0.02	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2013	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
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2021	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2022	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2023	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2024	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2025	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2026	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2027	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2028	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2029	Dragline	4.0	1,212	362	0.4288	0.14	0.03	1.29	0.27	2.60	0.54	0.008	0.002	0.002	99.4	0.0025	0.0057	100
2012	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2013	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2014	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2015	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2016	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2017	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2018	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2019	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2020	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2021	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2022	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2023	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2024	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2025	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2026	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2027	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2028	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255
2029	980G Loader (Pit Agg)	10.5	3,188	414	0.3618	0.08	0.04	1.29	0.68	2.60	1.37	0.008	0.004	0.004	252.3	0.0065	0.0144	255

Super-Mitigated Off-Road (Non-Road) Emissions Calculations to be Assessed in Potential to Emit Calculations

						VOC		NOx		CO		PM_{10}		$PM_{2.5}$[4]	CO2	N2O	CH4	CO2e
Calendar Year	Activity/Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Avg. Load Factor[2]	EF[3] (g/hp-hr)	Emiss. (tpy)	EF[3] (g/hp-hr)	Emiss. (tpy)	EF[3] (g/hp-hr)	Emiss. (tpy)	EF[3] (g/hp-hr)	Emiss. (tpy)	Emiss. (tpy)	(MT)	(MT)	(MT)	(MT)
2012	773 Truck	0.0	0	740	0.3819	0.48	0.00	6.85	0.00	8.50	0.00	0.29	0.00	0.00	0.0	0.0000	0.0000	0
2013	773 Truck	0.0	0	740	0.3819	0.47	0.00	6.58	0.00	8.50	0.00	0.28	0.00	0.00	0.0	0.0000	0.0000	0
2014	773 Truck	0.0	0	740	0.3819	0.42	0.00	5.84	0.00	8.50	0.00	0.24	0.00	0.00	0.0	0.0000	0.0000	0
2015	773 Truck	0.0	0	740	0.3819	0.39	0.00	5.37	0.00	8.50	0.00	0.22	0.00	0.00	0.0	0.0000	0.0000	0
2016	773 Truck	0.0	0	740	0.3819	0.36	0.00	4.88	0.00	8.50	0.00	0.20	0.00	0.00	0.0	0.0000	0.0000	0
2017	773 Truck	0.0	0	740	0.3819	0.34	0.00	4.48	0.00	8.50	0.00	0.18	0.00	0.00	0.0	0.0000	0.0000	0
2018	773 Truck	0.0	0	740	0.3819	0.30	0.00	3.88	0.00	8.50	0.00	0.15	0.00	0.00	0.0	0.0000	0.0000	0
2019	773 Truck	0.0	0	740	0.3819	0.28	0.00	3.50	0.00	8.50	0.00	0.14	0.00	0.00	0.0	0.0000	0.0000	0
2020	773 Truck	0.0	0	740	0.3819	0.27	0.00	3.22	0.00	8.50	0.00	0.13	0.00	0.00	0.0	0.0000	0.0000	0
2021	773 Truck	0.0	0	740	0.3819	0.26	0.00	2.81	0.00	8.50	0.00	0.11	0.00	0.00	0.0	0.0000	0.0000	0
2022	773 Truck	0.0	0	740	0.3819	0.23	0.00	2.38	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2023	773 Truck	0.0	0	740	0.3819	0.23	0.00	2.29	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2024	773 Truck	0.0	0	740	0.3819	0.22	0.00	2.19	0.00	8.50	0.00	0.08	0.00	0.00	0.0	0.0000	0.0000	0
2025	773 Truck	0.0	0	740	0.3819	0.20	0.00	1.83	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2026	773 Truck	0.0	0	740	0.3819	0.21	0.00	1.82	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2027	773 Truck	0.0	0	740	0.3819	0.20	0.00	1.70	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2028	773 Truck	0.0	0	740	0.3819	0.21	0.00	1.73	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2029	773 Truck	0.0	0	740	0.3819	0.19	0.00	1.55	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2012	773 Truck	0.0	0	740	0.3819	0.48	0.00	6.85	0.00	8.50	0.00	0.29	0.00	0.00	0.0	0.0000	0.0000	0
2013	773 Truck	0.0	0	740	0.3819	0.47	0.00	6.58	0.00	8.50	0.00	0.28	0.00	0.00	0.0	0.0000	0.0000	0
2014	773 Truck	0.0	0	740	0.3819	0.42	0.00	5.84	0.00	8.50	0.00	0.24	0.00	0.00	0.0	0.0000	0.0000	0
2015	773 Truck	0.0	0	740	0.3819	0.39	0.00	5.37	0.00	8.50	0.00	0.22	0.00	0.00	0.0	0.0000	0.0000	0
2016	773 Truck	0.0	0	740	0.3819	0.36	0.00	4.88	0.00	8.50	0.00	0.20	0.00	0.00	0.0	0.0000	0.0000	0
2017	773 Truck	0.0	0	740	0.3819	0.34	0.00	4.48	0.00	8.50	0.00	0.18	0.00	0.00	0.0	0.0000	0.0000	0
2018	773 Truck	0.0	0	740	0.3819	0.30	0.00	3.88	0.00	8.50	0.00	0.15	0.00	0.00	0.0	0.0000	0.0000	0
2019	773 Truck	0.0	0	740	0.3819	0.28	0.00	3.50	0.00	8.50	0.00	0.14	0.00	0.00	0.0	0.0000	0.0000	0
2020	773 Truck	0.0	0	740	0.3819	0.27	0.00	3.22	0.00	8.50	0.00	0.13	0.00	0.00	0.0	0.0000	0.0000	0
2021	773 Truck	0.0	0	740	0.3819	0.26	0.00	2.81	0.00	8.50	0.00	0.11	0.00	0.00	0.0	0.0000	0.0000	0
2022	773 Truck	0.0	0	740	0.3819	0.23	0.00	2.38	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2023	773 Truck	0.0	0	740	0.3819	0.23	0.00	2.29	0.00	8.50	0.00	0.09	0.00	0.00	0.0	0.0000	0.0000	0
2024	773 Truck	0.0	0	740	0.3819	0.22	0.00	2.19	0.00	8.50	0.00	0.08	0.00	0.00	0.0	0.0000	0.0000	0
2025	773 Truck	0.0	0	740	0.3819	0.20	0.00	1.83	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2026	773 Truck	0.0	0	740	0.3819	0.21	0.00	1.82	0.00	8.50	0.00	0.07	0.00	0.00	0.0	0.0000	0.0000	0
2027	773 Truck	0.0	0	740	0.3819	0.20	0.00	1.70	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2028	773 Truck	0.0	0	740	0.3819	0.21	0.00	1.73	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0
2029	773 Truck	0.0	0	740	0.3819	0.19	0.00	1.55	0.00	8.50	0.00	0.06	0.00	0.00	0.0	0.0000	0.0000	0

0.367	lb/hp-hr
2000	lb/ton
453.59237	g/lb
2205	lb/MT
7.05	lb/gal diesel
1000	kg/MT

[1] Horsepowers based on engine specs provided by Applicant.

[2] Load factors are from OFFROAD2011.

[3] Emissions factors are CalEEMod defaults (User Manual Appendix D, Table 3.5) for interim Tier 4 on most units and natural gas sweeper. Emissions factors for the Project fleet by year incorporate load factor.

[4] All PM10 is assumed to be PM2.5.

Emission F	AR GRPv3.1	Table #	GWP
10.15	kg CO2/gal	C.3	1
0.26	g N2O/gal	C.6	310
0.58	g CH4/gal	C.6	21

TRAFFIC - POTENTIAL TO EMIT CALCULATIONS

Potential VMT per ton Produced

		Peak Year	#/trip	loads/yr	VMT/load	TOTAL VMT/yr	VMT/yr in AVAQMD	VMT/yr in MDAQMD	VMT in SCAQMD
Aggregate	Tons Produced	2,000,000							
Aggregate	Tons Shipped	1,354,325	29	46,701	51.06	2,384,546	1,925,944	280,205	178,397
RMC	Total CY	225,000	10	22,500	29.4	661,500	661,500	-	-
RMC	Total Tons	452,700				-			
RMC	Agg Tons	369,675				-			
RMC	Cement	55,238	29	1,905	29.4	55,999	55,999	-	-
RMC	Flyash/SCM/Admix.	8,213	29	283					
RMC	Water	19,575				-			
HMA	Total Tons	300,000	15	20,000	29.4	588,000	588,000	-	-
HMA	Agg Tons	276,000				-			
HMA	Oil Tons	24,000	29	828	55	45,517	28,601	-	16,916
Cement	Tons Shipped	244,763	29	8,440	55	464,205	291,689	-	172,515
Service/Fuel	Trips	4,545	1	4,545	29.4	133,623	133,623	-	-
			TOTAL	105,201		4,333,390	3,685,357	280,205	367,829
					Project Fleet (Agg., HMA, RMC):	4,098,251	3,467,133	280,205	350,913
					Non-Project Owned (Cement, oil, fuel):	235,140	218,224	-	16,916
					Percentage of Non-Project Owned Truck VMT	5.4%	5.9%	0.0%	4.6%

Effective Roundtrip Distance Traveled per Load

	Fraction	Avg. (mi)	AV (mi)	MD (mi)	SC (mi)
Westbound	80%	55	43.2	0	11.8
Eastbound	20%	35.3	33.4	30	-5.62
		51.06	41.2	6.0	3.8

loads/day	VMT/day in SCAQMD
301	3551.8

SCAQMD miles are negative going east because the average trip does not enter the District. SCAQMD is assessed assuming 100% of peak day loads (i.e. 301) head west traveling an average of 55 miles of which 11.8 miles is within SCAQMD.

VMT/ton Produced within Each Air Di:	Average	AV	MD	SC
VMT per Average Roundtrip	51.06	35.0	6	6.57
VMT per tons produced (VMT/ton)	**2.17**	**1.84**	**0.14**	**0.18**

Super-Mitigated Lowered Facilities Alternative - On-site Haul Truck Running Emissions to be Assessed in Potential to Emit Calculations

	Acivity (trucks/yr)	Length (m)	Distance (VMT/yr)	ROG	CO	NOx	CO2	PM10	SOx
				Emissions (tpy)					
ENTRY - ALL	105,201	431	56,325	0.07	0.18	0.43	165.33	0.006	0.00
AGG	46,701	193	11,197	0.01	0.04	0.09	32.86	0.001	0.00
HMA	20,828	100	2,587	0.00	0.01	0.02	7.59	0.000	0.00
RECYC	-	146	-	-	-	-	-	-	-
QUEUE	8,440	358	3,753	0.00	0.01	0.03	11.02	0.000	0.00
TOTAL			73,863	0.10	0.23	0.56	216.81	0.008	0.0021

Note: RMC plant is located adjacent to the entry and so no additional distance is traveled by RMC trucks.

On-site Haul Truck Idling Emissions

Activity (Each truck idles 5 minutes)			Emissions Units	HC	CO	NOx	PM	CO2
	idle-hr/yr	8,767	tpy	0.071	0.403	0.37	0.001	67
	idle-hr/day	25.08	lb/day	0.409	2.307	2.12	0.006	385
	idle-hr/hr	5.98	lb/hr	0.098	0.550	0.51	0.001	92

Emissions Factors (EMFAC2011)

Engine Model	15 mph Running (lb/VMT)						Idling (g/idle-hr)				
Year	ROG	CO	NOx	CO2	PM10	SOx	ROG	CO	NOx	PM	CO2
2010	0.0026	0.0063	0.0153	5.87	0.00023	5.74E-05	7.40	41.72	38.41	0.11	6,965

Mitigated Aggregate Plant Emissions

Description	% of Total	Throughput (tpy)	Emission Factor[1] (lb/ton)	Annual PM_{10} (tpy)	Annual $PM_{2.5}$[2] (tpy)
Hopper to conveyor	100%	2,500,000	0.000046	0.058	0.02
Conveyor to crusher	100%	2,500,000	0.000046	0.058	0.02
Jaw crushing	100%	2,500,000	0.000540	0.675	0.20
Conveyor to conveyor	100%	2,500,000	0.000046	0.058	0.02
Conveyor to storage pile	100%	2,500,000	0.000046	0.058	0.02
Storage pile to conveyor (underground)	100%	2,500,000	0.000000	0.000	0.00
Conveyor to screen	100%	2,500,000	0.000046	0.058	0.02
Screening (bh)	130%	3,250,000	0.000518	0.841	0.25
Conveyor to crusher	30%	750,000	0.000046	0.017	0.01
Crushing (bh)	30%	750,000	0.000143	0.054	0.02
Conveyor to screen	30%	750,000	0.000046	0.017	0.01
Conveyor to screen	60%	1,500,000	0.000046	0.035	0.01
Screening (bh)	60%	1,500,000	0.000518	0.388	0.12
Conveyor to crusher	15%	375,000	0.000046	0.009	0.00
Crushing (bh)	15%	375,000	0.000143	0.027	0.00
Conveyor to screen	15%	375,000	0.000046	0.009	0.00
Conveyor to storage pile	15%	375,000	0.000046	0.009	0.00
Conveyor to screen	30%	750,000	0.000046	0.017	0.01
Screening	30%	750,000	0.000518	0.194	0.06
Conveyor to storage pile	15%	375,000	0.000046	0.009	0.00
Conveyor to storage pile	15%	375,000	0.000046	0.009	0.00
Fines conveyor to backfill	20%	500,000	0.000046	0.012	0.00
Conveyor to wet screen	40%	1,000,000	0.000046	0.023	0.01
Wet screening	40%	1,000,000	0.000000	0.000	0.00
Conveyor to storage pile	15%	375,000	0.000000	0.000	0.00
Conveyor to storage pile	15%	375,000	0.000000	0.000	0.00
Screw conveyor to conveyor	10%	250,000	0.000000	0.000	0.00
Conveyor to storage pile	10%	250,000	0.000000	0.000	0.00
			Annual Emissions (tpy):	2.63	0.78
			Plant Emission Factors (lb/ton):	0.0021	0.00062
			Daily Emissions (lb/day):	13.7	4.0

Throughput (tons)

2,500,000 Annual
6,500 Daily

PM_{10} Emission Factors[1]:	E.F. (lb/ton)	Control Method	**$PM_{2.5}$ Fraction of PM_{10}**
conveyor transfer point	0.000046	water spray	0.292
screening	0.000518	baghouse	0.3
crushing	0.0001428	baghouse	0.3
wet processing	0	saturation	
crushing	0.00054	water spray	

[1] Emission factors for controlled emissions as defined in AP-42 Section 11.19.2 dated 8/04 and Section 13.2 for loader drop of aggregate with 3% moisture. Baghouse emissions factors are 95% capture and 99% control on the uncontrolled AP-42 factors.

[2] $PM_{2.5}$ emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Mineral Process Loss: Loading and Unloading Bulk Materials and Mineral Products: Crushing, Screening, Blasting, Loading, Unloading.

Asphalt Plant Emissions

Yearly Asphalt Plant Emissions

	VOC	NOx	CO	SOx	PM_{10}	$PM_{2.5}$ [4]
Dryer/Mixer Emissions						
E.F. (lb/ton)[1]	0.0082				0.023	
E.F. (lb/10^3 gal)[2]		4.575	7.5	0.095		
Control Factor	88.2%	0%			90.0%	
Emissions (tons/yr)	0.15	1.88	3.1	0.039	0.35	0.34
Silo Fill Emissions						
E.F. (lb/ton)[3]	0.0115		0.0012		0.0006	
Control Factor					95%	
Emissions (tons/yr)	1.7183		0.1770		0.0044	0.0013
Load Out Emissions						
E.F. (lb/ton)[3]	0.0039		0.0013		0.0005	
Control Factor					95%	
Emissions (tons/yr)	0.5864		0.2024		0.00039	0.00011
Total Peak Yearly (tpy)	**2.45**	**1.88**	**3.45**	**0.04**	**0.35**	**0.34**

Assumptions:

Plant Throughput (tons/yr) =	300,000	Maximum Hourly Plant throughput (tph):	400
Plant Rating (MMBtu/hr) =	100	Operation/Year at Max Throughput (hrs/yr):	750
Conversion Factor (btu/gal) =	91,500	Yearly Fuel Usage (10^3gal/yr):	820
Hourly Fuel Usage (gal/hr):	1,093		

Control Factors:

Unit	PM_{10}	VOCs	NOx	Reference
Dryer/Mixer	90.00%	88.20%	0%	Dryer and mixer PM10 emissions are controlled by a knock out box and a baghouse equipped with bag techology that is 90% more efficient than cotton at removing PM10. VOC and NOx emissions are controlled by flue gas recirculation of the mixer exhaust through the dryer (88.2% = 90% capture and 98% control for VOC, NOx per AVAQMD Rule 1146).
Silo Loading	95%	---	---	Emissions are vented to a blue smoke filtration system which has 95% control efficiency per manufacturer specifications. Some condensable VOC's are controlled, but the VOC control factor is conservatively assumed to be 0%.
Product Load Out	95%	---	---	

[1] Batch process emission factor from AP42 Table 11.1-6 used for VOCs since mixing occurs after dryer in both batch and proposed process, natural gas EF used because propane EF does not exist. Factor accounts for additional VOCs beyond fuel burning. Drum process emission factor from AP42 11.1 used for PM_{10} (controlled by fabric filter) since proposed dryer is a drum dryer.

[2] AP42 Table 1.5-1 for propane combustion emission factors (average of industrial and commercial). SOx EF based on 185 ppmw Sulfur standard in propane. NOx emissions factor from AVAQMD Rule 1146(c)(1) is 0.05 lb/MMBtu.

[3] Silo filling and plant load-out emission factors from AP42 section 11.1 Tables 11.1-14,16 (3/04)

[4] $PM_{2.5}$ emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds" from October, 2006, Mineral Process Loss: Loading and Unloading Bulk Materials and External Combustion: Gaseous Fuel-Petroleum and Industrial Process Heater Only.

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 11

Air Quality Health Risk Assessment

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AIR QUALITY HEALTH RISK ASSESSMENT

Lebata, Inc.
Big Rock Creek Project
12600 Block of Avenue T
Unincorporated Los Angeles County, CA

March 8, 2012

Prepared for:	Lebata, Inc. c/o McGee & Associates 23 Corporate Plaza, Suite 230 Newport Beach, California 92660
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AIR QUALITY HEALTH RISK ASSESSMENT

Lebata, Inc.
Big Rock Creek Project
Unincorporated Los Angeles County, CA

March 8, 2012

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AIR QUALITY HEALTH RISK ASSESSMENT

Lebata, Inc.
Big Rock Creek Project
Unincorporated Los Angeles County, CA

March 8, 2012

1.0 INTRODUCTION

This Air Quality Health Risk Assessment (HRA) has been prepared for the Big Rock Creek Project (Project) using the site configuration in the proposed Lowered Facilities Alternative to the Project. This HRA presents toxic air contaminant (TAC) source identification, air dispersion modeling, and risk calculations at residential receptors for emission sources associated with the operation of aggregate surface mining and processing facility, a ready-mixed concrete (RMC) plant, a hot mix asphalt (HMA) plant, a Vac-Lite plant, and a raw cement transfer facility (Project). Figure 1 (Appendix A) illustrates the Project location.

This HRA has been prepared as a supplement to the Big Rock Creek Project Air Quality and Climate Change Impact Assessment (AQCCIA) and both documents are intended for use in California Environmental Quality Act (CEQA) environmental review. The Antelope Valley Air Quality Management District's (AVAQMD) *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines* (Guidelines, August 2011) and California Air Resources Board Toxic Program guidance/modeling tools (i.e. HARP) are the basis of the methodology used for this HRA.

Activity assumptions used in this HRA are consistent with those used in the AQCCIA. The effect of the mitigation measures that are presented in the AQCCIA is predicted in this HRA.

2.0 REGULATORY SETTING

This analysis has been prepared for use in the CEQA environmental analysis process. This section discusses the CEQA process and the various HRA related regulations applicable to the Project.

2.1 State

California regulates new development projects under the California Environmental Quality Act and toxic air contaminants (TACs) from stationary sources under the Air Toxics Hot Spots Act (AB 2588) and other sources under Air Toxic Control Measures (ATCMs) that regulate TACs for various source types.

2.1.1 California Environmental Quality Act

CEQA (Public Resources Code (PRC) §§21000 - 21177) was enacted by the California State Legislature in 1970. Its purpose is to help ensure that governmental decision makers and the public are fully informed of potential significant environmental effects of proposed projects and activities. CEQA also requires that significant environmental impacts be avoided or reduced where feasible. In addition, if an Environmental Impact Report (EIR) is prepared, alternatives that accomplish most of the Project objectives, and reduce the Project's adverse environmental effects, must be considered. When there are no feasible alternatives, and no feasible mitigation measures available to reduce the project's significant impact to a less than significant level, a statement of overriding considerations can be adopted, which enables a public agency to approve a project despite significant environmental effects.

CEQA applies to activities directly undertaken by governmental agencies, activities financed in whole or in part by governmental agencies, and private activities that require approval from governmental agencies. There are several basic steps in the CEQA process:

- An agency determines whether a project is subject to CEQA or exempt from CEQA analysis.
- If the project is subject to CEQA, then the agency prepares an Initial Study to determine whether the project may have a significant effect on the environment.
- If the project will not have a significant effect, the agency prepares a Negative Declaration (ND).
- If the project can be modified to avoid or reduce the significant effect to a level of less than significant, the agency prepares a Mitigated Negative Declaration (MND).
- If the Initial Study shows that the project may have a significant effect, and the effects may not be able to be reduced to a less than significant level with mitigation, the agency prepares an Environmental Impact Report (EIR).

An EIR is a process that produces a compilation of evidence and testimony about the environmental effects of a project. A Draft EIR is prepared so that public has an opportunity to review a project's impacts and provide additional evidence and testimony for consideration by the Lead Agency. A Final EIR consists of the Draft EIR and modifications to the project / analysis that are made by the Lead Agency in response to stakeholder comments.

The Draft EIR identifies potential impacts and measures to mitigate identified significant adverse environmental effects, and potential project alternatives that reduce or eliminate the project's adverse environmental effects.

2.1.2 Air Toxics Regulations

As discussed in the Air Quality and Climate Change Impact Assessment (AQCCIA), the California Air Resources Control Board (CARB) has developed ATCMs that require the reduction of TAC emissions including diesel particulate matter (DPM) from compression ignition engines. The primary health risk causing pollutant associated with this Project and statewide is diesel particulate matter (DPM). The potential health effects caused by exposure to DPM are discussed in CARB's Toxic Contaminant Identification (Appendix B). ATCMs exist that apply to both on- and off-road diesel vehicles. The effects of applicable ACTM requirements with future effective dates are considered in this HRA by assuming Project equipment is represented by the average unit of that size and type in the statewide fleet as reported by EMFAC2011 and OFFROAD2011.

2.2 Local

The AVAQMD Guidelines and Toxics New Source Review (Rule 1401) contain the following significance thresholds for health risk:

- Cancer risk – 10 in 1 million at the maximum individual receptor.
- Chronic non-cancer risk – 1.0 hazard index.
- Acute non-cancer risk – 1.0 hazard index.

3.0 ENVIRONMENTAL SETTING

"An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to an understanding of the significant effects of the proposed project and its alternatives." (14CCR15125(a).) By its nature, health risk assessment predicts local effects of a project on nearby receptors.

3.1 Nearby Sources and Existing Risk

The existing physical setting is comprised mainly of emissions from vehicles on nearby roads. The SCAQMD MATES II study found that a majority (~70%) of cancer risk comes from diesel exhaust particulate. Accordingly, the 2010 risk map (Figure 2) prepared by CARB shows health risk in the region of the Project to be higher in urban areas (up to 250 excess cancer cases per 1 million people exposed) of than near the Project site (approximately 50 excess cancer cases per 1 million people exposed). The followup study, MATES III, enabled SCAQMD to produce an interactive risk map that shows the District boundary in Agua Dulce area to be between 150 and 200 excess cancer cases per 1 million people exposed. MATES II also ruled out crystalline silica as an air toxic of concern as evidenced by the fact that crystalline silica was not retained as a constituent in MATES III. Other studies performed by SCAQMD near aggregate mines (e.g. at Valley View School in Duarte) showed that crystalline silica levels outside those facility boundaries were acceptable.

3.2 Meteorological Data

The following meteorological (Met) data is utilized for modeling pollutant dispersion in this HRA:

Location: Lancaster
Year: 1981
File Name: LANCASTR.ASC

This Met data was obtained from South Coast Air Quality Management District. A wind rose generated from this data is presented in Appendix A as Figure 3. The predominant wind direction is from west to east.

3.3 Spatial Data

Universe Transverse Mercator (UTM) coordinates are used to model the source and receptor geometry. The Northing UTM coordinate is specified as the distance in kilometers between the point of interest (e.g. source or receptor) and the equator of the earth. The Easting UTM coordinate is the distance from the point of interest to the baseline for UTM Zone 11. The UTM coordinates are based on the USGS, NAD82, Zone 11 map.

3.4 Terrain Elevations

The following terrain elevation data is used for modeling pollutant dispersion in this HRA:

Location: Littlerock
File Name: 9047_75m.dem

Location: Lovejoy Buttes
File Name: 9048_75m.dem

These digital elevation models (DEM) were obtained from http://www.webgis.com/.

3.5 Receptors

From a HRA perspective, receptors are divided into three categories:

- Residential Receptors are places where people live.
- Commercial Receptors are places where people work.
- Sensitive Receptors are places where sensitive populations are expected to be found, such as schools, hospitals, and day care centers.

Receptors near the Project are residential in nature. The closest sensitive receptor to the project is Littlerock High School, approximately 3 miles to the northwest. Project effects are assessed at the following receptors (Figure 4, Appendix A).

- Receptor 1 (R1) is located west of the Project, in the north-west corner of the intersection of Avenue T and 106th Street.
- Receptor 2 (R2) is located west of the Project, adjacent to Avenue T on the north side.
- Receptor 3 (R3) is located approximately 4,000 feet west of the Project, near 126th Street.
- Receptor 4 (R4) is the closest receptor to the Project, located adjacent to both the Project and the railroad on the east side. Two residences exist at this location.
- Receptor 5 (R5) is approximately 600 feet east of the south-east corner of the Project.

4.0 PROJECT DESCRIPTION

The Proposed Project and the Lowered Facilities Alternative are discussed in the following subsections. The effect of mitigation measures that are described in the AQCCIA are predicted in this HRA.

4.1 Proposed Project

Lebata, Inc. (Applicant) proposes to construct an aggregate surface mining and processing facility, ready-mixed concrete plant, asphalt mixing plant, Vac-Lite plant, and raw cement transfer and aggregate distribution facility on a parcel in Los Angeles County, California. Figure 1 (Appendix A) shows the location of the Project. A complete Project Description can be found in Section 3.0 of the Draft EIR.

The extraction rate of unprocessed material over the life of the Project is expected to range between 1,000,000 to 2,500,000 tons per year. Annual sales will not exceed 2,000,000 tons per year. In this assessment, chronic risk is based on the maximum yearly mining rate of 2,500,000 tpy (i.e. 2,000,000 tons produced) and cancer risk is based on the annualized maximum Project throughput of 1,000,000 tpy for 47 years. Annualized maximum Project throughput is defined as the maximum throughput for the entire life of the Project (about 47,000,000 tons) divided by the number of years of the Project. The Project will be permitted to operate for 50 years, but the mining is expected to last for 47 years. Note that cancer risk is dependent only on the total amount of activity over the life of the Project, not the yearly process rate or the number of years. In other words, 47 years of 1,000,000 tpy activity (i.e. 800,000 tons produced) yields the same cancer risk as 18.8 years of 2,500,000 tpy activity (i.e. 1,000,000 tons produced). Hourly and annual throughputs for Project TAC emission sources are presented in Table 1 and Table 2.

Table 1. Peak Hourly Throughputs

Emission Source	Throughput	Rate	Data Source
Aggregate mining	aggregate	1,366 tons/hr	Excavator cycle time analysis
Asphalt dryer	natural gas	100 MMBtu/hr	Applicant
Asphalt fugitives	asphalt	400 ton/hr	Applicant
Asphaltic oil heater	natural gas	1.2 MMBtu/hr	Applicant
On road truck travel	trips (one way)	58 trips/hr	Traffic Study
On road truck idling	trucks idling	5	Assumption
Off road equipment	hours	1 hour	Assuming all engines in operation
Train idling	hours	0.5 hours	Assumption

Table 2. Annualized Maximum Project Throughputs

Emission Source	Throughput	Rate	Data Source
Aggregate mining	aggregate	1.0 MMtons/year	Applicant
Asphalt dryer	natural gas	47.6 MMcf/yr	Max heat input and production rate
Asphalt fugitives	asphalt	200,000 tpy	Applicant
Asphaltic oil heater	natural gas	10.0 MMcf/yr	Maximum rated input
On road truck travel	trips	65,751 trips/yr	Project Description trips/day for 303 days/year
On road truck idling	duration	5 min/truck	Regulation
Off road equipment	hours	Various	Cycle time analysis and assumption
Train idling	hours	150	Half hour per train, 300 trains/year
* Annualized maximum Project throughput is defined as the maximum throughput for the entire life of the Project divided by the number of years of the Project.			

4.2 Lowered Facility Alternative

The Lowered Facilities Project Alternative reduces the elevation of the processing facilities to approximately 25 to 30 feet below existing grade (i.e. in a "pit"). The orientation of the processing facilities would also change in this Alternative. Other Facility operations would remain unchanged from the Proposed Project. A site plan for the Lowered Facilities Project Alternative is included as Figure 9 (Appendix A). Additional information regarding the alternative is provided in the Lowered Facilities Alternative Description in the EIR.

Under the Lowered Facilities Project Alternative, initial operations would begin with excavation in the northern processing area at a rate of about 0.8 MMtpy. Material mined in this phase would be processed using a portable aggregate processing plant. Production of ready-mixed concrete (RMC), hot mix asphalt (HMA), and Vac-Lite would not occur during this phase of operation. This would continue until a depth of approximately 25 to 30 feet is achieved and the permanent plant structures could be built (including RMC, HMA, and Vac-Lite plants). Once complete, mining would proceed at a rate of between 1.0 and 2.5 MMtpy in the southern portion of the site, below the Longview Road easement with production amounts between 800,000 tpy and 2 MMtpy.

Air quality mitigation measures presented in the Draft EIR (AQ1 through AQ8) are included in the analysis of the Mitigated Lowered Facilities Project Alternative.

5.0 IMPACT ASSESSMENT

The following Project TAC emission sources are evaluated in this assessment:

- Operation of the asphalt plant and the asphaltic oil heater, including natural gas combustion;
- Fugitive organics from silo filling and load out of hot asphalt;
- Truck travel onsite and in route to Pearblossom Highway;
- Truck idling onsite;
- Off road equipment operating onsite; and
- Train idling.

The aggregate plant, RMC plant, Vac-Lite plant, and cement transfer station activities are not included in this HRA because they do not emit considerable amounts of TACs. However, the off road and on road mobile equipment associated with their operation is included.

Assessment included the preparation of two air dispersion models: one for the Project site and adjacent traffic on Avenue T; and the other to evaluate conditions west of the Project along Avenue T and at the intersection with 106th Street where a majority of trucks will make a left and head south.

5.1 Emission Calculations

Emission calculations are based on methodologies discussed in this section and Project throughputs presented in Table 1 and Table 2. Emissions calculations are presented in Appendix C. Mitigations proposed in the AQCCIA are included in these calculations.

5.1.1 Stationary Sources

AP-42 and CARB emissions factors are used to calculate TAC emissions from fugitive organics and natural gas combustion at the following stationary sources:

- **Drum dryer and drum mixer emissions, including propane combustion**. Emissions from the drum dryer are vented to a knock out box and baghouse. Particulate emissions from the mixer are drawn back through the dryer and therefore controlled by the knock out box and baghouse as well. This recirculation of mixer exhaust also controls organic pollutants by oxidization in the dryer.
- **Asphaltic oil heater** emissions occur as a result of propane combustion.
- **Silo filling and product load out** are controlled by blue smoke filtration systems. These systems control some organic emissions and particulates with a manufacturer provided control efficiency of 95%.

Asphalt plant emission calculations, which are based on the California Air Toxics Emission Factor (CATEF) Database, are included in Appendix B. The CATEF Database includes fully speciated polycyclic aromatic hydrocarbon (PAH) emissions factors for asphalt plants. Note that the HMA plant and the asphaltic oil heater will be powered with propane rather than natural gas. However, TAC emission factors for propane combustion are not available, so it is standard practice to use natural gas emission factors in their place.

5.1.2 Mobile Sources

Mobile sources considered include:

- **Haul truck travel** onsite at a speed of 15 mph and offsite at a speed of 40 mph. Travel distances used in the calculations correspond to the distance of the modeled road sources. Emission factors for haul trucks a determined using EMFAC2011 (Appendix D).
- **Haul truck idling** will occur onsite for five (5) minutes per truck trip (see Section 5.0). Emission factors for idling were determined using EMFAC2011 (Appendix D).
- **Off road equipment** to be used onsite includes a number of loaders, a drag line, an excavator, etc. (Appendix C). To determine hours of operation, a cycle time analysis following Caterpillar methodology was used for the loaders and excavator. See the AQA for these calculations. Hours of operation for the remaining equipment are assumed. Operation hours utilized in the AQCCIA are based on the peak year throughput (2.5 MMtpy to produce 2 MMtpy).

Cancer risk is assessed using emissions from haul truck traffic, haul truck idling, and off road equipment calculated on a year-by-year basis in order to account for the progressively cleaner engines that will be required in the future by the existing CARB ATCM regulations. The emissions are scaled by half to account for the fact that the maximum annualized rate of mining is 47 years at one million tons per year (1 MMtpy) rather than 18.8 years at 2.5 MMtpy mined (i.e. 2 MMtpy produced).

Chronic risk is calculated based on the maximum year of emissions in 2012. No adjustments to account for increasingly clean engines are included in the chronic risk calculation. Acute risk was assessed by speciating diesel exhaust using the ARB speciation profiles (Appendix D).

5.2 Dispersion Modeling

The Lakes air dispersion modeling software was used in this assessment. The software incorporates the Industrial Source Complex Short Term (ISCST3) source code designed by USEPA. The Lakes implementation of ISCST3 expresses concentration as an air dilution factor (χ/Q) for each source-receptor combination. χ/Q is calculated by dividing the modeled concentration at a receptor (χ in units µg/m3) by the source emission rate (Q in units g/s). By modeling an emission rate of one gram per second (1 g/s), concentration changes due to each source, at each receptor, can be calculated by multiplying χ/Q by the actual emission rate for the source.

Emissions discussed in Section 5.1 are allocated to specific model sources. Each model source has stack parameters (e.g. temperature, height, velocity) that affect how TACs will be dispersed (Appendix E). This assessment uses the following sources:

- **Point Sources**. Point sources are generally stationary sources that are equipped with a stack. Point sources are used in this model to represent:
  - a. The asphalt plant;
  - b. Asphalt load out and silo;
  - c. The asphaltic oil heater;
  - d. Four (4) haul truck idling points; and

e. A train idle point.

- **Area Sources**. Area sources are used to represent off road equipment. Three model sources were created in areas where the off road equipment activity is most likely to occur:

  a. The plant area (near the plants and stockpiles);

  b. The north pit area; and

  c. The south pit area.

- **Line Sources**. Line sources are modeled in the Lakes ISC-AERMOD View software as a series of volume sources. Line sources are used in this model for haul truck traffic on:

  a. Avenue T adjacent to the site and for a length upwind to the west; and

  b. The onsite haul roads.

Discrete receptors were placed at the locations discussed in Section 3.5 (Figure 4, Appendix A). A grid of receptors (100 meter spacing) that covers the area most impacted by Project TAC emissions and a series of receptors along the Project boundary (25 meter spacing) were modeled. All receptors modeled are 1.5 meters in height. The locations of the modeled sources are illustrated in Figure 5.

5.3 Risk Assessment

The risk assessment calculations are performed using HARP. The Lakes software air dispersion output file (χ/Q) is used as the input file for the HARP health risk assessment module. Before inputting the Lakes file into HARP it must be converted using the HARP ONRAMP software to a format that is compatible with HARP. Four HARP ONRAMP runs were performed using the Project Site dispersion model results including unmitigated and mitigated runs for both cancer risks and non-cancer risks at the maximum annual rate of 2.5 MMtpy mined and 2.0 MMtpy produced.

The HARP Risk Module uses the χ/Q data as discussed in Section 5.2 to calculate concentration and risk at each receptor. On the emissions tab of the Risk Module, the cancer risk model emissions of diesel particulate matter (DPM) were adjusted using the multiplier fields to reflect the reduced throughput of the annualized peak year and the maximum amount to be mined over a 70 year lifetime. In this case, 1 MMtpy mined for 47 years results in a multiplier of 0.27 (i.e. 1 / 2.5 * 47 / 70). The non-cancer risks were modeled for the maximum annual throughput of 2.5 MMtpy in 2012 (i.e. 2 MMtpy production).

Once calculated, risk from each of the sources is summed for each receptor to obtain the risk values presented in this section. HARP calculates the cancer risk, chronic hazard index (HI), and acute HI. After risk is calculated by HARP output file is converted to a contoured plot and exported to Google Earth.

Exposure to TACs by routes of exposure other than inhalation is included by the multi-pathway risk assessment. Exposure via home grown produce, dermal absorption, soil ingestion, and mother's milk are included. Deposition is assumed to occur at a rate of 0.02 meters per second. Tables 3 through 8 summarize unmitigated and mitigated risk results for this assessment.

Receptors R1, R4 and R5 are modeled where they are located. Conditions at Receptor R2 are based on the sum of a grid receptor from the Project Site model (417000, 3821900) and a grid receptor from the Road model (414575, 3821875). Conditions at Receptor R3 risk are based upon the Road model grid receptor (414425, 3822775) which is located approximately 25 meters north of the roadway centerline.

Table 3. Unmitigated Cancer Risk

Parameter	R1	R2	R3	R4	R5
Cancer Risk [1]	1.2	3.6	1.8	11.5	7.4
Threshold [1]	10	10	10	10	10
Significant?	**No**	**No**	**No**	**Yes**	**No**
[1] Excess cancer cases per million people exposed.					

Table 4. Unmitigated Chronic Hazard Index

Parameter	R1	R2	R3	R4	R5
Chronic Index	ND	ND	0.01	0.09	0.06
Threshold	1	1	1	1	1
Significant?	**No**	**No**	**No**	**No**	**No**
ND: Not determined quantitatively because comparison of chronic to cancer health risk shows that cancer risk is a more conservative threshold.					

Table 5. Unmitigated Acute Hazard Index

Parameter	R1	R2	R3	R4	R5	PMI[1]
Acute Index	ND	ND	0.14	0.2	0.12	0.97
Threshold	1	1	1	1	1	1
Significant?	**No**	**No**	**No**	**No**	**No**	**No**
[1] The acute risk PMI occurs at UTM 417900, 3822700 which is located north of the facility on Ave. T. ND: Not determined quantitatively because comparison of acute to cancer health risk for diesel exhaust shows that cancer risk is a more conservative threshold.						

Modeling files are included in Appendix C. Mitigation measures AQ1 through AQ8 include substitution of a dragline and excavator for a dozer, a loader and two haul trucks as described in AQ4 which is the primary mitigation to affect the HRA results. AQ4 needs to be adjusted in order to ensure cancer risk at the maximum exposed individual receptor is less than 10 in 1 million:

AQ4. Aggregate material will be excavated using a dragline and portable crusher prior to exceeding 800,000 tons per year of material fed to the Aggregate Plant.

Table 6 presents the range of mitigated risk depending upon whether the facility operates at the reduced maximum annualized rate of 800,000 tons per year; or installs the dragline and portable crusher. R1 and R2 are unaffected because they are along the Avenue T and far from the Project site. Chronic and acute risks are less than significant without mitigation.

Table 6. Mitigated Cancer Risk

Parameter	R1	R2	R3	R4	R5
Cancer Risk[1]	1.2	3.6	1.0 to 1.2	4.2 to 9.9	2.4 to 6.3
Threshold[1]	10	10	10	10	10
Significant?	**No**	**No**	**No**	**No**	**No**
[1] Excess cancer cases per million people exposed.					

Table 7. Mitigated Chronic Hazard Index

Parameter	R1	R2	R3	R4	R5
Chronic Index	ND	ND	0.003	0.02	0.01
Threshold	1	1	1	1	1
Significant?	**No**	**No**	**No**	**No**	**No**
ND: Not determined quantitatively because comparison of chronic to cancer health risk for other receptors shows that cancer risk is a more conservative threshold.					

Table 8. Mitigated Acute Hazard Index

Parameter	R1	R2	R3	R4	R5	PMI[1]
Acute Index	ND	ND	0.14	0.20	0.12	0.97
Threshold	1	1	1	1	1	1
Significant?	**No**	**No**	**No**	**No**	**No**	**No**
[1] The acute risk PMI occurs at UTM 417900, 3822700 which is located north of the facility on Ave. T. ND: Not determined quantitatively because comparison of acute to cancer health risk for diesel exhaust shows that cancer risk is a more conservative threshold.						

6.0 FINDINGS

This HRA finds that, with all of the air quality mitigation measures proposed in the ADEIR:

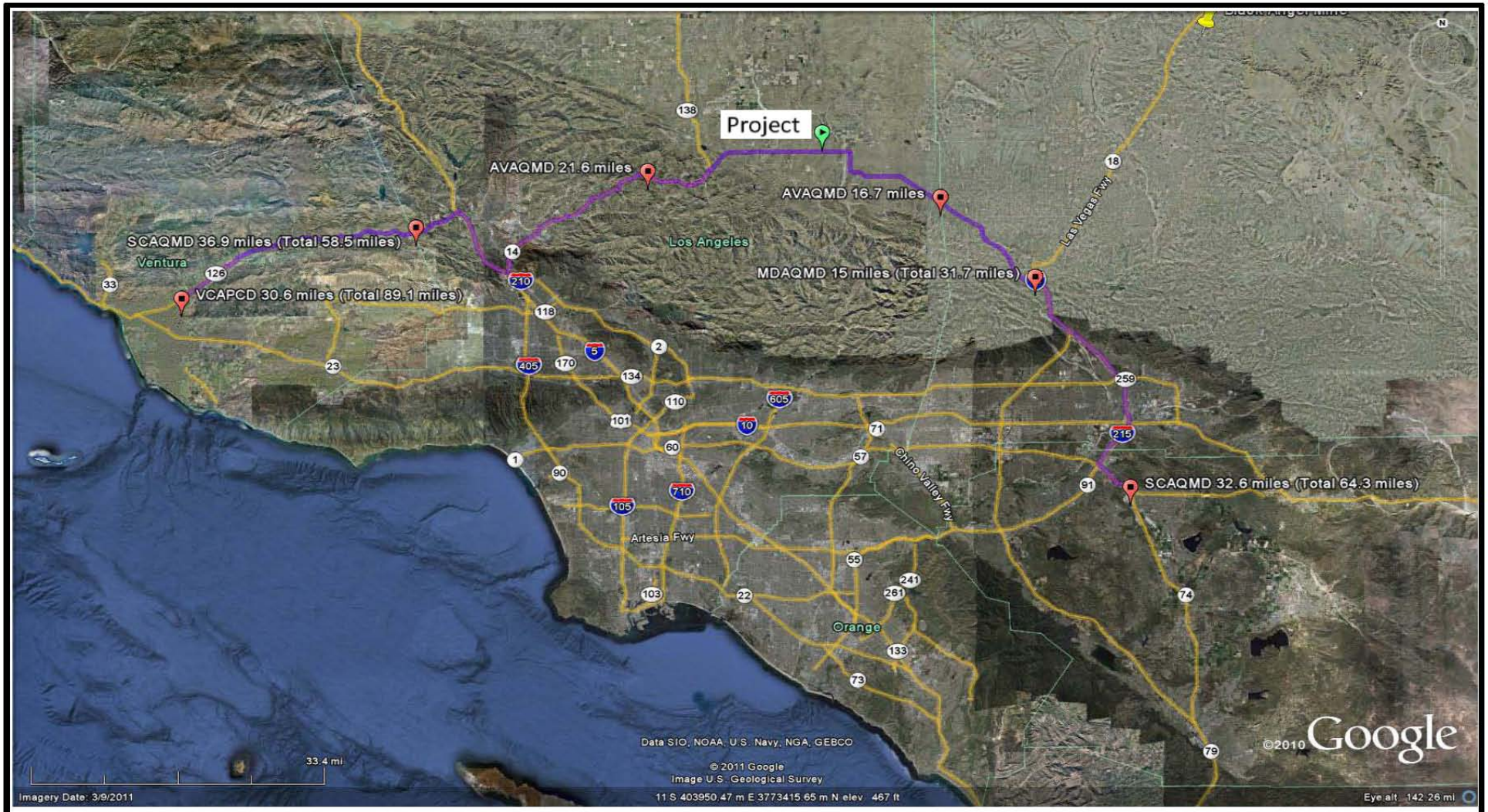
- The Lowered Facilities Project Alternative, with the mitigations identified in the AQA, will result in cancer risk impacts less than the significance threshold of 10 in a million at all receptors.
- The Lowered Facilities Project Alternative, with the mitigations identified in the AQA, will result in chronic risk impacts less than the significance threshold of 1.0 hazard index at all receptors.
- The Lowered Facilities Project Alternative, with the mitigations identified in the AQA, will result in acute risk impacts less than the significance threshold of 1.0 hazard index at all receptors.
- The Lowered Facilities Project Alternative results in a Class III health risk impact, significant but mitigable.

7.0 RESOURCES

- California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, AVAQMD (August 2011) (http://www.avaqmd.ca.gov/index.htm)
- California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, MDAQMD (June 2011) (http://www.mdaqmd.ca.gov/rules_plans/rules-plans.htm)
- Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, California Office of Environmental Health Hazard Assessment (OEHHA) (August 2003) (http://www.oehha.org/air/hot_spots/HRAguidefinal.html).
- AP-42, USEPA (http://www.epa.gov/ttn/chief).
- EMFAC2011 (http://www.arb.ca.gov/msei/msei.htm).
- OFFROAD2011 (http://www.arb.ca.gov/msei/msei.htm).
- Caterpillar Performance Handbook, Edition 37, Caterpillar (February 2007)
- HARP Onramp Program by CARB.
- HARP User Manual, CARB, December 2003 (http://www.arb.ca.gov/toxics/harp/harp.htm).
- Hot Spots Analysis and Reporting Program (HARP) Version 1.4 by Dillingham Software Engineering, Inc. (http://www.arb.ca.gov/toxics/harp/harp.htm).
- AERMOD View Version 7.3.0 by Lakes Environmental (http://www.weblakes.com/products/aermod/index.html)

APPENDIX A

FIGURES



This figure shows the Project location and maximum haul distance that may occur.

N

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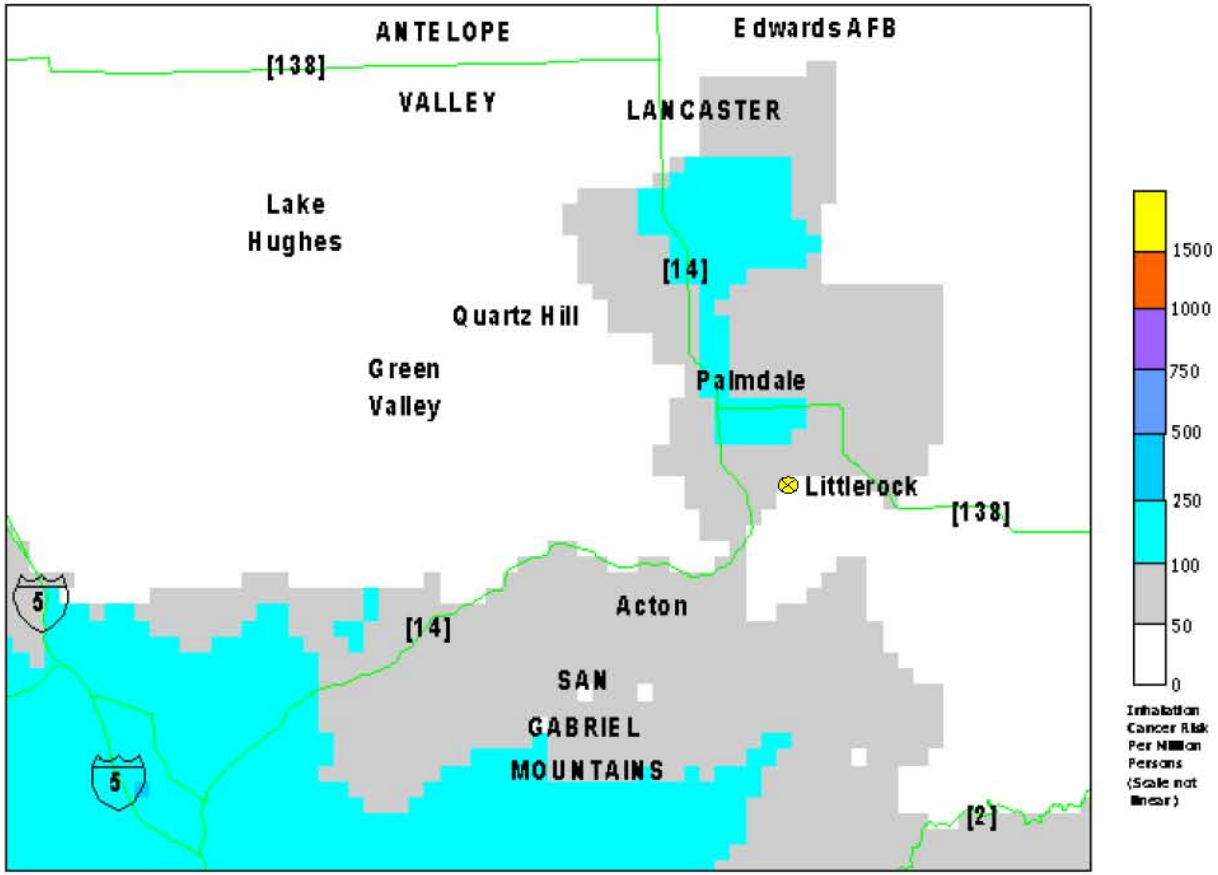
FIGURE 1	Site Location Map Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	2/7/12
SCALE:	AS SHOWN	DRAWN BY:	SDC

Total Risk (diesel + nondiesel)

Lancaster-Palmdale: 2010 Cancer Risk Per Million
AllSources



See ARB web site list of sources not yet included in risk.
ARB:EIB:SRF 6/18/2004

http://www.arb.ca.gov/ch/communities/hlthrisk/cncrinhl/rskmapvwtrend.htm

⊗ Littlerock is the approximate location of the site.

N

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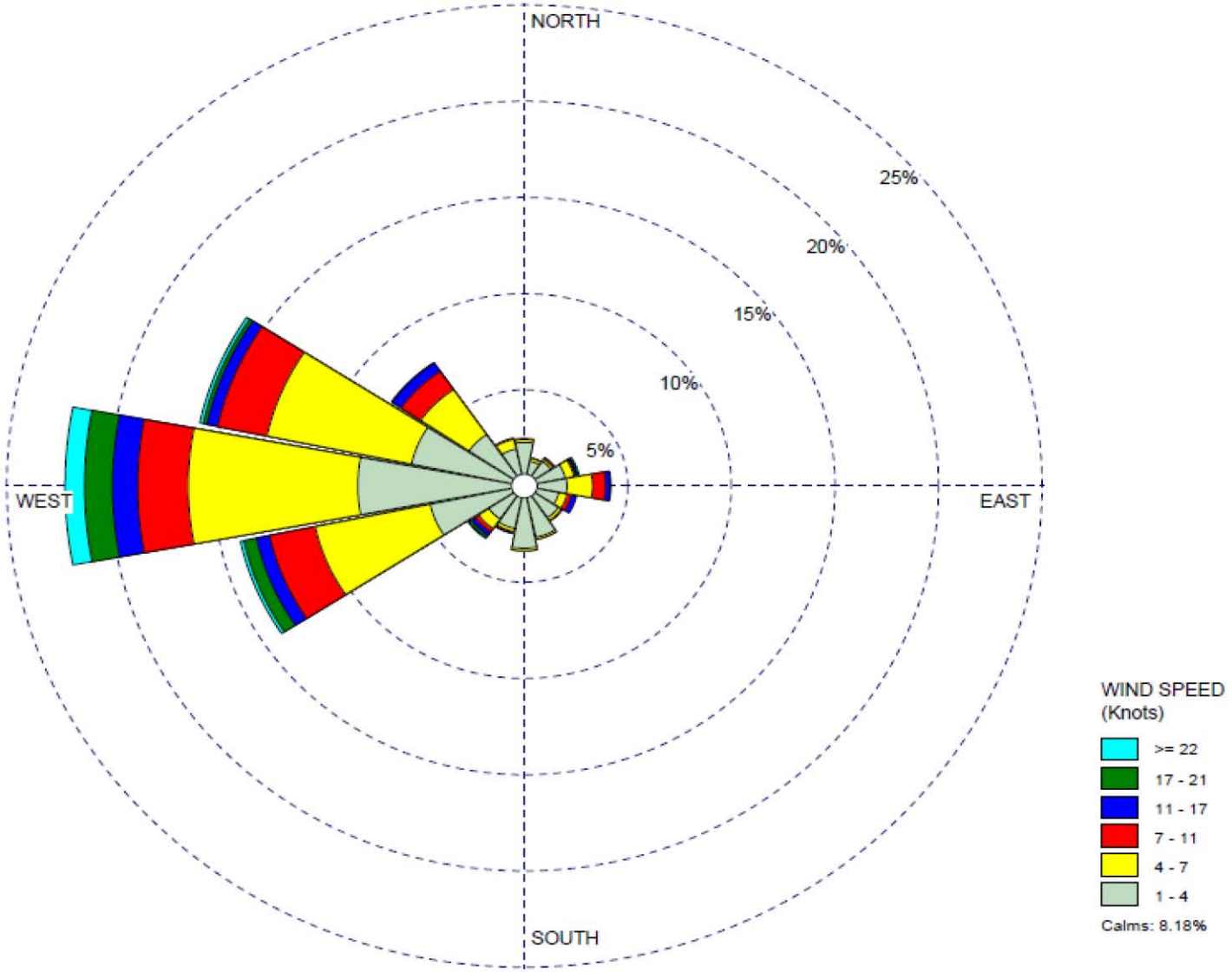
FIGURE 2	EXISTING HEALTH RISK Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	2/7/12
SCALE:	not to scale	DRAWN BY:	SDC



Calendar Year 1981
Average wind speed 4.8 Knots with 8.18% calm winds.

http://www.aqmd.gov/smog/metdata/ISCST3_Table1.html

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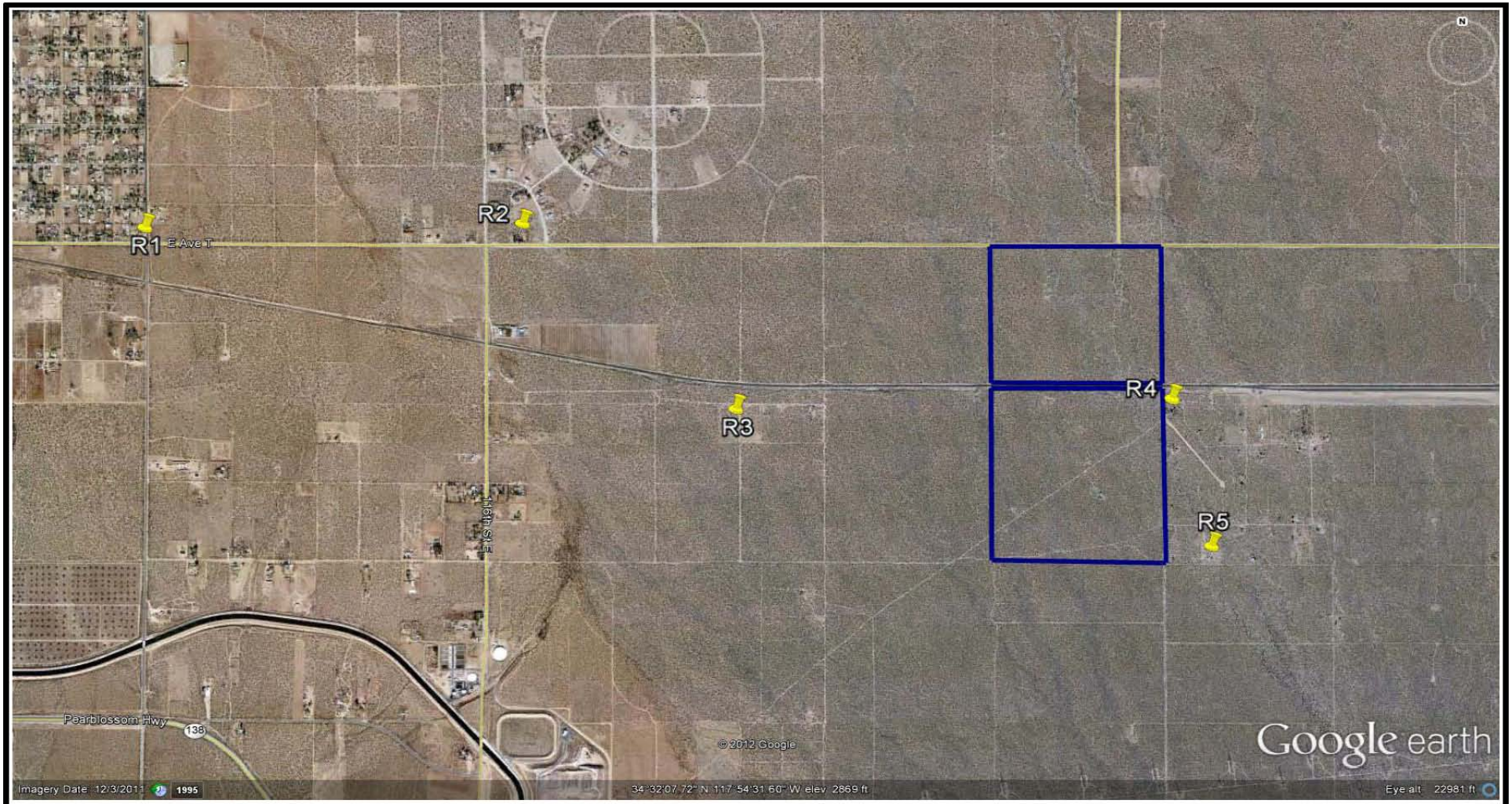
FIGURE 3	WINDROSE - LANCASTER STATION Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	2/7/12
SCALE:	N/A	DRAWN BY:	SDC



Project boundary shown in dark blue.

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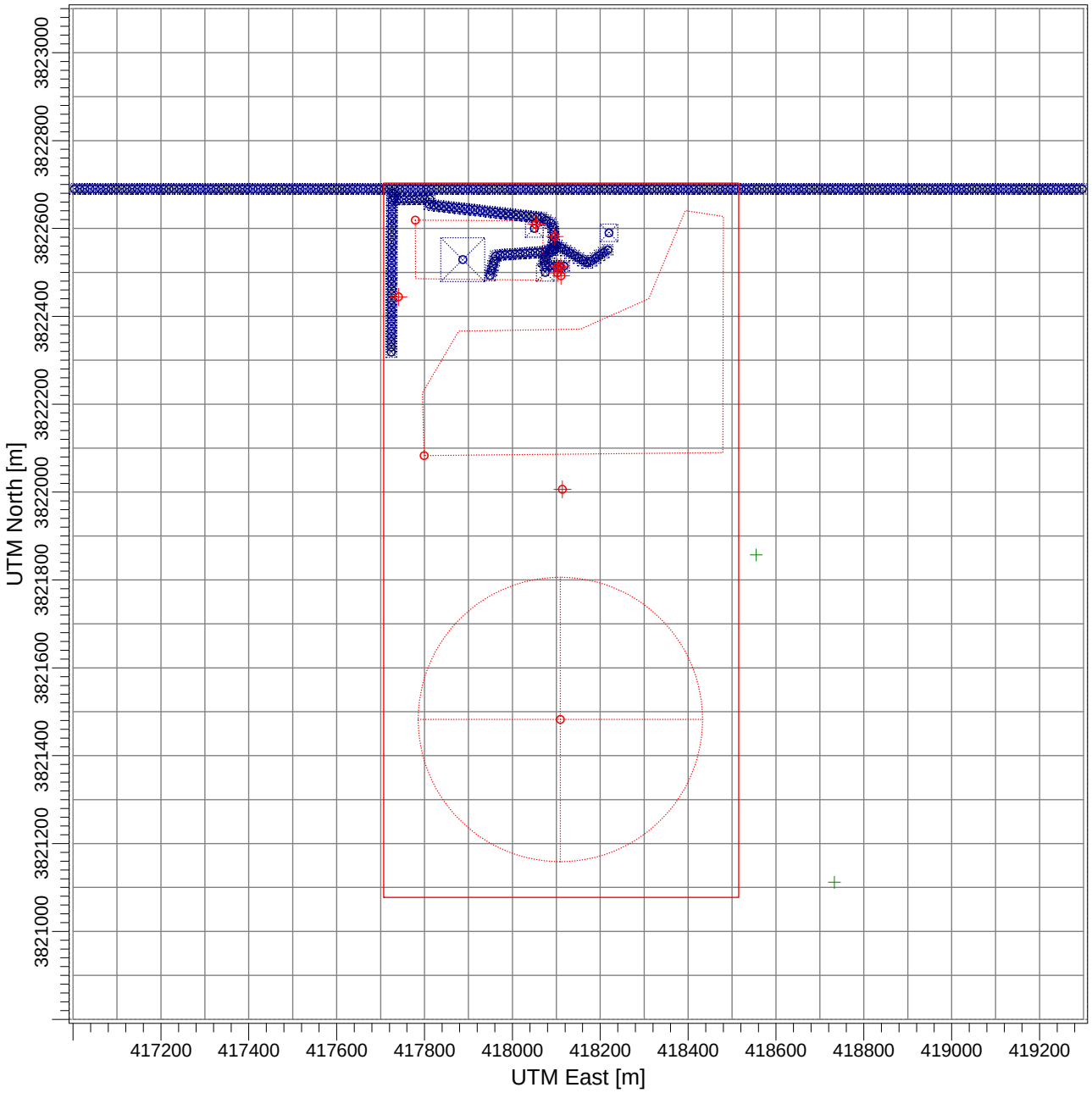
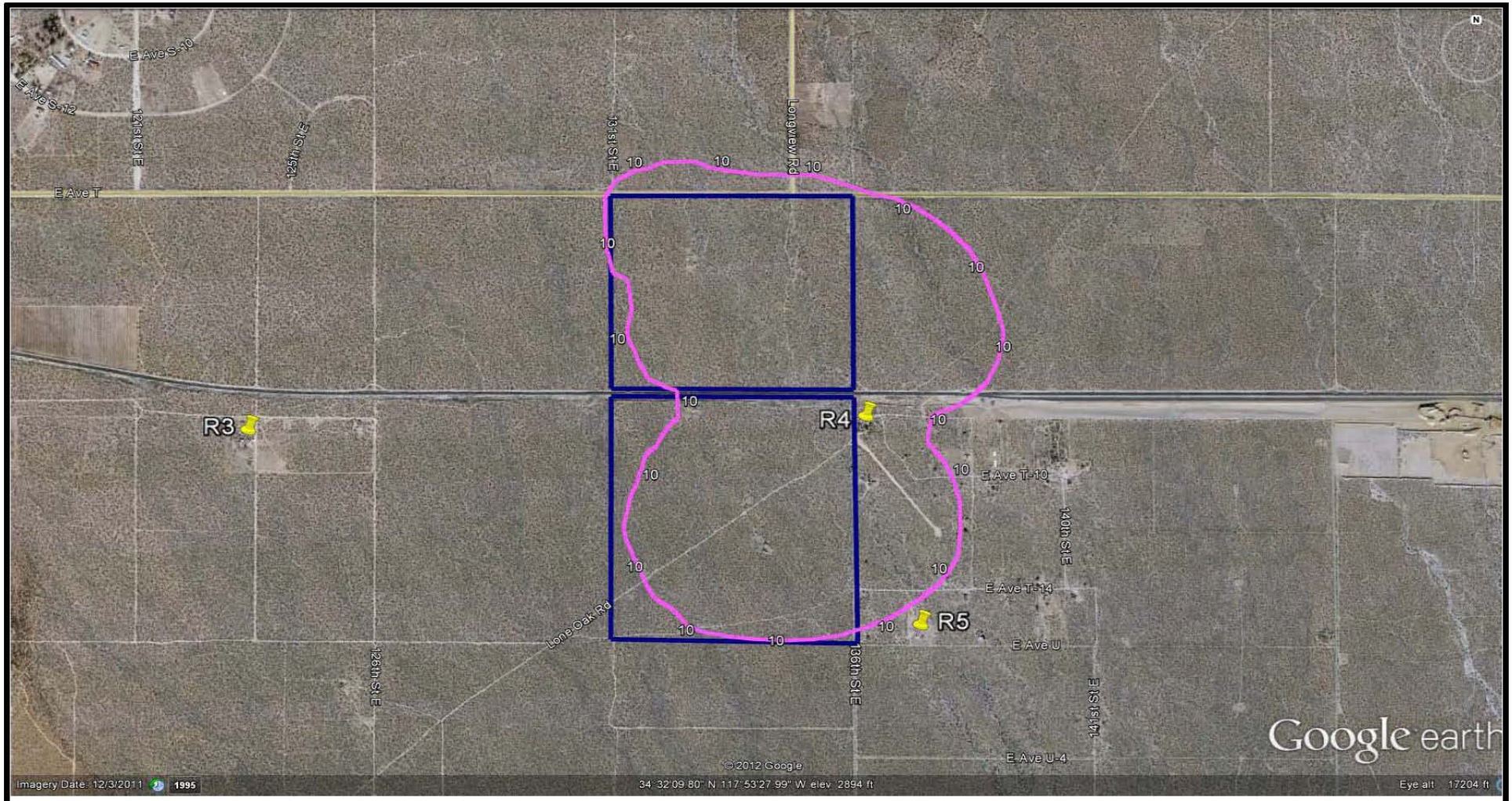
FIGURE	RECEPTORS Big Rock Creek Project Unincorporated Los Angeles County		
4			
PROJECT #:	MC01	DATE:	2/7/12
SCALE:	N/A	DRAWN BY:	SDC

PROJECT TITLE:

Big Rock Creek
HRA - Lowered Facility Alternative



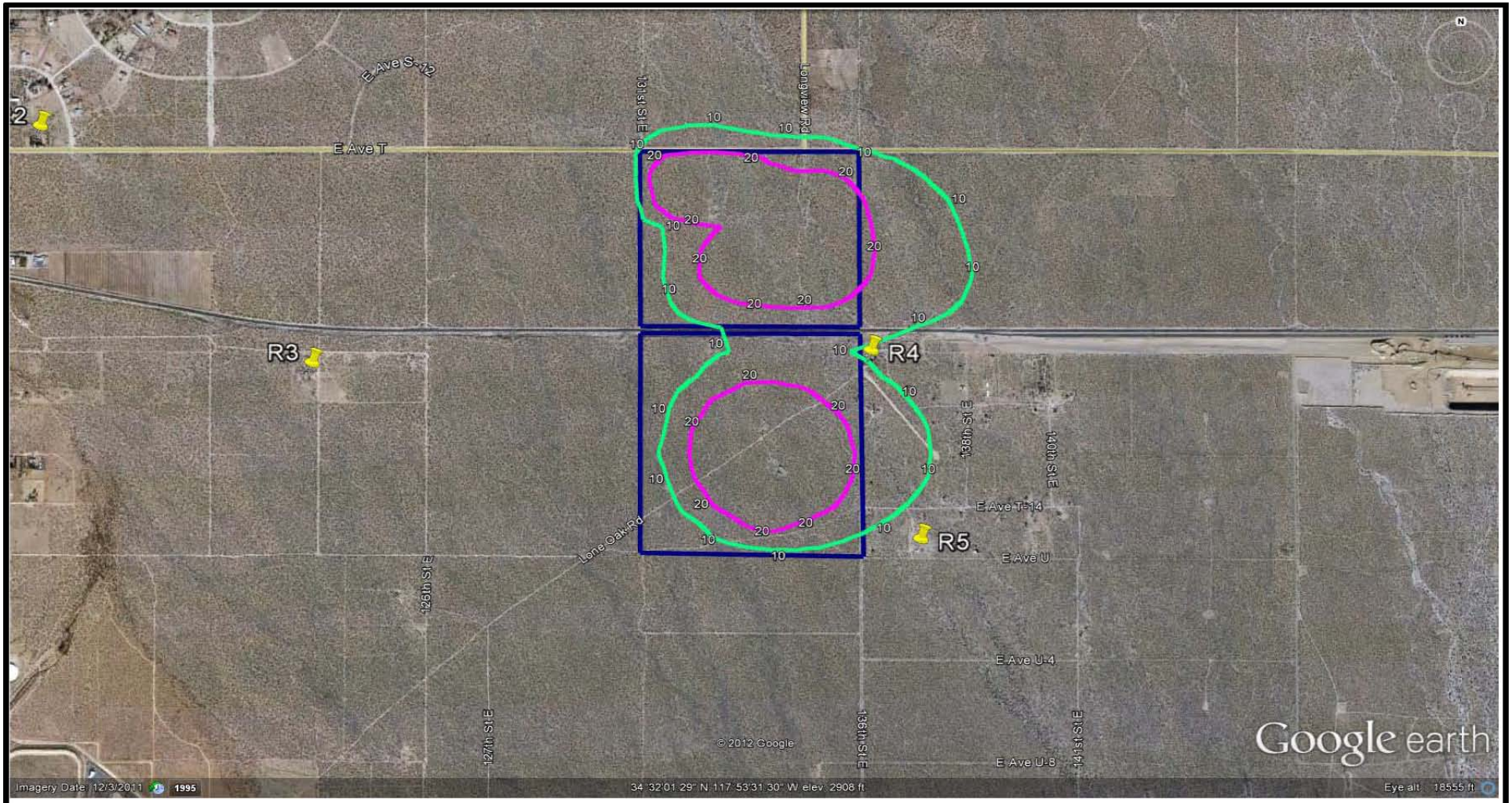
COMMENTS:	SOURCES: **315**	**Figure 5**	
	RECEPTORS: **578**	MODELER: **SDC**	SESPE CONSULTING, INC.
		SCALE: 1:14,572 0 0.5 km	
		DATE: **2/24/2012**	PROJECT NO.: **MC01**



Risk at roadside receptors located west of the site (R1 and R2) are not shown because risk is less than 10 in 1 million and so there is no contour to illustrate. Project boundary shown in dark blue.

SESPE CONSULTING, INC.

FIGURE 6	UNMITIGATED CANCER RISK FROM PROJECT SITE Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	2/9/12
SCALE:	AS SHOWN	DRAWN BY:	SDC



Risk at roadside receptors located west of the site (R1 and R2) are not shown because risk is less than 10 in 1 million and so there is no contour to illustrate. Project boundary shown in dark blue.

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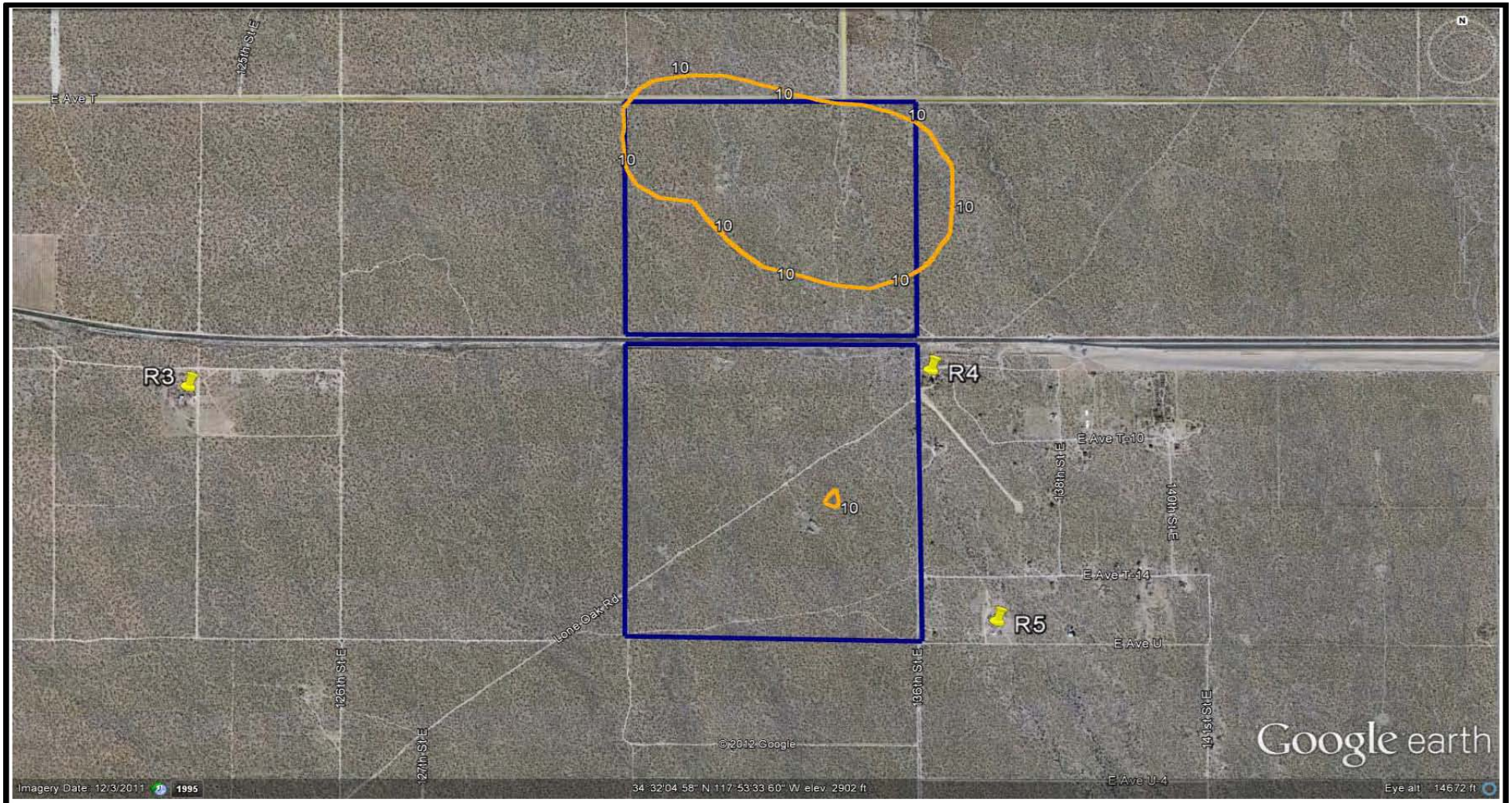
FIGURE 7	800,000 tpy UNMITIGATED CANCER RISK FROM PROJECT SITE Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	3/7/12
SCALE:	AS SHOWN	DRAWN BY:	SDC



Risk at roadside receptors located west of the site (R1 and R2) are not shown because risk is less than 10 in 1 million and so there is no contour to illustrate. Project boundary shown in dark blue.

SESPE CONSULTING, INC.

FIGURE 8	MITIGATED CANCER RISK FROM PROJECT SITE Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	2/9/12
SCALE:	AS SHOWN	DRAWN BY:	SDC

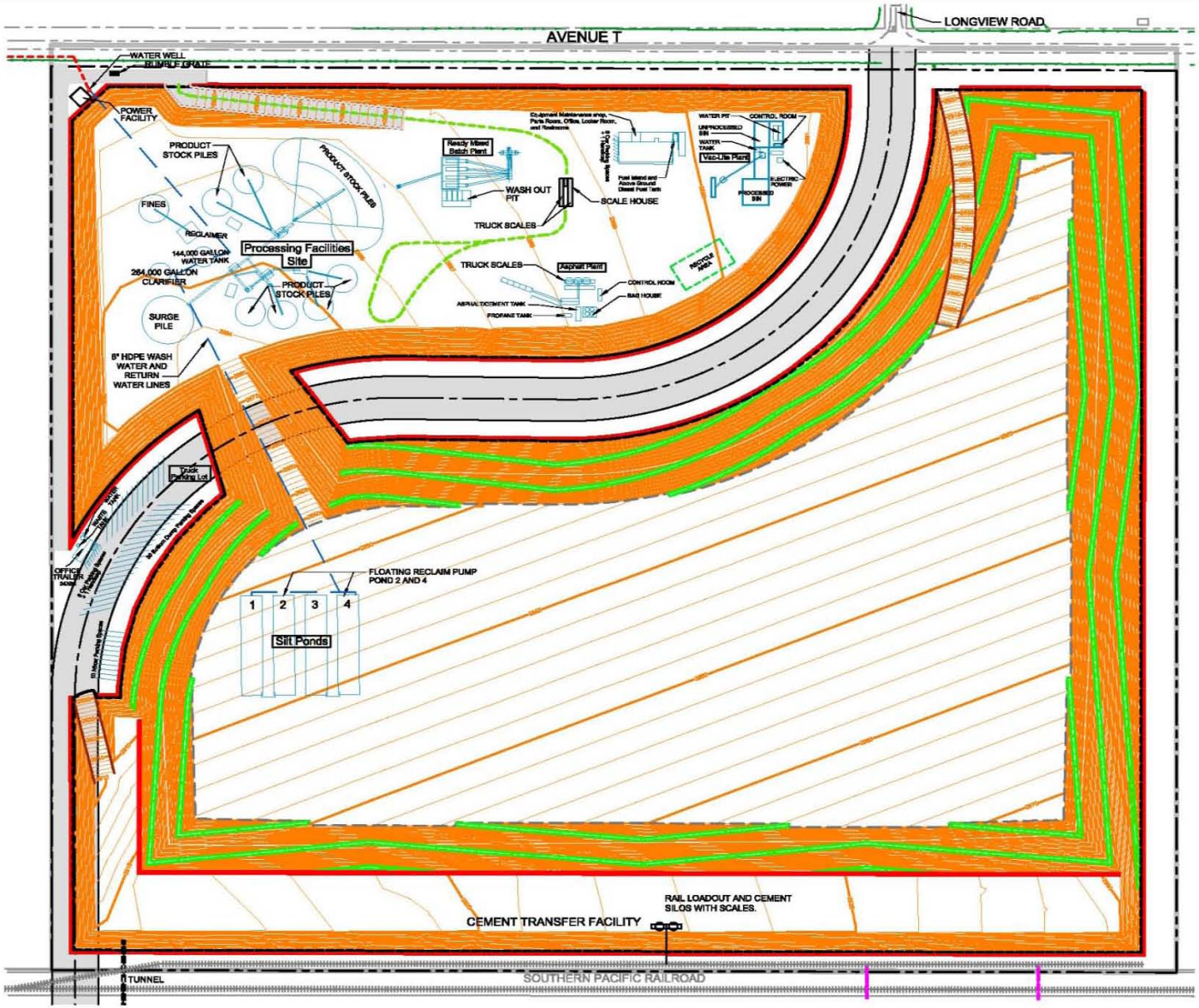


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FIGURE 9	Lowered Facilities Alternative Big Rock Creek Project Unincorporated Los Angeles County		
PROJECT #:	MC01	DATE:	2/24/12
SCALE:	400 feet / inch	DRAWN BY:	SDC

APPENDIX B

HEALTH EFFECTS OF DIESEL EXHAUST

DIESEL EXHAUST

Diesel exhaust is currently in the identification phase as a proposed Toxic Air Contaminant under California's air toxics program (AB 1807). A draft document published in May, 1997 is available.

CAS Registry Number: N/A

Molecular Formula: N/A

Diesel exhaust is a complex mixture of gases, vapors, and fine particles. Some of the exhaust components, like arsenic, benzene and nickel, are known to cause cancer in humans. At least 40 other components, including suspected human carcinogens benzo[a]pyrene, 1,3-butadiene and formaldehyde, are listed by the United States Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and the Air Resources Board (ARB) as toxic air contaminants (see Table 1). Diesel Exhaust also contains carbon monoxide, oxides of nitrogen, sulfur dioxide, hydrocarbons, particulate matter (PM), aldehydes, ketones, sulfates, cyanides, phenols, ammonia, and metals. Some of these substances can result from unburned fuel and lubricating oil components, products of incomplete combustion, or a result of engine wear or trace contaminants (Volkswagen, 1989).

In this substance review, California's population exposure to diesel exhaust PM is discussed in more detail because more is known about the PM fraction, and most researchers believe that the diesel exhaust particles contribute the majority of the risk from exposures to diesel exhaust.

Diesel exhaust particles carry many of the harmful organics and metals present in the exhaust. Typical diesel exhaust particles have mass-median aerodynamic diameters ranging from 0.1 to 0.25 micrometers (μm) (Groblicki and Begeman, 1979; Dolan et al., 1980; NRC, 1982; Williams, 1982). More than 75 percent of the particles are smaller than 1 μm (Pierson et al., 1983) and are mainly aggregates of spherical elemental carbon particles coated with organic and inorganic substances. The particles have a sponge-like structure and large surface area which attracts compounds of low volatility to the inside or surface of the particles. The primary organic compounds associated with the particles include aliphatic hydrocarbons, polycyclic aromatic hydrocarbons (PAH), and PAH-derivatives (Zielinska, 1990). Methylated PAHs appear to be the most abundant PAH derivatives and more than 50 nitro-PAHs have been identified in diesel exhaust (ARB, 1997d).

TABLE 1 - TOXIC AIR CONTAMINANTS FOUND IN DIESEL EXHAUST*

acetaldehyde	chlorine	methyl ethyl ketone
acrolein	chlorobenzene	naphthalene
aluminum	chromium compounds	nickel
ammonia	cobalt compounds	4-nitrobiphenyl
aniline	copper	phenol
antimony compounds	cresol	phosphorus
arsenic	cyanide compounds	**POM (including PAHs)
barium	dibenzofuran	propionaldehyde
benzene	dibutylphthalate	selenium compounds
beryllium compounds	ethyl benzene	silver
biphenyl	formaldehyde	styrene
bis [2-ethylhexyl]phthalate	hexane	sulfuric acid
bromine	lead compounds	toluene
1,3-butadiene	manganese compounds	xylene isomers and mixtures
cadmium	mercury compounds	zinc
chlorinated dioxins	methanol	

(ARB, 1997d)

* This list of toxic air contaminants have either been identified in diesel exhaust, or presumed to be in the exhaust based on observed chemical reactions and/or presence in the fuel or oil.

** See Polycyclic Organic Matter (POM) Fact Sheet.

SOURCES AND EMISSIONS

A. Sources

Diesel exhaust PM emissions can be emitted from mobile sources (on-road vehicles and off-road mobile sources), stationary area sources, and stationary point sources. On-road diesel vehicles contribute approximately 59 percent of California's diesel exhaust PM. Other mobile sources contribute about 36 percent, and stationary area and point sources contribute the remaining amount. Stationary area sources of diesel exhaust include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations where exhaust emissions result from multiple locations within the site (ARB, 1997d). The primary stationary sources that have reported emissions of diesel exhaust are heavy construction (except highway), electrical services, and crude petroleum and natural gas extraction (ARB, 1997b).

B. Emissions

The total emissions of diesel exhaust from stationary sources in California are estimated to be at least 31,000 pounds per year, based on data reported under the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b). Also, based on the ARB 1990 emissions inventory, approximately 58,000 tons of diesel exhaust PM_{10} from all sources are emitted into California air each year (ARB, 1997d).

Emissions from on-road mobile source diesel exhaust PM_{10} in California are expected to decline by approximately 50 percent from 1990 until about 2010 as a result of mobile source standards and regulations already adopted by the ARB through 1996. The expected reduction is mainly due to adopted diesel vehicle emission and fuel regulations, even though both the number and vehicle miles traveled (VMT) of heavy-duty trucks are expected to increase during this period. Similarly, NO_x emissions from on-road diesel vehicles have been reduced since 1990, and will continue to be reduced through 2010 because of new NO_x engine emission standards (ARB, 1997d).

C. Natural Occurrence

Diesel exhaust is a product of diesel fuel combustion and does not occur naturally in the environment.

AMBIENT CONCENTRATIONS

The ARB has conducted a preliminary estimation of diesel exhaust concentrations for California's 15 air basins using a PM-based exposure method. This method used the ARB emissions inventory's database for particulate matter 10 microns or smaller (PM_{10}); ambient PM_{10} monitoring network data; and the results from several studies where chemical speciation of ambient data was performed, along with receptor modeling techniques to estimate statewide outdoor concentrations of diesel exhaust PM_{10}. The statewide population-weighted average diesel exhaust PM concentration is estimated to be 3.2 micrograms per cubic meter ($\mu g/m^3$). The basin-wide average diesel exhaust PM estimates ranged from 0.3 (in the Great Basin Valley) to 3.6 $\mu g/m^3$ (in the South Coast Air Basin) (ARB, 1997d).

INDOOR SOURCES AND CONCENTRATIONS

To estimate Californians' exposures to diesel exhaust particles, ARB staff used estimates of population-weighted ambient diesel exhaust particle concentrations in a model that can estimate indoor air concentrations, population indoor air exposure, and total air exposure. The model, called the California Population Indoor Exposure Model (CPIEM), was recently developed under contract to the ARB to improve estimates of population exposures to toxic air pollutants. The model uses relevant data (such as distributions of California building air exchange rates, activity patterns data, and air concentrations of diesel exhaust particles) as inputs to develop indoor concentration estimates across all environments.

The average indoor exhaust particle concentrations estimated by the model ranged from 1.7 $\mu g/m^3$, in office buildings to 3.2 $\mu g/m^3$ in industrial plants and inside vehicles. These estimates were combined with activity pattern data in the model to estimate Californians' exposures across all enclosed environments. The exposure modeling results indicate that Californians were exposed to average diesel exhaust particle concentrations of 2.1 $\mu g/m^3$ in enclosed environments in 1990. This is two-thirds of the population-weighted ambient average outdoor diesel exhaust PM_{10} concentration (ARB, 1997d).

ATMOSPHERIC PERSISTENCE

Physical removal of diesel exhaust PM from the atmosphere is usually accomplished through accretion of the particles, atmospheric fall-out (dry deposition), and atmospheric removal by rain (wet deposition). The particles, generally smaller than 1 μm, are expected to remain in the atmosphere from 5 to 15 days (Pierson et al., 1983; Balkanski et al., 1993).

AB 2588 RISK ASSESSMENT INFORMATION

Although diesel exhaust is reported as being emitted in California from stationary sources, no health values (cancer or non-cancer) are listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

The probable route of human exposure to diesel exhaust is inhalation (ARB, 1994b).

