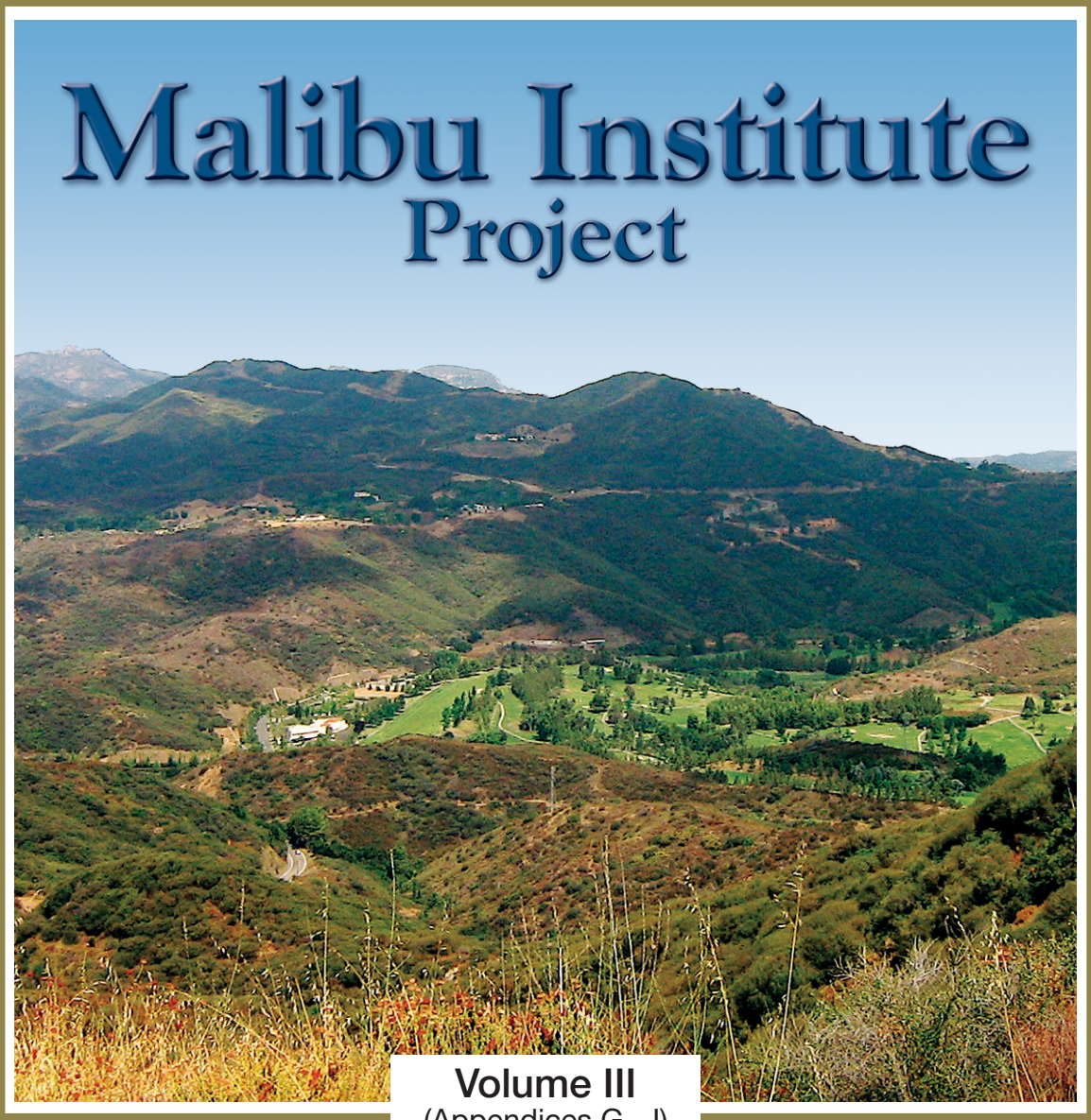
Draft Environmental Impact Report

State Clearinghouse No. 2012111068



Volume III
(Appendices G - I)

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December 9, 2013

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Malibu Institute Project: A Plan toward Restoring Trancas Creek, a Significant Stream in the Santa Monica Mountains National Recreation Area. A Report on California Newt and Western Pond Turtle Surveys – 2013, Dr. Lee B. Kats, August 2013.
Appendix E: Geotechnical Investigation of The Malibu Institute and Proposed Renovations and Expansion of the Malibu Golf Course (Sladden Engineering, July 16, 2012, Responses to Comments February 25, 2013, July 22, 2013)
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Appendix G.4: Preliminary Water System Design Report (AECOM, March 29, 2013)
Appendix H: Traffic and Circulation Study (ATE, September 13, 2013)
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Appendix G.1

Addendum I Engineering Feasibility Report for the Proposed Onsite Wastewater System, EPD Consultants, March 22, 2013

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ADDENDUM I ENGINEERING FEASIBILITY REPORT FOR THE PROPOSED ONSITE WASTEWATER SYSTEM

THE MALIBU INSTITUTE
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Project: K118 The Malibu Institute

March 22, 2013

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March 22, 2013

Malibu Associates, LLC
Attn: Mr. Thomas Hix
480 San Antonio Road, Suite 205
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Subject: **Addendum I Engineering Feasibility Report for the Proposed Onsite Wastewater System at The Malibu Institute, 901 Encinal Canyon Road, Los Angeles County, California.**

Dear Mr. Hix,

EPD Consultants, Inc. (EPD) is pleased to present this Addendum I Engineering Feasibility Report for the proposed Onsite Wastewater System (OWS) at the subject property. This report was prepared in order to address the modified site development plan which reduces the overall volume of wastewater to be generated, and allows for a more concentrated and efficient OWS. The overall Project Objective of treating all wastewater generated by the proposed development to California Title 22 reuse standards for unrestricted access landscape irrigation has not changed. Also presented is baseline groundwater quality data collected from groundwater extraction wells onsite. This report provides a Master Plan that has been prepared to be compliant with Los Angeles Regional Water Quality Control Board (LARWQCB) requirements, California Department of Public Health (CaDPH) Title 22 Disinfected Tertiary Treatment Standards requirements, and Los Angeles County Departments of Public Health and Public Works (LACoDPH / LACoDPW) requirements.

This report has been prepared for the exclusive use of Malibu Associates, LLC and their authorized agents, and is not intended for transfer or use by other parties without written review by Consultant. Work performed by EPD was in general accordance with the authorized scope of work. This report summarizes our scope of work and presents the results of our research, our analyses and interpretation of available data, and presents our engineering conclusions and recommendations concerning the subject property and the proposed project. Based on the results presented herein, it is currently our opinion that the proposed project is feasible from an engineering standpoint provided the recommendations presented in this report, and those presented by the Project Engineering Geologic Consultant, are properly incorporated in the overall project design and implemented during construction.

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We appreciate the opportunity to provide you with our professional engineering services. It is strongly recommended that you read this report from cover to cover in order to understand the assumptions and limitations of this study and to avoid taking a finding or recommendation out-of-context. Please avoid misunderstandings or misinterpretation of this report by contact the undersigned if there are any questions concerning this report or the recommendations included herein.

Respectfully submitted,
EPD Consultants, Inc.

Kevin Poffenbarger, PE
RCE 69089, Exp 6/30/14
Senior Project Engineer

Attachments:
A. Estimated Wastewater Flowrate Calculations
B. Estimated Grease Flow Calculations
C. Treated Effluent Pond Calculations
D. Water Sample Analysis Results from Existing Groundwater Monitoring Wells
E. Ecofluid Case Study: Pahrump, Nevada
F. Ecofluid Case Study: Mill Springs, Mill Bay, BC, Canada
G. Ecofluid Case Study: UniverCity Childcare, Burnaby, BC, Canada
H. Waterworld Snug Cove USBFMBR Article

Enclosures: Onsite Wastewater System Plans Revision 2, dated November 2012

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B. ESTIMATED GREASE FLOW CALCULATIONS
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D. WATER SAMPLE ANALYSIS RESULTS FROM EXISTING GROUNDWATER MONITORING WELLS

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E. ECOFLUID CASE STUDY: PAHRUMP, NEVADA
F. ECOFLUID CASE STUDY: MILL SPRINGS, MILL BAY, BC, CANADA
G. ECOFLUID CASE STUDY: UNIVERCITY CHILDCARE, BURNABY, BC, CANADA

ENCLOSURE:

ONSITE WASTEWATER SYSTEM PLANS REVISION 2, DATED NOVEMBER 2012

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1.0 Project Objective

To estimate peak, average and design wastewater flows and design a wastewater collection, treatment and dispersal system for the subject property capable of producing treated effluent that exceeds California Title 22 reuse standards for unrestricted access landscape irrigation.

1.0.1 Introduction

The proposed development plan, as presented by the most recent LRS Architecture Site Plan, dated May 18, 2012 (Reference 11(b)), consists of multiple uses summarized in Attachment A of this Report. The proposed development intensity has been reduced, and the development will be constructed in one phase. There are no available sewers in the area of the proposed development and the development is to be served by an Onsite Wastewater System (OWS). The OWS is comprised of collection, treatment, and dispersal components. This Addendum I Engineering Feasibility Report with the enclosed OWS Plans Revision 2, dated November 2012 has been prepared to provide an overview of the modified proposed development and OWS, as well as present results and new water sample analysis results from the existing groundwater monitoring wells

The proposed development is considered commercial development, and is located in the Malibu area of unincorporated Los Angeles County (County). For all commercial projects in the County that utilize OWS, it is required that Waste Discharge Requirements (WDRs) are obtained from the Los Angeles Regional Water Quality Board (RWQCB) prior to being reviewed by County agencies. Further, to recycle wastewater for unrestricted access landscape irrigation, the WDRs must include Waste Reclamation Requirements (WRR). The RWQCB may require a Title 22 Water Recycling Permit as part of the WRR. Based upon the size of the proposed development and preliminary wastewater generation calculations, it is anticipated that the average day estimated total wastewater flows generated by the project will be approximately 40,000 gallons per day (gpd), and the peak day estimated total wastewater flows will be approximately 60,000 gpd. The proposed project will therefore be subject to an Individual WDR by the RWCQB instead of a General WDR.

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1.0.2 Summary

Based on the peak day estimated flows of 60,000 gpd, the OWS will consist of the following components:

1) Four (4) 5,000 gallon Grease Interceptors (GI-1, GI-2, GI-3 & GI-4);
2) Gravity sewer system with manholes to grade;
3) One (1) 40,000 Equalization Tank (EQT-1) with duplex sewage pumps;
4) A secondary/tertiary treatment system consisting of:
   a. Three (3) Ecofluid Upflow Sludge Blanket Filtration (USBF) and Mitsubishi Steraporesun Ultrafiltration Membrane Treatment Tanks (USBFMBR-1, USBFMBR-2 & USBFMBR-3);
   b. One (1) 10,000 gallon Sludge Holding Tank (SHT-1); and
   c. One (1) 10,000 gallon Effluent Pump Tank (EPT-1);
   d. Two (2) 30,000 gallon Emergency Storage Tanks (EST-1 & EST-2);
   e. Two (2) solenoid valve boxes (SOVB-1 & SOVB-2);
   f. Two (2) Ultraviolet (UV) disinfection arrays (UV-1 and UV-2);
   g. One (1) Flowmeter (FM-1);
   h. Fourteen (14) Aeration Blowers (AB-1 to AB-14).
5) Treated effluent force main system with pressure cleanouts to grade;
6) Treated effluent storage in a 0.659 million gallon total volume lined Treated Effluent Pond (TEP-1) with 0.500 million gallon total usable volume; and
7) Unrestricted access landscape irrigation reuse of the effluent water on the golf course.

Grease-laden wastewater generated from food preparation areas will be pre-treated by four (4) 5,000 gallon Grease Interceptors. All wastewater will receive flow equalization in the 40,000 gallon Equalization Tank. Supplemental alkalinity will be added at the inlet of the Equalization tank to ensure adequate nitrification occurs in the biological process. The Equalization Tanks will provide additional surge volume to buffer the proposed peak day design flows generated by the entire property and ensure a constant flow is delivered to the biological treatment system. Sewage pumps in the Equalization Tanks will transfer wastewater to the secondary/tertiary treatment system consisting of three (3) Ecofluid Upflow Sludge Blanket Filtration (USBF) and Mitsubishi Steraporesun Ultrafiltration Membrane (MBR) Treatment Tanks. Effluent flows through the treatment tanks in a four (4) compartment system made up of an anoxic, aerobic, upflow sludge blanket filter, and ultrafiltration membrane compartment where it receives biological treatment and membrane filtration. The hollow fiber membrane contains submerged ultrafiltration membranes. A small fraction of the treated effluent will pass through the

ultrafiltration membranes as filtrate with the majority being rejected as returned activated sludge (RAS) to the anoxic compartment. This extended aeration/RAS process configuration reliably enhances reduction of Total Nitrogen (TN) in the treated effluent to below the groundwater limit of 10 mg/L TN. Mixed liquor will be periodically wasted to the Sludge Holding Tank to prevent the buildup of solids in the biological process.

The treated effluent from the treatment tanks will flow by gravity into the Effluent Pump Tank. The Effluent Pump Tank will collect the treated effluent for pumping to a treated effluent force main system into the solenoid valve box. The solenoid valve box will be configured to divert any treated effluent that does not meet Title 22 Standards for disinfected tertiary effluent (off-spec effluent) to the two (2) Emergency Storage Tanks. Treated effluent that meets Title 22 Standards for disinfected tertiary effluent (spec effluent) will be distributed through the treated effluent force main system to the flow meter and on to the two (2) UV disinfection units. The point of compliance to determine whether or not treated effluent is spec or off-spec is the Effluent Sample Box, which is to be configured with a sample port and electronic turbidity meter. Only treated effluent that meets Title 22 Standards for disinfected tertiary effluent shall be distributed through the second solenoid valve box and on to the Treated Effluent Pond.

Tertiary treated effluent will discharge to a 0.659 million gallon total volume lined Treated Effluent Pond, with 0.500 million gallon total usable volume. The OWS will be designed and operated in accordance with California water reuse requirements allowing for spray irrigation of disinfected tertiary effluent on public access areas of the golf course.

1.1 Wastewater Source

Wastewater is generated from the proposed development consisting of the Malibu Institute Building, Security Information Building, Golf Pro Shop and Grill, Cart Barn, Club House, 40 Guest Bungalows, Maintenance Building and Warehouse.

1.1.1 Wastewater Quantity

A total average day estimated flow of 40,000 gpd and a total peak day estimated flow of 60,000 gpd are identified. The OWS is designed to accommodate full occupancy based upon proposed

use calculations summarized and detailed in Attachment A. Wastewater flows are estimated for each proposed use on the basis of typical flow generation factors employed by the California Building and Plumbing Codes (See References 1 and 2), which do not account for the anticipated use of modern conservation plumbing fixtures throughout the development.