Non-Cancer: Non-cancer effects of diesel exhaust are likely due to the presence of particles in the exhaust (WHO, 1994). A Recent study has reported that exposures to airborne respirable particulate matter are associated with increased morbidity and mortality, with observed effects including respiratory symptoms, changes in lung function, and increased hospitalizations for respiratory and cardiovascular disease (Pope et al., 1995a). Cellular changes upon exposure to particles include an accumulation of particle-laden macrophages and proliferation of bronchiolar epithelium of type II alveolar cells. Studies by Ulfvarson and coworkers (in 1990 and 1991) showed pulmonary function increases after a workshift during which diesel exhaust was removed from the work environment (Ulfvarson et al., 1990; 1991).

In June of 1993, the U.S. EPA determined an inhalation Reference Concentration (RfC) of 5 $\mu g/m^3$ for non-cancer effects of diesel exhaust. The U.S. EPA estimates that inhalation of this concentration or less, over a lifetime, would not likely result in the occurrence of chronic non-cancer effects (ARB, 1997d).

The available literature does not provide sufficient information to determine whether or not diesel exhaust exposure induces reproductive, developmental or teratogenic effects in humans. Exposure via inhalation did not induce sperm abnormalities nor affect spermatogonial survival in mice and monkeys though sperm anomalies have been observed in hamsters. Data on the effects of diesel exhaust on female reproductive capacity are limited, but potential effects on the corpora lutea and mating period have been suggested for laboratory rodents. Rats born to dams exposed to high concentrations of diesel exhaust had delayed ossification of the chest. Exposure during the neonatal developmental period of rodents induces neurobehavioral and neurophysiological effects, but does not affect general lung development. Generational studies conducted in rodents revealed that inhalation exposure to diesel exhaust resulted in increases in lung weight in all generations examined (ARB 1997d).

Cancer: Epidemiological studies in truck drivers, transport and equipment workers, dock workers, and railway workers, reported a statistically significant increase in the incidence of lung cancer associated with exposure to diesel exhaust. Two studies reported no category with a risk ratio elevated for exposure to diesel exhaust (ARB, 1997d; HEI, 1995).

In the last decade, results of inhalation bioassays of rodents have demonstrated the carcinogenicity of diesel exhaust. Seven studies in rats exposed to greater than 2 milligrams per cubic meter (mg/m^3) of whole diesel exhaust longer than 24 months, reported statistically significant increases in lung tumors (ARB, 1994b; Heinrich, 1995; Nikula, 1995). An exposure of 2.0 mg/m^3 compromises the clearance capacity of the rat lung. Studies of other rodents have been less extensive. The results in mice were mixed, depending on the strain. All three studies in hamsters were negative (ARB, 1997d).

The International Agency for Research on Cancer (IARC) concluded in 1989 that there is sufficient evidence that whole diesel engine exhaust probably causes cancer in humans and classified diesel exhaust in Group 2A: Probable human carcinogen (IARC, 1989a). The National Institute of Occupational Health and Safety recommended that whole diesel exhaust be regarded as a potential occupational carcinogen (NIOSH, 1988). The Office of Environmental Health Hazard Assessment is in the process of evaluating diesel exhaust as a potential toxic air contaminant (ARB, 1997d). The U.S. EPA is currently in the process of developing a health assessment for diesel exhaust; their first draft was released December 1995. The State of California has determined under Proposition 65 that diesel engine exhaust is a carcinogen (CCR, 1996).

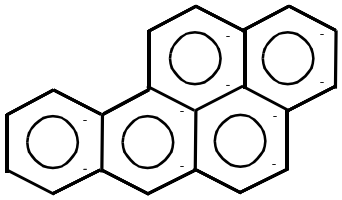
Diesel exhaust is currently in the identification phase as a proposed Toxic Air Contaminant under California's air toxics program (AB 1807). The first draft report was released in June 1994 for a six month comment period. A workshop was held in September 1994 to discuss the draft report. To further our understanding of the human health effects of diesel exhaust, the Office of Environmental Health Hazard Assessment, Health Effects Institute, World Health Organization, National Institute of Occupational Safety and Health, United States Environmental Protection Agency, and the ARB sponsored a scientific workshop to discuss the use of epidemiological data in developing quantitative cancer risk estimates for diesel exhaust. The workshop was held on January 29-30, 1996 in San Francisco.

POLYCYCLIC ORGANIC MATTER

Polycyclic organic matter is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 50-32-8

Molecular Formula: $C_{20}H_{12}$



Benzo[a]pyrene

Polycyclic organic matter (POM) consists of over 100 compounds and is defined by the Federal Clean Air Act as organic compounds with more than one benzene ring that have a boiling point greater than or equal to 100 ^{o}C.

POM can be divided into the subgroups of polycyclic aromatic hydrocarbons (PAHs) and PAH-derivatives. PAHs are organic compounds which include only carbon and hydrogen with
a fused ring structure containing at least two benzene (six-sided) rings. PAHs may also contain additional fused rings that are not six-sided. PAH-derivatives also have at least two benzene rings and may contain additional fused rings that are not six-sided rings. However, PAH-derivatives contain other elements in addition to carbon and hydrogen (CAPCOA, 1993).

In general, POM exists as a gas when its molecular weight is below 230 grams per mole, and is a particle above this molecular weight. This means that compounds with two rings (e.g., naphthalene) exist as a gas. Compounds with three to four rings (e.g., pyrene) exist either as a gas or particle depending on the temperature and pressure. Compounds with five rings
(e.g., dibenzo[a,h]anthracene, benzo[a]pyrene) exist as particles in the atmosphere (Atkinson, 1995).

PAHs are primarily planar, nonpolar compounds that melt well above room temperature (U.S. EPA, 1987f). Generally, PAHs exist as colorless, white, or pale yellow-green solids that are attached to particulate matter. PAHs may also exist as solids in soil or sediment (ATSDR, 1993d). PAH-derivatives include nitro-PAHs, amino-PAHs, and oxygenated PAHs (phenols, quinones, and heterocyclic aromatic compounds containing sulfur and oxygen (Finlayson-Pitts and Pitts, Jr., 1986).

Benzo[a]pyrene is a PAH and is soluble in benzene, toluene, and xylene, but practically

insoluble in water (Merck, 1983). The following table lists the physical properties of benzo[a]pyrene.

Physical Properties of Benzo[a]pyrene

Synonyms: 3,4-benz[a]pyrene; benz[a]pyrene; BaP; BP

CAS Registry Number:	50-32-8
Molecular Formula:	$C_{20}H_{12}$
Molecular Weight:	252.30
Boiling Point:	360 ºC
Melting Point:	179 ºC
Vapor Pressure:	1 mm Hg at 20 ºC
Vapor Density:	8.7 (air = 1)
Density/Specific Gravity:	1.351
Log Octanol/Water Partition Coefficient:	6.04
Conversion Factor:	1 ppm = 10.3 mg/m^3

(HSDB, 1995; Merck, 1989; Sax, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

POM is produced by the incomplete combustion of fossil fuels and vegetable matter. PAHs have been detected in motor vehicle exhaust, smoke from residential wood combustion, and fly ash from coal-fired electric generating plants (Finlayson-Pitts and Pitts, Jr., 1986). The primary stationary sources that have reported emissions of benzo[a]pyrene in California are petroleum refineries, industrial machinery manufacturers, and the wholesale trade in petroleum and petroleum products. The primary stationary sources that have reported emissions of PAHs in California are paper mills, manufacturers of miscellaneous wood products, and petroleum refining (ARB, 1997b).

B. Emissions

The total emissions of PAHs from stationary sources in California are estimated to be about 370,000 pounds per year, based on data reported under the Air Toxics “Hot Spots” Program
(AB 2588). The table below lists the portion of these emissions of the individual isomers of PAHs. There are also approximately 2,600 pounds of unspecified polycyclic organic compounds and 250,000 pounds of unspecified PAHs in addition to those listed individually (ARB, 1997b).

Emissions for Individual PAH Isomers

Compound	Emissions (pounds/year)
Acenaphthene	6
Acenaphthylene	27
Anthracene	285
Benzo[a]pyrene	304
Benzo[a]anthracene	175
Benzo[b]fluoranthene	175
Benzo[k]fluoranthene	181
Benzo[g,h,i]perylene	10
Chrysene	275
Dibenz[a,h]anthracene	211
Dibenz[a,e]pyrene	3
Fluoranthene	
23	
Fluorene	32
Indeno[1,2,3-cd]pyrene	204
Naphthalene	360,000
Phenanthrene	63
Pyrene	42

(ARB, 1997b)

C. Natural Occurrence

POM can be formed from any naturally-occurring combustion, such as forest fires (U.S. EPA, 1994a). Benzo[a]pyrene occurs in crude oils, shale oils, and coal tars, and is emitted with gases and fly ash from active volcanoes (HSDB, 1995).

AMBIENT CONCENTRATIONS

Several PAHs are routinely monitored by the statewide Air Resources Board (ARB) air toxics network. The table below gives the network's mean concentration, in nanograms per cubic meter (ng/m^3), of various PAHs from January 1996 through December 1996 (ARB, 1997c).

PAH Compound	Mean Concentration (ng/m^3)
Benzo[a]pyrene	0.194
Benzo[b]fluoranthene	0.245
Benzo[g,h,i]perylene	0.619
Benzo[k]fluoranthene	0.100
Dibenz[a,h]anthracene	0.031
Indeno[1,2,3-cd]pyrene	0.327

When benzo[a]pyrene was formally identified as a toxic air contaminant, the ARB estimated a population-weighted annual ambient concentration of 0.53 ng/m^3 based on 1988 to 1989 monitoring data (ARB, 1994e).

The United States Environmental Protection Agency (U. S. EPA) has also compiled ambient concentration data from several study areas throughout the United States during 1984-91. The overall mean concentration for POM was 8.4 ng/m^3 (U.S. EPA, 1993a).

INDOOR SOURCES AND CONCENTRATIONS

According to two large field studies conducted in California, the major sources of indoor PAHs are tobacco smoking, woodburning in fireplaces and wood stoves, and infiltration of polluted outdoor air (ARB, 1992b; Sheldon et al., 1993).

The largest field study was conducted in northern California and measured 13 PAHs inside 280 homes during the winter. Concurrent outdoor samples were collected at each home for 24 hours. The homes were selected based upon the occupants' use of tobacco, fireplaces, wood stoves, and gas heat. The table below lists the average indoor concentrations for some PAHs
for each type of combustion source. Average indoor PAH levels ranged from about one-fourth
to 6 times the average of outdoor levels. When compared to concentrations inside homes with
no obvious combustion sources ("no source"), substantially higher concentrations of all 13 PAHs were measured inside homes where smoking occurred. In addition, woodburning in fireplaces and wood stoves appeared to cause slight to moderate increases in concentrations of benzo[a]anthracene, chrysene, benzofluoranthenes, and benzo[a]pyrene indoors. Investigators estimated that infiltration of polluted outdoor air was also a major contributor to concentrations of PAHs indoors, particularly outdoor air polluted by woodsmoke (Sheldon et al., 1993).

Average PAH Concentrations in Northern California Homes (ng/m^3)

PAH Compound(s)	Smoking	Fireplace	Woodstove	Gas Heat	No Source
Benzo[a]pyrene	2.2	1.0	1.2	0.41	0.83
Benzo[e]pyrene	1.1	0.49	0.55	0.25	0.42
Indeno[ghi]perylene	2.8	1.7	1.9	0.92	1.4
Benzo[ghi]preylene	2.0	1.4	1.5	0.78	1.3
Pyrene	4.1	2.0	2.5	1.6	1.8
Chrysene	2.0	0.56	0.61	0.24	0.4
Fluoranthene	4.5	1.9	2.3	1.4	1.6
Benzo[a]anthracene	1.3	0.43	0.55	0.17	0.32
Benzofluoranthenes	3.7	1.6	2.0	0.81	1.5

(Sheldon et al., 1993)

Another field study measured 12 PAH compounds inside 125 southern California homes during a relatively warm fall season. At each home, two consecutive 12-hour samples were collected. Concurrent samples were also collected outside 65 of those homes. Average indoor PAH concentrations ranged from about one-half to two times the corresponding outdoor levels. The table below shows average concentrations (combined daytime/nighttime) for some PAHs. Levels of most PAHs were significantly higher in homes where smoking occurred than in nonsmokers' homes. As in the northern California study, investigators estimated that infiltration of polluted outdoor air was a major source of PAHs indoors (ARB, 1992b).

Average PAH Concentrations in Southern California Homes (ng/m^3)

PAH Compound(s)	Indoor Average	Outdoor Average
Benzo[a]pyrene	0.70	0.30
Benzo[e]pyrene	0.39	0.28
Indeno[ghi]perylene	1.1	0.51
Benzo[ghi]perylene	2.4	1.0
Pyrene	2.8	2.2
Chrysene	0.30	0.39
Fluoranthene	2.2	2.5
Benzo[a]anthracene	0.16	0.18

(ARB, 1992b)

Concentrations of chrysene, benzo[b]fluoranthene, benzo[d]fluoranthene, benzo[a]pyrene, dibenz[a,h]anthracene, benzo[ghi]perylene, and indeno[1,2,3-cd]pyrene were measured in 17 public office buildings in Oregon and Washington. PAH levels were higher in smoking areas than in nonsmoking areas; investigators measured an average total PAH concentration of about 9.4 ng/m^3 in the smoking areas, but only 2.4 ng/m^3 in the nonsmoking areas (Turk et al., 1987).

ATMOSPHERIC PERSISTENCE

Benzo[a]pyrene exists almost entirely in the particle phase in the atmosphere, and hence subject to wet and dry deposition. The average half-life and lifetime for particles in the troposphere is estimated to be about 3.5 to 10 days and 5 to 15 days, respectively. In addition, photolysis and reaction with ozone of particle-associated benzo[a]pyrene may occur, leading to
a shorter overall half-life and overall lifetime of benzo[a]pyrene than estimated from wet and dry deposition of the host particles alone (Balkanski et al., 1993; Atkinson, 1995). Benzo[a]pyrene generally associates in the atmosphere with particulate matter three microns or less in size. Benzo[a]pyrene comprises no more than 5 percent of the total PAHs present in the atmosphere (Ronia, et al., 1983).

Besides benzo[a]pyrene, other PAHs are emitted or formed in the atmosphere. Volatile, 2- to 4-ring PAHs present in POM exist in the atmosphere at least partially in the gas phase. These gas-phase PAHs react with hydroxyl (OH) radicals, NO_3 radicals, and ozone in the atmosphere, with the OH radical reaction generally dominating as the PAH loss process (Atkinson and Arey, 1994). The estimated half-lives and lifetimes of the 2- and 4-ring volatile PAHs in the atmosphere due to reaction with the OH radical are in the range of 2 to 19 hours and 3 to 27 hours, respectively (Atkinson and Arey, 1994). The products of the OH radical reactions include hydroxyl-PAH, nitro-PAH (in low, less than 5 percent, yield), and ring-opened dicarbonyls.

Although generally of minor importance as a PAH atmospheric loss process, the nighttime NO_3 radical reactions lead to the formation of nitro-PAH in high yields for certain PAH (naphthalene, 1- and 2-methylnaphthalene and fluoranthene) and the NO_3 radical reactions can be an important atmospheric route to the formation of mutagenic nitro-PAH (Atkinson and Arey, 1994). The atmospheric photooxidations of phenanthrene and pyrene lead to the formation, in low yield, of nitro-PAH lactones (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

The Office of Environmental Health Hazard Assessment reviews risk assessments submitted under the Air Toxics “Hot Spots” Program (AB 2588). Of the risk assessments reviewed as of April 1996, PAHs were a major contributor to the overall cancer risk in 43 of the approximately 550 risk assessments reporting a total cancer risk equal to or greater than 1 in 1 million, and contributed to the total cancer risk in 166 of these risk assessments. PAHs also were the major contributor to overall cancer risk in 8 of the approximately 130 risk assessments reporting a total cancer risk equal to or greater than 10 in 1 million, and contributed to the total cancer risk in 54 of these risk assessments (OEHHA, 1996a).

Indeno[1,2,3,-cd]pyrene and dibenz[a,h]anthracene each contributed to the total cancer risk
in 2 of the approximately 550 risk assessments reporting a total cancer risk equal to or greater than 1 in 1 million. Indeno[1,2,3,-cd]pyrene also contributed to the total cancer risk in 1 of the approximately 130 risk assessments reporting a total cancer risk equal to or greater than 10 in
1 million (OEHHA, 1996a).

Benzo[a]anthracene, benzo[a]pyrene, and benzo[k]fluoranthene each contributed to the total cancer risk in 1 of the risk assessments reporting a total cancer risk equal to or greater than 1 in
1 million (OEHHA, 1996a).

HEALTH EFFECTS

Probable routes of human exposure to POM are inhalation, ingestion, and dermal contact.

Non-Cancer: No information is available on the acute effects of POM in humans. Enzyme alterations in the mucosa of the gastrointestinal tract and increased liver weights have been reported in animals exposed orally to several PAHs. Chronic exposure to benzo[a]pyrene in humans has resulted in dermatitis, photosensitization in sunlight, eye irritation and cataracts. Animal studies have reported effects on the blood and liver from oral exposure to benzo[a]pyrene and effects on the immune system from dermal exposure to benzo[a]pyrene (ATSDR, 1993d).

The U.S. EPA has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for POM or for benzo[a]pyrene (U.S. EPA, 1994a).

No information is available on adverse reproductive or developmental effects of POM in humans (U.S. EPA, 1994a). Oral exposure to benzo[a]pyrene in animals has been reported to result in adverse reproductive effects, including reduced incidence of pregnancy and decreased fertility, and developmental effects such as reduced viability of litters and reduced mean pup weight, and decreased fertility in offspring (U.S. EPA, 1994a; ATSDR, 1993d). Benzo[a]pyrene has been demonstrated to cause transplacental carcinogenesis in animals (ATSDR, 1993d).

Cancer: Results from epidemiologic studies have indicated an increase in lung cancer occurs in humans exposed to coke oven emissions, roofing tar emissions, and cigarette smoke. Each
of these mixtures contains a number of PAHs. Respiratory tract tumors have been reported in animals exposed via inhalation to benzo[a]pyrene and forestomach tumors, leukemia, esophageal and laryngeal tumors from oral exposure (U.S. EPA, 1994a).

The U.S. EPA has classified benzo[a]pyrene in Group B2: Probable human carcinogen, and has calculated an oral unit risk estimate of 2.1×10^{-4} (microgram per liter)$^{-1}$. This means that
if an individual were to ingest water containing benzo[a]pyrene at 0.005 micrograms per liter over an entire lifetime, that person would theoretically have no more than a 1-in-1-million increased chance of developing cancer (U.S. EPA, 1994a). The International Agency for Research on Cancer (IARC) has classified benzo[a]pyrene in Group 2A: Probable human carcinogen based on sufficient evidence in animals and limited evidence in humans (IARC, 1987a).

The State of California has determined under Proposition 65 that several POM compounds (including benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, chrysene, indeno[1,2,3-cd]pyrene, 3,7-dinitrofluoranthene, and 3,9-dinitrofluoranthene) are carcinogens (CCR, 1997). The inhalation potency factor that has been used as a basis for regulatory action in California is 1.1×10^{-3} (microgram per cubic meter)$^{-1}$ for benzo[a]pyrene (OEHHA, 1994). In other words, the most potential excess cancer risk for a person exposed over a lifetime to 1 microgram per cubic meter of benzo[a]pyrene is 1,100 in one million. The oral potency factor that has been used as a basis

for regulatory action in California is 12 (milligram per kilogram per day)$^{-1}$ for benzo[a]pyrene (OEHHA, 1994).

There are also a number of PAHs now listed that do not have specific cancer potency factors, but can be assessed using a relative potency scheme with benzo[a]pyrene as a reference compound. These compounds and the suggested potency equivalency factor (PEF) are listed below. The PEF may be used for both inhalation and oral exposure pathways, although data
used for their development were prioritized so inhalation exposure was given higher priority than other routes of exposure. This weighting scheme for PAHs was developed by the Air Toxicology and Epidemiology Section of the Office of Environmental Health Hazard

Assessment in the document entitled Benzo[a]pyrene as a Toxic Air Contaminant (ARB, 1994e). When a specific potency value is developed for a chemical, it should be used in place of the PEF.

Potency Equivalency Factors (PEF)

PAH or Derivative	CAS Number	Suggested PEF
benzo[a]pyrene	50-32-8	1.0 (index compound)
benzo[a]anthracene	56-55-3	0.1
benzo[b]fluoranthene	205-99-2	0.1
benzo[j]fluoranthene	205-82-3	0.1
benzo[k]fluoranthene	207-08-9	0.1
dibenz[a,j]acridine	224-42-0	0.1
dibenz[a,h]acridine	226-36-8	0.1
7H-dibenzo[c,g]carbazole	194-59-2	1.0
dibenzo[a,e]pyrene	192-65-4	1.0
dibenzo[a,h]pyrene	189-64-0	10
dibenzo[a,i]pyrene	189-55-9	10
dibenzo[a,l]pyrene	191-30-0	10
indeno[1,2,3-cd]pyrene	193-39-5	0.1
5-methylchrysene	3697-24-3	1.0
1-nitropyrene	5522-43-0	0.1
4-nitropyrene	57835-92-4	0.1
1,6-dinitropyrene	42397-64-8	10
1,8-dinitropyrene	42397-65-9	1.0
6-nitrocrysene	7496-02-8	10
2-nitrofluorene	607-57-8	0.01
chrysene	218-01-9	0.01
dibenz[a,h]anthracene*	53-70-3	0.4
7,12-dimethylbenzanthracene*	57-97-6	21.8

3-methylcholanthrene*	56-49-5	1.9
5-nitroacenaphthene*	602-87-9	0.01

The nitro PAHs are those listed as IARC class 2B. Although chrysene is an IARC class 3 carcinogen, the U.S. EPA classifies it as Group B2 (ARB, 1994e).

* An inhalation unit risk factor has been developed for this PAH for purposes of implementing Proposition 65. PEF determined by dividing the inhalation unit risk factor for the PAH by the inhalation unit risk factor for benzo[a]pyrene.

APPENDIX C

EMISSIONS CALCULATIONS

Asphalt Plant Emission Calculations

Annual production (tpy): 200,000
Peak hour production (tph): 400

TAC ID	Pollutant	Emission Factor (lbs/ton)	Emissions Peak Annual (lb/yr)	Emissions Peak Hourly (lb/hr)
50000	formaldehyde	3.89E-05	7.78	1.6E-02
50328	Benzo(a)pyrene	1.04E-09	2.1E-04	4.2E-07
53703	Dibenz(a,h)anthracene	1.04E-09	2.1E-04	4.2E-07
56553	Benz(a)anthracene	1.03E-08	2.1E-03	4.1E-06
71432	benzene	1.94E-05	3.88	7.8E-03
71556	methyl chloroform	2.83E-06	0.57	1.1E-03
75070	acetaldehyde	5.80E-05	11.60	2.3E-02
91203	naphthalene	1.56E-05	3.12	6.2E-03
100404	Ethyl benzene	2.70E-05	5.40	1.1E-02
108883	toluene	4.50E-05	9.00	1.8E-02
191242	Benzo(g,h,i)perylene	1.27E-09	2.5E-04	5.1E-07
192972	Benzo(e)pyrene	3.94E-09	7.9E-04	1.6E-06
193395	Indeno(1,2,3-cd)pyrene	1.04E-09	2.1E-04	4.2E-07
205992	Benzo(b)fluoranthene	5.31E-10	1.1E-04	2.1E-07
207089	Benzo(k)fluoranthene	1.55E-09	3.1E-04	6.2E-07
218019	Chrysene	1.55E-09	3.1E-04	6.2E-07
1330207	xylene	4.05E-05	8.10	1.6E-02
7439921	lead	1.52E-06	0.30	6.1E-04
7439965	manganese	2.16E-05	4.32	8.6E-03
7439976	mercury	3.39E-06	0.68	1.4E-03
7440020	nickel	2.05E-06	0.41	8.2E-04
7440382	Arsenic	6.13E-07	0.12	2.5E-04
7440417	beryllium	9.08E-07	0.18	3.6E-04
7440439	cadmium	9.44E-07	0.19	3.8E-04
7440473	Chromium (Total)	1.04E-06	0.21	4.2E-04
7440508	copper	3.37E-06	0.67	1.3E-03
7440666	zinc	1.24E-05	2.48	5.0E-03
7782492	selenium	6.13E-07	0.12	2.5E-04
7783064	Hydrogen sulfide	7.25E-04	145.00	2.9E-01
18540299	chromium VI	3.05E-07	0.06	1.2E-04
n/a	Acenaphthene	5.72E-07	0.11	2.3E-04
n/a	Acenaphthylene	2.14E-07	0.04	8.6E-05
n/a	Anthracene	9.45E-08	0.02	3.8E-05
n/a	Fluoranthene	7.46E-08	0.01	3.0E-05
n/a	Fluorene	2.07E-06	0.41	8.3E-04
n/a	Phenanthrene	1.91E-06	0.38	7.6E-04
n/a	Pyrene	6.14E-08	0.01	2.5E-05

Emission factors are from the California Air Toxic Emission Factor (CATEF) database for natural gas fired asphalt plants (http://www.arb.ca.gov/ei/catef/catef.htm). CATEF Emissions factors are based on a number of source tests conducted in the early 1990s. The median emission factors are used and are conservative because advances in asphalt production technology result in more efficient and cleaner plants.

Load Out and Silo Loading Emission Factors

Spreadsheet Provided by Manufacturer

Pollutant	CAS #	Uncontrolled Emissions						Controlled Emissions				Total Emissions	
		Load-out			Silo Filling			Load-out		Silo Filling			
		EF[1] (%)	lb/hr	lb/year	EF[1] (%)	lb/hr	lb/year	lb/hr	lb/year	lb/hr	lb/year	lb/hr	lb/year
Naphthalene	91-20-3	1.25	1.70E-03	0.852	1.82	1.85E-03	0.924	8.52E-05	0.043	9.24E-05	0.046	1.78E-04	0.089
TOTAL PAH HAPs		5.93	8.09E-03	4.044	11.4	1.16E-02	5.789	4.04E-04	0.202	5.79E-04	0.289	9.83E-04	0.492
PAH HAPs MINUS NAPHTHALENE		4.68	6.38E-03	3.191	9.58	9.73E-03	4.865	3.19E-04	0.160	4.86E-04	0.243	8.06E-04	0.403
Phenol	108-95-2	1.18	1.61E-03	0.805	ND			8.05E-05	0.040	Not Detected		8.05E-05	0.040
Benzene	71-43-2	0.052	8.65E-04	0.43	0.032	1.56E-03	0.78	4.33E-05	0.022	7.80E-05	0.039	1.21E-04	0.061
Bromomethane	74-83-9	0.0096	1.60E-04	0.08	0.0049	2.39E-04	0.12	won't condense - not controlled				3.99E-04	1.99E-01
2-Butanone	78-93-3	0.049	8.15E-04	0.41	0.039	1.90E-03	0.95	4.08E-05	0.020	9.51E-05	0.048	1.36E-04	0.068
Carbon Disulfide	75-15-0	0.013	2.16E-04	0.11	0.016	7.80E-04	0.39	1.08E-05	0.005	3.90E-05	0.019	4.98E-05	0.025
Chloroethane	75-00-3	0.00021	3.49E-06	0.00	0.004	1.95E-04	0.10	won't condense - not controlled				1.98E-04	9.92E-02
Ethyl benzene	100-41-4	0.28	4.66E-03	2.33	0.038	1.85E-03	0.93	2.33E-04	0.116	9.26E-05	0.046	3.26E-04	0.163
Formaldehyde	50-00-0	0.088	1.46E-03	0.73	0.69	3.36E-02	16.82	won't condense - not controlled				3.51E-02	17.55
n-Hexane	100-54-3	0.15	2.50E-03	1.25	0.1	4.87E-03	2.44	1.25E-04	0.062	2.44E-04	0.122	3.69E-04	0.184
Methylene Chloride	75-09-2	ND			0.00027	1.32E-05	0.01	ND		6.58E-07	3.29E-04	6.58E-07	0.000
Styrene	100-42-5	0.0073	1.21E-04	0.06	0.0054	2.63E-04	0.13	6.07E-06	0.003	1.32E-05	0.007	1.92E-05	0.010
Tetrachloroethane	127-184-4	0.0077	1.28E-04	0.06	ND			6.40E-06	0.003	Not Detected		6.40E-06	0.003
Toluene	100-88-3	0.21	3.49E-03	1.75	0.062	3.02E-03	1.51	1.75E-04	0.087	1.51E-04	0.076	3.26E-04	0.163
Trichlorofluoromethane	75-69-4	0.0013	2.16E-05	0.01	ND			1.08E-06	0.001	Not Detected		1.08E-06	0.001
m-/p-Xylene	1330-20-7	0.41	6.82E-03	3.41	0.2	9.75E-03	4.87	3.41E-04	0.171	4.87E-04	0.244	8.29E-04	0.414
o-Xylene	95-47-6	0.08	1.33E-03	0.67	0.057	2.78E-03	1.39	6.65E-05	0.033	1.39E-04	0.069	2.05E-04	0.103
Total Volatile Organic HAPs		1.5	2.50E-02	12.48	1.3	6.34E-02	31.69	1.25E-03	0.624	3.17E-03	1.584		

Assumptions:

Production capacity:	400	tph	Asphalt Volatility (V):	-0.50
Average Annual Production:	200,000	tons	Mix Temp (F):	325
Control Efficiency:	95%			

[1] Emission factor % represents a percent of the TOC emission rate

Plant Load-out Emission Factors:

Total PM:	EF = 0.000181+0.00141(-V)e^((0.0251)(T+460)-20.43)	0.000522
Organic PM:	EF = 0.00141(-V)e^((0.0251)(T+460)-20.43)	0.000341
TOC	EF = 0.0172(-V)e^((0.0251)(T+460)-20.43)	0.004159
CO	EF = 0.00558(-V)e^((0.0251)(T+460)-20.43)	0.001349

Plant Load-out Emission Rates:

Total PM:	0.209	lb/hr	104.4	lb/year	0.052	ton/year	uncontrolled rates
	0.010	lb/hr	5.2	lb/year	0.003	ton/year	controlled rates
Organic PM:	0.136	lb/hr	68.2	lb/year	0.034	ton/year	see above
TOC	1.664	lb/hr	831.8	lb/year	0.416	ton/year	see above
CO	0.540	lb/hr	269.8	lb/year	0.135	ton/year	uncontrolled

Silo Filling Emission Factors:

Total PM:	EF = 0.000332 + 0.00105(-V)e^((0.0251)(T+460)-20.43)	0.000586
Organic PM:	EF = 0.00105(-V)e^((0.0251)(T+460)-20.43)	0.000254
TOC	EF = 0.0504(-V)e^((0.0251)(T+460)-20.43)	0.012187
CO	EF = 0.00488(-V)e^((0.0251)(T+460)-20.43)	0.001180

Silo Filling Emission Rates:

Total PM:	0.234	lb/hr	117.2	lb/year	0.059	ton/year	uncontrolled rates
	0.012	lb/hr	5.9	lb/year	0.003	ton/year	controlled rates
Organic PM:	0.102	lb/hr	50.8	lb/year	0.025	ton/year	see above
TOC	4.875	lb/hr	2437.3	lb/year	1.219	ton/year	see above
CO	0.472	lb/hr	236.0	lb/year	0.118	ton/year	uncontrolled

Asphaltic Oil Heater Emissions

Toxics	EF (lb/MMcf)	Peak Annual Emissions (lb/yr)	Peak Hourly Emissions (lb/hr)
arsenic	0.0002	0.0020	2.29E-07
barium	0.0044	0.0441	5.03E-06
beryllium	0.0000	0.0001	1.37E-08
cadmium	0.0011	0.0110	1.26E-06
chromium	0.0014	0.0140	1.60E-06
cobalt	0.0001	0.0008	9.60E-08
copper	0.0009	0.0085	9.71E-07
manganese	0.0004	0.0038	4.34E-07
mercury	0.0003	0.0026	2.97E-07
nickel	0.0021	0.0210	2.40E-06
selenium	0.0000	0.0002	2.74E-08
zinc	0.0290	0.2903	3.31E-05
acetaldehyde	0.0043	0.0430	4.91E-06
acrolein	0.0027	0.0270	3.09E-06
benzene	0.0080	0.0801	9.14E-06
ethylbenzene	0.0095	0.0951	1.09E-05
formaldehyde	0.0170	0.1702	1.94E-05
hexane	0.0063	0.0631	7.20E-06
naphthalene	0.0003	0.0030	3.43E-07
total PAH's (excl. Naphth)	0.0001	0.0010	1.14E-07
propylene	0.7310	7.3184	8.35E-04
toluene	0.0366	0.3664	4.18E-05
xylenes	0.0272	0.2723	3.11E-05

Greyed emissions are not relevant to health risk assessment because the pollutants do not have health risk values.

Assumptions

1.2 MMBtu/hr
10512 MMBtu/yr
10.0 MMcf/yr

References

AP-42 Table 1.4-4, 7/1998.
VCAPCD AB2588 Emission Factors for Natural Gas Fired External Combustion Equipment.

Mitigated Off-Road Emissions

Summary for Model Input

		Total	North Pit	South Pit	Plant
VOC	lb/hr	1.09	0.21	0.34	0.54
DPM	lb/hr	0.66	0.12	0.20	0.35
DPM-Cancer	lb/yr	308	61	100	147
DPM-Noncancer	lb/yr	943.2	188	305	451
Model Area Sources	sq. ft.	510378	194503	315875	

Mitigated Off-Road Emissions						VOC	PM_{10}		DPM					
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	TOTAL	16,082	4,872,894			0.15	0.09			943.2				
2013	TOTAL	16,082	4,872,894			0.14	0.08			903.7				
2014	TOTAL	16,082	4,872,894			0.14	0.08			851.0				
2015	TOTAL	16,082	4,872,894			0.14	0.08			830.3				
2016	TOTAL	16,082	4,872,894			0.13	0.07			782.1				
2017	TOTAL	16,082	4,872,894			0.12	0.07			718.1				
2018	TOTAL	16,082	4,872,894			0.11	0.06			603.9				
2019	TOTAL	16,082	4,872,894			0.10	0.05			526.3				
2020	TOTAL	16,082	4,872,894			0.09	0.04			475.5				
2021	TOTAL	16,082	4,872,894			0.08	0.04			420.6				
2022	TOTAL	16,082	4,872,894			0.08	0.03			352.4				
2023	TOTAL	16,082	4,872,894			0.07	0.03			316.3				
2024	TOTAL	16,082	4,872,894			0.07	0.03			290.3				
2025	TOTAL	16,082	4,872,894			0.06	0.02			250.3				
2026	TOTAL	16,082	4,872,894			0.06	0.02			229.4				
2027	TOTAL	16,082	4,872,894			0.06	0.02			213.3				
2028	TOTAL	16,082	4,872,894			0.06	0.02			198.8				
2029	TOTAL	16,082	4,872,894			0.06	0.02			185.9	308.13	61.30	99.55	147.28

Mitigated Off-Road Emissions						VOC	PM_{10}		DPM					
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	140 H Grader	2.0	606	185	0.4087	0.35	0.21	0.058094	0.034517	20.9				
2013	140 H Grader	2.0	606	185	0.4087	0.35	0.21			20.9				
2014	140 H Grader	2.0	606	185	0.4087	0.36	0.21			20.9				
2015	140 H Grader	2.0	606	185	0.4087	0.37	0.21			20.9				
2016	140 H Grader	2.0	606	185	0.4087	0.37	0.21			20.8				
2017	140 H Grader	2.0	606	185	0.4087	0.37	0.20			20.3				
2018	140 H Grader	2.0	606	185	0.4087	0.36	0.19			19.4				
2019	140 H Grader	2.0	606	185	0.4087	0.33	0.18			17.7				
2020	140 H Grader	2.0	606	185	0.4087	0.33	0.17			16.9				
2021	140 H Grader	2.0	606	185	0.4087	0.31	0.16			15.8				
2022	140 H Grader	2.0	606	185	0.4087	0.29	0.14			14.0				
2023	140 H Grader	2.0	606	185	0.4087	0.26	0.13			12.7				
2024	140 H Grader	2.0	606	185	0.4087	0.24	0.11			11.3				
2025	140 H Grader	2.0	606	185	0.4087	0.21	0.09			9.4				
2026	140 H Grader	2.0	606	185	0.4087	0.19	0.08			8.1				
2027	140 H Grader	2.0	606	185	0.4087	0.18	0.07			7.0				
2028	140 H Grader	2.0	606	185	0.4087	0.17	0.06			6.4				
2029	140 H Grader	2.0	606	185	0.4087	0.17	0.06			5.9	9.35	3.56	5.79	0
2012	980G Loader (Agg)	10.5	3,188	318	0.3618	0.36	0.21	0.091326	0.053824	171.6				
2013	980G Loader (Agg)	10.5	3,188	318	0.3618	0.36	0.21			169.0				
2014	980G Loader (Agg)	10.5	3,188	318	0.3618	0.35	0.20			159.5				
2015	980G Loader (Agg)	10.5	3,188	318	0.3618	0.35	0.19			154.8				
2016	980G Loader (Agg)	10.5	3,188	318	0.3618	0.33	0.18			142.1				
2017	980G Loader (Agg)	10.5	3,188	318	0.3618	0.31	0.16			131.2				
2018	980G Loader (Agg)	10.5	3,188	318	0.3618	0.28	0.14			114.2				
2019	980G Loader (Agg)	10.5	3,188	318	0.3618	0.26	0.12			100.4				
2020	980G Loader (Agg)	10.5	3,188	318	0.3618	0.24	0.11			91.7				
2021	980G Loader (Agg)	10.5	3,188	318	0.3618	0.22	0.10			79.5				
2022	980G Loader (Agg)	10.5	3,188	318	0.3618	0.20	0.08			66.2				
2023	980G Loader (Agg)	10.5	3,188	318	0.3618	0.18	0.07			56.6				
2024	980G Loader (Agg)	10.5	3,188	318	0.3618	0.17	0.06			51.4				
2025	980G Loader (Agg)	10.5	3,188	318	0.3618	0.16	0.05			42.7				
2026	980G Loader (Agg)	10.5	3,188	318	0.3618	0.16	0.05			38.8				
2027	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			35.3				
2028	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			33.2				
2029	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			31.2	54.76	0	0	54.76

Mitigated Off-Road Emissions						VOC	PM_{10}		DPM					
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	980G Loader (HMA)	2.0	615	318	0.3618	0.36	0.21	0.091326	0.053824	33.1				
2013	980G Loader (HMA)	2.0	615	318	0.3618	0.36	0.21			32.6				
2014	980G Loader (HMA)	2.0	615	318	0.3618	0.35	0.20			30.8				
2015	980G Loader (HMA)	2.0	615	318	0.3618	0.35	0.19			29.9				
2016	980G Loader (HMA)	2.0	615	318	0.3618	0.33	0.18			27.4				
2017	980G Loader (HMA)	2.0	615	318	0.3618	0.31	0.16			25.3				
2018	980G Loader (HMA)	2.0	615	318	0.3618	0.28	0.14			22.0				
2019	980G Loader (HMA)	2.0	615	318	0.3618	0.26	0.12			19.4				
2020	980G Loader (HMA)	2.0	615	318	0.3618	0.24	0.11			17.7				
2021	980G Loader (HMA)	2.0	615	318	0.3618	0.22	0.10			15.3				
2022	980G Loader (HMA)	2.0	615	318	0.3618	0.20	0.08			12.8				
2023	980G Loader (HMA)	2.0	615	318	0.3618	0.18	0.07			10.9				
2024	980G Loader (HMA)	2.0	615	318	0.3618	0.17	0.06			9.9				
2025	980G Loader (HMA)	2.0	615	318	0.3618	0.16	0.05			8.2				
2026	980G Loader (HMA)	2.0	615	318	0.3618	0.16	0.05			7.5				
2027	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.8				
2028	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.4				
2029	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.0	10.57	0	0	10.57
2012	Water Truck	8.0	2,424	189	0.3819	0.48	0.29	0.075831	0.046768	113.4				
2013	Water Truck	8.0	2,424	189	0.3819	0.46	0.28			107.7				
2014	Water Truck	8.0	2,424	189	0.3819	0.42	0.25			96.6				
2015	Water Truck	8.0	2,424	189	0.3819	0.42	0.24			93.0				
2016	Water Truck	8.0	2,424	189	0.3819	0.39	0.22			85.2				
2017	Water Truck	8.0	2,424	189	0.3819	0.37	0.20			77.4				
2018	Water Truck	8.0	2,424	189	0.3819	0.30	0.15			57.8				
2019	Water Truck	8.0	2,424	189	0.3819	0.27	0.13			48.7				
2020	Water Truck	8.0	2,424	189	0.3819	0.24	0.10			39.9				
2021	Water Truck	8.0	2,424	189	0.3819	0.22	0.09			33.6				
2022	Water Truck	8.0	2,424	189	0.3819	0.19	0.07			26.1				
2023	Water Truck	8.0	2,424	189	0.3819	0.18	0.06			24.2				
2024	Water Truck	8.0	2,424	189	0.3819	0.18	0.06			22.2				
2025	Water Truck	8.0	2,424	189	0.3819	0.16	0.05			17.7				
2026	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			16.5				
2027	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.6				
2028	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.2				
2029	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.1	28.62	0	0	28.62

Mitigated Off-Road Emissions						VOC	PM_{10}		DPM					
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	Street Sweeper	2.0	606	189	0.4556	0.56	0.36	0.10554	0.068768	41.7				
2013	Street Sweeper	2.0	606	189	0.4556	0.52	0.33			38.3				
2014	Street Sweeper	2.0	606	189	0.4556	0.53	0.34			38.6				
2015	Street Sweeper	2.0	606	189	0.4556	0.54	0.34			38.9				
2016	Street Sweeper	2.0	606	189	0.4556	0.54	0.34			39.3				
2017	Street Sweeper	2.0	606	189	0.4556	0.54	0.33			38.4				
2018	Street Sweeper	2.0	606	189	0.4556	0.37	0.21			24.6				
2019	Street Sweeper	2.0	606	189	0.4556	0.25	0.13			14.4				
2020	Street Sweeper	2.0	606	189	0.4556	0.22	0.10			11.5				
2021	Street Sweeper	2.0	606	189	0.4556	0.17	0.07			8.0				
2022	Street Sweeper	2.0	606	189	0.4556	0.16	0.06			7.3				
2023	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			7.3				
2024	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			7.4				
2025	Street Sweeper	2.0	606	189	0.4556	0.18	0.06			7.4				
2026	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			6.5				
2027	Street Sweeper	2.0	606	189	0.4556	0.18	0.06			6.6				
2028	Street Sweeper	2.0	606	189	0.4556	0.16	0.05			5.4				
2029	Street Sweeper	2.0	606	189	0.4556	0.14	0.04			4.0	9.84	0	0	9.84
2012	Caterpillar 730	5.0	1,515	325	0.3819	0.48	0.22	0.130397	0.060243	91.3				
2013	Caterpillar 730	5.0	1,515	325	0.3819	0.46	0.21			85.3				
2014	Caterpillar 730	5.0	1,515	325	0.3819	0.42	0.19			77.9				
2015	Caterpillar 730	5.0	1,515	325	0.3819	0.42	0.18			75.0				
2016	Caterpillar 730	5.0	1,515	325	0.3819	0.39	0.16			66.3				
2017	Caterpillar 730	5.0	1,515	325	0.3819	0.37	0.14			59.2				
2018	Caterpillar 730	5.0	1,515	325	0.3819	0.30	0.12			49.0				
2019	Caterpillar 730	5.0	1,515	325	0.3819	0.27	0.10			42.2				
2020	Caterpillar 730	5.0	1,515	325	0.3819	0.24	0.09			37.2				
2021	Caterpillar 730	5.0	1,515	325	0.3819	0.22	0.08			31.2				
2022	Caterpillar 730	5.0	1,515	325	0.3819	0.19	0.06			23.6				
2023	Caterpillar 730	5.0	1,515	325	0.3819	0.18	0.05			20.8				
2024	Caterpillar 730	5.0	1,515	325	0.3819	0.18	0.05			19.3				
2025	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			16.5				
2026	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			15.1				
2027	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			14.6				
2028	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.03			13.4				
2029	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.03			12.6	23.71	0	0	23.71

Mitigated Off-Road Emissions						VOC	PM_{10}		DPM					
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	Hitachi EX1100	6.2	1,872	550	0.3819	0.25	0.15	0.11432	0.071525	133.9				
2013	Hitachi EX1100	6.2	1,872	550	0.3819	0.22	0.13			116.6				
2014	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			105.5				
2015	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			104.3				
2016	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			101.7				
2017	Hitachi EX1100	6.2	1,872	550	0.3819	0.18	0.10			82.9				
2018	Hitachi EX1100	6.2	1,872	550	0.3819	0.17	0.08			69.9				
2019	Hitachi EX1100	6.2	1,872	550	0.3819	0.15	0.07			61.8				
2020	Hitachi EX1100	6.2	1,872	550	0.3819	0.15	0.07			56.4				
2021	Hitachi EX1100	6.2	1,872	550	0.3819	0.14	0.06			51.7				
2022	Hitachi EX1100	6.2	1,872	550	0.3819	0.13	0.05			43.5				
2023	Hitachi EX1100	6.2	1,872	550	0.3819	0.13	0.05			39.8				
2024	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			37.4				
2025	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			35.0				
2026	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			31.7				
2027	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			30.8				
2028	Hitachi EX1100	6.2	1,872	550	0.3819	0.11	0.03			28.3				
2029	Hitachi EX1100	6.2	1,872	550	0.3819	0.11	0.03			26.0	40.65	15.49	25.16	0
2012	966G Loader (RMC)	4.6	1,397	262	0.3618	0.36	0.21	0.075244	0.044345	62.0				
2013	966G Loader (RMC)	4.6	1,397	262	0.3618	0.36	0.21			61.0				
2014	966G Loader (RMC)	4.6	1,397	262	0.3618	0.35	0.20			57.6				
2015	966G Loader (RMC)	4.6	1,397	262	0.3618	0.35	0.19			55.9				
2016	966G Loader (RMC)	4.6	1,397	262	0.3618	0.33	0.18			51.3				
2017	966G Loader (RMC)	4.6	1,397	262	0.3618	0.31	0.16			47.4				
2018	966G Loader (RMC)	4.6	1,397	262	0.3618	0.28	0.14			41.2				
2019	966G Loader (RMC)	4.6	1,397	262	0.3618	0.26	0.12			36.3				
2020	966G Loader (RMC)	4.6	1,397	262	0.3618	0.24	0.11			33.1				
2021	966G Loader (RMC)	4.6	1,397	262	0.3618	0.22	0.10			28.7				
2022	966G Loader (RMC)	4.6	1,397	262	0.3618	0.20	0.08			23.9				
2023	966G Loader (RMC)	4.6	1,397	262	0.3618	0.18	0.07			20.4				
2024	966G Loader (RMC)	4.6	1,397	262	0.3618	0.17	0.06			18.6				
2025	966G Loader (RMC)	4.6	1,397	262	0.3618	0.16	0.05			15.4				
2026	966G Loader (RMC)	4.6	1,397	262	0.3618	0.16	0.05			14.0				
2027	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			12.7				
2028	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			12.0				
2029	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			11.3	19.78	0	0	19.78

Mitigated Off-Road Emissions						VOC	PM_{10}		DPM					
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	Dragline	4.0	1,212	900	0.4288	0.41	0.27	0.348833	0.227265	275.4				
2013	Dragline	4.0	1,212	900	0.4288	0.41	0.26			272.3				
2014	Dragline	4.0	1,212	900	0.4288	0.40	0.26			263.5				
2015	Dragline	4.0	1,212	900	0.4288	0.40	0.25			257.6				
2016	Dragline	4.0	1,212	900	0.4288	0.39	0.24			247.9				
2017	Dragline	4.0	1,212	900	0.4288	0.37	0.23			235.9				
2018	Dragline	4.0	1,212	900	0.4288	0.33	0.20			205.8				
2019	Dragline	4.0	1,212	900	0.4288	0.31	0.18			185.5				
2020	Dragline	4.0	1,212	900	0.4288	0.29	0.17			171.0				
2021	Dragline	4.0	1,212	900	0.4288	0.28	0.15			156.8				
2022	Dragline	4.0	1,212	900	0.4288	0.25	0.13			135.1				
2023	Dragline	4.0	1,212	900	0.4288	0.23	0.12			123.6				
2024	Dragline	4.0	1,212	900	0.4288	0.22	0.11			112.7				
2025	Dragline	4.0	1,212	900	0.4288	0.20	0.10			98.0				
2026	Dragline	4.0	1,212	900	0.4288	0.20	0.09			91.1				
2027	Dragline	4.0	1,212	900	0.4288	0.19	0.08			83.9				
2028	Dragline	4.0	1,212	900	0.4288	0.18	0.08			78.4				
2029	Dragline	4.0	1,212	900	0.4288	0.18	0.07			73.9	110.85	42.25	68.61	0
2012	980G Loader (Pit Ag	0.0	0	318	0.3618	0.36	0.21			0.0				
2013	980G Loader (Pit Ag	0.0	0	318	0.3618	0.36	0.21			0.0				
2014	980G Loader (Pit Ag	0.0	0	318	0.3618	0.35	0.20			0.0				
2015	980G Loader (Pit Ag	0.0	0	318	0.3618	0.35	0.19			0.0				
2016	980G Loader (Pit Ag	0.0	0	318	0.3618	0.33	0.18			0.0				
2017	980G Loader (Pit Ag	0.0	0	318	0.3618	0.31	0.16			0.0				
2018	980G Loader (Pit Ag	0.0	0	318	0.3618	0.28	0.14			0.0				
2019	980G Loader (Pit Ag	0.0	0	318	0.3618	0.26	0.12			0.0				
2020	980G Loader (Pit Ag	0.0	0	318	0.3618	0.24	0.11			0.0				
2021	980G Loader (Pit Ag	0.0	0	318	0.3618	0.22	0.10			0.0				
2022	980G Loader (Pit Ag	0.0	0	318	0.3618	0.20	0.08			0.0				
2023	980G Loader (Pit Ag	0.0	0	318	0.3618	0.18	0.07			0.0				
2024	980G Loader (Pit Ag	0.0	0	318	0.3618	0.17	0.06			0.0				
2025	980G Loader (Pit Ag	0.0	0	318	0.3618	0.16	0.05			0.0				
2026	980G Loader (Pit Ag	0.0	0	318	0.3618	0.16	0.05			0.0				
2027	980G Loader (Pit Ag	0.0	0	318	0.3618	0.15	0.04			0.0				
2028	980G Loader (Pit Ag	0.0	0	318	0.3618	0.15	0.04			0.0				
2029	980G Loader (Pit Ag	0.0	0	318	0.3618	0.15	0.04			0.0				

Mitigated Off-Road Emissions						VOC	PM_{10}		DPM					
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	773 Truck	0.0	0	740	0.3819	0.48	0.29			0.0				
2013	773 Truck	0.0	0	740	0.3819	0.47	0.28			0.0				
2014	773 Truck	0.0	0	740	0.3819	0.42	0.24			0.0				
2015	773 Truck	0.0	0	740	0.3819	0.39	0.22			0.0				
2016	773 Truck	0.0	0	740	0.3819	0.36	0.20			0.0				
2017	773 Truck	0.0	0	740	0.3819	0.34	0.18			0.0				
2018	773 Truck	0.0	0	740	0.3819	0.30	0.15			0.0				
2019	773 Truck	0.0	0	740	0.3819	0.28	0.14			0.0				
2020	773 Truck	0.0	0	740	0.3819	0.27	0.13			0.0				
2021	773 Truck	0.0	0	740	0.3819	0.26	0.11			0.0				
2022	773 Truck	0.0	0	740	0.3819	0.23	0.09			0.0				
2023	773 Truck	0.0	0	740	0.3819	0.23	0.09			0.0				
2024	773 Truck	0.0	0	740	0.3819	0.22	0.08			0.0				
2025	773 Truck	0.0	0	740	0.3819	0.20	0.07			0.0				
2026	773 Truck	0.0	0	740	0.3819	0.21	0.07			0.0				
2027	773 Truck	0.0	0	740	0.3819	0.20	0.06			0.0				
2028	773 Truck	0.0	0	740	0.3819	0.21	0.06			0.0				
2029	773 Truck	0.0	0	740	0.3819	0.19	0.06			0.0				
2012	773 Truck	0.0	0	740	0.3819	0.48	0.29			0.0				
2013	773 Truck	0.0	0	740	0.3819	0.47	0.28			0.0				
2014	773 Truck	0.0	0	740	0.3819	0.42	0.24			0.0				
2015	773 Truck	0.0	0	740	0.3819	0.39	0.22			0.0				
2016	773 Truck	0.0	0	740	0.3819	0.36	0.20			0.0				
2017	773 Truck	0.0	0	740	0.3819	0.34	0.18			0.0				
2018	773 Truck	0.0	0	740	0.3819	0.30	0.15			0.0				
2019	773 Truck	0.0	0	740	0.3819	0.28	0.14			0.0				
2020	773 Truck	0.0	0	740	0.3819	0.27	0.13			0.0				
2021	773 Truck	0.0	0	740	0.3819	0.26	0.11			0.0				
2022	773 Truck	0.0	0	740	0.3819	0.23	0.09			0.0				
2023	773 Truck	0.0	0	740	0.3819	0.23	0.09			0.0				
2024	773 Truck	0.0	0	740	0.3819	0.22	0.08			0.0				
2025	773 Truck	0.0	0	740	0.3819	0.20	0.07			0.0				
2026	773 Truck	0.0	0	740	0.3819	0.21	0.07			0.0				
2027	773 Truck	0.0	0	740	0.3819	0.20	0.06			0.0				
2028	773 Truck	0.0	0	740	0.3819	0.21	0.06			0.0				
2029	773 Truck	0.0	0	740	0.3819	0.19	0.06			0.0				

0.367	lb/hp-hr
2000	lb/ton
453.59237	g/lb
7.05	lb/gal diesel
1000	kg/MT
2205	lb/MT

[1] Horsepowers based on engine specs provided by Applicant.
[2] Load factors are from OFFROAD2011.
[4] Emissions factors are average for type and size of equipment as determined using OFFROAD2011.
Emissions factors for the Project fleet by year incorporate load factor.
[5] PM2.5 emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Off-Road Equipment: Diesel.
[6] Future year NOx emissions are calculated using fleet average emission factors from the off road ATCM regulation.
See the "Off Road and On Road Emission Profile" spreadsheet for more information.

Unmitigated Off-Road Emissions for Maximum Annualized Mining Rate of 800,000 tons per year

Summary for Model Input

		Total	North Pit	South Pit	Plant
VOC	lb/hr	1.55	0.47	0.77	0.31
DPM	lb/hr	0.93	0.28	0.45	0.20
DPM-Cancer	lb/yr	690	207	336	147
DPM-Noncancer	lb/yr	2253	727	1181	344
Model Area Source	sq. ft.	510378	194503	315875	

59 years of operation would be required at the maximum annualized rate of 800,000 tons per year.

Annualizing emissions over 47 years is conservative as compared to 54 years because end years have lower emissions than start years.

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	TOTAL	34,841	10,556,763			0.16	0.10	1.55	0.93	2252.5				
2013	TOTAL	34,841	10,556,763			0.16	0.09			2156.4				
2014	TOTAL	34,841	10,556,763			0.15	0.08			1927.2				
2015	TOTAL	34,841	10,556,763			0.14	0.08			1804.2				
2016	TOTAL	34,841	10,556,763			0.13	0.07			1648.6				
2017	TOTAL	34,841	10,556,763			0.12	0.06			1503.9				
2018	TOTAL	34,841	10,556,763			0.11	0.05			1264.2				
2019	TOTAL	34,841	10,556,763			0.10	0.05			1118.3				
2020	TOTAL	34,841	10,556,763			0.10	0.04			1025.3				
2021	TOTAL	34,841	10,556,763			0.09	0.04			904.1				
2022	TOTAL	34,841	10,556,763			0.08	0.03			746.8				
2023	TOTAL	34,841	10,556,763			0.08	0.03			692.3				
2024	TOTAL	34,841	10,556,763			0.08	0.03			643.3				
2025	TOTAL	34,841	10,556,763			0.07	0.02			540.2				
2026	TOTAL	34,841	10,556,763			0.07	0.02			519.2				
2027	TOTAL	34,841	10,556,763			0.07	0.02			477.3				
2028	TOTAL	34,841	10,556,763			0.07	0.02			468.5				
2029	TOTAL	34,841	10,556,763			0.06	0.02			424.5	689.94	206.81	335.86	147.28

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	140 H Grader	2.0	606	185	0.4087	0.35	0.21	0.058	0.035	20.9				
2013	140 H Grader	2.0	606	185	0.4087	0.35	0.21			20.9				
2014	140 H Grader	2.0	606	185	0.4087	0.36	0.21			20.9				
2015	140 H Grader	2.0	606	185	0.4087	0.37	0.21			20.9				
2016	140 H Grader	2.0	606	185	0.4087	0.37	0.21			20.8				
2017	140 H Grader	2.0	606	185	0.4087	0.37	0.20			20.3				
2018	140 H Grader	2.0	606	185	0.4087	0.36	0.19			19.4				
2019	140 H Grader	2.0	606	185	0.4087	0.33	0.18			17.7				
2020	140 H Grader	2.0	606	185	0.4087	0.33	0.17			16.9				
2021	140 H Grader	2.0	606	185	0.4087	0.31	0.16			15.8				
2022	140 H Grader	2.0	606	185	0.4087	0.29	0.14			14.0				
2023	140 H Grader	2.0	606	185	0.4087	0.26	0.13			12.7				
2024	140 H Grader	2.0	606	185	0.4087	0.24	0.11			11.3				
2025	140 H Grader	2.0	606	185	0.4087	0.21	0.09			9.4				
2026	140 H Grader	2.0	606	185	0.4087	0.19	0.08			8.1				
2027	140 H Grader	2.0	606	185	0.4087	0.18	0.07			7.0				
2028	140 H Grader	2.0	606	185	0.4087	0.17	0.06			6.4				
2029	140 H Grader	2.0	606	185	0.4087	0.17	0.06			5.9	9.35	3.56	5.79	0
2012	980G Loader (Agg)	10.5	3,188	318	0.3618	0.36	0.21	0.091	0.054	171.6				
2013	980G Loader (Agg)	10.5	3,188	318	0.3618	0.36	0.21			169.0				
2014	980G Loader (Agg)	10.5	3,188	318	0.3618	0.35	0.20			159.5				
2015	980G Loader (Agg)	10.5	3,188	318	0.3618	0.35	0.19			154.8				
2016	980G Loader (Agg)	10.5	3,188	318	0.3618	0.33	0.18			142.1				
2017	980G Loader (Agg)	10.5	3,188	318	0.3618	0.31	0.16			131.2				
2018	980G Loader (Agg)	10.5	3,188	318	0.3618	0.28	0.14			114.2				
2019	980G Loader (Agg)	10.5	3,188	318	0.3618	0.26	0.12			100.4				
2020	980G Loader (Agg)	10.5	3,188	318	0.3618	0.24	0.11			91.7				
2021	980G Loader (Agg)	10.5	3,188	318	0.3618	0.22	0.10			79.5				
2022	980G Loader (Agg)	10.5	3,188	318	0.3618	0.20	0.08			66.2				
2023	980G Loader (Agg)	10.5	3,188	318	0.3618	0.18	0.07			56.6				
2024	980G Loader (Agg)	10.5	3,188	318	0.3618	0.17	0.06			51.4				
2025	980G Loader (Agg)	10.5	3,188	318	0.3618	0.16	0.05			42.7				
2026	980G Loader (Agg)	10.5	3,188	318	0.3618	0.16	0.05			38.8				
2027	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			35.3				
2028	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			33.2				
2029	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			31.2	54.76	0	0	54.76

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	980G Loader (HMA)	2.0	615	318	0.3618	0.36	0.21	0.091	0.054	33.1				
2013	980G Loader (HMA)	2.0	615	318	0.3618	0.36	0.21			32.6				
2014	980G Loader (HMA)	2.0	615	318	0.3618	0.35	0.20			30.8				
2015	980G Loader (HMA)	2.0	615	318	0.3618	0.35	0.19			29.9				
2016	980G Loader (HMA)	2.0	615	318	0.3618	0.33	0.18			27.4				
2017	980G Loader (HMA)	2.0	615	318	0.3618	0.31	0.16			25.3				
2018	980G Loader (HMA)	2.0	615	318	0.3618	0.28	0.14			22.0				
2019	980G Loader (HMA)	2.0	615	318	0.3618	0.26	0.12			19.4				
2020	980G Loader (HMA)	2.0	615	318	0.3618	0.24	0.11			17.7				
2021	980G Loader (HMA)	2.0	615	318	0.3618	0.22	0.10			15.3				
2022	980G Loader (HMA)	2.0	615	318	0.3618	0.20	0.08			12.8				
2023	980G Loader (HMA)	2.0	615	318	0.3618	0.18	0.07			10.9				
2024	980G Loader (HMA)	2.0	615	318	0.3618	0.17	0.06			9.9				
2025	980G Loader (HMA)	2.0	615	318	0.3618	0.16	0.05			8.2				
2026	980G Loader (HMA)	2.0	615	318	0.3618	0.16	0.05			7.5				
2027	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.8				
2028	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.4				
2029	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.0	10.57	0	0	10.57
2012	Water Truck	8.0	2,424	189	0.3819	0.48	0.29	0.076	0.047	113.4				
2013	Water Truck	8.0	2,424	189	0.3819	0.46	0.28			107.7				
2014	Water Truck	8.0	2,424	189	0.3819	0.42	0.25			96.6				
2015	Water Truck	8.0	2,424	189	0.3819	0.42	0.24			93.0				
2016	Water Truck	8.0	2,424	189	0.3819	0.39	0.22			85.2				
2017	Water Truck	8.0	2,424	189	0.3819	0.37	0.20			77.4				
2018	Water Truck	8.0	2,424	189	0.3819	0.30	0.15			57.8				
2019	Water Truck	8.0	2,424	189	0.3819	0.27	0.13			48.7				
2020	Water Truck	8.0	2,424	189	0.3819	0.24	0.10			39.9				
2021	Water Truck	8.0	2,424	189	0.3819	0.22	0.09			33.6				
2022	Water Truck	8.0	2,424	189	0.3819	0.19	0.07			26.1				
2023	Water Truck	8.0	2,424	189	0.3819	0.18	0.06			24.2				
2024	Water Truck	8.0	2,424	189	0.3819	0.18	0.06			22.2				
2025	Water Truck	8.0	2,424	189	0.3819	0.16	0.05			17.7				
2026	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			16.5				
2027	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.6				
2028	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.2				
2029	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.1	28.62	0	0	28.62

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	Street Sweeper	2.0	606	189	0.4556	0.56	0.36	0.106	0.069	41.7				
2013	Street Sweeper	2.0	606	189	0.4556	0.52	0.33			38.3				
2014	Street Sweeper	2.0	606	189	0.4556	0.53	0.34			38.6				
2015	Street Sweeper	2.0	606	189	0.4556	0.54	0.34			38.9				
2016	Street Sweeper	2.0	606	189	0.4556	0.54	0.34			39.3				
2017	Street Sweeper	2.0	606	189	0.4556	0.54	0.33			38.4				
2018	Street Sweeper	2.0	606	189	0.4556	0.37	0.21			24.6				
2019	Street Sweeper	2.0	606	189	0.4556	0.25	0.13			14.4				
2020	Street Sweeper	2.0	606	189	0.4556	0.22	0.10			11.5				
2021	Street Sweeper	2.0	606	189	0.4556	0.17	0.07			8.0				
2022	Street Sweeper	2.0	606	189	0.4556	0.16	0.06			7.3				
2023	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			7.3				
2024	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			7.4				
2025	Street Sweeper	2.0	606	189	0.4556	0.18	0.06			7.4				
2026	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			6.5				
2027	Street Sweeper	2.0	606	189	0.4556	0.18	0.06			6.6				
2028	Street Sweeper	2.0	606	189	0.4556	0.16	0.05			5.4				
2029	Street Sweeper	2.0	606	189	0.4556	0.14	0.04			4.0	9.84	0	0	9.84
2012	Caterpillar 730	5.0	1,515	325	0.3819	0.48	0.22	0.130	0.060	91.3				
2013	Caterpillar 730	5.0	1,515	325	0.3819	0.46	0.21			85.3				
2014	Caterpillar 730	5.0	1,515	325	0.3819	0.42	0.19			77.9				
2015	Caterpillar 730	5.0	1,515	325	0.3819	0.42	0.18			75.0				
2016	Caterpillar 730	5.0	1,515	325	0.3819	0.39	0.16			66.3				
2017	Caterpillar 730	5.0	1,515	325	0.3819	0.37	0.14			59.2				
2018	Caterpillar 730	5.0	1,515	325	0.3819	0.30	0.12			49.0				
2019	Caterpillar 730	5.0	1,515	325	0.3819	0.27	0.10			42.2				
2020	Caterpillar 730	5.0	1,515	325	0.3819	0.24	0.09			37.2				
2021	Caterpillar 730	5.0	1,515	325	0.3819	0.22	0.08			31.2				
2022	Caterpillar 730	5.0	1,515	325	0.3819	0.19	0.06			23.6				
2023	Caterpillar 730	5.0	1,515	325	0.3819	0.18	0.05			20.8				
2024	Caterpillar 730	5.0	1,515	325	0.3819	0.18	0.05			19.3				
2025	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			16.5				
2026	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			15.1				
2027	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			14.6				
2028	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.03			13.4				
2029	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.03			12.6	23.71	0	0	23.71

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	Hitachi EX1100	6.2	1,872	550	0.3819	0.25	0.15	0.114	0.072	133.9				
2013	Hitachi EX1100	6.2	1,872	550	0.3819	0.22	0.13			116.6				
2014	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			105.5				
2015	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			104.3				
2016	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			101.7				
2017	Hitachi EX1100	6.2	1,872	550	0.3819	0.18	0.10			82.9				
2018	Hitachi EX1100	6.2	1,872	550	0.3819	0.17	0.08			69.9				
2019	Hitachi EX1100	6.2	1,872	550	0.3819	0.15	0.07			61.8				
2020	Hitachi EX1100	6.2	1,872	550	0.3819	0.15	0.07			56.4				
2021	Hitachi EX1100	6.2	1,872	550	0.3819	0.14	0.06			51.7				
2022	Hitachi EX1100	6.2	1,872	550	0.3819	0.13	0.05			43.5				
2023	Hitachi EX1100	6.2	1,872	550	0.3819	0.13	0.05			39.8				
2024	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			37.4				
2025	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			35.0				
2026	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			31.7				
2027	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			30.8				
2028	Hitachi EX1100	6.2	1,872	550	0.3819	0.11	0.03			28.3				
2029	Hitachi EX1100	6.2	1,872	550	0.3819	0.11	0.03			26.0	40.65	15.49	25.16	0
2012	966G Loader (RMC)	4.6	1,397	262	0.3618	0.36	0.21	0.075	0.044	62.0				
2013	966G Loader (RMC)	4.6	1,397	262	0.3618	0.36	0.21			61.0				
2014	966G Loader (RMC)	4.6	1,397	262	0.3618	0.35	0.20			57.6				
2015	966G Loader (RMC)	4.6	1,397	262	0.3618	0.35	0.19			55.9				
2016	966G Loader (RMC)	4.6	1,397	262	0.3618	0.33	0.18			51.3				
2017	966G Loader (RMC)	4.6	1,397	262	0.3618	0.31	0.16			47.4				
2018	966G Loader (RMC)	4.6	1,397	262	0.3618	0.28	0.14			41.2				
2019	966G Loader (RMC)	4.6	1,397	262	0.3618	0.26	0.12			36.3				
2020	966G Loader (RMC)	4.6	1,397	262	0.3618	0.24	0.11			33.1				
2021	966G Loader (RMC)	4.6	1,397	262	0.3618	0.22	0.10			28.7				
2022	966G Loader (RMC)	4.6	1,397	262	0.3618	0.20	0.08			23.9				
2023	966G Loader (RMC)	4.6	1,397	262	0.3618	0.18	0.07			20.4				
2024	966G Loader (RMC)	4.6	1,397	262	0.3618	0.17	0.06			18.6				
2025	966G Loader (RMC)	4.6	1,397	262	0.3618	0.16	0.05			15.4				
2026	966G Loader (RMC)	4.6	1,397	262	0.3618	0.16	0.05			14.0				
2027	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			12.7				
2028	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			12.0				
2029	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			11.3	19.78	0	0	19.78

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	D8R Dozer	4.0	1,212	315	0.4288	0.41	0.27	0.122	0.080	96.4				
2013	D8R Dozer	4.0	1,212	315	0.4288	0.41	0.26			95.3				
2014	D8R Dozer	4.0	1,212	315	0.4288	0.40	0.26			92.2				
2015	D8R Dozer	4.0	1,212	315	0.4288	0.40	0.25			90.2				
2016	D8R Dozer	4.0	1,212	315	0.4288	0.39	0.24			86.8				
2017	D8R Dozer	4.0	1,212	315	0.4288	0.37	0.23			82.6				
2018	D8R Dozer	4.0	1,212	315	0.4288	0.33	0.20			72.0				
2019	D8R Dozer	4.0	1,212	315	0.4288	0.31	0.18			64.9				
2020	D8R Dozer	4.0	1,212	315	0.4288	0.29	0.17			59.9				
2021	D8R Dozer	4.0	1,212	315	0.4288	0.28	0.15			54.9				
2022	D8R Dozer	4.0	1,212	315	0.4288	0.25	0.13			47.3				
2023	D8R Dozer	4.0	1,212	315	0.4288	0.23	0.12			43.3				
2024	D8R Dozer	4.0	1,212	315	0.4288	0.22	0.11			39.4				
2025	D8R Dozer	4.0	1,212	315	0.4288	0.20	0.10			34.3				
2026	D8R Dozer	4.0	1,212	315	0.4288	0.20	0.09			31.9				
2027	D8R Dozer	4.0	1,212	315	0.4288	0.19	0.08			29.4				
2028	D8R Dozer	4.0	1,212	315	0.4288	0.18	0.08			27.4				
2029	D8R Dozer	4.0	1,212	315	0.4288	0.18	0.07			25.8	38.80	14.79	24.01	0
2012	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.36	0.21	0.091	0.054	191.4				
2013	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.36	0.21			188.5				
2014	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.35	0.20			178.0				
2015	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.35	0.19			172.6				
2016	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.33	0.18			158.5				
2017	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.31	0.16			146.3				
2018	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.28	0.14			127.3				
2019	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.26	0.12			112.0				
2020	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.24	0.11			102.3				
2021	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.22	0.10			88.6				
2022	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.20	0.08			73.9				
2023	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.18	0.07			63.1				
2024	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.17	0.06			57.4				
2025	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.16	0.05			47.7				
2026	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.16	0.05			43.3				
2027	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.15	0.04			39.3				
2028	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.15	0.04			37.0				
2029	980G Loader (Pit Agg)	11.7	3556	318	0.3618	0.15	0.04			34.8	61.08	23.28	37.80	0

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	773 Truck #1	11.7	3556	740	0.3819	0.48	0.29	0.299	0.182	648.5				
2013	773 Truck #1	11.7	3556	740	0.3819	0.47	0.28			620.6				
2014	773 Truck #1	11.7	3556	740	0.3819	0.42	0.24			534.8				
2015	773 Truck #1	11.7	3556	740	0.3819	0.39	0.22			484.4				
2016	773 Truck #1	11.7	3556	740	0.3819	0.36	0.20			434.5				
2017	773 Truck #1	11.7	3556	740	0.3819	0.34	0.18			396.4				
2018	773 Truck #1	11.7	3556	740	0.3819	0.30	0.15			333.4				
2019	773 Truck #1	11.7	3556	740	0.3819	0.28	0.14			300.3				
2020	773 Truck #1	11.7	3556	740	0.3819	0.27	0.13			279.3				
2021	773 Truck #1	11.7	3556	740	0.3819	0.26	0.11			248.4				
2022	773 Truck #1	11.7	3556	740	0.3819	0.23	0.09			204.2				
2023	773 Truck #1	11.7	3556	740	0.3819	0.23	0.09			196.6				
2024	773 Truck #1	11.7	3556	740	0.3819	0.22	0.08			184.5				
2025	773 Truck #1	11.7	3556	740	0.3819	0.20	0.07			153.0				
2026	773 Truck #1	11.7	3556	740	0.3819	0.21	0.07			152.8				
2027	773 Truck #1	11.7	3556	740	0.3819	0.20	0.06			139.6				
2028	773 Truck #1	11.7	3556	740	0.3819	0.21	0.06			141.8				
2029	773 Truck #1	11.7	3556	740	0.3819	0.19	0.06			125.9	196.39	74.84	121.55	0
2012	773 Truck #2	11.7	3556	740	0.3819	0.48	0.29	0.299	0.182	648.5				
2013	773 Truck #2	11.7	3556	740	0.3819	0.47	0.28			620.6				
2014	773 Truck #2	11.7	3556	740	0.3819	0.42	0.24			534.8				
2015	773 Truck #2	11.7	3556	740	0.3819	0.39	0.22			484.4				
2016	773 Truck #2	11.7	3556	740	0.3819	0.36	0.20			434.5				
2017	773 Truck #2	11.7	3556	740	0.3819	0.34	0.18			396.4				
2018	773 Truck #2	11.7	3556	740	0.3819	0.30	0.15			333.4				
2019	773 Truck #2	11.7	3556	740	0.3819	0.28	0.14			300.3				
2020	773 Truck #2	11.7	3556	740	0.3819	0.27	0.13			279.3				
2021	773 Truck #2	11.7	3556	740	0.3819	0.26	0.11			248.4				
2022	773 Truck #2	11.7	3556	740	0.3819	0.23	0.09			204.2				
2023	773 Truck #2	11.7	3556	740	0.3819	0.23	0.09			196.6				
2024	773 Truck #2	11.7	3556	740	0.3819	0.22	0.08			184.5				
2025	773 Truck #2	11.7	3556	740	0.3819	0.20	0.07			153.0				
2026	773 Truck #2	11.7	3556	740	0.3819	0.21	0.07			152.8				
2027	773 Truck #2	11.7	3556	740	0.3819	0.20	0.06			139.6				
2028	773 Truck #2	11.7	3556	740	0.3819	0.21	0.06			141.8				
2029	773 Truck #2	11.7	3556	740	0.3819	0.19	0.06			125.9	196.39	74.84	121.55	0

0.367	lb/hp-hr
2000	lb/ton
453.59237	g/lb
2205	lb/MT
7.05	lb/gal diesel
1000	kg/MT

[1] Horsepowers based on engine specs and URBEMIS2007 default for the water truck
[2] Load factors are from OFFROAD2011.
[4] Emissions factors are average for type and size of equipment as determined using OFFROAD2011.
Emissions factors for the Project fleet by year incorporate load factor.
[5] PM2.5 emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Off-Road Equipment: Diesel.
[6] Future year NOx emissions are calculated using fleet average emission factors from the off road ATCM regulation.
See the "Off Road and On Road Emission Profile" spreadsheet for more information.

Unmitigated Off-Road Emissions

Summary for Model Input

		Total	North Pit	South Pit	Plant
VOC	lb/hr	1.55	0.47	0.77	0.31
DPM	lb/hr	0.93	0.28	0.45	0.20
DPM-Cancer	lb/yr	803	250	406	147
DPM-Noncancer	lb/yr	2625	869	1412	344
Model Area Source	sq. ft.	510378	194503	315875	

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	TOTAL	40,115	12,154,985			0.16	0.10	1.55	0.93	2624.6				
2013	TOTAL	40,115	12,154,985			0.16	0.09			2513.8				
2014	TOTAL	40,115	12,154,985			0.15	0.08			2239.1				
2015	TOTAL	40,115	12,154,985			0.14	0.08			2089.5				
2016	TOTAL	40,115	12,154,985			0.13	0.07			1905.5				
2017	TOTAL	40,115	12,154,985			0.12	0.06			1738.6				
2018	TOTAL	40,115	12,154,985			0.11	0.05			1462.7				
2019	TOTAL	40,115	12,154,985			0.10	0.05			1296.5				
2020	TOTAL	40,115	12,154,985			0.10	0.04			1190.5				
2021	TOTAL	40,115	12,154,985			0.09	0.04			1050.5				
2022	TOTAL	40,115	12,154,985			0.08	0.03			867.3				
2023	TOTAL	40,115	12,154,985			0.08	0.03			806.4				
2024	TOTAL	40,115	12,154,985			0.08	0.03			749.9				
2025	TOTAL	40,115	12,154,985			0.07	0.02			628.6				
2026	TOTAL	40,115	12,154,985			0.07	0.02			606.4				
2027	TOTAL	40,115	12,154,985			0.07	0.02			557.0				
2028	TOTAL	40,115	12,154,985			0.07	0.02			548.6				
2029	TOTAL	40,115	12,154,985			0.07	0.02			496.2	803.41	250.05	406.08	147.28

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	140 H Grader	2.0	606	185	0.4087	0.35	0.21	0.058	0.035	20.9				
2013	140 H Grader	2.0	606	185	0.4087	0.35	0.21			20.9				
2014	140 H Grader	2.0	606	185	0.4087	0.36	0.21			20.9				
2015	140 H Grader	2.0	606	185	0.4087	0.37	0.21			20.9				
2016	140 H Grader	2.0	606	185	0.4087	0.37	0.21			20.8				
2017	140 H Grader	2.0	606	185	0.4087	0.37	0.20			20.3				
2018	140 H Grader	2.0	606	185	0.4087	0.36	0.19			19.4				
2019	140 H Grader	2.0	606	185	0.4087	0.33	0.18			17.7				
2020	140 H Grader	2.0	606	185	0.4087	0.33	0.17			16.9				
2021	140 H Grader	2.0	606	185	0.4087	0.31	0.16			15.8				
2022	140 H Grader	2.0	606	185	0.4087	0.29	0.14			14.0				
2023	140 H Grader	2.0	606	185	0.4087	0.26	0.13			12.7				
2024	140 H Grader	2.0	606	185	0.4087	0.24	0.11			11.3				
2025	140 H Grader	2.0	606	185	0.4087	0.21	0.09			9.4				
2026	140 H Grader	2.0	606	185	0.4087	0.19	0.08			8.1				
2027	140 H Grader	2.0	606	185	0.4087	0.18	0.07			7.0				
2028	140 H Grader	2.0	606	185	0.4087	0.17	0.06			6.4				
2029	140 H Grader	2.0	606	185	0.4087	0.17	0.06			5.9	9.35	3.56	5.79	0
2012	980G Loader (Agg)	10.5	3,188	318	0.3618	0.36	0.21	0.091	0.054	171.6				
2013	980G Loader (Agg)	10.5	3,188	318	0.3618	0.36	0.21			169.0				
2014	980G Loader (Agg)	10.5	3,188	318	0.3618	0.35	0.20			159.5				
2015	980G Loader (Agg)	10.5	3,188	318	0.3618	0.35	0.19			154.8				
2016	980G Loader (Agg)	10.5	3,188	318	0.3618	0.33	0.18			142.1				
2017	980G Loader (Agg)	10.5	3,188	318	0.3618	0.31	0.16			131.2				
2018	980G Loader (Agg)	10.5	3,188	318	0.3618	0.28	0.14			114.2				
2019	980G Loader (Agg)	10.5	3,188	318	0.3618	0.26	0.12			100.4				
2020	980G Loader (Agg)	10.5	3,188	318	0.3618	0.24	0.11			91.7				
2021	980G Loader (Agg)	10.5	3,188	318	0.3618	0.22	0.10			79.5				
2022	980G Loader (Agg)	10.5	3,188	318	0.3618	0.20	0.08			66.2				
2023	980G Loader (Agg)	10.5	3,188	318	0.3618	0.18	0.07			56.6				
2024	980G Loader (Agg)	10.5	3,188	318	0.3618	0.17	0.06			51.4				
2025	980G Loader (Agg)	10.5	3,188	318	0.3618	0.16	0.05			42.7				
2026	980G Loader (Agg)	10.5	3,188	318	0.3618	0.16	0.05			38.8				
2027	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			35.3				
2028	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			33.2				
2029	980G Loader (Agg)	10.5	3,188	318	0.3618	0.15	0.04			31.2	54.76	0	0	54.76

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	980G Loader (HMA)	2.0	615	318	0.3618	0.36	0.21	0.091	0.054	33.1				
2013	980G Loader (HMA)	2.0	615	318	0.3618	0.36	0.21			32.6				
2014	980G Loader (HMA)	2.0	615	318	0.3618	0.35	0.20			30.8				
2015	980G Loader (HMA)	2.0	615	318	0.3618	0.35	0.19			29.9				
2016	980G Loader (HMA)	2.0	615	318	0.3618	0.33	0.18			27.4				
2017	980G Loader (HMA)	2.0	615	318	0.3618	0.31	0.16			25.3				
2018	980G Loader (HMA)	2.0	615	318	0.3618	0.28	0.14			22.0				
2019	980G Loader (HMA)	2.0	615	318	0.3618	0.26	0.12			19.4				
2020	980G Loader (HMA)	2.0	615	318	0.3618	0.24	0.11			17.7				
2021	980G Loader (HMA)	2.0	615	318	0.3618	0.22	0.10			15.3				
2022	980G Loader (HMA)	2.0	615	318	0.3618	0.20	0.08			12.8				
2023	980G Loader (HMA)	2.0	615	318	0.3618	0.18	0.07			10.9				
2024	980G Loader (HMA)	2.0	615	318	0.3618	0.17	0.06			9.9				
2025	980G Loader (HMA)	2.0	615	318	0.3618	0.16	0.05			8.2				
2026	980G Loader (HMA)	2.0	615	318	0.3618	0.16	0.05			7.5				
2027	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.8				
2028	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.4				
2029	980G Loader (HMA)	2.0	615	318	0.3618	0.15	0.04			6.0	10.57	0	0	10.57
2012	Water Truck	8.0	2,424	189	0.3819	0.48	0.29	0.076	0.047	113.4				
2013	Water Truck	8.0	2,424	189	0.3819	0.46	0.28			107.7				
2014	Water Truck	8.0	2,424	189	0.3819	0.42	0.25			96.6				
2015	Water Truck	8.0	2,424	189	0.3819	0.42	0.24			93.0				
2016	Water Truck	8.0	2,424	189	0.3819	0.39	0.22			85.2				
2017	Water Truck	8.0	2,424	189	0.3819	0.37	0.20			77.4				
2018	Water Truck	8.0	2,424	189	0.3819	0.30	0.15			57.8				
2019	Water Truck	8.0	2,424	189	0.3819	0.27	0.13			48.7				
2020	Water Truck	8.0	2,424	189	0.3819	0.24	0.10			39.9				
2021	Water Truck	8.0	2,424	189	0.3819	0.22	0.09			33.6				
2022	Water Truck	8.0	2,424	189	0.3819	0.19	0.07			26.1				
2023	Water Truck	8.0	2,424	189	0.3819	0.18	0.06			24.2				
2024	Water Truck	8.0	2,424	189	0.3819	0.18	0.06			22.2				
2025	Water Truck	8.0	2,424	189	0.3819	0.16	0.05			17.7				
2026	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			16.5				
2027	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.6				
2028	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.2				
2029	Water Truck	8.0	2,424	189	0.3819	0.16	0.04			15.1	28.62	0	0	28.62

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	Street Sweeper	2.0	606	189	0.4556	0.56	0.36	0.106	0.069	41.7				
2013	Street Sweeper	2.0	606	189	0.4556	0.52	0.33			38.3				
2014	Street Sweeper	2.0	606	189	0.4556	0.53	0.34			38.6				
2015	Street Sweeper	2.0	606	189	0.4556	0.54	0.34			38.9				
2016	Street Sweeper	2.0	606	189	0.4556	0.54	0.34			39.3				
2017	Street Sweeper	2.0	606	189	0.4556	0.54	0.33			38.4				
2018	Street Sweeper	2.0	606	189	0.4556	0.37	0.21			24.6				
2019	Street Sweeper	2.0	606	189	0.4556	0.25	0.13			14.4				
2020	Street Sweeper	2.0	606	189	0.4556	0.22	0.10			11.5				
2021	Street Sweeper	2.0	606	189	0.4556	0.17	0.07			8.0				
2022	Street Sweeper	2.0	606	189	0.4556	0.16	0.06			7.3				
2023	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			7.3				
2024	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			7.4				
2025	Street Sweeper	2.0	606	189	0.4556	0.18	0.06			7.4				
2026	Street Sweeper	2.0	606	189	0.4556	0.17	0.06			6.5				
2027	Street Sweeper	2.0	606	189	0.4556	0.18	0.06			6.6				
2028	Street Sweeper	2.0	606	189	0.4556	0.16	0.05			5.4				
2029	Street Sweeper	2.0	606	189	0.4556	0.14	0.04			4.0	9.84	0	0	9.84
2012	Caterpillar 730	5.0	1,515	325	0.3819	0.48	0.22	0.130	0.060	91.3				
2013	Caterpillar 730	5.0	1,515	325	0.3819	0.46	0.21			85.3				
2014	Caterpillar 730	5.0	1,515	325	0.3819	0.42	0.19			77.9				
2015	Caterpillar 730	5.0	1,515	325	0.3819	0.42	0.18			75.0				
2016	Caterpillar 730	5.0	1,515	325	0.3819	0.39	0.16			66.3				
2017	Caterpillar 730	5.0	1,515	325	0.3819	0.37	0.14			59.2				
2018	Caterpillar 730	5.0	1,515	325	0.3819	0.30	0.12			49.0				
2019	Caterpillar 730	5.0	1,515	325	0.3819	0.27	0.10			42.2				
2020	Caterpillar 730	5.0	1,515	325	0.3819	0.24	0.09			37.2				
2021	Caterpillar 730	5.0	1,515	325	0.3819	0.22	0.08			31.2				
2022	Caterpillar 730	5.0	1,515	325	0.3819	0.19	0.06			23.6				
2023	Caterpillar 730	5.0	1,515	325	0.3819	0.18	0.05			20.8				
2024	Caterpillar 730	5.0	1,515	325	0.3819	0.18	0.05			19.3				
2025	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			16.5				
2026	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			15.1				
2027	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.04			14.6				
2028	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.03			13.4				
2029	Caterpillar 730	5.0	1,515	325	0.3819	0.16	0.03			12.6	23.71	0	0	23.71

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	Hitachi EX1100	6.2	1,872	550	0.3819	0.25	0.15	0.114	0.072	133.9				
2013	Hitachi EX1100	6.2	1,872	550	0.3819	0.22	0.13			116.6				
2014	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			105.5				
2015	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			104.3				
2016	Hitachi EX1100	6.2	1,872	550	0.3819	0.21	0.12			101.7				
2017	Hitachi EX1100	6.2	1,872	550	0.3819	0.18	0.10			82.9				
2018	Hitachi EX1100	6.2	1,872	550	0.3819	0.17	0.08			69.9				
2019	Hitachi EX1100	6.2	1,872	550	0.3819	0.15	0.07			61.8				
2020	Hitachi EX1100	6.2	1,872	550	0.3819	0.15	0.07			56.4				
2021	Hitachi EX1100	6.2	1,872	550	0.3819	0.14	0.06			51.7				
2022	Hitachi EX1100	6.2	1,872	550	0.3819	0.13	0.05			43.5				
2023	Hitachi EX1100	6.2	1,872	550	0.3819	0.13	0.05			39.8				
2024	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			37.4				
2025	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			35.0				
2026	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			31.7				
2027	Hitachi EX1100	6.2	1,872	550	0.3819	0.12	0.04			30.8				
2028	Hitachi EX1100	6.2	1,872	550	0.3819	0.11	0.03			28.3				
2029	Hitachi EX1100	6.2	1,872	550	0.3819	0.11	0.03			26.0	40.65	15.49	25.16	0
2012	966G Loader (RMC)	4.6	1,397	262	0.3618	0.36	0.21	0.075	0.044	62.0				
2013	966G Loader (RMC)	4.6	1,397	262	0.3618	0.36	0.21			61.0				
2014	966G Loader (RMC)	4.6	1,397	262	0.3618	0.35	0.20			57.6				
2015	966G Loader (RMC)	4.6	1,397	262	0.3618	0.35	0.19			55.9				
2016	966G Loader (RMC)	4.6	1,397	262	0.3618	0.33	0.18			51.3				
2017	966G Loader (RMC)	4.6	1,397	262	0.3618	0.31	0.16			47.4				
2018	966G Loader (RMC)	4.6	1,397	262	0.3618	0.28	0.14			41.2				
2019	966G Loader (RMC)	4.6	1,397	262	0.3618	0.26	0.12			36.3				
2020	966G Loader (RMC)	4.6	1,397	262	0.3618	0.24	0.11			33.1				
2021	966G Loader (RMC)	4.6	1,397	262	0.3618	0.22	0.10			28.7				
2022	966G Loader (RMC)	4.6	1,397	262	0.3618	0.20	0.08			23.9				
2023	966G Loader (RMC)	4.6	1,397	262	0.3618	0.18	0.07			20.4				
2024	966G Loader (RMC)	4.6	1,397	262	0.3618	0.17	0.06			18.6				
2025	966G Loader (RMC)	4.6	1,397	262	0.3618	0.16	0.05			15.4				
2026	966G Loader (RMC)	4.6	1,397	262	0.3618	0.16	0.05			14.0				
2027	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			12.7				
2028	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			12.0				
2029	966G Loader (RMC)	4.6	1,397	262	0.3618	0.15	0.04			11.3	19.78	0	0	19.78

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	D8R Dozer	4.0	1,212	315	0.4288	0.41	0.27	0.122	0.080	96.4				
2013	D8R Dozer	4.0	1,212	315	0.4288	0.41	0.26			95.3				
2014	D8R Dozer	4.0	1,212	315	0.4288	0.40	0.26			92.2				
2015	D8R Dozer	4.0	1,212	315	0.4288	0.40	0.25			90.2				
2016	D8R Dozer	4.0	1,212	315	0.4288	0.39	0.24			86.8				
2017	D8R Dozer	4.0	1,212	315	0.4288	0.37	0.23			82.6				
2018	D8R Dozer	4.0	1,212	315	0.4288	0.33	0.20			72.0				
2019	D8R Dozer	4.0	1,212	315	0.4288	0.31	0.18			64.9				
2020	D8R Dozer	4.0	1,212	315	0.4288	0.29	0.17			59.9				
2021	D8R Dozer	4.0	1,212	315	0.4288	0.28	0.15			54.9				
2022	D8R Dozer	4.0	1,212	315	0.4288	0.25	0.13			47.3				
2023	D8R Dozer	4.0	1,212	315	0.4288	0.23	0.12			43.3				
2024	D8R Dozer	4.0	1,212	315	0.4288	0.22	0.11			39.4				
2025	D8R Dozer	4.0	1,212	315	0.4288	0.20	0.10			34.3				
2026	D8R Dozer	4.0	1,212	315	0.4288	0.20	0.09			31.9				
2027	D8R Dozer	4.0	1,212	315	0.4288	0.19	0.08			29.4				
2028	D8R Dozer	4.0	1,212	315	0.4288	0.18	0.08			27.4				
2029	D8R Dozer	4.0	1,212	315	0.4288	0.18	0.07			25.8	38.80	14.79	24.01	0
2012	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.36	0.21	0.091	0.054	239.2				
2013	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.36	0.21			235.6				
2014	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.35	0.20			222.4				
2015	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.35	0.19			215.8				
2016	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.33	0.18			198.2				
2017	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.31	0.16			182.9				
2018	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.28	0.14			159.2				
2019	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.26	0.12			139.9				
2020	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.24	0.11			127.9				
2021	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.22	0.10			110.8				
2022	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.20	0.08			92.3				
2023	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.18	0.07			78.9				
2024	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.17	0.06			71.7				
2025	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.16	0.05			59.6				
2026	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.16	0.05			54.2				
2027	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.15	0.04			49.2				
2028	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.15	0.04			46.3				
2029	980G Loader (Pit Agg)	14.7	4,444	318	0.3618	0.15	0.04			43.5	76.35	29.10	47.25	0

Unmitigated Off-Road Emissions						VOC	PM_{10}				DPM			
Calendar Year	Activity / Unit	Total (HP-hrs) or Unit Hrs (hrs/day)	Total (HP-hrs) or Unit Hrs (hrs/yr)	HP[1]	Load Factor[2]	EF[4] (g/hp-hr)	EF[4] (g/hp-hr)	2012 VOC (lb/hr)	2012 DPM (lb/hr)	(lb/yr)	47 Year Avg. DPM (lb/yr)	North Pit DPM (lb/yr)	South Pit DPM (lb/yr)	Plant DPM (lb/yr)
2012	773 Truck #1	14.7	4,444	740	0.3819	0.48	0.29	0.299	0.182	810.6				
2013	773 Truck #1	14.7	4,444	740	0.3819	0.47	0.28			775.8				
2014	773 Truck #1	14.7	4,444	740	0.3819	0.42	0.24			668.5				
2015	773 Truck #1	14.7	4,444	740	0.3819	0.39	0.22			605.4				
2016	773 Truck #1	14.7	4,444	740	0.3819	0.36	0.20			543.1				
2017	773 Truck #1	14.7	4,444	740	0.3819	0.34	0.18			495.5				
2018	773 Truck #1	14.7	4,444	740	0.3819	0.30	0.15			416.7				
2019	773 Truck #1	14.7	4,444	740	0.3819	0.28	0.14			375.4				
2020	773 Truck #1	14.7	4,444	740	0.3819	0.27	0.13			349.1				
2021	773 Truck #1	14.7	4,444	740	0.3819	0.26	0.11			310.5				
2022	773 Truck #1	14.7	4,444	740	0.3819	0.23	0.09			255.2				
2023	773 Truck #1	14.7	4,444	740	0.3819	0.23	0.09			245.8				
2024	773 Truck #1	14.7	4,444	740	0.3819	0.22	0.08			230.6				
2025	773 Truck #1	14.7	4,444	740	0.3819	0.20	0.07			191.2				
2026	773 Truck #1	14.7	4,444	740	0.3819	0.21	0.07			191.0				
2027	773 Truck #1	14.7	4,444	740	0.3819	0.20	0.06			174.5				
2028	773 Truck #1	14.7	4,444	740	0.3819	0.21	0.06			177.3				
2029	773 Truck #1	14.7	4,444	740	0.3819	0.19	0.06			157.4	245.49	93.56	151.94	0
2012	773 Truck #2	14.7	4,444	740	0.3819	0.48	0.29	0.299	0.182	810.6				
2013	773 Truck #2	14.7	4,444	740	0.3819	0.47	0.28			775.8				
2014	773 Truck #2	14.7	4,444	740	0.3819	0.42	0.24			668.5				
2015	773 Truck #2	14.7	4,444	740	0.3819	0.39	0.22			605.4				
2016	773 Truck #2	14.7	4,444	740	0.3819	0.36	0.20			543.1				
2017	773 Truck #2	14.7	4,444	740	0.3819	0.34	0.18			495.5				
2018	773 Truck #2	14.7	4,444	740	0.3819	0.30	0.15			416.7				
2019	773 Truck #2	14.7	4,444	740	0.3819	0.28	0.14			375.4				
2020	773 Truck #2	14.7	4,444	740	0.3819	0.27	0.13			349.1				
2021	773 Truck #2	14.7	4,444	740	0.3819	0.26	0.11			310.5				
2022	773 Truck #2	14.7	4,444	740	0.3819	0.23	0.09			255.2				
2023	773 Truck #2	14.7	4,444	740	0.3819	0.23	0.09			245.8				
2024	773 Truck #2	14.7	4,444	740	0.3819	0.22	0.08			230.6				
2025	773 Truck #2	14.7	4,444	740	0.3819	0.20	0.07			191.2				
2026	773 Truck #2	14.7	4,444	740	0.3819	0.21	0.07			191.0				
2027	773 Truck #2	14.7	4,444	740	0.3819	0.20	0.06			174.5				
2028	773 Truck #2	14.7	4,444	740	0.3819	0.21	0.06			177.3				
2029	773 Truck #2	14.7	4,444	740	0.3819	0.19	0.06			157.4	245.49	93.56	151.94	0

0.367	lb/hp-hr
2000	lb/ton
453.59237	g/lb
2205	lb/MT
7.05	lb/gal diesel
1000	kg/MT

[1] Horsepowers based on engine specs and URBEMIS2007 default for the water truck
[2] Load factors are from OFFROAD2011.
[4] Emissions factors are average for type and size of equipment as determined using OFFROAD2011.
Emissions factors for the Project fleet by year incorporate load factor.
[5] PM2.5 emissions based on SCAQMD's "Final-Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds" from October, 2006, Off-Road Equipment: Diesel.
[6] Future year NOx emissions are calculated using fleet average emission factors from the off road ATCM regulation.
See the "Off Road and On Road Emission Profile" spreadsheet for more information.

Diesel Particulate Matter Emissions for ROAD Model

1500	meters of road at the intersection is represented by volume sources
1609	meters/mile
0.000266036	lb DPM/VMT @ 15 mph adjusted for future effective requirements over 47 year project
85,706	roundtrips per year through intersection
42.5	lb/yr DPM emissions
39	volume sources represent the length of road comprising the intersection
1.09	lb/yr/volume source is the amount assigned in HARP

15 MPH Emissions Factors (EMFAC2011) all values in lb/VMT except MPG

CY	ROG	CO	NOx	CO2	PM10	SOx	MPG
2012	0.00656657	0.017991961	0.04532951	6.013506551	0.002118648	5.7372E-05	3.695385053
2013	0.00575844	0.015767612	0.042427619	6.018607437	0.001788918	5.742E-05	3.692253143
2014	0.00388755	0.010740936	0.039483618	6.041570973	0.001157791	5.7639E-05	3.678219179
2015	0.00314267	0.008390479	0.034760589	6.019223607	0.000780785	5.7426E-05	3.691875177
2016	0.00192924	0.004839952	0.029913602	6.014797955	0.000301759	5.7384E-05	3.694591637
2017	0.0017743	0.004400889	0.026858139	6.002866311	0.000228361	5.727E-05	3.701935221
2018	0.00177739	0.004399158	0.024221388	5.990884096	0.000215391	5.7156E-05	3.709339367
2019	0.00175081	0.004324865	0.022105086	5.980905284	0.000203386	5.7061E-05	3.715528196
2020	0.00172434	0.004210818	0.018102659	5.966543593	0.000172556	5.6924E-05	3.72447161
2021	0.00174939	0.004265915	0.013528082	5.946467379	0.000152344	5.6732E-05	3.737046015
2022	0.00182624	0.004455549	0.009966405	5.931070757	0.000148008	5.6585E-05	3.74674711
2023	0.00169006	0.00412674	0.008552876	5.917290877	0.000144525	5.6454E-05	3.755472341
2024	0.0016962	0.004142473	0.008616883	5.917107026	0.000145396	5.6452E-05	3.755589027
2025	0.00170266	0.004158655	0.008672908	5.917024342	0.0001462	5.6451E-05	3.755641508
2026	0.0017061	0.004167306	0.008700723	5.91696575	0.000146642	5.6451E-05	3.755678698
2027	0.0017046	0.004163956	0.008691844	5.916862414	0.00014658	5.645E-05	3.75574429
2028	0.00170015	0.004153513	0.00866615	5.916714817	0.000146235	5.6448E-05	3.755837979
2029	0.00169578	0.004143225	0.008646099	5.916574661	0.000145891	5.6447E-05	3.75592695
2030	0.00169356	0.004138039	0.008638165	5.916492812	0.000145727	5.6446E-05	3.75597891
2031	0.00169308	0.004136929	0.008637278	5.916468312	0.000145698	5.6446E-05	3.755994464
2032	0.00169212	0.004134681	0.008631398	5.916437532	0.000145623	5.6446E-05	3.756014004
2033	0.00169064	0.004131148	0.008621333	5.916400826	0.000145495	5.6445E-05	3.756037306
2034	0.00168887	0.004126923	0.008612767	5.916358772	0.000145341	5.6445E-05	3.756064005
2035	0.00168799	0.004124839	0.00860841	5.916336574	0.000145266	5.6445E-05	3.756078097
					0.009162566	0.00334111	0.012503674
					24	23	47

DPM	Cancer risk	lb/VMT =	0.000266036
DPM	Chronic and acute risk	lb/VMT =	0.002118648
ROG	Acute risk	lb/VMT =	0.006566571

	Acivity (Loads/yr)	Length (m)	Distance (VMT/yr)	DPM-Cancer (lb/yr)	DPM-Chronic (lb/yr)	Activity (loads/hr)	DPM-Acute (lb/hr)	ROG-Acute (lb/hr)
ENTRY - ALL / RMC	111,678	431	59,793	15.91	126.68	58	0.066	0.204
AGG	54,173	193	12,988	3.46	27.52	20	0.010	0.032
HMA	15,960	100	1,983	0.53	4.20	19	0.005	0.016
RECYC	-	146	-	-	-	0	0.000	-
QUEUE (AND CEMEN	9,462	358	4,208	1.12	8.92	8	0.008	0.023
CEMENT (NORTH PIT	9,462	500	5,877	1.56	12.45	8	0.011	0.033
TOTAL	111,678		84,848	23	180	58	0.10	0.31

1609 meters per mile

40 MPH Emissions Factors (EMFAC2011) all values in lb/VMT except MPG

CY	ROG	CO	NOx	CO2	PM10	SOx	MPG
2012	0.001275077	0.006909088	0.028118	3.750256834	0.000902524	3.57792E-05	5.925520092
2013	0.001139324	0.0061351	0.026152	3.753437945	0.000774579	3.58096E-05	5.9204981
2014	0.000783124	0.004238406	0.0242	3.767758901	0.000475201	3.59462E-05	5.897994752
2015	0.000639893	0.003328516	0.021051	3.753822213	0.000330664	3.58132E-05	5.919892035
2016	0.000438982	0.002112894	0.017728	3.751062205	0.000175704	3.57869E-05	5.924247856
2017	0.000416581	0.001975102	0.015777	3.743621167	0.000150184	3.57159E-05	5.936023233
2018	0.000421969	0.001993657	0.01408	3.736148591	0.000148812	3.56446E-05	5.947895722
2019	0.000419465	0.001976004	0.012688	3.729925415	0.000147384	3.55852E-05	5.95781946
2020	0.00042391	0.001972492	0.009834	3.720968905	0.00014626	3.54998E-05	5.972160152
2021	0.000437519	0.002028173	0.006932	3.708448597	0.000143854	3.53803E-05	5.992323108
2022	0.000456738	0.002118332	0.005107	3.698846664	0.000139759	3.52887E-05	6.007878737
2023	0.00042268	0.001962004	0.004383	3.690252994	0.000136471	3.52067E-05	6.021869574
2024	0.000424216	0.001969484	0.004415	3.690138337	0.000137293	3.52056E-05	6.022056679
2025	0.000425832	0.001977177	0.004444	3.690086772	0.000138052	3.52052E-05	6.022140831
2026	0.000426691	0.001981291	0.004458	3.690050232	0.000138469	3.52048E-05	6.022200465
2027	0.000426316	0.001979698	0.004454	3.689985787	0.000138411	3.52042E-05	6.022305641
2028	0.000425204	0.001974733	0.004441	3.68989374	0.000138085	3.52033E-05	6.022455872
2029	0.000424111	0.001969842	0.00443	3.689806334	0.000137761	3.52025E-05	6.022598536
2030	0.000423557	0.001967376	0.004426	3.689755289	0.000137606	3.5202E-05	6.022681853
2031	0.000423435	0.001966849	0.004426	3.68974001	0.000137579	3.52018E-05	6.022706793
2032	0.000423196	0.001965779	0.004423	3.689720815	0.000137508	3.52017E-05	6.022738125
2033	0.000422825	0.0019641	0.004418	3.689697923	0.000137387	3.52014E-05	6.022775491
2034	0.000422381	0.001962091	0.004413	3.689671697	0.000137241	3.52012E-05	6.022818302
2035	0.000422162	0.0019611	0.004411	3.689657854	0.00013717	3.52011E-05	6.022840899
					0.00532396	0.003154911	0.00847887
					24	23	47

DPM	Cancer risk	lb/VMT =	0.000180401
DPM	Chronic and acute risk	lb/VMT =	0.000902524
ROG	Acute risk	lb/VMT =	0.001275077

		East	**West**	
		20	**80**	Percent traveling each direction
		40	40	miles per hour (mph)
		21,427	85,706	Round trips per year
		0.962732919	0.453416149	VMT per round trip
		20,628	38,861	VMT per year
		12	46	Peak round trips per hour
DPM	Cancer risk	3.7	7.0	lb/yr
DPM	Chronic risk	18.6	35.1	lb/yr
DPM	Acute risk	0.010	0.019	lb/hr
ROG	Acute risk	0.014	0.027	lb/hr

Idling Emissions

Through 2035	After 2035	Total	Units
5.31	2.48	7.78	g/hr, sum of average emissions factors for years in period
24	23	47	years, of Project.
		0.166	g/hr, average idle emissions rate over 47 years.

Emissions				**Each of 4 sources**
Cancer Risk	2.00	lb/yr	DPM over Project	0.50
Chronic Risk	9.27	lb/yr	DPM in Maximum Year (2012)	2.32
Acute-DPM	0.0085	lb/hr	DPM in Maximum Hour	0.0021
Acute-VOC	0.069	lb/hr	VOC in Maximum Hour	0.017

Assumptions

idle time/truck	5	min/trip	From ATCM standards
round trips/year [2]	65,751	trips/year	
idle hr/yr	5,479	hrs/yr	
max idle/hr	5	vehicles	5 vehicles idling at a time

Conversions

453.59237 g/lb

EMFAC2011 Output with Calculated Average Idling Emissions Factors by Year

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2012	a	DSL	1968	0.00030552	0.017%	6.455		25.34807	
2012	a	DSL	1969	0	0.000%	6.455		25.34807	
2012	a	DSL	1970	1.6936E-05	0.001%	6.455		25.34807	
2012	a	DSL	1971	4.0684E-05	0.002%	6.455		25.34807	
2012	a	DSL	1972	6.4734E-05	0.004%	6.455		25.34807	
2012	a	DSL	1973	3.403E-05	0.002%	6.455		25.34807	
2012	a	DSL	1974	8.3175E-05	0.005%	6.455		25.34807	
2012	a	DSL	1975	6.5472E-05	0.004%	6.455		25.34807	
2012	a	DSL	1976	9.8455E-05	0.005%	6.455		25.34807	
2012	a	DSL	1977	0.00011447	0.006%	6.455		25.34807	
2012	a	DSL	1978	0.00010136	0.006%	6.455		25.34807	
2012	a	DSL	1979	0.00023242	0.013%	6.455		25.34807	
2012	a	DSL	1980	0.0003091	0.017%	6.455		25.34807	
2012	a	DSL	1981	0.0004047	0.022%	6.455		25.34807	
2012	a	DSL	1982	0.00040714	0.022%	6.455		25.34807	
2012	a	DSL	1983	0.00038278	0.021%	6.455		25.34807	
2012	a	DSL	1984	0.00046954	0.026%	6.455		25.34807	
2012	a	DSL	1985	0.00077965	0.043%	6.455		25.34807	
2012	a	DSL	1986	0.00061906	0.034%	6.455		25.34807	
2012	a	DSL	1987	0.00118737	0.065%	3.220		14.8441	
2012	a	DSL	1988	0.0015587	0.085%	3.220		14.8441	
2012	a	DSL	1989	0.00128834	0.071%	3.220		14.8441	
2012	a	DSL	1990	0.00190553	0.104%	3.220		14.8441	
2012	a	DSL	1991	0.00256369	0.140%	2.408		11.84433	
2012	a	DSL	1992	0.00393959	0.216%	2.408		11.84433	
2012	a	DSL	1993	0.00761973	0.417%	2.408		11.84433	
2012	a	DSL	1994	0.01228336	0.673%	1.808		9.473468	

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2012	a	DSL	1995	0.01648751	0.903%	1.808		9.473468	
2012	a	DSL	1996	0.01667026	0.913%	1.808		9.473468	
2012	a	DSL	1997	0.02212797	1.212%	1.808		9.473468	
2012	a	DSL	1998	0.03035674	1.663%	1.250		7.108736	
2012	a	DSL	1999	0.04901877	2.685%	1.250		7.108736	
2012	a	DSL	2000	0.04952974	2.713%	1.250		7.108736	
2012	a	DSL	2001	0.04565148	2.500%	1.250		7.108736	
2012	a	DSL	2002	0.06558333	3.592%	1.250		7.108736	
2012	a	DSL	2003	0.08553684	4.685%	0.970		5.840037	
2012	a	DSL	2004	0.16075639	8.805%	0.970		5.840037	
2012	a	DSL	2005	0.25993221	14.236%	0.970		5.840037	
2012	a	DSL	2006	0.34647848	18.976%	0.970		5.840037	
2012	a	DSL	2007	0.18924703	10.365%	0.108		5.840037	
2012	a	DSL	2008	0.140619	7.702%	0.108		5.840037	
2012	a	DSL	2009	0.07942529	4.350%	0.108		5.840037	
2012	a	DSL	2010	0.06503425	3.562%	0.108		5.840037	
2012	a	DSL	2011	0.05945834	3.256%	0.108		5.840037	
2012	a	DSL	2012	0.06247627	3.422%	0.108		5.840037	
2012	a	DSL	2013	0.0445749	2.441%	0.108	0.7672	5.840037	6.3
2013	a	DSL	1969	0.00036816	0.018%	6.455			
2013	a	DSL	1970	0	0.000%	6.455			
2013	a	DSL	1971	2.0409E-05	0.001%	6.455			
2013	a	DSL	1972	4.9026E-05	0.002%	6.455			
2013	a	DSL	1973	7.8007E-05	0.004%	6.455			
2013	a	DSL	1974	4.1007E-05	0.002%	6.455			
2013	a	DSL	1975	0.00010023	0.005%	6.455			
2013	a	DSL	1976	7.8896E-05	0.004%	6.455			
2013	a	DSL	1977	0.00011864	0.006%	6.455			
2013	a	DSL	1978	0.00013795	0.007%	6.455			
2013	a	DSL	1979	0.00012214	0.006%	6.455			
2013	a	DSL	1980	0.00028008	0.014%	6.455			
2013	a	DSL	1981	0.00037248	0.018%	6.455			
2013	a	DSL	1982	0.00048768	0.024%	6.455			
2013	a	DSL	1983	0.00049062	0.024%	6.455			
2013	a	DSL	1984	0.00046126	0.022%	6.455			
2013	a	DSL	1985	0.00055608	0.027%	6.455			
2013	a	DSL	1986	0.00078829	0.038%	6.455			
2013	a	DSL	1987	0.00083685	0.041%	3.220			
2013	a	DSL	1988	0.00159654	0.078%	3.220			
2013	a	DSL	1989	0.00180249	0.088%	3.220			
2013	a	DSL	1990	0.00128129	0.062%	3.220			
2013	a	DSL	1991	0.00183981	0.089%	2.408			
2013	a	DSL	1992	0.00366808	0.178%	2.408			
2013	a	DSL	1993	0.006198	0.301%	2.408			
2013	a	DSL	1994	0.01063204	0.516%	1.808			
2013	a	DSL	1995	0.01580109	0.768%	1.808			
2013	a	DSL	1996	0.01652724	0.803%	1.808			
2013	a	DSL	1997	0.0207852	1.010%	1.808			
2013	a	DSL	1998	0.03082798	1.497%	1.250			
2013	a	DSL	1999	0.04514821	2.193%	1.250			
2013	a	DSL	2000	0.04695171	2.281%	1.250			
2013	a	DSL	2001	0.03884147	1.887%	1.250			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2013	a	DSL	2002	0.0567563	2.757%	1.250			
2013	a	DSL	2003	0.07578458	3.681%	0.970			
2013	a	DSL	2004	0.1455549	7.070%	0.970			
2013	a	DSL	2005	0.23780832	11.552%	0.970			
2013	a	DSL	2006	0.34730921	16.870%	0.970			
2013	a	DSL	2007	0.21907111	10.641%	0.108			
2013	a	DSL	2008	0.19905892	9.669%	0.108			
2013	a	DSL	2009	0.11883808	5.773%	0.108			
2013	a	DSL	2010	0.10274927	4.991%	0.108			
2013	a	DSL	2011	0.09205944	4.472%	0.108			
2013	a	DSL	2012	0.07785146	3.782%	0.108			
2013	a	DSL	2013	0.07991882	3.882%	0.108			
2013	a	DSL	2014	0.05862855	2.848%	0.108	0.6548		
2014	a	DSL	1970	0.00043529	0.019%	6.455			
2014	a	DSL	1971	0	0.000%	6.455			
2014	a	DSL	1972	2.413E-05	0.001%	6.455			
2014	a	DSL	1973	5.7965E-05	0.003%	6.455			
2014	a	DSL	1974	9.223E-05	0.004%	6.455			
2014	a	DSL	1975	4.8484E-05	0.002%	6.455			
2014	a	DSL	1976	0.0001185	0.005%	6.455			
2014	a	DSL	1977	9.3281E-05	0.004%	6.455			
2014	a	DSL	1978	0.00014027	0.006%	6.455			
2014	a	DSL	1979	0.0001631	0.007%	6.455			
2014	a	DSL	1980	0.00014441	0.006%	6.455			
2014	a	DSL	1981	0.00033115	0.014%	6.455			
2014	a	DSL	1982	0.0004404	0.019%	6.455			
2014	a	DSL	1983	0.0005766	0.025%	6.455			
2014	a	DSL	1984	0.00058007	0.025%	6.455			
2014	a	DSL	1985	0.00053598	0.023%	6.455			
2014	a	DSL	1986	0.00055164	0.024%	6.455			
2014	a	DSL	1987	0.00104553	0.046%	3.220			
2014	a	DSL	1988	0.00110402	0.048%	3.220			
2014	a	DSL	1989	0.00181145	0.079%	3.220			
2014	a	DSL	1990	0.00175885	0.077%	3.220			
2014	a	DSL	1991	0.00121379	0.053%	2.408			
2014	a	DSL	1992	0.00258275	0.113%	2.408			
2014	a	DSL	1993	0.00566208	0.248%	2.408			
2014	a	DSL	1994	0.00848525	0.372%	1.808			
2014	a	DSL	1995	0.01341909	0.588%	1.808			
2014	a	DSL	1996	0.01554063	0.680%	1.808			
2014	a	DSL	1997	0.02021849	0.885%	1.808			
2014	a	DSL	1998	0.0284115	1.244%	1.250			
2014	a	DSL	1999	0.04498492	1.970%	1.250			
2014	a	DSL	2000	0.04242932	1.858%	1.250			
2014	a	DSL	2001	0.0361258	1.582%	1.250			
2014	a	DSL	2002	0.0473796	2.074%	1.250			
2014	a	DSL	2003	0.06434843	2.817%	0.970			
2014	a	DSL	2004	0.12652925	5.540%	0.970			
2014	a	DSL	2005	0.21126235	9.250%	0.970			
2014	a	DSL	2006	0.31175952	13.650%	0.970			
2014	a	DSL	2007	0.2154575	9.434%	0.108			
2014	a	DSL	2008	0.22608626	9.899%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2014	a	DSL	2009	0.16505541	7.227%	0.108			
2014	a	DSL	2010	0.15083845	6.604%	0.108			
2014	a	DSL	2011	0.14270575	6.248%	0.108			
2014	a	DSL	2012	0.11826569	5.178%	0.108			
2014	a	DSL	2013	0.09770959	4.278%	0.108			
2014	a	DSL	2014	0.10313459	4.516%	0.108			
2014	a	DSL	2015	0.07425581	3.251%	0.108	0.5492		
2015	a	DSL	1971	3.7767E-05	0.002%	6.455			
2015	a	DSL	1972	0	0.000%	6.455			
2015	a	DSL	1973	2.1163E-06	0.000%	6.455			
2015	a	DSL	1974	5.111E-06	0.000%	6.455			
2015	a	DSL	1975	8.1756E-06	0.000%	6.455			
2015	a	DSL	1976	4.3206E-06	0.000%	6.455			
2015	a	DSL	1977	1.0616E-05	0.000%	6.455			
2015	a	DSL	1978	8.4004E-06	0.000%	6.455			
2015	a	DSL	1979	1.2698E-05	0.001%	6.455			
2015	a	DSL	1980	1.4841E-05	0.001%	6.455			
2015	a	DSL	1981	1.1602E-05	0.000%	6.455			
2015	a	DSL	1982	1.7054E-05	0.001%	6.455			
2015	a	DSL	1983	4.0967E-05	0.002%	6.455			
2015	a	DSL	1984	8.2496E-05	0.003%	6.455			
2015	a	DSL	1985	5.6569E-05	0.002%	6.455			
2015	a	DSL	1986	1.7477E-05	0.001%	6.455			
2015	a	DSL	1987	5.663E-05	0.002%	3.220			
2015	a	DSL	1988	9.6318E-05	0.004%	3.220			
2015	a	DSL	1989	0.00011864	0.005%	3.220			
2015	a	DSL	1990	0.00014948	0.006%	3.220			
2015	a	DSL	1991	0.00013694	0.005%	2.408			
2015	a	DSL	1992	0.00012551	0.005%	2.408			
2015	a	DSL	1993	0.0003586	0.014%	2.408			
2015	a	DSL	1994	0.00748828	0.301%	1.808			
2015	a	DSL	1995	0.0103458	0.415%	1.808			
2015	a	DSL	1996	0.01274962	0.512%	1.808			
2015	a	DSL	1997	0.0183658	0.737%	1.808			
2015	a	DSL	1998	0.02669817	1.072%	1.250			
2015	a	DSL	1999	0.04005059	1.607%	1.250			
2015	a	DSL	2000	0.04083996	1.639%	1.250			
2015	a	DSL	2001	0.03153734	1.266%	1.250			
2015	a	DSL	2002	0.04257024	1.709%	1.250			
2015	a	DSL	2003	0.05189292	2.083%	0.970			
2015	a	DSL	2004	0.10378651	4.166%	0.970			
2015	a	DSL	2005	0.17741041	7.121%	0.970			
2015	a	DSL	2006	0.26755166	10.738%	0.970			
2015	a	DSL	2007	0.18683486	7.499%	0.108			
2015	a	DSL	2008	0.21480458	8.621%	0.108			
2015	a	DSL	2009	0.18109862	7.269%	0.108			
2015	a	DSL	2010	0.21728651	8.721%	0.108			
2015	a	DSL	2011	0.20238002	8.123%	0.108			
2015	a	DSL	2012	0.17710254	7.108%	0.108			
2015	a	DSL	2013	0.14339106	5.755%	0.108			
2015	a	DSL	2014	0.12181068	4.889%	0.108			
2015	a	DSL	2015	0.12618812	5.065%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2015	a	DSL	2016	0.0879856	3.531%	0.108	0.4342		
2016	a	DSL	1972	2.862E-05	0.001%	6.455			
2016	a	DSL	1973	0	0.000%	6.455			
2016	a	DSL	1974	1.6116E-06	0.000%	6.455			
2016	a	DSL	1975	3.9014E-06	0.000%	6.455			
2016	a	DSL	1976	6.2555E-06	0.000%	6.455			
2016	a	DSL	1977	3.3136E-06	0.000%	6.455			
2016	a	DSL	1978	8.1606E-06	0.000%	6.455			
2016	a	DSL	1979	6.4721E-06	0.000%	6.455			
2016	a	DSL	1980	9.8054E-06	0.000%	6.455			
2016	a	DSL	1981	1.1485E-05	0.000%	6.455			
2016	a	DSL	1982	1.2806E-05	0.000%	6.455			
2016	a	DSL	1983	1.8823E-05	0.001%	6.455			
2016	a	DSL	1984	2.4655E-05	0.001%	6.455			
2016	a	DSL	1985	2.9956E-05	0.001%	6.455			
2016	a	DSL	1986	5.2388E-05	0.002%	6.455			
2016	a	DSL	1987	2.164E-05	0.001%	3.220			
2016	a	DSL	1988	4.6532E-05	0.002%	3.220			
2016	a	DSL	1989	7.5138E-05	0.003%	3.220			
2016	a	DSL	1990	8.0858E-05	0.003%	3.220			
2016	a	DSL	1991	9.1928E-05	0.003%	2.408			
2016	a	DSL	1992	0.00011405	0.004%	2.408			
2016	a	DSL	1993	0.00010898	0.004%	2.408			
2016	a	DSL	1994	0.0003203	0.012%	1.808			
2016	a	DSL	1995	0.00046253	0.017%	1.808			
2016	a	DSL	1996	0.00949906	0.353%	1.808			
2016	a	DSL	1997	0.01456066	0.542%	1.808			
2016	a	DSL	1998	0.02343608	0.872%	1.250			
2016	a	DSL	1999	0.0363696	1.353%	1.250			
2016	a	DSL	2000	0.0351374	1.307%	1.250			
2016	a	DSL	2001	0.02933503	1.091%	1.250			
2016	a	DSL	2002	0.03591335	1.336%	1.250			
2016	a	DSL	2003	0.0450573	1.676%	0.970			
2016	a	DSL	2004	0.08088228	3.009%	0.970			
2016	a	DSL	2005	0.14062787	5.232%	0.970			
2016	a	DSL	2006	0.21712357	8.079%	0.970			
2016	a	DSL	2007	0.15494879	5.765%	0.108			
2016	a	DSL	2008	0.18000401	6.698%	0.108			
2016	a	DSL	2009	0.16627497	6.187%	0.108			
2016	a	DSL	2010	0.24075674	8.958%	0.108			
2016	a	DSL	2011	0.26240794	9.764%	0.108			
2016	a	DSL	2012	0.24271313	9.031%	0.108			
2016	a	DSL	2013	0.20750589	7.721%	0.108			
2016	a	DSL	2014	0.17274783	6.428%	0.108			
2016	a	DSL	2015	0.14402631	5.359%	0.108			
2016	a	DSL	2016	0.14449139	5.376%	0.108			
2016	a	DSL	2017	0.10224499	3.804%	0.108	0.3478		
2017	a	DSL	1996	0.00788357	0.274%	1.808			
2017	a	DSL	1997	0.01055716	0.366%	1.808			
2017	a	DSL	1998	0.01808168	0.627%	1.250			
2017	a	DSL	1999	0.03106881	1.078%	1.250			
2017	a	DSL	2000	0.03105144	1.078%	1.250			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2017	a	DSL	2001	0.02456142	0.852%	1.250			
2017	a	DSL	2002	0.03250873	1.128%	1.250			
2017	a	DSL	2003	0.03699112	1.284%	0.970			
2017	a	DSL	2004	0.06834284	2.372%	0.970			
2017	a	DSL	2005	0.10665137	3.701%	0.970			
2017	a	DSL	2006	0.16748729	5.812%	0.970			
2017	a	DSL	2007	0.12236862	4.246%	0.108			
2017	a	DSL	2008	0.14527638	5.041%	0.108			
2017	a	DSL	2009	0.13559637	4.705%	0.108			
2017	a	DSL	2010	0.21326164	7.400%	0.108			
2017	a	DSL	2011	0.27076172	9.396%	0.108			
2017	a	DSL	2012	0.3062564	10.627%	0.108			
2017	a	DSL	2013	0.27674609	9.603%	0.108			
2017	a	DSL	2014	0.24327837	8.442%	0.108			
2017	a	DSL	2015	0.19877037	6.898%	0.108			
2017	a	DSL	2016	0.16048997	5.569%	0.108			
2017	a	DSL	2017	0.1634011	5.670%	0.108			
2017	a	DSL	2018	0.11036363	3.830%	0.108	0.2866		
2018	a	DSL	1996	0.00476359	0.161%	1.808			
2018	a	DSL	1997	0.00827634	0.279%	1.808			
2018	a	DSL	1998	0.0123838	0.418%	1.250			
2018	a	DSL	1999	0.02264266	0.765%	1.250			
2018	a	DSL	2000	0.0250563	0.846%	1.250			
2018	a	DSL	2001	0.02050287	0.692%	1.250			
2018	a	DSL	2002	0.02571083	0.868%	1.250			
2018	a	DSL	2003	0.03162938	1.068%	0.970			
2018	a	DSL	2004	0.05299983	1.790%	0.970			
2018	a	DSL	2005	0.08512462	2.874%	0.970			
2018	a	DSL	2006	0.11998474	4.051%	0.970			
2018	a	DSL	2007	0.08916493	3.011%	0.108			
2018	a	DSL	2008	0.10837423	3.659%	0.108			
2018	a	DSL	2009	0.10337369	3.490%	0.108			
2018	a	DSL	2010	0.1648842	5.567%	0.108			
2018	a	DSL	2011	0.22852339	7.716%	0.108			
2018	a	DSL	2012	0.29850017	10.079%	0.108			
2018	a	DSL	2013	0.32985457	11.138%	0.108			
2018	a	DSL	2014	0.30648109	10.349%	0.108			
2018	a	DSL	2015	0.2644184	8.928%	0.108			
2018	a	DSL	2016	0.20922174	7.065%	0.108			
2018	a	DSL	2017	0.17143915	5.789%	0.108			
2018	a	DSL	2018	0.16660501	5.626%	0.108			
2018	a	DSL	2019	0.11166468	3.770%	0.108	0.2406		
2019	a	DSL	1996	0.00268134	0.088%	1.808			
2019	a	DSL	1997	0.00497201	0.163%	1.808			
2019	a	DSL	1998	0.00965222	0.316%	1.250			
2019	a	DSL	1999	0.01541789	0.504%	1.250			
2019	a	DSL	2000	0.01815524	0.594%	1.250			
2019	a	DSL	2001	0.01644872	0.538%	1.250			
2019	a	DSL	2002	0.02133829	0.698%	1.250			
2019	a	DSL	2003	0.02487076	0.814%	0.970			
2019	a	DSL	2004	0.04505573	1.474%	0.970			
2019	a	DSL	2005	0.0656325	2.147%	0.970			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2019	a	DSL	2006	0.09521317	3.115%	0.970			
2019	a	DSL	2007	0.06350684	2.078%	0.108			
2019	a	DSL	2008	0.07851132	2.569%	0.108			
2019	a	DSL	2009	0.07666961	2.508%	0.108			
2019	a	DSL	2010	0.12700573	4.155%	0.108			
2019	a	DSL	2011	0.17501821	5.726%	0.108			
2019	a	DSL	2012	0.25047838	8.195%	0.108			
2019	a	DSL	2013	0.31964225	10.458%	0.108			
2019	a	DSL	2014	0.36318421	11.882%	0.108			
2019	a	DSL	2015	0.33118763	10.836%	0.108			
2019	a	DSL	2016	0.27671271	9.053%	0.108			
2019	a	DSL	2017	0.22220365	7.270%	0.108			
2019	a	DSL	2018	0.17379023	5.686%	0.108			
2019	a	DSL	2019	0.16759464	5.483%	0.108			
2019	a	DSL	2020	0.11156102	3.650%	0.108	0.2074		
2020	a	DSL	2000	0.01237111	0.391%	1.250			
2020	a	DSL	2001	0.01192687	0.377%	1.250			
2020	a	DSL	2002	0.01713114	0.541%	1.250			
2020	a	DSL	2003	0.02065579	0.653%	0.970			
2020	a	DSL	2004	0.03545337	1.120%	0.970			
2020	a	DSL	2005	0.05583463	1.764%	0.970			
2020	a	DSL	2006	0.07346322	2.321%	0.970			
2020	a	DSL	2007	0.05043136	1.593%	0.108			
2020	a	DSL	2008	0.05595874	1.768%	0.108			
2020	a	DSL	2009	0.05558259	1.756%	0.108			
2020	a	DSL	2010	0.09522295	3.008%	0.108			
2020	a	DSL	2011	0.13275065	4.194%	0.108			
2020	a	DSL	2012	0.19196941	6.065%	0.108			
2020	a	DSL	2013	0.2921818	9.231%	0.108			
2020	a	DSL	2014	0.35219067	11.127%	0.108			
2020	a	DSL	2015	0.39274132	12.408%	0.108			
2020	a	DSL	2016	0.34683328	10.957%	0.108			
2020	a	DSL	2017	0.29409165	9.291%	0.108			
2020	a	DSL	2018	0.22541133	7.121%	0.108			
2020	a	DSL	2019	0.17494706	5.527%	0.108			
2020	a	DSL	2020	0.16755833	5.294%	0.108			
2020	a	DSL	2021	0.11055955	3.493%	0.108	0.1732		
2021	a	DSL	2005	0.0428787	1.342%	0.970			
2021	a	DSL	2006	0.06099373	1.909%	0.970			
2021	a	DSL	2007	0.03797556	1.189%	0.108			
2021	a	DSL	2008	0.04336892	1.357%	0.108			
2021	a	DSL	2009	0.03866383	1.210%	0.108			
2021	a	DSL	2010	0.06799461	2.128%	0.108			
2021	a	DSL	2011	0.09615893	3.009%	0.108			
2021	a	DSL	2012	0.14210715	4.447%	0.108			
2021	a	DSL	2013	0.21684741	6.787%	0.108			
2021	a	DSL	2014	0.36302447	11.361%	0.108			
2021	a	DSL	2015	0.37169607	11.633%	0.108			
2021	a	DSL	2016	0.40140588	12.563%	0.108			
2021	a	DSL	2017	0.35975333	11.259%	0.108			
2021	a	DSL	2018	0.29116403	9.112%	0.108			
2021	a	DSL	2019	0.22145603	6.931%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2021	a	DSL	2020	0.17070373	5.342%	0.108			
2021	a	DSL	2021	0.16206165	5.072%	0.108			
2021	a	DSL	2022	0.10698093	3.348%	0.108	0.1358		
2022	a	DSL	2007	0.03174214	0.982%	0.108			
2022	a	DSL	2008	0.03287751	1.017%	0.108			
2022	a	DSL	2009	0.03016702	0.933%	0.108			
2022	a	DSL	2010	0.04876925	1.509%	0.108			
2022	a	DSL	2011	0.06849399	2.119%	0.108			
2022	a	DSL	2012	0.10363007	3.206%	0.108			
2022	a	DSL	2013	0.16142662	4.994%	0.108			
2022	a	DSL	2014	0.27130214	8.393%	0.108			
2022	a	DSL	2015	0.38881538	12.029%	0.108			
2022	a	DSL	2016	0.38245644	11.832%	0.108			
2022	a	DSL	2017	0.41916467	12.968%	0.108			
2022	a	DSL	2018	0.3585723	11.093%	0.108			
2022	a	DSL	2019	0.28798269	8.909%	0.108			
2022	a	DSL	2020	0.21754082	6.730%	0.108			
2022	a	DSL	2021	0.1662165	5.142%	0.108			
2022	a	DSL	2022	0.15787277	4.884%	0.108			
2022	a	DSL	2023	0.10531502	3.258%	0.108	0.1078		
2023	a	DSL	2010	0.03830317	1.169%	0.108			
2023	a	DSL	2011	0.0482891	1.474%	0.108			
2023	a	DSL	2012	0.07431257	2.268%	0.108			
2023	a	DSL	2013	0.1206767	3.683%	0.108			
2023	a	DSL	2014	0.20007273	6.106%	0.108			
2023	a	DSL	2015	0.37440495	11.427%	0.108			
2023	a	DSL	2016	0.31767124	9.696%	0.108			
2023	a	DSL	2017	0.40206531	12.271%	0.108			
2023	a	DSL	2018	0.42060097	12.837%	0.108			
2023	a	DSL	2019	0.35704182	10.897%	0.108			
2023	a	DSL	2020	0.28479562	8.692%	0.108			
2023	a	DSL	2021	0.2132483	6.508%	0.108			
2023	a	DSL	2022	0.16301021	4.975%	0.108			
2023	a	DSL	2023	0.15646057	4.775%	0.108			
2023	a	DSL	2024	0.10550788	3.220%	0.108	0.1078		
2024	a	DSL	2010	0.03000475	0.903%	0.108			
2024	a	DSL	2011	0.03815515	1.148%	0.108			
2024	a	DSL	2012	0.05270135	1.586%	0.108			
2024	a	DSL	2013	0.08756286	2.636%	0.108			
2024	a	DSL	2014	0.14686424	4.420%	0.108			
2024	a	DSL	2015	0.28801544	8.669%	0.108			
2024	a	DSL	2016	0.24224983	7.291%	0.108			
2024	a	DSL	2017	0.33593502	10.111%	0.108			
2024	a	DSL	2018	0.40583076	12.215%	0.108			
2024	a	DSL	2019	0.42128439	12.680%	0.108			
2024	a	DSL	2020	0.35518021	10.690%	0.108			
2024	a	DSL	2021	0.2808283	8.453%	0.108			
2024	a	DSL	2022	0.21037251	6.332%	0.108			
2024	a	DSL	2023	0.16250818	4.891%	0.108			
2024	a	DSL	2024	0.15767478	4.746%	0.108			
2024	a	DSL	2025	0.10723171	3.228%	0.108	0.1078		
2025	a	DSL	2010	0.0257104	0.764%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2025	a	DSL	2011	0.02941567	0.874%	0.108			
2025	a	DSL	2012	0.04181716	1.242%	0.108			
2025	a	DSL	2013	0.0624483	1.855%	0.108			
2025	a	DSL	2014	0.10702633	3.178%	0.108			
2025	a	DSL	2015	0.21586655	6.411%	0.108			
2025	a	DSL	2016	0.18359864	5.452%	0.108			
2025	a	DSL	2017	0.25725843	7.640%	0.108			
2025	a	DSL	2018	0.34051197	10.112%	0.108			
2025	a	DSL	2019	0.40820546	12.123%	0.108			
2025	a	DSL	2020	0.42085627	12.499%	0.108			
2025	a	DSL	2021	0.3517103	10.445%	0.108			
2025	a	DSL	2022	0.2782102	8.262%	0.108			
2025	a	DSL	2023	0.2106096	6.255%	0.108			
2025	a	DSL	2024	0.16446039	4.884%	0.108			
2025	a	DSL	2025	0.16092715	4.779%	0.108			
2025	a	DSL	2026	0.10861273	3.226%	0.108	0.1078		
2026	a	DSL	2010	0.02050296	0.601%	0.108			
2026	a	DSL	2011	0.0250724	0.735%	0.108			
2026	a	DSL	2012	0.0323266	0.948%	0.108			
2026	a	DSL	2013	0.05017359	1.471%	0.108			
2026	a	DSL	2014	0.07586193	2.225%	0.108			
2026	a	DSL	2015	0.15959463	4.680%	0.108			
2026	a	DSL	2016	0.13652887	4.004%	0.108			
2026	a	DSL	2017	0.19550398	5.733%	0.108			
2026	a	DSL	2018	0.26147293	7.668%	0.108			
2026	a	DSL	2019	0.34343634	10.071%	0.108			
2026	a	DSL	2020	0.40890013	11.991%	0.108			
2026	a	DSL	2021	0.4178786	12.254%	0.108			
2026	a	DSL	2022	0.34937938	10.245%	0.108			
2026	a	DSL	2023	0.27928154	8.190%	0.108			
2026	a	DSL	2024	0.21371955	6.267%	0.108			
2026	a	DSL	2025	0.16830941	4.936%	0.108			
2026	a	DSL	2026	0.16344318	4.793%	0.108			
2026	a	DSL	2027	0.10873839	3.189%	0.108	0.1078		
2027	a	DSL	2010	0.01689731	0.490%	0.108			
2027	a	DSL	2011	0.01979123	0.573%	0.108			
2027	a	DSL	2012	0.02758761	0.799%	0.108			
2027	a	DSL	2013	0.038916	1.127%	0.108			
2027	a	DSL	2014	0.06025319	1.746%	0.108			
2027	a	DSL	2015	0.11490573	3.329%	0.108			
2027	a	DSL	2016	0.09929089	2.877%	0.108			
2027	a	DSL	2017	0.14556183	4.217%	0.108			
2027	a	DSL	2018	0.19895258	5.764%	0.108			
2027	a	DSL	2019	0.2640447	7.650%	0.108			
2027	a	DSL	2020	0.34444632	9.979%	0.108			
2027	a	DSL	2021	0.40650926	11.777%	0.108			
2027	a	DSL	2022	0.41562262	12.041%	0.108			
2027	a	DSL	2023	0.3511586	10.173%	0.108			
2027	a	DSL	2024	0.28375608	8.221%	0.108			
2027	a	DSL	2025	0.21899197	6.344%	0.108			
2027	a	DSL	2026	0.17115231	4.958%	0.108			
2027	a	DSL	2027	0.16383468	4.746%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2027	a	DSL	2028	0.11011579	3.190%	0.108	0.1078		
2028	a	DSL	2010	0.01355038	0.388%	0.108			
2028	a	DSL	2011	0.01647821	0.472%	0.108			
2028	a	DSL	2012	0.02176236	0.623%	0.108			
2028	a	DSL	2013	0.03343203	0.958%	0.108			
2028	a	DSL	2014	0.04761593	1.364%	0.108			
2028	a	DSL	2015	0.08565679	2.454%	0.108			
2028	a	DSL	2016	0.07094623	2.032%	0.108			
2028	a	DSL	2017	0.10579065	3.031%	0.108			
2028	a	DSL	2018	0.14803226	4.241%	0.108			
2028	a	DSL	2019	0.20077757	5.752%	0.108			
2028	a	DSL	2020	0.2646474	7.581%	0.108			
2028	a	DSL	2021	0.34220758	9.803%	0.108			
2028	a	DSL	2022	0.40404931	11.575%	0.108			
2028	a	DSL	2023	0.41746503	11.959%	0.108			
2028	a	DSL	2024	0.35655057	10.214%	0.108			
2028	a	DSL	2025	0.29056547	8.324%	0.108			
2028	a	DSL	2026	0.2225448	6.375%	0.108			
2028	a	DSL	2027	0.17144968	4.912%	0.108			
2028	a	DSL	2028	0.16580111	4.750%	0.108			
2028	a	DSL	2029	0.11143745	3.192%	0.108	0.1078		
2029	a	DSL	2010	0.00999182	0.283%	0.108			
2029	a	DSL	2011	0.01324488	0.375%	0.108			
2029	a	DSL	2012	0.01809549	0.513%	0.108			
2029	a	DSL	2013	0.02687663	0.762%	0.108			
2029	a	DSL	2014	0.03995426	1.132%	0.108			
2029	a	DSL	2015	0.06442081	1.826%	0.108			
2029	a	DSL	2016	0.05640547	1.599%	0.108			
2029	a	DSL	2017	0.07549089	2.139%	0.108			
2029	a	DSL	2018	0.10744432	3.045%	0.108			
2029	a	DSL	2019	0.1491933	4.228%	0.108			
2029	a	DSL	2020	0.20097069	5.695%	0.108			
2029	a	DSL	2021	0.26258086	7.441%	0.108			
2029	a	DSL	2022	0.33968854	9.627%	0.108			
2029	a	DSL	2023	0.40530563	11.486%	0.108			
2029	a	DSL	2024	0.42331657	11.997%	0.108			
2029	a	DSL	2025	0.36462573	10.333%	0.108			
2029	a	DSL	2026	0.29489038	8.357%	0.108			
2029	a	DSL	2027	0.2226377	6.310%	0.108			
2029	a	DSL	2028	0.17327886	4.911%	0.108			
2029	a	DSL	2029	0.16757003	4.749%	0.108			
2029	a	DSL	2030	0.11262637	3.192%	0.108	0.1078		
2030	a	DSL	2010	0.00713543	0.200%	0.108			
2030	a	DSL	2011	0.00960486	0.269%	0.108			
2030	a	DSL	2012	0.01452932	0.408%	0.108			
2030	a	DSL	2013	0.02224135	0.624%	0.108			
2030	a	DSL	2014	0.0312553	0.877%	0.108			
2030	a	DSL	2015	0.05328854	1.495%	0.108			
2030	a	DSL	2016	0.04352538	1.221%	0.108			
2030	a	DSL	2017	0.0599547	1.682%	0.108			
2030	a	DSL	2018	0.0765892	2.148%	0.108			
2030	a	DSL	2019	0.10817159	3.034%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2030	a	DSL	2020	0.14917761	4.184%	0.108			
2030	a	DSL	2021	0.19918881	5.587%	0.108			
2030	a	DSL	2022	0.26037011	7.303%	0.108			
2030	a	DSL	2023	0.34038151	9.547%	0.108			
2030	a	DSL	2024	0.41054863	11.515%	0.108			
2030	a	DSL	2025	0.43244237	12.129%	0.108			
2030	a	DSL	2026	0.3696585	10.368%	0.108			
2030	a	DSL	2027	0.29469899	8.266%	0.108			
2030	a	DSL	2028	0.22477315	6.304%	0.108			
2030	a	DSL	2029	0.17494088	4.907%	0.108			
2030	a	DSL	2030	0.16917729	4.745%	0.108			
2030	a	DSL	2031	0.11370663	3.189%	0.108	0.1078		
2031	a	DSL	2010	0.00580866	0.160%	0.108			
2031	a	DSL	2011	0.00661254	0.182%	0.108			
2031	a	DSL	2012	0.01064414	0.293%	0.108			
2031	a	DSL	2013	0.017847	0.490%	0.108			
2031	a	DSL	2014	0.02666744	0.733%	0.108			
2031	a	DSL	2015	0.04131428	1.135%	0.108			
2031	a	DSL	2016	0.03741088	1.028%	0.108			
2031	a	DSL	2017	0.04673764	1.284%	0.108			
2031	a	DSL	2018	0.0614495	1.689%	0.108			
2031	a	DSL	2019	0.07789677	2.141%	0.108			
2031	a	DSL	2020	0.10926717	3.003%	0.108			
2031	a	DSL	2021	0.14936815	4.105%	0.108			
2031	a	DSL	2022	0.19953319	5.483%	0.108			
2031	a	DSL	2023	0.26357143	7.243%	0.108			
2031	a	DSL	2024	0.34831331	9.572%	0.108			
2031	a	DSL	2025	0.42369147	11.643%	0.108			
2031	a	DSL	2026	0.44289806	12.171%	0.108			
2031	a	DSL	2027	0.37319938	10.256%	0.108			
2031	a	DSL	2028	0.30057062	8.260%	0.108			
2031	a	DSL	2029	0.22925156	6.300%	0.108			
2031	a	DSL	2030	0.17842643	4.903%	0.108			
2031	a	DSL	2031	0.172548	4.742%	0.108			
2031	a	DSL	2032	0.11597214	3.187%	0.108	0.1078		
2032	a	DSL	2010	0.00398735	0.107%	0.108			
2032	a	DSL	2011	0.00521085	0.140%	0.108			
2032	a	DSL	2012	0.00732782	0.197%	0.108			
2032	a	DSL	2013	0.01306576	0.352%	0.108			
2032	a	DSL	2014	0.02154592	0.580%	0.108			
2032	a	DSL	2015	0.03426565	0.923%	0.108			
2032	a	DSL	2016	0.02974152	0.801%	0.108			
2032	a	DSL	2017	0.04017068	1.082%	0.108			
2032	a	DSL	2018	0.0479015	1.290%	0.108			
2032	a	DSL	2019	0.06249674	1.683%	0.108			
2032	a	DSL	2020	0.07868339	2.119%	0.108			
2032	a	DSL	2021	0.10940349	2.947%	0.108			
2032	a	DSL	2022	0.14962196	4.030%	0.108			
2032	a	DSL	2023	0.20198052	5.440%	0.108			
2032	a	DSL	2024	0.26970537	7.264%	0.108			
2032	a	DSL	2025	0.35945317	9.681%	0.108			
2032	a	DSL	2026	0.43392272	11.687%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2032	a	DSL	2027	0.44712723	12.043%	0.108			
2032	a	DSL	2028	0.38062377	10.252%	0.108			
2032	a	DSL	2029	0.30655014	8.257%	0.108			
2032	a	DSL	2030	0.23381226	6.297%	0.108			
2032	a	DSL	2031	0.18197602	4.901%	0.108			
2032	a	DSL	2032	0.17598065	4.740%	0.108			
2032	a	DSL	2033	0.11827928	3.186%	0.108	0.1078		
2033	a	DSL	2010	0.00273118	0.072%	0.108			
2033	a	DSL	2011	0.0031645	0.084%	0.108			
2033	a	DSL	2012	0.00577367	0.152%	0.108			
2033	a	DSL	2013	0.0089799	0.237%	0.108			
2033	a	DSL	2014	0.01638903	0.433%	0.108			
2033	a	DSL	2015	0.02812327	0.743%	0.108			
2033	a	DSL	2016	0.02495228	0.659%	0.108			
2033	a	DSL	2017	0.0319309	0.843%	0.108			
2033	a	DSL	2018	0.041165	1.087%	0.108			
2033	a	DSL	2019	0.04871074	1.286%	0.108			
2033	a	DSL	2020	0.06311864	1.667%	0.108			
2033	a	DSL	2021	0.07877007	2.080%	0.108			
2033	a	DSL	2022	0.10957342	2.894%	0.108			
2033	a	DSL	2023	0.15143504	3.999%	0.108			
2033	a	DSL	2024	0.20665095	5.457%	0.108			
2033	a	DSL	2025	0.27829058	7.349%	0.108			
2033	a	DSL	2026	0.36807953	9.721%	0.108			
2033	a	DSL	2027	0.43800231	11.567%	0.108			
2033	a	DSL	2028	0.45595584	12.041%	0.108			
2033	a	DSL	2029	0.38813926	10.250%	0.108			
2033	a	DSL	2030	0.31260303	8.255%	0.108			
2033	a	DSL	2031	0.23842893	6.297%	0.108			
2033	a	DSL	2032	0.18556918	4.901%	0.108			
2033	a	DSL	2033	0.17945542	4.739%	0.108			
2033	a	DSL	2034	0.12061472	3.185%	0.108	0.1078		
2034	a	DSL	2010	0.00273275	0.071%	0.108			
2034	a	DSL	2011	0.00180021	0.047%	0.108			
2034	a	DSL	2012	0.00350546	0.091%	0.108			
2034	a	DSL	2013	0.00727831	0.189%	0.108			
2034	a	DSL	2014	0.0118388	0.307%	0.108			
2034	a	DSL	2015	0.02079787	0.539%	0.108			
2034	a	DSL	2016	0.02023148	0.524%	0.108			
2034	a	DSL	2017	0.02678271	0.694%	0.108			
2034	a	DSL	2018	0.03271345	0.847%	0.108			
2034	a	DSL	2019	0.04185045	1.084%	0.108			
2034	a	DSL	2020	0.04918371	1.274%	0.108			
2034	a	DSL	2021	0.06317309	1.637%	0.108			
2034	a	DSL	2022	0.07887357	2.043%	0.108			
2034	a	DSL	2023	0.11087471	2.872%	0.108			
2034	a	DSL	2024	0.15489969	4.013%	0.108			
2034	a	DSL	2025	0.21317811	5.523%	0.108			
2034	a	DSL	2026	0.28490109	7.381%	0.108			
2034	a	DSL	2027	0.37145135	9.623%	0.108			
2034	a	DSL	2028	0.44654408	11.568%	0.108			
2034	a	DSL	2029	0.46484774	12.043%	0.108			

CalYr	Season	Fuel	MdlYr	pop_ca	% of Population	DPM by MY (g/hr)	DPM by CY (g/hr)	VOC by MY (g/hr)	VOC by CY (g/hr)
2034	a	DSL	2030	0.39570862	10.251%	0.108			
2034	a	DSL	2031	0.31869931	8.256%	0.108			
2034	a	DSL	2032	0.24307869	6.297%	0.108			
2034	a	DSL	2033	0.18918808	4.901%	0.108			
2034	a	DSL	2034	0.1829551	4.740%	0.108			
2034	a	DSL	2035	0.12296691	3.186%	0.108	0.1078		
2035	a	DSL	2010	0.00233692	0.059%	0.108			
2035	a	DSL	2011	0.00213009	0.054%	0.108			
2035	a	DSL	2012	0.00199346	0.051%	0.108			
2035	a	DSL	2013	0.0046167	0.117%	0.108			
2035	a	DSL	2014	0.00949282	0.241%	0.108			
2035	a	DSL	2015	0.01521097	0.387%	0.108			
2035	a	DSL	2016	0.01481008	0.376%	0.108			
2035	a	DSL	2017	0.02170784	0.552%	0.108			
2035	a	DSL	2018	0.02742929	0.697%	0.108			
2035	a	DSL	2019	0.03324628	0.845%	0.108			
2035	a	DSL	2020	0.04224171	1.074%	0.108			
2035	a	DSL	2021	0.04920855	1.251%	0.108			
2035	a	DSL	2022	0.0632335	1.607%	0.108			
2035	a	DSL	2023	0.07978176	2.028%	0.108			
2035	a	DSL	2024	0.11337088	2.882%	0.108			
2035	a	DSL	2025	0.15973518	4.060%	0.108			
2035	a	DSL	2026	0.21816398	5.546%	0.108			
2035	a	DSL	2027	0.28740825	7.306%	0.108			
2035	a	DSL	2028	0.37855999	9.623%	0.108			
2035	a	DSL	2029	0.45508981	11.568%	0.108			
2035	a	DSL	2030	0.47374375	12.043%	0.108			
2035	a	DSL	2031	0.40328148	10.251%	0.108			
2035	a	DSL	2032	0.32479841	8.256%	0.108			
2035	a	DSL	2033	0.2477306	6.297%	0.108			
2035	a	DSL	2034	0.19280866	4.901%	0.108			
2035	a	DSL	2035	0.1864564	4.740%	0.108			
2035	a	DSL	2036	0.12532019	3.186%	0.108	0.1078		

EMFAC2011 IDLING EMISSIONS FACTORS BY MODEL YEAR

Model_Year	HC	CO	NOx	PM	CO2
1965	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1966	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1967	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1968	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1969	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1970	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1971	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1972	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1973	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1974	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1975	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1976	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1977	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1978	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1979	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1980	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1981	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1982	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1983	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1984	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1985	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1986	25.34806616	71.44536556	58.47063987	6.454933928	6089.170469
1987	14.84410104	58.90268215	89.81775652	3.219520311	6425.570119
1988	14.84410104	58.90268215	89.81775652	3.219520311	6425.570119
1989	14.84410104	58.90268215	89.81775652	3.219520311	6425.570119
1990	14.84410104	58.90268215	89.81775652	3.219520311	6425.570119
1991	11.84432943	54.19452849	100.3961819	2.407636174	6572.744966
1992	11.84432943	54.19452849	100.3961819	2.407636174	6572.744966
1993	11.84432943	54.19452849	100.3961819	2.407636174	6572.744966
1994	9.473467566	49.87911671	109.1590641	1.807634775	6719.919813
1995	9.473467566	49.87911671	109.1590641	1.807634775	6719.919813
1996	9.473467566	49.87911671	109.1590641	1.807634775	6719.919813
1997	9.473467566	49.87911671	109.1590641	1.807634775	6719.919813
1998	7.108735975	44.83176762	117.8791509	1.250442578	6909.144617
1999	7.108735975	44.83176762	117.8791509	1.250442578	6909.144617
2000	7.108735975	44.83176762	117.8791509	1.250442578	6909.144617
2001	7.108735975	44.83176762	117.8791509	1.250442578	6909.144617
2002	7.108735975	44.83176762	117.8791509	1.250442578	6909.144617
2003	5.840037229	41.72448379	122.2778332	0.969796514	7035.294485
2004	5.840037229	41.72448379	122.2778332	0.969796514	7035.294485
2005	5.840037229	41.72448379	122.2778332	0.969796514	7035.294485

Model_Year	HC	CO	NOx	PM	CO2
2006	5.840037229	41.72448379	122.2778332	0.969796514	7035.294485
2007	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2008	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2009	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2010	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2011	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2012	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2013	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2014	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2015	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2016	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2017	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2018	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2019	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2020	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2021	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2022	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2023	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2024	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2025	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2026	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2027	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2028	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2029	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2030	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2031	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2032	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2033	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2034	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2035	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2036	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2037	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2038	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2039	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485
2040	5.840037229	41.72448379	38.40895563	0.107755168	7035.294485

Train Idling Emissions

		EF[1] (g/hr)		Emissions		
Source	Time / Train (hours)	DPM	VOC	DPM (lb/year)	DPM (lb/hr)	VOC (lb/hr)
Train Idling	0.5	44	207	14.5	0.05	0.23

Assumptions:

Total cement import:	300,000	tpy
Train car capacity[2]:	100	tons / car
Train cars per trip:	100	cars / trip
Fraction of cars[3]:	10%	
Annual trips:	300	trips / year

[1] Emission factors are from CARB's Locomotive Emission Study (January 1991) for Union Pacific Line Haul (pg B-11)
[2] Rail car capacity based on Waste by Rail Inc - http://www.wbrinc.com/transport.html
[3] Fraction of cars filled with Project related materials is assumed

APPENDIX D

MODEL SOURCE APPORTIONMENT AND DIESEL EXHAUST SPECIATION

DPM Emission Source Apportionment and Stack Parameters Summary

Source Apportionment

Source	Stack Name	Type	Cancer DPM (lb/yr)	Chronic DPM (lb/yr)	Acute DPM (lb/hr)
IDLE1	Idle Truck #1	Point	0.5	2.3	0.00211
IDLE2	Idle Truck #2	Point	0.5	2.3	0.00211
IDLE3	Idle Truck #3	Point	0.5	2.3	0.00211
IDLE4	Idle Truck #4	Point	0.5	2.3	0.00211
HMASTACK	Asphalt Plant	Area	---	---	---
HMALOAD	Asphalt Load Out / Silo	Area	---	---	---
HMAHEAT	Asphalt Oil Heaters	Point	---	---	---
RAILIDLE	Train Idle	Point	14.5	14.5	0.05
ORSOUTH	Off Road South Pit (Unmitigated)	Area	406.1	1,411.7	0.45
ORNORTH	Off Road North Pit (Unmitigated)	Area	251.6	881.7	0.29
ORSOUTH	Off Road South Pit (20% reduction)	Area	335.9	1,181.4	0.45
ORNORTH	Off Road North Pit (20% reduction)	Area	208.4	739.9	0.29
ORSOUTH	Off Road South Pit (Mitigated)	Area	99.6	304.7	0.20
ORNORTH	Off Road North Pit (Mitigated)	Area	62.9	200.1	0.13
ORPLANT	Off Road Plant	Area	147.3	450.8	0.35
AVET001 to 060	Haul Truck Traffic - Offsite West	Volumes	0.12	0.58	0.00032
AVET061 to 193	Haul Truck Traffic - Offsite East	Volumes	0.028	0.14	0.00008
ENTRY001 to 38	Haul Truck Traffic - All / RMC	Volumes	0.53	4.2	0.00173
QUEUE001 to 30	Haul Truck Traffic - Queueing	Volumes	0.037	0.297	0.00025
AGG001 to 19	Haul Truck Traffic - Aggregates	Volumes	0.18	1.4	0.00054
HMA001 to 9	Haul Truck Traffic - HMA	Volumes	0.06	0.5	0.00056
RECYC001 to 13	Haul Truck Traffic - Recycle/Vaclite	Volumes	0	0	0

Note: Haul truck emissions shown above are for each volume source (e.g. AVET001 through 060 has 60 volume sources).
Cement truck trip emissions occurring within the ORNORTH area are summed with offroad emissions.
20% reduction is used to estimate the cancer risk for 800,000 ton maximum annualized rate versus unmitigated rate of 1,000,000 tons per year.

Stack Parameters

Source	Stack Name	Release Height (m)	Temperature (K)	Velocity (m/s)	Stack Diameter (m)	Vertical Dimension (m)	Initial Vert. Dimension (m)
IDLE1	Idle Truck #1	3.0	536	19.74	0.15		
IDLE2	Idle Truck #2	3.0	536	19.74	0.15		
IDLE3	Idle Truck #3	3.0	536	19.74	0.15		
IDLE4	Idle Truck #4	3.0	536	19.74	0.15		
HMASTACK	Asphalt Plant	9.1	408	18.97	1.32		
HMALOAD	Asphalt Load Out / Silo	4.9	311	20.32	2.44		
HMAHEAT	Asphaltic Oil Heater	2.5	500	2.39	0.30		
RAILIDLE	Train Idle	15.0	342	5.63	0.30		
ORSOUTH	South Pit	3.0				6	1.40
ORNORTH	North Pit	3.0				6	1.40
ORPLANT	Off Road Plant	3.0				6	1.40
AVET001 to 060	Haul Truck Traffic - Offsite West	3.0				6	1.40
AVET061 to 193	Haul Truck Traffic - Offsite East	3.0				6	1.40
ENTRY001 to 38	Haul Truck Traffic - All / RMC	3.0				6	1.40
QUEUE001 to 30	Haul Truck Traffic - Queueing	3.0				6	1.40
AGG001 to 19	Haul Truck Traffic - Aggregates	3.0				6	1.40
HMA001 to 9	Haul Truck Traffic - HMA	3.0				6	1.40
RECYC001 to 13	Haul Truck Traffic - Recycle/Vaclite	3.0				6	1.40

Acute Diesel Exhaust Speciation (lbs/hr)

			On Road Haul Truck Travel[2]							Off Road On Site			
Model Source ID[1]	Fraction	On Road Haul Truck Idle[2] (2-5)	Off Site-West (AVET001 TO 60)	Off Site-East (AVET061 TO 193)	On Site (ENTRY001 TO 38)	On Site (QUEUE001 TO 30)	On Site (AGG001 TO 19)	On Site (HMA001 TO 9)	On Site (RECYC001 TO 13)	ORNORTH	ORPLANT	ORSOUTH	Train Idling (10)
ROG[3] (lb/hr):		1.73E-02	4.47E-04	1.07E-04	5.37E-03	7.79E-04	1.66E-03	1.72E-03	0.00E+00	2.43E-01	5.39E-01	3.42E-01	2.28E-01
Benzene	2.00E-02	3.45E-04	8.95E-06	2.14E-06	1.07E-04	1.56E-05	3.32E-05	3.45E-05	0.00E+00	4.86E-03	1.08E-02	6.84E-03	4.56E-03
Toluene	1.47E-02	2.54E-04	6.59E-06	1.58E-06	7.91E-05	1.15E-05	2.44E-05	2.54E-05	0.00E+00	3.58E-03	7.94E-03	5.03E-03	3.36E-03
Xylenes	1.04E-02	1.80E-04	4.65E-06	1.11E-06	5.59E-05	8.11E-06	1.73E-05	1.79E-05	0.00E+00	2.53E-03	5.61E-03	3.56E-03	2.37E-03
Formaldehyde	1.47E-01	2.54E-03	6.58E-05	1.58E-05	7.90E-04	1.15E-04	2.44E-04	2.54E-04	0.00E+00	3.58E-02	7.93E-02	5.03E-02	3.35E-02
Acrolein	2.64E-04	4.56E-06	1.18E-07	2.83E-08	1.42E-06	2.06E-07	4.38E-07	4.55E-07	0.00E+00	6.42E-05	1.42E-04	9.03E-05	6.03E-05
Methanol	3.00E-04	5.18E-06	1.34E-07	3.21E-08	1.61E-06	2.34E-07	4.97E-07	5.17E-07	0.00E+00	7.29E-05	1.62E-04	1.02E-04	6.84E-05
Methyl Ethyl Ketone	1.48E-02	2.55E-04	6.60E-06	1.58E-06	7.93E-05	1.15E-05	2.45E-05	2.55E-05	0.00E+00	3.59E-03	7.96E-03	5.05E-03	3.37E-03
Styrene	5.80E-04	1.00E-05	2.59E-07	6.21E-08	3.11E-06	4.52E-07	9.62E-07	9.99E-07	0.00E+00	1.41E-04	3.13E-04	1.98E-04	1.32E-04
Off Road South Pit (20% reduction)		2.11E-03	3.16E-04	7.58E-05	1.73E-03	2.51E-04	5.35E-04	5.56E-04	0.00E+00	1.31E-01	3.46E-01	1.95E-01	4.85E-02
Off Road North Pit (20%	3.37E-03	7.12E-06	1.07E-06	2.55E-07	5.84E-06	8.47E-07	1.80E-06	1.87E-06	0.00E+00	4.41E-04	1.16E-03	6.58E-04	1.63E-04
Arsenic	5.00E-06	1.06E-08	1.58E-09	3.79E-10	8.66E-09	1.26E-09	2.68E-09	2.78E-09	0.00E+00	6.54E-07	1.73E-06	9.76E-07	2.42E-07
Chlorine	3.44E-04	7.27E-07	1.09E-07	2.61E-08	5.96E-07	8.65E-08	1.84E-07	1.91E-07	0.00E+00	4.50E-05	1.19E-04	6.72E-05	1.67E-05
Copper	2.50E-05	5.29E-08	7.91E-09	1.89E-09	4.33E-08	6.29E-09	1.34E-08	1.39E-08	0.00E+00	3.27E-06	8.64E-06	4.88E-06	1.21E-06
Mercury	3.00E-05	6.34E-08	9.49E-09	2.27E-09	5.20E-08	7.54E-09	1.61E-08	1.67E-08	0.00E+00	3.92E-06	1.04E-05	5.86E-06	1.45E-06
Nickel	1.90E-05	4.02E-08	6.01E-09	1.44E-09	3.29E-08	4.78E-09	1.02E-08	1.06E-08	0.00E+00	2.48E-06	6.57E-06	3.71E-06	9.21E-07
Vanadium	2.90E-05	6.13E-08	9.18E-09	2.20E-09	5.02E-08	7.29E-09	1.55E-08	1.61E-08	0.00E+00	3.79E-06	1.00E-05	5.66E-06	1.41E-06

[1] Substances without an acute risk value are omitted.

[2] Emissions are per source.

[3] ROG fractions calculated with emission factors from CARB diesel speciation for diesel fueled farm equipment

[4] DPM speciation also from CARB for diesel fueled automobiles.

[5] ORNORTH includes offroad equipment and cement trucks traveling to rail loading area via queueing area on the western property boundary.

APPENDIX E

MODELING FILES ON CDROM

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 12

Habitat Assessment/Burrow Survey

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LONGVIEW ROAD
PEARBLOSSOM AREA, LOS ANGELES COUNTY, CALIFORNIA
DESERT TORTOISE PRESENCE/ABSENCE SURVEY

BURROWING OWL SURVEY PHASE I (HABITAT ASSESSMENT) AND PHASE II (BURROW SURVEY)

APN: 3039-021-009, 3039-036-001 & 002

UTM: 11-S: 418,100mE; 3,821,700mN

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PSBS #U755

8 March 2006

Cornelius W Bouscaren
for
R. Mitchel Beauchamp, M. Sc., President

LONGVIEW ROAD
PEARBLOSSOM AREA, LOS ANGELES COUNTY, CALIFORNIA
DESERT TORTOISE PRESENCE/ABSENCE SURVEY

BURROWING OWL SURVEY PHASE I (HABITAT ASSESSMENT) AND PHASE II (BURROW SURVEY)

8 March 2006

SUMMARY

A presence/absence survey for the Desert Tortoise was conducted on a site on Longview Road in the Pearblossom area of Los Angeles County. A Burrowing Owl survey - Phase I (Habitat Assessment) and Phase II (Burrow Survey) - was also conducted. A habitat assessment for the Mohave Ground Squirrel was also performed. **No Tortoises or Tortoise sign were detected during this survey.**

INTRODUCTION

Pacific Southwest Biological Services, Inc., (Pacific Southwest) at the request of McGee and Associates, conducted a presence/absence survey for the Desert Tortoise (*Gopherus agassizii*) (Tortoise) on a 309.47-acre property in the community of Pearblossom, Los Angeles County. The purpose of the survey was to document the presence/absence of the Tortoise, a species listed as Threatened by the U. S. Fish and Wildlife Service (Service). A survey for the Burrowing Owl (*Athene cunicularia*), a California Species of Special Concern, was also conducted.

LOCATION

The project area (APN: 3039-021-009, 3039-036-001 & 002) is located in the north part of the community of Pearblossom in eastern Los Angeles County, California. The site is situated north of Avenue U, south of Avenue T, east of Longview Road (131st Street East), and west of 136th Street East. The map location is in the western half of Section 11, Township 5 North, Range 10 West of the San Bernardino Base and Meridian; USGS 7.5' Littlerock, California quadrangle (UTM: 11-S: 418,100mE; 3,821,700mN). Access to the site from State Highway 138 (Pearblossom Highway) is north on Longview Road (131st Street East) to the Avenue U intersection; the site is in the northeast quadrant.

PROJECT DESCRIPTION

The proposed project consists of development of a quarry for extraction of mineral construction material. Since the proposed project could potentially result in "take" of the Tortoise or Tortoise habitat, a tortoise survey is a requirement of the Service as a condition of compliance with the Endangered Species Act of 1973, as amended.

SURVEY DEFINITIONS

The scientific nomenclature used in this report is from the following standard references: vascular plants (Hickman 1993); vegetation communities (Holland 1986); amphibians and reptiles (Crother 2000, Crother *et al.* 2003); birds (American Ornithologists' Union 1998); and mammals (Jameson and Peeters 1988).

GENERAL PHYSIOGRAPHY AND VEGETATION

The site lies on a broad bajada extending north from the lower slopes of the San Gabriel Mountains. Elevation ranges from a high of approximately 2,943 feet above mean sea level in the southeast corner to a low of approximately 2,852 feet in the northwest. Geologic strata are mapped as Quaternary Holocene Alluvium (undifferentiated) (Bortugno and Spittler 1986). Soils consist of the Arizo Association, 0-5% slopes (USDA 1969).

The plant community on the site is Mojave Creosote Bush Scrub, the basic creosote scrub of the Mojave Desert. Creosote Bush (*Larrea tridentata*) is the most abundant shrub while Burro-weed (*Ambrosia dumosa*) is also numerous. Joshua Tree (*Yucca brevifolia*) is more numerous in the surrounding area than on the property. Also prominent are Fourwing Saltbush (*Atriplex canescens*), Ephedra (*Ephedra* sp.), Winter Fat (*Krascheninnikovia lanata*), Spinescale (*A. spinifera*), Lycium (*Lycium* spp.), Desert Trumpet (*Eriogonum inflatum*), Wild Turnip (*Brassica tourneforti*), and Rancher's Fireweed (*Amsinckia menziesii*). Mediterranean Grass (*Schismus barbatus*), Soft Chess (*Bromus hordeaceus*), and Red-stem Filaree (*Erodium cicutarium*) are abundant annuals on the site.

The site is heavily disturbed. Based on the vintage of the evidence, the property and environs appear to have been used as dumping grounds for decades. Old tires, tin cans, scrapped vehicles and parts, household furniture, discarded appliances, building materials, and clothing are scattered about. Empty paint and oil containers occur on the site. The presence of spent shotguns shells and revolver casings attest to firearms activity. Sign of domestic dogs is abundant. There are mounds of gravel spoil on the site. Off-road vehicle activity is apparent. Light equestrian activity was observed on the site during the survey.

Undeveloped land is adjacent to the site on the south, west, and north. Within the area surveyed north of Avenue T are several concrete building pads that appear to have been in place for many years. Some of these have the remains of structures, with evidence of fire. Scattered occupied residences and collapsed/abandoned structures occur to the east. The Burlington Northern Santa Fe rail line bisects the property east/west in the approximate center of the site.

METHODS AND OBSERVATIONS

Desert Tortoise Survey

Four biologists participated in the Desert Tortoise survey during the period 20-26 February 2006: Cornelius W. Bouscaren, Eric A. Dugan, Dale R. Powell, and Chris M. Rodriguez. The fieldwork was conducted according to the following schedule:

Date	Personnel	Time	Conditions
20 Feb	Rodriguez	0800-1600	Temperature 41-62°F, skies less than 5% high clouds becoming clear, winds calm
21 Feb	Dugan	0715-1300	Temperature 41-56°F, skies 25-30% high clouds becoming clear, winds north 0-7 mph
21 Feb	Powell	0800-1700	(As above)
22 Feb	Powell	0800-1730	Temperature 40-64°F, skies clear, winds east 0-10 mph
22 Feb	Bouscaren	0700-1525	(As above)
22 Feb	Rodriguez	0800-1600	(As above)
23 Feb	Powell	0800-1700	Temperature 43-64°F, skies clear, winds east 0-10 mph
23 Feb	Bouscaren	0700-1400	(As above)
24 Feb	Powell	0800-1620	Temperature 44-67°F, skies clear, winds east 0-8 mph
26 Feb	Dugan, Rodriguez	0800-1300	Temperature 76-79°F, skies clear, winds south 0-5 mph

The survey was performed on foot in accordance with Service protocol for presence/absence surveys for any non-federal action that may occur within the range of the Tortoise (Service 1992). The survey included 100% coverage of the entire project site, using 30-foot wide belt transects, and following completion of the 100% survey, an additional intensive coverage of 5% of the site, using 10-foot wide belt transects, as mandated by the protocol (Figure 2). It also included five additional transects on each side of the site, at 100, 300, 600, 1,200 and 2,400 feet beyond the boundaries of the property to cover what the Service refers to as the Zone of Influence. The Zone of Influence is defined as the area where Tortoises on adjacent lands may be directly or indirectly affected by project exploration, construction, maintenance, operation, monitoring, dismantlement, enhancement, and project abandonment.

No Tortoises, and no active or inactive burrows, were detected during the survey. No Tortoise signs (tracks, shell fragments, courtship rings, or drinking sites) were detected. Pacific Southwest's opinion is that the site and adjacent areas have been subject to intensive human influence for many decades, that the local Tortoise population was extirpated many years ago, and the probability of recolonization of the area by this species is nonexistent.

Since no Tortoise sign was observed on the project site or Zone of Influence, the Service requires completion of a summary form, which is included (Appendix 2).

Burrowing Owl Survey

The Burrowing Owl survey was conducted in accordance with accepted protocol for such surveys (Lincer and Steenhof 1997), with minor variations. The Phase I (habitat assessment), determining presence of suitable habitat for the Burrowing Owl on the site, was accomplished immediately upon arrival at the site, as it supports low-growing desert vegetation. Burrows are the essential component of Burrowing Owl habitat, providing shelter, protection, and nests. The Burrowing Owl typically uses burrows made by fossorial animals such as the California Ground Squirrel (*Spermophilus beecheyi*) or Badger (*Taxidea taxus*), but also may use man-made

structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement. The Phase II (burrow survey) was conducted concurrently with the Desert Tortoise survey, using the 30-foot wide belt transects required for the Desert Tortoise survey rather than the 100-foot wide transects specified in the Burrowing Owl protocol. This provided more detailed coverage of the site than the Burrowing Owl protocol specifies. The Phase II survey extended to include the five additional transects on each side of the site, at 100, 300, 600, 1,200 and 2,400 feet beyond the boundaries of the property, which were surveyed during the Desert Tortoise survey. This may have resulted in minor omissions of habitat covered, as the Burrowing Owl protocol requires 100-foot transects covering all areas within 500 feet of the project impact zone.

Burrows and piles of spoil potentially used by the Burrowing Owl are found on the site (Figure 2). In addition, a single Burrowing Owl was observed departing from a burrow approximately 400 feet west of the site at 0930 hours 22 February (UTM: 11-S: 417,631mE; 3,821,218mN).

Since the Service requires a report of any surveys for the Tortoise and CDFG requires a report of any Burrowing Owl surveys, Pacific Southwest is sending an independent copy of this report to each agency.

Faunal Species Observed

Thirty animal species were observed during the survey: three invertebrates, three reptiles, 19 avian species, and five mammals (Appendix 1).

MITIGATION MEASURES

BURROWING OWL

Further surveys, to determine whether the Burrowing Owl occurs on the property and to what extent, are recommended. This would avoid delays in implementation of the proposed project because of potential objections by CDFG that adequate steps have not been taken for conservation of this species. Such surveys would include a Phase III survey (burrow survey, census, and mapping), followed by subsequent surveys if necessary. A Phase III survey requires four site visits during the breeding season (15 April – 15 July) on separate days, early in the morning or late in the afternoon. If the Burrowing Owl is not observed during the breeding season surveys, a winter survey (1 December – 31 January) is required, also requiring four site visits on separate days.