1.1.2 Wastewater Quality

The characteristics of wastewaters generated from proposed uses are anticipated to be similar to that of commercial strength wastewaters. Values of anticipated water quality associated with proposed uses are presented in Table 1. Grease-laden wastewaters generated at kitchen and food preparation areas are anticipated to be of higher strength than typical untreated domestic wastewaters. Corresponding values of potable water quality are also presented on this table.

Table 1. Anticipated Composition of Wastewaters Generated Onsite

Contaminant	Unit	Potable Water[a]	Untreated Wastewater[b]	Typical Wastewater	Grease-laden Wastewater
Biochemical oxygen demand, BOD	mg/L	ND	110 to 400	210	400
Suspended solids, total (TSS)	mg/L	ND	100 to 350	210	350
Dissolved solids, total (TDS)	mg/L	320	280 to 850	500	850
Nitrogen (total as N)	mg/L	0.6	20 to 85	35	65
Phosphorous (total as P)	mg/L	NA	4 to 15	7	9
Total Coliform	No./100 mL	0.2	10^6 to 10^9	10^7 to 10^8	10^7 to 10^9

[a] Values reported in Las Virgenes Municipal Water District 2010 Consumer Confidence Report. ND–Non Detect (assumed); NA–Not available.
[b] Values reported for untreated domestic (sanitary) wastewater, Table 4-14 Tchobanoglous et al. 1998 (See Reference 3).

To increase the long-term performance of the OWS and reduce the strength of wastewater discharged from the Equalization Tank to the secondary/tertiary treatment system, Grease Interceptors are sized in excess of the minimum plumbing code requirements. Use of garbage disposals will be limited and discouraged and a simple vermicomposting container system is recommended for converting food wastes to high-quality potting soil whenever practicable. Likewise, excess fats, oils, and greases should not be disposed of down the sink but should also be treated as solid waste. Greasy pans should be wiped with paper towels prior to washing.

The facilities will be served with potable water by the Las Virgenes Municipal Water District. This water comes from a variety of sources, primary among which is the State Water Project

aqueduct. Salinity in this water supply is low to moderate. The use of onsite water softeners is not anticipated, thus consumptive increases in salinity are expected to be within ranges typical of domestic and commercial wastewaters.

Industrial wastewaters will not be allowed to enter the OWS collection system and will be handled in accordance with local and state requirements if they occur as a result of facilities maintenance, golf course or kitchen activities. The pH of wastewater entering the OWS will be monitored and will provide an indicator of illicit industrial discharge.

The target effluent water quality parameters presented in Table 2 are designed to exceed minimum standards for disinfected tertiary recycled water in accordance with California Title 22 reuse requirements (See Reference 5). The filtration and disinfection technologies employed in the OWS are certified by the California Department of Public Health (CDPH) for use in the production of recycled water (See Reference 6). Disinfected tertiary recycled water is permissible for a broad range of unrestricted access landscape irrigation, non-restricted recreational impoundment, commercial cooling, toilet flushing and other uses, with the general exception of groundwater recharge and [indirect] potable reuse, for which more restrictive requirements are in effect.

Table 2. Design Effluent Water Quality Parameters

Constituent	Units	Average	Peak
pH	units	6.5 - 8.5	6.5 - 8.5
Biochemical Oxygen Demand, BOD	mg/L	--	10
Total Suspended Solids, TSS	mg/L	--	10
Turbidity	NTU	<0.2	<0.5
Oil & Grease	mg/L	--	15
Total Dissolved Solids, TDS	mg/L	--	2,000
Sulfate	mg/L	--	500
Chloride	mg/L	--	500
Boron	mg/L	--	2.0
Total Nitrogen, TN	mg/L	--	10
Total Coliform[a]	MPN/100mL	<2.2	23
Fecal Coliform[a]	MPN/100mL	--	200
Enterococcus[b]	MPN/100mL	24	104
Virus Kill	--	>5 log	>5 log

[a] The limits for coliform shall apply prior to discharge of the effluent into the storage pond.
[b] The Enterococcus limit is based upon the geometric mean of at least 5 equally spaced samples in any 5-week period.

1.2 Geology

A Preliminary Geotechnical Feasibility Study was prepared for the subject project by Leighton and Associates (See Reference 7).

1.2.1 Groundwater

There are several groundwater extraction wells on the site, as labeled on the OWS Plans Revision 2, dated November 2012. Groundwater samples were collected and analyzed from extraction wells EW-1 and EW-5 as labeled on the OWS Plans. Results of the laboratory analysis are presented in Attachment F of this Report. Groundwater wells may be used for onsite landscape irrigation but will not contribute to the potable water supply for the proposed project.

The Preliminary Geotechnical Feasibility Study reported no known groundwater monitoring wells on the site. There is no indication of a regional water table at the site. It is anticipated shallow groundwater may occur in the canyon bottoms. Perched and localized groundwater may occur on the hillsides.

1.2.2 Geology and Stability

According to the Preliminary Geotechnical Feasibility Study, the site is underlain by middle Miocene age bedrock of the Conejo Volcanics. Surficial deposits at the site consist of shallow slump deposits, debris flows, younger alluvium and colluvium. Artificial fill associated with the existing golf course has been placed in several areas within Trancas Canyon. The hillside areas of the site are impacted by slopes with potential for seismically-induced landslides, shallow slumps and debris flows. These features are not anticipated to impact the feasibility of proposed development at the site.

1.3 Design Intent

The Design Intent is to treat all wastewater generated from the proposed development to levels in accordance with the definition of disinfected tertiary recycled water contained in the California Title 22 reuse requirements (See Reference 5) as well as all requirements of the State of California

Regional Water Quality Control Board General Waste Discharge Requirements (WDR) Orders No. 97-10-DWQ and 01-031.

The following is a summary of the Design Intent:

1. The pH of wastes discharged shall at all times be between 6.5 and 8.5 pH units.
2. Treated effluent discharged to the Treated Effluent Pond shall not contain constituents in excess of the limits identified in Table 2.
3. Treated wastewater discharged to the lined Treated Effluent Pond shall not contain salts, heavy metals or organic pollutants at levels that would impact groundwater that may be in hydraulic connection with surface waters with designated uses for marine aquatic life or body contact recreation.
4. Any treated effluent that does not meet the foregoing requirements shall be held in impervious containers and discharged at a legal point of disposal.

The Design Intent is to uniformly disperse of all treated effluent that meets the foregoing requirements in such a manner as to avoid the possibility of runoff of treated effluent. Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas or food handling facilities and all drinking water fountains will be protected against contact with recycled water spray, mist, or runoff.

Absent further geologic investigation and characterization of well construction and use, no irrigation with disinfected tertiary recycled water shall take place within 50 feet of any domestic water supply well. All treated effluent stored in the lined Treated Effluent Pond shall be used to irrigate the golf course.

2.0 Design Summary

The proposed OWS provides primary and secondary/tertiary treatment enhanced for denitrification. All of the primary and secondary/tertiary treatment components will be located belowground in traffic-rated fiberglass reinforced plastic (FRP), concrete or steel tanks. Additional tertiary treatment mechanical components will be located in an underground mechanical vault (MV-1) structure in the OWS treatment system area. Disinfected tertiary effluent will be stored in a lined Treated Effluent Pond prior to reuse for unrestricted access landscape irrigation. A process piping schematic flow diagram is presented on Sheet W2.01 of

the enclosed Onsite Wastewater System Plans Revision 2, dated November 2012. The proposed OWS consists of the following elements:

1) Four (4) 5,000 gallon Grease Interceptors (GI-1, GI-2, GI-3 & GI-4) to serve commercial kitchens in the proposed Pro Shop Grill, Clubhouse and Malibu Institute buildings to discharge to gravity sewer system;
2) Gravity sewer system lines will transmit all onsite wastewater generated to the primary treatment system, consisting of one (1) 40,000 Equalization Tank (EQT-1) with duplex sewage pumps. The equalization tank is designed to have 0.67 day surge volume based upon proposed peak day design flows and 1.00 day surge volume based upon proposed average design flows;
3) A secondary/tertiary treatment system consisting of:
   a. Three (3) Ecofluid Upflow Sludge Blanket Filtration (USBF) and Mitsubishi Steraporesun Ultrafiltration Membrane Treatment Tanks (USBFMBR-1, USBFMBR-2 & USBFMBR-3);
   b. One (1) 10,000 gallon Sludge Holding Tank (SHT-1);
   c. One (1) 10,000 gallon Effluent Pump Tank (EPT-1);
   d. Two (2) 30,000 gallon Emergency Storage Tanks (EST-1 & EST-2).
   e. Two (2) solenoid valve boxes (SOVB-1 & SOVB-2);
   f. Two (2) Ultraviolet (UV) disinfection arrays (UV-1 and UV-2);
   g. One (1) Flowmeter (FM-1);
   h. Fourteen (14) Aeration Blowers (AB-1 to AB-14)
4) Treated effluent force main system that will transmit all tertiary treated effluent from the secondary/tertiary treatment system to the dispersal system;
5) A dispersal system consisting of:
   a. Treated effluent storage in a 0.659 million gallon total volume lined Treated Effluent Pond (TEP-1) with 0.500 million gallon total usable volume; and
   b. Unrestricted access landscape irrigation reuse of the effluent water on the golf course.

2.1 Fat, Oil and Grease Removal

To increase the long-term performance of the OWS and reduce the strength of wastewater discharged from the Equalization Tank to the secondary/tertiary treatment system, Grease Interceptors are sized in excess of minimum plumbing code requirements. Four (4) 5,000 gallon grease interceptor tanks (GI-1, GI-2, GI-3 & GI-4) totaling 20,000 gallons of volume are to be installed at this site, based upon the estimated peak day flow rates and sizing calculations presented in Attachment B.

2.2 Primary Treatment and Flow Equalization

The proposed OWS will include an adequately-sized, gas and watertight Equalization Tank located in the OWS treatment system area and shall be more than 100 feet from any water supply well. A 40,000 gallon Equalization Tank (EQT-1) is being proposed to dampen hourly peak wastewater flows based upon the projected average and peak flow rates to regulate the inflow of primary effluent to the secondary/tertiary treatment system. The Equalization Tank is sized with a surge volume of more than 50 percent of the peak design daily flow rate in order to ensure that effluent will be regulated to the secondary treatment system at a constant rate during peak flow events. The Equalization Tank will utilize sewage grinder pumps to assist in ensuring that any larger solid particles will remain in the equalization tank and not damage the secondary/tertiary treatment process components. The Equalization Tank will also be equipped with submerged mixers and course bubble air diffusers to keep the contents mixed, aerated and to minimize odors prior to discharging the effluent by pressure to the secondary/tertiary treatment system.

2.3 Secondary/Tertiary Treatment

An Upflow Sludge Blanket Filtration (USBF) extended aeration / activated sludge process designed by Ecofluid Systems, Inc. (ESI), combined with the Mitsubishi Steraporesun Ultrafiltration Membrane (MBR) treatment system has been selected for the proposed project on the basis of its ability to provide consistent and reliable levels of secondary and tertiary treatment for both small and large scale commercial wastewater systems. The combined process separates biological treatment (USBF) and membrane filtration (MBR), allowing an optimized wastewater treatment process with reduced MBR maintenance. The proposed process train eliminates or drastically reduces odors, while optimizing the nitrification and denitrification process. The USBF process and MBR products together in series create a USBFMBR technology to capitalize on the advantages of both systems for the treatment of wastewater. For this project, there will be a total of three (3) proposed USBFMBR treatment tanks (USBFMBR-1, 2 & 3) that will be provided by the manufacturers in three (3) separate treatment tanks each 52 feet long by 10.5 feet wide made from pre-fabricated 1/4-inch thick galvanized steel plates installed on a concrete pad below grade. The proposed tank layout is provided on detail 1/sheet

W1.02 along with the process piping schematic flow diagram on sheet W2.01 of the enclosed OWS Plans Revision 3, dated March 2013 (Reference 11(b)). The treatment tanks are to be configured in parallel, such that at any given time one treatment tank may be isolated and taken offline for service while maintain full treatment capacity for the design peak flows. Case studies are presented in Attachments D through H of this Report.

The USBFMBR package system is a mature technology with over fifty years of research and development consisting of well proven and tried equipment and operations. The USBFMBR process operates predominantly on gravity flow with minimum pumping equipment reducing the overall costs and energy requirements. The USBFMBR system has many benefits including hydraulic flexibility to accommodate flow variations in a self-regulating manner, no need for special influent fine screening, does not require primary clarification prior to biological treatment and utilizes hollow fiber membrane filtration certified for the production of recycled water by the CaDPH (See Reference 6).

A discussion of the following elements included in the secondary/tertiary treatment system is provided in the subsequent sections of this report: Upflow Sludge Blanket Filtration (USBF), Mitsubishi Steraporesun Ultrafiltration Membrane Filtration (MBR), Sludge Holding Tank, Effluent Pump Tank, Air Management, and UV Disinfection.

2.3.1 Upflow Sludge Blanket Filtration (USBF)

An Upflow Sludge Blanket Filtration (USBF) process designed by ESI has been selected for the proposed project that will take place in a three (3) compartment pre-fabricated steel tank by the manufacturer consisting of one (1) anoxic compartment, one (1) aerobic compartment, and one (1) uplfow sludge blanket filter compartment located in the OWS treatment system area. The USBF process will be utilized for enhanced nitrification and denitrification, along with phosphorous and BOD removal. There are a total of three (3) proposed USBF tanks that are to be installed in parallel, with the three (3) Mitsubishi Steraporesun Hollow Fiber Membranes (MBR) for the subject property (USBFMBR-1, 2 & 3) as detailed on the enclosed OWS Plans Revision 2, dated November 2012 (Reference 12(b)).

Screened primary effluent from the Equalization Tank discharges by gravity into the anoxic compartment of the USBF treatment tank(s) where it is mixed with activated sludge recycled from the bottom of the sludge blanket filter. From the anoxic compartment, the mixed effluent overflows by gravity into the aerobic compartment equipped with fine bubble aeration diffusers (AB-3, 5, 7). From the aerobic compartment, the aerated mixed effluent flows by gravity into the bottom of the upflow sludge blanket filtration compartment. The mixture of microbial cells and effluent enters the filter at the bottom through a specially designed baffle and, as it rises, upward velocity decreases until the flocs (settled sludge) of the cells become stationary and thus form a filtering media. A high degree of filtration efficiency is achieved as colloid and very fine particles are filtered out. As the floc becomes large and heavy, they descend to the bottom of the sludge blanket filter and subsequently are recycled back into the anoxic compartment by a pump mounted external to the clarifier to maintain the biological treatment process. This process provides a higher rate of gravity separation allowing it to accommodate high peak flows and flow deviations in a self-regulating manner. The higher the flow, the higher the sludge flocs rise and the larger the filtration area becomes. The sludge blanket filters are provided with a gravity surface skimmer system where the walls of the skimmer are submerged just below the clarifier surface level, and if and when required, the skimming's collected are transferred by gravity to the sludge holding tank (SHT-1). The clarified effluent is then collected in a trough on top of the sludge blanket filter compartment which is then transferred by gravity to the Mitsubishi Steraporesun Hollow Fiber Membranes (MBR) which is included as part of the USBFMBR-1, 2 & 3 treatment tanks.