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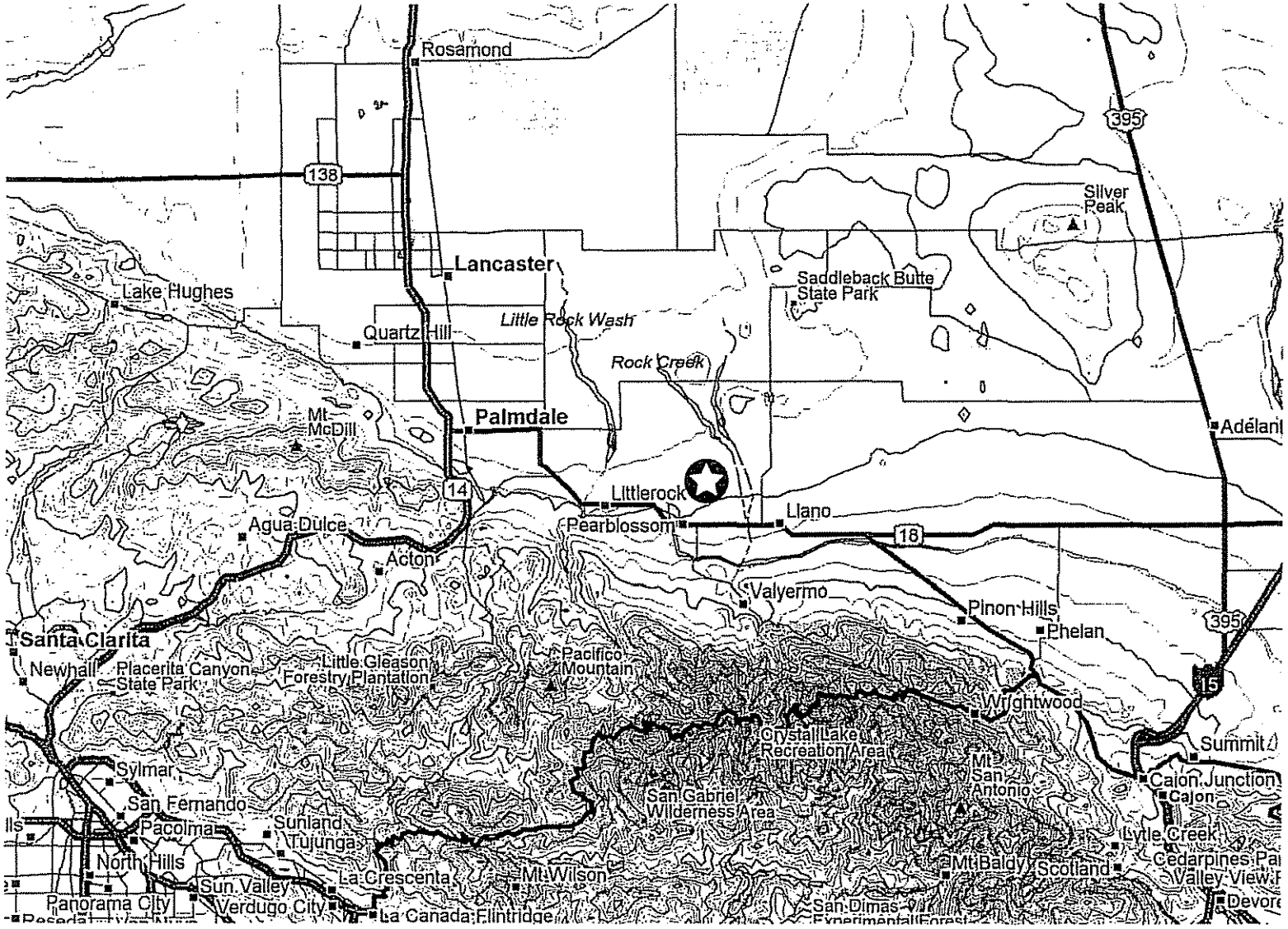


Figure 1. Project Vicinity, Longview Road, Pearblossom Area, Los Angeles County, CA -

N

Not to Scale

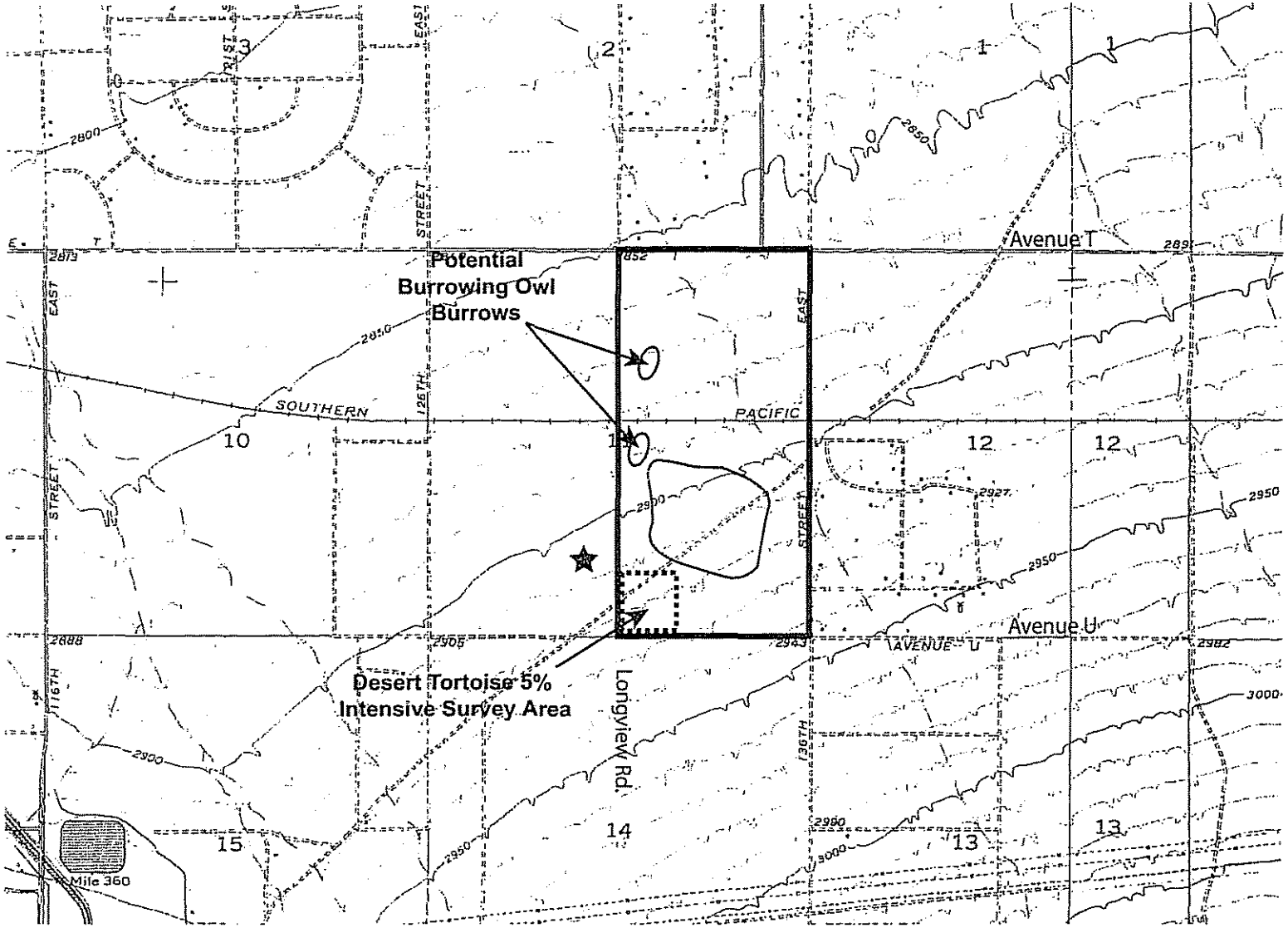


Figure 2. Project Location, Longview Road, Pearblossom Area, Los Angeles County
USGS 7.5' Littlerock, CA Quadrangle

★ Location of Burrowing Owl Observation

Scattered Debris Piles

N

1' = 2,200"

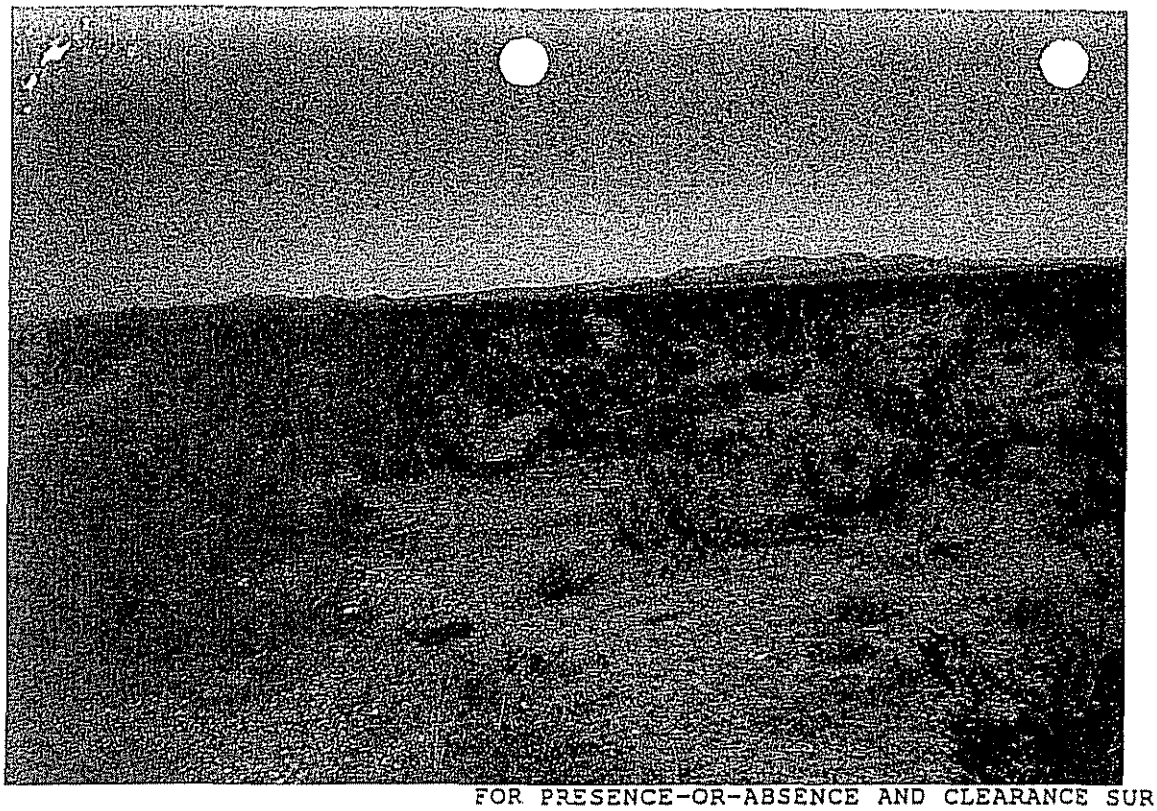
APPENDIX 1. ANIMALS OBSERVED OR DETECTED

COMMON NAME	SCIENTIFIC NAME
LEPIDOPTERA (Butterflies and Moths)	
Pieridae (Whites, Sulfurs, Marbles, and Orange-tips)	
Checkered White	*Pontia protodice*
Sara Orangetip	*Anthocharis sara*
Hymenoptera (Ants, Wasps, and Bees)	
Formicidae (Ants)	
California Harvester Ant	*Pogonomyrmex californicus*
REPTILES	
Phrynosomatidae	
Desert Spiny Lizard	*Sceloporus magister*
Side-blotched Lizard	*Uta stansburiana*
Xantusiidae (Night Lizards)	
Yucca Night Lizard	*Xantusia vigilis vigilis*
BIRDS	
Accipitridae (Hawks, Eagles, Harriers, and Kites)	
Red-tailed Hawk	*Buteo jamaice*
Falconidae (Falcons)	
American Kestrel	*Falco sparverius*
Columbidae (Pigeons and Doves)	
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Strigidae (Typical Owls)	
Burrowing Owl	*Athene cunicularia*
Trochilidae (Hummingbirds)	
Anna's Hummingbird	*Calypte anna*
Picidae (Woodpeckers)	
Ladder-backed Woodpecker	*Picoides scalaris*
Tyrannidae (Tyrant Flycatchers)	
Say's Phoebe	*Sayornis saya*
Laniidae (Shrikes)	
Loggerhead Shrike	*Lanius ludovicianus*
Corvidae (Jays, Crows, Ravens, and Magpies)	
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Troglodytidae (Wrens)	
Cactus Wren	*Campylorhynchus brunneicapillus*

APPENDIX 1. ANIMALS OBSERVED OR DETECTED (CONTINUED)

Mimidae (Mockingbirds and Thrashers)	
Northern Mockingbird	*Mimus polyglottos*
Emberizidae (Towhees and Sparrows)	
California Towhee	*Pipilo crissalis*
Brewer's Sparrow	*Spizella breweri*
Sage Sparrow	*Amphispiza belli*
White-crowned Sparrow	*Zonotrichia leucophrys*
Fringillidae (Finches)	
House Finch	*Carpodacus mexicanus*
Passeridae (Old World Sparrows)	
House Sparrow	*Passer domesticus*
MAMMALS	
Leporidae (Rabbits and Hares)	
Desert Cottontail	*Sylvilagus audubonii*
Black-tailed Jackrabbit	*Lepus californicus*
Sciuridae (Squirrels, Chipmunks, and Marmots)	
Antelope Ground Squirrel	*Ammospermophilus leucurus*
Heteromyidae (Pocket Mice and Kangaroo Rats)	
Pacific Kangaroo Rat	*Dipodomys agilis*
Canidae (Foxes, Wolves, and Relatives)	
Coyote	*Canis latrans*

APPENDIX 2. DESERT TORTOISE SURVEY SUMMARY FORM



M/D/Y
Date 20-26 FEB 2006
Transect No. ALL
State CALIFORNIA
County LOS ANGELES
City PEARBLOSSOM AREA
Recorder C W BOUSCAREN
Address P.O. BOX 985 NATIONAL CIT
Project Name LONGVIEW A
Type of Project MINERAL EXTRACTION
Quad Name LITTLEROCK, CA
Scale 1:24000
Site Name LONGVIEW ROA
T 5N R 10W Sec 11
¼ Sec NE+SE ¼¼ Sec —
UTM Zone 11-S
Northing 3821700
Easting 418100
Parcel No.

FOR PRESENCE-OR-ABSENCE AND CLEARANCE SURVEYS
FOR DESERT TORTOISE SIGN

% Slope: high 2 low 1 Aspect NW Elevation 2852-2943 ft.
Land Form (e.g., mesa, bajada, wash) BAJADA
Soils ARIZO ASSOCIATION 0-5% SLOPES
Vegetation: dominant perennials LARREA TRIDENTATA, AMBROSIA DUMOSA, YUCCA BREVIFOLIA
other species EPHEDRA SP., OPUNTIA ECHINOCARPA, ATRIPLEX CANESCENS,
dominant annuals BROMUS SP., ERODIUM CICUTARIUM. KRASCHENINNIKOVIA LANATA
other species
Adjacent Land Use: immediate UNDEVELOPED TO SOUTH, WEST, AND NORTH. SCATTERED
Within 1 mi. RESIDENCES AND ABANDONED BLDGS TO EAST
Soils ARIZO ASSOCIATION 0-5% SLOPES
Vegetation MOHAVE / CREOSOTE BUSH SCRUB

Weather: Temperature - Air at 5 cm ____ °C Surface ____ °C Cloud cover ____ %
Wind speed ____ Rainfall ____ in. Rainfall in last 30 days — in.

Corrected Sign	Live Tortoises Adult/Juv.	TOTAL NUMBER OF Shelter Sites Pallet/Burrow/Den Active/Inactive [1]	Scats [2]	Shell Remains [3]
	A= J=		M= F=	A= J= Unk= Unk=

Tracks	Eggshell Fragments	Drinking Sites	Courtship Rings	Other	Neotoma Middens w/sign	:w/o sign
					:	

SIGNS OF HUMAN DISTURBANCE - NUMBER AND TYPES SEEN

Tire Tracks	Human Footprints	Dog Sign	Trash	Dump Sites	Shotgun/ Rifle Shells	Blading	Ravens	Other EQUESTRIAN

Attachment F

FUGRO West, Inc.

Slope Stability Evaluation, Big Rock Creek Mine Slopes, Antelope Valley Near Pearblossom, Los Angeles County, California,

Dated September 2006

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 13

Biological Assessment

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Biological Assessment

Big Rock Wash Surface Mining Project Site, Pearblossom, Los Angeles County, California

Prepared by:

Impact Sciences, Inc.
234 E. Colorado Boulevard, Suite 205
Pasadena, California 91101

March 2008

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Biological Assessment
Big Rock Wash Surface Mining Project Site
Pearblossom, Los Angeles County, California

METHODOLOGY

Impact Sciences biologists conducted a field visit at the Big Rock Wash Surface Mining project site (site), on April 24, 2007. The approximately 310-acre site is located on Assessor's parcel numbers (APN) 3039-021-009, 3039-036-001, and 3039-036-002, in the unincorporated community of Pearblossom, Los Angeles County. The site occurs south of Avenue T, north of Avenue U, and is bounded by 131st Street East on the west and 136th Street East on the east. Longview Road reaches its southern terminus at Avenue T and the project site. The purpose of the site visit was to identify and characterize on-site habitats and their potential to support special-status plant or animal species, and other sensitive resources (e.g., wetlands, drainages, protected trees). The potential of the site to serve as an important regional wildlife movement corridor or habitat linkage area was also evaluated.

Prior to the site visit, a search of the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) (CDFG 2006) and California Native Plant Society (CNPS) database (CNPS 2007) was conducted to identify special-status plant or animal species with a potential to occur in the project vicinity. The CNDDB lists historical and recently recorded occurrences of special-status plant and animal species, and the CNPS database lists historical and recent occurrences of special-status plant species. When it became available, the April 28, 2007 update to the CNDDB was viewed to evaluate whether additional plant and/or animal observations had been recorded. The database searches included the Littlerock United States Geological Survey (USGS) 7.5-minute quadrangle, in which the project site is located, as well as the following eight surrounding quadrangles: Palmdale, Lancaster East, Alpine Butte, Hi Vista, Lovejoy Buttes, Valyermo, Juniper Hills, and Pacifico Mountain. Additionally, prior to the site visit, the March 8, 2006 technical report prepared for the project site by Pacific Southwest Biological Services, titled *Longview Road, Pearblossom Area, Los Angeles County, California Desert Tortoise Presence/Absence Survey; Burrowing Owl Survey Phase I (Habitat Assessment) and Phase II (Burrow Survey)*, was reviewed. Texts and field guides were consulted for information about biological resources during review of the project site; species nomenclature follows these texts (Hickman 1993; Jameson et al. 2004; Sibley 2003; Stebbins 2003).

The April 24, 2007 site visit conducted by Impact Sciences took place under sunny skies with a temperature of up to approximately 80 degrees Fahrenheit. The site was traversed by car and on foot. Portions of the site that were not directly traveled were observed from vantage points that allowed an overview of the general area. Because the purpose of the evaluation was to identify and characterize on-site habitats and their potential to support sensitive resources, focused/detailed surveys for particular

plant and animal species were not conducted, although such species were noted if observed. However, the findings of previously conducted focused surveys for special-status wildlife species with the potential to occur on site are reported in this evaluation. The potential for special-status species to occur on the project site is based on the proximity of the site to recorded occurrences from the CNDDB and CNPS databases, knowledge of the project region, on-site vegetation, habitat characteristics, topography, elevation, soils, surrounding land uses, and habitat preferences and geographic ranges of special-status plant and animal species known to occur in the region.

EXISTING CONDITIONS

General

The project site is situated in northeastern, unincorporated Los Angeles County, California, on the outskirts of the community of Pearblossom, approximately 2 miles northeast of the community of Pearblossom's center. A map depicting the location of the project site is provided in **Figure 1, Project Site Location**. The site is located in the Antelope Valley, the westernmost portion of the Mojave Desert. The San Gabriel Mountains lie approximately 4 miles to the south of the project site.

Land uses in the project area consist primarily of undeveloped lands, with widely scattered residential units and intermittent agricultural, mining, and industrial uses. Adjacent land to the north, south, northeast, and west consists of undeveloped open space vegetated with desert scrub, while land to the east contains a single-family residence. Land use on the project site consists of undeveloped native habitat with some disturbance (approximately 1 percent) associated with on-site unimproved roads and trash dumping. A Union Pacific Railroad line traverses the center of the project site from east to west. The Los Angeles County affiliated Jackrabbit Flats Wildlife Sanctuary occurs approximately 1 mile west of the project site on Avenue T. Photographs of the project site are provided in **Figures 2** through **6**.

Elevation at the site ranges from approximately 870-896 meters (2,850–2,940 feet) above mean sea level (msl), and topography slopes downward from the southeast toward the northwest. Soils on the site have been mapped by the Natural Resources Conservation Service (NRCS) as Arizo gravelly, loamy sand with 0 to 5 percent slopes, and Arizo loamy, fine sand with 0 to 2 percent slopes. Soil on the project site was observed to be sand with gravel and scattered rocks and boulders. The project site includes braided tributaries that are historically associated with Big Rock Wash, which lies about 2.5 miles east of the project site.

Vegetation

The dominant vegetation community, which was observed on approximately 270 acres (87 percent) of the project site, is Creosote Bush Series (Sawyer and Keeler-Wolf 1995). This vegetation community would

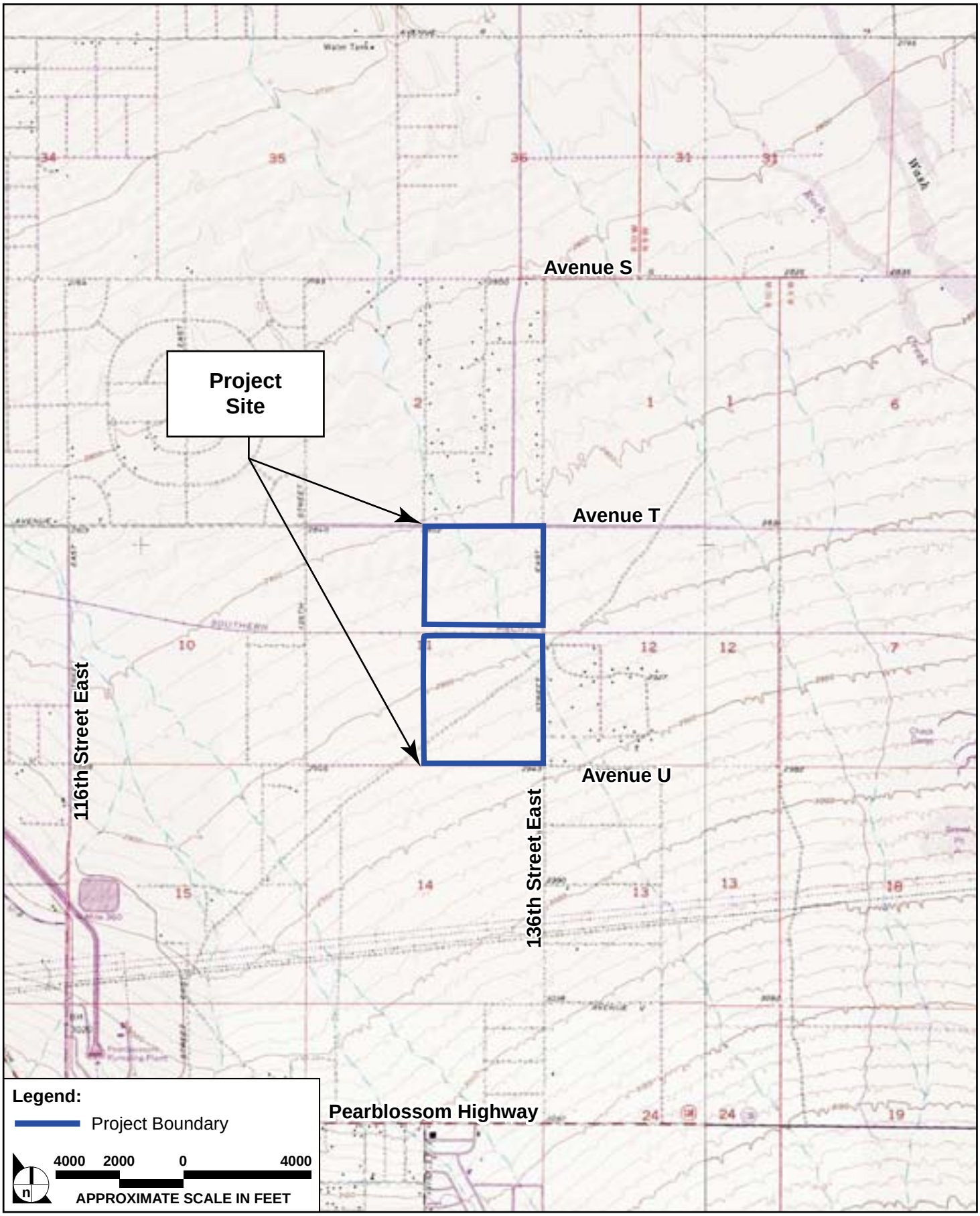
be classified as Mojave Creosote Bush Scrub (CDFG 2003). The dominant plant species observed in the project site is creosote bush (*Larrea tridentata*), with the co-dominant plant species observed to be white bursage (*Ambrosia dumosa*) and cheesebush (*Hymenoclea salsola*). Many individuals of the species Joshua tree (*Yucca brevifolia*) were observed throughout the site; an estimated 200 Joshua trees grow on the property. Other species observed within the on-site Mojave Creosote Bush Scrub include: big sagebrush (*Artemisia tridentata*), four-wing saltbush (*Atriplex canescens*), spinescale (*Atriplex spinifera*), rubber rabbitbrush (*Chrysothamnus nauseosus*), ephedra (*Ephedra nevadensis*), California buckwheat (*Eriogonum fasciculatum*), matchweed (*Gutierrezia sarothrae*), winterfat (*Krascheninnikovia lanata*), desert alyssum (*Lepidium fremontii*), Anderson boxthorn (*Lycium andersonii*), short-jointed beavertail cactus (*Opuntia basilaris* var. *brachyclada*), golden cholla (*Opuntia echinocarpa*), antelope bush (*Purshia tridentata*), Mexican bladdersage (*Salazaria mexicana*), Russian thistle (*Salsola tragus*), and Mojave horsebrush (*Tetradymia stenolepis*). The scrub understory contains annuals, including soft chess (*Bromus hordeaceus*), red-stemmed filaree (*Erodium cicutarium*), and Mediterranean grass (*Schismus barbatus*).

Approximately 34 acres (11 percent) of the site comprises drainage channels vegetated with Rubber Rabbitbrush Series (Sawyer and Keeler-Wolf 1995) and classified as Rabbitbrush Scrub (CDFG 2003). The on-site drainages contain rubber rabbitbrush as the dominant species, and also contains four-wing saltbush and antelope bush.

The remaining approximately 7 acres (2 percent) of the project site have been disturbed by dirt access roads and off-road driving disturbances. In addition, dumping of trash is evident in multiple portions of the site. A map indicating vegetation communities on the project site is included as **Figure 7, Vegetation Communities on the Big Rock Wash Surface Mining Project Site**.

Wildlife

California harvester ants (*Pogonomyrmex californicus*) were observed on the project site, as were praying mantis (*Stagmomantis californica*) egg cases. Two reptile species, Great Basin whiptail (*Aspidoscelis tigris tigris*) and side-blotched lizard (*Uta stansburiana*), were observed onsite. Wildlife observed onsite during the site visit included the following bird species: American kestrel (*Falco sparverius*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), ash-throated flycatcher (*Myiarchus cinerascens*), common raven (*Corvus corax*), barn swallow (*Hirundo rustica*), verdin (*Auriparus flaviceps*), and sage thrasher (*Oreoscoptes montanus*). Antelope ground squirrel (*Ammospermophilus leucurus*) was observed on the property adjacent to the project site, to the east, and small mammal burrows were observed periodically throughout the site. Black-tailed jackrabbit (*Lepus californicus*) was observed onsite, and jackrabbit scat, as well as coyote (*Canis latrans*) scat, was observed in numerous locations throughout the site.



SOURCE: USGS 7.5 Minute Topographic Quadrangle Littlerock & Lovejoy Buttes, California 1957 Photorevised 1992, (C)2002 DeLorme, XMap(R) 3.5, West Coast Environmental and Engineering - January 2007

FIGURE **1**

Project Location Map

913-001•06/07

Photo 01 – South-facing view of Mojave Creosote Bush Scrub on project site (north of railroad tracks) with San Gabriel Mountains in background.

Photo 02 - South-facing view of project site with dirt access road.

NOT TO SCALE

SOURCE: Impact Sciences, Inc. – June 2007

FIGURE **2**

Photos 1 & 2

913-001•06/07

Photo 03 – South-facing view of Mojave Creosote Bush Scrub on project site (south of railroad tracks).

Photo 04 – East-facing view of wash channel adjacent to railroad tracks on project site.

NOT TO SCALE

SOURCE: Impact Sciences, Inc. – June 2007

FIGURE **3**

Photos 3 & 4

913-001•06/07

Photo 05 – North-facing view of Mojave Creosote Bush Scrub with railroad tracks in background.

Photo 06 – Northwest-facing view of scrub on project site with Joshua tree.

NOT TO SCALE

SOURCE: Impact Sciences, Inc. – June 2007

FIGURE **4**

Photos 5 & 6

913-001•06/07

Photo 07 – West-facing view of wash channel on project site.

Photo 08 – Example of short-jointed beavertail cactus (*Opuntia basilaris* var. *brachyclada*) observed onsite.

NOT TO SCALE

SOURCE: Impact Sciences, Inc. – June 2007

FIGURE **5**

Photos 7 & 8

913-001•06/07

Photo 09 – Mourning dove (*Zenaida macroura*) nest observed in creosote bush (*Larrea tridentata*) on the project site.

Photo 10 – Old cactus wren (*Campylorhynchus brunneicapillus*) nests observed in golden cholla (*Opuntia echinocarpa*) on the project site.

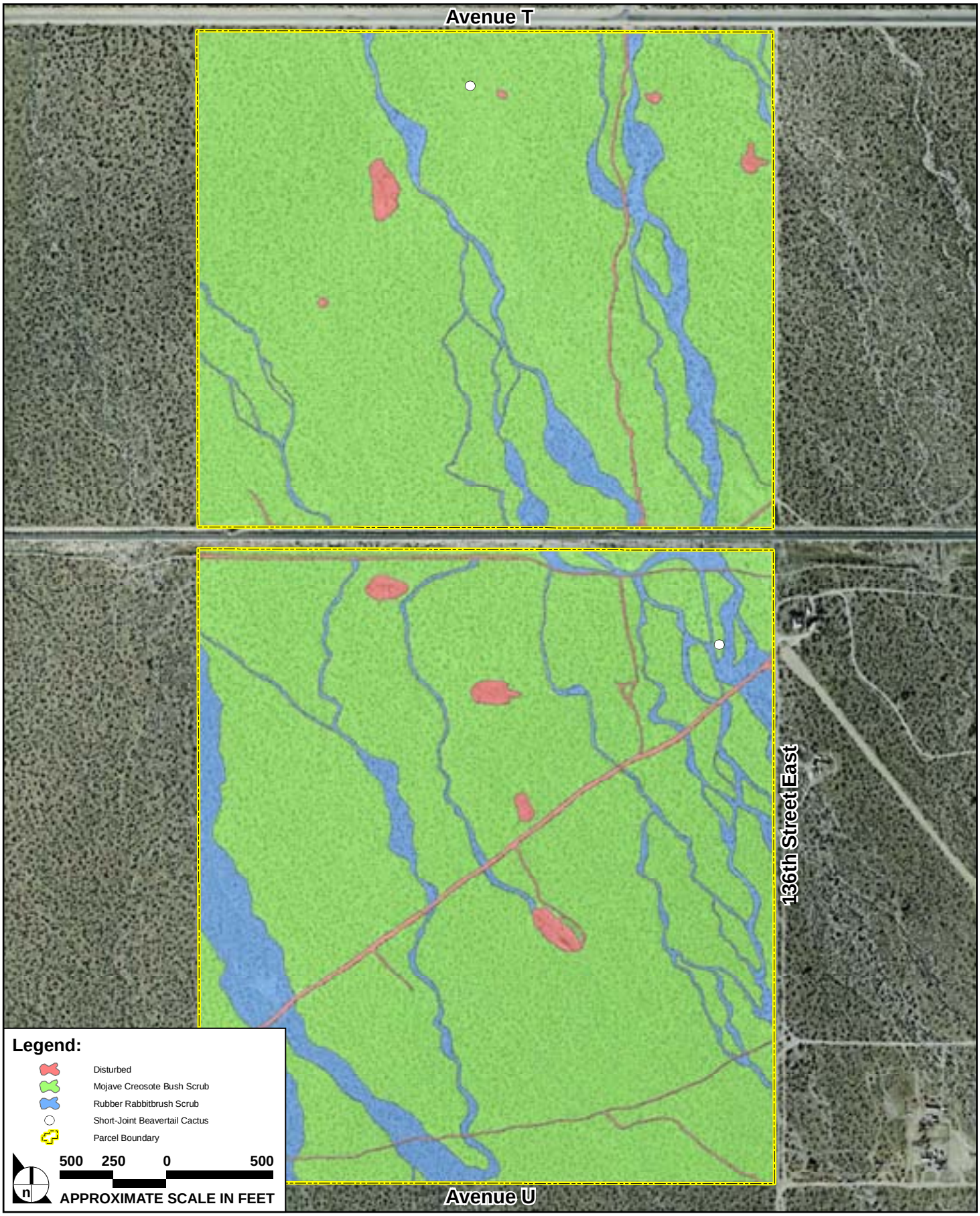
NOT TO SCALE

SOURCE: Impact Sciences, Inc. – June 2007

FIGURE **6**

Photos 9 & 10

913-001•06/07



SOURCE: County of Los Angeles GlobeXplorer 2006 - June 2007

FIGURE **7**

Big Rock Wash Surface Mining Vegetation Communities

913-001•06/07

Special-Status Plants/Wildlife

The April 24, 2007 site visit did not include specific presence/absence surveys for special-status plant or wildlife species. Nonetheless, the field visit assessed the potential for special-status plant and wildlife species to occur on the site based upon observed habitat characteristics and other biological information. Lists of the special-status plant and wildlife species reported to occur in the vicinity of the project site, from the CNDDB and CNPS databases, were compiled and reviewed and are included at the end of this document in **Table 1, Special-Status Plant Species Known to Occur in the Project Region**, and **Table 2, Special-Status Wildlife Species Known to Occur in the Project Region**.

Special-Status Plants

Based upon the review of the CNDDB and CNPS databases, knowledge of the project region, and evaluation of habitat types on the project site, one special-status plant species was found or is expected to occur on site, short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*), a CNPS list 1B.2 plant species. The CNPS is an authority recognized by the CDFG on the status of rare or threatened plant species in California, and the criteria for placement on List 1 or List 2 of the CNPS lists is similar to criteria that CDFG and the U.S. Fish and Wildlife Service (USFWS) use for species considered as candidates for listing as Threatened or Endangered. Short-joint beavertail was observed in two locations on the project site; these approximate locations are indicated on **Figure 7, Vegetation Communities on the Big Rock Wash Surface Mining Project Site**.

Special-Status Wildlife

Based upon the review of the CNDDB database, knowledge of the project region, and evaluation of habitat types on the project site, two reptile species, four bird species, and three mammal species have the potential to utilize the project site. One reptile species, coast (San Diego) horned lizard (*Phrynosoma coronatum* (*blainvillii* population), is a California Species of Concern (CSC). One of the bird species with the potential to occur on site, Cooper's hawk (*Accipiter cooperi*), is a CSC, and three of the bird species, western burrowing owl (*Athene cunicularia*), prairie falcon (*Falco mexicanus*), and Le Conte's thrasher (*Toxostoma lecontei*), are considered a CSC and a Bird of Conservation Concern (BCC). Two of the mammal species with the potential to occur on site, southern grasshopper mouse (*Onychomys torridus ramona*) and American badger (*Taxidea taxus*), are CSC. The categories of CSC and BCC are "watch lists." One of the mammal species with the potential to occur on site, Mohave ground squirrel (*Spermophilus mohavensis*), is state listed as Threatened.

One of the reptile species with the potential to occur on site, desert tortoise (*Gopherus agassizii*), is listed as a federally Threatened and California Threatened species. This species likely historically occurred on the

project site, but has not been reported from the project vicinity for many years. Current isolation of the site (due to railroad tracks, roads and human disturbances) from known populations of the tortoise makes it unlikely that this species would recolonize the site. A protocol desert tortoise presence/absence survey was conducted in February 2006. The survey resulted in negative findings for the species or any sign of the species. According to the report stating the findings of the survey (Pacific Southwest Biological Services, Inc.'s March 2006 report, titled *Longview Road, Pearblossom Area, Los Angeles County, California Desert Tortoise Presence/Absence Survey*, and *Burrowing Owl Survey Phase I (Habitat Assessment) and Phase II (Burrow Survey)*), "the probability of recolonization of the area by this species is nonexistent." However, during an April 2007 field meeting with CDFG representatives on the project site, it was indicated that future desert tortoise protocol surveys on the site may be appropriate to ensure that individuals of the species do not move back onto the site prior to project implementation.

Two of the four special-status bird species either occurring or having the potential to occur on the project site would be likely to utilize the site only for foraging, and would not be expected to nest on the site. These are Cooper's hawk and prairie falcon. Two bird species, western burrowing owl and Le Conte's thrasher, have the potential to burrow/nest on the project site or within 500 feet (burrowing owl) or 300 feet (Le Conte's thrasher) of the site. Surveys for burrowing owl were conducted on the site in February 2006. The surveys resulted in negative findings for the species or sign of the species on the project site. However, an individual of this species was observed exiting a burrow on a property adjacent to the site, approximately 400 feet to the west. Small mammal burrows were observed scattered throughout the project site, and suitable burrows sites were observed on the project site, both in small mammal burrows and dumped trash/soil piles. Therefore, the potential for this species to utilize the project site both for burrowing and foraging is high, and individuals of this species could move onto the project site prior to implementation of future proposed surface mining activities.

Native Bird Nests

Many shrubs and Joshua trees occur throughout the project site, providing suitable nesting habitat for a variety of bird species. In addition, shrubs and grasses found on the site provide potential nesting habitat for ground-nesting bird species (such as mourning doves, an individual of which was observed nesting on the site, on the ground, within a creosote bush).

Protected Trees

The County of Los Angeles zoning code protects oak trees (the genus *Quercus*). None of the trees protected under County's ordinance occur on site. However, numerous Joshua trees do occur on the project site; during the April 2007 site visit, Impact Sciences estimated that roughly 200 individuals of this species were observed. The CDFG recognizes habitat with Joshua trees as sensitive, due to the presence

of Joshua trees, which are considered a biologically and aesthetically valuable, as well as declining, plant species. The value of Joshua trees as important biological and aesthetic resources is recognized by many desert communities, including nearby City of Palmdale, which states that protection of desert vegetation, particularly Joshua trees, is important to retain the unique natural desert aesthetics of the area. In addition, Joshua trees are known to provide habitat for a variety of desert wildlife species, including desert woodrat (*Neotoma lepida*), ladder-backed woodpecker (*Picoides scalaris*), Scott's oriole (*Icterus parisorum*), night snake (*Hypsiglena torquata*), desert night lizard (*Xantusia vigilis*), and yucca moth (*Tegeticula maculata*). Joshua trees, which are endemic to the Mojave Desert, face a population decline, due largely to habitat loss.

Drainages/Jurisdictional Waters

The main branch of Big Rock Wash, an intermittent stream that flows from the Angeles National Forest into the Antelope Valley, is located approximately 2.5 miles to the east of the project site. Several historically linked channels of Big Rock Wash traverse the project site. Water flow on the site drains to the wash channels, which carries water to the north, where the wash ultimately flows into Rogers (dry) Lake, located approximately 20 miles to the north, on Edwards Air Force Base.

Wildlife Movement Corridors

Wildlife movement corridors are linear landscape elements that serve as linkages between historically connected habitat/natural areas, thereby facilitating wildlife movement between these natural areas (McEuen 1993). The proposed project site is currently open space, which allows for local wildlife movement. Property surrounding the project site on all sides consists of open space vegetated with desert scrub. These open space areas, in conjunction with the subject site, increase opportunities for wildlife movement through the area. However, due to the availability of open space throughout the project area, the project site does not function in an appreciable manner to any significant regional wildlife movement corridor. Further, upon completion of usage of the project site for surface mining, the area is intended to remain open space, which will allow some continued future use of the site for wildlife movement. Open pits that are expected to occur on the site upon completion of mining will likely hinder, but not completely interfere with, wildlife movement.

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Table 1
Special-Status Plant Species Known to Occur in the Project Region

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	CNPS		
San Gabriel Manzanita *Arctostaphylos gabrielensis*	--	--	1B.2	Rocky outcrops at approximately 1,500 meters (m). Can be dominant shrub where it occurs.	**No:** This species occurs in the San Gabriel Mountains approximately 4 miles to the south of the project site. Suitable habitat for this species does not occur on site, and the site occurs below the elevational range of this species.
Greata's aster *Symphyotrichum (Aster) greatae*	--	--	1B.3	Chaparral or cismontane woodland; between elevations of 800–1,500 m.	**No:** This species has been reported from several locations in the San Gabriel Mountains to the south. This species would not be expected to occur in the Antelope Valley, and suitable habitat for this species does not occur on site.
San Antonio milk-vetch *Astragalus lentiginosus* var. *antonius*	--	--	1B.3	Lower/upper montane coniferous forest. Dry slopes in open yellow pine forest. Between 1,500-2,600 m.	**No:** This species occurs in the San Gabriel Mountains to the south, at elevations higher than those on the project site. Suitable habitat for this species does not occur on site.

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	CNPS		
Lancaster milk-vetch *Astragalus preussii* var. *laxiflorus*	--	--	1B.1	The following habitats within chenopod scrub: alkaline clay flats, gravelly or sandy washes, and along draws in gullied badlands. At elevations of approximately 725 m.	**No:** The reported habitat for this species does not occur on the project site. This species has been recorded from Edwards Air Force Base, approximately 15 miles north of the project site. This species is unlikely to occur on the project site.
Alkali mariposa lily *Calochortus striatus*	--	--	1B.2	Found within alkaline meadows and ephemeral washes within chaparral, chenopod scrub, Mojavean desert scrub, and meadow habitats. Between elevations of 90–1,595 m.	**No:** This species has been reported from locations in the project vicinity with finer soils or more alkaline, clay soils than those occurring on the project site. Due to the lack of appropriate alkaline soils on the site, this species would not be expected to occur there.
Mount Gleason Indian paintbrush *Castilleja gleasonii*	--	SR	1B.2	Open flats or slopes in granitic soil within lower montane coniferous forest; restricted to the San Gabriel Mountains. Between elevations of 1,650–1,830 m.	**No:** This species occurs in the San Gabriel Mountains to the south, at elevations higher than those on the project site. Suitable habitat for this species does not occur on site.
Parry's spineflower *Chorizanthe parryi* var. *parryi*	--	--	3.2	In coastal scrub or chaparral with dry slopes and flats and dry, sandy soils. Sometimes found at the interface of two vegetation types, such as chaparral and oak woodland. Between elevations 40–1,705 m.	**No:** This species has been reported from only one location in the project vicinity, a site near Lancaster, in 1896. This report is considered by the CNPS to be in doubt, and appears to be out of range (CNPS 2007).

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	CNPS		
Kern Canyon clarkia *Clarkia xantiana* ssp. *parviflora*	--	--	1B.2	Dry slopes of cismontane woodland; between elevations of 845–1,155 m.	**No:** This species occurs at elevations higher than those on the project site. Suitable habitat for this species does not occur on site.
Lemon lily *Lilium parryi*	--	--	1B.2	Found in wet, mountainous terrain, including lower/upper montane coniferous forest, meadows and seeps, and riparian forest. Generally occurs in forested areas, on shay edges of streams, or in open, boggy meadows and seeps. Between elevations of 1,300–2,790 m.	**No:** This species occurs in the San Gabriel Mountains to the south, at elevations higher than those on the project site. Suitable habitat for this species does not occur on site.
San Gabriel linanthus *Linanthus concinnus*	--	--	1B.2	Dry, rocky slopes within lower/upper montane coniferous forest, often in Jeffrey pine or canyon oak forest. Between elevations of 1,575–2,545 m.	**No:** This species occurs in the San Gabriel Mountains to the south, at elevations higher than those on the project site. Suitable habitat for this species does not occur on site.
Sagebrush loeflingia *Loeflingia squarrosa* var. *artemisiarum*	--	--	2.2	Great Basin scrub, Sonoran desert scrub, and desert dunes with sandy flats and dunes, sandy areas around clay slicks, especially where Sarcobatus, Atriplex, and Tetradymia occur. Between elevations of 700–1,200 m.	**No:** The lack of sandy flats, dunes, or sandy areas around clay slicks makes it unlikely that this species would occur on site.
Peirson's lupine *Lupinus peirsonii*	--	--	1B.3	Decomposed granite slide and talus, on slopes and ridges, within Joshua tree woodland, pinyon juniper woodland, and upper montane coniferous forest; between elevations of 1,100–2,000 m.	**No:** This species occurs in the San Gabriel Mountains to the south, at elevations higher than those on the project site. Suitable habitat for this species does not occur on site.

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	CNPS		
Short-joint beavertail *Opuntia basilaris* var. *brachyclada*	--	--	1B.2	Chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon juniper woodland, and riparian woodland. Found on sandy soil or coarse, granitic loam. Between elevations of 425–1,800 m.	**Yes:** This species was observed on site.
Rock Creek broomrape *Orobanche valida* ssp. *valida*	--	--	1B.2	Slopes of loose decomposed granite within chaparral or pinyon juniper woodland; is parasitic on various chaparral shrubs. Between elevations of 1,705–1,820 m.	**No:** This species occurs in the San Gabriel Mountains to the south, at elevations higher than those on the project site. Suitable habitat for this species does not occur on site.
Parish's popcorn-flower *Plagiobothrys parishii*	--	--	1B.1	Alkaline soils and mesic sites within Great Basin scrub and Joshua tree woodland; between elevations of 750–1,400 m.	**No:** This species has been reported from one near-by location, at Lovejoy Springs, in swampy soil. The suitable micro-habitat for this species does not occur on site. Additionally, the record of this species is considered by the CNPS to be in doubt, and appears to be out of range (CNPS 2007).

Status Key:

CNPS: 1B = Plants Rare and Endangered in California and elsewhere; 2 = Rare or Endangered in California, more common elsewhere; 3 = Plants about which more information is needed; 0.1 = Seriously Endangered in California; 0.2 = Fairly Endangered in California; 0.3 = Not very Endangered in California

Table 2
Special-Status Wildlife Species Known to Occur in the Project Region

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	Other		
Silvery legless lizard *Anniella pulchra pulchra*	--	CSC	--	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential; prefer soils with a high moisture content.	**No:** This species has been reported to the CDFG from a site just north of Pearblossom Highway, approximately 11 miles to the west of the project site. The site was vegetated with juniper trees, desert scrub, and Joshua trees on alluvial soil. The presence of juniper trees and alluvial soil indicates that the observation site contained higher moisture than the subject site; this species would not be expected to occur on the project site due to lower soil moisture.
Arroyo toad *Bufo californicus*	FE	CSC	--	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian or desert wash habitat. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in the drier parts of the range.	**No:** On-site wash channels do not provide suitable habitat. In addition, this species has been reported from Little Rock Creek, from a location in the San Gabriel Mountains, approximately 5 miles to the south of the project site, and not from Big Rock Wash.
Desert tortoise *Gopherus agassizii*	FT	CT	--	Occurs in almost every desert habitat, but most common in desert scrub, desert wash, and Joshua tree habitats. Requires friable soils for burrow and nest construction. Creosote bush habitat with large annual wildflower blooms is preferred.	**Yes:** The project site is located to the west of the majority of sightings of this species made to the CDFG. A desert tortoise survey conducted on the site in February 2006 resulted in negative findings for the species and sign of the species. It was the conclusion in the report that, due to

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	Other		
					heavy human disturbance in the project site region, this species had likely been extirpated from the site and that the probability of recolonization is low. During an April 2007 field meeting with CDFG representatives on the project site, it was indicated that future desert tortoise protocol surveys on the site may be appropriate, to ensure that individuals of the species do not move back onto the site prior to project implementation.
Coast (San Diego) horned lizard *Phrynosoma coronatum* (*blainvillii* population)	--	CSC	--	Coastal sage scrub and chaparral, in arid and semi-arid climate conditions. Prefers friable, rocky, or shallow sandy soils.	**Yes:** This species has been reported to the CDFG from 14 locations in the project vicinity. On-site friable soils, especially within drainage channels, provide potentially suitable habitat. The main food source for this species, harvester ants, was observed on site.
Mountain yellow-legged frog *Rana muscosa*	FE	CSC	--	Mountain species, always found within a few feed of water; tadpoles may require 2-4 years to complete their aquatic development. The federal listing refers to populations in the San Gabriel, San Jacinto, and San Bernardino Mountains only.	**No:** This species has been reported to the CDFG from the San Gabriel Mountains approximately 4 miles to the south. Suitable habitat does not occur on the project site.
Two-striped garter snake *Thamnophis hammondii*	--	CSC	--	Coastal California, from sea level to about 7,000 feet elevation. Highly aquatic, founding or near permanent fresh water, often along streams with rocky beds and riparian growth.	**No:** On-site wash channels do not provide suitable aquatic habitat for this species.

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	Other		
Cooper's hawk (nesting) *Accipiter cooperi*	--	CSC	--	Nests in woodlands, chiefly of open, interrupted, or marginal type. Nest site is mainly found in riparian growths of deciduous trees, such as canyon bottoms on river floodplains, or live oak trees. Will nest in low scrub of treeless areas.	**Yes (but not for nesting):** This species could forage on site, although breeding habitat is not present.
Tricolored blackbird (nesting colony) *Agelaius tricolor*	BCC	CSC	--	Nests in colonies near open water, with a protected nesting substrate and a foraging area with insect pretty within a few kilometers of the colony. Most numerous in the Central Valley and vicinity.	**No:** Suitable habitat not present on site.
Western burrowing owl (burrow sites) *Athene cunicularia*	BCC	CSC	--	Open, dry grassland and desert habitats throughout California, or scrublands characterized by low-growing, widely spaced vegetation. Dependant upon burrowing mammals, especially California ground squirrel.	**Yes:** On-site small mammal burrows within desert scrub, as well as dumped soil and trash piles, provide potentially suitable burrowing habitat for this species. A burrowing owl survey conducted on the project site in February 2006 did not result in the observation of active burrowing owl burrows. However, potentially suitable burrows were observed on the project site, and a burrowing owl individual was observed exiting a burrow approximately 400 feet west of the project site. Additionally, the species could move onto the project site and take up habitation of burrow sites prior to implementation of proposed surface mining activities.
Swainson's hawk (nesting) *Buteo swainsoni*	BCC	CT	--	Breeds in stands with few trees in juniper-sage flats, riparian areas, and oak savannah. Requires adjacent	**No:** Suitable nesting habitat does not occur on site, and the project site is unlikely to support the number of

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	Other		
				suitable foraging areas, such as grasslands or alfalfa or grain fields supporting rodent populations.	rodents required for foraging.
Mountain plover (wintering) *Charadrius montanus*	BCC	CSC	--	Winters in short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Prefers short vegetation, bare ground, and flat topography for wintering, especially grazed areas and areas with burrowing rodents.	**No:** This species has been observed on agricultural fields in the project area. The lack of agricultural fields or grasslands on the project site makes it unlikely that this species would occur.
Prairie falcon (nesting) *Falco mexicanus*	BCC	CSC	--	Breeds on cliffs in dry, open terrain and forages far a field, even to marshlands and ocean shores.	**Yes (but not for nesting):** This species may forage on site; however, breeding habitat is not present.
Le Conte's thrasher *Toxostoma lecontei*	BCC	CSC	--	Desert wash, desert scrub, desert alkali scrub, and desert succulent scrub habitats. Commonly nests in a dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2–8 feet above the ground.	**Yes:** This species could occur within on-site scrub habitat.
Pallid San Diego pocket mouse *Chaetodipus fallax pallidus*	--	CSC	--	Sandy, herbaceous areas, usually in association with rocks or coarse gravel. Found within desert border areas in eastern San Diego County, in desert wash, desert scrub, desert succulent scrub, and pinyon-juniper habitats.	**No:** This species has been reported to the CDFG from three locations at the base of the San Gabriel mountains, approximately 4-5 miles south of the project site. This species requires the more herbaceous habitat that the base and foothills of the mountains would provide, but that the project site would not.
Southern grasshopper mouse *Onychomys torridus ramona*	--	CSC	--	Desert areas, especially scrub habitats with friable soils for digging; prefers low to moderate shrub cover. Feeds almost exclusively on arthropods, especially scorpions and orthopteran	**Yes:** This species has been reported from a location approximately 6 miles to the east of the project site. On-site scrub with friable soils provides suitable habitat.

Common Name *Scientific Name*	Status			Habitat	Potential To Occur: Yes/No
	Federal	State	Other		
				insects.	
San Joaquin pocket mouse *Perognathus inornatus inornatus*	--	--	CNDDB Special Animal	Friable soils within grassland and blue oak savannah.	**No:** Suitable habitat for this species does not occur on site. In addition, according to the CDFG, the identification of the specimen reported from near-by (Palmdale) is questionable.
Mohave ground squirrel *Spermophilus mohavensis*	--	CT	--	Restricted to the Mojave Desert. Open desert scrub, alkali scrub, and Joshua tree woodland. Will feed in annual grasslands. Prefers sandy to gravelly soils, and avoids rocky areas. Uses burrows at base of shrubs for cover, and nests are in burrows	**Yes:** This species has been reported from 21 locations in the project area. Although this species has not been sighted in the vicinity of the project site in recent years, because the species likely historically occurred on the site, and because suitable habitat occurs on the site, this species cannot be ruled out.
American badger *Taxidea taxus*	--	CSC	--	Drier, open stages of most shrub, forest, and herbaceous habitats with friable soils.	**Yes:** On-site scrub habitat with friable soils provides suitable habitat.

Status Key:
Federal: FE = Federal Endangered; FT = Federal Threatened; BCC = Fish and Wildlife Service Bird of Conservation Concern
State: CT = California Threatened; CSC = California Species of Concern
CNDDB: Special Animal = Species that do not have a formal designation by any resource agency, but that are considered sensitive resources by the CDFG due to known declines in population

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 14

Sensitive Plant Survey

and

Sensitive Plant Survey Report Addendum

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FINAL
Sensitive Plant Survey Report
Lebata, Inc. - Big Rock Creek Surface Mining Project
Los Angeles County, CA

Littlerock USGS 7.5′ quadrangle

Submitted to:

West Coast Environmental and Engineering
101 Providence Mine Road, Suite 105
Nevada City, CA 95959
Attn: Lou Merzario

Submitted by:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
215 North Fifth Street
Redlands, CA 92374

JULY 2008

FINAL

Lebata, Inc.
Big Rock Creek Surface Mining Project
Sensitive Plant Survey Report

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SUMMARY

Lebata, Inc. (Lebata) has proposed surface mining activities on approximately 310 acres in Big Rock Creek, near the town of Pearblossom, in Los Angeles County, California. ECORP Consulting, Inc. (ECORP) was contracted to conduct a literature review and focused survey on the site for the presence or absence of listed and/or sensitive plant species. Prior to conducting the focused survey, the literature review was conducted in order to identify the potential for occurrence of plant species based on the habitat types present on the project site. The project site is dominated by creosote bush scrub that is interspersed with smaller patches of rubber rabbitbrush scrub and disturbed areas.

Based on the results of the literature review, a total of twenty special-status plant species have been reported in the vicinity of the project area. Based on the habitats present on the Lebata project site, it was determine that suitable habitat was present on the site for six of the plant species. In April 2008, ECORP's botanists conducted a sensitive plant survey in the project area.

The results of the survey indicate that no state or federally-listed (threatened or endangered) plant species were observed on site. One sensitive plant species, the crowned muilla (*Muilla coronata*) was observed during the focused surveys. Additionally, beavertail cactus (*Opuntia basilaris* var. *basilaris*) was also observed and these appear to contain genes of short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*). Documented intermediates or hybrids of these two species were found on another site close by in 2005 (Chambers Group 2005). The crowned muilla has a limited distribution and is currently on the CNPS watch list, but it does not have any state or federal protection. The intermediate between the two beavertail cactus species does not have any legal protection under state or federal legislation.

1.0 INTRODUCTION

1.1 Project Location

The project site is located on Assessors parcel numbers (APNs) 3039-021-009, 3039-036-001, and 3039-036-002 in the unincorporated community of Pearblossom, Los Angeles County, CA (Figure 1). The site is located on the USGS Littlerock 7.5 minute topographic quadrangle and is bounded Avenue T on the north, by 131st Street East on the west, by 136th Street East on the east, and it is bisected by a Union Pacific Railroad (UPRR) line that runs east-west (Figure 2). Elevations on the site range from 870 to 896 meters (m) [2,850 to 2,940 feet (ft)] above mean sea level (amsl).

1.2 Proposed Project

Lebata, Inc. (Lebata) proposes surface mining activities on approximately 310 acres. The project involves both on-site mining and processing of material. The project is divided into three phases, with Phases 1 and 3 located north of the UPRR tracks and Phase 2 located south of the tracks. The Phase 1 mining area consists of the majority of the parcel north of the UPRR tracks. The Phase 3 area in the northwestern portion of the northern parcel is the proposed location for processing facilities, as well as the point of transfer and distribution of materials via

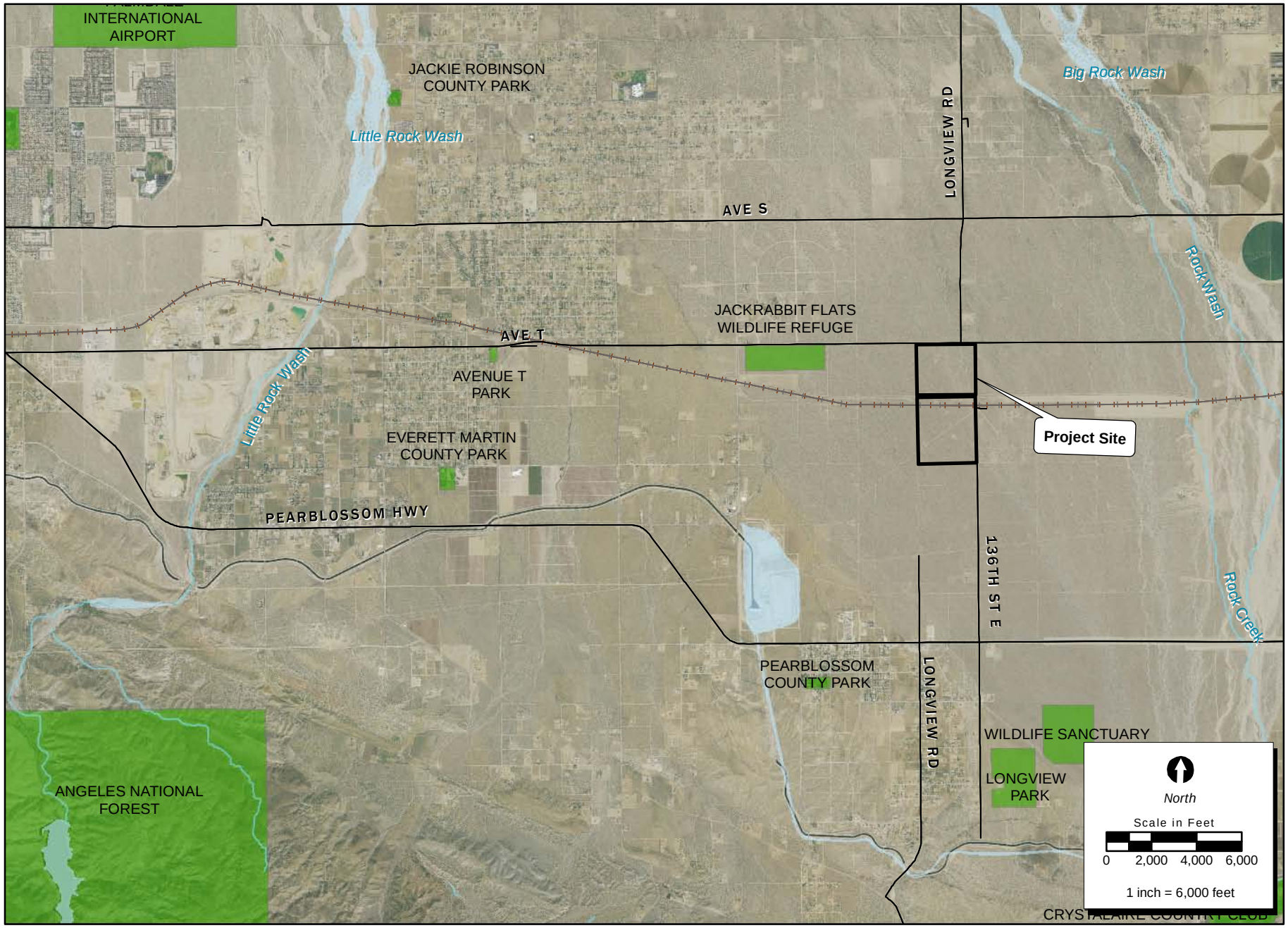

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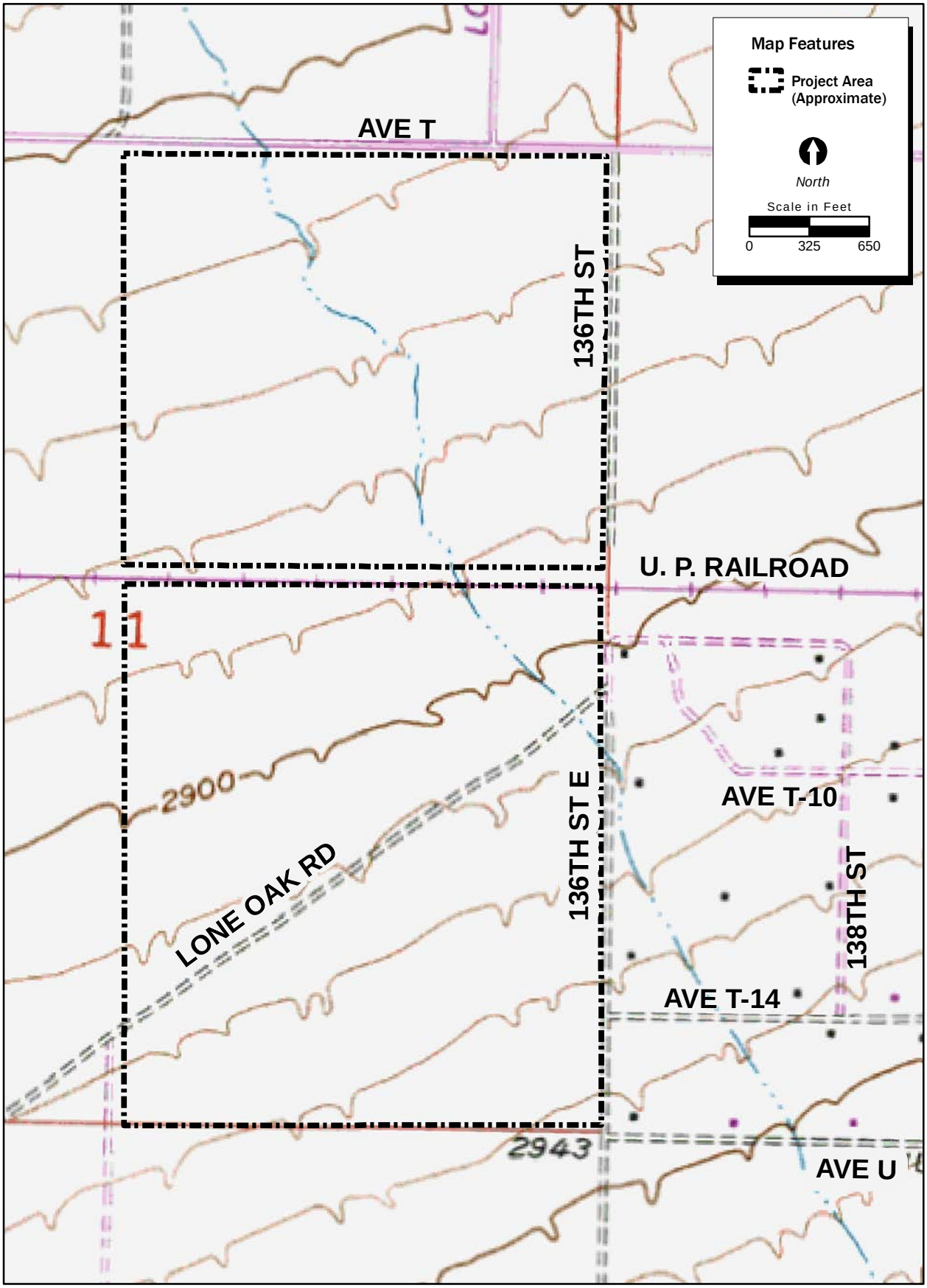
Figure 1. Project Vicinity

2008-055 Lebata Big Rock Creek

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 2. Project Boundaries



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Rail. The Phase 2 mining area consists of the majority of the parcel south of the UPRR tracks. There are multiple existing surface mines in the vicinity of the site, including operations by Service Rock, Holliday Rock, Antelope Valley Aggregate Service Rock, Vulcan Materials, Hi-Grade Materials, and Granite Construction.

2.0 METHODS

2.1 Literature Search

Prior to conducting the sensitive plant survey, a literature search was performed utilizing the California Natural Diversity Database (CNDDB 2008), the California Native Plant Society's Rare Plant Inventory (CNPS 2008), University of California, Berkeley's Specimen Management System of California Herbaria (SMASCH) database (UCB 2008) and the CalFlora database (CalFlora 2008) of the project region. Nine USGS 7.5' topo quads were searched; Littlerock, Palmdale, Lancaster East, Alpine Butte, Hi Vista, Lovejoy Buttes, Valyermo, Juniper Hills, and Pacifico Mountain. Additional reference data regarding local special-status and common plants likely to occur within the project area was also gathered from the following sources:

- The Jepson Manual (Hickman 1993),
- Mohave Desert Wildflowers (MacKay, 2003), and
- Online websites (CalPhotos 2006.)

The following guidelines were utilized to assess each sensitive species' potential to occur:

Presumed Absent: Species was not observed during focused surveys conducted at an appropriate time for identification, or environmental conditions (including elevation, soils and vegetation communities) associated with species occurrence are not present on the site.

Low: No recent or historic records exist for the species within the project area or its immediate vicinity (approximately 5 miles [mi]), and environmental conditions on site (including elevation, soils and vegetation communities) associated with the given species are of poor quality.

Moderate: Either a historic record exists for the species within the immediate vicinity of the project area (approximately 5 mi), or the environmental conditions (including elevation, soils and vegetation communities) associated with the given species exist within the project area.

High: A historic record of the species exists within the project site or its immediate vicinity (approximately 5 mi), and the environmental conditions (including elevation, soils and vegetation communities) associated with the given species exist within the project area.

Present: Species was observed within the project area during the survey.

*** Note:** Location information on some sensitive species is not available; therefore, for survey purposes, landscape factors associated with species occurrence requirements may be considered sufficient to give a species a positive potential for occurrence.

2.2 Field Surveys

Focused plant surveys of the project area were conducted by ECORP's botanist Kerry Myers and biologists Brad Haley, Danica Schaffer-Smith, and Manna Warburton on April 21 and 22, 2008. The field surveys consisted of:

- Walking the entire project site including a 100-ft buffer and transects spaced 10 meters apart;
- Characterizing plant communities present on site;
- Recording and/or later identifying observed species using taxonomic keys;
- Taking GPS coordinates of any sensitive plant species observed on site;
- Taking digital site reference photographs throughout the project site; and
- Recording weather data during surveys, including time, temperature, and wind speed for each day surveys were conducted (Table 1).

Table 1 - Survey Conditions

Date	Surveyors	Time Surveys were Conducted	Average Wind Speed	Average Temperature
4/21/08	Kerry Myers, Brad Haley, Danica Schaffer-Smith, Manna Warburton	0700 to 1600	5.5 mph (8.85 km/h)	65°F (18.3°C)
4/22/08	Kerry Myers, Brad Haley, Danica Schaffer-Smith, Manna Warburton	0700 to 1600	8.6 mph (13.9 km/h)	62°F(16.6 °C)

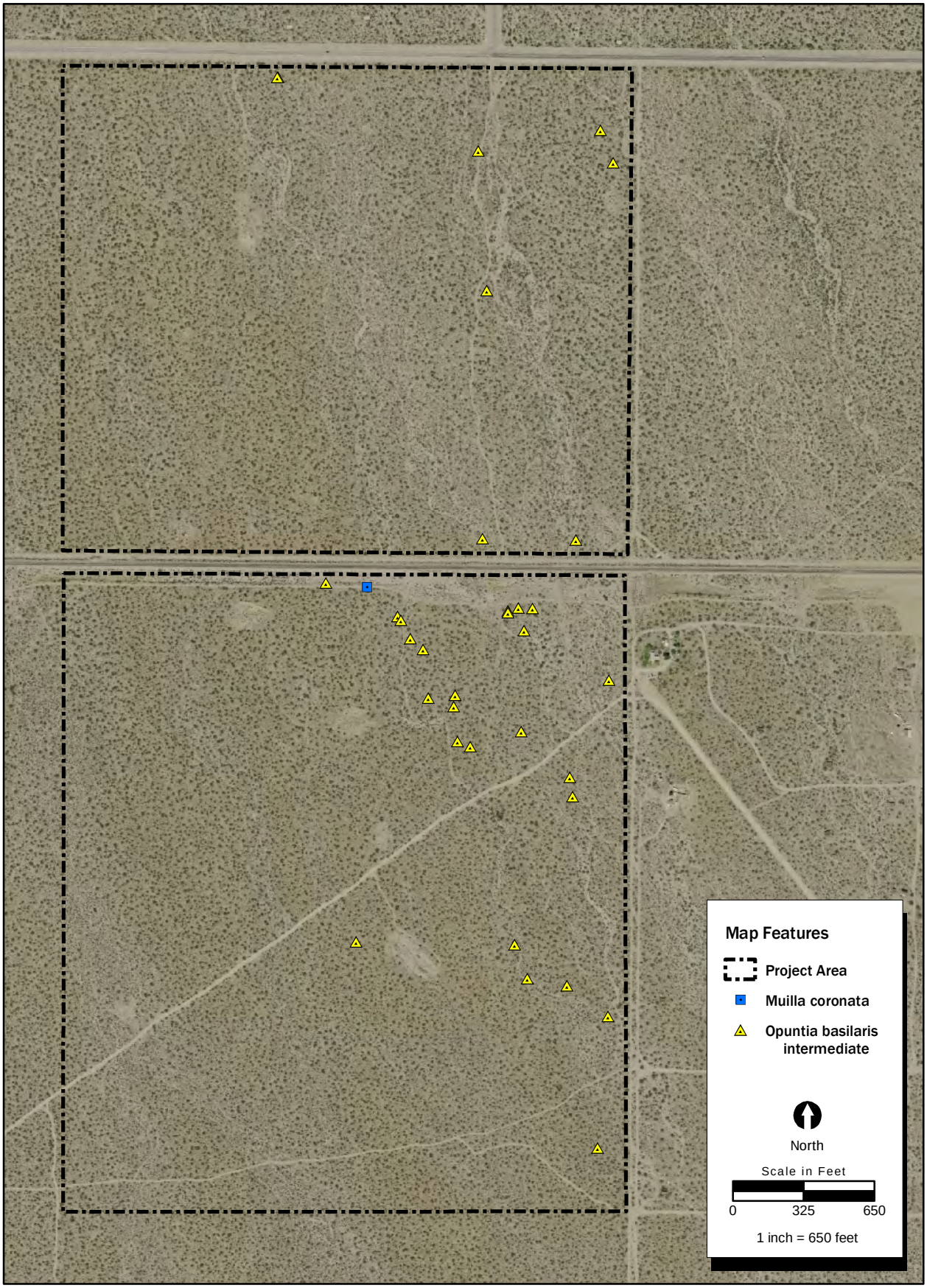
3.0 RESULTS

This section includes the results of the literature and database searches, vegetation communities, and sensitive plant species observed within the project area. Original survey datasheets are included as Appendix A. A list of all plant species observed and identified during the focused rare plant survey is included in Appendix B.

3.1 Vegetation Communities

The project site supports creosote bush scrub series vegetation (Sawyer & Keeler-Wolf 1995) that is relatively undisturbed with the exception of moderate disturbance around the UPRR track that approximately bisects the site, as well as narrow dirt roads and OHV tracks on the property. Figure 3 shows an aerial photograph of the project area and the locations of sensitive plant species observed during the survey. A representative photograph of the habitat on site is shown in Figure 4.

Figure 3. Sensitive Plant Species Observation Map



Location: N:\2008\2008-055 Lebata Big Rock Creek\MAPS\VEGETATION\sensitive_plants.mxd

Image Source: Digital Globe, March 01, 2008

3.1.1 Creosote Bush Scrub Series

Creosote bush scrub series vegetation is found throughout the project site. This community is characterized by fairly open stands of the dominant shrub creosote bush (*Larrea tridentata*) with white bur-sage (*Ambrosia dumosa*). Typically it occurs on well-drained sandy soils at elevations below 1,219 m (4,000 ft) amsl. Associated species within this community on site include cheesebush (*Hymenoclea salsola*), antelope bush (*Purshia tridentata*), big sagebrush (*Artemisia tridentata*), and California buckwheat (*Eriogonum fasciculatum*) with annual species including brown-eyed evening primrose (*Camissonia claviformis*), desert dandelion (*Malacothrix glabrata*), and sapphire eriastrum (*Eriastrum sapphirinum*). Small amounts of non-native annual grasses were observed in the understory.

3.1.2 Rubber Rabbitbrush Series

Rubber rabbitbrush series vegetation is a disturbance-maintained shrub community dominated by rabbitbrush (*Ericameria nauseosus*). Rubber rabbitbrush is an additional dominant shrub species found along drainage channels and associated with disturbance on the project site. This community intergrades with the creosote bush scrub on the site. Associated species observed in this community include: four-wing saltbush (*Atriplex canescens),* antelope bush*,* and mormon tea (*Ephedra nevadensis*).

3.1.3 Disturbed/Unvegetated

Portions of the site consist of weedy, disturbed areas, which are mainly located along existing dirt access roads and the UPRR line. A higher density of non-native grasses occurs in these areas.

Figure 4 – Representative Habitat Photograph

3.2 Sensitive Plant Species

One species considered rare in California and nineteen other special-status plant species were identified during the literature search as potentially occurring in the vicinity of the site. Only two special-status plant species were observed during the focused surveys conducted in April of 2008. Individuals of beavertail cactus with some characteristics of the sensitive variety (*Opuntia basilaris* var. *brachyclada*) were recorded at numerous locations on site. In addition, crowned muilla (*Muilla coronata*), which was not identified as being previously reported in the area, was also found during the survey of the project area. Figure 3 shows the locations of all beavertail cactus and the crowned muilla that were found in the project area. Figures 5 and 6 show photographs of the two plant species found during the survey.

Figure 5 – Crowned Muilla (*Muilla coronata*) Specimen

Figure 6 – Beavertail Cactus (*Opuntia basilaris*) Specimen

The majority of species previously documented in the vicinity of the site are presumed absent based on the lack of suitable habitat and/or non-detection during the focused surveys. A list of plant species was compiled including state and federal listing status, CNPS designations, and expected presence/absence due to habitat conditions or focused survey results is included as Appendix C. Those species that typically occur in the habitat on the site are discussed individually below.

Preuss's milk-vetch (*Astragalus preussii* var. *preussii*) is a CNPS List 2.3 perennial herb associated with chenopod scrub and Mojavean desert scrub habitats on Selenium-bearing soils. It typically occurs from 750 to 825 m (2,460 to 2,707 ft) amsl and its bloom period is from May to June. Suitable habitat exists on site for this species, but it was not observed during the focused surveys. Although the surveys were conducted before the normal bloom period for this species, the vegetative parts of the plant should have been present making observation possible and most plant species bloomed earlier than normal during 2008 spring surveys. This species is presumed absent from the project area.

Alkali mariposa lily (*Calochortus striatus*) is a Bureau of Land Management (BLM) sensitive and CNPS 1B.2 bulbiferous herb. This species typically occurs in chaparral, chenopod scrub, Mojave Desert scrub, alkaline meadows, and ephemeral washes at elevations ranging from 90 to 1,595 m (295 to 5,233 ft) amsl and usually blooms from April to June. Suitable habitat exists on site but no occurrence records were found within an 8 kilometer (km) (5 mi) radius. Focused surveys were conducted during the appropriate bloom period for this species. However, no individuals were observed. This species is presumed absent from the site.

Sagebrush loeflingia (*Loeflingia squarrosa* var. *artemisiarum*) is a BLM-listed sensitive species and a CNPS List 2.2 species that is associated with Great Basin scrub, Sonoran Desert scrub,

desert dunes, sandy flats and dune habitats, often around clay slicks. It is found from 700 to 1,200 m (2,296 to 3,937 ft) amsl and its bloom period is from April to May. Even though limited suitable habitat is present on site, this species was not observed during the focused surveys. Therefore, it is presumed absent.

Peirson's lupine (*Lupinus peirsonii*) is a CNPS List 1B.3 species that typically occurs in Joshua tree woodland, lower montane coniferous forest, pinyon/juniper woodland and upper montane coniferous forest from 1,000 to 2,500 m (3,281 to 8,202 ft) amsl. Only limited suitable habitat is present on site. This species was not observed during the focused surveys (conducted within the appropriate bloom period [April to June] for this species). Therefore, it is presumed absent from the site.

Although crowned muilla (*Muilla coronata*) was not identified in the literature review as occurring in the vicinity, it is discussed here due to observations made during the field surveys. This species is a CNPS List 4.2 bulbiferous herb that typically occurs in chenopod scrub, Joshua tree woodland, Mojave desert scrub, and pinyon-juniper woodland from 765 to 1,960 m (2,510 to 6,430 ft) amsl. One individual of crowned muilla was observed on the site. The location of this species is shown in Figure 3.

Short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*) is a CNPS List 1B.2 species that is usually found in a range of habitats including chaparral, Joshua tree woodland, Mojave Desert scrub, pinyon/juniper woodland, and riparian woodland between 1,250 and 1,820 m (4,101 to 5,971 ft) amsl. Suitable habitat exists on site and known populations occur within 16 km (10 mi) of the property. The locations of numerous individuals of *Opuntia basilaris* were recorded within the project area (Figure 3). A taxonomic study including collection and comparative propagation through Rancho Santa Ana Botanic Garden was conducted of similar beavertail specimens on a nearby property in Big Rock Wash. The individuals of the study were determined to be intermediates expressing some genes of the sensitive variety (*brachyclada*) (Chambers Group 2005) along with the common variety (*basilaris*). Botanist Pamela DeVries, who was involved with the prior study, was consulted regarding the individuals observed at the Lebata project site. She confirmed that these individuals are most likely intermediates containing physical characteristics of both the common and the sensitive varieties and that they are not likely the pure *brachyclada* varietal (pers. comm. 2008). A photograph of the beavertail cactus is shown in Figure 6.

Parish's popcorn-flower (*Plagiobothrys parishii*) is a CNPS List 1B.1 species that occurs within Great Basin scrub and Joshua tree woodland habitats in mesic areas with alkaline soils from 750 to 1,400 m (2,460 to 4,593 ft) amsl. Limited suitable habitat for the popcorn-flower exists on site and no individuals were observed during focused surveys (conducted during the appropriate bloom period [March to June]). Therefore, this species is presumed absent from the site.

4.0 CONCLUSIONS

No state or federally-listed plant species were observed during focused surveys of the project area. Only one sensitive (CNPS List 4.2) plant species, the crowned muilla, was detected on the site. This species has a limited distribution and is currently on the CNPS watch list, but it does

not have any state or federal protection. Only one individual was recorded during focused plant surveys and it had already gone to seed. It is possible that additional individuals may occur on site.

Numerous individuals of beavertail cactus were recorded on the site during the survey. These specimens were determined to be intermediates between the sensitive and common varieties. The individuals recorded within the project area do not currently have protection under any state or federal legislation.

CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: July 21, 2008 SIGNED: Kerry A. Myers

Ms. Kerry Myers

1) Report Prepared By: SIGNED: Danica Schaffer-Smith

Ms. Danica Schaffer-Smith

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APPENDIX A

ORIGINAL SURVEY DATASHEETS

Date: 4/21/08 4/22/08	**Botanical Survey** ECORP Consulting, Inc.	Project Name: Lebata Big Rock Project Number: 2008-055-001 Phase :
Survey #: 1, 2 Survey Season: Spring	Land Ownership: undevel. w/ scattered residential units, some agric., mining & industrial uses union pacific RR transes the center of the project site.	Client: W. Coast Environmental & Engineering John Hecht

General Information

Surveyors: Kerry Myers, Brad Haley, Danica Schaffer-Smith, Manna Warburton	(circle) Point Polygon Line GPS Unit: Etrex garmin Unique ID: (Name of pt. /poly.)	
Entire extent of rare plants mapped? Y	Comments: Opuntia basilaris v. brachyclada was observed along with Muilla coronata	

Site Information

Directions to Site: 15 N to HWY 138 toward Pearblossom exit 136th St. East head N pass transmission lines, then 3rd dirt Rd. is the SE corner of the project (see maps)		Exotics: BROMAD s. rubens VULMYU HIRINC
Quad: ____ ___,R___,S___	County: Los Angeles	UTM Coordinates (NAD 83)
Parcel # APN: 3039-021-009, 3039-036-001, 3039-036-002		NW: [PHOTOS? ___]
Habitat/ Site Description: CBS N of RR tracks & S of RR tracks (85%)		NE: [PHOTOS? ___]
		SE: [PHOTOS? ___]
		SW: [PHOTOS? ___]

Physical Characteristics

Elevation: 870-896 (ft/m) (2,850 - 2,940')	Aspect:	Soil text: clay, clay loam, loam, sand, silt, silt loam, sandy loam
Substrate: Cliff Duff Gravel Log Moss Other roadside Rock Soil Water Other	Comments: Arizo gravelly loamy sand, & fine sand	%Slope: (0-5%)
Soil moisture: mesic xeric hydric	Comments:	
Light Exposure: full sun	part shade full shade	

Current Land Use:

Disturbance: Some soil piles just S. of RR Some OHV tracks also	Current/potential threats:	
Plant Species Observed:	{dominance rating for each plant} ----→ (omit)	1-indiv 2-rare 3-frequent 4-common 5-abundant

Mulla coronata / just S of dirt Rd. that U's RR / Assoc. ERO CIC, ERI WAL, ERI PRI (11S 0418153 3821959) gone to seed

O. basilaris / v. basilaris — (ST) seg. 8-21 cm, 5-13 cm wide, flat ± obov.

O. basilaris v. brachyclada — (ST) seg. 5-13 cm, 1.5-5 cm wide, slightly flat, ± cylindric to ± club-shaped, spines Ø

Waypoint 1 : Just S. of RR (11S 0418097 3821961) / 2,804' / No joint/seg. to measure / length 1vs. 2X width
Assoc. spp: ACHHYM, ERO CIC, ERIOWALL, CHAFRE, ERIA SAPP, BROMAD, CAMCAM

~~Waypoint~~ #2 : Just S. of Lone Oak Rd. (11S 0418138 3821455) / 2855' / IN FLR. / coarse sandy opening of CBS / length 2x width 1vs. 2 1/8 cm / 1 1/4 cm
Assoc. spp: ERO CIC, AMSMEN, VULMYU, ERI PRI

#3 S of RR (11S 0418227 3821795) / In FLR / Assoc: VULMYU, ERO CIC / "

#4 S of RR (11S 0418238 3821802) / No new growth / Assoc: CHO BREV-BRE, ERO CIC / "

#5 S of RR (11S 0418231 3821870) / NOT IN FLR, No joints/segments / Assoc: VULMYU, BROMAD, CH BRE, ERO CIC, LINPAR / l 4cm w 4.5 cm.