For nitrification, denitrification and phosphorous removal designs, the anoxic compartment provides the necessary conditions for dissimilarity nitrate reduction and phosphorous removal by "luxury uptake." Luxury update is the process where ammonia nitrogen is oxidized to nitrite and then to nitrate by Nitrosomonas and Nitrobacter bacteria, respectively in the aeration compartment. The nitrate is then recycled to the anoxic zone where the nitrate is reduced by dissimilarity nitrate reduction. In this reaction, the incoming BOD serves as the carbon source for the reduction of nitrate to elemental nitrogen. This internal recycle of effluent also provides BOD recycle that is required for the endogenously supported nitrate reduction and for recycle of

phosphorous removal organisms developed in the anoxic compartment that are then carried into the aeration compartment for phosphorous uptake. The assimilated phosphorous is then removed from the system as excess waste sludge. The dissolved oxygen (DO) concentration should be maintained at 2.0 to 4.0 mg/L in the aeration compartment and less than 0.5 mg/L in the anoxic compartment. The USBF process is capable of removing of BOD to less than 5 mg/L, TSS removal to less than 10 mg/L, and total nitrogen to less than 10 mg/L without further membrane filtration.

2.3.2 Mitsubishi Steraporesun Ultrafiltration Membrane Filtration (MBR)

A Steraporesun Hollow Ultrafiltration Membrane (MBR) unit designed by Mitsubishi Rayon Co., Ltd. (MRC) has been selected for the proposed project that will be incorporated as part of secondary/tertiary treatment system and is a California Title 22 approved membrane for unrestricted access landscape irrigation reuse of the effluent water on the golf course. The MBR consists of an 8 inch diameter hollow fiber membrane module with a pore size of 0.4 microns and 450 square feet of membrane surface area per module. The MBR will be constructed in arrays as needed to accommodate the desired flow. The MBR will not be a stand-alone unit; it will be incorporated by the ESI and MRC manufacturers as the final component of the USBFMBR-1, 2 & 3 pre-fabricated steel treatment tanks located in series after the USBF component. There are a total of three (3) proposed MBR units for the subject property (USBFMBR-1, 2 & 3) as detailed on the enclosed OWS Plans Revision 3, dated November 2012 (Reference 11(b)).

The MBR is a tertiary membrane filtration process that occurs after the secondary biological process for the removal of effluent turbidity and pathogens. This process utilizes the low suspended solids in the USBF effluent (typically less than 10 mg/L TSS) which increases the operating flux of the MBR minimizing effluent turbidity and TSS, thereby improving the system effluent parameters. The MBR can discharge an average effluent of less than 5mg/L TSS and BOD.

The clarified effluent from the USBF component discharges by gravity into the MBR unit(s), where one (1) supplied automated control feed pressurization pump per each membrane unit

(PP-1, PP-2 & PP-3) draws treated effluent through the pores of the hollow fiber membranes and into the backpulse tank. Once full, the treated effluent is automatically diverted away from the backpulse tank toward disinfection, storage and landscape irrigation. Manual throttling valves are used to adjust the discharge flow of the permeate pumps as needed. One (1) supplied automated control backwash pressurization pump per each membrane unit is used to periodically reverse the flow of the permeate and backpulse the membranes at regular intervals. Under normal operating conditions, permeation is periodically stopped and aeration is used to dislodge particles from the surface of the membrane fibers and a full backwash sequence is often not required. One (1) set of membrane air scour blowers per each membrane unit (AB-4, AB-6 & AB-8), with associated piping, are used for each membrane unit. The air scour blowers provide membrane air scouring during production of permeate using course-bubble diffusers. Once the clarified effluent is treated in the MBR it will be discharged by gravity to the Effluent Pump Tank (EPT-1).

2.3.3 Sludge Holding Tank

A 10,000 gallon Sludge Holding Tank (SHT-1) is proposed to store excess solids transferred from the aerobic compartment of the USBF and is located in the OWS treatment system area. SHT-1 will be provided with duplex sewage pumps (SP-1 & 2) that shall periodically dewater and concentrate the sludge wasted to this tank, which will allow the pump out interval of the Sludge Holding Tank to be extended. Effluent generated in the dewatering process is to be returned to the anoxic compartment of the USBF. The sludge will need to be periodically pumped and hauled to a certified receiving facility.

2.3.4 Effluent Pump Tank

A 10,000 gallon Effluent Pump Tank (EPT-1) is proposed to receive secondary/tertiary treated effluent by gravity from the USBFMBR-1, 2 & 3 treatment tanks and is located in the OWS treatment system area. EPT-1 will be provided with duplex effluent pumps (EF-1 & 2) that will pressurize and distribute the treated effluent to the Solenoid Valve Box (SOVB-1). SOVB-1 will be provided with three (3) solenoid valves. Two (2) of the solenoid valve (SV-1 & 2) will transfer effluent to the two (2) Emergency Storage Tanks (EST-1 & 2), and the remaining solenoid valve

(SV-3) will transfer effluent to the Flow Meter (FM-1) and on to the UV disinfection system (UV-1 & 2).

2.3.5 Air Management

Air is required for the biology in the fine bubble aeration diffusers for RAS airlift pumps. Air blowers shall be provided in the Equalization Tank (AB-1 & 2), Sludge Holding Tank (AB-9 & 10), and two (2) Emergency Storage Tanks (AB-11, 12, 13 & 14) as coarse bubble diffusers for sludge post-stabilization. Air to the biology is supplied by positive displacement blowers and may be provided with variable frequency drives (VFD) and controlled by continuous dissolved oxygen monitors within the aeration compartment. The standard USBFMBR is supplied with one (1) air blower per USBF (AB-3, 5 & 7) and one per MBR units (AB-4, 6 & 8) where one (1) air blower is duty and one (1) air blower is standby. Switching to standby blower requires an operator's manual intervention. The blowers are V-belt driven rotary positive displacement blowers equipped with a filter-silencer, pressure relief valve, discharge silencer and check valve. The blower/motor assembly is factory mounted on a steel base plate and all blowers shall be installed inside the proposed Mechanical Vault (MV-1).

2.3.6 UV Disinfection

The proposed Disinfection System is a TrojanUVFit package disinfection system. This is a CaDPH Title 22 validated UV system from Trojan UV. The UV lamp array is pre-arranged in a stainless steel tank for mounting slab on grade in the belowground mechanical vault MV-1. The UV disinfection will receive effluent from SOVB-1 per Solenoid Valve SV-3 after passing through the Flow Meter (FM-1). Once the effluent is disinfected by the UV components (UV-1 & 2), the effluent will pass through an Effluent Sample Box (ESB-1), on to SOVB-2 where SV-4 will discharge the treated effluent to the Treated Effluent Pond (TEP-1).

2.4 Effluent Irrigation and Storage

Treated effluent will be stored in a 0.659 million gallon total volume lined Treated Effluent Pond (TEP-1) with 0.500 million gallons of total usable volume. A minimum 40 mil (1 mm) HDPE liner will prevent leakage and downward migration of stored effluent. The pond will be mechanically

aerated to provide circulation and enhanced oxygenation. The nutrient reduction features of the OWS will reduce the likelihood of algae blooms in the storage impoundment. The storage impoundment is located more than 100 feet from any domestic water supply wells or surface water courses.

The typical southern California golf course needs an average of 0.3 million gallons per day (mgd) with peak summer demands up to 0.8 mgd. On this basis, supplemental irrigation will be required.

Irrigation will be accomplished via a dedicated sprinkler system with appropriate cross connection prevention components to assure it is completely separate from any potable irrigation system. All areas where recycled water is used that are accessible to the public will be posted with signs that are visible to the public with the following wording, "RECYCLED WATER – DO NOT DRINK." The portions of the recycled water piping system that are in areas subject to access by the general public shall not include any hose bibs. Only quick couplers that differ from those used on the potable water system shall be used on the portions of the recycled water piping system in areas subject to public access.

2.5 Odor Control

A Biological Odor Control Filter is proposed to be utilized to capture and treat the headspace of all belowground tanks in the secondary/tertiary treatment system area. The Biological Odor Control Filter system consists of a duplex Odor Control Blower (OCB-1) and an Odor Control Filter containing activated carbon media such as Calgon Carbon Ventsorb 400 with Centaur Carbon. A backup blower for this system (OCB-2) is proposed and shall be maintained in use in the event that the main blower malfunctions. These units will be located inside the new belowground mechanical vault.

Individual Grease Interceptors may be fitted with dedicated odor control filters as needed.

2.6 Process Control

The proposed OWS will be supplied with a Supervisory Control and Data Acquisition (SCADA) system that will be installed in the Mechanical Vault (MV-1). This panel will include all electrical, alarms, air and motor control hardware and monitor and manage all critical process operations. The control panel will also be configured to serve as the master control panel that communicates with satellite telemetry control panels associated with the Grease Interceptors and Equalization Tank.

Level controls monitor the level of mixed liquor in the treatment tanks and transmit this information to the panel. The panel will activate the permeate pump train to ON during high mixed liquor levels, or to STANDBY during low mixed liquor levels in the treatment tanks. In the event of a system or equipment problem requiring operator attention, the panel can either alert the operator or shut the system down.

In accordance with the applicable portions of California Title 22 reuse requirements (See Reference 5), disinfected tertiary recycled water shall be sampled at least once daily for total coliform bacteria and continuously sampled for turbidity using a continuous turbidity meter and recorder following filtration.

2.7 Process Reliability Features and Contingency Plan

Wastewater management systems operated in accordance with California Title 22 reuse requirements must satisfy a high level of operational control and reliability. Process reliability features included in the OWS are described herein, along with a contingency plan which will assure that no untreated or inadequately treated wastewater will be delivered to the use area.

The OWS shall be provided with a sufficient number of qualified personnel (Refer to Chapter 9, Section 13625 of the California Water Code) to operate the facility effectively so as to achieve the required level of treatment at all times.

A preventive maintenance program shall be provided at each reclamation plant to ensure that all equipment is kept in a reliable operating condition. Operating records shall be maintained at the

reclamation plant documenting all analyses specified in the reclamation criteria and WDRs; records of operational problems, plant and equipment breakdowns, diversions to emergency storage or disposal and all corrective or preventive action taken. Process or equipment failures triggering an alarm shall be recorded and maintained as a separate record file. Any discharge of untreated or partially treated wastewater to the use area, and the cessation of same, shall be reported immediately by telephone to the regulatory agency, the CDPH and the local health officer.

In accordance with the applicable portions of California Title 22 reuse requirements (See Reference 5), alarm devices are required to be installed to provide warning of; loss of power from the normal power supply and failure of biological treatment, disinfection or filtration processes.

Two (2) Emergency Storage Tanks (EST-1 & 2) are provided to satisfy short-term retention provisions of the California Title 22 reuse requirements. Two (2) 30,000 gallon (60,000 gallons total) belowground tanks are sufficient to store untreated or partially treated wastewater for at least a 24-hour period, including a peak day event. In the event of a power failure or disruption to the treatment facilities, untreated or partially treated wastewater will be automatically diverted to the Emergency Storage Tanks. The Emergency Storage Tanks will be equipped with aeration, provisions for odor control and pumps to return the contents to the treatment system after service is restored. All of the equipment other than the pumps shall be either independent of the normal power supply or provided with a standby power source.

Additional reliability features associated with the OWS are summarized in Table 3.

Table 3. OWS Reliability Features

OWS Process	Reliability Feature
Primary Treatment	Equalization Tank provides distributed control of primary treatment. In the unlikely event of a leak, the Equalization Tank can be bypassed temporarily without causing disruption to the Secondary/Tertiary treatment process. The Equalization Tank provides redundant screening functionality.
Biological Treatment	The proposed biological system is capable of treating the peak day flow with one series of

	Anoxic and Aeration Tanks out of service. The Emergency Storage Tank provides short term (24-hr) retention of the peak day flow in the event of disruption of the biological process. Standby replacement of key process equipment (e.g. blowers, diffusers, pumps). Alarms to indicate high or low water levels, low dissolved oxygen levels, high turbidity, high or low pH in the process tanks.
Filtration	Two of the three membrane skids can process the entire treatment plant flow with one membrane skid out of operation. The Emergency Storage Tank provides short term (24-hr) retention of the peak day flow in the event of disruption of the filtration process.
Disinfection	Each disinfection skid can process the entire treatment plant flow with one disinfection skid out of operation. The Emergency Storage Tank provides short term (24-hr) retention of the peak day flow in the event of disruption of the filtration process.
Power Supply	Alarms and standby power supply are provided.

3.1 General Guidelines for using an Onsite Wastewater System

The following guidelines are recommended to ensure reliable and consistent performance of the OWS:

1. Grease Interceptors should be inspected and maintained at least once monthly for scum levels and pumped as necessary.
2. Equalization Tank should be inspected a minimum of once annually for scum and sludge levels and pumped as necessary.
3. The secondary/tertiary treatment system should be inspected a minimum of once monthly per the manufacturer's requirements.
4. At all times only biodegradable products should be discharged into the sewer (i.e. cleaning products, toilet paper, laundry soaps).
5. All discharging water fixtures in the dwelling should be designed for low flow devices.
6. Never dispose of coffee grounds, grease, paint, caustic, or oily liquids, flues, cooking fats, motor oils, sanitary napkins, tampons, condoms, cigarettes, plastics, or disposable diapers into the sewer system.
7. Always be water wise and train all employees and guests on ways to save water.
8. Spread the laundry cleaning over several days. Generally, three wash loads discharging into the sewer system can be greater than the water use for one person per day. Additionally, the surge of chemicals causes damage to the bacteria in the primary tanks.
9. Repair any leaky plumbing fixtures as soon as possible.

10. Dispose of waste products as much as possible by using the garbage solid waste disposal rather than the sewer system. Do not use in-sink garbage disposals.

4.1 Regional Board Waste Discharge Requirements

The location of the project is in unincorporated Los Angeles County and the volume of wastewater flows to be managed onsite for this project requires issuance of Individual Waste Discharge Requirements (WDRs) from the Los Angeles Region Regional Water Quality Control Board (RWQCB). A Report of Waste Discharge (ROWD) must be submitted to the RWQCB to initiate the process. The RWQCB will have 30 days to notify the applicant that the ROWD is complete. Assuming that the ROWD is complete, the RWQCB will draft Tentative WDRs and circulate them for comment for a minimum 30 day period. The Tentative WDRs are then subject to a public hearing with a 30 day notification period, where they may be formally adopted as WDRs with a majority vote. The applicant must pay an annual fee to maintain the WDRs and comply with all of the provisions of the WDRs, including monthly and annual reporting requirements.

5.0 References

1. California Building Standards Commission, 2010 Edition of the California Building Code, California Code of Regulations, Title 24, Part 2
2. California Building Standards Commission, 2010 Edition of the California Plumbing Code, California Code of Regulations, Title 24, Part 5
3. Crites, R., Tchobanoglous, T., 1998. Small and Decentralized Wastewater Management Systems, WCB/McGraw-Hill
4. EPA Onsite Wastewater Treatment Systems Manual (EPA/625/R-00/008)
5. California Department of Public Health, Water Recycling Criteria, Title 22, Division 4, Chapter 3 of the California Code of Regulations
6. California Department of Public Health, Division of Drinking Water and Environmental Management, December 2009. Treatment Technology Report for Recycled Water
7. Leighton & Associates, Inc., Preliminary Geotechnical Feasibility Study, Malibu Canyon Country Club Project, General Area of Trancas Canyon between Encinal Road and Mulholland Highway, Los Angeles County, California, dated February 24, 2006
8. Los Angeles RWQCB: Waste Discharge Requirements, Order 01,031
9. Metcalf & Eddy, 2003. Wastewater Engineering Treatment and Reuse, Fourth Edition
10. American Environmental Testing Laboratory, Inc.: Malibu Institute Baseline Groundwater Monitoring Results for MW-1 and MW-2, dated February 17, 2013.
11. LRS Paul Boundy Architects: (a) Site Plan, dated September 15, 2011; (b) Site Plan, dated May 18, 2012.

12. EPD Consultants, Inc.: (a) Preliminary Engineering Report and Report of Waste Discharge, dated September 16, 2011; (b) OWS Plans, dated September 16, 2011; (c) Engineering Feasibility Report and Report of Waste Discharge, dated October 16, 2011: (d) OWS Plans Revision 1, dated October 2011; (e) OWS Plans Revision 2, dated November 2012.

6.0 Limitations

Consultant has performed these services within the limits described by Client. This report completes our scope of services in accordance with our agreement. This Report has been prepared in accordance with generally accepted practice. The conclusions and recommendations in this Report are based upon data provided by Client and Client's authorized agents. Should conditions be encountered in the field that appears different from those described in this Report, Consultant should be contacted immediately in order that Consultant might evaluate their effect. No warranties, either expressed or implied, are made as to the professional advice provided under the terms of the agreement and included in this report.

The data and conditions presented herein are generally considered valid for one year from the date of this Report. Reports and system designs older than one year can be updated to assure compliance with current regulations. Consultant will be available to make a final review of the project plan and specifications to assist in assuring correct interpretation of this Report's recommendations for use in applicable sections. It is the responsibility of Client and/or Clients' Contractor to ensure that all recommendations are carried out properly and all backfill of trenches and excavations are periodically checked as well as restored to acceptable conditions.

If this Report or portions here of are provided to contractors or included in specifications, it should be understood by all parties that they are provided for preliminary information only and should be used as such. Any variance from Consultants prescribed requirements and/or recommendations would nullify this Report and Client and/or Clients' Contractor would indemnify Consultant and its representatives from any and all liabilities and/or obligations.

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ATTACHMENT A

ESTIMATED WASTEWATER FLOWRATE CALCULATIONS

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TABLE A-1
Peak Day Estimated Wastewater Flows
Malibu Institute

Summary of Peak Estimated Flows

Building	Flow	
Malibu Institute Building	21,376	gpd
Security / Information Building	60	gpd
Golf Pro Shop / Grill	5,002	gpd
Cart Barn	360	gpd
Club House	11,740	gpd
40 Guest Bungalows	19,200	gpd
Maintenance Building	500	gpd
Warehouse	100	gpd
Subtotal	58,338	gpd
TOTAL PEAK DESIGN FLOW	**60,000**	gpd
TOTAL AVERAGE DESIGN FLOW	**40,000**	**gpd**

Peak Estimated Flows

Malibu Institute Building 48,220 s.f.

			Source
Main Meeting Room & Lobby	13,548	s.f.	
No. of Guests per square-foot	15	S.f./guest	(1)
Flow per Guest	5	gpd	(2)
Main Meeting Room and Lobby Flow	**4,516**	**gpd**	

Cafeterias - Main and Lower Level	7,123	s.f.	
Square Footage per Dining Guest	15	s.f. per guest	(1)
Dining Guests per Meal	475	guests / meal	
# of Meals per Day per Dining Guest	3	meals / guest / day	(2)
Flow per Guest per Meal	7	gpd / meal / guest	(3)
Cafeterias - Flow	**9,975**	**gpd**	

Meeting Room, Class Room and Other Institute Areas			
Total Space	27,549	square feet	
# of Seats per 20 s.f.	1	per 20 s.f.	(2), (4)
# of Seats	1,377	seats	
Flow per Seat	5	gpd/s.f.	(5)
Meeting Rooms and Other Flow	**6,885**	**gpd**	

SUBTOTAL FOR MALIBU INSTITUTE BUILDING **21,376** **gpd**

TABLE A-1
Peak Day Estimated Wastewater Flows
Malibu Institute

Security / Information Building	447	s.f.	
			Source
Security / Information Building	447	s.f.	
# of Employees per 500 s.f.	3	employee/500 s.f.	(2)
# of Employees	3.0		
Flow per Employee	20	gpd/employee	(6)
Security / Administration Flow	**60**	**gpd**	
SUBTOTAL FOR SECURITY/INFO BUILDING	**60**	**gpd**	
Golf Pro Shop / Grill	12,104	s.f.	
Golf Pro Shop	10,184	s.f.	
Flow per Area (Dry Store)	0.10	gpd/s.f.	(6)
Area Flow	1018	gpd	
# of Employees per 500 s.f.	1	employee/500 s.f.	(2)
# of Employees	20	employees	
Flow per Employee	20	gpd/employee	(6)
Employee Retail Flow	400	gpd	
Golf Pro Shop Flow	**1,418**	**gpd**	
Grill			
Restaurant	1,920	s.f.	
Square Footage per Dining Guest	15	s.f. per guest	(1)
Dining Guests per Meal	128	guests / meal	
# of Meals per Day per Dining Guest	4	meals / guest / day	(2)
Flow per Guest per Meal	7	gpd / meal / guest	(3)
Diner Flow	3,584	gpd	
Grill Flow	**3,584**	**gpd**	
SUBTOTAL FOR GOLF PRO SHOP / GRILL	**5,002**	**gpd**	
Cart Barn	9,162	s.f.	
Cart Barn			
Total Cart Bar Space	9,162	square feet	
Square Footage per Employee	500	s.f. / employee	(7), (2)
# of Employees	18	employees	
Flow per Employee	20	gpd / employee	(8)
Area Flow	360	gpd	
Cart Barn Flow	**360**	**gpd**	
SUBTOTAL FOR CART BARN	**360**	**gpd**	

TABLE A-1
Peak Day Estimated Wastewater Flows
Malibu Institute

			Source
Club House	30,147	s.f.	
Main Dining Room	2,780	s.f.	
Square Footage per Dining Guest	15	s.f. per guest	(1)
Dining Guests per Meal	185	guests / meal	
# of Meals per Day per Dining Guest	3	meals / guest / day	(2)
Flow per Guest per Meal	7	gpd / meal / guest	(3)
Main Dining Room Flow	**3,885**	**gpd**	
Offices and Administration Areas	2,844	s.f.	
# of Employees per 500 s.f.	1	employee/500 s.f.	(2)
# of Employees	6		
Flow per Employee	20	gpd/employee	(6)
Office / Administration Flow	**120**	**gpd**	
Fitness / Yoga Rooms	2,505	s.f.	
No. of Guests per square-foot	15	S.f./guest	(1)
Flow per Guest	5	gpd	(2)
Fitness / Yoga Flow	835	gpd	
Fitness / Yoga	**835**	**gpd**	
Spa / Locker Rooms	3,449	s.f.	
Area per Guest per Cycle	50	s.f. / guest	(9)
No. of Guests per Cycle	69	guests / cycle	
Cycles per Day	2	cycles per day	(2)
Flow per Guest	50	gpd / guest	(10)
Spa / Locker Room Flow	6,900	gpd	
Spa / Locker Room Flow	**6,900**	**gpd**	
SUBTOTAL FOR CLUB HOUSE	**11,740**	**gpd**	
Guest Bungalows	109,140	s.f.	
Bungalows - 4 Bedrooms / Unit			
No. of Units	40	units	
No. of Guests per Unit	8	guests / unit	
Flow per Guest	60	gpd / guest	(11)
Bungalows - Flow	**19,200**	**gpd**	
SUBTOTAL FOR GUEST BUGALOWS	**19,200**	**gpd**	

TABLE A-1
Peak Day Estimated Wastewater Flows
Malibu Institute

Maintenance Building	2,500	s.f.	
			Source
Maintenance Building	2,500	square feet	
Square Footage per Employee	100	s.f. / employee	(7)
# of Employees	25	employees	
Flow per Employee	20	gpd / employee	(8)
Maintenance Building Flow	**500**	**gpd**	
SUBTOTAL FOR MAINTENANCE BUILDING	**500**	**gpd**	
Warehouse	2,500	s.f.	
Warehouse			
Total Warehouse Space	2,500	square feet	
Square Footage per Employee	500	s.f. / employee	(7), (2)
# of Employees	5	employees	
Flow per Employee	20	gpd / employee	(8)
Area Flow	100	gpd	
Warehouse Flow	**100**	**gpd**	
SUBTOTAL FOR WAREHOUSE	**100**	**gpd**	

Source Notes

(1) Calfornia Building Code Table 1004.1.1, Assembly without fixed seats, unconcentrated (tables & chairs)
(2) Engineer's Estimate
(3) California Plumbing Code, Table K-3, Type 15 (toilet flow included in Sources (2), (4), (7), (10) and (13))
(4) Calfornia Building Code Table 1004.1.1, Assembly with fixed seats
(5) California Plumbing Code Table K-3, Type 20
(6) California Plumbing Code, Table K-3, Type 18
(7) California Building Code Table 1004.1.1, Business Area
(8) California Plumbing Code, Table K-3, Type 13
(9) Calfornia Building Code Table 1004.1.1, Exercise Room/Locker Room
(10) Georgia Department of Natural Resources, Environmental Protection Division
(11) California Plumbing Code, Table K-3, Type 12

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ATTACHMENT B

ESTIMATED GREASE FLOW CALCULATIONS

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TABLE B-1
Peak Day Estimated Grease Flows
Malibu Institute

Summary of Peak Estimated Grease Flows

Building	Minimum Grease Tank Volume	Proposed Grease Tank Size (gallons)
Malibu Institute Building - Cafeteria	**7,500**	**10,000**
Golf Pro Shop - Grill	**2,500**	**5,000**
Club House - Dining Room	**3,750**	**5,000**

Malibu Institute Facilities - Peak Estimated Grease Flows

TOTAL GREASE FLOW 13,750 gallons

Malibu Institute Building - Cafeteria			Reference
Number of Meals Served at Peak Hour	300		(1)
Waste Flow Rate without dishwasher	5	gallons/hour	(2)
Retention Time for Commercial Kitchen Waste	2.5	hours	(2)
Storage Factor for Full Equipped Commercial Kitchen	2	unitless	(2)
Cafeteria Grease Peak Flow	**7,500**	**gallons**	

Golf Pro Shop - Grill			Reference
Number of Meals Served at Peak Hour	100		(1)
Waste Flow Rate without dishwasher	5	gallons/hour	(2)
Retention Time for Commercial Kitchen Waste	2.5	hours	(2)
Storage Factor for Full Equipped Commercial Kitchen	2	unitless	(2)
Grill Grease Peak Flow	**2,500**	**gallons**	

Club House - Dining Room			Reference
Number of Meals Served at Peak Hour	150		(1)
Waste Flow Rate without dishwasher	5	gallons/hour	(2)
Retention Time for Commercial Kitchen Waste	2.5	hours	(2)
Storage Factor for Full Equipped Commercial Kitchen	2	unitless	(2)
Dining Room Grease Peak Flow	**3,750**	**gallons**	

Reference Notes

(1) Engineer's Estimate

(2) Uniform Plumbing CodeTable H-1, Sizing of Grease Interceptors

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ATTACHMENT C

TREATED EFFLUENT POND CALCULATIONS

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TABLE MI-3
MALIBU INSTITUTE
POND CONFIGURATION WORKSHEET

POND 1

Bottom Width	10 '	Bottom Radius	5 '
Bottom Length	50 '	Top Radius	30 '
Interior Side Slope (x:1)	0	Depth	17 '
To Elevation:	0	Freeboard	1 '
Interior Side Slope (x:1)	2.5	Start Month	August
To Elevation:	18	Min. Depth	8 '

Depth (ft)	Length (ft)	Width (ft)	Radius (ft)	Surface Area (ft2)	Total Volume (Mgal)
0	10	50	5	479	0
1	15	55	6	790	0.005
2	20	60	8	1,148	0.012
3	25	65	9	1,553	0.022
4	30	70	11	2,004	0.035
5	35	75	12	2,503	0.052
6	40	80	13	3,047	0.073
7	45	85	15	3,639	0.098
8	50	90	16	4,277	0.128
9	55	95	18	4,962	0.162
10	60	100	19	5,694	0.202
11	65	105	20	6,472	0.248
12	70	110	22	7,297	0.299
13	75	115	23	8,169	0.357
14	80	120	24	9,087	0.421
15	85	125	26	10,052	0.493
16	90	130	27	11,064	0.572
17	95	135	29	12,122	0.659
18	100	140	30	13,227	

Operating Range

Date: 3/22/2013

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ATTACHMENT D

WATER SAMPLE ANALYSIS RESULTS
FROM EXISTING GROUNDWATER
MONITORING WELLS

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Water Sample Analysis Results from Existing Groundwater Monitoring Wells

Project: The Malibu Institute
Address: 901 Encinal Canyon Road
Los Angeles County, Malibu, CA 90265
Prepared For: Malibu Associates, LLC
Date: March 22, 2013

Items:

1. Groundwater Sample Results summarized below are provided from the American Environmental Testing Laboratory Inc. Malibu Institute Baseline Groundwater Monirtoing Reports for MW-1 and MW-2, dated January 17, 2013.

2. For existing groundwater well locations MW-1 (aka. EW-1) and MW-2 (aka. EW-5) refer to the Preliminary Groundwater Monitoring Plan, dated November 21, 2011 prepared by EPD Consultants, Inc.