#6 S of RR / NOT IN FLR / Assoc: CHO BRE, SCHBAR, ERO CIC, HYMSAL / l 5cm w 3cm

#7 S of RR / In bud measured segment where bud/pad meet / l 5cm w 3cm

#8 " / In bud " / l 6cm w 5cm

#9 called OPBABR9 / In leaf w/evidence herbivory / Assoc. VULMYU, ENC FRU, CAMCAM, LINPAR / l 1.5cm w 1 1/8 cm

#10 called waypt. 002 /

#11 003 / 1st pt. w/actual segment to measure / Assoc. VULMYU, MENALB, LINPAR, CHAFRE / Segment = 2cm wide

#12 004 / 2nd pt. w/ segment / Assoc: CHAFRE, CHO BRE, VULMYU, ERO CIC / seg = 1cm wide

#13 005 / l 2X w

#14 006 / Embankment of cobbly wash / In Lf. / l 2xw

#15 007 / In bud / l 2xw

#16 008 / In bud / cobbly wash / "

#17 009 / "

#18 010

#19 011

#20 012 / "

#21 013 / Rockwash / In FLR

#22 014 / No new growth

#23 015 / 100% Lf, no buds / Edge small drainage / "

#24 016 / no new growth / l 5cm w/ 2cm (leaf pad)

#25 017 / In bud / good specimen

#26 018 / In bud / Resembles OPBA v. bas. w/ flat pads not as cylindric, but appear dessicated also / l 8cm w/ 5.5 cm

#27 019 / sm. amt. new lf. growth / l 2xw

#28 020 / In bud

#29 021 / HAZMAT / Engine Oil / 20 x 5 gallon drums open

#30 DSS/GPS 003 / IN FLR / Good Specimen / l 2xw

#31 022 / NO NEW growth

#32 023 / IN FLR / Lf l 2xw

#33 024 / IN FLR / Lf 2xw

#34 DSS GPS 004 / IN FLR / Lf 2xw

W. of project area is Jack Rabbit Wildlife Sanctuary (116th St.)

	Date Observed			Date Observed	
Trees:	4/21	4/22		4/21	4/22
YUBR	✓	✓			
Shrubs:					
LARTRI	✓	✓	Acamptopappus sphaerocephali	✓	✓
AMBDUM	✓	✓	AMBACA	✓	✓
HYMSAL	✓	✓	ERIC FRUT	✓	✓
ATRTRI	✓		GRA SPIN	✓	✓
ATRCAN		✓	ERIO TRICH	✓	
ATR SPI		✓	XYL TORT v. tort.	✓	
ERI NAU	✓	✓	PSOR MULT	✓	
EPH NEV	✓	✓	ERIC LINE	✓	
ERI FAS	✓	✓	LYC COO		✓
GUT SAR	✓		STEP SPIN	✓	✓
KRA LAN	✓	✓			
PUR TRI v. glandulosa	✓	✓			
SALMEX	✓	✓			
SAL TRA		✓			
TET STE	✓	✓			
TET SPI	✓	✓			
Forbs/Herbs:					
LEPID FRE	✓	✓			
OPUN BAS v. brachyclada	✓	✓	OENCAL	✓	✓
OPUN ECHI	✓	✓	Loeseliastrum matthewsii	✓	✓
SCH BAR		✓	ESCH MULT	✓	✓
HIR INC	✓	✓	EREM EXIL	✓	✓
ERI DEF	✓		NICO OCCI	✓	✓
ACH HYM	✓	✓	ERIO sp. (tomentose)	✓	✓
ACH SPE	✓	✓	ERIO cf. maharense		✓
BRO MAD s. rubens	✓	✓	ERIO palm.	✓	✓
VUL MYU	✓	✓	DELP PAR s. PAR	✓	✓
ERIOGRAC	✓	✓	LIN AUR	✓	✓
AMS MEN	✓	✓	RUM HYM	✓	
PHAC DIST	✓	✓	LUP BIC	✓	✓
CHAE FREM	✓	✓	PHA CRE	✓	
LIN PARD	✓	✓	COR BIG		✓
Gilia latiflora	✓	✓	ABR POG		✓
Gilia breccianum	✓	✓	NAM DEM		✓
MAL GLA	✓	✓	CAS EXS s. venusta		✓
ERIO PRIN	✓	✓	CALY MON		✓
ERIO WALL	✓	✓	OROB sp.		✓
Chorizanthe breviconu v. brev.	✓	✓	SIS IRI		✓
Mentzelia albicaulis	✓	✓	Glyptopleura marginata		✓
CAM CAM	✓	✓	Tiquilia plicata		✓
Cuscuta sp.	✓		HOR VUL		✓
ERIA SAPP	✓	✓	MONA VIRI		✓
LAST CALI	✓	✓	NAS cf. pulchra		✓
CENT THUR	✓	✓	Lepidium flavum flavum		✓
CAM clavatus v. clav.	✓				
PEC PEN.	✓	✓			
ANIS ACAU	✓	✓			
MIR CAL	✓	✓			
CAM BRE	✓	✓			
CRYP CIRCU	✓	✓			

Photo 1 (KM): looking N from just N of Lone Oak Rd. on SW corner of project area fairly open CBS

Photo 2 (BH): looking N from RR

APPENDIX B

PLANT SPECIES OBSERVED

Appendix B
Plant Species Observed

Scientific Name	Common Name
VASCULAR PLANTS	
ANGIOSPERMS (DICOTYLEDONS)	
AMARANTHACEAE	**AMARANTHE FAMILY**
Grayia spinosa	hop-sage
ASTERACEAE	**SUNFLOWER FAMILY**
Acamptopappus sphaerocephalus	rayless goldenhead
Ambrosia acanthicarpa	annual burweed
Ambrosia dumosa	white bursage
Anisocoma acaulis	scale bud
Artemisia tridentata	basin sagebrush
Chaenactis fremontii	Fremont pincushion
Coreopsis bigelovii	Bigelow's tickseed
Encelia frutescens	rayless encelia
Ericameria nauseosa	Mojave rabbitbrush
Ericameria linearifolia	interior goldenbush
Eriophyllum pringlei	Pringle's woolly sunflower
Eriophyllum wallacei	Wallace eriophyllum
Glyptopleura marginata	carveseed
Gutierrezia sarothrae	matchweed
Hymenoclea salsola	cheesebush
Lasthenia glabrata	goldfields
Malacothrix glabrata	desert dandelion
Nicolletia occidentalis	hole in the sand plant
Stephanomeria spinosa	thorn skeletonweed
Tetradymia spinosa	spiny horsebrush
Tetradymia stenolepis	Mojave cottonthorn
Xylorhiza tortifolia var. *tortifolia*	Mojave aster
BORAGINACEAE	**BORAGE fAMILY**
Amsinckia menziesii var. intermedia	common fiddleneck
Cryptantha circumscissa	Western forget me not
Nama demissum	purple mat
Pectocarya penicillata	combseed
Phacelia crenulata	notch-leaved phacelia
Phacelia distans	distant phacelia
Tiquilia plicata	fanleaf crinklemat
BRASSICACEAE	**MUSTARD FAMILY**
*Hirschfeldia incana**	short-pod mustard
Lepidium flavuum var. *flavum*	peppergrass

Scientific Name	Common Name
Lepidium fremontii	desert peppergrass
*Sysimbrium irio**	London rocket
CACTACEAE	**CACTUS FAMILY**
Opuntia basilaris[2]	beavertail cactus
Opuntia echinocarpa	silver cholla
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Atriplex canescens	four-wing saltbush
Atriplex spinifera	Mojave saltbush
Krascheninnikovia lanata	winterfat
*Salsola tragus**	Russian thistle
CUSCUTACEAE	**DODDER FAMILY**
Cuscuta sp.	dodder
EPHEDRACEAE	**EPHEDRA FAMILY**
Ephedra nevadensis	Mormon tea
EPHEDRACEAE	**EPHEDRA FAMILY**
Ephedra nevadensis	Mormon tea
FABACEAE	**PEA FAMILY**
Lupinus bicolor	miniature lupine
GERANIACEAE	**GERANIUM FAMILY**
Erodium cicutarium	filaree
LAMIACEAE	**MINT FAMILY**
Monardella viridis	Green monardella
Salazaria mexicana	bladdersage
LOASACEAE	**LOASA FAMILY**
Mentzelia albicaulis	blazing star
MALVACEAE	**MALLOW FAMILY**
Eremalche exilis	small-flowered eremalche
NYCTAGINACEAE	**FOUR O'CLOCK FAMILY**
Abronia pogonantha	Mojave sand verbena
Mirabilis californica	California four o'clock

Scientific Name	Common Name
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissonia campestris	field primrose
Camissonia brevipes	yellow cups
Camissonia claviformis ssp. *claviformis*	browneyes
Oenothera californica	evening primrose
OROBANCHACEAE	**BROOMRAPE FAMILY**
Orobanche sp.	broomrape
PAPAVERACEAE	**POPPY FAMILY**
Eschscholzia minutiflora	Coville's poppy
POLEMONIACEAE	**PHLOX FAMILY**
Eriastrum sapphirinum	sapphire eriastrum
Gilia brecciarum	small gilia
Gilia latiflora	broad-flowered gilia
Linanthus aureus	golden linanthus
Linanthus parryae	sand blossoms
Loeseliastrum matthewsii	desert calico
POLYGONACEAE	**BUCKWHEAT FAMILY**
Centrostegia thurberi	Thurber's spineflower
Chorizanthe brevicornu var. *brevicornu*	brittle spineflower
Eriogonum deflexum	flat-topped buckwheat
Eriogonum fasciculatum	California buckwheat
Eriogonum gracillimum	rose and white buckwheat
Eriogonum cf. *mohavense*	Western Mojave buckwheat
Eriogonum palmerianum	Palmer's buckwheat
Eriogonum cf. *plumatella*	Yucca buckwheat
Eriogonum trichopes	little desert trumpet
Rumex hymenosepalus	wild rhubarb
PORTULACACEAE	**PURSLANE FAMILY**
Calyptridium monadrum	common pussy paws
RANUNCULACEAE	**BUTTERCUP FAMILY**
Delphinium parryi ssp. *parryi*	San Bernardino larkspur
ROSACEAE	**ROSE FAMILY**
Purshia tridentata var.*glandulosa*	antelope brush
SCROPHULARIACEAE	**FIGWORT FAMILY**
Castilleja exserta ssp. *venusta*	purple owl's clover

Scientific Name	Common Name
SOLANACEAE	**NIGHTSHADE FAMILY**
Lycium cooperi	peach thorn
ZYGOPHYLLACEAE	**CALTROP FAMILY**
Larrea tridentata	creosote bush
ANGIOSPERMS (MONOCOTYLEDONS)	
LILIACEAE	**LILY FAMILY**
Muilla coronata[1]	crowned muilla
POACEAE	**GRASS FAMILY**
Achnatherum hymenoides	Indian rice grass
Achnatherum speciosum	desert needlegrass
*Bromus madritensis ssp. rubens**	foxtail chess
*Hordeum vulgare**	wild barley
Nasella pulchra	purple needlegrass
*Schismus barbatus**	Mediterranean grass
*Vulpia myuros**	vulpia

[1] sensitive species
***non-native species**

APPENDIX C

POTENTIAL FOR OCCURRENCE OF SENSITIVE PLANT SPECIES

Appendix C
Potential for Occurrence of Sensitive Plant Species

Scientific Name Common Name	**Status**		**Flowering Period Elevation (meters)**	**Potential for Occurrence; Habitat**
Abronia villosa var. aurita Chaparral Sand-verbena	Fed: Ca: CNPS: BLM:	none none 1B.1 none	January-September 80-1600	**Presumed Absent;** Chaparral, Coastal Scrub Sandy Areas. No suitable habitat occurs on the site.
Arctostaphylos gabrielensis San Gabriel Manzanita	Fed: Ca: CNPS: BLM:	none none 1B.2 none	March 1500	**Presumed Absent;** Chaparral (Rocky). No suitable habitat occurs on the site.
Astragalus lentiginosus var. ***antonius*** San Antonio Milk-vetch	Fed: Ca: CNPS: BLM:	none none 1B.3 none	April-July 1500-2600	**Presumed Absent;** Dry Slopes In Open Yellow Pine Forest. No suitable habitat occurs on the site.
Astragalus preussii var. ***preussii*** Preuss's Milk-vetch	Fed: Ca: CNPS: BLM:	none none 2.3 none	May-June 750-825	**Presumed Absent;** Chenopod Scrub, Mojavean Desert Scrub. Confined To Selenium-Bearing Soils. Limited habitat occurs on the site, but species was not observed during focused surveys.
Calochortus striatus Alkali Mariposa Lily	Fed: Ca: CNPS: BLM:	none none 1B.2 SEN	April-June 90-1595	**Presumed Absent;** Chaparral, Chenopod Scrub, Mojavean Desert Scrub, Meadows. Alkaline Meadows And Ephemeral Washes. No suitable habitat occurs on the site.
Calystegia peirsonii Peirson's morning glory	Fed: Ca: CNPS: BLM:	none none 4.2 SEN	April-June 30-1500	**Presumed Absent;** Chaparral, Chenopod Scrub, Cismontane Woodland, Lower Montane Coniferous Forest. No suitable habitat occurs on the site.
Carex vulpinoidea Fox Sedge	Fed: Ca: CNPS: BLM:	none none 2.2 none	May-June 30-1200	**Presumed Absent;** Marshes And Swamps (Freshwater), Riparian Woodland. No suitable habitat occurs on the site.
Castilleja gleasonii Mount Gleason Indian Paintbrush	Fed: Ca: CNPS: BLM:	none **RAR** 1B.2 none	May-June 1160-2170	**Presumed Absent;** Lower Montane Coniferous Forest, Pinyon And Juniper Woodland/Granitic. No suitable habitat occurs on the site.
Chorizanthe parryi var. ***parryi*** Parry's Spineflower	Fed: Ca: CNPS: BLM:	none none 3.2 none	April-June 40-1705	**Presumed Absent;** Coastal Scrub, Chaparral. Dry, Sandy Soils. No suitable habitat occurs on the site.

Scientific Name Common Name	**Status**		**Flowering Period Elevation (meters)**	**Potential for Occurrence; Habitat**
Clarkia xantiana ssp. ***Parviflora*** Kern Canyon Clarkia	Fed: Ca: CNPS: BLM:	none none 1B.2 none	May-June 1000-1500	**Presumed Absent;** Cismontane Woodland, Great Basin Scrub. No suitable habitat occurs on the site.
Layia heterotricha Pale-yellow Layia	Fed: Ca: CNPS: BLM:	none none 1B.1 SEN	March-June	**Presumed Absent;** Cismontane Woodland, Pinyon And Juniper Woodland, Valley And Foothill Grassland/Alkaline Or Clay. No suitable habitat occurs on the site.
Lilium parryi Lemon Lily	Fed: Ca: CNPS: BLM:	none none 1B.2 none	July-August 1300-2790	**Presumed Absent;** Wet, Mountainous Terrain; Gen. In Forested Areas; On Shady Edges Of Streams, In Open Boggy Meadows & Seeps. No suitable habitat occurs on the site.
Linanthus concinnus San Gabriel Linanthus	Fed: Ca: CNPS: BLM:	none none 1B.2 none	April-June 1575-2545	**Presumed Absent;** Lower Montane Coniferous Forest, Upper Montane Coniferous Forest. Dry Rocky Slopes. No suitable habitat occurs on the site.
Loeflingia squarrosa var. ***artemisiarum*** Sagebrush Loeflingia	Fed: Ca: CNPS: BLM:	none none 2.2 SEN	April-May 700-1200	**Presumed Absent;** Great Basin Scrub, Sonoran Desert Scrub, Desert Dunes. Sandy Flats And Dunes. Sandy Areas Around Clay Slicks. Limited suitable habitat occurs on the site, but this species was not observed during focused surveys during the bloom period.
Lupinus peirsonii Peirson's Lupine	Fed: Ca: CNPS: BLM:	none none 1B.3 none	April-June 1000-2500	**Presumed Absent;** Joshua Tree Woodland, Lower Montane Coniferous Forest, Pinyon/Juniper Woodland, Upper Montane Coniferous Forest. Limited suitable habitat occurs on the site, but this species was not observed during the focused surveys.
Muhlenbergia californica California muhly	Fed: Ca: CNPS: BLM:	none none 4.3 none	June-September 100-2000	**Presumed Absent;** Coastal Sage, Chaparral, Lower Montane Coniferous Forest, Meadows, near Streams or Seeps. No suitable habitat is present on the site.

Scientific Name Common Name	**Status**		**Flowering Period Elevation (meters)**	**Potential for Occurrence; Habitat**
Opuntia basilaris var. ***brachyclada*** Short-joint Beavertail	Fed: Ca: CNPS: BLM:	none none 1B.2 none	April-June 425-1800	**Presumed Absent;** Chaparral, Joshua Tree Woodland, Mojavean Desert Scrub, Pinyon-Juniper Woodland, Riparian Woodland. Opuntia basilaris individuals were observed during the focused survey and determined to be an intermediate form, not pure *brachyclada.*
Orobanche valida ssp. ***valida*** Rock Creek Broomrape	Fed: Ca: CNPS: BLM:	none none 1B.2 none	May-June 1250-1820	**Presumed Absent;** Chaparral, Pinyon-Juniper Woodland. On Slopes Of Loose Decomposed Granite; Parasitic On Various Chaparral Shrubs. No suitable habitat is present on the site.
Plagiobothrys parishii Parish's Popcorn-flower	Fed: Ca: CNPS: BLM:	none none 1B.1 none	March-June (November) 750-1400	**Presumed Absent;** Great Basin Scrub, Joshua Tree Woodland. Alkaline Soils; Mesic Sites. Limited suitable habitat occurs on the site, but this species was not observed during the focused surveys during the bloom period.
Symphyotrichum defoliatum San Bernardino Aster	Fed: Ca: CNPS: BLM:	none none 1B.2 none	July-November 2-2040	**Presumed Absent;** Meadows, Seeps, Marshes And Swamps, Coastal Scrub, Cismontane Woodland, Lower Montane Coniferous Forest. No suitable habitat is present on the site.

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APPENDIX 14 ADDENDUM

Sensitive Plant Survey Report Addendum

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ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

July 30, 2010
(2008-055)

Mr. Lou Merzario
Project Manager II
SESPE Consulting, Inc.
468 Poli St., Ste. 2E
Ventura, CA 93001

Subject: Updated Information for the Sensitive Plant Survey Report for the Lebata Big Rock Creek Surface Mining Project in Los Angeles County, California

Dear Mr. Merzario,

The purpose of this letter is to provide updated information related to the rare plant survey report that ECORP Consulting, Inc. (ECORP) prepared in 2008 for the Lebata Big Rock Creek Surface Mining Project near the City of Pearblossom in Los Angeles County, California. ECORP conducted surveys on the site on April 22, 2008.

As requested by SESPE Consulting, Inc. (SESPE), ECORP conducted new searches of the California Department of Fish and Game Natural Diversity Database (CNDDB), California Native Plant Society Rare Plant Inventory (CNPS), and University of California, Berkeley's Specimen Management System of California Herbaria database (SMASCH) on July 30, 2010 to determine if any new sensitive plant species occurrences had been reported in the vicinity of Big Rock Creek Surface Mining Project site. The database searches consisted of a nine-quad search of the subject USGS 7.5-minute quadrangle containing the project site (Littlerock) and eight surrounding quadrangles (Palmdale, Lancaster East, Alpine Butte, Hi Vista, Lovejoy Buttes, Valyermo, Juniper Hills, and Pacifico Mountain) for the CNDDB and CNPS databases and a search of the geographic locality of Pearblossom for the SMASCH database.

No new sensitive plant species occurrences were reported in any of the databases. However, it should be noted that databases such as the CNDDB can have a lag time of several years between when an observation is submitted to the database and when it appears in the database. Additionally, although no new sensitive plant species occurrences were reported, three sensitive plant species not discussed in the 2008 survey results report were noted in the updated database search results. The three additional plants were the Lancaster milk-vetch (*Astragalus preussii* var. *laxiflorus*) (CNPS 1B.1) and white pygmy-poppy (*Canbya candida*) (CNPS 4.2) from the CNDDB search and Palmer's mariposa lily (*Calochortus Palmeri* var. *palmeri*) (CNPS 1B.2) from the CNPS search. The project site does not appear to have suitable habitat to support Palmer's mariposa lily, but it does appear to have suitable habitat for Lancaster milk-vetch and white pygmy-poppy. However, the Lancaster milk-vetch is thought to extinct and neither of these species was detected during the 2008 surveys. The 2008

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surveys were conducted during a good rain year and during the blooming period of March through May for the Lancaster milk-vetch and April through May for the pygmy poppy. Provided that the project site has not experienced any major habitat-altering events such as fire or flood and noting that the 2008 surveys were appropriately timed to detect potentially occurring sensitive plant species within the site based on site conditions and/or nearby reference populations, no additional sensitive plant species surveys should be necessary at this time.

Sincerely,

ECORP Consulting, Inc.

Ben Smith
Biologist

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 15

Visual Assessment

and

Visual Assessment Addendum

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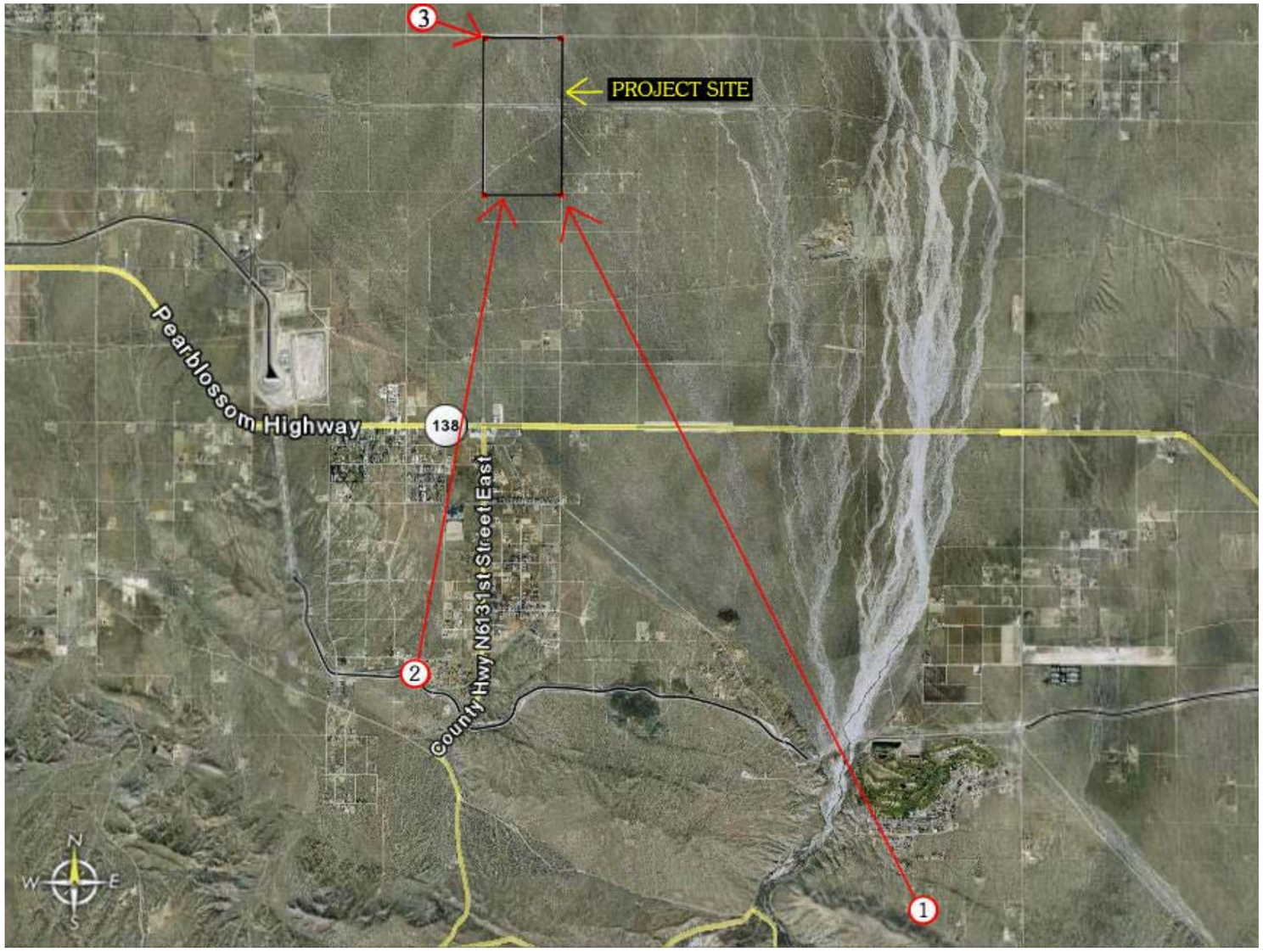
VISUAL ANALYSIS

Visual analysis photo locations



1. 157TH Street East & East Ave. Y-8, Llano, California (Crystalaire Country Club).

2. East Ave. X & Pearblossom Vista, Pearblossom, California

3. Ave. "T", Northwest corner of site

JORDAN, GILBERT & BAIN
3350 Loma Vista Road Ventura, CA 93003
Landscape Architects, Inc.
phone (805) 642-3641 fax (805) 642-9614

View # 1 –Looking North West from - 157TH Street East & East Ave. Y-8, Llano, California (Crystalaire Country Club).

A - Existing conditions

B - View after facility is installed

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View # 2 – Looking North from - East Ave. X & Pearblossom Vista, Pearblossom, California

A - Existing conditions

B - View after proposed facility is installed.

JORDAN, GILBERT & BAIN
3350 Loma Vista Road Ventura, CA 93003
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View # 3 – Looking Southeast from – Ave. T, at Northwest corner of site

A - Existing conditions

B - View after proposed facility is installed.

C – View after berming, planting, and painting.

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3350 Loma Vista Road Ventura, CA 93003

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VISUAL NARRATIVE FOR McGEE BIG ROCK CANYON

Using digitally enhanced photographs, a series of visual simulations have been produced for the purpose of establishing the visual impact the McGee Big Rock Canyon Project might have from two specific areas of concern. These areas were identified largely due to their elevations above the project site, and the existence of roads and housing at these vantage points. Due to the generally flat terrain in and around the project site, at no point within reasonable proximity could the site be seen. Simulations were not made of the site from Pearblossom highway for the same reason.

All photographs taken to demonstrate existing conditions, and then altered digitally to simulate the project at full construction, were shot with a 50mm lens on a digital camera. Site flag markers and a digital terrain model program were used to establish the simulated size and location of the site in the images.

View #1

The first view location is at an elevation of approximately 990(ft) above the proposed project site. The photos were taken from the intersection of "157th Street East" and "East Avenue Y8", in the town of Llano near the Crystalaire Country Club. The Project site is located approximately 6 miles to the Northwest. Image "A" represents the existing view from this location as of Sept. 20, 2007. Image "B" represents a simulation of the project site at full build out. The brightness of the simulated exposed earth was estimated, by imitating the color and contrast of the various areas of exposed earth that are visible, in a predominant manner, within the existing view.

Due to the extensive distance between the project site, and this viewpoint, all of the proposed structures planned for the site, are so small, they are of minimal visual impact in this simulation.

View #2

The second view location is at an elevation of approximately 520(ft) above the proposed project site. The photos were taken from the intersection of "East Avenue X" and "Pearblossom Vista", in the town of Pearblossom. The project site is located approximately 3.5 miles North. Image "A" represents the existing view from this location as of Sept.20, 2007. Image "B" represents a simulation of the project site at full build out. The brightness of the simulated exposed earth was estimated, by imitating the color and contrast of the various areas of exposed earth that are visible, within the existing view, at approximately the same distance.

Due to the extensive distance between the project site, and this viewpoint, all of the proposed structures planned for the site, are so small, they are not readily visible in this simulation.

View #3

The third view location is from East Avenue "T", at the Northwest corner of the project site. This is the location of the future entry road to the site. Image "A" represents the existing view from this location as of Sept.20, 2007. Image "B" represents a simulation of the project after all components of the equipment have been installed. Image "C" represents the view after the addition of a 5' perimeter berm, as well as the establishment of native vegetation, and possible transplantation of Joshua trees from other disturbed areas of the site. With the berm and native plantings, it will be possible to screen most of the lower buildings, roads, equipment and vehicle movement from view along East Ave. "T". It is recommended that the tanks and other taller equipment be painted a dark color that would help them blend with the surrounding landscape. Not only will the buildings be less visible from the distant existing housing areas, but the color will help mask staining, and create a visual effect of a smaller size.

Scale and heights for the pictured pieces of equipment is all estimated to be as close as possible to the proposed sizes from these views and perspectives, upon installation.

APPENDIX 15 ADDENDUM

Visual Assessment Addendum

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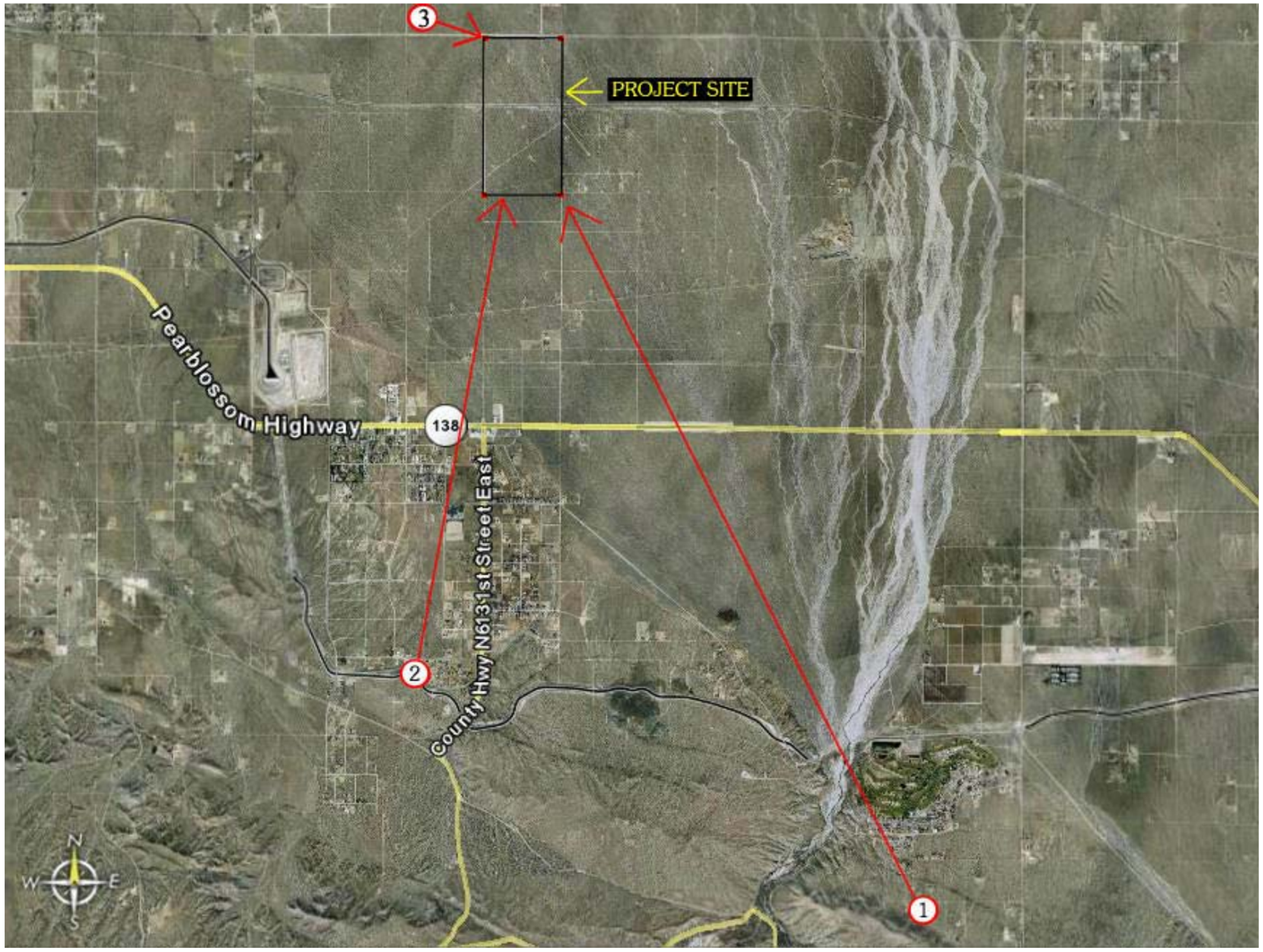
VISUAL ANALYSIS - McGEE BIG ROCK CREEK

Visual analysis photo locations



1. 157TH Street East & East Ave. Y-8, Llano, California (Crystalaire Country Club).

2. East Ave. X & Pearblossom Vista, Pearblossom, California

3. Ave. "T", Northwest corner of site

JORDAN, GILBERT & BAIN
3350 Loma Vista Road Ventura, CA 93003

Landscape Architects, Inc.
phone (805) 642-3641 fax (805) 642-9614

View # 1 –Looking North West from - 157TH Street East & East Ave. Y-8, Llano, California (Crystalaire Country Club).

A - Existing conditions

B - View after facility is installed

JORDAN, GILBERT & BAIN
3350 Loma Vista Road Ventura, CA 93003
▲
Landscape Architects, Inc.
phone (805) 642-3641 fax (805) 642-9614

View # 2 – Looking North from - East Ave. X & Pearblossom Vista, Pearblossom, California

A - Existing conditions

B - View after proposed facility is installed.

JORDAN, GILBERT & BAIN
3350 Loma Vista Road Ventura, CA 93003
Landscape Architects, Inc.
phone (805) 642-3641 fax (805) 642-9614

View # 3 – Looking Southeast from – Ave. T, at Northwest corner of site

A - Existing conditions

B – View after berming, planting, and painting.

JORDAN, GILBERT & BAIN
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Landscape Architects, Inc.
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VISUAL NARRATIVE FOR McGEE BIG ROCK CREEK

Using digitally enhanced photographs, a series of visual simulations have been produced for the purpose of establishing the visual impact the McGee Big Rock Canyon Project might have from two specific areas of concern. These areas were identified largely due to their elevations above the project site, and the existence of roads and housing at these vantage points. Due to the generally flat terrain in and around the project site, at no point within reasonable proximity could the site be seen. Simulations were not made of the site from Pearblossom highway for the same reason.

All photographs taken to demonstrate existing conditions, and then altered digitally to simulate the project at full construction, were shot with a 50mm lens on a digital camera. Site flag markers and a digital terrain model program were used to establish the simulated size and location of the site in the images.

View #1

The first view location is at an elevation of approximately 990(ft) above the proposed project site. The photos were taken from the intersection of "157th Street East" and "East Avenue Y8", in the town of Llano near the Crystalaire Country Club. The Project site is located approximately 6 miles to the Northwest. Image "A" represents the existing view from this location. Image "B" represents a simulation of the project site at full build out. The brightness of the simulated exposed earth was estimated, by imitating the color and contrast of the various areas of exposed earth that are visible, in a predominant manner, within the existing view.

Due to the extensive distance between the project site, and this viewpoint, all of the proposed structures planned for the site, are so small, they are of minimal visual impact in this simulation.

View #2

The second view location is at an elevation of approximately 520(ft) above the proposed project site. The photos were taken from the intersection of "East Avenue X" and "Pearblossom Vista", in the town of Pearblossom. The project site is located approximately 3.5 miles North. Image "A" represents the existing view from this location. Image "B" represents a simulation of the project site at full build out. The brightness of the simulated exposed earth was estimated, by imitating the color and contrast of the various areas of exposed earth that are visible, within the existing view, at approximately the same distance.

Due to the extensive distance between the project site, and this viewpoint, all of the proposed structures planned for the site, are so small, they are not readily visible in this simulation.

View #3

The third view location is from East Avenue “T”, at the Northwest corner of the project site. This is the location of the future entry road to the site. Image “A” represents the existing view from this location . Image “B” represents the view after the addition of a 5’ perimeter berm, as well as the establishment of native vegetation, and possible transplantation of Joshua trees from other disturbed areas of the site. With the berm and native plantings, it will be possible to screen most of the lower buildings, roads, equipment and vehicle movement from view along East Ave. “T”. It is recommended that the tanks and other taller equipment be painted a dark color that would help them blend with the surrounding landscape. Not only will the buildings be less visible from the distant existing housing areas, but the color will help mask staining, and create a visual effect of a smaller size.

Scale and heights for the pictured pieces of equipment is all estimated to be as close as possible to the proposed sizes from these views and perspectives, upon installation.

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 16

Photometric Study

and

Photometric Study Addendum

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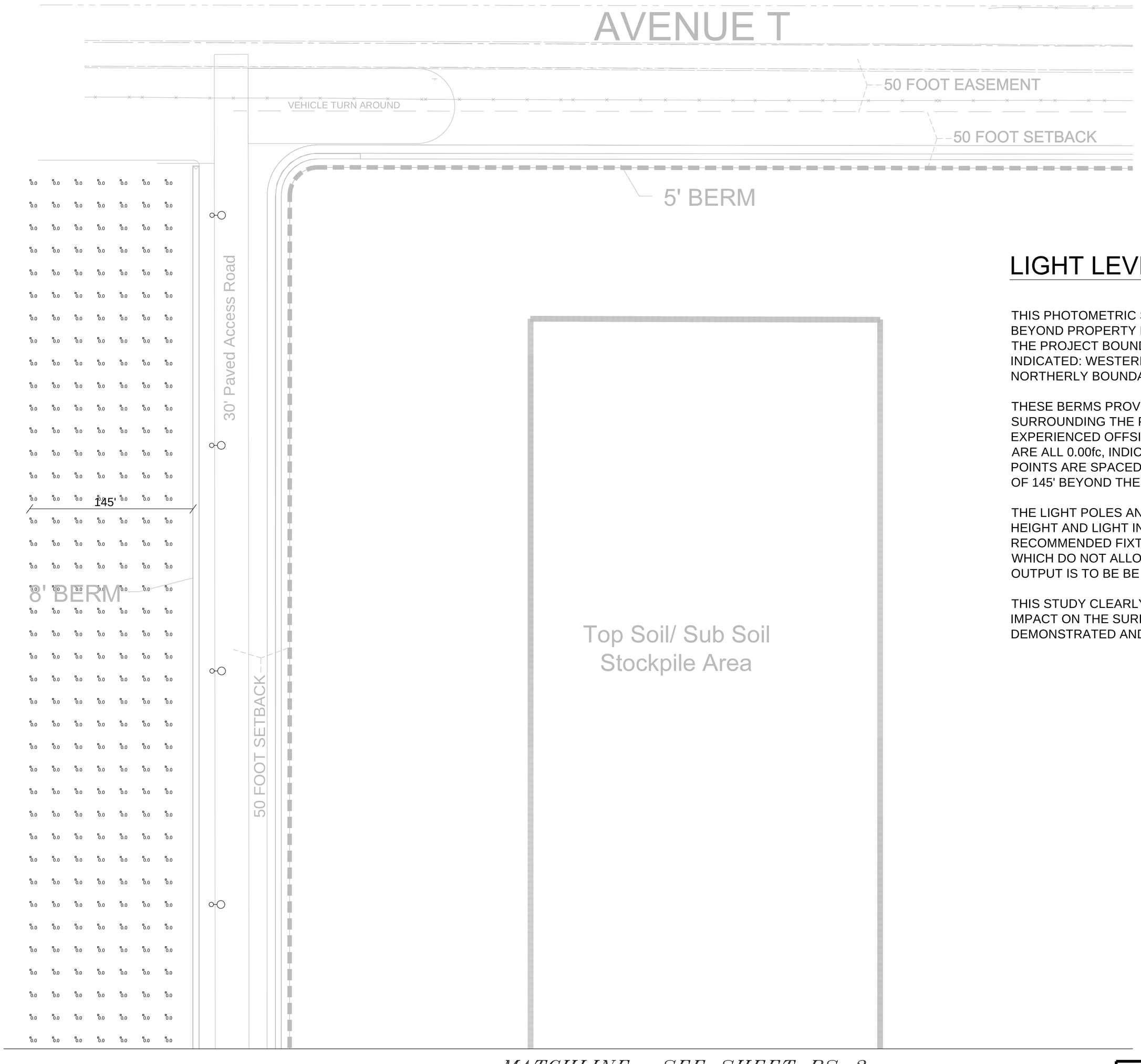

Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Lumens	Description
	7	25' TALL SITE LIGHT	SINGLE	36000	VISIONAIRE LIGHTING, AME-2 TYPE 3 LIGHT DISTRIBUTION, 400 WATT METAL HALIDE WITH FLAT LENS TO PREVENT UP-LIGHT.
	6	20' TALL ACCESS ROAD LIGHT	SINGLE	12500	VISIONAIRE LIGHTING, AME-1 TYPE 3 LIGHT DISTRIBUTION, 150 WATT METAL HALIDE WITH FLAT LENS TO PREVENT UP-LIGHT AND BACK SIDE SHIELDS TO PREVENT BACKWARD SPILL LIGHT.

LIGHT LEVEL STUDY FINDING:

THIS PHOTOMETRIC STUDY PROVIDES THE BASIS FOR DEMONSTRATING LIGHT TRESPASS LEVELS BEYOND PROPERTY LINE SETBACKS AND THE IMPACTS TO SURROUNDING PROPERTY OWNERS. THE PROJECT BOUNDARIES ARE ALL FLANKED BY EARTHEN BERMS OF VARYING HEIGHTS, AS INDICATED: WESTERLY BOUNDARY-8'. SOUTHERLY BOUNDARY-5'. EASTERLY BOUNDARY-3'. NORTHERLY BOUNDARY-5'.

THESE BERMS PROVIDE A NATURAL BARRIER TO OFF-SITE LIGHT TRESPASS. THE NUMBERS SURROUNDING THE PROJECT INDICATE THE INTENSITY OF PROJECT LIGHT ESTIMATED TO BE EXPERIENCED OFFSITE, AND IS REPRESENTED IN FOOT-CANDLES. AS CAN BE SEEN, THE LEVELS ARE ALL 0.00fc, INDICATING NO LIGHT TRESPASS OFF-SITE. THE PHOTOMETRIC CALCULATION POINTS ARE SPACED ON A 20'x20' GRID. THE LIGHT LEVELS HAVE BEEN ESTIMATED TO A DISTANCE OF 145' BEYOND THE BERMS.

THE LIGHT POLES AND FIXTURES USED TO PERFORM THIS STUDY ARE IDENTIFIED INTERMS OF HEIGHT AND LIGHT INTENSITY. SEE THE LUMENAIRE SCHEDULE ON EACH SHEET. THE RECOMMENDED FIXTURES SHALL EMPLOY FULL CUT-OFF OPTICS (I.E. THOSE HAVING A FLAT LENS), WHICH DO NOT ALLOW LIGHT LEVELS TO BE EMITTED ABOVE THE HORIZONTAL PLANE. ALL LIGHT OUTPUT IS TO BE BE EMITTED IN THE DOWNWARD DIRECTION, WITH 0% UP-LIGHT.

THIS STUDY CLEARLY ILLUSTRATES THAT THE BIG ROCK CREEK SITE DOES NOT HAVE A NEGATIVE IMPACT ON THE SURROUNDING LAND PARCELS AND WILL BE ACCEPTABLE TO THE COUNTY AS DEMONSTRATED AND DESCRIBED.

N

SCALE
1"-40'

PS-1

MATCHLINE--SEE SHEET PS-2

REGISTERED PROFESSIONAL ENGINEER
MILTON C. NIEDERHAUS
No. E 8636
ELECTRICAL
EXP. 9/08
STATE OF CALIFORNIA

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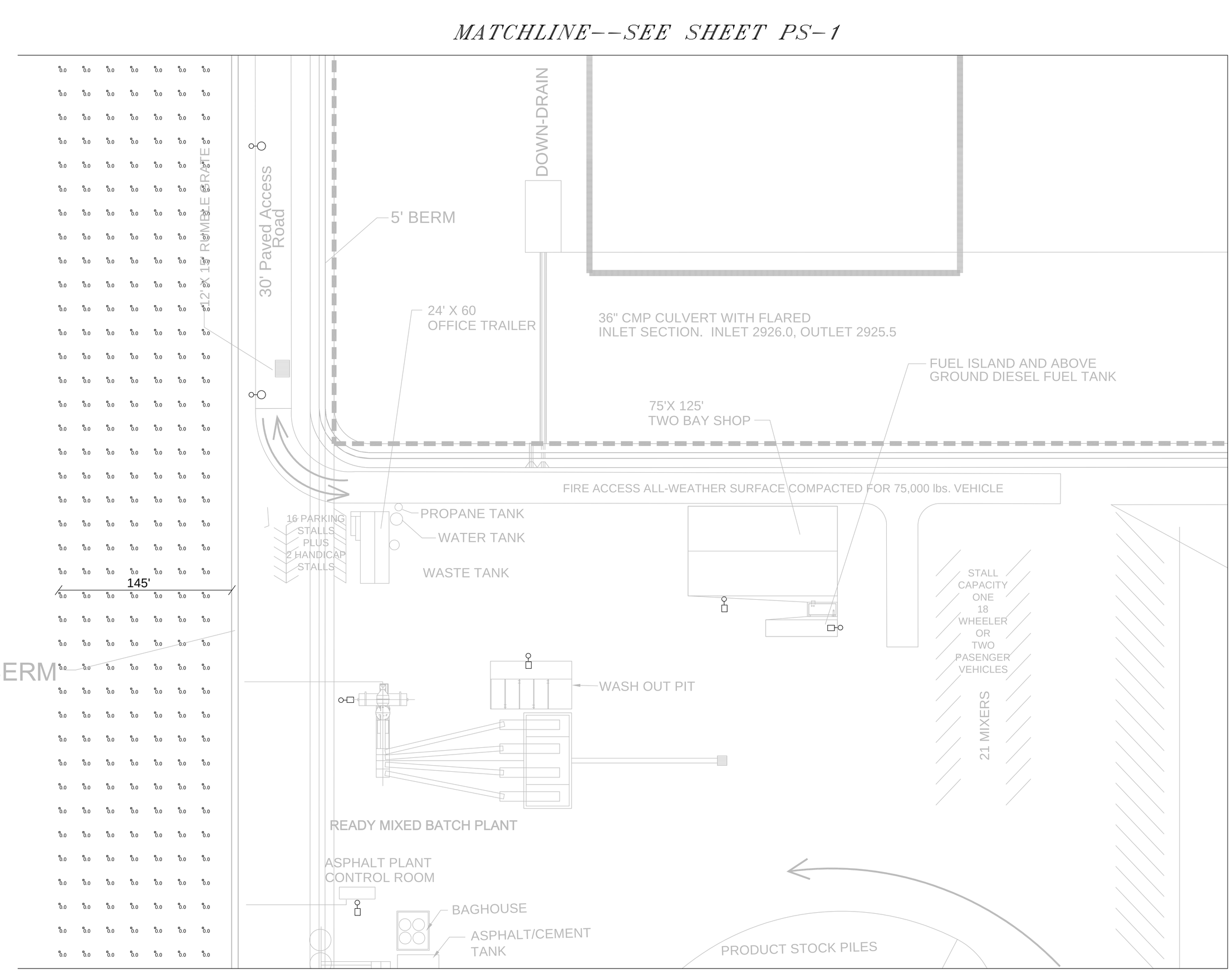
LIGHTING DESIGN & CONSULTATION
INNOVATORS IN LIGHTING PORTRAITS
7343 RONSON RD. SUITE I
SAN DIEGO, CA. 92111
PH: 858/278-4503
FAX: 858/278-4573

PHOTOMETRIC STUDY
Big Rock Creek Site
Antelope Valley, California

PROJECT: WCE07/103107		FIGURE 3
DRAWN BY: J.BURT	DATE: 02/29/08	REVISION:
APPROVED BY: K.PEREZ	DATE: 02/29/08	PRINTED: 02/29/08



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	6	20' TALL ACCESS ROAD LIGHT	SINGLE	12500	VISIONAIRE LIGHTING, AME-1 TYPE 3 LIGHT DISTRIBUTION, 150 WATT METAL HALIDE WITH FLAT LENS TO PREVENT UP-LIGHT AND BACK SIDE SHIELDS TO PREVENT BACKWARD SPILL LIGHT.

PS-2

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PHOTOMETRIC STUDY
Big Rock Creek Site
Antelope Valley, California

PROJECT: WCE07/103107		FIGURE 3
DRAWN BY: J.BURT	DATE: 02/29/08	REVISION:
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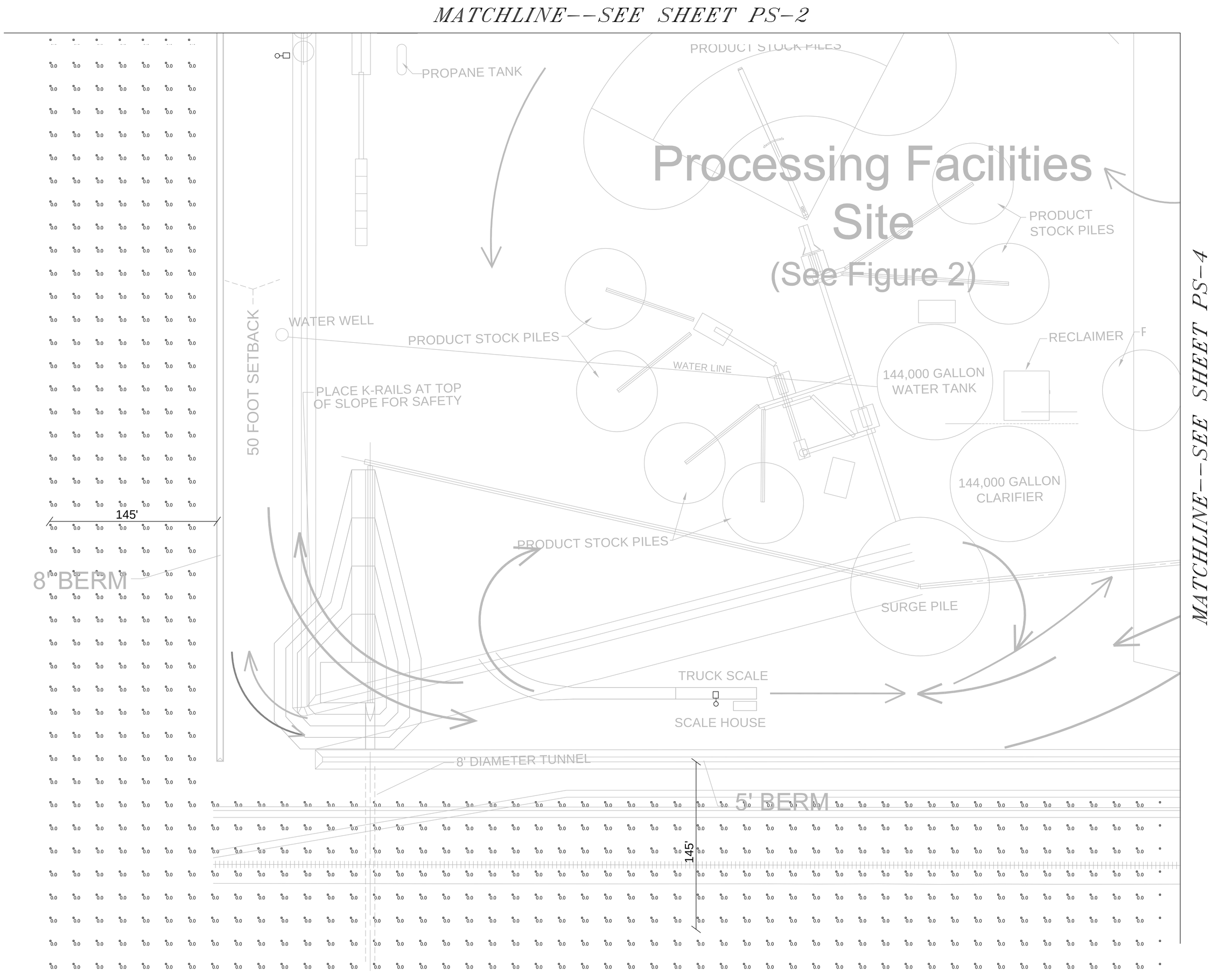

N

SCALE
1"-40'

PS-3

Luminaire Schedule					
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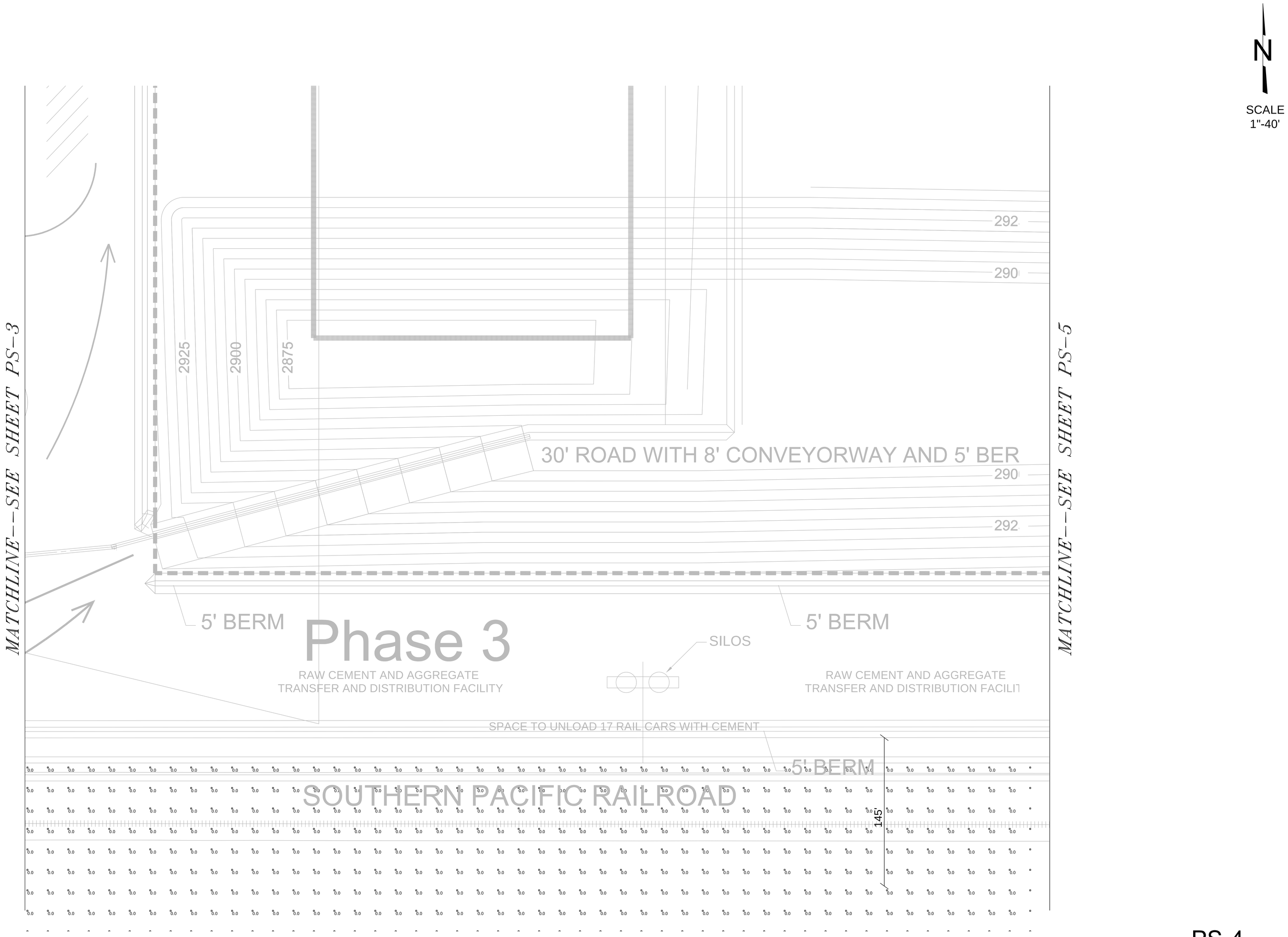
PHOTOMETRIC STUDY

Big Rock Creek Site
Antelope Valley, California

PROJECT: WCE07/103107		FIGURE 3
DRAWN BY: J.BURT	DATE: 02/29/08	REVISION:
APPROVED BY: K.PEREZ	DATE: 02/29/08	PRINTED: 02/29/08



PS-4

Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Lumens	Description
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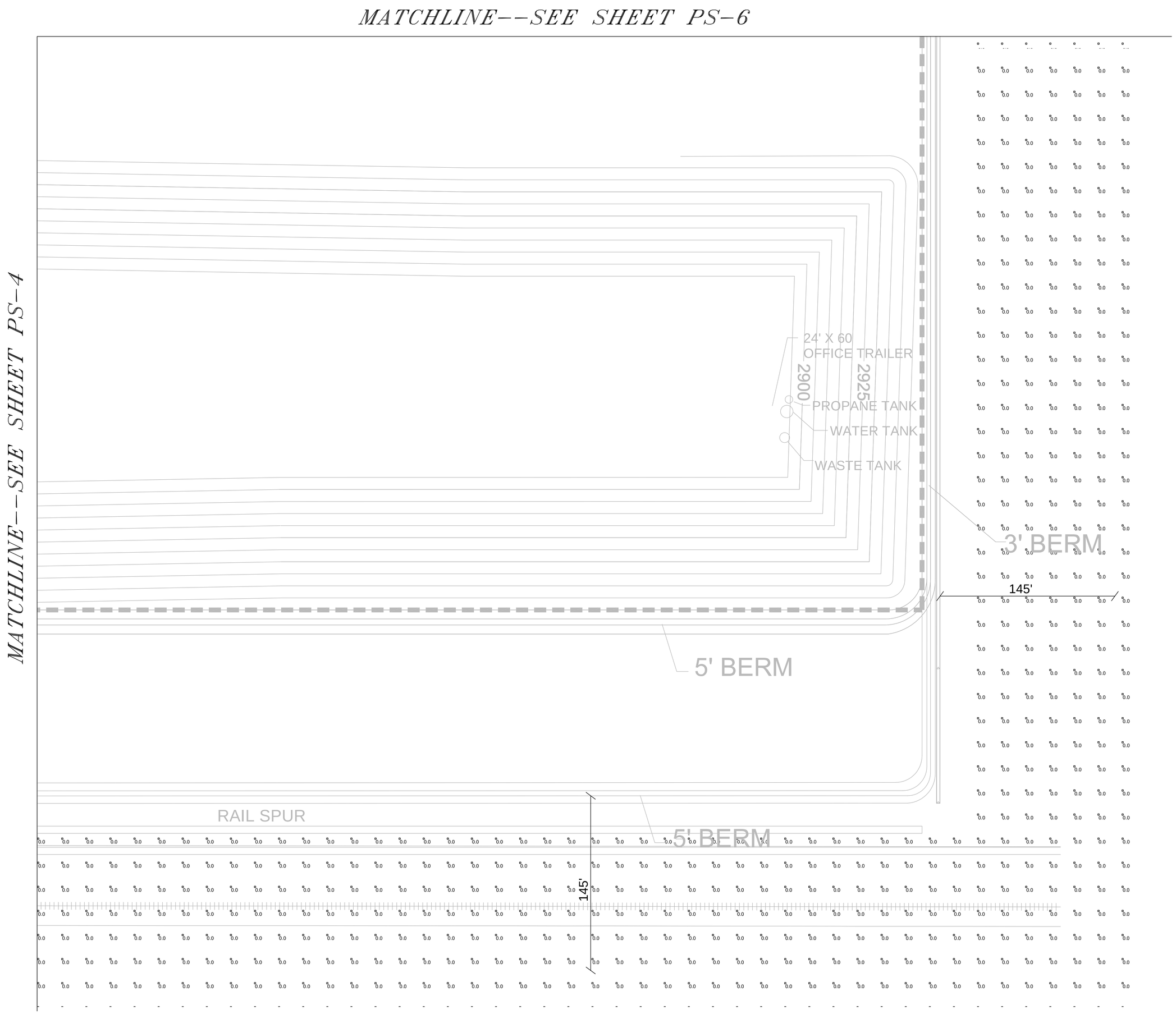
PHOTOMETRIC STUDY

Big Rock Creek Site
Antelope Valley, California

PROJECT: WCE07/103107		FIGURE 3
DRAWN BY: J.BURT	DATE: 02/29/08	REVISION:
APPROVED BY: K.PEREZ	DATE: 02/29/08	PRINTED: 02/29/08



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SCALE
1"-40'

PS-5

Luminaire Schedule					
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PHOTOMETRIC STUDY

Big Rock Creek Site
Antelope Valley, California

PROJECT: WCE07/103107		FIGURE 3
DRAWN BY: J.BURT	DATE: 02/29/08	REVISION:
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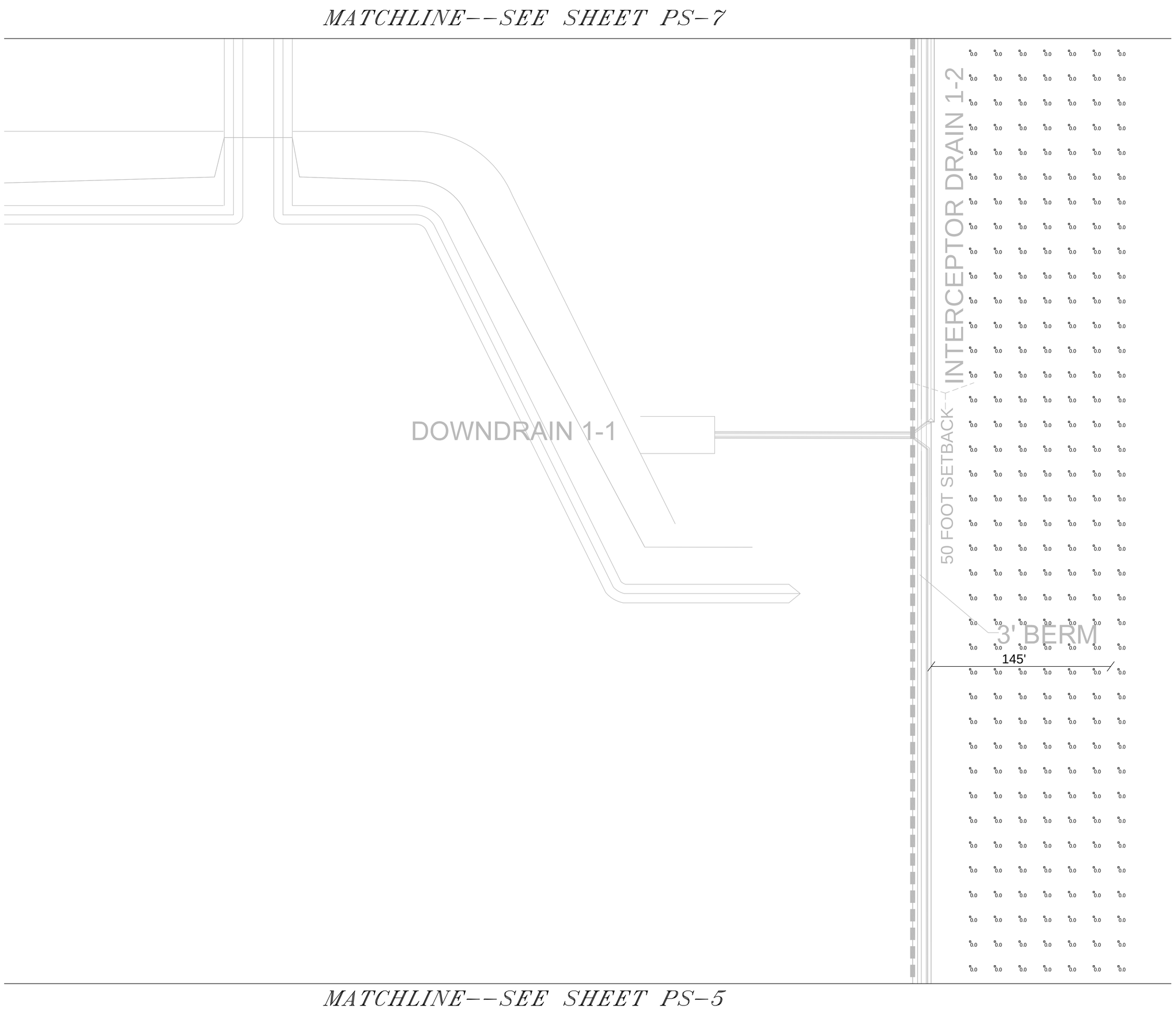

SCALE
1"-40'

PS-6

Luminaire Schedule					
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PHOTOMETRIC STUDY
Big Rock Creek Site
Antelope Valley, California

PROJECT: WCE07/103107	FIGURE 3
DRAWN BY: J.BURT DATE: 02/29/08	REVISION:
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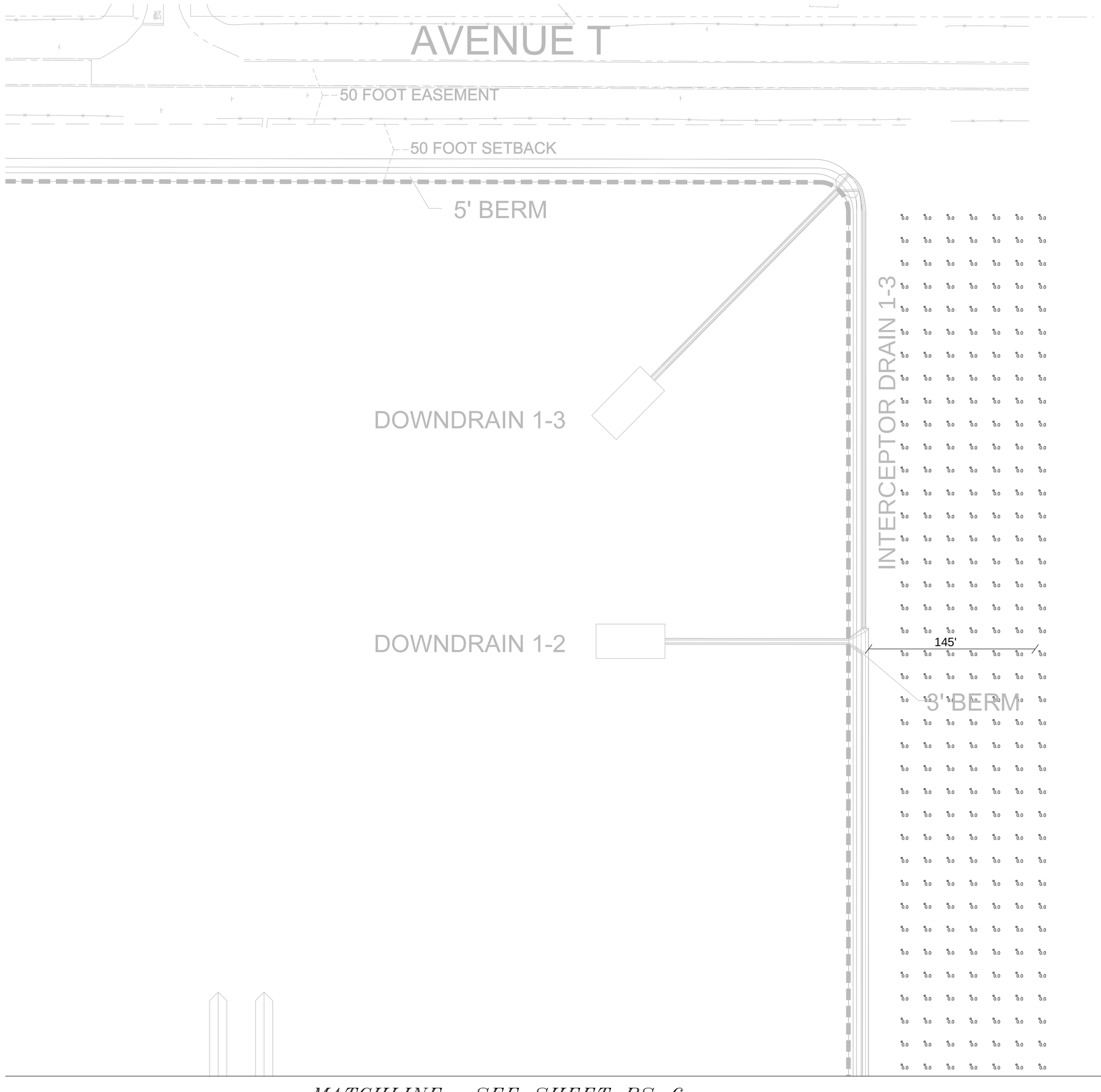

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SCALE
1"-40'

PS-7

MATCHLINE--SEE SHEET PS-6

Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Lumens	Description
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PHOTOMETRIC STUDY

Big Rock Creek Site
Antelope Valley, California

PROJECT: WCE07/103107	FIGURE 3
DRAWN BY: J.BURT DATE: 02/29/08	REVISION:
APPROVED BY: K.PEREZ DATE: 02/29/08	PRINTED: 02/29/08

APPENDIX 16 ADDENDUM

Photometric Study Addendum

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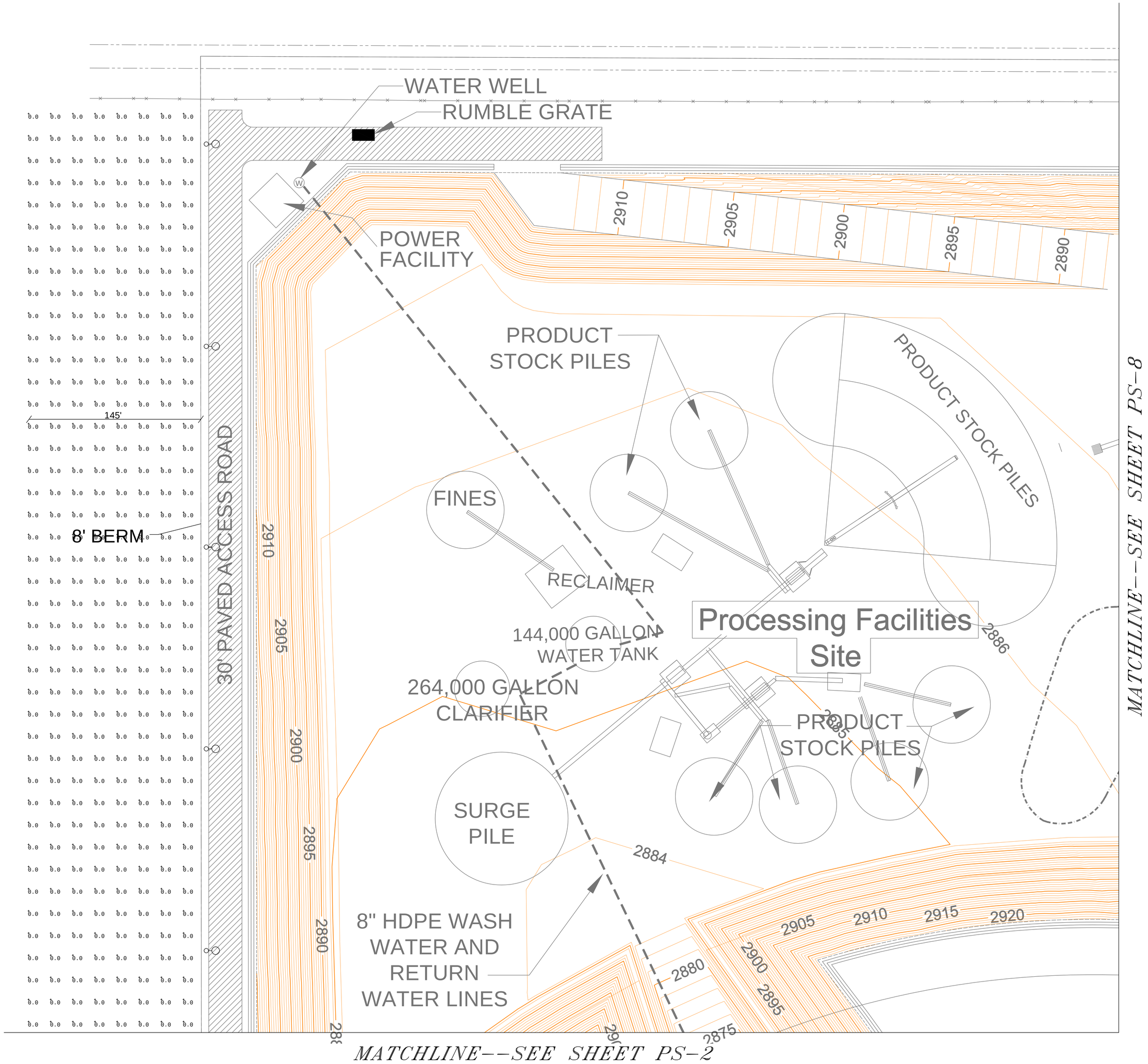

NORTH

0 20' 40' 80'
SCALE: 1"=40'-0"

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www.natemullenvisualconcepts.cc

Client:
SESPE

Project:
BIG ROCK CREEK SITE

ANTELOPE VALLEY, CA.

REGISTERED PROFESSIONAL ENGINEER
MILTON C. NIEDERHAUS
No. E 8636
ELECTRICAL
EXP. 9/10
STATE OF CALIFORNIA

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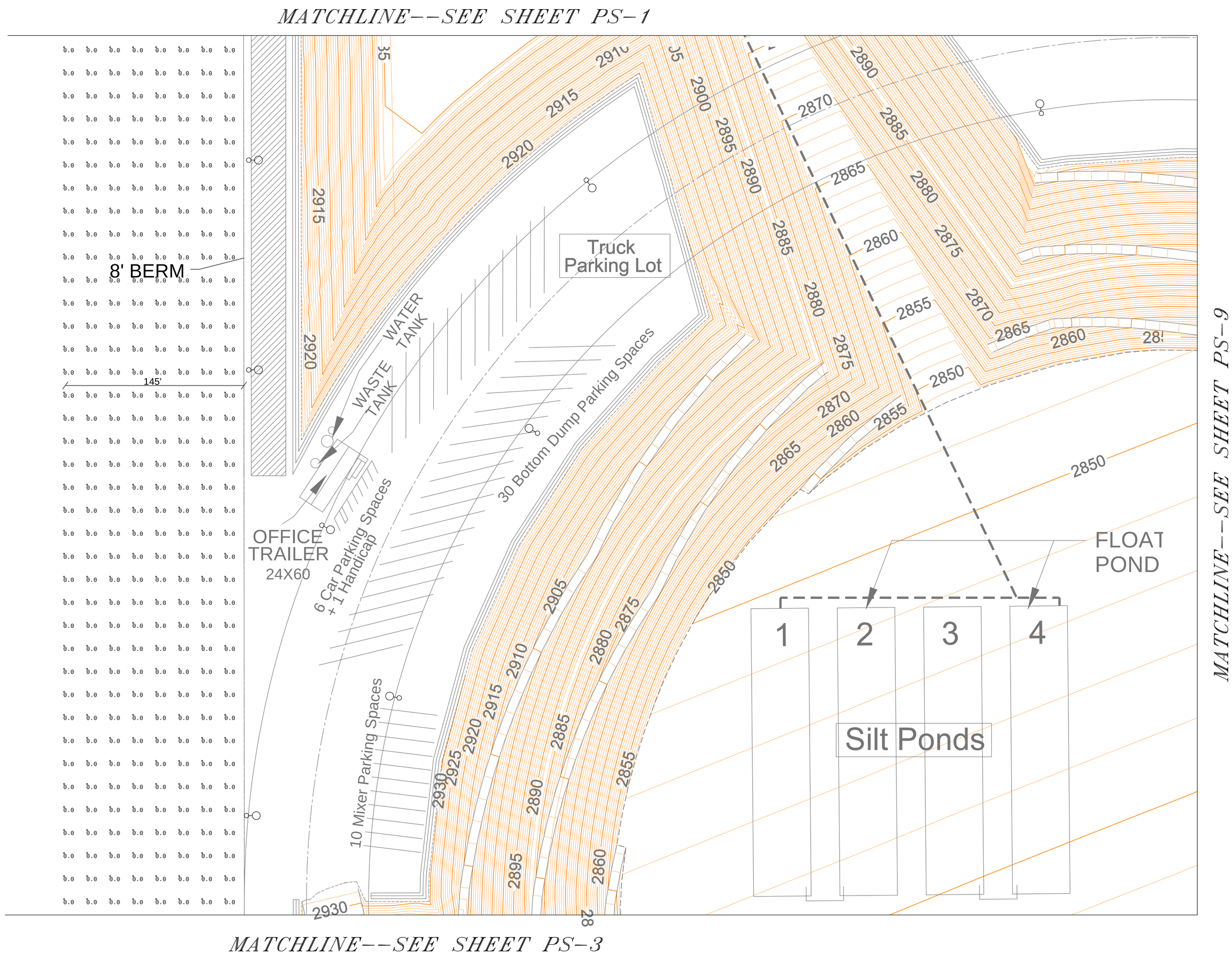

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Project:
BIG ROCK CREEK SITE

ANTELOPE VALLEY, CA.

REGISTERED PROFESSIONAL ENGINEER
MILTON C. NIEDERHAUS
No. E 8636
ELECTRICAL
EXP. 9/10
STATE OF CALIFORNIA

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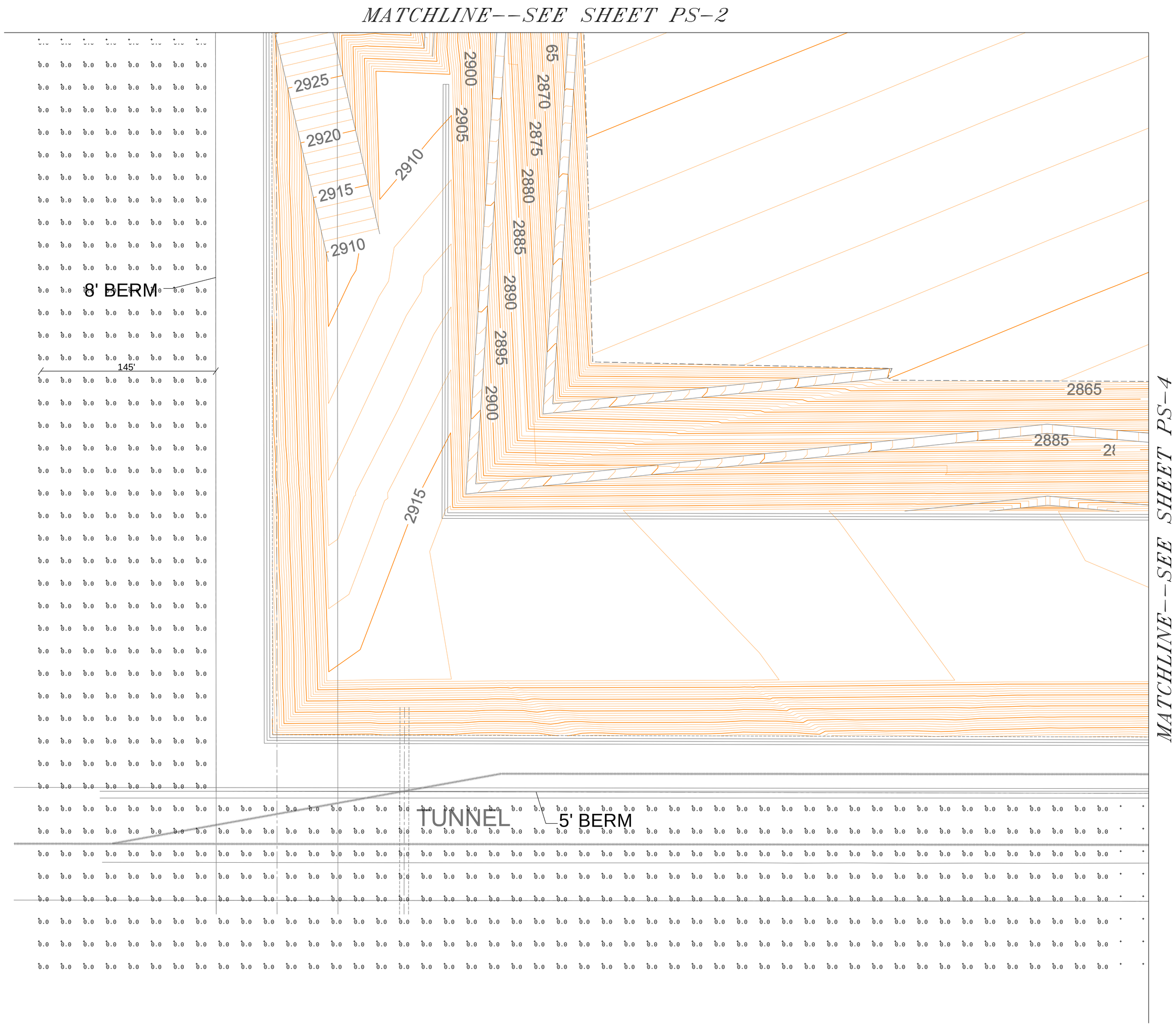

NORTH

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SCALE: 1"=40'-0"

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Project:
BIG ROCK CREEK SITE

ANTELOPE VALLEY, CA.

REGISTERED PROFESSIONAL ENGINEER
MILTON C. NIEDERHAUS
No. E 8636
ELECTRICAL
EXP. 9/10
STATE OF CALIFORNIA

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Sheet: 3 of 10

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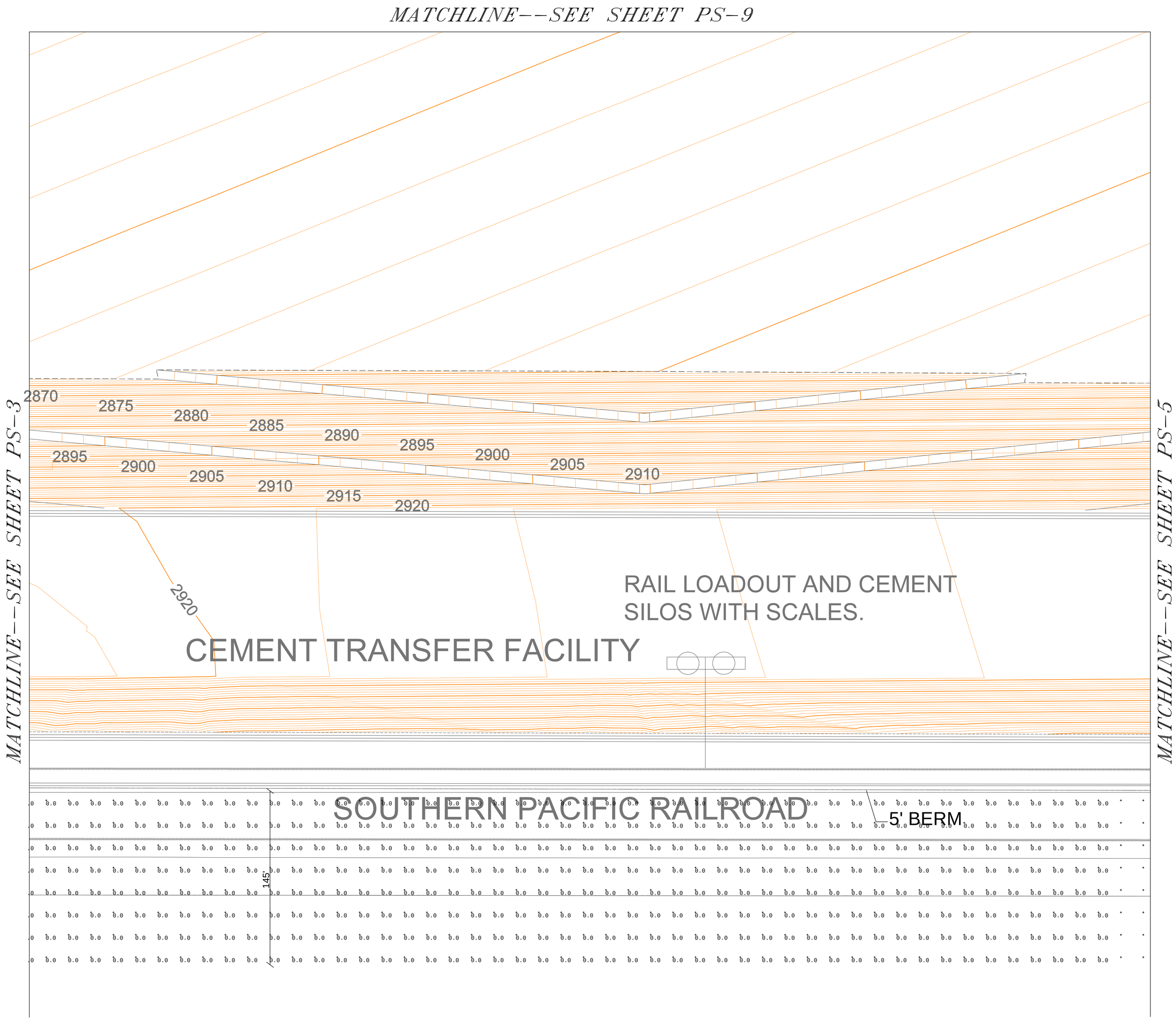

NORTH

0 20' 40' 80'
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ANTELOPE VALLEY, CA.

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ELECTRICAL
EXP. 9/10
STATE OF CALIFORNIA

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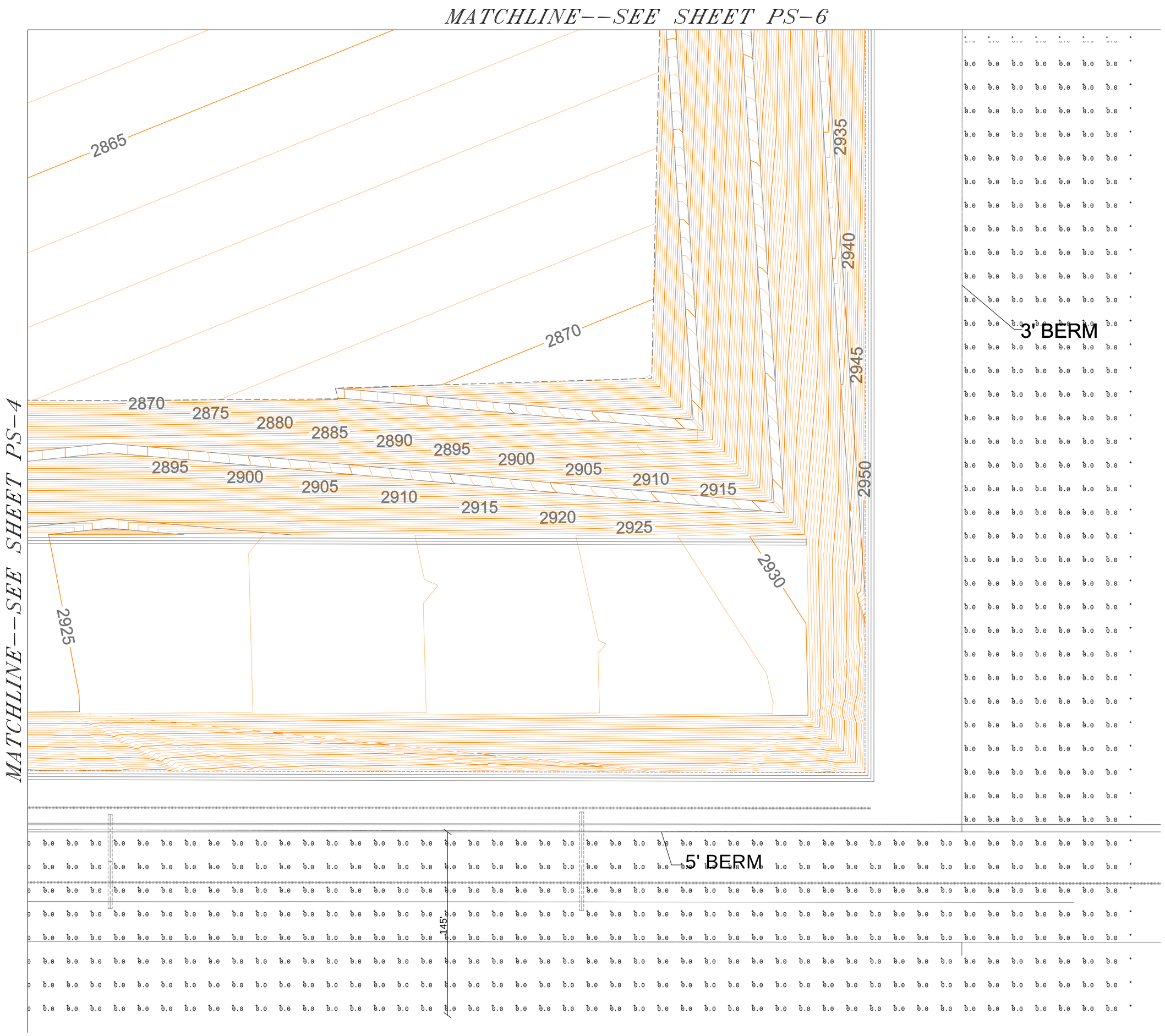

NORTH

0 20' 40' 80'

SCALE: 1"=40'-0"

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SESPE

Project:

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ANTELOPE VALLEY, CA.