Groundwater Constituents Sample Results - Standard

Constituents	Units	MW-1 Sample Results	MW-2 Sample Results
pH	pH Unit	8.85	8.95
Boron	mg/L	0.200	1.94
Chloride	mg/L	10.8	50.0
Ammonia-N	mg/L	0.414	0.435
Total Kjeldhal Nitrogen	mg/L	0.469	0.664
Nitrate-N	mg/L	0.150	0.050
Nitrite-N	mg/L	0.100	ND
Total Phosphorous	mg/L	ND	ND
Sulfate	mg/L	36.7	58.2
Total Dissolved Solids (TDS)	mg/L	531	591
Total Suspended Solids (TSS)	mg/L	ND	ND
Biochemcial Oxygem Demand (BOD)	mg/L	ND	ND
Fecal Enterococci	MPN/100mL	ND	ND
Fecal Coliform	MPN/100mL	ND	ND
Total Coliform	MPN/100mL	ND	ND
Oil and Grease	mg/L	ND	ND
Asbestos	MF/L	ND	ND
2,3,7,8-Tetrachlorodibenzo-p-dioxi n (2,3,7,8 TCDD)	pg/L	ND	ND

Groundwater Constituents Sample Results - Priority Pollutants: Metals & Miscellaneous

Constituents	Units	MW-1 Sample Results	MW-2 Sample Results
Antimony	mg/L	ND	ND
Arsenic	mg/L	ND	ND
Beryllium	mg/L	ND	ND
Cadmium	mg/L	ND	ND
Chromium	mg/L	ND	ND
Copper	mg/L	ND	ND
Cyanide	mg/L	ND	ND
Lead	mg/L	ND	ND
Mercury	mg/L	ND	ND
Nickel	mg/L	ND	ND
Selenium	mg/L	ND	ND
Silver	mg/L	ND	ND
Thallium	mg/L	ND	ND
Zinc	mg/L	ND	0.0103

Groundwater Constituents Sample Results - Priority Pollutants: Volatile Organic Compounds

Constituents	Units	MW-1 Sample Results	MW-2 Sample Results
Acetone	ug/L	ND	ND
Acrolein (2-Propenal)	ug/L	ND	ND
Acrylonitrile (2-Propenenitrile)	ug/L	ND	ND
Benzene	ug/L	ND	ND
Bromodichloromethane	ug/L	ND	ND
Bromoform (Tribromomethane)	ug/L	ND	ND
Bromomethane (Methyl bromide)	ug/L	ND	ND
2-Butanone (MEK)	ug/L	ND	ND
Carbon Disulfide	ug/L	ND	ND
Carbon Tetrachloride	ug/L	ND	ND
Chlorobenzene	ug/L	ND	ND
Chloroethane	ug/L	ND	ND
2-Chloroehtyl vinyl ether	ug/L	ND	ND
Chloroform (Trichloronethane)	ug/L	ND	ND
Chloromethane (Methyl chloride)	ug/L	ND	ND
Dibromochloromethane	ug/L	ND	ND
1,2-Dichlorobenzene	ug/L	ND	ND
1,3-Dichlorobenzene	ug/L	ND	ND
1,4-Dichlorobenzene	ug/L	ND	ND
Dichlorodifluoromethane	ug/L	ND	ND
1,1-Dichloroethane	ug/L	ND	ND
1,2-Dichloroethane (EDC)	ug/L	ND	ND
cis-1,2-Dichloroethene	ug/L	ND	ND
trans-1,2-Dichloroethene	ug/L	ND	ND
1,2-Dichloropropane	ug/L	ND	ND
cis-1,3-Dichloropropene	ug/L	ND	ND
trans-1,3-Dichloropropene	ug/L	ND	ND
Ethylbenzene	ug/L	ND	ND
2-Hexanone	ug/L	ND	ND
4-Methyl-2-pentanone (MIBK)	ug/L	ND	ND
Methyl-tert-butyl ether (MTBE)	ug/L	ND	ND
Methylene chloride (DCM)	ug/L	ND	ND
Styrene	ug/L	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	ND	ND
Tetrachloroethene	ug/L	ND	ND
Toluene (Methyl benzene)	ug/L	ND	ND
1,1,1-Trichloroethane	ug/L	ND	ND
1,1,2-Trichloroethane	ug/L	ND	ND
Trichloroethene	ug/L	ND	ND
Trichlorofluoromethane	ug/L	ND	ND
Vinyl Acetate	ug/L	ND	ND
Vinyl chloride (Chloroethene)	ug/L	ND	ND
Xylenes (Total)	ug/L	ND	ND

Groundwater Constituents Sample Results - Priority Pollutants: Semi-Volatile Organic Compounds

Constituents	Units	MW-1 Sample Results	MW-2 Sample Results
Acenaphthene	ug/L	ND	ND
Acenaohthylene	ug/L	ND	ND
Anthracene	ug/L	ND	ND
Azobenzene	ug/L	ND	ND
Benzidine	ug/L	ND	ND
Benzo(a)anthracene	ug/L	ND	ND
Benzo(a)pyrene	ug/L	ND	ND
Benzo(b)fluoranthene	ug/L	ND	ND
Benzo(g,h,i)perylene	ug/L	ND	ND
Benzo(k)fluoranthene	ug/L	ND	ND
Benzoic Acid	ug/L	ND	ND
Benzyl Alcohol	ug/L	ND	ND
Bis(2-Chloroethoxy)methane	ug/L	ND	ND
Bis(2-Chloroethyl)ether	ug/L	ND	ND
Bis(2-chloroisopropyl)ether	ug/L	ND	ND
Bis(2-ethylhexyl) phthalate	ug/L	ND	ND
4-Bromophenyl phenyl ether	ug/L	ND	ND
Butyl benzyl phthalate	ug/L	ND	ND
4-Chloro-3-methylphenol	ug/L	ND	ND
4-Chloroaniline	ug/L	ND	ND
2-Chloronaphthalene	ug/L	ND	ND
2-Chlorophenol	ug/L	ND	ND
4-Chlorophenyl phenyl ether	ug/L	ND	ND
Chrysene	ug/L	ND	ND
Di-n-butyl phthalate	ug/L	ND	ND
Di-n-octyl phthalate (Dioctyl ester)	ug/L	ND	ND
Dibenzo(a,h)anthracene	ug/L	ND	ND
Dibenzofuran	ug/L	ND	ND
1,2-Dichlorobenzene	ug/L	ND	ND
1,3-Dichlorobenzene	ug/L	ND	ND
1,4-Dichlorobenzene	ug/L	ND	ND
3,3'-Dichlorobenzidine	ug/L	ND	ND
2,4-Dichlorophenol	ug/L	ND	ND
Diethyl phthalate (Diethyl ester)	ug/L	ND	ND
Dimethyl phthalate (Dimethyl ester)	ug/L	ND	ND
2,4-Dimethylphenol	ug/L	ND	ND
4,6-Dinitro-2-methylphenol	ug/L	ND	ND
2,4-Dinitrophenol	ug/L	ND	ND
2,4-Dinitrotoluene	ug/L	ND	ND
2,6-Dinitrotoluene (2,6-DNT)	ug/L	ND	ND
1,2-Diphenylhydrazine	ug/L	ND	ND
Fluoranthene	ug/L	ND	ND
Fluorene	ug/L	ND	ND
Hexachlorobenzene	ug/L	ND	ND
Hexachlorobutadiene	ug/L	ND	ND
Hexachlorocyclopentadiene	ug/L	ND	ND
Hexachloroethane	ug/L	ND	ND
Indeno(1,2,3-cd)pyrene	ug/L	ND	ND
Isophorone	ug/L	ND	ND
2-Methylnaphthalene	ug/L	ND	ND
4-Methylphenol	ug/L	ND	ND
2-Methylphenol (2-Cresol)	ug/L	ND	ND
3-Methylphenol (3-Cresol)	ug/L	ND	ND
N-Nitroso-Di-n-propylamine	ug/L	ND	ND
Naphthalene	ug/L	ND	ND
2-Nitroaniline	ug/L	ND	ND

3-Nitroaniline	ug/L	ND	ND
4-Nitroaniline	ug/L	ND	ND
Nitrobenzene (NB)	ug/L	ND	ND
4-Nitrophenol	ug/L	ND	ND
2-Nitrophenol (o-Nitrophenol)	ug/L	ND	ND
N-Nitrosodimethylamine	ug/L	ND	ND
N-nitrosodiphenylamine	ug/L	ND	ND
Pentachlorophenol	ug/L	ND	ND
Phenanthrene	ug/L	ND	ND
Phenol	ug/L	ND	ND
Pyrene	ug/L	ND	ND
1,2,4-Trichlorobenzene	ug/L	ND	ND
2,4,5-Trichlorophenol	ug/L	ND	ND
2,4,6-Trichlorophenol	ug/L	ND	ND

Groundwater Constituents Sample Results - Priority Pollutants: Pesticides & PCB's

Constituents	Units	MW-1 Sample Resultss	MW-2 Sample Results
Aroclor-1016 (PCB-1016)	ug/L	ND	ND
Aroclor-1221 (PCB-1221)	ug/L	ND	ND
Aroclor-1232 (PCB-1232)	ug/L	ND	ND
Aroclor-1242 (PCB-1242)	ug/L	ND	ND
Aroclor-1248 (PCB-1248)	ug/L	ND	ND
Aroclor-1254 (PCB-1254)	ug/L	ND	ND
Aroclor-1260 (PCB-1260)	ug/L	ND	ND
Aldrin	ug/L	ND	ND
Chlordane	ug/L	ND	ND
alpha-Chlordane	ug/L	ND	ND
4,4'-DDD (DDD)	ug/L	ND	ND
4,4'-DDE (DDE)	ug/L	ND	ND
4,4'-DDT (DDT)	ug/L	ND	ND
Dieldrin	ug/L	ND	ND
Endosulfan 1	ug/L	ND	ND
Endosulfan 1 1	ug/L	ND	ND
Endosulfan sulfate	ug/L	ND	ND
Endrin	ug/L	ND	ND
Endrin aldehyde	ug/L	ND	ND
Endrin ketone	ug/L	ND	ND
Gamma-Chlordane	ug/L	ND	ND
Heptachlor	ug/L	ND	ND
Heptachlor epoxide	ug/L	ND	ND
alpha-Hexachlorocyclohexane (alpha-BHC)	ug/L	ND	ND
beta-Hexachlorocyclohexane (beta-BHC)	ug/L	ND	ND
delta-Hexachlorocyclohexane (Delta-BHC)	ug/L	ND	ND
gamma-Hexachlorocyclohexane (gamma-BHC)	ug/L	ND	ND
Methoxychlor	ug/L	ND	ND
Toxaphene	ug/L	ND	ND

ND = Constituent was not detected in the sample at or above MDL. Refer to Item 1.

MDL = Method Detection Limit is a statisticaly derived number which is specific for each instrument, each method, and each compound. It inidcates a distinctively detectable quantity with 99% probability. Refer to Item 1.

L = liter
mL = milliliter
mg/L = milligrams per liter
ug/L = microgram per liter
pg/L = petagram per liter
MPN/100mL = most probable number per hundred milliliters
MF/L = million fibers per liter

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Attention: Kevin Poffenbarger

Number of Pages 27
Date Received 01/17/2013
Date Reported 01/31/2013

Job Number	Order Date	Client
68172	01/17/2013	EPD

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

Enclosed please find results of analyses of 1 water sample which was analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

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CHAIN OF CUSTODY RECORD

№ 81921

AETL JOB No. 68172

Page 1 of 1

COMPANY: EPD CONSULTANTS
PROJECT MANAGER:
COMPANY ADDRESS: 411 N. HARBOR #304 SAN PEDRO
PHONE: (310) 2466565
FAX: (310) 2416566
PROJECT NAME:
PROJECT #: MALIBU INSTITUTE
SITE NAME AND ADDRESS:
PO #:

	SAMPLE ID	LAB ID	DATE	TIME	MATRIX	CONTAINER NUMBER/SIZE	PRES.	ANALYSIS REQUESTED: * See attachment	TEST INSTRUCTIONS & COMMENTS
1	MW1	68172-01	01/17/13		W	17x Various*	HCl/Ice $Na_2S_2O_3$	X	* 8 x 1 LT Amber 1 x 500 mL PL 1x 1 LT PL 2 x 250 mL PL 2 x 120 mL P 3 x 40 mL VOA
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
IX									
15									

SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

TOTAL NUMBER OF CONTAINERS	17	PROPERLY COOLED Y / N / NA	
CUSTODY SEALS Y / N / NA		SAMPLES INTACT Y / N / NA	
RECEIVED IN GOOD COND: Y / N		SAMPLES ACCEPTED Y / N	

TURN AROUND TIME

☐ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

DATA DELIVERABLE REQUIRED

☐ HARD COPY ☐ PDF ☐ GEOTRACKER (GLOBAL ID) _____ ☐ OTHER (PLEASE SPECIFY) _____

	RELINQUISHED BY SAMPLER: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature:			
Printed Name:	CHARLO		THOMAS ROBRAS-
Date / Time:	1/17/13 10:30AM	/	1-17-13 1245
	RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY LABORATORY: 3.
Signature:			
Printed Name:	THOMAS ROBRASA		Jean Claude
Date / Time:	1-17-13 10.30	/	01/17/13 1245

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

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December 17th, 2012

EPD Consultants

411 N. Harbor Blvd., Ste. 304, San Pedro, CA 90731
Tel. 310-241-6565, Fax. 310-241-6566

Site Location: Malibu Institute Baseline Groundwater Monitoring

ANALYTE	METHOD OF ANALYSI
Boron	200.7
Chloride	300.0
Ammonia – N	350.3
Nitrogen, Kjeldahl (TKN)	351.3
Nitrate – N	300.0
Nitrite – N	300.0
Total Phosphorus	365.2
Sulfate	300.0
SVOCs	625
2,3,7,8-TCDD*	1613B
Pesticides / PCBs (Low Level)	608
VOCs	624
12 Priority Pollutant Metals **	200.7
Mercury	245.2
Total Cyanide	335.2
Asbestos	100.2
Total Suspended Solids	160.2
Total Dissolved Solids	160.1
Total Coliform	SM-9221A-D
Fecal Coliform	SM-9221A-E
Fecal Enterococci	SM-9230A-B
BOD (5 Days at 20°C)	405.1
pH	150.1
Oil & Grease	1664
Temperature	170.1

*** TAT for 2,3,7,8-TCDD is 10 to 15 working days.**
**** Include Antimony, Cadmium, Lead, Selenium, Zinc, Arsenic, Total Chromium, Silver, Beryllium, Copper, Nickel, & Thallium.**

STANDARD TURN AROUND TIME (TAT) IS FIVE WORKING DAYS.
THERE IS A 75% SURCHARGE FOR NEXT DAY TAT.
THERE IS A 50% SURCHARGE FOR 2 DAYS TAT.
THERE IS A 45% SURCHARGE FOR 3 DAYS TAT.
THERE IS A 35% SURCHARGE FOR 4 DAYS TAT.
All surcharges apply to cost of analysis only.