REGISTERED PROFESSIONAL ENGINEER
MILTON C. NIEDERHAUS
No. E 8636
ELECTRICAL
EXP. 9/10
STATE OF CALIFORNIA

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Job No.:	SCI10/04281

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Sheet Reference:

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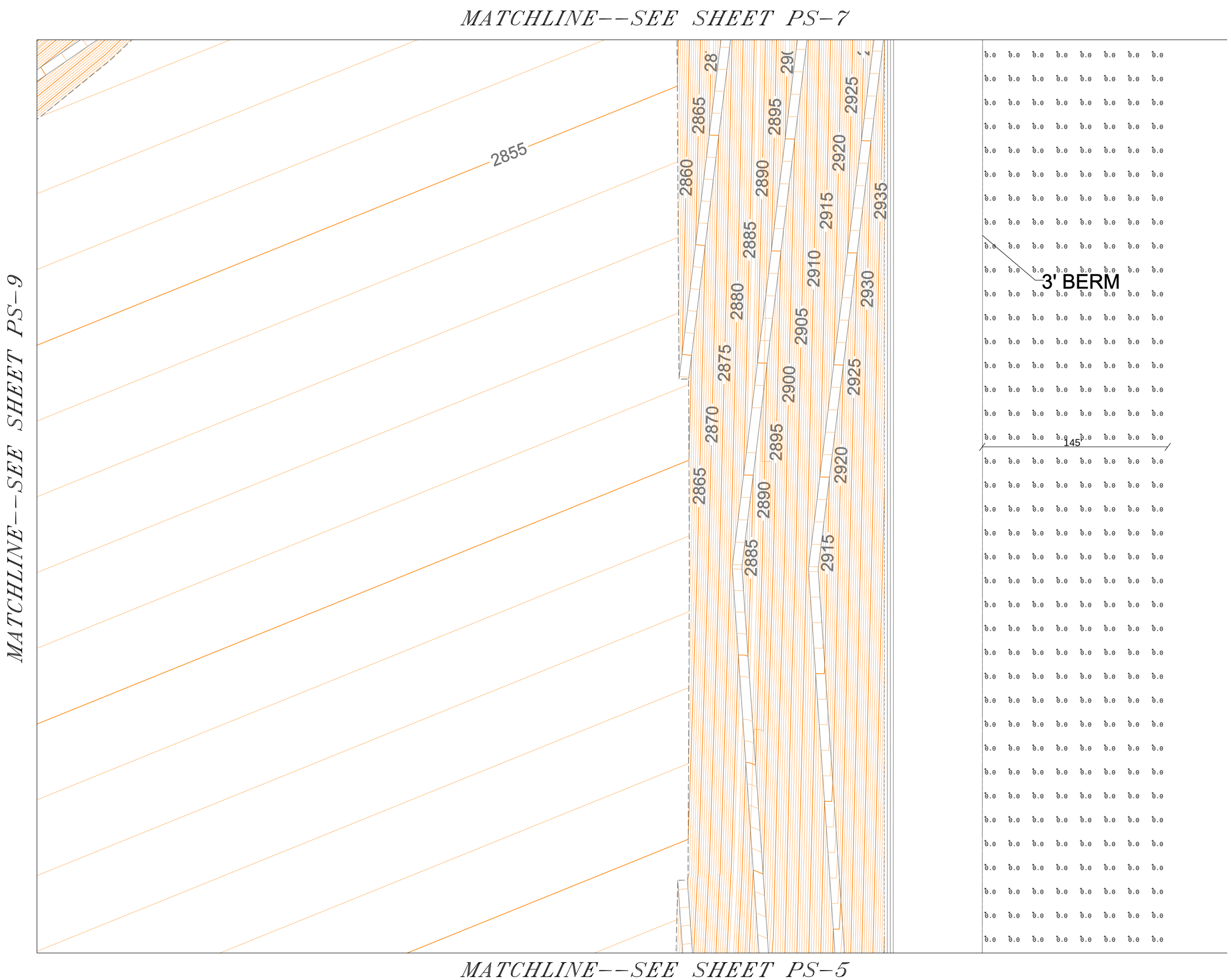

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Project:
BIG ROCK CREEK SITE

ANTELOPE VALLEY, CA.

REGISTERED PROFESSIONAL ENGINEER
MILTON C. NIEDERHAUS
No. E 8636
ELECTRICAL
EXP. 9/10
STATE OF CALIFORNIA

Revisions:

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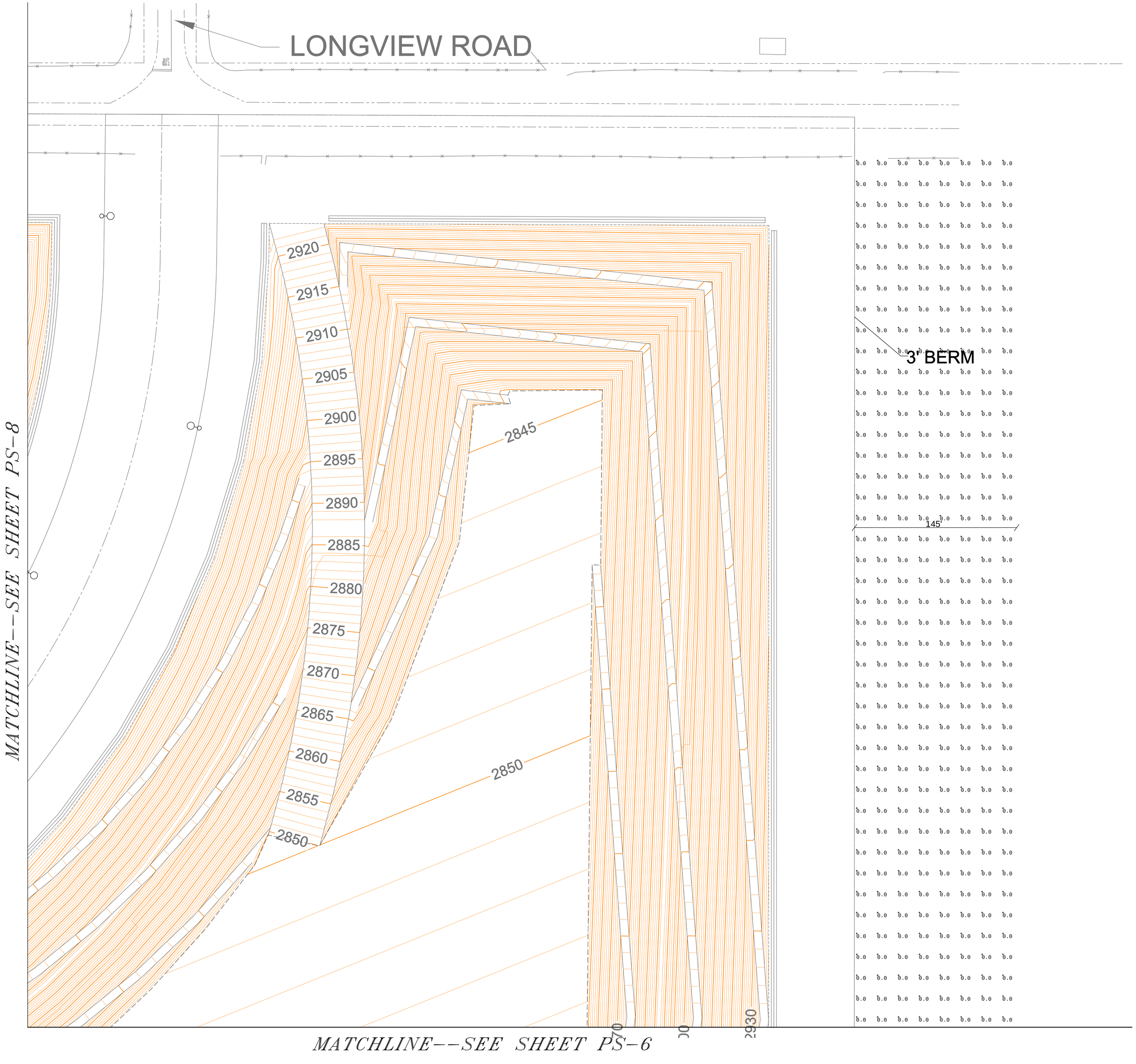

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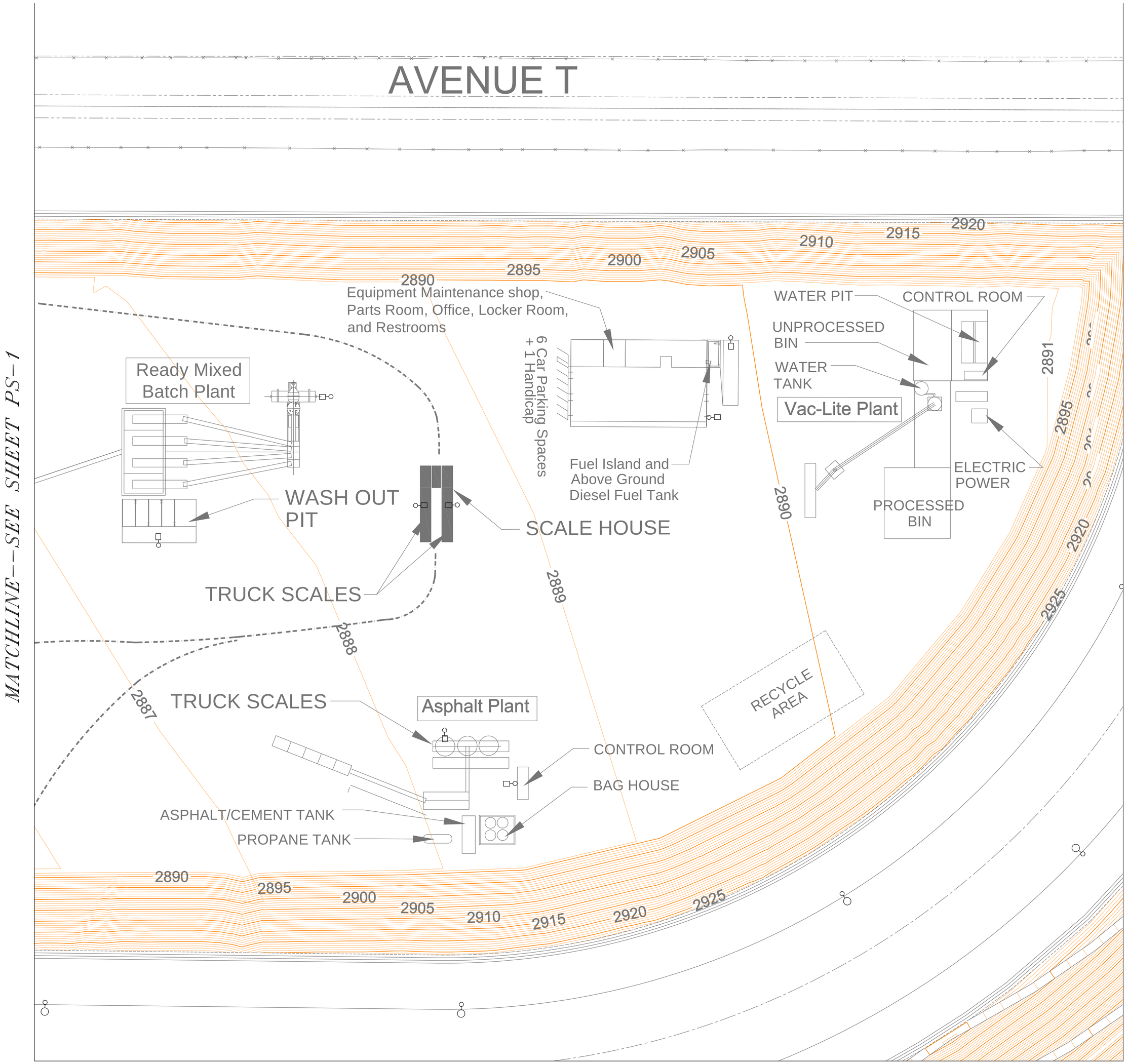

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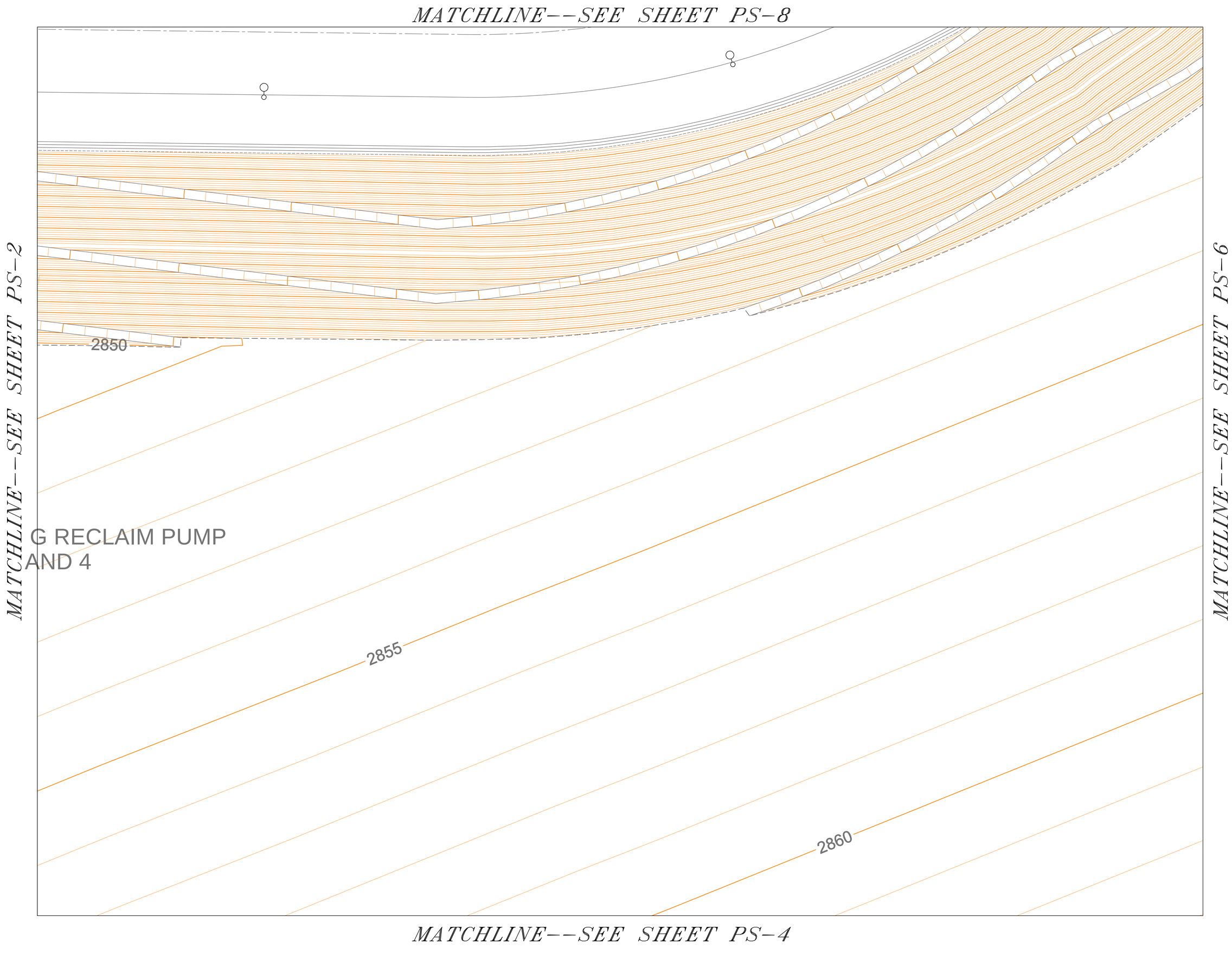

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PROPOSED LIGHT FIXTURES

Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Lumens	Description
	8	25' TALL SITE LIGHT	SINGLE	44000	VISIONAIRE LIGHTING, AME-2 TYPE 3 LIGHT DISTRIBUTION, 400 WATT PULSE START METAL HALIDE WITH FLAT LENS TO PREVENT UP-LIGHT.
	22	20' TALL ACCESS ROAD LIGHT	SINGLE	14000	VISIONAIRE LIGHTING, AME-1 TYPE 3 LIGHT DISTRIBUTION, 150 WATT PULSE START METAL HALIDE WITH FLAT LENS TO PREVENT UP-LIGHT AND BACK SIDE SHIELDS TO PREVENT BACKWARD SPILL LIGHT.

LIGHT LEVEL STUDY FINDING:

THIS PHOTOMETRIC STUDY PROVIDES THE BASIS FOR DEMONSTRATING LIGHT TRESPASS LEVELS BEYOND PROPERTY LINE SETBACKS AND THE IMPACTS TO SURROUNDING PROPERTY OWNERS. THE PROJECT BOUNDARIES ARE ALL FLANKED BY EARTHEN BERMS OF VARYING HEIGHTS, AS INDICATED: WESTERLY BOUNDARY-8'. SOUTHERLY BOUNDARY-5'. EASTERLY BOUNDARY-3'. NORTHERLY BOUNDARY-5'. AS WELL, THE MAJORITY OF THE SITE IS WELL BELOW THE HEIGHT OF THE PUBLIC ROAD.

THESE BERMS PROVIDE A NATURAL BARRIER TO OFF-SITE LIGHT TRESPASS. THE NUMBERS SURROUNDING THE PROJECT INDICATE THE INTENSITY OF PROJECT LIGHT ESTIMATED TO BE EXPERIENCED OFFSITE, AND IS REPRESENTED IN FOOT-CANDLES. AS CAN BE SEEN, THE LEVELS ARE ALL 0.00fc, INDICATING NO LIGHT TRESPASS OFF-SITE. THE PHOTOMETRIC CALCULATION POINTS ARE SPACED ON A 20'x20' GRID. THE LIGHT LEVELS HAVE BEEN ESTIMATED TO A DISTANCE OF 145' BEYOND THE BERMS.

THE LIGHT POLES AND FIXTURES USED TO PERFORM THIS STUDY ARE IDENTIFIED INTERMS OF HEIGHT AND LIGHT INTENSITY. SEE THE LUMENAIRE SCHEDULE ON EACH SHEET. THE RECOMMENDED FIXTURES SHALL EMPLOY FULL CUT-OFF OPTICS (I.E. THOSE HAVING A FLAT LENS), WHICH DO NOT ALLOW LIGHT LEVELS TO BE EMITTED ABOVE THE HORIZONTAL PLANE. ALL LIGHT OUTPUT IS TO BE BE EMITTED IN THE DOWNWARD DIRECTION, WITH 0% UP-LIGHT.

THIS STUDY CLEARLY ILLUSTRATES THAT THE BIG ROCK CREEK SITE DOES NOT HAVE A NEGATIVE IMPACT ON THE SURROUNDING LAND PARCELS AND WILL BE ACCEPTABLE TO THE COUNTY AS DEMONSTRATED AND DESCRIBED.

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Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 17

Phase I Environmental Site Assessment Report

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PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

SUBJECT PROPERTY: 310 ACRES OF VACANT LAND
AVENUE T AT LONGVIEW ROAD
BIG ROCK CREEK, CALIFORNIA 93553

REPORT DATE: MAY 11, 2006

CLIENT: MR. JIM McGEE
McGEE & ASSOCIATES
23 CORPORATE PLAZA, SUITE 330
NEWPORT BEACH, CALIFORNIA 92660

PREPARED FOR: MR. JIM McGEE
McGEE & ASSOCIATES

WRITTEN AND REVIEWED BY:

MARTIN A. KASMAN
REGISTERED ENVIRONMENTAL ASSESSOR

P06136

This report was prepared in conformance to meet or exceed the scope and limitations as set forth by the American Society for Testing & Materials (ASTM) Standard Practice E 1527-00. It is for the express use of the client, and its contents are considered to be privileged and confidential. Acceptance of this report constitutes an agreement by the client to assume full liability for information contained herein. This report is for the sole use and interpretation of the client, and it is not to be reproduced or distributed to outside parties. The information in this report is furnished in good faith and was obtained from sources and databases considered to be reliable; however, the accuracy of the information cannot be guaranteed. Our liability is limited to the fee charged.

Prepared by
ORSWELL & KASMAN, INC.
316 West Foothill Boulevard ■ Monrovia, CA 91016
(626) 932-1800 ■ FAX (626) 932-1807
www.orswell-kasman.com

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ORSWELL & KASMAN, INC.
PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

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310 ACRES OF VACANT LAND
AVENUE T AT LONGVIEW ROAD
BIG ROCK CREEK, CALIFORNIA 93553

1.0 SUMMARY

Based on a review of regulatory records, historical site information, and a visual inspection of the subject property and surrounding area, this assessment has revealed no *recognized environmental conditions* or *historical recognized environmental conditions* in connection with the Property, except as follows:

1) The subject property is approximately 310 acres of vacant unimproved land. There is an unimproved dirt road along the east side of the northern parcel of land, and another unimproved dirt road bisecting the southern parcel of land. Abandoned furniture, construction debris, automotive parts and tires, paint cans, trash and other non-hazardous debris were observed alongside the dirt roads. In addition, containers of motor oil have been abandoned along the northern road. The oil spills around the containers appear to be confined to the upper few inches of soil and not a threat to the groundwater; and

2) No offsite locations have been identified as potential risks or threats to the subject property.

Based on the results of this assessment, no further environmental studies are recommended for the site. The abandoned cast-off materials and containers of waste oil should be properly removed from the site, however, since the property is located in the open desert along a main road, it is likely additional cast-off materials will be illegally abandoned on the site in the future.

2.0 INTRODUCTION

2.1 Purpose

The purpose of this Phase I Environmental Site Assessment is to determine if any *recognized environmental conditions* or *historical recognized environmental conditions* exist on or near the subject property. As defined by the ASTM Standard, a *recognized environmental condition* is the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally

would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

The ASTM Standard defines a *historical recognized environmental condition* as a condition which in the past would have been considered a *recognized environmental condition*, but which may or may not be considered a *recognized environmental condition* currently. If a past release of any hazardous substance or petroleum products has occurred in connection with the property and has been remediated, with such remediation accepted by the responsible regulatory agency, this condition shall be considered a *historical recognized environmental condition.*

2.2 Detailed Scope of Services

This report is based on a preliminary study into the past and current uses of the subject property and the surrounding area. The report includes a visual inspection of the property and adjacent sites, and a review of regulatory agency records, aerial photographs, and other historic record sources. Also included in this report are maps, diagrams, and photographs pertaining to this site.

2.3 Significant Assumptions

The information in this report is furnished in good faith and was obtained from sources and databases considered to be reliable; however, nothing in this report should be construed as a promise or guarantee that the subject property is free of environmental hazards. In many instances, this report relies on regulatory database information provided by federal, state and local governmental agencies. Although the database information used in this report consists of the most recently released records, it may not reflect the actual current status of the case.

2.4 Limitations and Exceptions

This report was prepared in conformance to meet or exceed the scope and practice as set forth by the American Society for Testing & Materials (ASTM) Standard Practice E 1527-00, "Standard Practice of Environmental Site Assessments: Phase I Environmental Site Assessment Process." No tests were conducted, and no samples of air, water, soil or building materials were taken.

2.5 Special Terms and Conditions

No special terms or conditions have been incorporated into the preparation of this report. There were also no limiting physical conditions such as rain or lack of electrical power, that had a limiting effect on the site inspection.

2.6 User Reliance

This report is prepared for the express use of the client, and its contents are considered to be privileged and confidential. Acceptance of this report constitutes an agreement by the client to assume full liability for information contained herein. This report is for the sole use and interpretation of the client, and it is not be reproduced or distributed to outside parties.

3.0 SITE DESCRIPTION

3.1 Location and Legal Description

The subject property, is vacant undeveloped land located at the Avenue T at Longview Road in Big Rock Creek (Pearblossom Area), California. The property is described as Los Angeles County Tax Assessor's Parcel Numbers (APN) 3039-021-009, 3039-036-001 and 3039-036-002.

3.2 Site and Vicinity General Characteristics

The site consists of three large parcels of vacant, undeveloped land, located in a mixed undeveloped and residential area of Pearblossom, California (see site plan). The site and surrounding area are fairly level, and the property is not connected to the municipal water and sewage systems. The electrical power in the area is supplied by overhead utility lines located along Avenue T, and no nearby transformers were observed with signs indicating the presence of polychlorinated biphenyls (PCBs).

3.3 Current Use of Property

The subject property is approximately 310 acres of vacant unimproved land.

3.4 Descriptions of Structures, Roads, Other Improvements On Site

The site is vacant, unimproved land with no structures, buildings, or improved roads. No evidence of previous buildings or structures was observed on the site. There is a railroad right-of-way bisecting the property in an east-west direction.

3.5 Current Uses of the Adjoining Properties

North of the subject property is Avenue T, and further north is vacant land. Vacant land, 136th Street East, and a residence are east of the site. South and west of the subject property is vacant land.

4.0 USER PROVIDED INFORMATION

4.1 Title Records

No recorded land title records were provided by the client for review.

4.2 Environmental Liens or Activity and Use Limitations

The client has not provided any information concerning environmental liens or activity and use limitations.

4.3 Specialized Knowledge

No specialized knowledge of *recognized environmental conditions* or *historical recognized environmental conditions* in connection with the subject property has been provided by the client.

4.4 Valuation Reduction for Environmental Issues

No information has been provided which indicates the subject property is being sold or purchased at a significantly reduced price due to outstanding environmental issues.

4.5 Owner, Property Manager, and Occupant Information

Information provided by the owner, property manager, and/or occupants of the site are included in this report under Section 7.0, Interviews.

4.6 Reasons for Performing Phase I Environmental Site Assessment

The reasons for performing this Phase I Environmental Site Assessment is to satisfy commercial real estate lending requirements, or provide due diligence information concerning the historical uses and current condition of the site.

4.7 Other User Provided Information

No other information concerning the subject property has been provided by the client.

5.0 RECORDS REVIEW

5.1 Standard Environmental Records Sources

FEDERAL AGENCY RECORDS

United States Environmental Protection Agency (USEPA)
National Priorities List

The National Priorities List (NPL) identifies abandoned or uncontrolled hazardous waste sites which have been identified as possibly representing a long-term threat to the public health or environment. These sites have been identified as being highly contaminated with hazardous substances and represent the USEPA's target enforcement and cleanup efforts. Studies of individual sites are conducted by the USEPA to determine level of contamination, and the sites are then compared and ranked to other sites on the NPL.

A review of the USEPA National Priorities List dated March 2006 indicates there are no proposed or final sites within one mile of the subject property.

United States Environmental Protection Agency (USEPA)
Federal Superfund Liens List

The USEPA maintains a list of Superfund Lien sites that have been issued on properties throughout the United States. These sites have been remediated through the expenditures of Superfund monies; the purpose of the lien is to prevent the property owner from gaining a financial benefit from the federal government's cleanup and restoration activities.

A review of the July 1993 Federal Superfund List revealed there are no Superfund Liens on or adjacent to the site.

United States Environmental Protection Agency (USEPA)
Comprehensive Environmental Response, Compensation
and Liability Information System (CERCLIS)

The USEPA has developed a database known as CERCLIS which contains information on potential hazardous waste sites located throughout the United States. There are over 33,000 sites on the CERCLIS inventory. All sites are subjected to a preliminary assessment and thereafter are either placed on the National Priority List (NPL) or are placed in a category for those sites requiring no further Federal Superfund action.

A review of the March 2006 CERCLIS report indicates there are no CERCLIS sites within a ½ mile radius of the subject property. In addition, there are no listed "No Further Remedial Action Planned" (NFRAP) sites on or adjacent to the subject property.

United States Environmental Protection Agency (USEPA)
Resource Conservation and Recovery Act (RCRA)
Treatment, Storage or Disposal Facilities (TSDF)

The USEPA maintains a list of facilities which have been authorized to receive hazardous waste. These facilities have permits to treat, store, or dispose of the waste, as determined by the RCRA regulations. In addition, the USEPA publishes a list of those facilities who are subject to a corrective action, based on the facilities waste handling and storage procedures. The facilities which are subject to a corrective action are identified as CORRACTS sites.

A review of the December 2005 RCRA TSDF list determined there are no CORRACTS facilities within a one mile radius of the subject property. In addition, there are no non-CORRACTS TSD facilities listed within a ½ mile radius.

United States Environmental Protection Agency (USEPA)
Resource Conservation and Recovery Act (RCRA)
Hazardous Waste Generators

The USEPA maintains a list of facilities which are identified as generators of large and small quantities of hazardous waste. These facilities have permits to generate, store and dispose of the waste, as determined by the RCRA regulations.

A review of the December 2005 RCRA Hazardous Waste Generators list determined the subject and adjacent properties are not identified as large or small quantity hazardous waste generators.

United States Environmental Protection Agency (USEPA)
Office of Emergency and Remedial Response
Emergency Response Notification System (ERNS)

The USEPA maintains a list of locations which have reported a release of oil or hazardous substances to the federal government. Most of the data in this system is based on information that was received during the initial notification.

A review of the ERNS list for 1999 determined there are no reported incidents on the subject property.

United States Department of Transportation
United States Coast Guard
National Response Center (NRC)

The NRC is the national point of contact for reporting all oil, chemical, radiological, biological and etiological discharges into the environment anywhere in the United States and its territories. In addition to gathering and distributing spill data for Federal On-Scene Coordinators and serving as the communications and operations center for the National Response Team, the NRC maintains agreements with a variety of federal entities to make additional notifications regarding incidents meeting established trigger criteria.

A review of the NRC list for 2005 determined there are no reported incidents on the subject property.

STATE AGENCY RECORDS

State of California
Environmental Protection Agency (CAL-EPA)
Department of Toxic Substances Control (DTSC)

CAL-EPA is responsible for the regulation and enforcement of environmental health laws within the state of California, as set forth by the California Health and Safety Code. CAL-EPA is also designated by the USEPA to assist in enforcing federal environmental laws. CAL-EPA regulates companies involved in the generation, transportation, storage and disposal of hazardous substances. CAL-EPA records include the "CalSites" database, which is a listing of 7,800 known active, inactive and abandoned hazardous waste sites. These sites have previously been reported in the Abandoned Site Program Information System (ASPIS), Bond Expenditure Plan (BEP), and Cortese databases. CAL-EPA records also include a listing of the California Integrated Waste Management Board's "Active" and "Closed and Inactive" landfills database.

A review of the June 2005 CAL-EPA records determined there are no listed "CalSite" facilities within a ½ mile of the subject property. In addition, there are no active, closed or inactive landfill sites within a ½ mile radius of the subject property.

State of California
Environmental Protection Agency (CAL-EPA)
Department of Toxic Substances Control (DTSC)
Land Use Covenants

CAL-EPA/DTSC utilizes Land Use Covenants (LUCs) to protect the public from unsafe

exposures to residual contamination that is left in place after site remediation activities have been completed. The LUC imposes limitations on land use when hazardous materials, wastes, or substances remain on the property at levels which are not suitable for unrestricted use of the land. The LUC includes easements, servitudes, covenants, and restrictions which run with the land and continue into perpetuity unless modified or terminated in accordance with applicable law. All LUCs are signed by the DTSC and the landowner, and recorded in the county where the land is located.

A review of the June 2006 DTSC database records did not identify any deed restrictions on the subject property or the adjacent sites.

State of California
Water Resources Control Board
Regional Water Quality Control Board (RWQCB)

The RWQCB is responsible for monitoring the quality and flow of the groundwater, and compiles lists of known registered underground storage tanks and leaking underground storage tanks. In addition, the RWQCB addresses other potential threats to the groundwater from surface spills and leaks. The RWQCB monitors the contamination problem, the investigation and any remedial action.

A review of the March 2006 leaking underground storage tank records of the RWQCB determined the subject property is not listed as the source of a known leaking underground storage tank. According to the records, there are no known leaking underground storage tank sites within a ½ mile radius of the subject property. In addition, there are no records of registered underground storage tanks on or adjacent to the subject property. The subject property and adjacent sites are not identified on the RWQCB Spills, Leaks, Investigations and Cleanups (SLIC) list.

5.2 Additional Environmental Sources

Antelope Valley
Air Pollution Control District (APCD)

The APCD is responsible for the development and enforcement of regulations concerning air emissions and airborne hazards from stationary sources in the Mojave Desert Air Basin. APCD maintains a "Hot Spot" list of facilities whose air emissions pose as a risk to the surrounding community.

A review of the APCD records determined there are no "Hot Spot" facilities on or adjacent to the subject property.

Los Angeles County
Fire Department (LACOFD)
Health Hazardous Materials Division

LACOFD maintains inspection and inventory records of companies involved in the storage and use of hazardous materials, petrochemicals, or hazardous waste. LACOFD attempts to maintain a current record of the types of hazardous substances that are utilized or stored at a particular site, and conducts periodic inspections for safety and compliance. In addition, LACOFD maintains records concerning hazardous material sites in Los Angeles County, which are reported to LACOFD by various regulatory agencies. Upon receiving the report, LACOFD monitors the cleanup process on the contaminated site.

According to the LACOFD files, there are no records of hazardous waste generators or hazardous material handlers identified on or adjacent to the subject property. A review of the Active Mitigation Complaint Control Logs determined there are no listed sites on or adjacent to the subject property.

Los Angeles County
Department of Public Works
Waste Management Division (DPW/WMD)

DPW/WMD maintains maps showing the locations of active, inactive or future solid waste landfill sites in Los Angeles County.

A review of DPW's major waste systems map determined there are no active, inactive or future landfill sites within a ½ mile radius of the subject property.

United States Department of Interior
Geological Survey (USGS)
Water Resources Data Report

The USGS publishes data concerning the groundwater levels throughout the United States, based on selected water well measurements.

A review of the water resources data for the Palmdale, California area indicates the nearest water well is located about 4½ miles west of the subject property. The elevation at the well is 2,870 feet above sea level, and the groundwater levels are about 300 feet below the surface.

Based on the topography of the area, the groundwater flow is expected to be to the northwest, although this cannot be confirmed due to the lack of nearby wells.

State of California
Department of Conservation
Division of Mines and Geology (CDMG)

The CDMG conducts studies, publishes maps, and provides information concerning the geological formations throughout the state of California. CDMG research information is combined with information from the United States Geological Survey and the ensuing geologic maps of the state are prepared. These geologic maps also illustrate the approximate locations of known earthquake faults.

A review of the area map published by CDMG indicates the geologic area surrounding the subject property consists of Pre-Cretaceous metamorphic rocks. The client may wish to refer to the enclosed geologic map.

State of California
Department of Conservation
Division of Oil and Gas (CDOG)

The CDOG regulates the drilling, operation and abandonment of gas and oil wells throughout the state of California. If an active, idle or abandoned well is located on or adjacent to a proposed construction site, CDOG requires a site plan review prior to issuing a building permit. Abandoned oil wells must meet standards established in 1984.

A review of the area map published by CDOG indicates there are no producing, idle or abandoned oil wells on or adjacent to the subject property. The client may wish to review the enclosed map.

Los Angeles County
Department of Public Works
Underground Tank Division (DPW/UGT)

DPW/UGT maintains records and permits on businesses which store hazardous materials in underground tanks, and issues permits to remove abandoned underground tanks.

A review of the DPW/UGT records determined there are no records of underground storage tanks on or adjacent to the subject property.

5.3 Physical Setting Sources

A United States Geological Survey (USGS) 7.5 Minute Topographical map of the subject property and surrounding area is included in the appendices of the report. The map shows the locations of the identified offsite environmental risks or threats described in the report.

5.4 Historical Use Information on the Property

County of Los Angeles
Building and Safety Department

No building or demolition permits were on file for the subject property.

Historical Aerial Photographs

A review of the 1954, 1968, 1989, 1995, and 2002 historical aerial photographs of the subject property determined the subject property has been vacant land for the past 52 years.

Historic Sanborn Fire Insurance Maps

Sanborn Fire Insurance Maps provide information on commercial and industrial properties, based on risk data gathered for the fire insurance companies. The maps show the number of buildings located on the property, and the type of construction. The maps also describe the various businesses located nearby, and show the locations of tanks, boilers, and other potential hazards.

A review of the Sanborn Fire Insurance Map collections from 1867-1970, did not locate any maps for the subject property.

A review of the historical aerial photographs determined the subject property has been vacant undeveloped land for the past 52 years.

5.5 Historical Use Information on the Adjoining Properties

Historical Aerial Photographs

A review of historical aerial photographs of the adjoining properties determined the following information:

Date of Photo	Description
1954	The surrounding properties are vacant and undeveloped land.

Date of Photo	Description
1968	North of the subject property is Avenue T, and further north is vacant land. Vacant land, 136th Street East, and a residence are east of the site. South and west of the subject property is vacant land.
1989	The surrounding properties appear to be about the same as the 1968 photograph.
1995	North of the Avenue T is vacant land, and east of the subject property is vacant land, 136th Street East, and a residence. South and west of the subject property is vacant land.
2002	The surrounding properties appear to be about the same as the 1995 photograph.

Historic Sanborn Fire Insurance Maps

Sanborn Fire Insurance Maps provide information on commercial and industrial properties, based on risk data gathered for the fire insurance companies. The maps show the number of buildings located on the property, and the type of construction. The maps also describe the various businesses located nearby, and show the locations of tanks, boilers, and other potential hazards.

A review of the Sanborn Fire Insurance Map collections from 1867-1970, did not locate any maps for the area surrounding the subject property.

A review of historical aerial photographs indicates the surrounding properties have been vacant land for the past 52 years. The residence to the east of 136th Street East was constructed sometime between 1954 and 1968, and the property was previously vacant land.

6.0 SITE RECONNAISSANCE

6.1 Methodology and Limiting Conditions

The site reconnaissance consisted of a walk through the entire property, and visually observing the structures and storage areas. No inspection was conducted under floors, above ceilings, or behind walls.

6.2 General Site Setting

The site consists of three large parcels of vacant, undeveloped land, located in a mixed

undeveloped and residential area of Pearblossom, California (see site plan). The site and surrounding area are fairly level, and the property is not connected to the municipal water and sewage systems. The electrical power in the area is supplied by overhead utility lines located along Avenue T, and no nearby transformers were observed with signs indicating the presence of polychlorinated biphenyls (PCBs).

6.3 Subject Property Observations

On May 1, 2006, an inspection of the site and surrounding area was conducted by Registered Environmental Assessor Marty Kasman. The subject property is approximately 310 acres of vacant unimproved land. The property is covered with low grasses and weeds, with a few small bushes and trees on the site (see photos #1, #2, and #3). There is an unimproved dirt road along the east side of the northern parcel of land, and another unimproved dirt road bisecting the southern parcel of land. Abandoned furniture (see photo #4), construction debris (see photos #5 and #6), automotive parts and tires, paint cans (see photo #7), trash and other non-hazardous debris were observed along side the dirt roads. In addition, containers of motor oil have been abandoned along the northern road (see photo #8). The oil spills around the containers appear to be confined to the upper few inches of soil and not a threat to the groundwater. There is a railroad right-of-way bisecting the center of the property (see photos #9 and #10). No evidence of previous buildings or structures was observed on the site. No large quantities of hazardous materials were observed being stored or used on the property, and there was no evidence of wastewater clarifiers, sumps, pits or underground storage tanks. In addition, no evidence of wells or septic tanks was observed. No other visible signs of illegal dumping or distressed vegetation were found on the property, and there was no indication of obvious contamination on the site.

6.4 Adjoining Property Observations

Northern Border

North of the subject property is Avenue T, and further north is vacant land (see photo #11). There were no visible signs of spills or contamination on the adjacent property.

Eastern Border

East of the subject property is vacant land (see photo #12), 136th Street East, and a residence (see photo #13). There were no visible signs of spills or contamination on the adjacent properties.

Southern Border

South of the subject property is vacant land (see photo #14). There were no visible signs of spills

or contamination on the adjacent property.

Western Border

West of the subject property is vacant land (see photos #15 and #16). There were no visible signs of spills or contamination on the adjacent properties.

7.0 INTERVIEWS

7.1 Interview with Owner

The property is currently vacant land, and the owner was not present during the inspection.

7.2 Interview with Site Manager

The property is currently vacant land, and no property manager was present during the inspection.

7.3 Interviews with Occupants

The property is currently vacant land. There are no occupants.

7.4 Interviews with Local Government Officials

No interviews with local government officials were conducted.

7.5 Interview with Others

No interviews with other people were conducted concerning the subject property.

8.0 FINDINGS

8.1 Recognized Environmental Conditions

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Standard Practice E 1527-00 on the 310 acres of vacant land located at Avenue T and Longview Road, Big Rock Creek, California, the Property. Any exceptions to, or deletions from the Standard Practice are described in Section 2.4 of this report. This assessment has revealed no evidence of *recognized environmental conditions* in connection with the Property, except as follows:

1) The subject property is approximately 310 acres of vacant unimproved land. There is an unimproved dirt road along the east side of the northern parcel of land, and another unimproved dirt road bisecting the southern parcel of land. Abandoned furniture, construction debris, automotive parts and tires, paint cans, trash and other non-hazardous debris were observed alongside the dirt roads. In addition, containers of motor oil have been abandoned along the northern road. The oil spills around the containers appear to be confined to the upper few inches of soil and not a threat to the groundwater; and

2) No offsite locations have been identified as potential risks or threats to the subject property.

8.2 Historical Recognized Environmental Conditions

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Standard Practice E 1527-00 on the 310 acres of vacant land located at Avenue T and Longview Road, Big Rock Creek, California, the Property. Any exceptions to, or deletions from the Standard Practice are described in Section 2.4 of this report. This assessment has revealed no evidence of *historical recognized environmental conditions* in connection with the Property.

9.0 OPINION

Based on a review of regulatory and historical records and a visual inspection of the site and surrounding area, this assessment has found no evidence of *recognized environmental conditions or historical recognized environmental conditions* which are likely to impact the subject property.

10.0 CONCLUSIONS

Based on the results of this assessment, no further environmental studies are recommended for the site. The abandoned cast-off materials and containers of waste oil should be properly removed from the site, however, since the property is located in the open desert along a main road, it is likely additional cast-off materials will be illegally abandoned on the site in the future.

11.0 DEVIATIONS

This report was prepared in conformance to meet or exceed the scope and practice as set forth by the American Society for Testing & Materials (ASTM) Standard Practice E 1527-00, "Standard Practice of Environmental Site Assessments: Phase I Environmental Site Assessment Process." No significant deviations or deletions were made from this practice.

12.0 ADDITIONAL SERVICES

No additional services including a broader scope of services, liability/risk evaluations, or remedial activities are included in this report.

13.0 REFERENCES

All government records and maps were obtained directly from the regulatory agencies identified in this report. The fire insurance map information was obtained from Digital Sanborn Maps, 1867-1970, Ann Arbor, Michigan. The aerial photographs were obtained from Environmental Data Resources, Inc. (EDR) Aerial Photography Print Service, Milford, Connecticut.

14.0 APPENDICES

14.1 Qualifications of the Environmental Professionals

Attached to this report are the résumés of Richard Clark, who conducted the site inspection, and Jack Orswell and Marty Kasman, who conducted the records review and prepared the report.

14.2 Site and Vicinity Map

A United States Geological Survey (USGS) 7.5 Minute Topographical map of the subject property and surrounding area is included in the appendices of the report. The map shows the locations of the identified offsite environmental risks or threats described in the report.

14.3 Site Plan

A site plan of the subject property is included in the appendices of the report. The site plan shows the general location of the structures on the property, and other items of interest which were identified in the description of the site.

14.4 Site and Vicinity Photographs

Photographs of the subject property and surrounding neighborhood are attached to this report. These photographs were taken at the time of the site inspection.

14.5 Historical Research Documentation

Building permit records were obtained directly from the regulatory agency identified in this report. The aerial photographs summarized in this report were obtained from Environmental

Data Resources, Inc. (EDR) Aerial Photography Print Service, Milford, Connecticut. The Sanborn Fire Insurance Map information was obtained from Digital Sanborn Maps, 1867-1970, Ann Arbor, Michigan.

14.6 Regulatory Records Documentation

All government records were obtained directly from the regulatory agencies identified in this report.

14.7 Interview and Research Documentation

All of the field notes and supporting information obtained from interviews and research concerning the subject property are maintained in the report file at the offices of Orswell & Kasman, Inc.

14.8 Special Contractual Conditions between User and Environmental Professional

No special contractual conditions or agreements exist between the client and any of the employees of Orswell & Kasman, Inc., and Orswell & Kasman, Inc. does not have any financial interest in the subject property.

APPENDIX

JACK ORSWELL

Jack Orswell, a principal of the company, is a Registered Environmental Assessor (#1263) and a licensed Private Investigator (#PI 14366) with the State of California. He is also a USEPA/AHERA accredited Asbestos Management Planner and California Certified Asbestos Consultant (#92-0869). He received his Bachelor of Science degree in Business Administration from the University of Southern California, and spent 15 years as a Special Agent with the Federal Bureau of Investigation in the Denver, San Francisco and Los Angeles offices. Mr. Orswell received specialized training from the United States Environmental Protection Agency (EPA), and he was one of the first FBI Agents to work with the EPA in investigating federal environmental crimes.

While with the FBI, Mr. Orswell worked with the EPA's National Enforcement Investigations Center (NEIC) in Denver, Colorado, and helped establish evidence control procedures for their laboratory personnel. As coordinator of environmental investigations for the FBI's Los Angeles office, Mr. Orswell gained extensive training and experience working with the California Department of Health Services and the Los Angeles County Sheriff's Department.

For the past 15 years, Mr. Orswell has been in private industry, conducting environmental assessments for several financial institutions, real estate companies and law firms. Mr. Orswell has conducted environmental investigations throughout the United States, locating and interviewing witnesses to determine how hazardous materials were handled in various manufacturing operations, and documenting the long term effects of improper disposal.

Mr. Orswell's extensive background in criminal environmental enforcement and civil litigation support make him uniquely qualified as an environmental assessor and investigator. He is a member of the California Hazardous Materials Investigators Association, the Society of Former Special Agents of the Federal Bureau of Investigation, the National Association of Environmental Professionals, the National Association of Government Guarantee Lenders, and the American Society for Testing of Materials (ASTM).

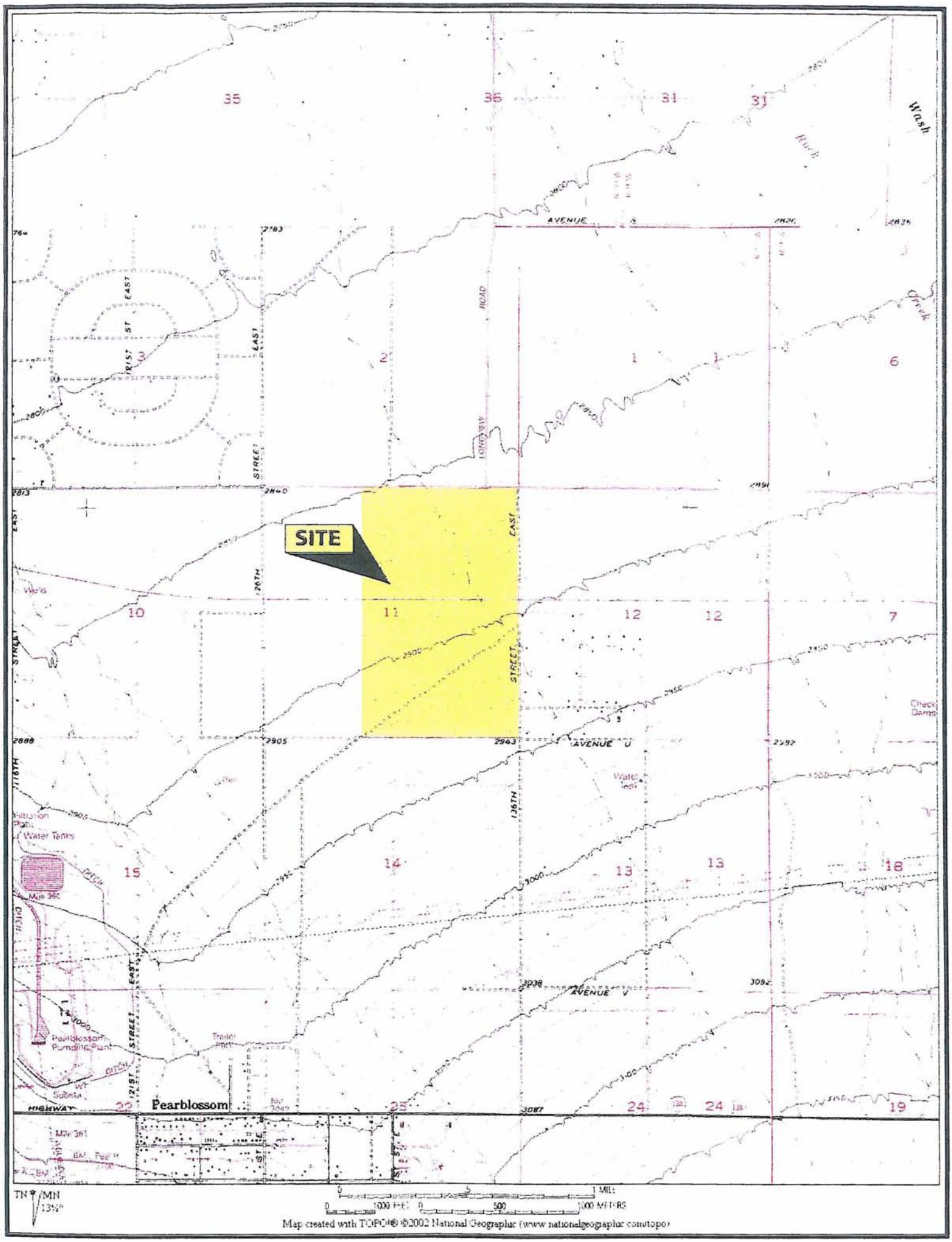
MARTY KASMAN

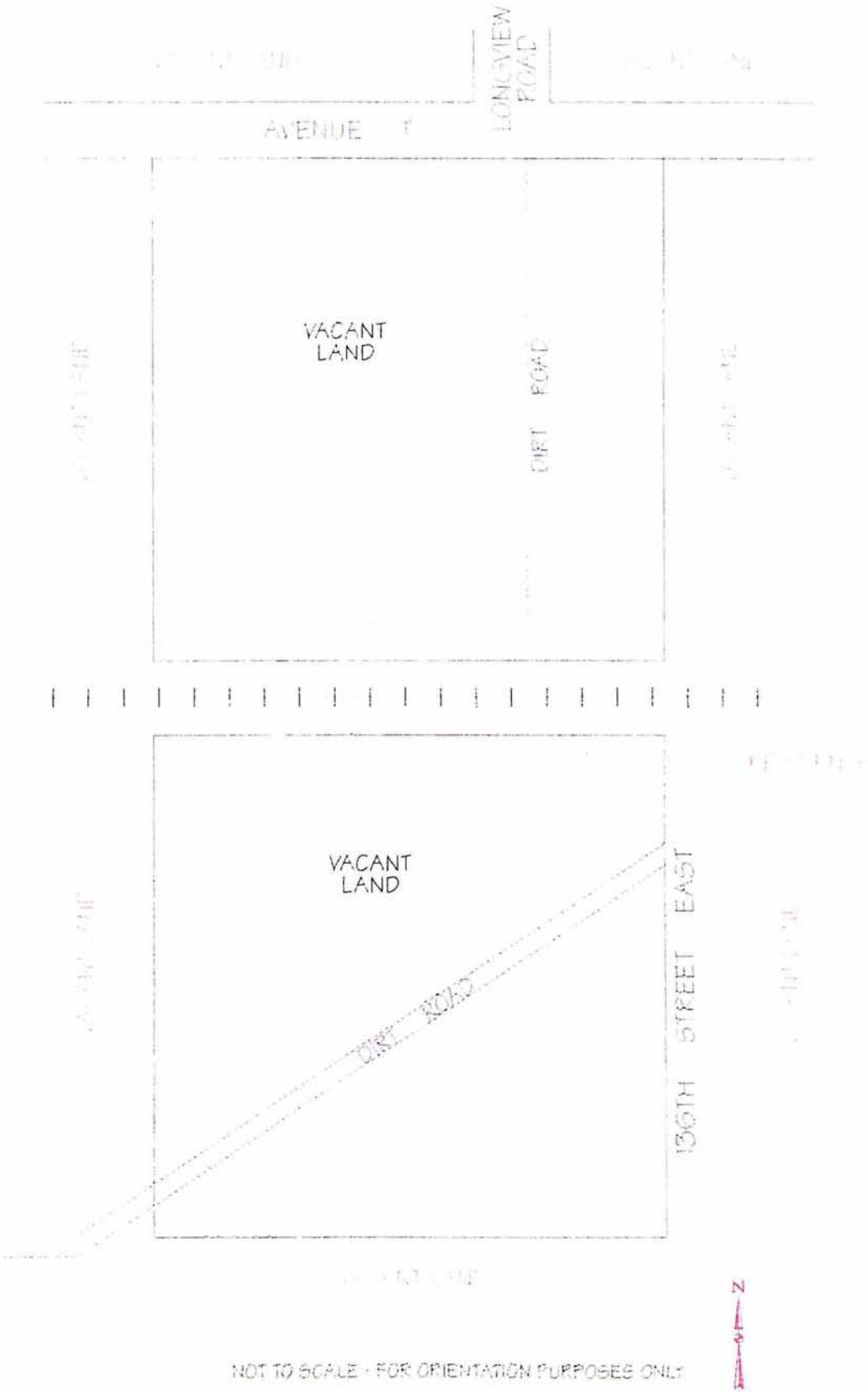
Marty Kasman, a principal of the company, is a Registered Environmental Health Specialist (#4927) and a Registered Environmental Assessor (#4022) with the State of California. He is also a USEPA/AHERA accredited Asbestos Management Planner and California Certified Asbestos Consultant (#99-2553). He received his Bachelor of Science and Master of Science degrees in Environmental and Occupational Health Science from California State University at Northridge. He also has a Certificate in Hazardous Materials Management from the University of California at Los Angeles (UCLA). In addition, Mr. Kasman also received specialized hazardous materials training at the Federal Law Enforcement Training Center in Georgia.

Mr. Kasman served 14 years with the Los Angeles County Fire Department, as a Supervising Hazardous Material Specialist and Deputy Health Officer. His responsibilities included field and laboratory work in hazardous materials management, conducting inspections of industrial plant operations, and monitoring cleanup activities. In addition, Mr. Kasman has investigated hundreds of abandoned waste sites and other cases involving the illegal dumping of hazardous materials throughout Los Angeles County.

Mr. Kasman currently serves as an environmental consultant to industry management in the proper handling of hazardous materials and waste. He has taught courses in hazardous materials regulatory compliance and waste management at UCLA, California State University at Northridge, and the California Specialized Training Institute at San Luis Obispo. Mr. Kasman is also serving on the State of California Local Unified Program Implementation Committee (LUPIC) to develop a standardized hazardous materials contingency plan.

Mr. Kasman's extensive education, training, and experience in hazardous materials management make him fully qualified to conduct environmental assessments and investigations. He is the former president and director of the California Hazardous Materials Investigators Association. He is also a former director of the Local Environmental Enforcement Officers Association, and the Los Angeles County Association of Environmental Health Specialists. He is a member of California and National Environmental Health Associations, and the National Association of Government Guarantee Lenders.


SITE
AVENUE S
AVENUE U
AVENUE V
Pearblossom
Water Tanks
Pearblossom Pumping Plant
Check Dams
TN
MN
1 MILE
1000 FEET
500
1000 METERS
Map created with TOPO! ©2002 National Geographic (www.nationalgeographic.com/topo)



NOT TO SCALE - FOR ORIENTATION PURPOSES ONLY

Phase I Environmental Site Assessment
Avenue T and Longview Road
May 11, 2006

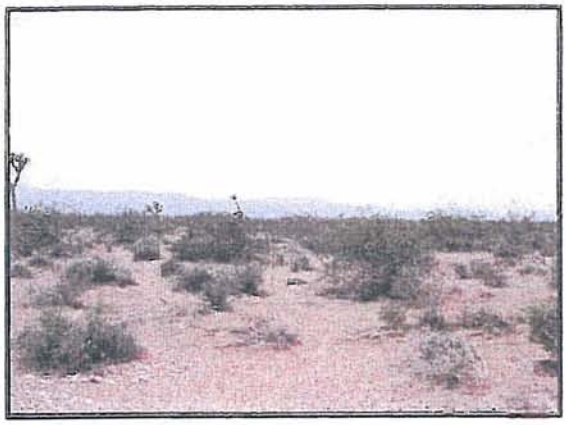
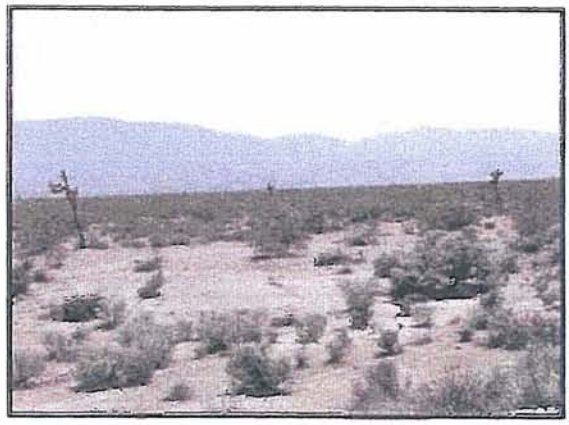


Photo 1



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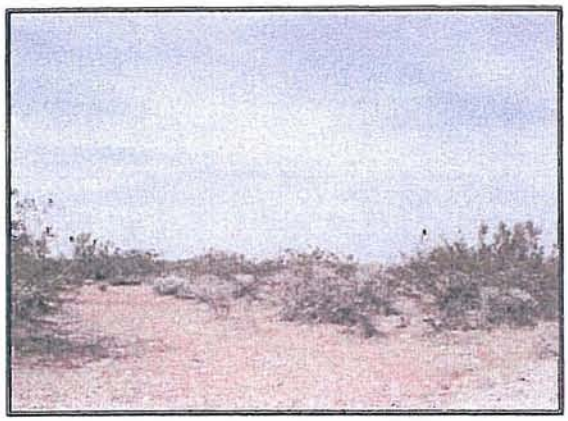


Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

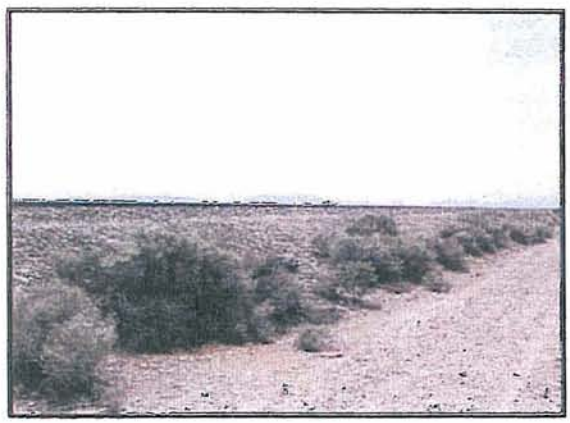


Photo 10

Photo 11

Photo 12

Phase I Environmental Site Assessment
Avenue T and Longview Road
May 11, 2006

Photo 13

Photo 14

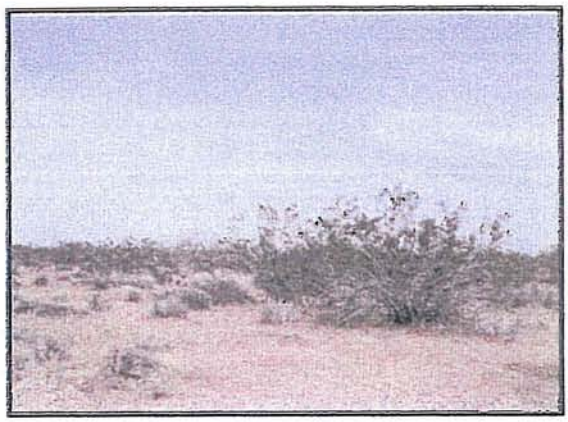
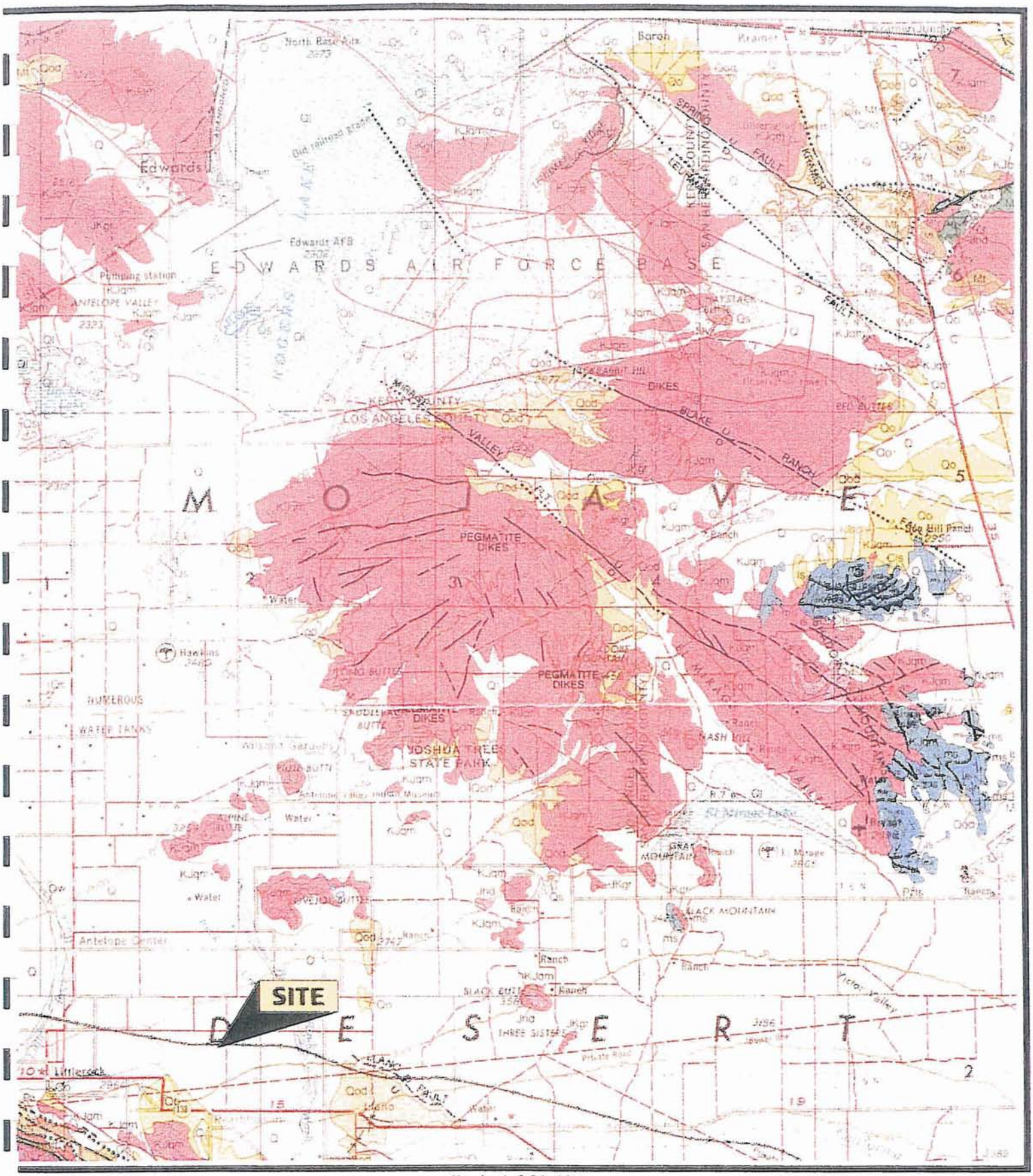


Photo 15

Photo 16



CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS

GEOLOGIC MAP OF CALIFORNIA

ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only, see Geologic Map Explanation for more accurate age determinations and unit descriptions

CENOZOIC

QUATERNARY

Holocene

- Alluvium (*Undifferentiated*)
- Wash deposits (*Alluvial deposits of active washes*)
- Older wash deposits (*Alluvial deposits of abandoned washes*)
- Landslide deposits
- Wind blown sand
- Younger fan deposits
- Fan deposits
- Younger alluvium
- Lake deposits

Pleistocene

- Older fan deposits
- Older alluvium (*Undifferentiated*)
- Glacial till and outwash
- Well dissected alluvial fans
- Harold Formation and Shoemaker Gravel (*Fine to coarse grained sediments, nonmarine*)
- Older lake deposits
- Continental deposits (*Undifferentiated, fluvial gravel, sand, silt, and clay*)

TERTIARY

Miocene

- San Timoteo Formation (*Nonmarine sandstone, siltstone, conglomerate and shales*)
- Juniper Hills Formation (*Nonmarine sandstone, conglomerate, siltstone, and shale*)
- Old Woman Sandstone (*Arkosic sandstone and conglomerate, nonmarine*)

Pliocene

- Crowder Formation (*Nonmarine arkosic sandstone and conglomerate*)
- Anaverde Formation (*Nonmarine sandstone and shale*)
- Fernando Formation (*Siltstone, sandstone, conglomerate, marine*)
- Punchbowl Formation (*Nonmarine cobble to pebble sandstone*)
- Potato Sandstone
- Santa Ana Sandstone (*Nonmarine*)
- Coachella Fanglomerate (*Boulder, cobble, and pebble conglomerate*)
- Puente Formation (*Marine siltstone, sandstone, and shale*)
- Barstow Formation (*Nonmarine sandstone, siltstone, conglomerate, and tuff*)
  Miocene rocks
- Punchbowl (?) Formation of Cajon Valley
  (*Nonmarine arkosic conglomerate and sandstone*)
- Topanga Formation
  (*Marine sandstone and conglomerate*)
- Tropico Group (*Conglomerate, arkosic sandstone, siltstone, tuff, shale and limestone*)
- Unnamed Miocene continental deposits (*Beds of red sandstone and conglomerate*)
  Mels limestone and claystone
- Pickhandle and Jackhammer Formations
  (*Nonmarine tuff, sedimentary sandstone, and mudflows*)
- Hector Formation
  (*Nonmarine volcaniclastic sediments*)
- Vaqueros (?) Formation
  (*Marine arkosic sandstone, siltstone, and conglomerate*)

- Basalt
  (*Under 10m*)

REGIONAL WILDCAT MAP

SHOWING WELLS NOT ON DIVISION OF OIL & GAS FIELD MAPS

STATE OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL & GAS

SCALE IN MILES

0 1 2 3 4 5

AUGUST 5, 1980

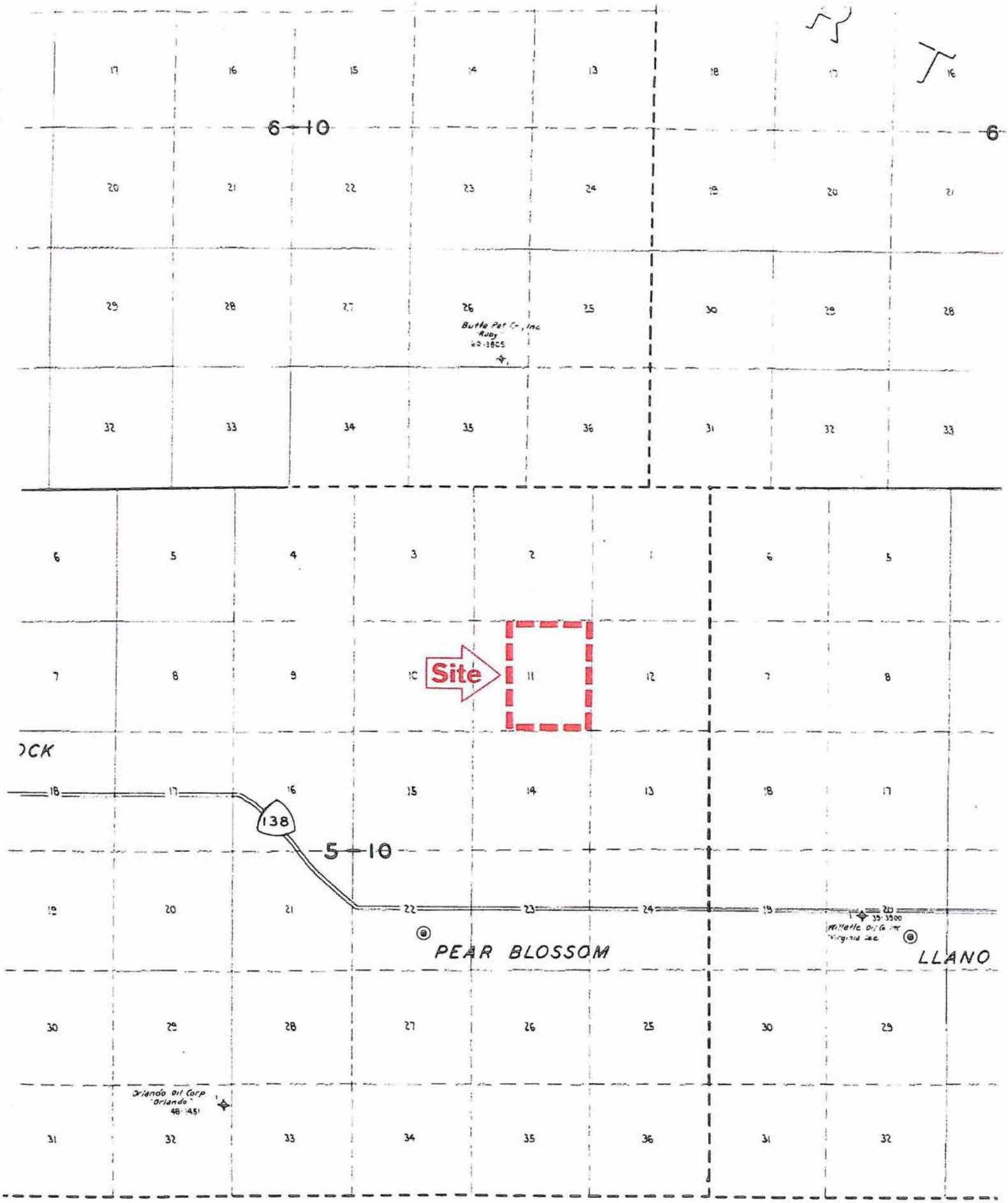
LEGEND

- DRILLING
- DRILLING - IDLE
- 79-6789 PLUGGED AND ABANDONED - DRY HOLE (Showing year drilled and total depth)
- COMPLETED - OIL
- IDLE - OIL
- PLUGGED AND ABANDONED - OIL
- COMPLETED - GAS
- IDLE - GAS
- PLUGGED AND ABANDONED - GAS
- 23 GAS - OPEN TO OIL ZONE
- WATER SOURCE
- WATER DISPOSAL
- WATERFLOOD
- STEAM FLOOD
- BOUNDARY OF FIELD MAP
- 4 / 1 DISTRICT ADMINISTRATIVE BOUNDARY (Numbers indicate districts)
- BURIED IDLE
- OBSERVATION

DIVISION OF OIL & GAS
1416 - 9th STREET
SACRAMENTO, CALIF.
95814

NOTE WELLS WITH DIRECTIONAL SURVEYS ON FILE WITH THE DIVISION OF OIL AND GAS ARE INDICATED WITH A SHORT LINE UNDER THE WELL SYMBOL

CURRENT WELL STATUS SHOULD BE CONFIRMED AT THE APPROPRIATE DIVISION OF OIL AND GAS DISTRICT OFFICE


6-10
6
Butte Pet Co., Inc
"Ruby"
20-3805
Site
138
5-10
PEAR BLOSSOM
LLANO
Orlando Oil Corp
"Orlando"
48-1451

ORSWELL & KASMAN, INC.

ENVIRONMENTAL RECORDS RESEARCH REPORT

Property Information:

310 Acres of Vacant Land
Avenue T & Longview Road
Big Rock Creek, CA 93553

OKI Report #:

P06136

Report Date:

May 11, 2006

Prepared For:

Jim McGee
McGee & Associates

Prepared by:

Orswell & Kasman, Inc.
316 West Foothill Boulevard
Monrovia, CA 91016
(626) 932 - 1800 * FAX (626) 932 - 1807
www.orswell-kasman.com

The information provided herein is based upon research of public records listed on the "Reference to the Regulatory Agency Database" page of this report and not on a physical inspection of the property. By requesting this report, the client accepts the terms and conditions described on the "Response Notification Sheet" of this report. The client may want to obtain detailed subject property information from a qualified consultant or specialist to determine if any potential hazards exist on the property.

RESPONSE NOTIFICATION SHEET

This report is in conformance with the ASTM standard for a Phase I Environmental Site Assessment governernment records check

	No Sites Within Specified Radius	Property & Adjacent	¼ Mile Radius	½ Mile Radius	1 Mile Radius
National Priority List (NPL)	✓				
RCRA CORRACTS Facilities*	✓				
CERCLIS	✓				
CALSITES**	✓				
Leaking Underground Storage Tanks (LUSTIS)*	✓				
Active / Inactive Landfills	✓				
Treatment, Storage & Disposal (TSD)	✓				
Spills, Leaks, Investigations and Cleanups (SLIC)	✓				
Registered Underground Storage Tanks	✓				
Generators (HWG)	✓				
Emergency Response Notification System (ERNS)	✓				
Superfund Leins	✓				
CERCLIS NFRAP	✓				

Sites reported as "Case Closed"* or "NFA - No Further Action"** may not be listed in this report

OKI Report #: **P06136**
Completion Date: **5/11/06**

Property Information:

310 Acres of Vacant Land
Avenue T & Longview Road
Big Rock Creek, CA 93553

Martin Kasman

Martin A. Kasman
Registered Environmental Assessor

REGISTERED ENVIRONMENTAL ASSESSOR
MARTIN A. KASMAN
No 04022
Expires 6/30/06
STATE OF CALIFORNIA

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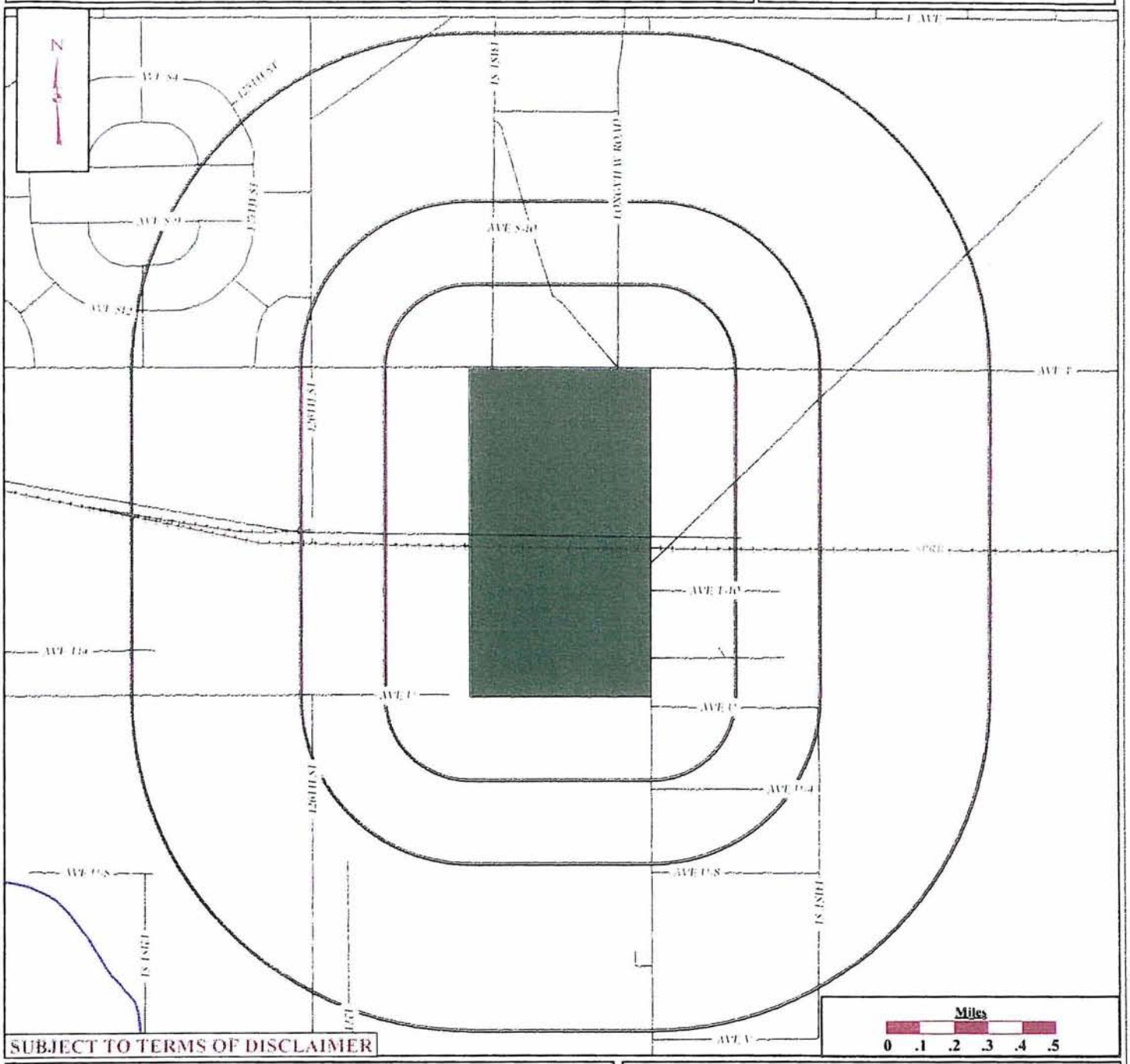
316 West Foothill Boulevard
Monrovia, CA 91016
(626) 932 - 1800 * Fax (626) 932 - 1807
www.orswell-kasman.com

Orswell & Kasman, Inc.

Environmental Assessments & Consulting

Subject Property Location:
Avenue T & Longview Road
Big Rock Creek, CA 93553



SUBJECT TO TERMS OF DISCLAIMER

MAP LEGEND

- One Mile Radius
- Half Mile Radius
- Quarter Mile Radius
- Subject Property
- Airports
- Parks & Golf Courses
- Waterways
- Railroads
- Roads
- Highways

HAZARDOUS SITE SYMBOLS

- National Priority List
- RCRA Corrective Action
- CERCLIS
- CalSites
- Leaking Underground Storage Tanks
- Active / Inactive Landfills
- Treatment, Storage, & Disposal Facilities
- Spills, Leaks, Investigations and Cleanups
- Registered Underground Tanks
- Generators
- Emergency Response Notification System
- Superfund Liens
- CERCLIS - No Further Remedial Action Planned
- Oil Wells

For more information please contact us at (626) 932-1800 or www.orswell-kasman.com

REFERENCE GUIDE TO THE REGULATORY AGENCY DATABASES

SOURCE	DESCRIPTION
NPL: *1 mile search radius* *Date: March 2006*	The Natonal Priority List (NPL) identifies abandoned or uncontrolled hazardous waste sites, which have been identified as possibly representing a long-term threat to the public health or environment. These sites have been identified as being highly contaminated with hazardous substances and represent the USEPA's target enforcement and cleanup efforts. Studies of individual sites are conducted by the USEPA to determine the level of contamination, and the sites are then compared and ranked to other sites on the NPL.
CORRACTS: *1 mile search radius* *Date: December 2005*	The USEPA maintains a list of facilities which have been authorized to receive hazardous waste. These facilities have permits to treat, store or dispose of the waste as determined by the RCRA regulations. In addition, the USEPA publishes a list of those facilities who are subject to a corrective action based on the facilities waste handling and storage procedures. The facilities, which are subject to a corrective action, are identified as CORRACTS sites.
CERCLIS: *½ mile search radius* *Date: March 2006*	The USEPA has developed a database known as the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS), which contains information on potential hazardous waste sites located throughout the United States. There are over 33,000 sites on the CERCLIS inventory. All sites are subjected to a preliminary assessment and thereafter are either placed on the National Priority List (NPL) or are placed in a category for those sites requiring no further Federal Superfund action.
CALST: *½ mile search radius* *Date: June 2005*	The State of California Environmental Protection Agency maintains the "CalSite" database, which is a listing of 7,800 known active, inactive and abandoned hazardous sites. These sites have previously been reported in the Abandoned Site Program Information System (ASPIS), Bond Ependiture Plan (BEP) and Cortese database.
LUSTIS: *½ mile search radius* *Date: March 2006*	The State of California Water Resources Control Board is responsible for monitoring the quality of flow of the groundwater and compiles lists of known leaking undergound storage tanks. The list is maintained as the Leaking Underground Storage Tank Information System (LUSTIS). The local Regional Water Quality Control Board (RWQCB) monitors the contamination problem, the investigation and any remedial activities.
SWIS: *½ mile search radius* *Date: August 2005*	The State of California Integrated Waste Management Board maintains a list of active and inactive landfill sites within California and provides information concerning the ownership and types of wastes brought to the landfills.
TSD: *½ mile search radius* *Date: December 2005*	Treatment, Storage or Disposal Facilities (TSDF) is a federal listing of facilities, which have been authorized to receive hazardous waste. These facilities have permits to treat, store or dispose of waste as determined by the RCRA regulations.
ERNS: *Property & adjacent* *Date: 2005*	The Emergency Response Notification System (ERNS) is a list of locations which have reported a release of oil or hazardous substances to the USEPA Office of Emergency and Remedial Response. Most of the data in this system is based on information that was received during the initial notification.
HWG: *Property & adjacent* *Date: December 2005*	The United States Environmental Protection Agency maintains a list of known hazardous waste generators in the nation. A company on the list generates reportable quantities of hazardous waste, and the disposal and transportation of the waste is monitored through the use of a hazardous waste manifest.
UTANK: *Property & adjacent* *Date: March 2006*	The location and identy of registered underground tanks is maintained by the State of California Water Resources Control Board in the Hazardous Substance Storage Container Database.
SFL: *Property & adjacent* *Date: July 1993*	The USEPA maintains a list of Superfund Leins that have been issued on properties throughout the United States. These sites have been remediated through the expenditures of Superfund monies. The purpose of the lein is to prevent the property owner from gaining a financial benefit from the federal government's cleanup and restoration activities.

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

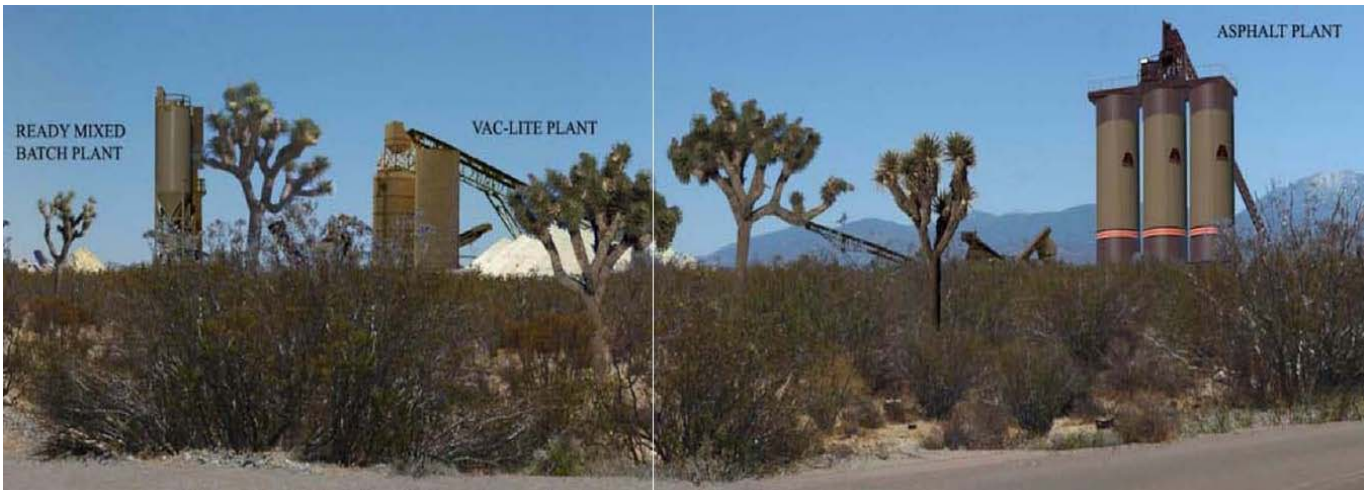
APPENDIX 18

Water Supply Assessment

FINAL
WATER SUPPLY ASSESSMENT
BIG ROCK CREEK PROJECT

Prepared for:

LEBATA INC.
NEWPORT BEACH, CA



JANUARY 2014

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SECTION 1: INTRODUCTION

1.1 Purpose of Water Supply Assessment

The purpose of this Water Supply Assessment is to demonstrate that water supplies are available to meet the proposed water demands of the proposed Lebata sand and gravel mining operation in the Antelope Valley (Project). This assessment has been prepared in accordance with the requirements of SB 610. Senate Bill 610 (Costa), an amendment to California Law (Public Resources Code Section 21151.9, Water Code Sections 10631, 10656, 10657, 10910-10915), places additional requirements upon the local water agencies and or planning agencies regarding land use planning and water supply availability. A copy of California Water Code Section 10910-10915 is provided in Appendix A.

SB 610 requires cities and counties, which determine if a project is subject to the California Environmental Quality Act, to identify any public water system that may supply water for a project. The cities and counties may request those public water systems to prepare a specified water supply assessment to be included in any environmental document prepared for a project. This assessment includes, among other information, an identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project and water received in prior years pursuant to those entitlements, rights, and contracts. If the assessment concludes that water supplies are or will be insufficient, the public water system would be asked to submit plans for acquiring additional water supplies.

SB 610 took effect on 1 January 2002 and requires that water agencies and or planning agencies demonstrate that sufficient and reliable sources are available in order for local agencies to approve large-scale developments and complete the environmental review process for projects. Water Code Section 10912 requires a Water Supply Assessment for several types of proposed projects, including "...a proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons or, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area." (Water Code, Section 10912.a.5) Based upon the criteria defining a project under water code, Section 10912.a.5, the proposed Project does not meet the intent of the law. The proposed Project is an industrial facility, but clearly is not an “industrial plant” with more than 1,000 persons or an “industrial park” planned to house more than 1,000 persons. Additionally, although the proposed Project consists of land having in excess of 40 acres, the processing portion of the Project occupies less than 40 acres. Notwithstanding, this Water Supply Assessment has been prepared for the purposes of being conservative and providing full disclosure.

This Water Supply Assessment was prepared in April 2013. In general, water supply assessments are prepared utilizing data and information from local UWMPs and other relevant sources. This WSA was prepared using available information known at the time of the preparation of this document.

1.2 Big Rock Creek Project

1.2.1 Project Location

The applicant, Lebata, Inc. (Lebata), is proposing to establish and operate a new sand and gravel mining operation (Project) in the Antelope Valley area of unincorporated Los Angeles County, California (see Figure 1-1 – Regional Map). (Lebata, State Clearinghouse No. 2007121054) The Project site is located near the community of Pearblossom. The Project site is bound by Avenue T to the north, 136th Street East to the east, Avenue U to the south, and 126th Street East to the west. The Project site is located on the

Littlerock USGS 7.5 Minute Topographic Quadrangle. The Project area involves two separate undeveloped parcels, referred to herein as the North and South Parcels, which are bisected by the Union Pacific Railroad (see Figure -1-2 – Vicinity Map).