PRICES INCLUDE QA/QC DATA, LABELS, CHAIN OF CUSTODY FORMS, COOLER, BLUE ICE, AND COMPLIMENTARY SAMPLE PICKUP IN SOUTHERN CALIFORNIA.

Cyrus Razmara, Ph.D.
CEO & Laboratory Director

American Environmental Testing Laboratory Inc.
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Attention: Kevin Poffenbarger

Project ID: MALIBU INSTITUTE
Date Received 01/17/2013
Date Reported 01/31/2013

Job Number	Order Date	Client
68172	01/17/2013	EPD

CERTIFICATE OF ANALYSIS
CASE NARRATIVE

AETL received 1 samples with the following specification on 01/17/2013.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
68172.01	MW1	01/17/2013	Aqueous	17

The samples were analyzed as specified on the enclosed chain of custody. Analytical non-conformances have been noted on the report.

Checked By: _____ Approved By: _____

Cyrus Razmara, Ph.D.
Laboratory Director

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ANALYTICAL RESULTS

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Page: 2

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 624, Purgeable Volatile Organics by GC/MS

QC Batch No: 0118131A1

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			624	624			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Acetone	10	10	ND	ND			
Acrolein (2-Propenal)	25	50	ND	ND			
Acrylonitrile (2-Propenenitrile)	25	50	ND	ND			
Benzene	0.5	1.0	ND	ND			
Bromodichloromethane	0.5	1.0	ND	ND			
Bromoform (Tribromomethane)	2.5	5.0	ND	ND			
Bromomethane (Methyl bromide)	1.5	3.0	ND	ND			
2-Butanone (MEK)	5.0	5.0	ND	ND			
Carbon Disulfide	0.5	1.0	ND	ND			
Carbon tetrachloride	0.5	1.0	ND	ND			
Chlorobenzene	0.5	1.0	ND	ND			
Chloroethane	1.5	3.0	ND	ND			
2-Chloroethyl vinyl ether	2.5	5.0	ND	ND			
Chloroform (Trichloromethane)	0.5	1.0	ND	ND			
Chloromethane (Methyl chloride)	1.5	3.0	ND	ND			
Dibromochloromethane	0.5	1.0	ND	ND			
1,2-Dichlorobenzene	0.5	1.0	ND	ND			
1,3-Dichlorobenzene	0.5	1.0	ND	ND			
1,4-Dichlorobenzene	0.5	1.0	ND	ND			
Dichlorodifluoromethane	1.5	3.0	ND	ND			
1,1-Dichloroethane	0.5	1.0	ND	ND			
1,2-Dichloroethane (EDC)	0.5	1.0	ND	ND			
1,1-Dichloroethene	0.5	1.0	ND	ND			
cis-1,2-Dichloroethene	0.5	1.0	ND	ND			
trans-1,2-Dichloroethene	0.5	1.0	ND	ND			
1,2-Dichloropropane	0.5	1.0	ND	ND			
cis-1,3-Dichloropropene	0.5	1.0	ND	ND			

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ANALYTICAL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 624, Purgeable Volatile Organics by GC/MS

QC Batch No: 0118131A1

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			624	624			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
trans-1,3-Dichloropropene	0.5	1.0	ND	ND			
Ethylbenzene	0.5	1.0	ND	ND			
2-Hexanone	2.5	5.0	ND	ND			
4-Methyl-2-pentanone (MIBK)	2.5	5.0	ND	ND			
Methyl-tert-butyl ether (MTBE)	0.5	1.0	ND	ND			
Methylene chloride (DCM)	2.0	4.0	ND	ND			
Styrene	0.5	1.0	ND	ND			
1,1,2,2-Tetrachloroethane	0.5	1.0	ND	ND			
Tetrachloroethene	0.5	1.0	ND	ND			
Toluene (Methyl benzene)	0.5	1.0	ND	ND			
1,1,1-Trichloroethane	0.5	1.0	ND	ND			
1,1,2-Trichloroethane	0.5	1.0	ND	ND			
Trichloroethene	0.5	1.0	ND	ND			
Trichlorofluoromethane	0.5	1.0	ND	ND			
Vinyl Acetate	0.5	5.0	ND	ND			
Vinyl chloride (Chloroethene)	0.5	3.0	ND	ND			
Xylenes (Total)	0.4	2.0	ND	ND			
Our Lab I.D.			Method Blank	68172.01			
Surrogates	**%Rec.Limit**		**% Rec.**	**% Rec.**			
Bromofluorobenzene	75-125		91.9	89.6			
1,2-Dichloroethane-d4	75-125		79.9	76.0			
Toluene-d8	75-125		103	104			

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/22/2013	01/22/2013			
Preparation Method			625	625			
Date Analyzed			01/22/2013	01/22/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Acenaphthene	5	10	ND	ND			
Acenaphthylene	5	10	ND	ND			
Anthracene	5	10	ND	ND			
Azobenzene	5	10	ND	ND			
Benzidine	5	10	ND	ND			
Benzo(a)anthracene	5	10	ND	ND			
Benzo(a)pyrene	5	10	ND	ND			
Benzo(b)fluoranthene	5	10	ND	ND			
Benzo(g,h,i)perylene	5	10	ND	ND			
Benzo(k)fluoranthene	5	10	ND	ND			
Benzoic Acid	5	10	ND	ND			
Benzyl Alcohol	5	10	ND	ND			
Bis(2-Chloroethoxy)methane	5	10	ND	ND			
Bis(2-Chloroethyl)ether	5	10	ND	ND			
Bis(2-chloroisopropyl) ether	5	10	ND	ND			
Bis(2-ethylhexyl) phthalate	5	10	ND	ND			
4-Bromophenyl phenyl ether	5	10	ND	ND			
Butyl benzyl phthalate	5	10	ND	ND			
4-Chloro-3-methylphenol	5	10	ND	ND			
4-Chloroaniline	5	10	ND	ND			
2-Chloronaphthalene	5	10	ND	ND			
2-Chlorophenol	5	10	ND	ND			
4-Chlorophenyl phenyl ether	5	10	ND	ND			
Chrysene	5	10	ND	ND			
Di-n-butyl phthalate	5	10	ND	ND			
Di-n-octyl phthalate (Dioctyl ester)	5	10	ND	ND			
Dibenzo(a,h)anthracene	5	10	ND	ND			

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ANALYTICAL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/22/2013	01/22/2013			
Preparation Method			625	625			
Date Analyzed			01/22/2013	01/22/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Dibenzofuran	5	10	ND	ND			
1,2-Dichlorobenzene	5	10	ND	ND			
1,3-Dichlorobenzene	5	10	ND	ND			
1,4-Dichlorobenzene	5	10	ND	ND			
3,3'-Dichlorobenzidine	5	10	ND	ND			
2,4-Dichlorophenol	5	10	ND	ND			
Diethyl phthalate (Diethyl ester)	5	10	ND	ND			
Dimethyl phthalate (Dimethyl ester)	5	10	ND	ND			
2,4-Dimethylphenol	5	10	ND	ND			
4,6-Dinitro-2-methylphenol	5	10	ND	ND			
2,4-Dinitrophenol	5	10	ND	ND			
2,4-Dinitrotoluene	5	10	ND	ND			
2,6-Dinitrotoluene (2,6-DNT)	5	10	ND	ND			
1,2-Diphenylhydrazine	5	10	ND	ND			
Fluoranthene	5	10	ND	ND			
Fluorene	5	10	ND	ND			
Hexachlorobenzene	5	10	ND	ND			
Hexachlorobutadiene	5	10	ND	ND			
Hexachlorocyclopentadiene	5	10	ND	ND			
Hexachloroethane	5	10	ND	ND			
Indeno(1,2,3-cd)pyrene	5	10	ND	ND			
Isophorone	5	10	ND	ND			
2-Methylnaphthalene	5	10	ND	ND			
4-Methylphenol	5	10	ND	ND			
2-Methylphenol (2-Cresol)	5	10	ND	ND			
3-Methylphenol (3-Cresol)	5	10	ND	ND			
N-Nitroso-Di-n-propylamine	5	10	ND	ND			
Naphthalene	5	10	ND	ND			
2-Nitroaniline	5	10	ND	ND			
3-Nitroaniline	5	10	ND	ND			
4-Nitroaniline	5	10	ND	ND			
Nitrobenzene (NB)	5	10	ND	ND			
4-Nitrophenol	5	10	ND	ND			
2-Nitrophenol (o-Nitrophenol)	5	10	ND	ND			

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ANALYTICAL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/22/2013	01/22/2013			
Preparation Method			625	625			
Date Analyzed			01/22/2013	01/22/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
N-Nitrosodimethylamine	5	10	ND	ND			
N-nitrosodiphenylamine	5	10	ND	ND			
Pentachlorophenol	5	10	ND	ND			
Phenanthrene	5	10	ND	ND			
Phenol	5	10	ND	ND			
Pyrene	5	10	ND	ND			
1,2,4-Trichlorobenzene	5	10	ND	ND			
2,4,5-Trichlorophenol	5	10	ND	ND			
2,4,6-Trichlorophenol	5	10	ND	ND			
Our Lab I.D.			Method Blank	68172.01			
Surrogates	**%Rec.Limit**		**% Rec.**	**% Rec.**			
2-Fluorophenol	25-121		42.8	27.0			
2-Fluorobiphenyl	30-115		70.7	69.0			
Nitrobenzene-d5	23-120		66.8	62.9			
Phenol-d6	10-94		59.5	14.6			
p-Terphenyl-D14	18-137		100	94.9			
2,4,6-Tribromophenol	19-122		72.0	82.5			

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ANALYTICAL RESULTS

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Page: 7

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 608, Organochlorine Pesticides and PCBs

QC Batch No: 011813LB1

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			608	608			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Aroclor-1016 (PCB-1016)	0.50	0.50	ND	ND			
Aroclor-1221 (PCB-1221)	0.50	0.50	ND	ND			
Aroclor-1232 (PCB-1232)	0.50	0.50	ND	ND			
Aroclor-1242 (PCB-1242)	0.50	0.50	ND	ND			
Aroclor-1248 (PCB-1248)	0.50	0.50	ND	ND			
Aroclor-1254 (PCB-1254)	0.50	0.50	ND	ND			
Aroclor-1260 (PCB-1260)	0.50	0.50	ND	ND			
Aldrin	0.005	0.005	ND	ND			
Chlordane	0.10	0.10	ND	ND			
alpha-Chlordane	0.10	0.10	ND	ND			
4,4'-DDD (DDD)	0.05	0.05	ND	ND			
4,4'-DDE (DDE)	0.05	0.05	ND	ND			
4,4'-DDT (DDT)	0.01	0.01	ND	ND			
Dieldrin	0.01	0.01	ND	ND			
Endosulfan I	0.01	0.01	ND	ND			
Endosulfan II	0.01	0.01	ND	ND			
Endosulfan sulfate	0.05	0.05	ND	ND			
Endrin	0.01	0.01	ND	ND			
Endrin aldehyde	0.01	0.01	ND	ND			
Endrin ketone	0.01	0.01	ND	ND			
Gamma-Chlordane	0.10	0.10	ND	ND			
Heptachlor	0.01	0.01	ND	ND			
Heptachlor epoxide	0.01	0.01	ND	ND			
alpha-Hexachlorocyclohexane (Alpha-BHC)	0.01	0.01	ND	ND			
beta-Hexachlorocyclohexane (Betta-BHC)	0.005	0.005	ND	ND			
delta-Hexachlorocyclohexane (Delta-BHC)	0.005	0.005	ND	ND			
gamma-Hexachlorocyclohexane	0.02	0.02	ND	ND			

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ANALYTICAL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 608, Organochlorine Pesticides and PCBs

QC Batch No: 011813LB1

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			608	608			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	MDL	PQL	Results	Results			
(Gamma-BHC, Lindane)							
Methoxychlor	0.10	0.10	ND	ND			
Toxaphene	0.50	0.50	ND	ND			
Our Lab I.D.			Method Blank	68172.01			
Surrogates	%Rec.Limit		% Rec.	% Rec.			
Decachlorobiphenyl	30-150		98.4	90.7			
Tetrachloro-m-xylene	30-150		84.0	85.2			

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ANALYTICAL RESULTS

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 200PPM, Priority Pollutant Metals (13 Metals)

QC Batch No: 0117132C2

Our Lab I.D.			Method Blank	68172.01			
Client Sample I.D.				MW1			
Date Sampled				01/17/2013			
Date Prepared			01/17/2013	01/17/2013			
Preparation Method			200.2	200.2			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			mg/L	mg/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Antimony	0.05	0.10	ND	ND			
Arsenic	0.05	0.10	ND	ND			
Beryllium	0.01	0.05	ND	ND			
Cadmium	0.01	0.05	ND	ND			
Chromium	0.01	0.05	ND	ND			
Copper	0.01	0.05	ND	ND			
Lead	0.05	0.10	ND	ND			
Mercury (By EPA 245.1)	0.001	0.002	ND	ND			
Nickel	0.01	0.05	ND	ND			
Selenium	0.05	0.10	ND	ND			
Silver	0.01	0.05	ND	ND			
Thallium	0.05	0.10	ND	ND			
Zinc	0.01	0.05	ND	ND			

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ANALYTICAL RESULTS

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Our Lab I.D.							N/A	68172.01	
Client Sample I.D.							Method Blank	MW1	
Date Sampled							01/17/2013	01/17/2013	
Matrix							Aqueous	Aqueous	
Analytes	**D.F.**	**Method**	**Units**	**MDL**	**PQL**	**Analyzed**	**Results**	**Results**	
pH	1	150.1	pH unit	0.01	0.01	01/17/2013	NA	8.85	
Total Dissolved Solids	1	160.1	mg/L	5.0	10.0	01/18/2013	ND	531	
Total Suspended Solids (TSS)	1	160.2	mg/L	0.50	5.00	01/17/2013	ND	ND	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	1	1613	pg/L	2.0	2.0	01/25/2013	ND	ND	
Oil and Grease	1	1664	mg/L	0.5	1.0	01/17/2013	ND	ND	
Boron	1	200.7	mg/L	0.050	0.100	01/21/2013	ND	0.200	
Chloride	1	300.0	mg/L	0.5	1.0	01/18/2013	ND	10.8	
Nitrate as Nitrogen	1	300.0	mg/L	0.05	0.10	01/18/2013	ND	0.150	
Nitrite as Nitrogen	1	300.0	mg/L	0.01	0.02	01/18/2013	ND	0.100	
Sulfate	1	300.0	mg/L	0.5	1.0	01/18/2013	ND	36.7	
Cyanide (Total)	1	335.2	mg/L	0.01	0.05	01/21/2013	ND	ND	
Ammonia as Nitrogen	1	350.3	mg/L	0.05	0.10	01/18/2013	ND	0.414	
Nitrogen, Total Kjeldahl	1	351.3	mg/L	0.05	0.10	01/18/2013	ND	0.469	
Phosphorus (total)	1	365.2	mg/L	0.05	0.10	01/21/2013	ND	ND	
Biochemical Oxygen Demand (BOD)	1	405.1	mg/L	5.0	5.0	01/22/2013	ND	ND	
Asbestos, Total	1	EPA-100.2	MF/L	0.19	0.19	01/21/2013	NA	ND	
Coliform, total	1	SM-9221A-D	MPN/100 mL	2.0	2.0	01/19/2013	NA	ND	
Coliform, fecal	1	SM-9221A-E	MPN/100 mL	2.0	2.0	01/19/2013	NA	ND	
Fecal Enterococci	1	SM-9230A-B	MPN/100 mL	2.0	2.0	01/21/2013	NA	ND	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 150.1, pH - Electrometric (EPA/600/4-79-020)