1.2.2 Project Description

The Project's primary objective is to produce marketable Portland Cement Concrete-grade (PCC-grade) aggregate and related construction material products and supply these products where they are in demand. (Lebata, State Clearinghouse No. 2007121054) The Project involves mining a total of approximately 46.48 million gross tons of sand and gravel over a period of approximately 47 years. The total Project area is comprised of approximately 310 acres, of which approximately 282.4 acres are proposed for excavation. The Project would extract aggregate from newly created pits in three distinct phases (Mining Phases). Although production would vary with market conditions, the extraction rate of unprocessed material over the life of the Project is expected to range between 1,000,000 to 2,500,000 tons per year. Annual sales would not exceed 2,000,000 tons per year. Because this resource could last approximately 47 years, Lebata is requesting a 50-year permit.

Peak daily sales would be limited to the physical capabilities of the processing equipment, stockpiles of processed materials onsite, and customer demand. (Lebata, State Clearinghouse No. 2007121054) Peak annual sales would be further limited by the daily truck trips. If all such trips were allocated to the delivery of aggregate materials processed onsite, peak annual sales could not exceed 2,000,000 tons. Actual sales levels would vary over time and are a direct function of the rate of development within the Project's market area, the number and type of contracts obtained (e.g., Caltrans), the overall economy, equipment downtime, as well as hours and days of operation.

The gross volume of the material proposed to be excavated from the mining area is estimated to be approximately 30.98 million cubic yards. (Lebata, State Clearinghouse No. 2007121054) At an assumed density of 1.5 tons per cubic yard, this equates to a total of 46.48 million gross tons. Assuming that approximately 20.75 percent of the material would be unsuitable for sale as PCC-grade aggregate, the net reserves are estimated at 36.84 million tons. Finished products would be PCC-grade aggregate and aggregate using products, such as concrete and asphalt. Processing also creates scalped fines as a byproduct, some of which may be used as a soil amendment onsite in association with revegetation activities. The remainder of the fines would be sold as slurry used in nonstructural concrete or as miscellaneous fill material.

The Project would include the following major components:

- Aggregate Surface Mining and Processing Facilities;
- Ready-Mixed Concrete Plant;
- Vac-Lite Plant (producing lightweight concrete);
- Asphalt Mixing Plant;
- Raw Cement and Aggregate Transfer and Distribution Facility;
- 24-foot by 60-foot office trailer (handicapped accessible); and
- 80-foot by 125-foot two-story building, which would include an equipment maintenance shop area, parts room, office, locker room, and restrooms (handicapped accessible).

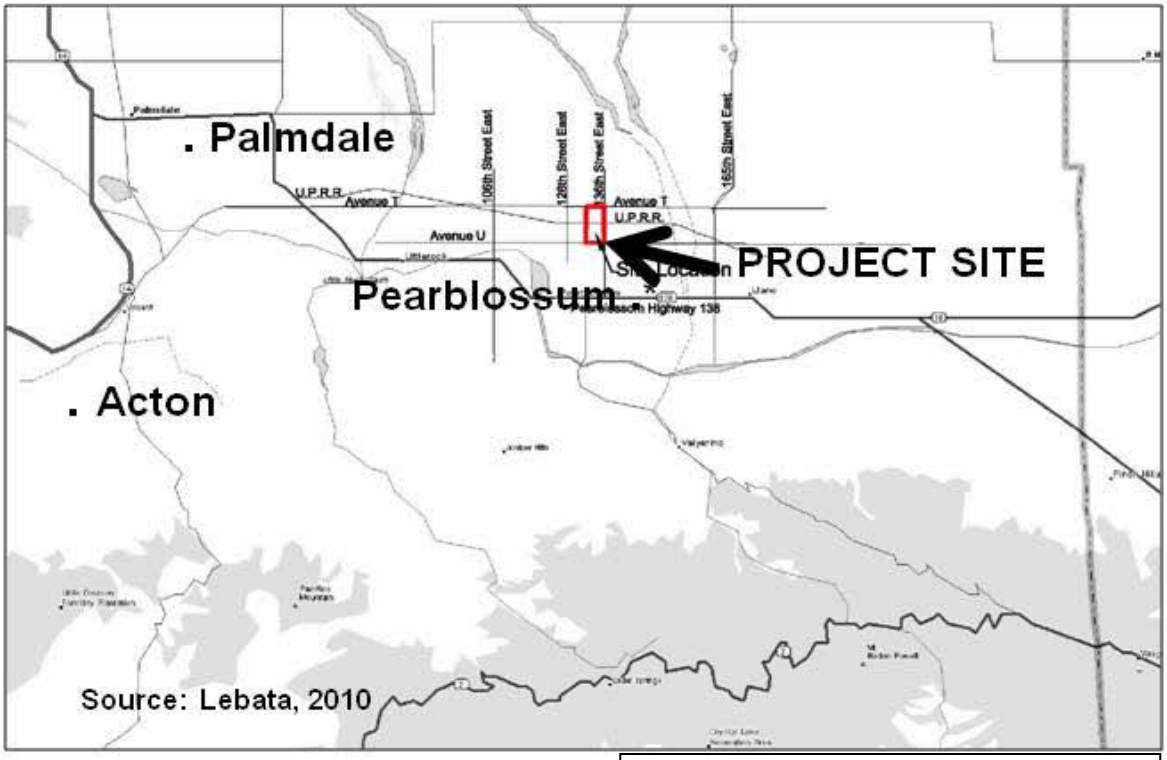


FIGURE 1-1
PROJECT VICINITY

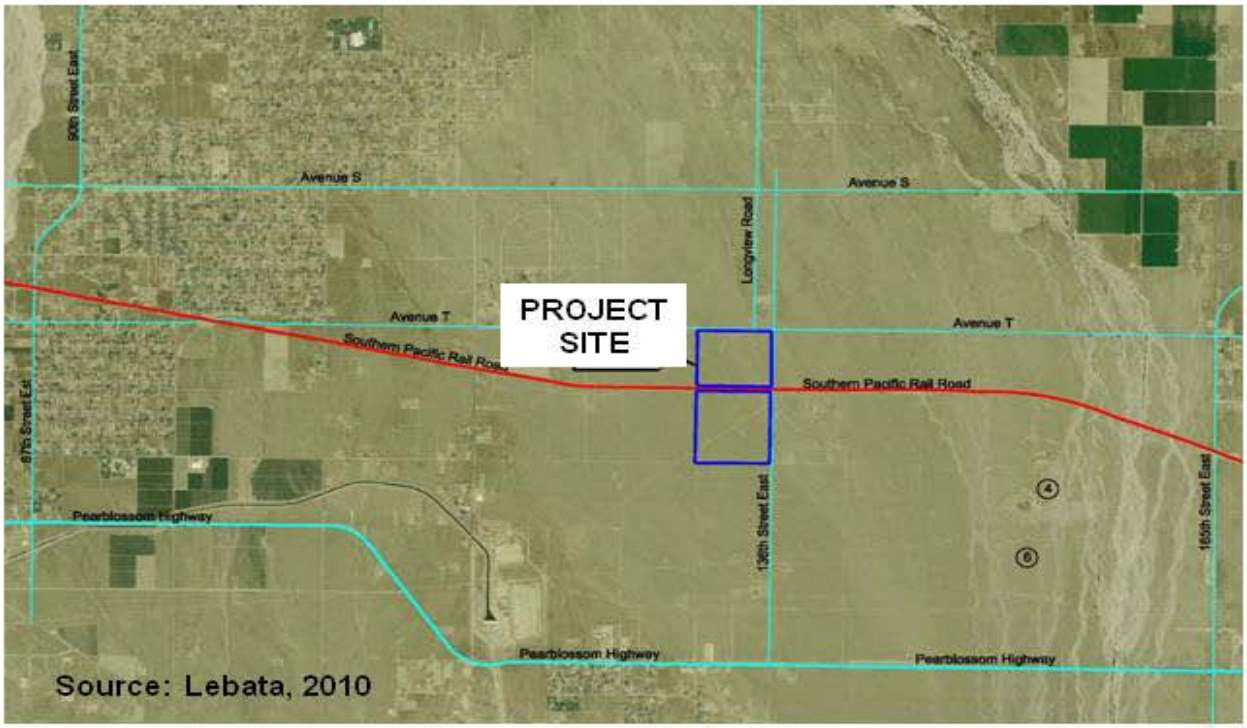


FIGURE 1-2
PROJECT LOCATION

Mined lands would be reclaimed in compliance with the standards specified in the Surface Mining and Reclamation Act of 1975, as amended (SMARA), the County of Los Angeles Mining Ordinance, and a State and County-approved Surface Mining and Reclamation Plan/Financial Assurance Plan. Additional details regarding the proposed Project are available in the Draft Environmental Impact Report (DEIR). (Lebata, State Clearinghouse No. 2007121054)

1.2.3 Project Status

Lebata submitted an application to the County for the Surface Mining Permit, along with a proposed Surface Mining and Reclamation Plan in 2007. The County reviewed the Surface Mining Permit application, including the supporting information, studies, analyses and reports, and prepared an Initial Study for the Project in accordance with the California Environmental Quality Act (Public Resources Code § 2710 et seq; CEQA). Based on the Initial Study, the County determined that an Environmental Impact Report (EIR) was required to assess the potential environmental impacts of the Project. The Initial Study identified potentially significant impacts with regard to several environmental issue areas. Lebata is preparing a Draft EIR for the Project (State Clearinghouse No. 2007121054).

The State of California Department of Public Health and the County of Los Angeles will be responsible for permits and regulatory approvals for constructing the necessary improvements to supply and deliver water to the Project.

1.3 Area Characteristics

The Antelope Valley is approximately 3,000 square miles in size and is located within a transitional area between the foothills of the San Gabriel and Sierra Pelona Mountains on the south and the Mojave Desert to the north and east. (Lebata, State Clearinghouse No. 2007121054) The Antelope Valley is separated on the northwest from the Central Valley by the Tehachapi Mountains, and on the south and southwest, it is separated from the Los Angeles Basin by the San Gabriel Mountains. Isolated buttes distinguish the north and east boundaries of the Antelope Valley. Additional details are available in the Project DEIR (State Clearinghouse No. 2007121054).

The Project site lies on a broad bajada (alluvial slope) extending north from the lower slopes of the San Gabriel Mountains. (Lebata, State Clearinghouse No. 2007121054) The Mojave Desert province has a typical, continental arid climate where years to decades may pass in which little or no precipitation falls, separated by brief episodes of locally torrential rain. In general, brief, heavy precipitation over relatively small areas generally causes rapid erosion in higher elevations, followed by deposition of transported sediments immediately after the runoff leaves the steep gradients of mountainous areas and reaches relatively flat-lying terrain. Ground surface on the Project site is relatively flat and characterized by high desert scrubland and grassland.

The Project site is currently in an undeveloped condition and is located in a relatively remote and undisturbed area of the Antelope Valley. (Lebata, State Clearinghouse No. 2007121054) The property is bisected by an existing Union Pacific railroad track and is surrounded by vacant undeveloped properties on the north, west and south sides. In general, adjacent land uses include undeveloped property to the north, undeveloped property to the east, undeveloped property to the south, undeveloped property to the west. Although properties along the eastern boundary are mostly undeveloped, there are a few residences, outbuildings, and well houses. The nearest residence is immediately south of the railroad tracks, approximately 200 feet east of the Project’s eastern boundary of the South Parcel.

1.4 Climate

The Project site lies in the High Desert Climate Zone. The local climate is characterized by hot summer days, mild summer nights, cool winter days, and cold winter nights. Annual average monthly temperatures range from a high of 77.1°F to low of 47.0°F (see Table 1-1 for details). (Western Region Climate Center) Annual average precipitation is approximately 7.90 inches per year (see Table 1-1 for details), of which most occurs during the winter season (December to March). Temperature and precipitation data from the City of Palmdale were used due to its proximity to the Project site.

TABLE 1-1
MONTHLY CLIMATE DATA FOR RAINFALL and TEMPERATURE

Parameter	Jan	Feb	Mar	Apr	May	Jun
Average Rainfall (in)[(a)]	1.51	1.65	1.28	0.47	0.13	0.04
Average Max Temperature (ºF)[(a)]	58.3	62.1	67.1	73.9	81.7	90.1
Average Min Temperature (ºF)[(a)]	32.4	35.6	38.9	43.7	50.7	57.7

Parameter	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Average Rainfall (in)[(b)]	0.05	0.18	0.20	0.34	0.68	1.37	7.90
Average Max Temperature (ºF)[(a)]	97.5	96.9	91.3	80.3	67.2	58.8	77.1
Average Min Temperature (ºF)[(a)]	65.0	63.7	57.4	48.0	38.0	32.7	47.0

Notes:

(a) Temperature and rainfall data obtained from Western Region Climate Center.

In the California Department of Water Resources (DWR) Water Plan (2009), an assessment of the impacts of global climate change on the State's water supply was conducted using a series of computer models based on decades of scientific research. Model results indicate increased temperature, reduction in Sierra snow depth, early snow melt, and a rise in sea level. These changing hydrological conditions could affect future planning efforts which are typically based on historic conditions. Difficulties that may arise include, but are not limited to, the following:

- hydrological conditions, variability, and extremes that are different than what current water systems were designed to manage.
- changes occurring too rapidly to allow sufficient time and information to permit managers to respond appropriately.
- special efforts or plans to protect against surprises and uncertainties.

As such, DWR will continue to provide updated results from these models as further research is conducted and information becomes available.

Additional details regarding potential impacts of climate change on water resources and water demands are provided in Sections 2 and 4.

1.5 Review of Local Urban Water Management Plans

SB 610 provides that if the projected water demand associated with the proposed project was accounted for in the Urban Water Management Plan (UWMP), or if the UWMP includes information applicable to the proposed project, then relevant information from that document may be incorporated into the SB 610 water supply assessment.

The Antelope Valley East Kern Water Agency (AVEK) adopted its current UWMP in June 2011. AVEK will supply water to the Project as a backup or alternative source if ground water (preferred source) is not available. Information in the AVEK UWMP relevant to this Water Supply Assessment will be identified and incorporated into this Assessment. Relevant information in the AVEK UWMP includes, but is not limited to, the following:

- AVEK currently supplies imported State Water Project (SWP) water to portions of northern Los Angeles County and southeastern Kern County.
- AVEK's SWP entitlement provides for it to receive a maximum of 141,400 acre-feet per year (AFY)
- AVEK does not currently receive or distribute groundwater or recycled water supplies
- AVEK water supplies include SWP water and groundwater recharge and extraction
- AVEK water demand in 2010 was 60,675 AFY including sales for municipal, commercial, industrial, agriculture, and system losses
- AVEK forecasts a normal year water demand of 96,558 AFY for the year 2030.

The County of Los Angeles Waterworks District No. 40 (LACWW40) and Quartz Hill Water District (QHWD) adopted an Integrated Regional UWMP (IRUWMP) in June 2011. Information in the IRUWMP relevant to this Water Supply Assessment will be identified and incorporated into this Assessment. Relevant information in the IRUWMP includes, but is not limited to, the following:

- LACWW40/QHWD currently supply treated imported SWP water and groundwater to customers
- LACWW40/QHWD do not currently receive or distribute recycled water
- LACWW40/QHWD future water supplies include SWP water, groundwater, recycled water, and groundwater recharge and extraction
- LACWW40/QHWD water demand in 2009 was 54,631 AFY with over 75 percent committed to residential customers
- LACWW40/QHWD forecast a normal year water demand of 141,020AFY for the year 2035.

1.6 Report Organization

The remainder of this Water Supply Assessment is organized as follows:

- Section 2 – Water Supply
- Section 3 – Water Demand
- Section 4 – Water Supply Reliability
- Section 5 – Conclusions.

1.7 List of Acronyms/Abbreviations

AF	acre-feet
AFY	acre-feet per year
AVEK	Antelope Valley East Kern Water Agency
AVIRWMP	Antelope Valley Integrated Regional Water Management Plan
BGS	below ground surface
County	County of Los Angeles
DAWN	Domestic Agricultural Water Network
DEIR	Lebata's Draft Environmental Impact Report
District	Los Angeles County Water Works District 40
DWR	California Department of Water Resources
gpm	gallons per minute
IRUWMP	Integrated Regional Urban Water Management Plan
Lebata	Lebata Inc.
LACWW40	Los Angeles County Water Works District 40
LADWP	City of Los Angeles, Department of Water and Power
MAF	million acre feet
mg/L	milligrams per liter
MGD	million gallons per day
PWRP	Palmdale Water Reclamation Plant
PCC	Portland Cement Concrete
QHWD	Quartz Hill Water District
Project	Big Rock Creek Project
SB	Senate bill
SWP	State Water Project
TDS	total dissolved solids
TOC	total organic carbon
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment.

SECTION 2: WATER SUPPLY

2.1 WSA Requirement

The WSA must comply with the following California Water Code requirements:

> 10910(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.
>
> (d) (1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.
> (2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:
> (A) Written contracts or other proof of entitlement to an identified water supply.
> (B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.
> (C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.
> (D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.
>
> (f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:
> (1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.
> (2) A description of any groundwater basin or basins from which the proposed project will be supplied. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis.

2.2 Project Water Supplies

The preferred source of water for the Project is the purchase of permanent entitlement of surface water from outside the Antelope Valley basin. In addition, Lebata has obtained an alternative or backup water source via agreement with the Antelope Valley East Kern Water Agency (AVEK) to supply supplemental water for the Project. Any supply from AVEK or other supplier that does not include permanent entitlement is considered temporary and interruptible. The Project lies within the Sphere of Influence of the Los Angeles County Waterworks District No. 40, Antelope Valley (District). Any water supply arrangements, agreements, or water service annexation will be subject to the District's approval. These water sources and other alternatives are summarized below.

2.3 Permanent Entitlement

2.3.1 Imported Surface Water via State Water Project

The State Water Project (SWP) is owned by the State of California and operated by the Department of Water Resources (DWR). The primary purpose of the SWP is to deliver surface water diverted from the Sacramento River-San Joaquin River-San Francisco Bay-Delta (Bay-Delta) to 29 urban and agricultural water suppliers in Northern California, San Francisco Bay Area, Central Valley, Central Coast, and Southern California, including approximately 20 million urban users and 750,000 acres of farmland. Of the contracted water supply, approximately 70 percent goes to urban users and 30 percent goes to agricultural users.

SWP facilities originate in Northern California at Lake Oroville on the Feather River. Water released from Lake Oroville flows into the Feather River, goes downstream to its confluence with the Sacramento River, and then travels into the Bay-Delta. Water is pumped from the Bay-Delta region to contractors in areas in San Francisco bay area and areas south of the Bay-Delta. SWP deliveries consist solely of untreated water. The SWP system currently consists of 701 miles of aqueduct, 34 storage facilities totaling 5.8 million acre feet (MAF) of storage, 5 hydro-electric power plants, 4 pumping-generating plants, 17 pumping plants, and 3 pump stations. Figure 2-1 illustrates the location of major SWP facilities.

In addition to delivering water to its contractors, the SWP is operated to improve water quality in the Bay-Delta region, control flood waters, provide recreation, power generation, and environmental enhancement.

Source: CA DWR.

FIGURE 2-1
STATE WATER PROJECT FACILITIES

2.3.2 SWP Contract Allocations

Contract allocations, also known as entitlements, for SWP contractors are summarized by DWR in a table commonly referred to as 'Table A'. Entitlements are based on the original projected SWP maximum yield of 4.173 million acre feet (MAF). Table A is a tool used by DWR to allocate fixed and variable SWP costs and yearly water entitlements to the contractors. Table A contract amounts do not reflect actual deliveries a contractor should expect to receive, as DWR adjusts the amounts downward during below normal years. Such adjustments are based upon the amount of SWP water available in any given year and the amount recently used by each Table A entitled users.

DWR annually approves the amount of SWP entitlement that contractors will receive based on several variables. The entitlement amount received by contractors varies based on contractor demands and projected available water supplies. Variables impacting projected available water supplies include snowpack in the Sierra Nevada, capacity available in reservoirs, operational constraints, and demands of other water users. Operational constraints include pumping restrictions related to fish species listed as either threatened or endangered under the federal or state Endangered Species Acts. Contractors' requests for portions of their entitlements cannot always be met. In some years there are shortages and in other years surpluses.

In 2012, SWP contractors received only 65 percent of their SWP contract entitlements. However, deliveries in 2007 to 2011 were only 35 to 80 percent of contract entitlements.

2.3.3 SWP Water Quantity Challenges

The original SWP facilities, completed in the early 1970s, were designed to meet the needs of the SWP contractors established at that time. It was anticipated that additional SWP facilities would be constructed over time to meet increases in contractor delivery needs. However, these additional facilities were repeatedly deferred and public attitudes and environmental regulations have changed. SWP facilities are not fully constructed and until full built-out, SWP facilities are only able to deliver about 62 percent of the project's 4.1 MAF of entitlements in a normal water year. As a result, the SWP is not capable of delivering full contractor entitlements every year.

The focal point of SWP supplies is the Bay-Delta; the largest estuary on the west coast through which 60 percent of the freshwater used in the State must pass. Years of environmental neglect to this area and political gridlock has resulted in significant environmental damage. In recent years, the Delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, and splittail were added as threatened or endangered species under the federal Endangered Species Act (ESA). Resulting actions taken to protect the ecosystem of the Bay-Delta have placed additional restrictions on SWP operations.

2.3.4 SWP Water Quality Challenges

SWP water is generally of high quality. Total dissolved solids (TDS) concentrations range between 250 and 350 milligrams per liter (mg/L). The quality of SWP water as a drinking water source is affected by a number of factors, most notably seawater intrusion and agricultural drainage from peat soil islands in the Bay-Delta.

The water quality parameters of most concern are total organic carbon (TOC), bromide, and salinity. Levels of TOC and bromide in the water increase significantly as it moves through the Bay-Delta. These constituents can combine with chemicals used in the water treatment process to form disinfection

byproducts that are carcinogenic. Treated wastewater discharged from cities and towns surrounding the Bay-Delta also add salts and pathogens to the water, which affect its suitability for drinking and recycling. Moreover, actions to protect Bay-Delta fisheries have exacerbated existing water quality problems by forcing SWP diversions to shift from the spring to the fall, when salinity and bromide levels are highest. Closure of the Bay-Delta Cross Channel gates to protect migrating fish has also degraded the quality of SWP supplies by reducing the flow of higher quality Sacramento River water.

2.3.5 SWP Reliability

It was thought at the time that the SWP was constructed that the system could deliver about 50 percent of its entitlement in a very dry year. DWR bi-annually prepares the State Water Project Delivery Reliability Report to provide contractors with current and projected water supply availability for SWP. The 2012 Reliability Report forecasts SWP deliveries at 60 percent for a normal water year for all Table A entitlements. (DWR, 2012) However, in a single dry year (worst case scenario) the DWR estimated delivery of an average of only 11 percent of Table A entitlements. (DWR, 2012) In a multiple dry year (4-year) sequence, the DWR estimated delivery of an average of 34 percent of Table A entitlements. (DWR, 2012) Additional details regarding reliability of the SWP water are provided in Section 4. Factors impacting deliveries include environmental constraints and hydrologic changes as a result of climate change.

For 2012, DWR delivered 65 percent of requested SWP water, or 2,711,967 AF. In 2011, DWR delivered 80 percent of requested SWP water. In 2010, the SWP delivered 50 percent of requested SWP water, up from a record-low initial projection of 5 percent due to lingering effects of the 2007 to 2009 drought. Deliveries were 60 percent of requests in 2007, 35 percent in 2008, and 40 percent in 2009. The last time DWR delivered 100 percent of entitlements, difficult to achieve even in wet years due to pumping restrictions to protect threatened and endangered fish, was in 2006.

2.3.6 Purchase of Permanent Entitlement

The preferred source of water for the Project is the purchase of permanent entitlement of SWP water from a supplier/agency outside the Antelope Valley basin. This option would involve purchasing permanent entitlement to SWP water (Table A, see Section 2.3.2) via contractors or agencies with entitlements for sale. Lebata may also consider short-term or long-term purchase options of SWP entitlements. If Lebata obtains SWP Table A water, the entitlement would be transferred to AVEK, then AVEK would be contracted to wheel the water to the Project site. See Section 2.4 for additional details regarding AVEK. A water service connection for the Project will be constructed to the AVEK Eastern Feeder pipeline located approximately 8,000 feet to the west of the Project site at the southeast corner of Avenue T and 116th Street. In addition, the County of Los Angeles County Waterworks District No. 40 (LACWWD40) may be involved in the water transfer since the Project site lies within the LACWWD40 service area.

Presently, Lebata does not own entitlements to SWP water, but is interested to purchase SWP Table A water. Lebata is aware of one or more agencies interested to sell entitlement to SWP Table A water. However, the cost to purchase entitlements to SWP water may be in the range of approximately $10,000 per acre-foot of water. In addition, Lebata would be required to pay DWR for delivery of the SWP water via the California Aqueduct to the AVEK turnout in the range of approximately $300 per acre-foot (2013 US$), and approximately $120 per acre-foot (2013 US$) to AVEK for treatment and distribution. Lebata will also be required to pay a capacity fee to AVEK for connection to the AVEK distribution system. Lebata will carefully evaluate this alternative and costs before pursuing a contract. If permanent water supplies are not acquired for the Project, the water service to the Project is temporary and interruptible.

2.4 Supplemental Water

2.4.1 Antelope Valley East Kern Water Agency

AVEK is a regional water agency supplying State Water Project water to a service area of approximately 2,400 square miles including portions of northern Los Angeles and southeastern Kern counties (see Figure 2-2). The AVEK service area includes a population of nearly 300,000. AVEK's primary function is to supplement local groundwater and surface water supplies with supplies from the SWP, which are delivered under AVEK's contract with DWR, via the California Aqueduct. See Figure 2-1 for a diagram of SWP Facilities.

AVEK has a system of pipelines and water treatment facilities that allow it to deliver both raw water and treated water to many areas in the Antelope Valley Region. AVEK has played a major role in the Valley's water system since it was granted a charter by the State Legislature in 1959. It succeeded the Antelope Valley-Feather River Association, which was formed in 1953 to encourage importation of water from the Feather River in northern California. In 1962, the AVEK Board of Directors signed a water supply contract with the State Department of Water Resources (DWR) to assure delivery of imported water to supplement Antelope Valley groundwater supplies.

AVEK's SWP entitlement provides for it to receive 141,400 acre-feet of Table A water in any given year. AVEK has the third largest entitlement (141,400 AFY) of 29 State Water Project (SWP) water agencies in California, following the Metropolitan Water District and the Kern County Water Agency. During below normal years, AVEK may obtain water supplies via entitlements of Table A SWP water and groundwater extracted from the AVEK Groundwater Bank (see Section 2.5). AVEK may also receive additional supplies such as Article 21 water, carryover water, turnback pool water, etc. during normal, wet, and dry water years.

2.4.2 AVEK Facilities

Financed by a $71 million bond issue, AVEK constructed the Domestic Agricultural Water Network (DAWN), which consists of four water treatment plants, water storage, and more than 100 miles of pipelines. Four 8-million gallon water storage reservoirs near Mojave and one 3-million gallon reservoir at Vincent Hill Summit complete the DAWN network. The bulk of the AVEK imported water is treated and distributed to customers throughout its service area. The DAWN network also provides delivery of untreated water from the Aqueduct to local farmers and ranchers.

The Quartz Hill water treatment plant is capable of producing 90 million gallons per day (MGD) of treated aqueduct water and includes 9.2 million gallon storage reservoir. The Eastside water treatment plant is capable of producing 10 MGD of treated water. The Rosamond water treatment plant can produce 14 MGD, while the most recently added treatment plant in Acton can produce 4 MGD of treated water. Additional surface water allotments from the SWP exist in the Antelope Valley for Palmdale Water District and Littlerock Creek Irrigation District. Additional details regarding AVEK current water supply programs are provided in AVEK's UWMP. (AVEK, 2010)

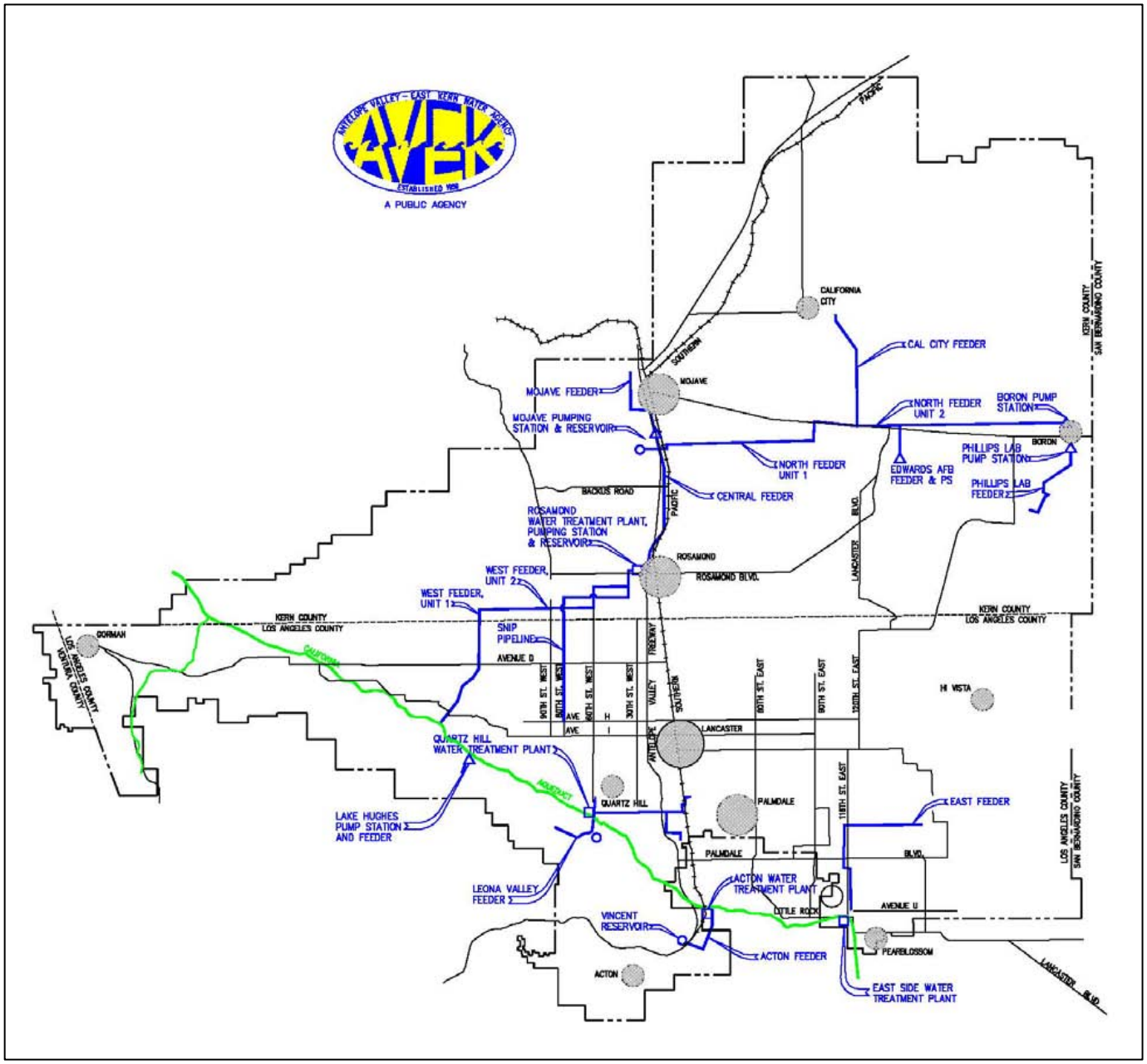


FIGURE 2-2
AVEK SERVICE AREA

2.4.3 Lebata Agreement with AVEK

The AVEK has agreed to provide supplemental water for the Project on an interruptible basis. A copy of the AVEK Board approval of the Lebata Inc. application for water service is provided in Appendix B. As previously noted, AVEK's SWP entitlement provides for it to receive 141,400 acre-feet of Table A water in any given year. AVEK will provide water to the Project during normal and wet water years from water that is surplus to the needs of the existing Table A entitled users within the Antelope Valley. The AVEK water will be supplied directly to the Project and or purchased by the Project for banking. Water so banked would later be extracted and delivered to the Project during below normal years (see Section 2.5 for additional details). AVEK may also receive additional supplies such as Article 21 water (SWP), carryover water (SWP), turnback pool water (SWP), groundwater (local), etc. during normal, wet, and dry water years.

A water service connection will be constructed to the AVEK Eastern Feeder pipeline located approximately 8,000 feet to the west of the Project at the southeast corner of Avenue T and 116th Street. In addition, the LACWWD40 may be involved in the water transfer since the Project site lies within the LACWWD40 service area.

Lebata would be required to pay the DWR fees, in the range of approximately $300 per acre-foot (2013 US$), to deliver the water via the California Aqueduct to the AVEK turnout. In addition, Lebata would pay AVEK for treatment and distribution costs in the range of approximately $120 per acre-foot (2013 US$). Lebata will also be required to pay a capacity fee to AVEK for connection to the AVEK distribution system. Lebata will carefully evaluate this alternative and costs before pursuing a contract.

2.5 Banked Water

There are several alternatives available for banking water supplies. These alternatives include, but not limited to, the following: AVEK Water Bank, Semitropic Water Bank, Antelope Valley Water Bank, Tejon Ranch, Rosedale-Rio Bravo/Irvine Ranch Water District, and Kern Water Bank. Most of these alternative water bank programs operate similarly, by percolating surface water and storing it in the ground during wet years, and extracting groundwater as needed in dry years. It must be noted that the objective of this document does not include an endorsement or selection of one water bank for the Project. That decision will be provided by Lebata at a later date. The following sections provide highlights for a few of the available water banks.

2.5.1 AVEK Water Bank

AVEK is currently constructing the Groundwater Recharge Project. This project includes a groundwater recharge and recovery program, with recharge facilities located on approximately 1,500 acres of land it owns in Los Angeles County, northwest of Lancaster, California. (AVEK, 2008) AVEK will utilize only untreated SWP supplies for recharge. (AVEK, 2008) Potential storage volume available will be approximately 155,000 to 165,000 acre-feet. Construction of the Groundwater Recharge Project will consist of groundwater recharge areas and wells and pipelines to recover water. AVEK's SWP water supplies will be delivered from the California Aqueduct to the site via gravity flow using AVEK's existing West Feeder pipeline. Delivered supplies will be spread across the surface of the land, then percolate into the soil, and be stored in the aquifer. When needed, the stored water will be extracted using pumps, delivered to the West Feeder pipelines, and then delivered to AVEK customers via the West Feeder pipeline. Recovered raw water could also be delivered to a new storage, treatment, and pumping facility. AVEK has constructed initial components of the Groundwater Recharge Project, with final buildout anticipated by late 2014. (personal communication, 2013)

This Groundwater Recharge Project will allow AVEK to deliver water during emergencies and during drought conditions (when State Water Project deliveries are less than Agency water users' demands). (AVEK, 2008) In an emergency, such as the shutdown of the California Aqueduct due to water supply problems in the Bay-Delta or failure of the SWP and its pump stations along the Aqueduct, recovery would be by the use of the existing five wells on the property plus an additional five to eight wells designed strictly for recovery of stored water.

AVEK is willing to negotiate cooperative arrangements with Lebata to store and/or withdraw water from this water bank. Banking water in the AVEK Groundwater Recharge Project, when fully completed, would provide Lebata with a reliable local backup water supply during drought conditions and emergencies.

2.5.2 Antelope Valley Water Bank

The Antelope Valley Water Bank (AVWB) is located in Kern County at the western end of the Antelope Valley northwest of Lancaster. Semitropic-Rosamond Water Bank Authority (SRWBA) was the primary developer of the AVWB. The SRWBA consists of Semitropic Water Storage District, Rosamond Community Services District, and Valley Mutual Water Company. Currently, the AVWB consists of two 160-acre recharge basins. At final build-out there will be spreading basins built across the remaining 1,518 acres of water bank land, and 30 to 40 new recovery wells. The AVWB will be capable of annual recharge and recovery of up to 100,000 AFY and up to 500,000 AF of total storage capacity within the underlying aquifer. Supplies used for recharge and recovery in the AVWB include SWP water conveyed from the East Branch of the California Aqueduct via an agreement with AVEK. The AVWB is located entirely within the AVEK service area.

AVWB is willing to negotiate cooperative arrangements with public agencies and private parties who want to store and/or withdraw water from this water bank. Existing banking partners of the AVWB include the San Diego Water Authority and the Rosamond Community Services District.

2.5.3 Tejon Ranch Water Bank

In 2006, Tejon Ranch constructed and is operating a groundwater bank on its property. The bank is located in Kern County in the western end of the Antelope Valley and less than 1 mile north of the East Branch of the California Aqueduct. The recharge area of the bank currently includes nine basins and covers 120 acres with a storage capacity of approximately 60,000 AF. Thus far, Tejon Ranch has banked over 6,700 AF of SWP water imported into the Antelope Valley.

Tejon Ranch is willing to negotiate cooperative arrangements with public agencies and private parties who want to store and/or withdraw water from this water bank.

2.5.4 Central Valley Water Banks

Several water banking options exist within the southern Central Valley of California. These banking options include, but not limited to, the following: Kern Water Bank, Kern County Water Agency, Semitropic Water Storage District, Rosedale Rio Bravo Water Storage District/IRWD, etc. In general, these water banking programs involve diversion and storage of excess water supplies that are available when rainfall or runoff is plentiful by recharging that water through shallow ponds into the local groundwater basins. The stored water is then recovered in times of need by pumping it from the groundwater basins with local wells. The recovered water can be discharged to the California Aqueduct for delivery to agencies downstream. One of the primary benefits of these water banking programs is that water agencies can recover the water to augment dry-year water supplies.

Many of these water banking programs are willing to negotiate new cooperative arrangements with public agencies and private parties who want to store and/or withdraw water from their water banks. Lebata could contract with one or more of the alternative water banking operations noted above to store and supply water for the Project. The banked water could be extracted and discharged to the SWP California Aqueduct, then extracted by AVEK in the Antelope Valley. AVEK would be contracted to wheel the water to the Project site.

2.5.5 AquaHelio Resources Water Bank

Kern County is currently processing an application for the Fremont Valley Preservation Project, proposed by AquaHelio Resources, LLC. This solar power project is located about eight miles north of California City and 17 miles northeast of the unincorporated town of Mojave. One aspect of this project includes a water recharge, recovery and transport facility that would develop infrastructure for recharge of up to 200,000 AFY of surface water from the City of Los Angeles Department of Water and Power (LADWP) Aqueduct System. Water from the LADWP would be banked in the aquifers beneath the project sites for recovery at a later date. Surface water supplies recharged into the project sites would be delivered as they are available. Banking of surface water would be achieved through both injection wells and percolation. The proposed water recharge, recovery, and transport facility would also include above ground reservoirs and booster pump stations to transfer surface water to the project sites, basins, and spreading areas.

One potential recipient of this water includes AVEK which will enhance AVEK's ability to provide water from outside the Antelope Valley basin to its customers. The project would also include interconnections between AVEK and LADWP water transmission facilities to make allowance for LADWP banked groundwater distribution into the AVEK finished-water transmission pipelines. Additionally, interconnection facilities to transfer SWP water to LADWP are also proposed at the crossing with the California Aqueduct.

2.5.6 Lebata Purchase from Water Bank

Lebata could contract with one or more of the alternative water banking operations noted above to store and supply water for the Project. The banked water could be extracted and discharged to the SWP California Aqueduct, if stored in the Central Valley water banks. Or the water could be pumped from the California Aqueduct and stored in the Antelope Valley. If Lebata obtains water from one or more water bank(s), the AVEK would be contracted to wheel the water to the Project site. A water service connection for the Project will be constructed to the AVEK Eastern Feeder pipeline located approximately 8,000 feet to the west of the Project site at the southeast corner of Avenue T and 116th Street. In addition, the County of LACWWD40 may be involved in the water transfer since the Project site lies within the LACWWD40 service area.

Lebata could be required to pay significant additional fees for access to the banked water. Lebata would be required to pay the DWR fees to deliver the SWP water via the California Aqueduct to the AVEK turnout in the range of approximately $300 per acre-foot (2013 US$). In addition, if Lebata banked water in the AVEK Water Bank, then Lebata would pay AVEK for banking in the range of approximately $260 per acre-foot (2013 US$). Lebata would also pay AVEK for extraction from the water bank, treatment, and distribution in the range of approximately $160 per acre-foot (2013 US$). Lebata will also be required to pay a capacity fee to AVEK for connection to the AVEK distribution system. Lebata will evaluate the details of this alternative and costs before pursuing a contract for water banking.

2.6 Recycled Water

The Antelope Valley is faced with significant challenges with respect to management of water resources in the region. (Los Angeles County, 2011) Recycled water helps address the Antelope Valley's need for increased water supplies by offsetting existing potable demands and promoting beneficial reuse of treated wastewater, such as using recycled water for groundwater replenishment. Efforts are currently underway to develop a regional recycled water distribution system in the Antelope Valley, also known as the AV Backbone. However, this system is currently located more than 11 miles away from the Project site. The Palmdale Water Reclamation Plant (PWRP, owned and operated by the Sanitation Districts of Los Angeles County, SDLAC) is the wastewater treatment plant serving the Project area. PWRP has a secondary treatment capacity of 15 MGD and tertiary treatment capacity of 12 MGD. In fiscal year 2010-2011, the PWRP produced 7,993 AF of treated recycled water. (Sanitation Districts of Los Angeles County, 2011) The County projected volumes of recycled water available locally to increase from 24,000 AFY to 32,000 AFY, for the period 2015 to 2030.

Actual use of recycled water would be limited by progress of tertiary treatment upgrades, customer demand, and implementation of the AV Backbone and associated pipelines. Projections of recycled water demand for an average water year include 5,000 AFY to 16,000 AFY for the period 2015 to 2030. (Los Angeles County, 2011) These projections are based on a recycled water market assessment and are generally for municipal and industrial recycled water uses. Additional potential recycled water demands include agriculture and future urban development.

The Lebata Project could utilize recycled water for all non-potable demands of approximately 306 AFY (312 AFY total future project demand minus 6 AFY for potable demands). These demands include, but not limited to, operational demands, truck wash, dust control, and landscape irrigation. The State of California Department of Public Health and the County of Los Angeles will be responsible for permits and regulatory approvals for constructing the necessary future improvements to deliver recycled water to the Project site.

The process for allocating recycled water will be expected to favor large users in more densely populated areas closest to the source. These users would likely include golf courses, municipalities, large landscaped commercial and industrial centers, among others. Given it would be a distant industrial user, Lebata likely would be accorded a lower priority when compared to other users.

As previously noted, the recycled water system is currently located more than 11 miles from the Project site which presents a significant logistical issue. Lebata would pay for recycled water treatment and distribution in the range of approximately $380 per acre-foot (2013 US$). This recycled water cost estimated at approximately 90 percent of the cost of AVEK potable water ($420/AF). Lebata would also be required to pay a connection fee to the SDLAC for connection to the recycled water distribution system. Lebata will consider purchase and use of recycled for the Project at the future point when a recycled water pipeline may be close to the site. Therefore, Lebata determined that use of recycled water by the Project was not currently viable.

2.7 Supplies Via Local Purveyors

The urban water purveyors (retail) within the Antelope Valley anticipate meeting water demands using local groundwater, imported surface water, recycled water, and other sources. Local water purveyors will continue to implement water supply strategies to increase availability and reliability of water supplies via one or more of the following:

- Maximize use of available groundwater within Basin limits
- Expand conservation efforts
- Acquire and/or develop new imported supplies via the New Water Supply (Developer Fee)
- Create a combination of local surface spreading facilities to percolate untreated SWP water
- Expand use of Aquifer Storage and Recovery (ASR) wells to inject/recover potable water
- Add additional groundwater extraction capacity in order to recover stored water
- Expand use of recycled water within existing service areas
- Pursue an exchange program with agriculture interests to replace their groundwater use with recycled water thereby providing additional potable groundwater for municipal use
- Evaluate use of recycled water to replenish the Basin
- Expand storm water capture and recharge
- Add groundwater treatment and recharge
- Participate in groundwater banking programs outside of Antelope Valley
- Add desalination exchange program.

Additional details regarding these local water supply programs are provided in Antelope Valley Integrated Regional Water Management Plan (AVIRWMP, 2007) and Los Angeles County IRUWMP (2011).

It is understood that many of the local retail water purveyors do not have excess available water supplies for sale to new developers. Therefore, Lebata does not anticipate purchase of surplus water supplies from local retail water purveyors for the Project.

2.8 Groundwater

2.8.1 Local Geology and Hydrology

The Bulletin 118 database, prepared by the California Department of Water Resources (DWR, 2004), indicated that the Project site lies within the Big Rock Creek Hydrologic Subarea of the Antelope Hydrologic Unit (Basin). The 2007 Antelope Valley Integrated Water Management Plan (AVIRWMP) was prepared to comply with AB 3030 requirements and is considered to be the informal "groundwater management plan" for the Basin. (Los Angeles County, 2007)

Big Rock Creek is a seasonal stream originating from the San Gabriel Mountains to the south, and is fed by precipitation runoff and spring flows. The result is a mean annual runoff of approximately 11,500 acre feet. Much of this water infiltrates the permeable surface and recharges the groundwater sub-basins. The Big Rock Creek main channel flows south-north approximately 1 mile to the east of the Project site. Data indicate an overall average groundwater depth of approximately 170 feet below ground surface (BGS) with a gradient to the north and laterally away from the Creek bottom. Basin recharge generally occurs at the foot of the mountains and hills by percolation through the head of alluvial fan systems. The Big Rock and Little Rock Creeks, in the southern part of the Basin, contribute about 80 percent of runoff into the Basin (Durbin 1978). Other minor recharge is from return of irrigation water and septic system effluent (Lebata, State Clearinghouse No. 2007121054).

The Basin is comprised of two primary aquifers: (1) the principal aquifer and (2) the deep aquifer. (Los Angeles County, 2011) The principal aquifer is an unconfined aquifer and typically first encountered less than 100 feet below ground surface. (Lebata, 2012) Separated from the principal aquifer by clay layers, the deep aquifer is generally considered to be confined. In general, the principal aquifer is thickest in the southern portion of the Valley near the San Gabriel Mountains, while the deep aquifer is thickest in the vicinity of the dry lakes on Edwards Air Force Base. The deep aquifer ranges in depth and thickness, and is constrained vertically by the underlying bedrock. Based on the currently available information, the deep aquifer does not occur at the Site. (Lebata, 2012)

The Basin is divided into twelve subunits. These subunits include the following: Finger Buttes, West Antelope, Neenach, Willow Springs, Gloster, Chaffee, Oak Creek, Pearland, Buttes, Lancaster, North Muroc, and Peerless. A report by Duell (Lebata, State Clearinghouse No. 2007121054) indicated that the Project site is located within the Pearland groundwater subunit of the Basin. This subunit is bounded on the north, west and south by unnamed faults that are postulated from an analysis of water-level data. Substantial recharge to this subunit comes from Littlerock and Big Rock Creeks. Groundwater generally moves from southeast to northwest, with outflow to the Lancaster subunit.

The total storage capacity of the Basin has been reported at 68 million acre feet (MAF) to 70 MAF (AVIRWMP, 2007). Estimates of Basin natural recharge rates range from approximately 31,200 to 80,400 AFY. Groundwater extractions are reported to have increased from approximately 29,000 AF in 1919 to 400,000 AF in the1950's when groundwater use in the Region was at its highest.

2.8.2 Regional Groundwater Extractions

Groundwater extractions between 1926 and 1972 resulted in the overdraft of the aquifer that caused groundwater levels to drop significantly. (Los Angeles County, 2011) Implementation of the California State Water Project (SWP) in the 1970s resulted in stabilization of groundwater levels in some areas of the Antelope Valley, although groundwater levels in general have continued to fall to the present. From the 1990s to the present, agricultural uses have significantly increased groundwater production and exacerbated the drop in groundwater levels across the Basin.

It is understood that previous property owners used a groundwater well within the Project site to meet water demands. However, no data regarding well construction or extractions were available.

2.8.3 Basin Adjudication

In 1999, agricultural interests filed litigation seeking to determine rights to groundwater. Subsequently, the litigation was modified into a groundwater adjudication for the Basin. Three phases of trial have been completed in the adjudication which resulted in the Court determining, inter alia, the Basin boundaries, the safe yield of the Basin is 110,000 AFY, and that the Basin has been in a state of overdraft for over 50 years. Later phases of the trial are expected to result in rulings regarding rights to groundwater, including the prescriptive rights of the water purveyors, and a physical solution. There are no current restrictions on pumping while the Basin adjudication process continues. However, it is anticipated that water rights will be determined and limited as part of the future adjudication decisions.

2.8.4 Groundwater Elevation

Locally, groundwater data available from the DWR website indicates groundwater elevation is variable both spatially and temporally, occurring between 60 to 250 feet below ground surface (BGS) at different locations over the past 50 years. (Lebata, 2012; AVIRWMP, 2007) A Fugro report (Lebata, State

Clearinghouse No. 2007121054) indicated that two sampling holes were drilled on the Project site in August 2006. The first of these wells (DH-1) encountered a static water depth at about 70 feet BGS, while the second well (DH-2) did not encounter static water depth at its termination depth of 80 feet BGS. It has been suggested that well capacities are within a 200 to 800 gpm range (Lebata, 2012).

Groundwater in the vicinity of the Site has varied widely both from year to year and seasonally due to varying amounts of basin-wide groundwater usage. This would indicate that local groundwater supply wells would typically have been designed to accommodate wide fluctuations in groundwater level, and would therefore not be affected by the relatively small drawdown predicted for the potential Site Well.

According to the DWR database, there are five water wells located within a one mile radius from the proposed on-site supply well. Of these five wells, none are within 2,000 feet of the supply well. It is unclear which, if any of these wells are currently operational. Prior to the mid-1980s, and without the influence of the potential Site well, these wells have experienced total water level fluctuations of up to 140 feet.

2.8.5 Groundwater Quality

Groundwater quality is excellent within the principal aquifer but degrades toward the northern portion of the dry lake areas. (AVIRWMP, 2007) Water in the principal aquifer is considered to be generally suitable for domestic, agricultural, and industrial uses, with a total dissolved solids (TDS) concentration ranging from 200 to 800 milligrams per liter (mg/L). The deep aquifer typically has higher TDS levels and hardness levels range from 50 to 200 mg/L. Portions of the Basin have experienced high arsenic, boron, fluoride, and nitrate levels.

2.8.6 Proposed Project Well

A future water supply well may be constructed in the northwestern corner of the Site. It is anticipated that a 500-foot well would be installed with a screen interval ranging from 100 feet to 500 feet below the surface. (Lebata, 2012) Potential operation of the well includes 5 days per week, 12 hours per day, and approximate maximum flow rate of 545 gpm. Estimated drawdown of the potential well resulted in less than three feet after five years and approximately four feet at 30 years for the “average” case at the 2,000 foot radius. (Lebata, 2012) By comparison, the minimum scenario yields a drawdown of three feet at 2,000 feet after 30 years. The maximum scenario results in a drawdown of seven feet after 30 years at 2,000 feet. The impact of a potential water supply well located at the Site would be relatively minor. When taking into consideration the background groundwater level fluctuations (several tens of feet), it is unlikely that the impact on nearby wells would be discernible from background variations. (Lebata, 2012) In addition to establishing legal rights to pump groundwater, the Project will need to comply with Physical Solution as determined by the final adjudication.

Groundwater could be used within the Project site for all potable and non-potable demands. These demands include, but are not limited to, operational demands, truck wash, dust control, landscape irrigation, and employee needs. Maximum potential groundwater extractions for the Project could be approximately 312 AFY. However, Lebata does not have access to groundwater at the present time.

The State of California Department of Public Health will be responsible for reviewing an application for the well and regulatory approvals for constructing the necessary improvements to supply and deliver groundwater to the Project.

Based on the results of the Basin adjudication, Lebata could pursue groundwater via one or more processes including, but not limited to, the following: direct use of groundwater rights, purchase of available local groundwater, and lease available local groundwater. Once the Project receives approval for construction, Lebata will evaluate the potential to legally pump groundwater via one or more processes noted above. This evaluation will include an analysis of, but not limited to, the following: applicable source of groundwater, potential location(s) of wells, annual volume of groundwater to be pumped, short-term and long-term costs, and an estimate of the sustainability of the groundwater to meet future Project water demands. If groundwater is determined to be a viable water supply for the Project, Lebata will pursue construction of a new well(s) within the Project site and/or purchase/lease groundwater from a local source.

2.9 Hauled Water

Lebata considered the purchase and hauling the water (potable and or non-potable) to the Project site via railroad or truck. It is understood that hauling by railroad would require several steps, but not limited to, the following: agreement with Union Pacific to access the tracks within the Project site; agreement with a water supplier/agency to sell water, located in or outside of Antelope Valley, with a water connection located adjacent to the railroad tracks; if not already in place, construction of rail spur adjacent to the railroad tracks to accommodate the rail cars being filled with water; delivery and departure of an average of 12 water tank cars per day (29,000 gallon capacity each); construction of multiple rail spurs on the Project site (i.e., raw cement, water delivery, and/or empty tank cars); and construction and operation of water off-loading equipment and storage on the Project site. Similarly, hauling by truck would require several steps, but not limited to, the following: agreement with a water supplier/agency located near the Project site to sell water; delivery of an average of 37 water trucks per day (74 one-way trips, 9,000 gallon capacity each); construction and operation of water off-loading equipment; and the installation of added storage on the Project site.

The Project Description includes a Raw Cement and Aggregate Transfer and Distribution Facility, which would be located in an area alongside the existing railroad track and make use of a yet to be constructed rail spur. However, receiver stations or commitments needed from the Rail authorities to make this economically viable are not available at the present time. As such, it is possible the proposed rail spur may not be constructed to receive raw cement deliveries. Lebata determined the construction of a rail spur solely for the purpose of receiving Project water on railroad tank cars would require a significant expenditure of money, serious logistical issues with regard to a suitable off-site spur location (for filling) and possible construction, railroad operational issues in that frequent water delivery is considered a low priority cargo by the railroad operator, and may result in additional environmental issues (e.g., emissions, among others). Therefore, Lebata determined that hauling water to the Project site by railroad is not currently viable, nor economically feasible.

Hauling water to the Project site by truck may be considered as a short-term alternative during periods when water is not available from other sources. However, on a long-term basis, Lebata determined that hauling water to the Project site by truck required a significant expenditure of money, and would result in additional environmental issues (e.g., truck traffic, noise and emissions). Therefore, Lebata determined that hauling water to the Project site by truck was not currently viable on a long-term basis.

SECTION 3: WATER DEMAND

3.1 WSA Requirements

The WSA must comply with the following California Water Code requirements:

> (c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).
>
> (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

3.2 Current Project Water Demand

The Project site is undeveloped, thus there are no current water demands.

3.3 Current Regional Water Demand

The AVEK 2010 water demand was 60,675 acre-feet including sales for municipal, commercial, industrial, agriculture, and system losses. (AVEK, 2011) Additional details regarding current AVEK water demand are available in the AVEK 2010 UWMP.

The County of Los Angeles IRUWMP (2011) indicated the combined 2009 water demand for LACWW40 and QHWD was 54,631 AFY. Over 75 percent of this annual water demand was committed to residential customers.

Current regional water demands were identified by the Regional Water Management Group in the Antelope Valley Integrated Regional Water Management Plan (AVIRWMP, 2007). The AVIRWMP indicated 2005 total urban water demand of approximately 107,000 AFY and agriculture water demand of approximately 127,000 AFY for a total average year water demand of approximately 234,000 AFY. Additional details regarding current regional water demand are available in the AVIRWMP.

3.4 Future Project Water Demand

The Project will utilize water primarily for the following:

- Dust control using spray bar nozzles on the conveyors to wet aggregate materials being transported to the surge pile.
- Dust control by ground watering the area where loaders operate within the Aggregate Processing Facilities area and between the mining pit and the crusher.
- Dust control using sprayers at the three-deck and two-deck dry scalping screens.
- Ready-mixed concrete production

- Aggregate Processing Facility
- Landscaping
- Human hydration and hygiene
- Miscellaneous facility needs.

Estimated Project water demands will be approximately 312 AFY (Lebata, DEIR, State Clearinghouse No. 2007121054) and include the following:

- Aggregate processing - 272 AFY
- Dust control - 18 AFY
- Tire wash - 0.5 AFY
- Concrete processing - 14 AFY
- Landscape irrigation for vegetated berms - 1.5 AFY
- Human demands - 6 AFY.

Aggregate processing wash water would be reclaimed and directed to a series of silt ponds to settle out wash fines. Water would then be pumped to a 164,000-gallon clarifier where flocculants may be used, if needed, to further clarify the water before being reused on-site to wash aggregate. (Lebata, State Clearinghouse No. 2007121054) Estimated use of recycled and clarified rinse water is approximately 1,950 AFY within the Project site (note: repeated on-site reuse of clarified rinse water; not additional water demand).

3.5 Future Regional Water Demand

The AVEK future water demand for municipal, commercial, industrial, agriculture, and system losses were based on population projections for growth in the Antelope Valley and purveyor commitment to conservation programs, conjunctive use programs, groundwater management, and use of recycled water. Future AVEK normal-year water demand was estimated to be approximately 96,558 by 2030. (AVEK, 2011) It is understood that the Lebata Project future water demands were not included in the AVEK estimated future water demands.

The County of Los Angeles IRUWMP (2011) indicated the estimated 2035 water demand for LACWW40 and QHWD was 141,020 AFY.

Future regional demands were estimated by the Regional Water Management Group in the AVIRWMP. (2007). The AVIRWMP indicated future average year water demand will increase from approximately 302,000 AFY to 447,000 AFY for the period 2015 to 2035. Additional details regarding future regional water demand are available in the AVIRWMP.

3.6 Conservation Effects on Water Demand

In recent years, water conservation has become an increasingly important factor in water supply planning in California. The California plumbing code has instituted requirements for new construction that mandate the installation of ultra low-flow plumbing fixtures.

In addition, water wholesalers and retailers in the Antelope Valley implement a variety of water conservation programs. Examples of these programs include, but are not limited to, the following:

- Residential audits
- Conservation price structure (increasing block rates)
- Education programs
- Ultra low-flush toilet replacement program.

Recommended future water conservation programs may include, but not limited to, the following:

- agriculture programs
- evapotranspiration-based irrigation controller program for municipal customers.

According to the AVIRUMP, typically when a shortage occurs, water customers increase their awareness of water usage and voluntarily reduce water demand even more to avoid water rationing. The 20 percent reduction target from the proposed baseline (California SB X7-7, 20 percent by year 2020) has already been achieved within the Study Area. (Los Angeles County, 2011)

It is anticipated that the Project will maximize use of water conservation measures inside buildings, throughout the mining operations, and for site landscaping. Use of these measures throughout the Project will reduce the water demand as compared to projects that do not implement water conservation measures.

SECTION 4: WATER SUPPLY RELIABILITY

4.1 WSA Requirements

The WSA must comply with the following California Water Code requirements:

> 10910(c)(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.
>
> (4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

4.2 Introduction

Water supply reliability is commonly defined as “how much one can count on a certain amount of water being delivered to a specific place at a specific time”. Other factors include availability of water from the source, availability of the means of conveyance, and level and pattern of water demand at the place of delivery.

As previously described, the preferred source of water for the Project is the purchase of permanent entitlement of SWP water from outside the Antelope Valley basin. Additional sources of water for the Project include, but not limited to, the following: supplemental SWP water via AVEK, banked water, recycled water, groundwater, surplus supplies from local agencies, and or hauled water via railroad and or truck delivery. AVEK considers two aspects of reliability. (AVEK, 2011) First, the source "reliability" is only as reliable as the occurrences of the winter weather storms that deposit snow pack in the higher Sierra Nevada elevations that are part of the SWP watershed. Once the winter rain and snow season have been completed, the snowpack is measured and projected annual water volumes are given to SWP users. Prior to that, a specific volume of water is unpredictable. Based on previous experience, the predicted water values given by the State in the spring have been conservative.

The second aspect of “reliability” is what AVEK forecasts as the available water allocated for each of the water purveyors. AVEK also strives to be as informative as possible on the annual water entitlements, and distributes information from the SWP projections to the water purveyors in a timely manner. The demand by water purveyors is greater in the summer months compared to the winter months. AVEK charges higher water rates in peak months to offset water supply deficiencies as a demand management measure. Reliability planning requires information about: (1) the expected frequency and severity of shortages that

occur because of reduction in SWP entitlement and failure of transportation facilities; and (2) how available contingency measures can reduce the impact of shortages when they occur.

4.3 Water Supply Shortages

AVEK will attempt to meet local purveyor water demands. However, during a supply shortage AVEK may only be able to provide the minimum health and safety water needs of the service area. Therefore, since the Project's water supply requirements are not for health and safety, it is considered secondary priority after health and safety demands are met. The Project would be subject to drought management practices per the Rules and Regulations of the Los Angeles County Waterworks Districts. This is the primary reason that Lebata will pursue a permanent entitlement of SWP water as the primary source of water for the Project, and Lebata will consider participating in one or more banking programs. The AVEK water shortage response plan was designed based on the assumption that during a long term drought DWR will have a reduction in water deliveries. Additional details regarding the AVEK water supply shortage program are provided in the AVEK UWMP. (AVEK, 2011)

Rationing stages may be triggered by a shortage in the DWR water source. Although an actual shortage may occur at any time during the year, a shortage (if one occurs) is usually forecasted annually by the Department of Water Resources on or about April 1 each year. If it appears that it may be a dry year and the water supplies will be reduced, AVEK contacts its agricultural customers in March with confirmation follow up in April, so that the customers can minimize potential financial impacts. Currently, the sole water source for AVEK is imported surface water, but extraction from the AVEK water banking facilities is planned for the future. Rationing stages may be triggered by a supply shortage or by contamination.

The AVEK will make water delivery reductions per existing ordinances for entitlements. A copy of the AVEK "Water Shortage Contingency Plan" (Ordinance O-07-2) is available in Appendix D. Additional specific details regarding AVEK response to water supply shortages are available in the AVEK UWMP. (AVEK, 2011)

4.4 Reliability Comparison

The Water Code requires an assessment of water supply reliability and vulnerability to seasonal or climatic shortage. (CA Water Code, Section 10910) Reliability is a measure of a water service system’s anticipated success in managing water shortages. This assessment must include a comparison of the total projected water demand with the supply available for the following conditions: (1) average or normal water year, (2) single dry water year, and (3) three consecutive dry years (multiple dry-year). Additional details are provided in the AVEK UWMP. (AVEK, 2011)

The AVEK future supply projections assume normal inflows from the Bay-Delta for the SWP. AVEK utilized DWR delivery estimates for future SWP water supply reliability. For normal year water conditions, AVEK projected a long-term average delivery of 62 percent of maximum SWP entitlement. (AVEK, 2011) For single dry-year conditions, AVEK used the projected delivery of 12 percent of the maximum SWP entitlement. The AVEK multiple dry-year delivery was based on 46 to 51 percent of the maximum SWP entitlement. AVEK anticipated future water supplies only include SWP water and does not consider use of banked water to supplement supplies. Multiple-year drought periods correspond with the with the lowest water deliveries that were available from DWR.

4.4.1 Normal Year Supply and Demand

A summary of the AVEK's projected 20-year water supplies and demands for normal conditions is provided in Table 4-1. As noted in Table 4-1, AVEK will meet its normal year demands from 2015 to 2030 via use of existing imported water supplies. AVEK anticipates a surplus of nearly 11,000 to 16,000 AFY for the period 2015 to 2030. (AVEK, 2011) In addition, local water purveyors will continue to implement additional water supply strategies to increase availability and reliability of water supplies.

TABLE 4-1
NORMAL YEAR SUPPLY AND DEMAND COMPARISON

	2015	2020	2025	2030
Projected Supplies AFY (1,2)	**107,688**	**107,688**	**107,688**	**107,688**
Projected Demands AFY	**91,075**	**92,828**	**94,530**	**96,558**
Net Difference AFY (1)	**16,593**	**14,840**	**13,138**	**11,110**
Difference as a % of Supply (1)	**15.4**	**13.8**	**12.2**	**10.3**
Difference as a % of Demand (1)	**18.2**	**16.0**	**13.9**	**11.5**

Notes:

Source: AVEK UWMP (2011).

(1) Does not include additional AVEK supply sources including supplemental SWP water, and groundwater extracted via the Groundwater Recharge Project.

(2) Does not include other water resources utilized by water purveyors, such as their use of groundwater, future groundwater banking programs, conservation and water rationing efforts, and use of recycled water.

4.4.2 Single Dry-Year Supply and Demand

A summary of the AVEK projected 20-year water supplies for a single dry-year condition is provided in Table 4-2. Table 4-2 indicates that AVEK may have a potential supply deficit of 55,000 to 60,000 AFY during a single dry-year for the years 2015 to 2030. (AVEK, 2011) Current AVEK supplies identified in Table 4-2 only include SWP water available via DWR Table A. These supplies do not include AVEK additional water resources such as supplemental SWP water and groundwater extracted via the AVEK Groundwater Recharge Project. In addition, local water purveyors will have sufficient supply to meet future demands through 2035 (Los Angeles County, 2011) with implementation of one or more of the following future water supply strategies:

- Maximize use of available groundwater within Basin limits
- Expand conservation efforts
- Acquire and/or develop new imported supplies via the New Water Supply (Developer Fee)
- Create a combination of local surface spreading facilities to percolate untreated SWP water
- Expand use of Aquifer Storage and Recovery (ASR) wells to inject/recover potable water
- Add additional groundwater extraction capacity in order to recover stored water

- Expand use of recycled water within existing service areas
- Pursue an exchange program with agriculture interests to replace their groundwater use with recycled water thereby providing additional potable groundwater for municipal use
- Evaluate use of recycled water to replenish the Basin.

TABLE 4-2
SINGLE DRY YEAR SUPPLY AND DEMAND COMPARISON

	2015	2020	2025	2030
Projected Supplies AFY (1,2)	**37,000**	**37,000**	**37,000**	**37,000**
Projected Demands AFY (3)	**91,075**	**92,828**	**94,530**	**96,558**
Net Difference AFY (1,2,3)	**-54,075**	**-55,828**	**-57,530**	**-59,558**
Difference as a % of Supply (1,2)	**-146.1**	**-150.9**	**-155.5**	**-161.0**
Difference as a % of Demand (1,2)	**-59.4**	**-60.1**	**-60.9**	**-61.7**

Notes:

Source: AVEK UWMP (2011).

(1) Does not include additional AVEK supply sources including supplemental SWP water, and groundwater extracted via the Groundwater Recharge Project.

(2) Does not include other water resources utilized by water purveyors, such as their use of groundwater, future groundwater banking programs, conservation and water rationing efforts, and use of recycled water.

(3) Assumes demand unchanged compared to Normal Year.

According to the Antelope Valley Regional Water Management Group, local water purveyors will have a single dry-year deficit of approximately 152,000 AFY to 294,000 AFY for the period 2015 to 2035. (AVIRWMP, 2007) However, the AVIRWMP indicates that local purveyors could meet anticipated water demands via implementation of one or more of the following future water supply strategies:

- Expand local groundwater recharge areas, water banking programs, and aquifer storage and recovery (ASR) programs
- Add aggressive conservation program
- Add storm water capture and recharge
- Add recycled water for groundwater recharge
- Add groundwater treatment and recharge
- Expand use of recycled water for urban and agriculture demands
- Participate in groundwater banking programs outside of Antelope Valley
- Add desalination exchange program.

4.4.3 Multiple Dry-Year Supply and Demand

A summary of the AVEK's projected 20-year water supplies for multiple dry-year conditions is provided in Table 4-3. Table 4-3 indicates that AVEK may have a potential supply deficit of approximately 18,000 to 31,000 AFY during a multiple dry-year period for the years 2015 to 2030. (AVEK, 2011) Current AVEK supplies identified in Table 4-3 only include SWP water available via DWR Table A. These supplies do not include AVEK additional water resources such as supplemental SWP water and groundwater extracted via the Groundwater Recharge Project.

In addition, local water purveyors will have sufficient supply to meet future demands through 2035 (Los Angeles County, 2011) with implementation of one or more of the following future water supply strategies:

- Maximize use of available groundwater within Basin limits
- Expand conservation efforts
- Acquire and/or develop new imported supplies via the New Water Supply (Developer Fee)
- Create a combination of local surface spreading facilities to percolate untreated SWP water
- Expand use of Aquifer Storage and Recovery (ASR) wells to inject/recover potable water
- Add additional groundwater extraction capacity in order to recover stored water
- Expand use of recycled water within existing service areas
- Pursue an exchange program with agriculture interests to replace their groundwater use with recycled water thereby providing additional potable groundwater for municipal use
- Evaluate use of recycled water to replenish the Basin.

TABLE 4-3
MULTIPLE DRY-YEAR SUPPLY AND DEMAND COMPARISON

		2015	2020	2025	2030
Year 1	Supplies AFY (1,2)	65,587	65,587	65,587	65,587
	Demands AFY (3)	91,075	92,828	94,530	96,558
	Difference AFY (1,2,3)	-25,488	-27,240	-28,943	-30,970
	Difference - % of Supply (1,2)	-38.9	-41.5	-44.4	-47.2
	Difference - % of Demand (1,2)	-28.0	-29.3	-30.6	-32.1
Year 2	Supplies AFY (1,2)	70,847	70,847	70,847	70,847
	Demands AFY (3)	91,075	92,828	94,530	96,558
	Difference AFY (1,2,3)	-20,228	-21,980	-23,683	-25,710
	Difference - % of Supply (1,2)	-28.6	-31.0	-33.4	-36.3
	Difference - % of Demand (1,2)	-22.2	-23.7	-25.1	-26.6
Year 3	Supplies AFY (1,2)	72,601	72,601	72,601	72,601
	Demands AFY (3)	91,075	92,828	94,530	96,558
	Difference AFY (1,2,3)	-18,474	-20,227	-21,929	-23,957
	Difference - % of Supply (1,2)	-25.4	-27.9	-30.2	-33.0
	Difference - % of Demand (1,2)	-20.3	-21.8	-23.2	-24.8

Notes:

Source: AVEK UWMP (2011).

(1) Does not include additional AVEK supply sources including supplemental SWP water, and groundwater extracted via the Groundwater Recharge Project.

(2) Does not include other water resources utilized by water purveyors, such as their use of groundwater, future groundwater banking programs, conservation and water rationing efforts, and use of recycled water.

(3) Assumes demand unchanged compared to Normal Year.

According to the Antelope Valley Regional Water Management Group, local water purveyors will have a multiple dry-year deficit of approximately 90,000 AFY to 260,000 AFY for the period 2015 to 2035. (AVIRWMP, 2007) However, the AVIRWMP indicates that local purveyors could meet anticipated water demands via implementation of one or more of the following future water supply strategies:

- Expand local groundwater recharge areas, water banking programs, and aquifer storage and recovery (ASR) programs
- Add aggressive conservation program
- Add storm water capture and recharge
- Add recycled water for groundwater recharge
- Add groundwater treatment and recharge
- Expand use of recycled water for urban and agriculture demands
- Participate in groundwater banking programs outside of Antelope Valley
- Add desalination exchange program.

4.5 Climate Change

4.5.1 Introduction

Current climate change projections suggest that California will continue to enjoy a Mediterranean climate with the typical seasonal pattern of relatively cool and wet winters and hot, dry summers. However, climate patterns are different now and may continue to change at an accelerated pace. Increases in global emissions of greenhouse gases are leading to serious consequences for California including, but not limited to, the following: higher air and water temperatures, rising sea levels, increased droughts and floods, decreased amount and duration of snow pack, and extreme variability in weather patterns. (CA DWR, 2009; CA NRA, 2009) These changes are anticipated to intensify over the 20-year planning horizon of this Assessment. Even if all emissions of greenhouse gases ceased today, some of these developments would be unavoidable because of the increase in greenhouse gases recorded over the last 100 years and the fact that the climate system changes slowly. (PPIC, 2011) Many of these climate changes would affect the availability, volume, and quality of California water resources.

4.5.2 Potential Impacts of Climate Change

State and local water resources and water demands may be impacted by climate change via one or more processes including precipitation, air temperature, runoff, sea level change, and flooding. Each of these processes are summarized below.

4.5.2.1 Precipitation

Rainfall variability is expected to increase, leading to more frequent droughts and floods. Runoff from snowpack may be earlier and less predictable, and precipitation may fall as more rain and less snow. Computer models differ in determining where and how much rain and snowfall patterns may change under different emissions scenarios. However, the models are nearly unanimous in predicting a 12 to 35 percent decrease in northern California precipitation levels by mid-century (relative to average precipitation for 1960-1990). (CA NRA, 2009) California DWR estimates that Sierra Nevada snowpack may be reduced by 25 to 40 percent by 2050 (relative to average snowpack for mid 20th century). (CA NRA, 2009) However, average air temperature increases of 6 to 11 degrees Fahrenheit could trigger intensification of the of the El Nino Southern Oscillation (ENSO) cycles over the Pacific Ocean. (CA RNA, 2009) Intensification of the ENSO cycles could mean stormier wet years and even drier (or extended periods of) drought years. These ENSO cycles may lead to more severe coastal storms during the winter months and more erosion and coastal flooding. (CA RNA, 2009) Local precipitation amounts will continue to vary greatly year to year in future climate patterns. Local areas may experience prolonged periods of drought.

4.5.2.2 Air Temperature

Air temperatures in California are anticipated to increase by 2 to 9 degrees Fahrenheit by the year 2100. (CA NRA, 2009) Higher air temperatures may result in more rain and less snow, diminishing the reserves of water held in the Sierra Nevada snowpack. (CA NRA, 2009) Higher air temperatures may increase evaporation rates from reservoirs by 15 to 37 percent. (CA NRA, 2009) Regions that rely heavily upon surface water could be particularly affected as runoff becomes more variable and extended droughts occur more frequently. Change in air temperature may further stress the state's forests, making them more vulnerable to pests, disease, fire, and changes in species composition. Higher air temperatures may also increase evapotranspiration rates and external water demands for agriculture and landscaping, both significant sources of water demand within the District.

4.5.2.3 Runoff

Spring runoff from snowpack is occurring earlier now than it did in the first part of the 20th century. This change in runoff could affect availability of spring and summer snowmelt from mountain areas, including State Water Project water from the Bay-Delta and local rivers and streams. As an example, Figure 4-1 indicates the change in timing of seasonal runoff on the Sacramento River. The amount of April to July runoff (as a percent of total runoff) on the Sacramento River has decreased from nearly 45 percent to under 35 percent over the period 1906 to 2005 resulting in a loss of approximately 1.5 million AF of water (during April to July). (CA DWR, 2011) Changes is runoff timing may force water agencies to adapt to more runoff earlier in the water year which affects water storage for potable and irrigation demands, hydroelectric power production, and lake recreation, etc. Total annual exports from the Bay-Delta for State and Federal contractors may also decrease by 20 to 25 percent by the year 2100. (CCCC, 2009) Also, changes in runoff patterns may impact groundwater recharge in California especially those areas prone to groundwater overdraft including the local Antelope Valley Basin.

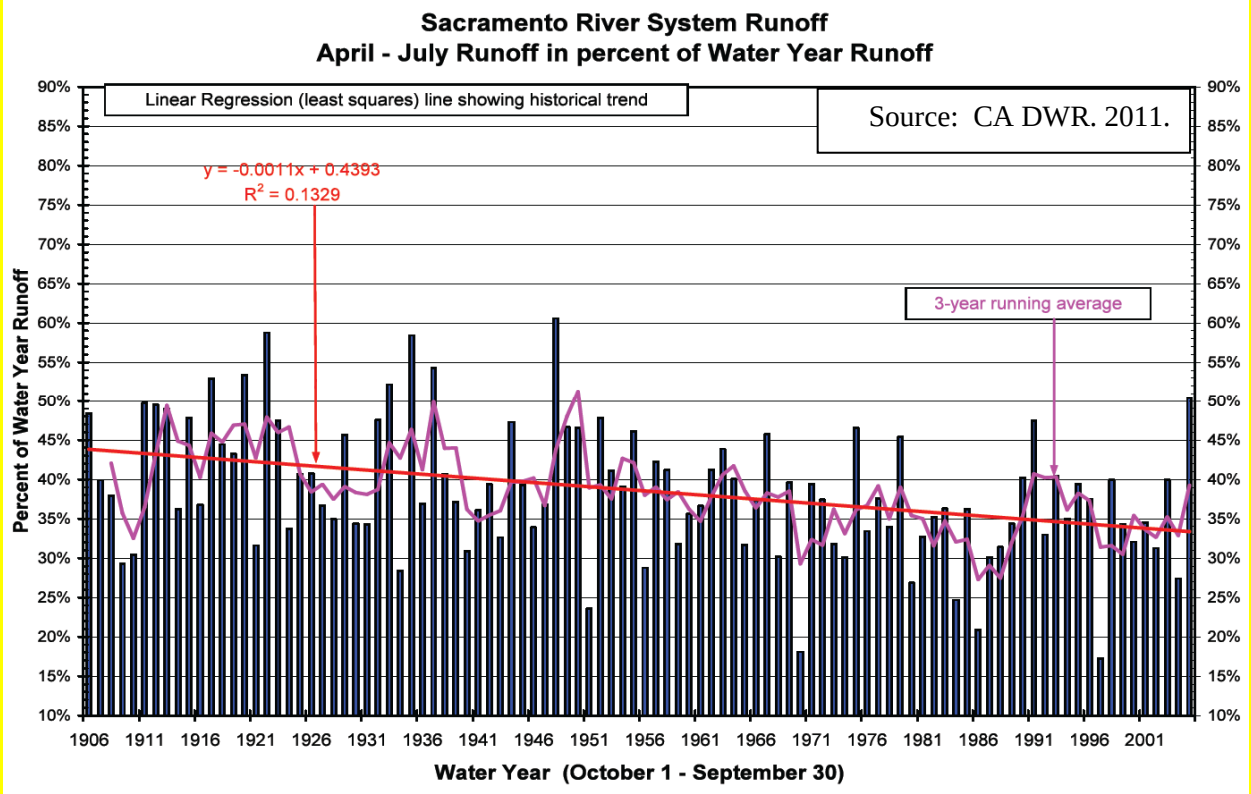
4.5.2.4 Sea Level

Sea levels have risen by as much as 7 inches along the California coast over the last century. (CA NRA, 2009) According to some estimates, sea level is projected to rise an additional 2 to 5 feet by 2100. (PPIC, 2011; Pacific Institute, 2009; CA RNA, 2009; CAT, 2008) These sea level increases could significantly impact infrastructure within coastal areas and affect quantity and timing of State Water Project water exports from the Bay-Delta. Affects of sea level rise in the Bay-Delta would be two-fold: (1) problems with weak levees protecting the low-lying land, many already below sea level; and (2) increased salinity intrusion from the ocean which could degrade fresh water transfer supplies pumped at the southern edge of the Bay-Delta or require more fresh water releases to repel ocean salinity. Estimated costs of 100-year flooding on coastal areas (4.6 feet) could reach $100 billion (2000 dollars) for replacement value of buildings and contents. (Pacific Institute, 2009) In addition, sea level rise poses threats to fragile Bay-Delta levees, which are extremely important for the State Water Project water supply. Changes in sea level may also impact areas prone to sea water intrusion further impacting water quantity and quality of available groundwater.

4.5.2.5 Flooding

Diminishing mountain snowpack reduces water storage and may increase the risk of flooding in many areas of California including Los Angeles County. There is some variance in the literature about whether climate change will impact the frequency and intensity of storm events in California over the next 100 years. However, as noted previously, average air temperature increases of 6 to 11 degrees Fahrenheit could trigger intensification of the of the El Nino cycles over the Pacific Ocean which may lead to stormier wet years, extended periods of drought years, more severe coastal storms during the winter months, and more erosion and coastal flooding. (CA RNA, 2009)

FIGURE 4-1



4.5.3 Mitigation and Adaptation

Responding to climate change generally takes two forms: mitigation and adaptation. Mitigation is taking steps to reduce human contribution to the causes of climate change by reducing green house gas (GHG) emissions. Adaptation is the process of responding to the effects of climate change by modifying our systems and behaviors to function in a warmer climate. (CA DWR, 2011)

In the water sector, climate change mitigation is generally achieved by reducing energy use, becoming more efficient with energy use, and/or substituting renewable energy sources in place of fossil fuel based energy sources. Because water requires energy to move, treat, use, heat, and discharge, water conservation is also energy conservation. As each water supplier implements water conservation measures and determines its water conservation targets, it can also calculate conserved energy and GHGs not-emitted as a side benefit. Once a water supplier has calculated the water conserved by a BMP, it is straightforward to convert that volume to conserved energy, and GHGs not-emitted. Additionally, water suppliers may want to focus on implementing water conservation measures that conserve water but do so at a significant decrease in GHG emissions as compared with other measures. (CA DWR, 2011)

Climate change means more than hotter days. Continued warming of the climate system has considerable impact on the operation of most water districts. Snow in the Sierra Nevada provides 65 percent of California's water supply. Predictions indicate that by 2050 the Sierra snowpack will be significantly reduced. Much of the lost snow will fall as rain, which will result in less snowpack. Runoff will flow quickly down the mountains during winter with less of the runoff to be stored in our current water system (compared to current snowpack) for use during California's hot, dry summers. The climate is also expected

to become more variable, bringing more droughts and floods. Water districts will have to adapt to new, more variable conditions. (CA DWR, 2011)

Principles of climate change adaptation include the following:

- As more mitigation is completed now, the less adaptation we may have to do in the future, because climate impacts could be less severe.
- Mitigation is much less expensive than adaptation.
- Mitigation should happen globally.
- Adaptation must happen locally.
- Adaptation strategies should be implemented according to future conditions, regular assessment and recalibration.
- Some adaptation strategies have benefits that can be realized today.

4.5.4 Local Strategies

As climate change continues to unfold in the coming decades, water agencies, may need to mitigate and adapt to new strategies, which may require reevaluating existing agency missions, policies, regulations, facilities, funding priorities, and other responsibilities. Examples of mitigation and adaptation strategies include, but not limited to, the following:

- Prepare long-term facility and sustainability master plan including specific elements for climate change adaptation.
- Increase groundwater recharge using additional surface water and recycled water.
- Promote use of recycled water.
- Promote water use efficiency for urban, agricultural, commercial, and industrial best management practices.
- Increase investments in infrastructure that promotes adaptation strategies (such as groundwater recharge, and recycled water) and existing principal facilities susceptible to impacts of climate change.

Notwithstanding the above strategies for dealing with climate change, the reality is that current environmental regulations place a very high priority on releasing additional water for fish (i.e., Delta smelt and others) and the environment. There will be great reluctance by regulators to acknowledge that changes to the earth's climate may alter the ranges of sensitive species. To attempt to maintain artificial ranges that may no longer be viable, regulators will likely require even more water to be released to the environment. With powerful laws like the Endangered Species Act to support such reactions, there will be more competition for scarce water supplies between people and the environment. Resolving this conflict will be one of the biggest challenges confronting water agencies. Promotion and implementation of programs such as groundwater storage and maximizing use of recycled water are two examples of successful strategies to be utilized by water agencies to mitigate the effects of climate change.

SECTION 5: CONCLUSIONS

This Water Supply Assessment (WSA) was prepared to assist the County of Los Angeles in satisfying the requirements of SB 610/California Water Code and supplement the Project DEIR (State Clearinghouse No. 2007121054). The WSA included a review of local Urban Water Management Plans, local planning documents, and the water requirements for the subject Project.

5.1 Project Summary

The applicant, Lebata, Inc. (Lebata), is proposing to establish and operate a new sand and gravel mining operation (Project) in the Antelope Valley area of unincorporated Los Angeles County, California. The Project's primary objective is to produce marketable Portland Cement Concrete-grade aggregate and related construction material products and supply these products where they are in demand. The Project involves mining a total of approximately 46.48 million gross tons of sand and gravel over a period of approximately 47 years. Total Project area is comprised of approximately 310 acres, of which approximately 282.4 acres are proposed for excavation. Although production would vary with market conditions, the extraction rate of unprocessed material over the life of the Project is expected to range between 1,000,000 to 2,500,000 tons per year, with annual sales of less than 2,000,000 tons per year. Actual sales levels would vary over time and are a direct function of several local and regional market factors.

Water demand for the Project will be approximately 312 AFY at final build-out. Estimated Project water demands will include 304.5 AFY for processes, 1.5 AFY for landscaping, and 6 AFY for potable needs. Aggregate processing wash water would be reclaimed and directed to a series of on-site silt ponds to settle out wash fines. Water would then be pumped to an on-site 164,000-gallon clarifier for treatment prior to reuse on-site.

The preferred source of water for the Project is the purchase of permanent entitlement of SWP water from outside the Antelope Valley basin. Another viable option for water for the Project includes the purchase of supplemental water from AVEK. These sources and additional alternative sources of water for the Project are summarized below.

5.2 Permanent Entitlement

The preferred source of water for the Project is the purchase of permanent entitlement of SWP water from a supplier/agency outside the Antelope Valley basin. This option would involve purchasing permanent entitlement to SWP water (Table A, see Section 2.3.2) via contractors or agencies with entitlements for sale. Lebata may also consider short-term and or long-term purchase options of SWP entitlements. As previously noted, SWP Table A entitlements do not reflect actual deliveries a contractor should expect to receive as the amounts are adjusted downward during below normal years. During below normal years, such adjustments are based upon the amount of SWP water available in any given year and the amount recently used by each Table A entitled users. SWP entitlements may not meet 100 percent of Project water demand in any one given year, thus Lebata may need to rely upon water supplies previously purchased and banked and or alternative water sources.

Presently, Lebata does not own entitlements to SWP water, but is interested to purchase SWP Table A water. Lebata is aware of one or more agencies interested to sell entitlement to SWP Table A water. If Lebata obtains SWP Table A water, the entitlement would be transferred to AVEK, then AVEK would be contracted to wheel the water to the Project site. A water service connection for the Project will be constructed to the AVEK Eastern Feeder pipeline located approximately 8,000 feet to the west of the Project site at the southeast corner of Avenue T and 116th Street. In addition, the LACWWD40 may be involved in the water transfer since the Project site lies within the LACWWD40 service area. Lebata will evaluate the details of this alternative and costs before pursuing a contract for permanent entitlement of SWP water.