QC Batch No: 011713-1; Dup or Spiked Sample: 68168.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/17/2013; Units: pH unit

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
pH	7.63	7.60	<1	<15	7.00	7.00	100	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 160.1, Total Dissolved Solids, Gravimetric, Dried at 180 C

QC Batch No: 011713-1; Dup or Spiked Sample: 68162.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/18/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Total Dissolved Solids	1,230	1,260	2.4	<15	100	105	105	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 160.2, Residue, Non-Filterable, Gravimetric, Dried at 103-105 C

QC Batch No: 011713-1; Dup or Spiked Sample: 68163.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/17/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Total Suspended Solids (TSS)	ND	ND	<1	<15	100	84.0	84.0	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 1613, 2,3,7,8-TCDD by HRGC/HRMS

QC Batch No: 012513; Dup or Spiked Sample: B012513; LCS: Clean Water; LCS Prepared: 01/25/2013; LCS Analyzed: 01/25/2013; Units: pg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	50.0	50.5	101	50.0	53.5	107	5.8	67-158	<30	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 1664, Oil and Grease, Gravimetric

QC Batch No: 011713-1; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/17/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Oil and Grease	40.0	37.4	93.5	40.0	36.8	92.0	1.6	80-120	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 200.7, Boron by ICP

QC Batch No: 0121132C1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Boron	0.200	1.00	1.16	96.0	1.00	1.17	97.0	1.04	80-120	<20

QC Batch No: 0121132C1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Boron	1.00	0.950	95.2	1.00	0.970	97.0	1.87	80-120	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 200PPM, Priority Pollutant Metals (13 Metals)

QC Batch No: 0117132C2; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/17/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Antimony	0.00	1.00	0.990	99.1	1.00	1.00	99.5	<1	80-120	<15
Arsenic	0.00	1.00	1.03	103	1.00	1.02	102	<1	80-120	<15
Beryllium	0.00	1.00	1.14	114	1.00	1.14	114	<1	80-120	<15
Cadmium	0.00	1.00	1.02	102	1.00	1.00	100	1.98	80-120	<15
Chromium	0.00	1.00	0.990	99.2	1.00	0.980	98.4	<1	80-120	<15
Copper	0.00	1.00	0.980	97.8	1.00	0.980	98.0	<1	80-120	<15
Lead	0.00	1.00	0.970	96.5	1.00	0.960	96.0	<1	80-120	<15
Mercury (By EPA 245.1)	0.00	0.0100	0.0116	116	0.0100	0.0119	119	2.6	80-120	<15
Nickel	0.00	1.00	0.990	98.6	1.00	0.980	98.0	<1	80-120	<15
Selenium	0.00	1.00	1.03	103	1.00	1.04	104	<1	80-120	<15
Silver	0.00	1.00	0.120#	12.1	1.00	0.150#	14.6	18.7	80-120	<15
Thallium	0.00	1.00	0.970	96.5	1.00	0.970	96.9	<1	80-120	<15
Zinc	0.0103	1.00	1.07	106	1.00	1.06	105	<1	80-120	<15

QC Batch No: 0117132C2; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/17/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Antimony	1.00	0.990	99.2	1.00	1.01	101	1.80	80-120	<15	
Arsenic	1.00	1.02	102	1.00	1.03	103	<1	80-120	<15	
Beryllium	1.00	1.11	111	1.00	1.11	111	<1	80-120	<15	
Cadmium	1.00	0.990	99.2	1.00	0.990	98.6	<1	80-120	<15	
Chromium	1.00	0.970	96.9	1.00	0.970	96.5	<1	80-120	<15	
Copper	1.00	0.940	93.6	1.00	0.940	93.6	<1	80-120	<15	
Lead	1.00	0.940	93.6	1.00	0.940	93.8	<1	80-120	<15	
Mercury (By EPA 245.1)	0.0100	0.0112	112	0.0100	0.0111	111	<1	80-120	<15	
Nickel	1.00	0.950	94.5	1.00	0.940	94.1	<1	80-120	<15	
Selenium	1.00	1.03	103	1.00	1.03	103	<1	80-120	<15	
Silver	1.00	0.960	96.3	1.00	0.960	96.2	<1	80-120	<15	
Thallium	1.00	0.920	92.4	1.00	0.940	93.6	1.29	80-120	<15	
Zinc	1.00	1.01	101	1.00	0.997	99.7	1.30	80-120	<15	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 300.0, Determination of Inorganic Anion in water by IC

QC Batch No: 011813-1; Dup or Spiked Sample: 68168.01; LCS: Clean Water; LCS Prepared: 01/18/2013; LCS Analyzed: 01/18/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Chloride	20.0	19.6	98.0	20.0	19.6	98.0	<1	80-120	<20	
Nitrate as Nitrogen	2.00	2.00	100	2.00	2.06	103	3.0	80-120	<20	
Nitrite as Nitrogen	2.00	2.04	102	2.00	2.02	101	<1	80-120	<20	
Sulfate	20.0	20.6	103	20.0	20.4	102	<1	80-120	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 335.2, Cyanide, Total, Titrimetric, Spectrophotometric

QC Batch No: 012113; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Cyanide (Total)	0.00	0.200	0.176	88.0	0.200	0.187	93.5	6.1	80-120	<15

QC Batch No: 012113; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Cyanide (Total)	ND	ND	<1	<15	0.200	0.182	91.0	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 350.3, Ammonia as N, Potentiometric, ISE (EPA/600/4-79-020)

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Ammonia as Nitrogen	0.414	0.500	0.838	84.8	0.500	0.852	87.6	3.2	80-120	<15

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit						
Ammonia as Nitrogen	0.500	0.505	101	80-120						

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 351.3, Nitrogen, Kjeldahl (EPA/600/4-79/020)

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Nitrogen, Total Kjeldahl	0.469	0.500	0.880	82.2	0.500	0.889	84.0	2.2	80-120	<15

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Nitrogen, Total Kjeldahl	0.469	0.452	3.7	<15	0.500	0.484	96.8	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 365.2, Phosphorus, Total, Colorimetric, Ascorbic Acid

QC Batch No: 012113-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Phosphorus (total)	0.00	0.196	0.210	107	0.196	0.212	108	<1	80-120	<15

QC Batch No: 012113-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Phosphorus (total)	ND	ND	<1	<15	0.196	0.204	104	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 405.1, Biochemical Oxygen Demand, 5 days, 20C (EPA/600/4-79-020)

QC Batch No: 011713-1; Dup or Spiked Sample: 68171.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/22/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Biochemical Oxygen Demand (BOD)	ND	ND	<1	<15	198	189	95.4	80-120		

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Page: 24

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 608, Organochlorine Pesticides and PCBs

QC Batch No: 011813LB1; Dup or Spiked Sample: B011813LB1; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: ug/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Aroclor-1260 (PCB-1260)	0.00	5.00	4.83	96.6	5.00	4.14	82.8	15.4	50-150	<50
Aldrin	0.00	0.400	0.387	96.8	0.400	0.412	103	6.2	40-140	<40
4,4'-DDT (DDT)	0.00	1.00	0.975	97.5	1.00	1.07	107	9.3	40-140	<40
Dieldrin	0.00	1.00	0.862	86.2	1.00	0.942	94.2	8.9	40-140	<40
Endrin	0.00	1.00	0.988	98.8	1.00	1.08	108	8.9	40-140	<40
Heptachlor	0.00	0.400	0.355	88.8	0.400	0.408	102	13.8	40-140	<40
gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane)	0.00	0.400	0.400	100	0.400	0.428	107	6.8	40-140	<40
Surrogates										
Decachlorobiphenyl	0.00	1.00	1.04	104	1.00	0.929	92.9	10.7	30-150	<20
Tetrachloro-m-xylene	0.00	1.00	1.08	108	1.00	0.924	92.4	14.4	30-150	<20

QC Batch No: 011813LB1; Dup or Spiked Sample: B011813LB1; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit						
Aroclor-1260 (PCB-1260)	5.00	5.02	100	60-140						
Aldrin	0.400	0.395	98.8	60-140						
4,4'-DDT (DDT)	1.00	1.06	106	60-140						
Dieldrin	1.00	0.926	92.6	60-140						
Endrin	1.00	1.07	107	60-140						
Heptachlor	0.400	0.390	97.5	60-140						
gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane)	0.400	0.440	110	60-140						
Surrogates										
Decachlorobiphenyl	1.00	0.938	93.8	30-150						
Tetrachloro-m-xylene	1.00	1.07	107	30-150						

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 624, Purgeable Volatile Organics by GC/MS

QC Batch No: 0118131A1; Dup or Spiked Sample: B0118131A1; LCS: Clean Water; QC Prepared: 01/18/2013;MS Analyzed: 01/19/2013; LCS Analyzed: 01/18/2013; Units: ug/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Benzene	0.00	50.0	43.8	87.6	50.0	42.6	85.2	2.78	75-125	<20
Chlorobenzene	0.00	50.0	54.5	109	50.0	53.5	107	1.85	75-125	<20
1,1-Dichloroethene	0.00	50.0	49.6	99.2	50.0	49.8	99.6	<1	75-125	<20
Methyl-tert-butyl ether (MTBE)	0.00	50.0	39.1	78.2	50.0	39.3	78.6	<1	75-125	<20
Toluene (Methyl benzene)	0.00	50.0	49.5	99.0	50.0	48.3	96.6	2.45	75-125	<20
Trichloroethene	0.00	50.0	59.0	118	50.0	53.0	106	10.7	75-125	<20
Surrogates										
Bromofluorobenzene	0.00	50.0	38.5	77.0	50.0	38.1	76.2	1.04	75-125	<20
1,2-Dichloroethane-d4	0.00	50.0	46.7	93.3	50.0	39.1	78.2	16.2	75-125	<20
Toluene-d8	0.00	50.0	52.0	104	50.0	52.0	104	<1	75-125	<20

QC Batch No: 0118131A1; Dup or Spiked Sample: B0118131A1; LCS: Clean Water; QC Prepared: 01/18/2013;MS Analyzed: 01/19/2013; LCS Analyzed: 01/18/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Benzene	50.0	46.5	93.0	50.0	44.5	89.0	4.40	75-125	<20	
Chlorobenzene	50.0	57.1	114	50.0	54.3	109	4.48	75-125	<20	
1,1-Dichloroethene	50.0	57.6	115	50.0	54.2	108	6.28	75-125	<20	
Methyl-tert-butyl ether (MTBE)	50.0	45.2	90.4	50.0	42.8	86.0	4.99	75-125	<20	
Toluene (Methyl benzene)	50.0	51.4	103	50.0	49.2	98.0	4.98	75-125	<20	
Trichloroethene	50.0	60.4	121	50.0	58.0	116	4.22	75-125	<20	
LCS										
Chloroform (Trichloromethane)	50.0	50.5	101	50.0	48.0	96.0	5.08	75-125	<20	
Ethylbenzene	50.0	52.6	105	50.0	50.3	101	3.88	75-125	<20	
1,1,1-Trichloroethane	50.0	51.0	102	50.0	49.2	98.0	4.00	75-125	<20	
o-Xylene	50.0	52.1	104	50.0	49.1	98.0	5.94	75-125	<20	
m,p-Xylenes	100	111	111	100	106	106	4.61	75-125	<20	
Surrogates										
Bromofluorobenzene	50.0	39.1	78.2	50.0	39.2	78.3	<1	75-125	<20	
1,2-Dichloroethane-d4	50.0	39.9	79.9	50.0	39.4	78.8	1.38	75-125	<20	
Toluene-d8	50.0	50.6	101	50.0	50.2	100	<1	75-125	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1; Dup or Spiked Sample: B012213JB1; LCS: Clean Water; QC Prepared: 01/22/2013; QC Analyzed: 01/22/2013; Units: ug/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Acenaphthene	0.00	100	69.9	69.9	100	73.8	73.8	5.4	46-118	<20
4-Chloro-3-methylphenol	0.00	200	149	74.5	200	156	78.0	4.6	39-98	<20
2-Chlorophenol	0.00	200	129	64.5	200	140	70.0	8.2	27-123	<20
1,4-Dichlorobenzene	0.00	100	65.4	65.4	100	72.6	72.6	10.4	36-97	<20
2,4-Dinitrotoluene	0.00	100	80.2	80.2	100	82.3	82.3	2.6	24-96	<20
N-Nitroso-Di-n-propylamine	0.00	100	70.1	70.1	100	70.9	70.9	1.1	41-116	<20
4-Nitrophenol	0.00	200	52.6	26.3	200	64.0	32.0	19.6	10-80	<20
Pentachlorophenol	0.00	200	168	84.0	200	168	84.0	<1	40-125	<20
Phenol	0.00	200	54.8	27.4	200	67.0	33.5	20.0	12-89	<20
Pyrene	0.00	100	88.6	88.6	100	88.0	88.0	<1	26-127	<20
1,2,4-Trichlorobenzene	0.00	100	75.0	75.0	100	82.2	82.2	9.2	39-98	<20
Surrogates										
2-Fluorophenol	0.00	200	77.2	38.6	200	97.0	48.5	22.7	25-121	<20
2-Fluorobiphenyl	0.00	100	67.1	67.1	100	74.4	74.4	10.3	30-115	<20
Nitrobenzene-d5	0.00	100	64.6	64.6	100	67.4	67.4	4.2	23-120	<20
p-Terphenyl-D14	0.00	100	99.7	99.7	100	96.9	96.9	2.8	18-137	<20
Phenol-d6	0.00	200	51.0	25.5	200	65.8	32.9	25.3	10-94	<20
2,4,6-Tribromophenol	0.00	200	187	93.5	200	190	95.0	1.6	19-122	<20

QC Batch No: 012213JB1; Dup or Spiked Sample: B012213JB1; LCS: Clean Water; QC Prepared: 01/22/2013; QC Analyzed: 01/22/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit
Acenaphthene	100	73.0	73.0	46-118
4-Chloro-3-methylphenol	200	153	76.5	39-98
2-Chlorophenol	200	137	68.5	27-123
1,4-Dichlorobenzene	100	71.1	71.1	36-97
2,4-Dinitrotoluene	100	83.0	83.0	24-96
N-Nitroso-Di-n-propylamine	100	71.5	71.5	41-116
4-Nitrophenol	200	56.8	28.4	10-80
Pentachlorophenol	200	164	82.0	40-125

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QUALITY CONTROL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68172	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1; Dup or Spiked Sample: B012213JB1; LCS: Clean Water; QC Prepared: 01/22/2013; QC Analyzed: 01/22/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit						
Phenol	200	57.8	28.9	12-89						
Pyrene	100	86.9	86.9	26-127						
1,2,4-Trichlorobenzene	100	80.6	80.6	39-98						
Surrogates										
2-Fluorophenol	200	86.8	43.4	25-121						
2-Fluorobiphenyl	100	72.9	72.9	30-115						
Nitrobenzene-d5	100	67.9	67.9	23-120						
p-Terphenyl-D14	100	97.9	97.9	18-137						
Phenol-d6	200	57.2	28.6	10-94						
2,4,6-Tribromophenol	200	189	94.5	19-122						

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Data Qualifiers and Descriptors

Data Qualifier:

#:	Recovery is not within acceptable control limits.
*:	In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
B:	Analyte was present in the Method Blank.
D:	Result is from a diluted analysis.
E:	Result is beyond calibration limits and is estimated.
H:	Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
J:	Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
M:	Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
MCL:	Maximum Contaminant Level
NS:	No Standard Available
S6:	Surrogate recovery is outside control limits due to matrix interference.
S8:	The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
X:	Results represent LCS and LCSD data.