5.3 Supplemental Water Via AVEK

AVEK has agreed to provide supplemental water for the Project on an interruptible basis. A copy of the AVEK Board approval of the Lebata Inc. application for water service is provided in Appendix B. As previously noted, AVEK's SWP entitlement provides for it to receive 141,400 acre-feet of Table A water in any given year. AVEK will provide water to the Project during normal and wet water years from water that is surplus to the needs of the existing Table A entitled users within the Antelope Valley. The AVEK water will be supplied directly to the Project and or purchased by the Project for banking. Water so banked would later be extracted and delivered to the Project during below normal years (see Section 2.5 for additional details). AVEK may also receive additional supplies such as Article 21 water (SWP), carryover water (SWP), turnback pool water (SWP), groundwater (local), etc. during normal, wet, and dry water years.

A water service connection will be constructed to the AVEK Eastern Feeder pipeline located approximately 8,000 feet to the west of the Project at the southeast corner of Avenue T and 116th Street. In addition, the LACWWD40 may be involved in the water transfer since the Project site lies within the LACWWD40 service area.

5.4 Other Sources of Water

As previously noted, during below normal years and emergencies SWP water may not be available to the Project. Other alternative sources of water which may be considered for the Project include banked water, recycled water, groundwater, surplus supplies from local agencies, and hauled water via railroad and or truck delivery. Many of these additional water supply sources are not anticipated to be viable for Project startup. Lebata may evaluate the details of one or more of these alternatives and costs before pursuing delivery of water for the Project.

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APPENDICES

Appendix A - California Water Code - Section 10910-10915

Appendix B - AVEK Board Approval of Water Service for Lebata Inc.

Appendix C - AVEK 2010 Annual Water Quality Report

Appendix D - AVEK Water Shortage Contingency Plan

Appendix A

California Water Code - Section 10910-10915

CALIFORNIA CODES
WATER CODE
SECTION **10910**-**10915**

10910. (a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources **Code**) under Section 21080 of the Public Resources **Code** shall comply with this part.

(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources **Code**, shall identify any **water** system that is, or may become as a result of supplying **water** to the project identified pursuant to this subdivision, a public **water** system, as defined in Section 10912, that may supply **water** for the project. If the city or county is not able to identify any public **water** system that may supply **water** for the project, the city or county shall prepare the **water** assessment required by this part after consulting with any entity serving domestic **water** supplies whose service area includes the project site, the local agency formation commission, and any public **water** system adjacent to the project site.

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources **Code**, shall request each public **water** system identified pursuant to subdivision (b) to determine whether the projected **water** demand associated with a proposed project was included as part of the most recently adopted urban **water** management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected **water** demand associated with the proposed project was accounted for in the most recently adopted urban **water** management plan, the public **water** system may incorporate the requested information from the urban **water** management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected **water** demand associated with the proposed project was not accounted for in the most recently adopted urban **water** management plan, or the public **water** system has no urban **water** management plan, the **water** supply assessment for the project shall include a discussion with regard to whether the public **water** system's total projected **water** supplies available during normal, single dry, and multiple dry **water** years during a 20-year projection will meet the projected **water** demand associated with the proposed project, in addition to the public **water** system's existing and planned future uses, including agricultural and manufacturing uses.

(4) If the city or county is required to comply with this part pursuant to subdivision (b), the **water** supply assessment for the project shall include a discussion with regard to whether the total projected **water** supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry **water** years during a 20-year projection, will meet the projected **water** demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

(d) (1) The assessment required by this section shall include an identification of any existing **water** supply entitlements, **water** rights, or **water** service contracts relevant to the identified **water** supply for the proposed project, and a description of the quantities of **water** received in prior years by the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing **water** supply entitlements, **water** rights, or **water** service contracts.

(2) An identification of existing **water** supply entitlements, **water** rights, or **water** service contracts held by the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified **water** supply.

(B) Copies of a capital outlay program for financing the delivery of a **water** supply that has been adopted by the public **water** system.

(C) Federal, state, and local permits for construction of

necessary infrastructure associated with delivering the **water** supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the **water** supply.

(e) If no **water** has been received in prior years by the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing **water** supply entitlements, **water** rights, or **water** service contracts, the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its **water** supply assessment pursuant to subdivision (c), an identification of the other public **water** systems or **water** service contractholders that receive a **water** supply or have existing **water** supply entitlements, **water** rights, or **water** service contracts, to the same source of **water** as the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of **water** supply within its **water** supply assessments.

(f) If a **water** supply for a proposed project includes groundwater, the following additional information shall be included in the **water** supply assessment:

(1) A review of any information contained in the urban **water** management plan relevant to the identified **water** supply for the proposed project.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected **water** demand associated with the proposed project. A **water** supply assessment shall not be required to include the information required by this paragraph if the public **water** system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected **water** demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

(g) (1) Subject to paragraph (2), the governing body of each public **water** system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public **water** system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

(2) Prior to the expiration of the 90-day period, if the public **water** system intends to request an extension of time to prepare and adopt the assessment, the public **water** system shall meet with the city or county to request an extension of time, which shall not exceed 30 days, to prepare and adopt the assessment.

(3) If the public **water** system fails to request an extension of time, or fails to submit the assessment notwithstanding the extension

of time granted pursuant to paragraph (2), the city or county may seek a writ of mandamus to compel the governing body of the public **water** system to comply with the requirements of this part relating to the submission of the **water** supply assessment.

(h) Notwithstanding any other provision of this part, if a project has been the subject of a **water** supply assessment that complies with the requirements of this part, no additional **water** supply assessment shall be required for subsequent projects that were part of a larger project for which a **water** supply assessment was completed and that has complied with the requirements of this part and for which the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has concluded that its **water** supplies are sufficient to meet the projected **water** demand associated with the proposed project, in addition to the existing and planned future uses, including, but not limited to, agricultural and industrial uses, unless one or more of the following changes occurs:

(1) Changes in the project that result in a substantial increase in **water** demand for the project.

(2) Changes in the circumstances or conditions substantially affecting the ability of the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), to provide a sufficient supply of **water** for the project.

(3) Significant new information becomes available which was not known and could not have been known at the time when the assessment was prepared.

10911. (a) If, as a result of its assessment, the public **water** system concludes that its **water** supplies are, or will be, insufficient, the public **water** system shall provide to the city or county its plans for acquiring additional **water** supplies, setting forth the measures that are being undertaken to acquire and develop those **water** supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that **water** supplies are, or will be, insufficient, the city or county shall include in its **water** supply assessment its plans for acquiring additional **water** supplies, setting forth the measures that are being undertaken to acquire and develop those **water** supplies. Those plans may include, but are not limited to, information concerning all of the following:

(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional **water** supplies.

(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional **water** supplies.

(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public **water** system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional **water** supplies.

(b) The city or county shall include the **water** supply assessment provided pursuant to Section **10910**, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources **Code**.

(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected **water** supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that **water** supplies will not be sufficient, the city or county shall include that determination in its findings for the project.

10912. For the purposes of this part, the following terms have the following meanings:

(a) "Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
(4) A proposed hotel or motel, or both, having more than 500 rooms.
(5) (A) Except as otherwise provided in subparagraph (B), a proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
(B) A proposed photovoltaic or wind energy generation facility approved on or after the effective date of the amendments made to this section at the 2011-12 Regular Session is not a project if the facility would demand no more than 75 acre-feet of **water** annually.
(6) A mixed-use project that includes one or more of the projects specified in this subdivision.
(7) A project that would demand an amount of **water** equivalent to, or greater than, the amount of **water** required by a 500 dwelling unit project.
(b) If a public **water** system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public **water** system's existing service connections, or a mixed-use project that would demand an amount of **water** equivalent to, or greater than, the amount of **water** required by residential development that would represent an increase of 10 percent or more in the number of the public **water** system's existing service connections.
(c) "Public **water** system" means a system for the provision of piped **water** to the public for human consumption that has 3,000 or more service connections. A public **water** system includes all of the following:
(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system that is used primarily in connection with the system.
(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.
(3) Any person who treats **water** on behalf of one or more public **water** systems for the purpose of rendering it safe for human consumption.
(d) This section shall remain in effect only until January 1, 2017, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2017, deletes or extends that date.

10912. For the purposes of this part, the following terms have the following meanings:
(a) "Project" means any of the following:
(1) A proposed residential development of more than 500 dwelling units.
(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
(4) A proposed hotel or motel, or both, having more than 500 rooms.
(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
(6) A mixed-use project that includes one or more of the projects specified in this subdivision.
(7) A project that would demand an amount of **water** equivalent to, or greater than, the amount of **water** required by a 500 dwelling unit project.
(b) If a public **water** system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public **water** system's existing service connections, or a mixed-use project that would demand an amount of **water** equivalent to, or greater than, the amount of **water** required by residential development that would represent an increase of 10 percent or more in the number of the public **water** system's existing service connections.
(c) "Public **water** system" means a system for the provision of piped **water** to the public for human consumption that has 3,000 or

more service connections. A public **water** system includes all of the following:

(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system that is used primarily in connection with the system.

(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.

(3) Any person who treats **water** on behalf of one or more public **water** systems for the purpose of rendering it safe for human consumption.

(d) This section shall become operative on January 1, 2017.

10914. (a) Nothing in this part is intended to create a right or entitlement to **water** service or any specific level of **water** service.

(b) Nothing in this part is intended to either impose, expand, or limit any duty concerning the obligation of a public **water** system to provide certain service to its existing customers or to any future potential customers.

(c) Nothing in this part is intended to modify or otherwise change existing law with respect to projects which are not subject to this part.

(d) This part applies only to a project for which a notice of preparation is submitted on or after January 1, 1996.

10915. The County of San Diego is deemed to comply with this part if the Office of Planning and Research determines that all of the following conditions have been met:

(a) Proposition C, as approved by the voters of the County of San Diego in November 1988, requires the development of a regional growth management plan and directs the establishment of a regional planning and growth management review board.

(b) The County of San Diego and the cities in the county, by agreement, designate the San Diego Association of Governments as that review board.

(c) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C.

(d) The regional growth management strategy includes a **water** element to coordinate planning for **water** that is consistent with the requirements of this part.

(e) The San Diego County **Water** Authority, by agreement with the San Diego Association of Governments in its capacity as the review board, uses the association's most recent regional growth forecasts for planning purposes and to implement the **water** element of the strategy.

(f) The procedures established by the review board for the development and approval of the regional growth management strategy, including the **water** element and any certification process established to ensure that a project is consistent with that element, comply with the requirements of this part.

(g) The environmental documents for a project located in the County of San Diego include information that accomplishes the same purposes as a **water** supply assessment that is prepared pursuant to Section **10910**.

Appendix B

AVEK Board Approval of Water Service for Lebata Inc.

B/D Item 11 (a)

ANTELOPE VALLEY – EAST KERN WATER AGENCY

APPLICATION FOR WATER SERVICE CONNECTION Revised

We hereby request the ANTELOPE VALLEY – EAST KERN WATER AGENCY to provide a Water Service Connection to the Agency facilities to provide a water supply to Big Rock Creek Surface Mining Project pursuant to the Water Service Agreement between Agency and this consumer.

Requested location of water service connection:

South side of Avenue T, approximately 8,000 linear feet east of the intersection of 16th Street E and Avenue T.

Requested rates of flow:

Maximum 1.4 cfs

Minimum 1.0 cfs

Requested hydraulic gradient on discharge:

Elevation above mean sea level 2855 ft.

Maximum amount of water to be delivered through connection:

~~260~~ 316 Acre-feet/year

Date of First Delivery: 03 (Month) 01 (Day) 2012 (Year)

	General Counsel	October 25, 2011
(Signed)	(Title)	(Date)

FOR AGENCY USE

Reviewed: _____ (General Manager) 1/30/2012 (Date)

Estimate Cost: $ _____

_____ (Engineer) (Date)

Payment Received: _____ (Date)

Authorization Sent: _____ (Date)

RECOMMENDED BOARD ORDER 11 (a)

To the Board of Directors

FOR BOARD ACTION

APPROVE APPLICATION REVISION FOR WATER SERVICE CONNECTION REQUEST BY LEBATA, INC.

The Board of Directors adopted the following board order on January 24, 2012:

That the revised application for the water service connection between AVEK and Lebata, Inc., increasing the supply from 260 AFY to 316 AFY, be approved as presented.

Motion by Sonato

Second by Rutledge

Carried 7-0; Aye

BOARD ORDER 11 (a)

~~11-08-11~~

01-24-12

Appendix C

AVEK Annual Water Quality Report

Antelope Valley-East Kern Water Agency
2012 Annual Water Quality Report - Los Angeles County System

The Antelope Valley-East Kern Water Agency provides treated surface water as a source of drinking water.
Treatment technique: Conventional
EPA Turbidity Performance Standards: Turbidity of the filtered water must:

1. Be less than or equal to 0.30 NTU in 95% of measurements in a month.
2. Not exceed 1 NTU at any time.

Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1: **100%**
Highest single turbidity measurement during the year: **0.13 NTU**
Percentage of samples < 0.30 NTU: **100%**
The number of violations of any surface water treatment requirements: **NONE**
Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance. Turbidity results which meet performance standards are considered to be in compliance with filtration requirements.

MICROBIOLOGICAL CONTAMINANTS

Type of Sample(s)	Parameter	Sampling Frequency	MCL	No. of Months in Violation	System Results Range	System Results Average
Distribution	Total Coliform Bacteria	108 - 160 / mo	5% positive	None	0.0 - 0.6%	0.05%
Distribution	Fecal Coliform/*E. coli*	108 - 160 / mo	1 pos. with 2 TC pos.	None	0%	0%

INORGANIC CONTAMINANTS

					RESULTS							
					Acton Plant Effluent (CWR)		Eastside Plant Effluent (CWR)		Quartz Hill Plant Effluent (CWR)		Raw Influent (Source)	
Parameter	Units	MCL	DLR	PHG or (MCLG)	Range	Average	Range	Average	Range	Average	Range	Average
Aluminum	mg/L	1	0.05	0.6	ND	ND	ND	ND	ND-0.052	ND		ND
Antimony	µg/L	6	6	20		ND		ND		ND		ND
Arsenic	µg/L	10	2	0.004		ND		ND		ND		2.1
Asbestos	MFL	7	0.20	7								<0.20
Barium	mg/L	1	0.1	2		ND		ND		ND		ND
Beryllium	µg/L	4	1	1		ND		ND		ND		ND
Cadmium	µg/L	5	1	0.04		ND		ND		ND		ND
Chromium (Total)	µg/L	50	10			ND		ND		ND		ND
Cyanide	µg/L	150	100	150		ND		ND		ND		ND
Fluoride	mg/L	2	0.1	1		ND		ND		ND		ND
Lead	µg/L		5	0.2		ND		ND		ND		ND
Mercury	µg/L	2	1	1.2		ND		ND		ND		ND
Nickel	µg/L	100	10	12		ND		ND		ND		ND
Nitrate (as NO3)	mg/L	45	2	45		ND		2.3		2.2	ND-3.7	2.3
Nitrite (as N)	mg/L	1	0.4	1		ND		ND		ND		ND
Nitrate+Nitrite (as N)	mg/L	10	0.4	10		ND		ND		ND		ND
Perchlorate	µg/L	6	4	6		ND		ND		ND		ND
Selenium	µg/L	50	5	30		ND		ND		ND		ND
Thallium	µg/L	2	1	0.1		ND		ND		ND		ND

VOLATILE ORGANIC CONTAMINANTS

Parameter	Units	MCL	DLR	PHG	RESULTS Raw Influent (Source)
1,1,1-Trichlorethane (1,1,1-TCA)	µg/L	200	0.5	100	ND
1,1,2,2-Tetrachloroethane	µg/L	1	0.5	0.1	ND
1,1,2-Trichloroethane (1,1,2-TCA)	µg/L	5	0.5	0.3	ND
1,1-Dichloroethane (1,1-DCA)	µg/L	5	0.5	3	ND
1,1-Dichloroethylene (1,1-DCE)	µg/L	6	0.5	10	ND
1,2,4-Trichlorobenzene	µg/L	5	0.5	5	ND
1,2-Dichlorobenzene (o-DCB)	µg/L	600	0.5	600	ND
1,2-Dichloroethane (1,2-DCA)	µg/L	0.5	0.5	0.4	ND
1,2-Dichloropropane	µg/L	5	0.5	0.5	ND
1,3-Dichloropropene (Total)	µg/L	0.5	0.5	0.2	ND
1,4-Dichlorobenzene (p-DCB)	µg/L	5	0.5	6	ND
Benzene	µg/L	1	0.5	0.15	ND
Carbon tetrachloride	µg/L	0.5	0.5	0.1	ND
cis-1,2-Dichloroethylene (c-1,2-DCE)	µg/L	6	0.5	100	ND
Dichloromethane (Methylene Chloride)	µg/L	5	0.5	4	ND
Ethylbenzene	µg/L	300	0.5	300	ND
Methyl-tert-butyl ether (MTBE)	µg/L	5	3	13	ND
Monochlorobenzene (Chlorobenzene)	µg/L	70	0.5	200	ND
Styrene	µg/L	100	0.5	0.5	ND
Tetrachloroethylene (PCE)	µg/L	5	0.5	0.06	ND
Toluene	µg/L	150	0.5	150	ND
trans-1,2-Dichloroethylene (t-1,2-DCE)	µg/L	10	0.5	60	ND
Trichloroethylene (TCE)	µg/L	5	0.5	1.7	ND
Trichlorofluromethane (Freon11)	µg/L	150	5	700	ND
Trichlorotrifluoroethane (Freon 113)	µg/L	1200	10	4000	ND
Vinyl Chloride (VC)	µg/L	0.5	0.5	0.05	ND
Xylenes (Total)	µg/L	1750	0.5	1800	ND

SYNTHETIC ORGANIC CHEMICALS

Parameter	Units	MCL	DLR (DL)	PHG	RESULTS Raw Influent (Source)
Dioxin	pg/L	30	5.00	0.05	ND
Diquat	µg/L	20	4	15	ND
Endothall	µg/L	100	45	580	ND

Antelope Valley-East Kern Water Agency
2012 Annual Water Quality Report - Los Angeles County System

GENERAL PHYSICAL AND SECONDARY STANDARDS

				RESULTS							
				Acton Plant Effluent (CWR)		Eastside Plant Effluent (CWR)		Quartz Hill Plant Effluent (CWR)		Raw Influent (Source)	
Parameter	Units	MCL	DLR	Range	Average	Range	Average	Range	Average	Range	Average
Aluminum	µg/L	200	50	ND	ND	ND	ND	ND-0.052	ND		ND
Calcium	mg/L	no standard			21.8		18.1		18.5		17.4
Chloride	mg/L	250			120		93		93		91
Color	Units	15		<5	<5	<5	<5	<5	<5		
Copper	µg/L	1000	50		ND		ND		ND		ND
Foaming Agents (MBAS)	mg/L	0.5			ND		ND		ND		ND
Hardness (Total) as CaCO3	mg/L	no standard			110		101		103		96
Iron	µg/L	300	100		ND		ND		ND		ND
Magnesium	mg/L	no standard			13.0		13.6		13.7		12.9
Manganese	µg/L	50	20		ND		ND		ND		ND
Odor @ 60 C	Units	3	1	<1	<1	<1	<1	<1	<1		
pH	Units	no standard		6.2-7.0	6.68	6.3-6.8	6.60	6.4-7.2	6.96	7.1-8.9	8.17
Potassium	mg/L	no standard			3.2		3.1		3.0		2.8
Silver	µg/L	100	10		ND		ND		ND		ND
Sodium	mg/L	no standard			63		59		59		56
Specific Conductance	µmhos	900			560		530	329 - 665	485	306 - 654	471
Sulfate	mg/L	250	0.5		31		51		50		30
Thiobencarb (Bolero)	µg/L	1	1		ND		ND		ND		ND
Total Dissolved Solids	mg/L	500			300		280		270		270
Turbidity	Units	5		0.01-0.11	0.03	0.01-0.10	0.06	0.02-0.13	0.05		
Zinc	mg/L	5.0	0.050		0.410		0.480		0.250		ND
Total Alkalinity (as CaCO3)	mg/L	no standard			70		65		65	63 - 89	75
Bicarbonate Alkalinity(HCO3)	mg/L	no standard			86		80		80		
Carbonate Alkalinity	mg/L	no standard			ND		ND		ND		
Hydroxide Alkalinity	mg/L	no standard			ND		ND		ND		

DISINFECTION RESIDUAL, PRECURSORS, and BYPRODUCTS

Type of Sample(s)	Parameter	Units	MCL/MRDL	DLR	MRDLG	RESULTS Range	RESULTS Average
Distribution	Chlorine (as total Cl2)	mg/L	4.0**		4	ND - 1.77	0.90
Treated Water	Total Organic Carbon (TOC)	mg/L	Treatment Requirement	0.3		1.1 - 2.1	1.6
Source Water	Total Organic Carbon (TOC)	mg/L	Treatment Requirement	0.3		2.0 - 3.6	2.7
Distribution	Stage 1 D/DBP Rule Total Trihalomethanes	µg/L	80**	0.5		20	20 #
Distribution	Stage 1 D/DBP Rule Total Haloacetic Acids	µg/L	60**	1		4.6	4.6 #
Distribution	Stage 2 D/DBP Rule Total Trihalomethanes	µg/L	80**	0.5		16 - 57	49 #
Distribution	Stage 2 D/DBP Rule Total Haloacetic Acids	µg/L	60**	1		4.3 - 11	10 #
Treated Water	Bromate	µg/L	10+	5		1.2 - 21	6.3

** Stage 1 D/DBP Rule Total THMs and Total HAAs compliance is based upon a system wide Running Annual Average of distribution system samples.
Stage 2 D/DBP Rule Total THMs and Total HAAs compliance is based upon Locational Running Annual Averages.
For Stage 1 D/DBP Rule this average is a system-wide value, for Stage 2 D/DBP Rule samples this is the location with the highest TTHM average
+ Compliance is based on the running annual average computed quarterly, of monthly samples, collected at the entrance to the distribution system.

DEFINITIONS and FOOTNOTES:

Plant Effluent, CWR, is finished, treated drinking water.
Raw Water is the Source Water, the California Aqueduct, prior to treatment.
Units : **mg/L** = milligrams per liter, parts per million (ppm)
µg/L = micrograms per liter, parts per billion (ppb)
pg/L = picograms per liter, parts per quadrillion (ppq)
µmhos = micromhos, a measure of specific conductance
MFL = million fibers per liter
pCi/L = pico Curies per liter
< = less than
> = greater than
ND = none detected above the DLR
NTU = nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.
MCL: Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. MCLs are set by the U.S. Environmental Protection Agency or the California Department of Public Health as close to the PHGs and MCLGs as is economically or technologically feasible.
MRDL: Maximum Residual Disinfectant Level. The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.
DLR: Detection Limit for purposes of Reporting.
(DL): Detection limit determined by the Laboratory when no DLR has been established.
MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.
MRDLG: Maximum Residual Disinfectant Level Goal. The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the U.S. Environmental Protection Agency.
PHG: Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Office of Environmental Health Hazard Assessment.
Primary Drinking Water Standard: Primary MCLs, specific treatment techniques adopted in lieu of primary MCLs, and monitoring and reporting requirements for MCLs that are specified in regulations.
Secondary Standards: Aesthetic standards established by the California Department of Public Health.
AL: Action Level. There is no MCL, if this level is exceeded, action is required by the Califronia Department of Public Health.
All analyses performed by the ELAP certified laboratories: AVEK Water Agency, Weck Laboratories, or Weck subcontract lab.

Appendix D

AVEK Water Shortage Contingency Plan

Section 5 Water Supply Reliability Planning and Water Shortage Contingency Planning

Law

10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable and provide data for each of the following:
(1) An probable water year;
(2) A single dry water year; and,
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

5.1 Reliability

AVEK considers two aspects of reliability. First, the source reliability is only as reliable as the occurrences of the winter weather storms that deposit snow pack in the higher Sierra Nevada elevations that are part of the SWP watershed. Once the winter rain and snow season have been completed, the snowpack is measured and projected annual water volumes are given to SWP users. Prior to that, a specific volume of water is unpredictable. Based on previous experience, the predicted water values given by the State in the spring have been conservative.

The second aspect of “reliability” is what AVEK forecasts as the available water allocated for each of the water purveyors. AVEK also strives to be as informative as possible on the annual water allocations, and distributes information from the SWP projections to the water purveyors in a timely manner. The demand by water purveyors is greater in the summer months compared to the winter months. AVEK charges higher water rates in peak months to offset water supply deficiencies as a demand management measure.

Reliability planning requires information about: (1) the expected frequency and severity of shortages that occur because of reduction in SWP allocation and failure of transportation facilities; and (2) how available contingency measures can reduce the impact of shortages when they occur.

5.2 Water Shortage Contingency Plan

Law

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

5.2.1 Stages of Action

5.2.1.1 Rationing Stages and Reduction Goals

The Agency has developed delivery reduction goals to curb demand during water shortages. In the event of water supply shortages the Agency will make water delivery reductions per the Agency law for allocations. Reference is made to **Appendix B**, which includes Ordinance O-07-2, AVEK Water Shortage Contingency Plan.

Stage No.	Water Supply Conditions	% Shortage
1	Reduction in SWP Allocation Below Current Demand	1%
2	Reduction in SWP Allocation Below Current Demand	50%

5.2.1.2 Estimate of Minimum Supply for Next Three years

Law

> *10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:*
>
> *10632 (b) An estimate of the minimum water supply available during each of the next three-water years based on the driest three-year historic sequence for the agency's water supply.*

Table 7 presents minimum projected 3-year supply.

Table 7 **Projected Supply (Ac-Ft)** [1]				
Source	Year 1	Year 2	Year 3	Normal
State Water Project	44,900	51,300	51,800	87,668

[1] Based on the years 1931, 1932, and 1933 as reported in *ContractorDRR_2009_rev080510.xlsx*.

5.2.2 Preparation for Catastrophic Water Supply Interruption

Law

> *10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:*
>
> *10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*

5.2.2.1 Water Shortage Emergency Response

Since the Agency began selling water to retailers, AVEK has maintained emergency contingency plans for activities required in the event there is an interruption in the DWR water supply or there is a major mechanical or electrical failure in one of the water treatment plants. The emergency activities that are undertaken by AVEK depend upon the severity of the problem and how quickly the problem can be remedied.

5.2.2.2 SWP Emergency Outage Scenarios

The Department of Water Resources has faced several potential outages along various parts of the SWP, mainly the California Aqueduct, since construction of the SWP in the early 1970s. Notable examples include slippage of side panels into the Aqueduct near Patterson in the mid-1990s, the Arroyo Pasajero flood event in 1995 (which also destroyed part of Interstate 5 near Los Banos), and various subsidence repairs needed along the East Branch of the Aqueduct since the 1980s.

All of these outages were short-term in nature (on the order of weeks or months), and DWRs Operations and Maintenance Division worked diligently to devise methods to keep the Aqueduct in operation while repairs were made. Thus, the SWP contractors experienced no interruption in deliveries.

One of the great design engineering features of the State Water Project is the ability to isolate parts of the system. If one reservoir or portion of the Aqueduct (the Aqueduct is divided into “pools”) is damaged in some way, other portions of the system can still remain in operation. Since September 11, 2001, DWR has made significant investments in the security measures protecting all SWP facilities. Security is now coordinated with the California Highway Patrol.

Events could transpire that could result in significant outages and potential interruption of service. Examples of possible nature-caused events include a levee breach in the Sacramento San Joaquin Delta near the Harvey O. Banks Pumping Plant, a; flood or earthquake event that severely damaged the Aqueduct along its San Joaquin Valley traverse, or an earthquake event along either the West or East Branches. Such events could impact all the SWP Contractors south of the Delta.

AVEK and other SWP Contractors response to such events would be highly dependent on where along the SWP an event occurred. Three scenarios are described herein that could impact AVEKs SWP deliveries. For these scenarios it is assumed that a 100 percent reduction for six months would result from these catastrophic events.

Scenario 1: Levee Breach near Banks Pumping Plant

As demonstrated by the June 2004 Jones Tract levee breach, the Deltas levee system is extremely fragile. The SWPs main pumping facilities are located in the southern Delta. Should a major levee in the Delta near these facilities fail catastrophically, salt water from the eastern portions of San Francisco Bay would rush into the Delta, displacing the fresh water runoff that supplies the SWP. All pumping would be disrupted until water quality conditions stabilized and returned to pre-breach conditions. The re-freshening of Delta water quality would require large amounts of additional Delta inflows, which might not be immediately available depending on the timing of the levee breach. The Jones Tract repairs took several weeks to accomplish and months to complete; a more severe breach could take much longer, during which time pumping might not be available on a regular basis.

Annual SWP operations consist of filling San Luis Reservoir, the major SWP storage facility south of the Delta, during the winter and spring months. South of Delta Contractors then take deliveries through San Luis Reservoir for the remainder of the year. Supplies are also stored in Pyramid and Castaic Lakes along the West Branch, as well as in a variety of groundwater banking programs in the southern San Joaquin Valley. Assuming that Banks Pumping Plant would be out of service for six months and that all southern Contractors had to take their supplies from the three reservoirs and from banking programs, coordination between DWR and Contractors would be required.

Scenario 2: Complete Disruption of the Aqueduct in the San Joaquin Valley

The 1995 flood event at Arroyo Pasajero demonstrated vulnerabilities of the Edmund G. “Pat” Brown portion of the California Aqueduct (that portion that traverses the San Joaquin Valley from San Luis Reservoir to Edmonston Pumping Plant). Should a similar flood event or an earthquake damage this portion of the aqueduct, deliveries from San Luis Reservoir could be interrupted for a period of time. DWR has informed the contractors that a four-month outage could be expected in such an event. AVEKs assumption is a six-month outage.

Scenario 3: Complete Disruption of the Aqueduct East Branch

The East Branch of the California Aqueduct begins at a bifurcation of the Aqueduct in the Tehachapi Mountains south of Edmonston Pumping Plant. From the point of bifurcation, it is an open canal.
If a major earthquake (an event similar to or greater than the 1994 Northridge earthquake) were to damage a portion of the East Branch, deliveries could be interrupted. The exact location of such damage along the East Branch would be key to determining emergency operations by DWR and the southern California contractors. For this scenario, it is assumed that the East Branch suffered a single-location break and would not be available for deliveries.

If the shortage problem can be resolved within the available water storage time frame, only a few of the larger consumers need to be notified of the temporary decrease in water supply. If there will be a stoppage in the raw water deliveries to the various treatment plants, all customers (M&I and agriculture) will be notified of the stoppage and how soon water deliveries may be resumed.

If raw water deliveries to water treatment plants are temporarily stopped, treated water from other plants may be rerouted to the affected areas in some instances via interconnecting pipeline systems. Damages to the aqueduct will be repaired by DWR. Damaged Agency treatment plant components, whether mechanical or electrical, can usually be circumvented due to the duplicity of pumping and operations systems or the availability of manual over-ride controls. The magnitude of reduced water deliveries and length of time before resumption of full water availability will determine the extent of customer (M&I and agriculture) notification and activities required by the AVEK staff.

Possible Catastrophe:

- Power Outage
- Aqueduct Failure due to Earthquake or other circumstances
- Agency Treatment Plant Shutdown due to vital component failure
- Delta Levee Failure
- Local Earthquake

The following summarizes the actions the water agency will take during a water supply catastrophe.

Response by the agency to a catastrophic event will always include contact and coordination with AVEK's customers. Additionally, in the event of power loss AVEK has permanent emergency power generation that automatically starts to maintain water treatment operations. In the event of an earthquake, AVEK personnel will survey and assess damage and respond accordingly with shutdowns and repairs.

Preparation Actions for a Catastrophe	
Possible Catastrophe	Summary of Actions
Regional power outage	Automatic switch to emergency power; contact customers, assess and respond
Earthquake	Automatic switch to emergency power (if needed); contact customers, assess and respond

5.2.3 Prohibitions, Consumption Reduction Methods and Penalties

Law

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its

water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

10632 (f) Penalties or charges for excessive use, where applicable.

5.2.3.1 Mandatory Prohibitions on Water Wasting

AVEK believes that their customers are in the best position to implement no-waste policies. AVEK can and will make recommendations to assist its customers in monitoring water wasting, if AVEKs assistance is requested.

5.2.3.2 Excessive Use Penalties

Penalties for excessive use are imposed by water purveyor customers of AVEK. It is anticipated agricultural users will economize their water usage as required. AVEK has in place provisions for pre-paid ordering as a method of penalizing users who do not take the delivery requested. AVEK does not have powers to implement penalties for excessive use by a retailers customer but encourages all retailers to have such penalties in place.

5.2.3.3 Implementation

AVEK relies on its water retailers to implement water consumption reduction methods to their customers in order to cope with water supply shortages.

5.2.4 Revenue and Expenditure Impacts and Measures to Overcome Impacts

Law

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments

Revenues collected by the Agency are currently used to fund operation and maintenance of the existing facilities and fund new capital improvements. The Agency will estimate projected ranges of water sales versus shortage stage to best understand the impact each level of shortage will have on projected revenues and expenditures.

Revenue reduction and an increase in expenditure may occur due to reduced sales from implementing the abovementioned programs. The magnitude of the revenue reduction and expenditure increase will be dependent on the severity of the water shortage, with larger and longer water shortages having greater impact on revenues. For minor events, the Agency may be able to absorb the revenue shortfall/increase in expenditures by reallocating existing funds, such as delaying some capital projects. For large events, the Agency may enact a rate adjustment to its customers.

5.2.5 Shortage Contingency Ordinance/Resolution

Law

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of

the urban water supplier:

10632 (h) A draft water shortage contingency resolution

5.2.5.1 AVEK Water Shortage Response/Priority by Use

AVEK has a plan of action in its existing rules and regulations in the event it is necessary to declare a water shortage emergency. AVEK reserves the right at any time if the quantity of water available to the Agency pursuant to the Water Supply Contract between the DWR and AVEK is less than the aggregate of all consumer requests to allocate the quantity of water available to AVEK to the extent permitted by law. See Appendix B for Ordinance O-07-2 to Adopt a Water Shortage Contingency Plan.

5.2.5.2 Health and Safety Requirements

These requirements will be left to the retailing water purveyor agencies. AVEK has no direct control of the final water user actions and activities.

5.2.5.3 Water Shortage and Triggering Mechanisms

AVEK will attempt to provide the minimum health and safety water needs of the service area. It must be recognized that AVEKs water supply is not considered a primary source of water and it is a secondary source of water. The water shortage response plan was designed based on the assumption that during a long term drought DWR will have a reduction in water deliveries.

Rationing stages may be triggered by a shortage in the DWR water source. Although an actual shortage may occur at any time during the year, a shortage (if one occurs) is usually forecasted by the Department of Water Resources on or about April 1 each year. If it appears that it may be a dry year and the water supplies will be reduced, AVEK contacts its agricultural customers in March with confirmation follow up in April, so that the customers can minimize potential financial impacts.

Currently, the Agency's sole water source is imported surface water, but extraction from the AVEK water banking facilities is planned for the future. Rationing stages may be triggered by a supply shortage or by contamination.

5.2.6 Reduction Measuring Mechanism

Law

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

5.2.6.1 Mechanism to Determine Reductions in Water Use

Under non-emergency water supply conditions, potable water production figures are recorded daily. Totals are reported daily to the Water Treatment Facility Supervisor. Totals are reported monthly to the Board of Directors and incorporated into the water supply report.

During water shortage periods, the Agency will review daily the water demands versus the established reduction goals. Reference is made to **Appendix B**, Ordinance O-07-2 to Adopt Water Storage Contingency Plan. The Agency will take appropriate steps to reduce their deliveries to meet the reduction

goals.

5.3 Recycled Water Plan

Law

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:

10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, including quantification of the amount of wastewater collected and treated methods of wastewater disposal.

10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.

10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

5.3.1 Wastewater Quantity, Quality, and Current Uses

5.3.1.1 AVEK's Recycled Water Use Capabilities

AVEK does not collect or treat wastewater and has no plan to use recycled water as part of their deliveries. The Agency provides service to retail and water purveyors and agricultural customers that may have the opportunity to utilize recycled water as part of deliveries. The Agency supports customers plans that would utilize recycled water within AVEK boundaries. The use of recycled water by AVEK customers is an important part of reducing the demand on AVEKs available water. Los Angeles County Water Works District has estimates for the future availability and location of recycled water and they are included in **Appendix I**.

5.3.1.2 Potential and Projected Use, Optimization Plan with Incentives

Law

10633 (d) A description and quantification of the potential uses of recycled water. …, and a determination with regard to the technical and economic feasibility of serving those uses.

10633. (e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

10633 (f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

10633 (g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated

Draft Environmental Impact Report
Lebata, Inc.
Big Rock Creek Surface Mining Project

APPENDIX 19

Drawdown Assessment of Proposed Water Supply Well

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DRAWDOWN ASSESSMENT OF PROPOSED WATER SUPPLY WELL LEBATA BIG ROCK QUARRY

Pearblossom, CA

For:
Sespe Consulting

Prepared by:
Strategic Engineering & Science, Inc.
17701 Cowan, Suite 210
Irvine, CA 92614

February 16, 2012

CERTIFICATION

I hereby certify that the work conducted for: "***Drawdown Assessment of Proposed Water Supply Well – Lebata Big Rock Quarry, Pearblossom, CA***" (prepared by SES, Inc. for SESPE Consulting, Inc.) was completed by a Professional Geologist and Civil Engineering within the State of California.

Executed at Irvine, California on February 17, 2012.

Signature,

Mark Trevor, P.G.
Senior Project Geologist

Ian Hutchison, Ph.D, P.E.
Principal/President

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1.0 INTRODUCTION

This report describes the results of an assessment of the groundwater drawdown of a potential water supply well at the proposed Lebata - Big Rock Quarry near the town of Pearblossom in Los Angeles County, California. This assessment is in support of an Environmental Impact Report (EIR) prepared for the Los Angeles County Department of Public Works. The work described here was conducted by a qualified civil engineer and geologist at Strategic Engineering and Science Inc. (SES).

In performing the evaluations described here, SES has relied on the documents listed at the end of this report, which include the United States Geological Survey (USGS) groundwater modeling performed in 2003 (and previous models), a Water Supply Assessment prepared for the Antelope Valley Solar Ranch One, and the Summary Expert Report prepared for the Antelope Valley Area of Adjudication (2010). Other reports were also consulted and are referenced in the text below.

2.0 REGIONAL AND LOCAL GEOLOGY

The project area (Site) is located within the Mojave Desert Geomorphic Province near its southwest margin; approximately three miles north of the San Andres Fault and the foot of the San Gabriel Mountains (Figure 1). The province is characterized by narrow, heavily eroded ridges separated by wide alluvial valleys (Hilltop Geotechnical, 2006). Geologically, the southwestern portion of the province is underlain by pre-cenozoic granitic bedrock, downdropped by a series of faults, the most prominent of which is the San Andreas Fault zone to the south of the Site. The granitic basement appears to be irregular, possibly faulted, and consequently has a depth that varies by up to 600 feet. The granite is overlain by Pliocene and Miocene basalts and terrestrial sedimentary rocks as well as thick sequences of Quaternary alluvial and lacustrine (lake) deposits. A more detailed description of the local and regional geology can be found in Appendix 6 of the Draft EIR (Sespe, 2010).

The Site is located near the end of an alluvial fan, which emanates from Big Rock Creek near the foot of the mountains to the south. Topography here is relatively flat with a gentle slope to the north and an approximate elevation of 2,900 feet above mean sea level (amsl) (Figure 2). The area is underlain by a thick sequence of Quaternary alluvial deposits. Geologic cross sections prepared for the area are shown on Figure 3. The closest cross sections to the Site (Figures 4 and 5) suggest the Quaternary deposits may be up to 1,000 feet thick before terminating at the granitic bedrock (Beeby et. al, 2010), although 300-600 feet is a more likely thickness. The Quaternary deposits include fine-grained lake bed deposits at depth, but closer to the surface a relatively coarse-grained, heterogeneous mix of sand and gravel is predominant. This is characteristic of an arid, alluvial fan depositional environment.

3.0 HYDROGEOLOGY AND WATER BALANCE

3.1 Regional Hydrogeology and Water Balance

The Site is located in the South Lahonton Hydrologic Region, a relatively arid environment encompassing approximately 21 million acres (Department of Resources [DWR], 2003). The Site is located in the Antelope Valley sub-region, which occupies 1,390 square miles in the southwest portion of the hydrologic region. The Antelope Valley is a closed groundwater basin, and all water flows stay within the basin and drain to central lakes, which, due to the areas aridity, are usually dry. Average rainfall in the Antelope Valley is approximately 10-inches (Beeby et. al, 2010).

Groundwater in the Antelope Valley occurs primarily in the confined and unconfined aquifers of the alluvial deposits. The shallowest, unconfined aquifer is called the "Principal Aquifer" and is typically first encountered less than 100 feet below the surface. Deeper aquifers are confined in many areas by Pleistocene clayey lake deposits. The deeper aquifers range in depth and thickness, but are all constrained vertically by the underlying bedrock, and generally provide a poor water source. Based on the currently available information, these deeper aquifers do not occur at the Site.

The Antelope Valley supplies water to a population of roughly 300,000 people for a combination of industrial, municipal, agricultural and, to a lesser extent, environmental uses. The majority of the water is supplied by groundwater wells. Since 1998, groundwater pumping has been about 150,000 acre feet per year (afy). This volume is supplemented by approximately 60,000 afy of imported water and less than 10,000 afy of diverted surface water. Natural recharge in the valley is approximately 60,000 afy, while return flows of pumped, imported or diverted water account for roughly 76,000 afy. Artificial recharge accounts for a very small fraction of total recharge (less than 1%). According to the Antelope Valley Adjudication Area (AVAA) Expert Report, the sustainable yield of the valley is approximately 110,000 afy[1].

A potential well at the Site would be utilized for the sand and gravel operations and would be required to deliver approximately 312 afy. This amounts to approximately 0.3% of the sustainable yield. Its effect on the Antelope Valley's water balance would therefore be negligible, not considering the cumulative effects of other potential future water supply needs. In addition, the well would be located close to a major recharge area, thus potentially mitigating the wells local effect on water levels.

---

[1] It should be noted that the water balance values cited in the above paragraph refer to the AVAA, which is slightly smaller than the Antelope Valley hydrologic sub-basin as defined by the DWR.

3.2 Local Hydrogeology

The Site is located within the South East Groundwater Area of Antelope Valley. Portions of which (especially to the south) are natural groundwater recharge areas for the Antelope Valley. The Site is located at the northern end of one of those recharge areas (Leighton and Phillips, 2003). Shallow groundwater is usually encountered at depths shallower than 100 feet below grade. Groundwater generally flows to the north and northwest. It has been suggested that well capacities are within a 200 to 800 gpm range (Beeby et. al, 2010). Locally, groundwater well data available from the DWR website indicates groundwater elevation is variable both spatially and temporally, occurring between 60 to 120 feet below surface at different locations over the past 50 years. Figure 6 includes hydrographs for three wells located near the project Site. Soil borings at the Site, drilled in 2005 discovered moist to wet conditions at 80 feet below ground (fbg).

Groundwater in the vicinity of the Site has varied widely both from year to year and seasonally due to varying amounts of basin-wide groundwater usage. This would indicate that local groundwater supply wells would typically have been designed to accommodate wide fluctuations in groundwater level, and would therefore not be affected by the relatively small drawdown predicted for the potential Site Well, as discussed below.

4.0 DRAWDOWN EVALUATION

4.1 Approach

The potential water supply well would be located in the northwestern corner of the Site as shown in Figure 2. It is assumed that a 500-foot well would be installed with a screen interval ranging from 100 feet below the surface to the total depth of the well. This would result in a 400 foot long screened interval.

As mentioned above, the required water supply is estimated at 312 afy. This is to be achieved by pumping the well 5 days per week for 12.4 hours per day, at an approximate flow rate of 545 gpm. The planned intermittent pumping will have the same affect on groundwater as continuous pumping at a lower flow rate. Thus, to simplify the calculations, we use a continuous flow rate of 193 gpm, which also corresponds to 312 afy.

To verify the minimal drawdown difference between the two flow rates we compared the drawdown in a 12 hour period for 545 gpm and 193 gpm. At 100 ft distance, the difference was 0.5 feet and at 200 ft there was no measurable difference. (Appendix A)

Existing data from regional studies (Beeby et. al, 2010), previously conducted groundwater modeling (Leighton and Phillips, 2003 and earlier) and local site data were used to model drawdown of the potential well out to an approximate radius of one mile. Drawdown calculations were performed using the Cooper-Jacob Approximation of the Theis Solution for groundwater flow (Theis, 1935, Cooper and Jacob, 1946).

The equation estimates drawdown (s) at distance (r) and time (t), by:

$$S = \frac{Q}{4\pi T} \times \ln[2.2459 \times \frac{Tt}{r^2 S}]$$

where Q is the pumping rate, T is the transmissivity and S is the storage coefficient.

Estimates of the various groundwater parameters used are as follows:

- Q: A pumping rate of 193 gpm.
- T: The transmissivity is based on hydraulic conductivity (K) times the assumed aquifer thickness, in this instance the screen interval of 400 feet.
- K: Hydraulic conductivity is based on the 2003 USGS model, which in turn is based on, but modified from an earlier USGS model (1998). These and other models rely heavily on empirical data from Bloyd (1967). The USGS model was performed on a regional scale (Antelope Valley), but broke the analysis horizontally into one-square mile units and vertically into model layers based on aquifer properties. Only the upper layer (Layer Unit 1) occurs at the Site. The assigned hydraulic conductivity for the one-square mile unit encompassing the Site is 10 feet per day (or 3.5×10^{-3} cm/sec). This value correlates reasonably well with other published approximations for the formation type found at the site (Freeze and Cherry, 1979) (Nielson, 2006), and was used for what is referred to as the "average" drawdown estimate described in Section 4.2.
- S: Storage coefficient for an unconfined aquifer is comparable to specific yield. We chose to use the specific yield estimated by USGS (2003), which is 0.1 (unitless), thus for our model, S = 0.1.

The equation was solved for various distances from the source well starting at 100 feet to a maximum of 5,000 feet and for different total pumping times ranging from one year to 100 years. Recognizing potential uncertainties in the hydraulic conductivity value used, the average conductivity value was increased and decreased by 50% respectively, to provide "minimum" and "maximum" drawdown estimates respectively.

4.2 Results

Table 1 (below) shows the average drawdown. A plot of average drawdown contours is included as Figure 7 and the results are detailed in Appendix A.

Table 1. Average Drawdown at Select Distances from Pumping Well

		Distance from Pumping Well (ft)				
		100	**200**	**500**	**2000**	**5000**
Time (years)	**1**	6.0	5.0	3.6	1.6	0.2
	2	6.5	5.5	4.1	2.1	0.7
	5	7.2	6.2	4.8	2.8	1.4
	10	7.7	6.7	5.3	3.3	1.9
	30	8.5	7.5	6.1	4.1	2.7
	100	9.4	8.4	7.0	5.0	3.6

According to the DWR database, there are five water wells located within a one mile radius from the on-site supply well (Figure 2). Of these five wells, none are within 2,000 feet of the supply well. At the 2,000 foot radius, the drawdown is less than three feet after five years and approximately four feet at 30 years for the "average" case. It is unclear which, if any of these wells are currently operational. Prior to the mid-1980s, and without the influence of the potential Site well, these wells have experienced total water level fluctuations of up to 140 feet[2]. Thereafter maximum fluctuations decreased to approximately 60 feet and in the last ten years they decreased to 15 feet.

By comparison, for the minimum scenario yields a drawdown of three feet at 2,000 feet after 30 years. The maximum scenario results in a drawdown of seven feet after 30 years.

5.0 CONCLUSIONS

In considering the results, there are several assumptions implicit in the Theis equation which should be considered. Firstly, the equation assumes there is no recharge from any source. For that reason, all results are higher than the true probable drawdown value, as the Site is actually in a groundwater recharge zone. Furthermore, the amount of drawdown would stabilize long before the 100 years conservatively used in the calculations described in the report.

Another assumption is that the formation is uniform in character; there is no hydraulic gradient and hydraulic conductivity is equal in all directions. This produces the perfectly circular ROI contours in Figure 7. In reality, drawdown will be higher in areas with lower conductivity, or other features that preclude groundwater movement, and the shape of the drawdown curves could be skewed by the horizontal movement of groundwater.

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[2] DWR, Well 05NO9W20KODS.

The impact of a potential 312 afy water supply well located at the Site would be relatively minor. Only a handful of nearby wells would see a measurable impact in water level, and the drawdown is not considered to be sufficient to effect capacity of these wells to supply water. When taking into consideration the background water level fluctuations (several tens of feet), it is unlikely that the impact on nearby wells would be discernible from background variations.

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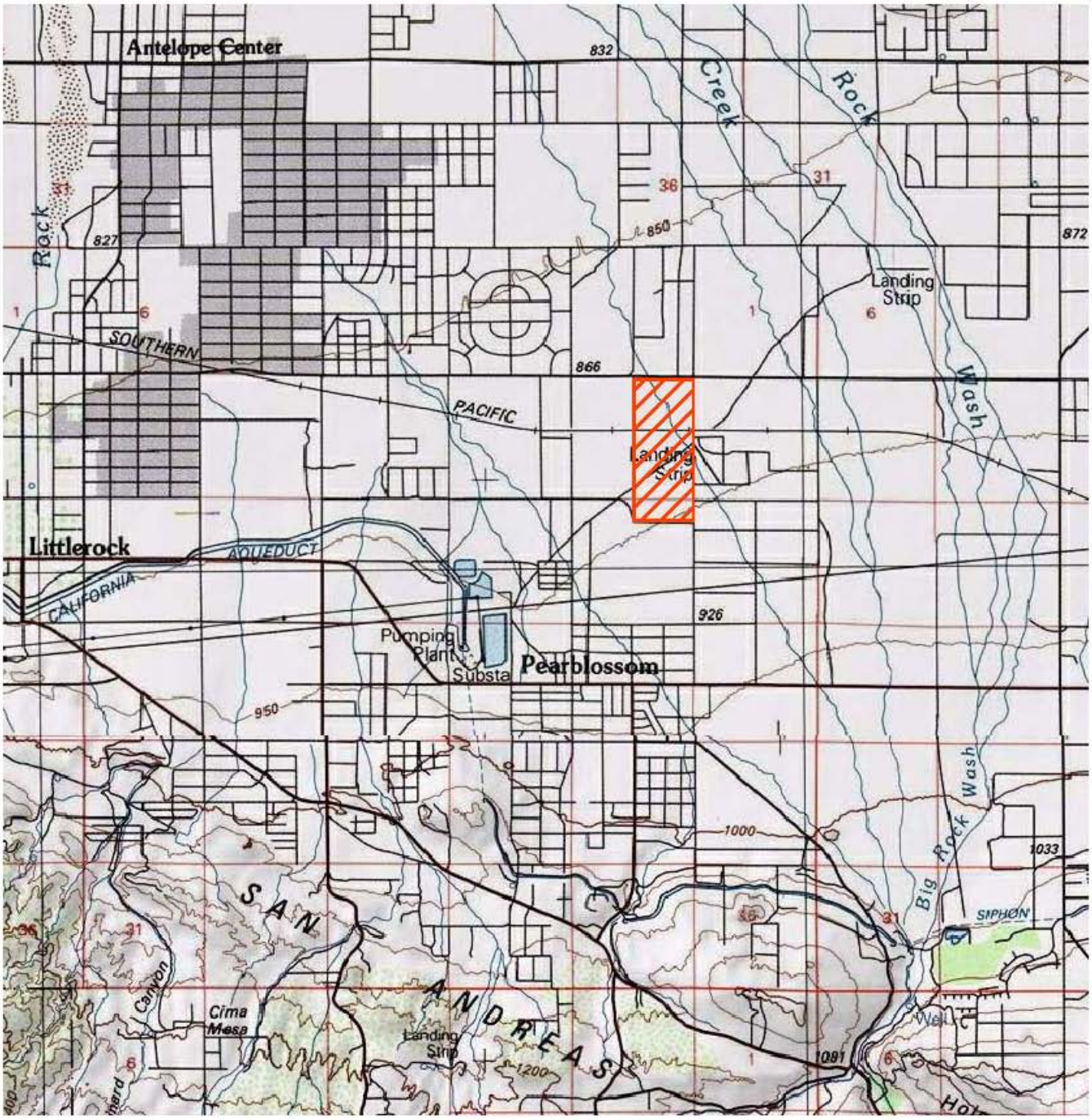

N

0 0.75 1.50

SCALE (MILE)

LEGEND

SITE BOUNDARY

Reference: Image from USGS 1:100,000 Map Series

Vicinity Map

SESPE Consulting
Big Rock Creek Mine
Pearblossom, California

Figure 1	February 2011	SES STRATEGIC ENGINEERING & SCIENCE

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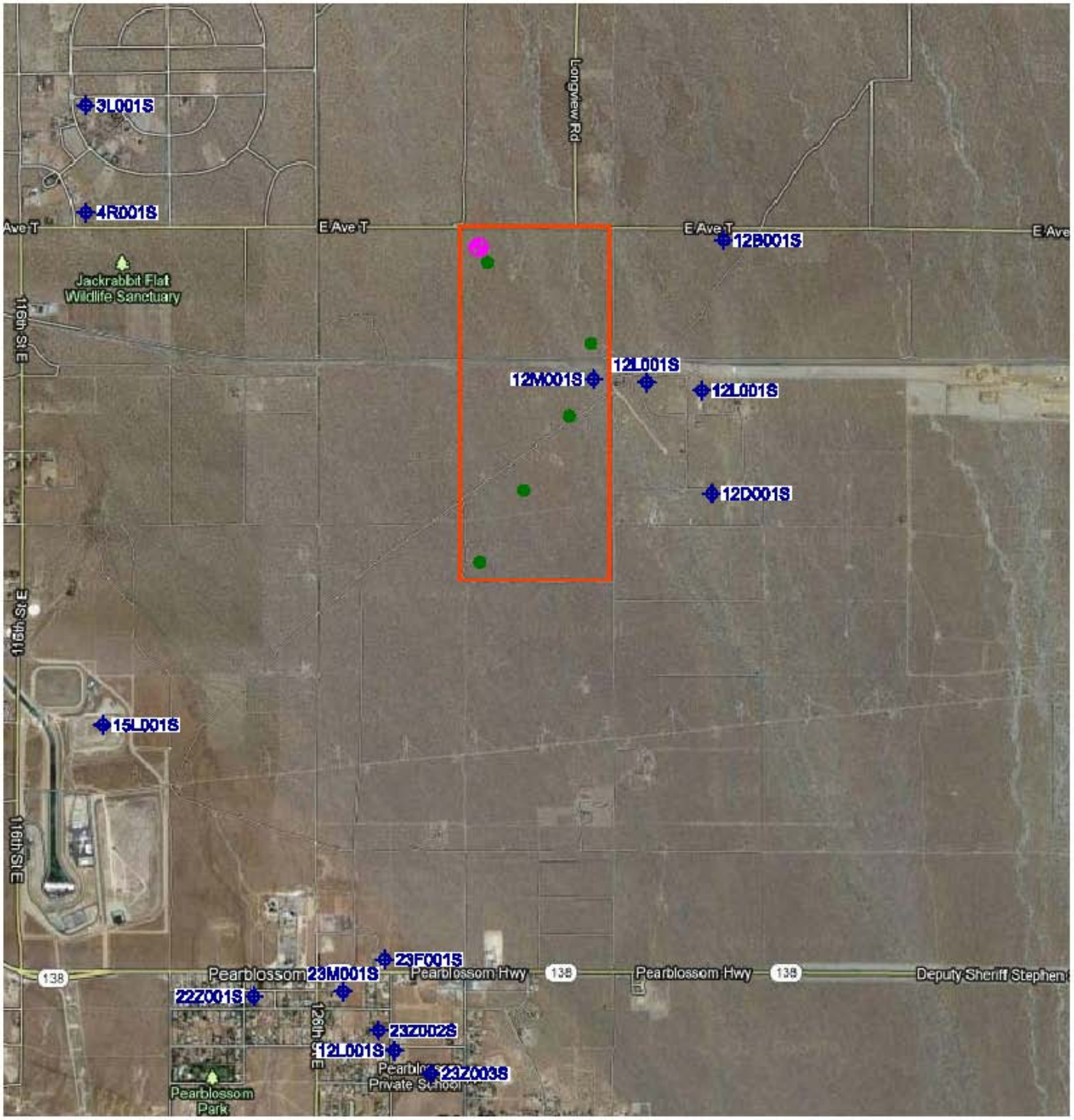

LEGEND

- SITE BOUNDARY
- PROPOSED SUPPLY WELL
- 22Z001S EXISTING GROUND WATER WELLS
- PREVIOUS SOIL BORINGS

Reference: Image from Google Maps

0 0.5 1

SCALE (MILE)

N

Proposed Supply Well, Existing Ground Water Wells, & Previous Soil Borings

SESPE Consulting
Big Rock Creek Mine
Pearblossom, California

Figure 2 | February 2011 | SES

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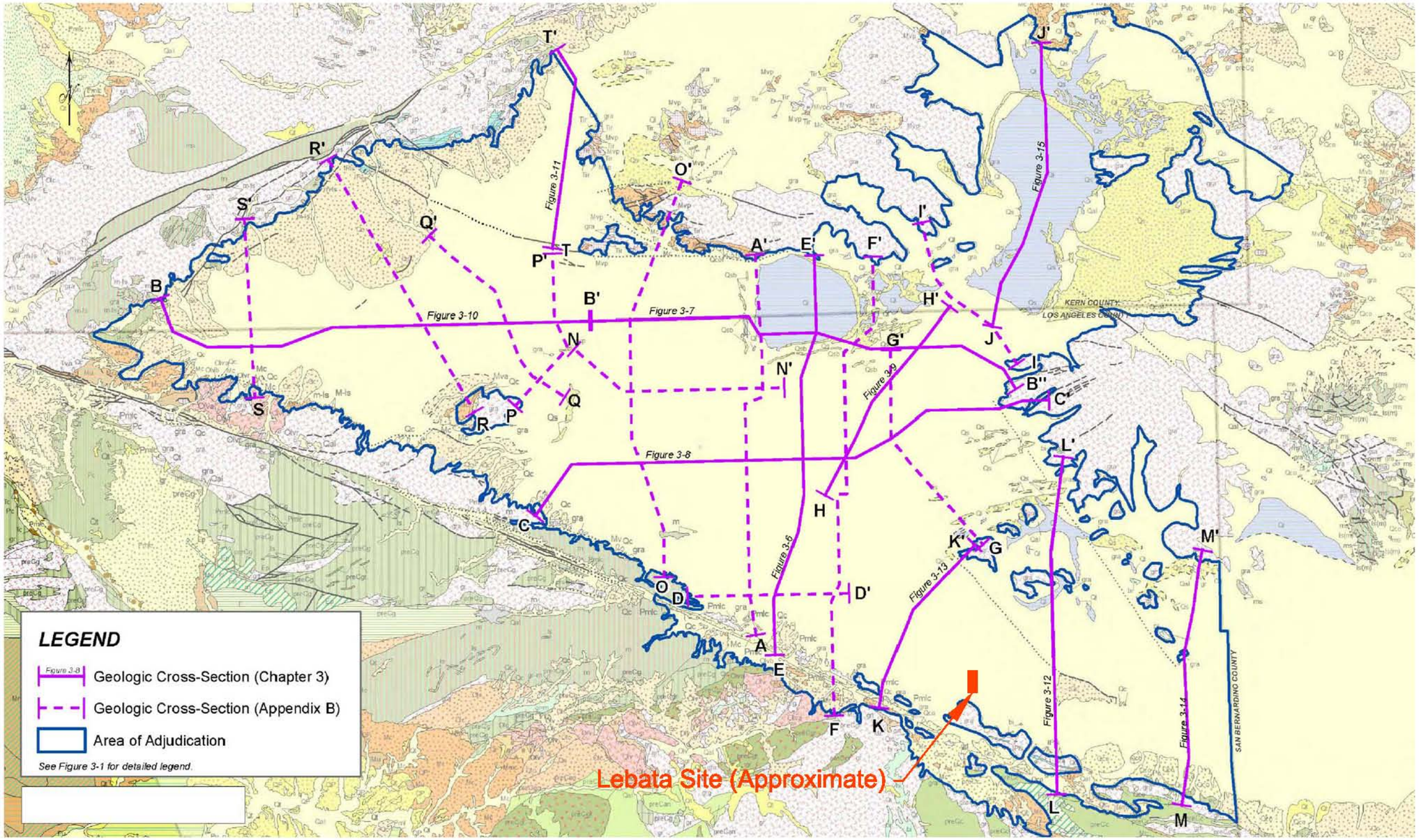

Reference: Image from Luhdorff & Scalmanini Consulting Engineers, "Figure 3-2, Location Map - Geologic Cross-Sections, Antelope Valley Area of Adjudication."

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SCALE (MILE)

Cross Section Locations

SESPE Consulting
Big Rock Creek Mine
Pearblossom, California

Figure 3 | February 2011 | SES STRATEGIC ENGINEERING & SCIENCE

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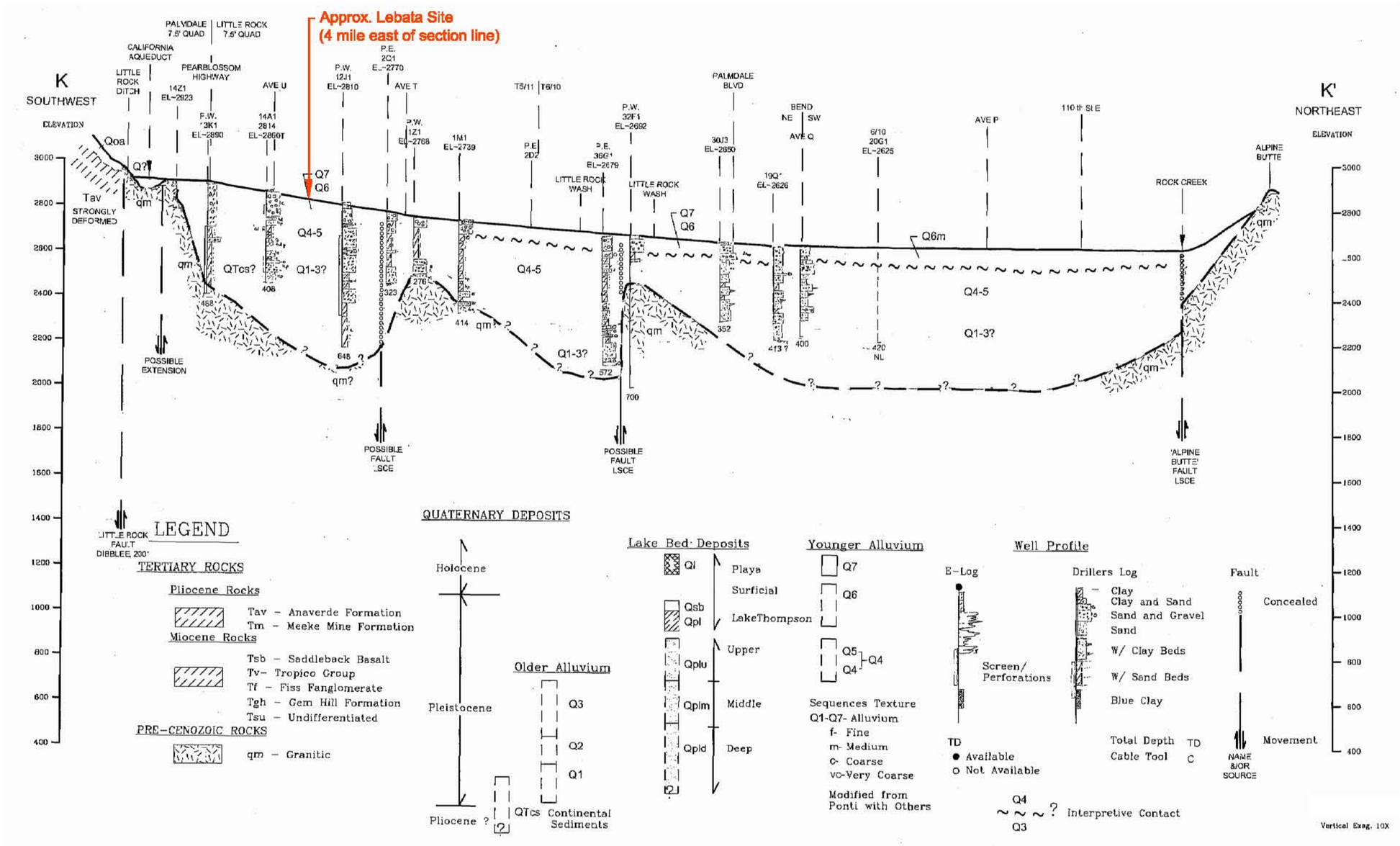

Reference: Image from Luhdorff & Scalmanini Consulting Engineers, "Figure 3-13, Sheet 1 of 1, Geologic Cross Section K-K', Antelope Valley Area of Adjudication."

N

0 5,000 10,000

SCALE (FEET)

Cross Section K-K'

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Big Rock Creek Mine
Pearblossom, California

Figure 4 | February 2011 | SES STRATEGIC ENGINEERING & SCIENCE

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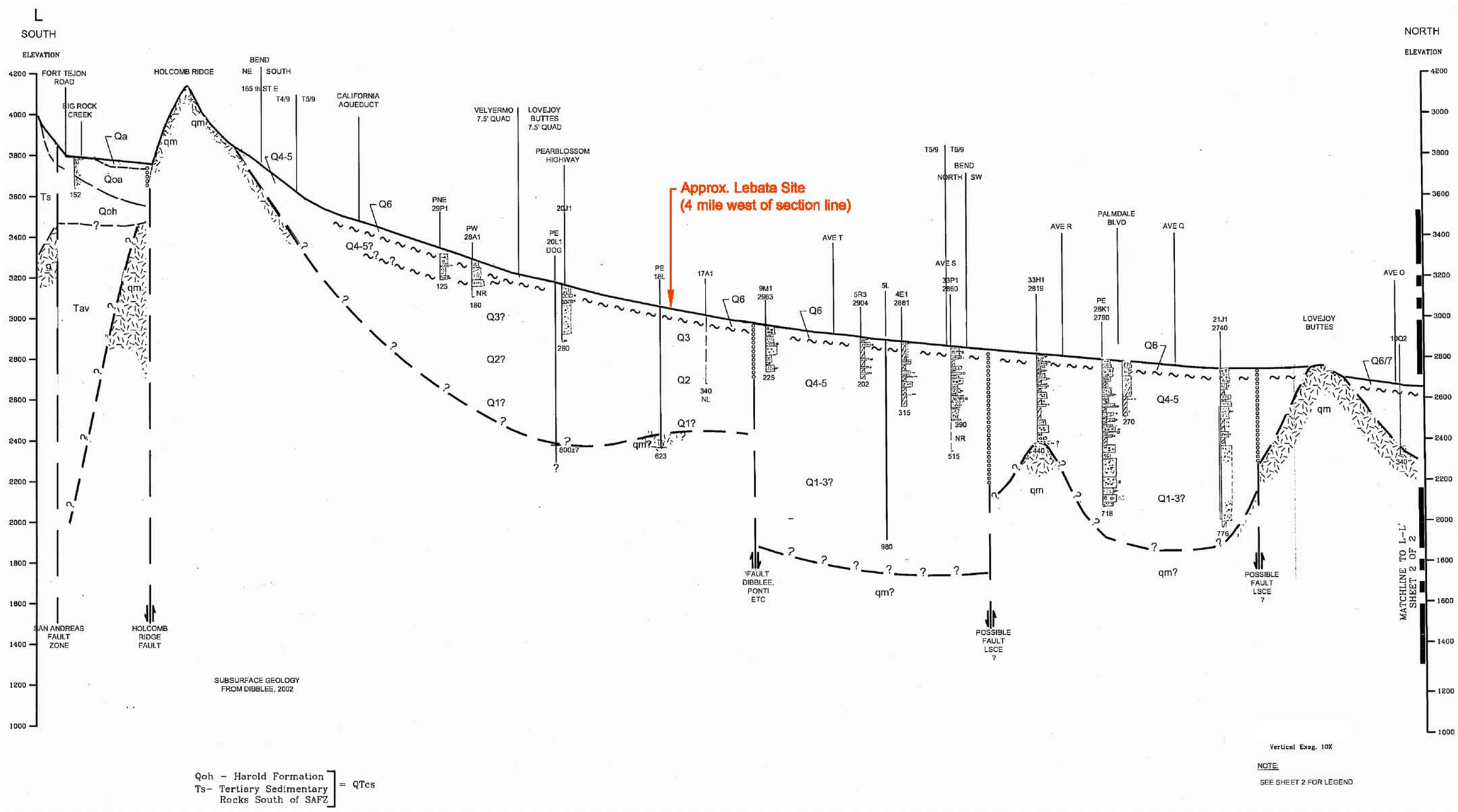

Qoh - Harold Formation
Ts- Tertiary Sedimentary Rocks South of SAFZ
= QTcs

Reference: Image from Luhdorff & Scalmanini Consulting Engineers, "Figure 3-12, Sheet 1 of 2, Geologic Cross Section L-L', Antelope Valley Area of Adjudication."

N

0 5,000 10,000
SCALE (FEET)

Cross Section L-L'

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Pearblossom, California

Figure 5 | February 2011 | SES STRATEGIC ENGINEERING & SCIENCE

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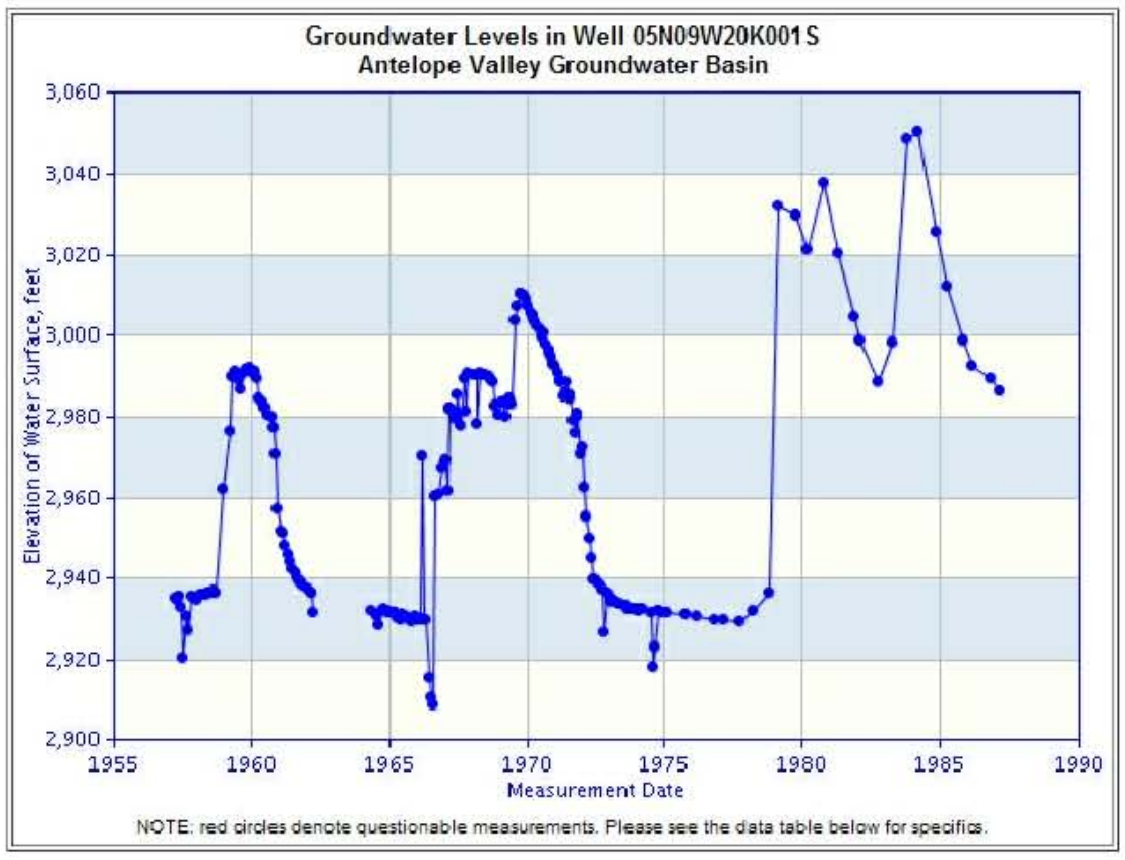

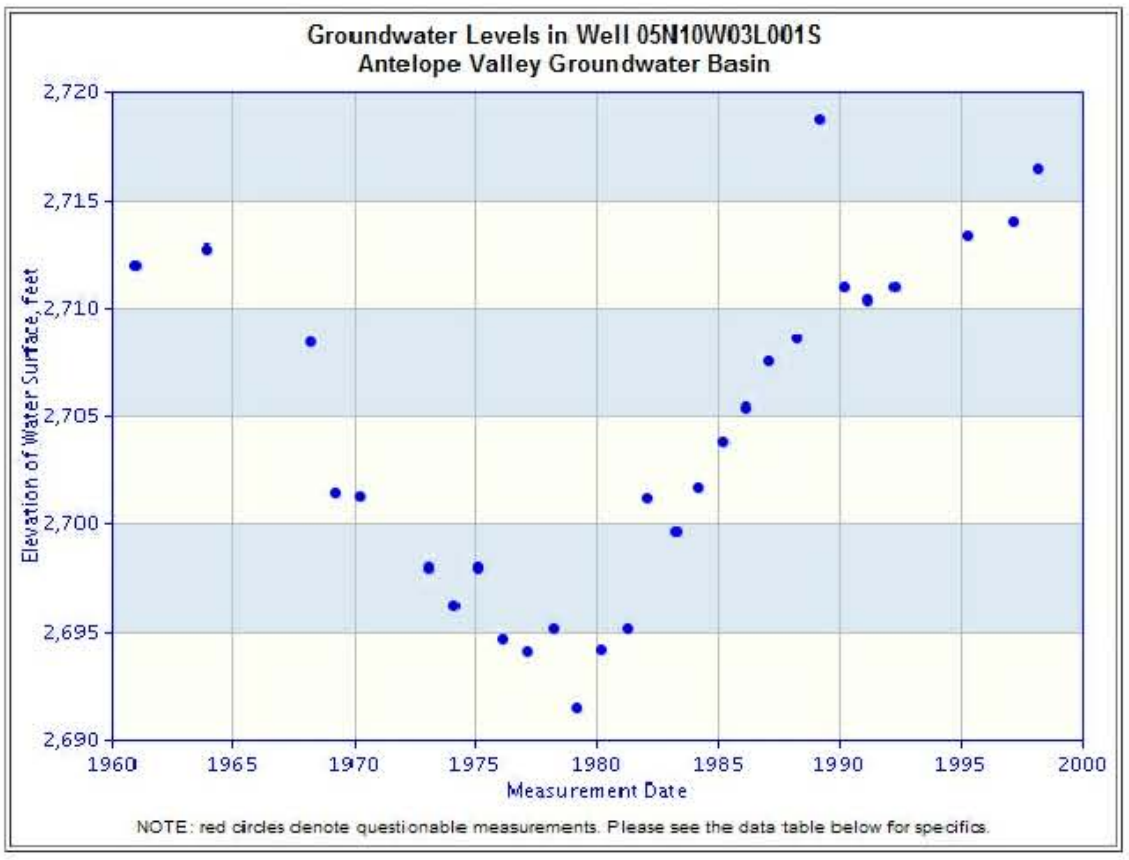

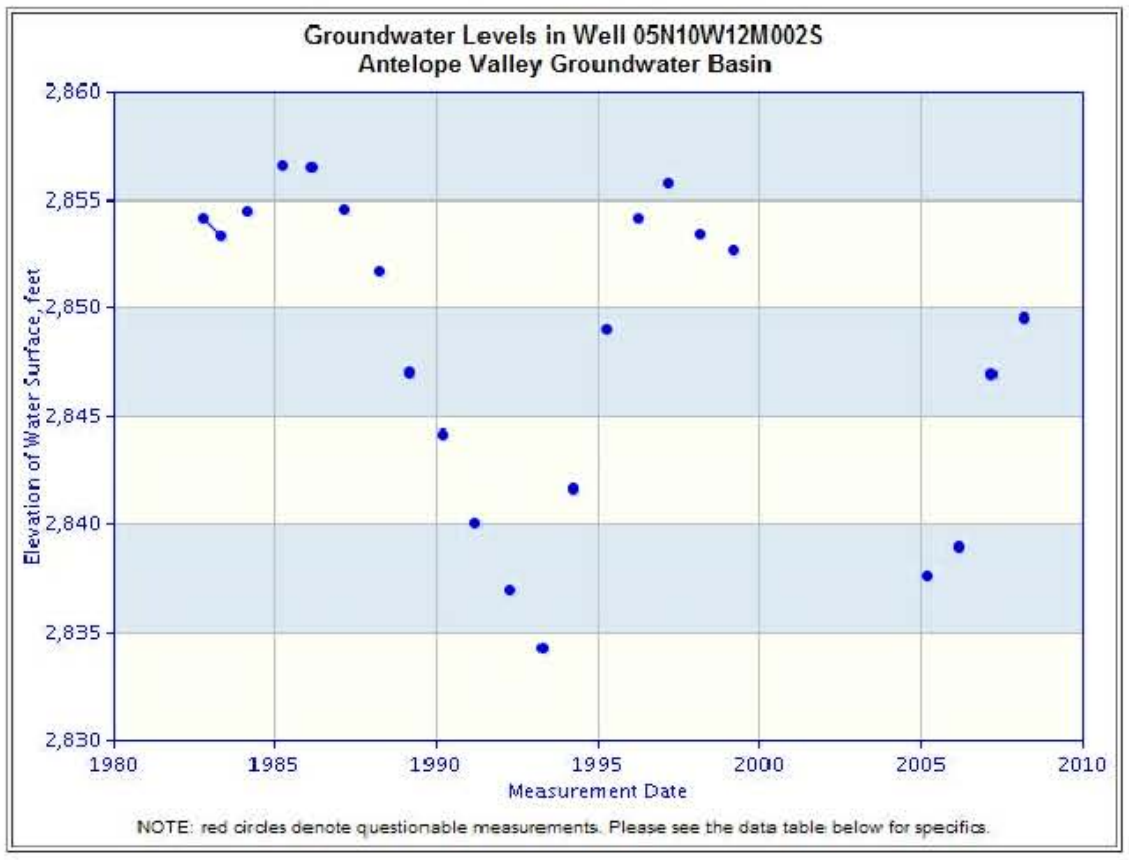

Reference: Images from California Department of Water Resources

Well Hydrographs

SESPE Consulting
Big Rock Creek Mine
Pearblossom, California

Figure 6 | February 2011

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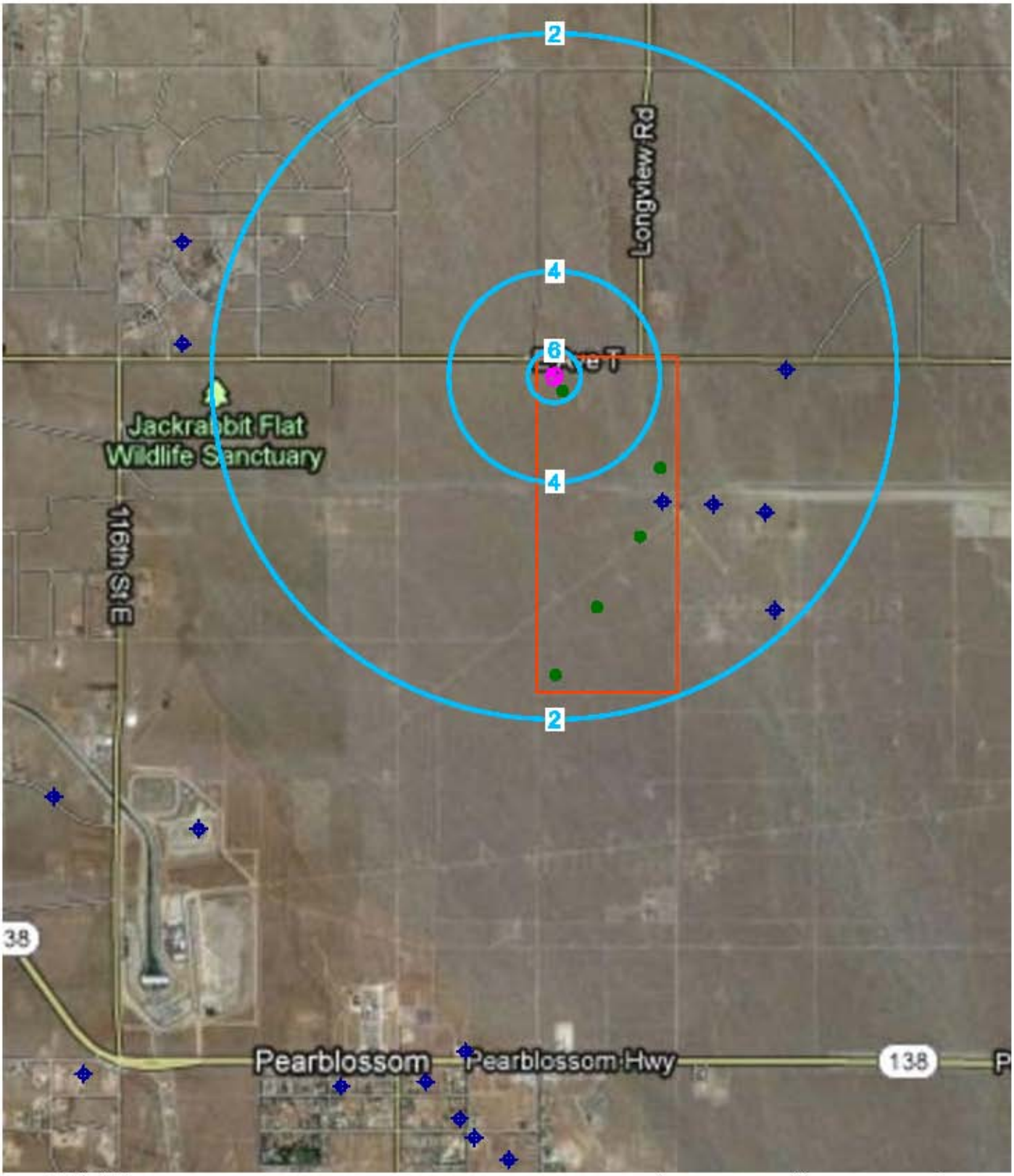

LEGEND

- SITE BOUNDARY
- PROPOSED SUPPLY WELL
- EXISTING GROUND WATER WELLS
- PREVIOUS SOIL BORINGS
- 2 DRAWDOWN CONTOUR LINE (FEET)

Reference: Image from Google Maps

0 0.5 1
SCALE (MILE)

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30-Year Average Drawdown Contour Lines

SESPE Consulting
Big Rock Creek Mine
Pearblossom, California

Figure 7

February 2011

SES

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APPENDIX A

DRAWDOWN CALCULATION TABLES

Average Estimated Drawdown for 193 GPM Pumping Well

Big Rock Quarry Surface Mining Project

	Distance (ft) →							
Time (yrs)	**100**	**200**	**300**	**400**	**500**	**1000**	**2000**	**5000**
1	6.0	5.0	4.4	3.9	3.6	2.6	1.6	0.2
2	6.5	5.5	4.9	4.4	4.1	3.1	2.1	0.7
3	6.8	5.8	5.2	4.7	4.4	3.4	2.4	1.0
4	7.0	6.0	5.4	5.0	4.6	3.6	2.6	1.2
5	7.2	6.1	5.5	5.1	4.8	3.8	2.7	1.4
10	7.7	6.7	6.1	5.6	5.3	4.3	3.3	1.9
20	8.2	7.2	6.6	6.1	5.8	4.8	3.8	2.4
30	8.5	7.5	6.9	6.4	6.1	5.1	4.1	2.7
40	8.7	7.7	7.1	6.7	6.3	5.3	4.3	2.9
50	8.9	7.9	7.3	6.8	6.5	5.5	4.4	3.1
100	9.4	8.4	7.8	7.3	7.0	6.0	5.0	3.6

Minimum Estimated Drawdown for 193 GPM Pumping Well

Big Rock Quarry Surface Mining Project

	Distance (ft) →							
Time (yrs)	**100**	**200**	**300**	**400**	**500**	**1000**	**2000**	**5000**
1	4.2	3.5	3.1	2.8	2.6	1.9	1.2	0.3
2	4.5	3.8	3.4	3.2	2.9	2.3	1.6	0.7
3	4.7	4.0	3.6	3.4	3.1	2.5	1.8	0.9
4	4.9	4.2	3.8	3.5	3.3	2.6	1.9	1.0
5	5.0	4.3	3.9	3.6	3.4	2.7	2.0	1.1
10	5.3	4.6	4.2	4.0	3.7	3.1	2.4	1.5
20	5.7	5.0	4.6	4.3	4.1	3.4	2.7	1.8
30	5.9	5.2	4.8	4.5	4.3	3.6	2.9	2.0
40	6.0	5.3	4.9	4.6	4.4	3.7	3.1	2.2
50	6.1	5.4	5.0	4.8	4.5	3.8	3.2	2.3
100	6.5	5.8	5.4	5.1	4.9	4.2	3.5	2.6

Maximum Estimated Drawdown for 193 GPM Pumping Well

Big Rock Quarry Surface Mining Project

	Distance (ft) →							
Time (yrs)	**100**	**200**	**300**	**400**	**500**	**1000**	**2000**	**5000**
1	10.9	8.9	7.7	6.8	6.2	4.1	2.1	0.0
2	12.0	9.9	8.7	7.9	7.2	5.2	3.1	0.4
3	12.6	10.5	9.3	8.5	7.8	5.8	3.7	1.0
4	13.0	10.9	9.7	8.9	8.2	6.2	4.1	1.4
5	13.3	11.3	10.1	9.2	8.6	6.5	4.5	1.8
10	14.3	12.3	11.1	10.2	9.6	7.5	5.5	2.8
20	15.4	13.3	12.1	11.3	10.6	8.6	6.5	3.8
30	16.0	13.9	12.7	11.9	11.2	9.2	7.1	4.4
40	16.4	14.3	13.1	12.3	11.6	9.6	7.5	4.8
50	16.7	14.7	13.5	12.6	12.0	9.9	7.9	5.2
100	17.8	15.7	14.5	13.7	13.0	10.9	8.9	6.2

12-Hour Drawdown Comparison for 545 and 193 GPM Pumping Well

Big Rock Quarry Surface Mining Project

	Distance (ft) →							
	Time (hrs)	**100**	**200**	**300**	**400**	**500**	**1000**	**2000**
545 gpm	12	1.63311	0.126115	0	0	0	0	0
185 gpm	12	1.11039	0.126115	0	0	0	0	0