Definition:

%Limi:	Percent acceptable limits.
%REC:	Percent recovery.
Con.L:	Acceptable Control Limits
Conce:	Added concentration to the sample.
LCS:	Laboratory Control Sample
MDL:	Method Detection Limit is a statistically derived number which is specific for each instrument, each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.

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Data Qualifiers and Descriptors

MS:	Matrix Spike
MS DU:	Matrix Spike Duplicate
ND:	Analyte was not detected in the sample at or above MDL.
PQL:	Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.
Recov:	Recovered concentration in the sample.
RPD:	Relative Percent Difference

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Number of Pages 27
Date Received 01/17/2013
Date Reported 01/31/2013

Job Number	Order Date	Client
68173	01/17/2013	EPD

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

Enclosed please find results of analyses of 1 water sample which was analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

American Environmental Testing Laboratory Inc.

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CHAIN OF CUSTODY RECORD

№ 81927

AETL JOB No. 68173

Page 1 of 1

COMPANY	EPD Consultants
PROJECT MANAGER	Vicki N
COMPANY ADDRESS	411 N. HARBOR BLVD #304
PHONE	(310) 241-6565
FAX	310 241 6566
PROJECT NAME	
PROJECT #	UCLA Institute
SITE NAME AND ADDRESS	
PO #	

SAMPLE ID	LAB ID	DATE	TIME	MATRIX	CONTAINER NUMBER/SIZE	PRES.	ANALYSIS REQUESTED: * See attachment	TEST INSTRUCTIONS & COMMENTS
1 MW2	68173-01	01/17/13		W	17 x Various *	HCl/Ice	X	* Analysis per attached sheet
2						H_2SO_4		* 8 x 1 LT. Amber
3								1 x 500 mL PL
4								1 x 1 LT. PL
5								2 x 250 mL PL
6								2 x 120 mL PL
7								3 x 40 mL VOA
8								
9								
10								
11								
12								
13								
14								
15								

SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

TOTAL NUMBER OF CONTAINERS	17	PROPERLY COOLED Y / N / NA	
CUSTODY SEALS Y / N / NA		SAMPLES INTACT Y / N / NA	
RECEIVED IN GOOD COND. Y / N		SAMPLES ACCEPTED Y / N	

TURN AROUND TIME

☐ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

DATA DELIVERABLE REQUIRED

☐ HARD COPY
☐ PDF
☐ GEOTRACKER (GLOBAL ID) _____
☐ OTHER (PLEASE SPECIFY) _____

	1.	2.	3.
RELINQUISHED BY SAMPLER:	Signature:	Signature:	Signature:
	Printed Name: Shawn	Printed Name:	Printed Name: Thomas Robinson
	Date: 1/17/13 Time: 10:20	Date: Time:	Date: 1-17-13 Time: 1245
RECEIVED BY:	Signature:	Signature:	Signature:
	Printed Name: Thomas Robinson	Printed Name:	Printed Name: Jean Laude
	Date: 1-17-13 Time: 1620	Date: Time:	Date: 01/17/13 Time: 1245

RECEIVED BY LABORATORY: AETL 3.

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

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December 17th, 2012

EPD Consultants

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Tel. 310-241-6565, Fax. 310-241-6566

Site Location: Malibu Institute Baseline Groundwater Monitoring

ANALYTE	METHOD OF ANALYSIS
Boron	200.7
Chloride	300.0
Ammonia – N	350.3
Nitrogen, Kjeldahl (TKN)	351.3
Nitrate – N	300.0
Nitrite – N	300.0
Total Phosphorus	365.2
Sulfate	300.0
SVOCs	625
2,3,7,8-TCDD*	1613B
Pesticides / PCBs (Low Level)	608
VOCs	624
12 Priority Pollutant Metals **	200.7
Mercury	245.2
Total Cyanide	335.2
Asbestos	100.2
Total Suspended Solids	160.2
Total Dissolved Solids	160.1
Total Coliform	SM-9221A-D
Fecal Coliform	SM-9221A-E
Fecal Enterococci	SM-9230A-B
BOD (5 Days at 20°C)	405.1
pH	150.1
Oil & Grease	1664
Temperature	170.1

*** TAT for 2,3,7,8-TCDD is 10 to 15 working days.**
**** Include Antimony, Cadmium, Lead, Selenium, Zinc, Arsenic, Total Chromium, Silver, Beryllium, Copper, Nickel, & Thallium.**

STANDARD TURN AROUND TIME (TAT) IS FIVE WORKING DAYS.
THERE IS A 75% SURCHARGE FOR NEXT DAY TAT.
THERE IS A 50% SURCHARGE FOR 2 DAYS TAT.
THERE IS A 45% SURCHARGE FOR 3 DAYS TAT.
THERE IS A 35% SURCHARGE FOR 4 DAYS TAT.
All surcharges apply to cost of analysis only.

PRICES INCLUDE QA/QC DATA, LABELS, CHAIN OF CUSTODY FORMS, COOLER, BLUE ICE, AND COMPLIMENTARY SAMPLE PICKUP IN SOUTHERN CALIFORNIA.

Cyrus Razmara, Ph.D.
CEO & Laboratory Director

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Project ID: MALIBU INSTITUTE
Date Received 01/17/2013
Date Reported 01/31/2013

Job Number	Order Date	Client
68173	01/17/2013	EPD

CERTIFICATE OF ANALYSIS
CASE NARRATIVE

AETL received 1 samples with the following specification on 01/17/2013.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
68173.01	MW2	01/17/2013	Aqueous	17

The samples were analyzed as specified on the enclosed chain of custody. Analytical non-conformances have been noted on the report.

Checked By: _____ Approved By: _____

Cyrus Razmara, Ph.D.
Laboratory Director

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ANALYTICAL RESULTS

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 624, Purgeable Volatile Organics by GC/MS

QC Batch No: 0118131A1

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			624	624			
Date Analyzed			01/18/2013	01/19/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Acetone	10	10	ND	ND			
Acrolein (2-Propenal)	25	50	ND	ND			
Acrylonitrile (2-Propenenitrile)	25	50	ND	ND			
Benzene	0.5	1.0	ND	ND			
Bromodichloromethane	0.5	1.0	ND	ND			
Bromoform (Tribromomethane)	2.5	5.0	ND	ND			
Bromomethane (Methyl bromide)	1.5	3.0	ND	ND			
2-Butanone (MEK)	5.0	5.0	ND	ND			
Carbon Disulfide	0.5	1.0	ND	ND			
Carbon tetrachloride	0.5	1.0	ND	ND			
Chlorobenzene	0.5	1.0	ND	ND			
Chloroethane	1.5	3.0	ND	ND			
2-Chloroethyl vinyl ether	2.5	5.0	ND	ND			
Chloroform (Trichloromethane)	0.5	1.0	ND	ND			
Chloromethane (Methyl chloride)	1.5	3.0	ND	ND			
Dibromochloromethane	0.5	1.0	ND	ND			
1,2-Dichlorobenzene	0.5	1.0	ND	ND			
1,3-Dichlorobenzene	0.5	1.0	ND	ND			
1,4-Dichlorobenzene	0.5	1.0	ND	ND			
Dichlorodifluoromethane	1.5	3.0	ND	ND			
1,1-Dichloroethane	0.5	1.0	ND	ND			
1,2-Dichloroethane (EDC)	0.5	1.0	ND	ND			
1,1-Dichloroethene	0.5	1.0	ND	ND			
cis-1,2-Dichloroethene	0.5	1.0	ND	ND			
trans-1,2-Dichloroethene	0.5	1.0	ND	ND			
1,2-Dichloropropane	0.5	1.0	ND	ND			
cis-1,3-Dichloropropene	0.5	1.0	ND	ND			

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ANALYTICAL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 624, Purgeable Volatile Organics by GC/MS

QC Batch No: 0118131A1

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			624	624			
Date Analyzed			01/18/2013	01/19/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
trans-1,3-Dichloropropene	0.5	1.0	ND	ND			
Ethylbenzene	0.5	1.0	ND	ND			
2-Hexanone	2.5	5.0	ND	ND			
4-Methyl-2-pentanone (MIBK)	2.5	5.0	ND	ND			
Methyl-tert-butyl ether (MTBE)	0.5	1.0	ND	ND			
Methylene chloride (DCM)	2.0	4.0	ND	ND			
Styrene	0.5	1.0	ND	ND			
1,1,2,2-Tetrachloroethane	0.5	1.0	ND	ND			
Tetrachloroethene	0.5	1.0	ND	ND			
Toluene (Methyl benzene)	0.5	1.0	ND	ND			
1,1,1-Trichloroethane	0.5	1.0	ND	ND			
1,1,2-Trichloroethane	0.5	1.0	ND	ND			
Trichloroethene	0.5	1.0	ND	ND			
Trichlorofluoromethane	0.5	1.0	ND	ND			
Vinyl Acetate	0.5	5.0	ND	ND			
Vinyl chloride (Chloroethene)	0.5	3.0	ND	ND			
Xylenes (Total)	0.4	2.0	ND	ND			
Our Lab I.D.			Method Blank	68173.01			
Surrogates	**%Rec.Limit**		**% Rec.**	**% Rec.**			
Bromofluorobenzene	75-125		91.9	88.9			
1,2-Dichloroethane-d4	75-125		79.9	76.3			
Toluene-d8	75-125		103	105			

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/22/2013	01/22/2013			
Preparation Method			625	625			
Date Analyzed			01/22/2013	01/22/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Acenaphthene	5	10	ND	ND			
Acenaphthylene	5	10	ND	ND			
Anthracene	5	10	ND	ND			
Azobenzene	5	10	ND	ND			
Benzidine	5	10	ND	ND			
Benzo(a)anthracene	5	10	ND	ND			
Benzo(a)pyrene	5	10	ND	ND			
Benzo(b)fluoranthene	5	10	ND	ND			
Benzo(g,h,i)perylene	5	10	ND	ND			
Benzo(k)fluoranthene	5	10	ND	ND			
Benzoic Acid	5	10	ND	ND			
Benzyl Alcohol	5	10	ND	ND			
Bis(2-Chloroethoxy)methane	5	10	ND	ND			
Bis(2-Chloroethyl)ether	5	10	ND	ND			
Bis(2-chloroisopropyl) ether	5	10	ND	ND			
Bis(2-ethylhexyl) phthalate	5	10	ND	ND			
4-Bromophenyl phenyl ether	5	10	ND	ND			
Butyl benzyl phthalate	5	10	ND	ND			
4-Chloro-3-methylphenol	5	10	ND	ND			
4-Chloroaniline	5	10	ND	ND			
2-Chloronaphthalene	5	10	ND	ND			
2-Chlorophenol	5	10	ND	ND			
4-Chlorophenyl phenyl ether	5	10	ND	ND			
Chrysene	5	10	ND	ND			
Di-n-butyl phthalate	5	10	ND	ND			
Di-n-octyl phthalate (Dioctyl ester)	5	10	ND	ND			
Dibenzo(a,h)anthracene	5	10	ND	ND			

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/22/2013	01/22/2013			
Preparation Method			625	625			
Date Analyzed			01/22/2013	01/22/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Dibenzofuran	5	10	ND	ND			
1,2-Dichlorobenzene	5	10	ND	ND			
1,3-Dichlorobenzene	5	10	ND	ND			
1,4-Dichlorobenzene	5	10	ND	ND			
3,3'-Dichlorobenzidine	5	10	ND	ND			
2,4-Dichlorophenol	5	10	ND	ND			
Diethyl phthalate (Diethyl ester)	5	10	ND	ND			
Dimethyl phthalate (Dimethyl ester)	5	10	ND	ND			
2,4-Dimethylphenol	5	10	ND	ND			
4,6-Dinitro-2-methylphenol	5	10	ND	ND			
2,4-Dinitrophenol	5	10	ND	ND			
2,4-Dinitrotoluene	5	10	ND	ND			
2,6-Dinitrotoluene (2,6-DNT)	5	10	ND	ND			
1,2-Diphenylhydrazine	5	10	ND	ND			
Fluoranthene	5	10	ND	ND			
Fluorene	5	10	ND	ND			
Hexachlorobenzene	5	10	ND	ND			
Hexachlorobutadiene	5	10	ND	ND			
Hexachlorocyclopentadiene	5	10	ND	ND			
Hexachloroethane	5	10	ND	ND			
Indeno(1,2,3-cd)pyrene	5	10	ND	ND			
Isophorone	5	10	ND	ND			
2-Methylnaphthalene	5	10	ND	ND			
4-Methylphenol	5	10	ND	ND			
2-Methylphenol (2-Cresol)	5	10	ND	ND			
3-Methylphenol (3-Cresol)	5	10	ND	ND			
N-Nitroso-Di-n-propylamine	5	10	ND	ND			
Naphthalene	5	10	ND	ND			
2-Nitroaniline	5	10	ND	ND			
3-Nitroaniline	5	10	ND	ND			
4-Nitroaniline	5	10	ND	ND			
Nitrobenzene (NB)	5	10	ND	ND			
4-Nitrophenol	5	10	ND	ND			
2-Nitrophenol (o-Nitrophenol)	5	10	ND	ND			

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ANALYTICAL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/22/2013	01/22/2013			
Preparation Method			625	625			
Date Analyzed			01/22/2013	01/22/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
N-Nitrosodimethylamine	5	10	ND	ND			
N-nitrosodiphenylamine	5	10	ND	ND			
Pentachlorophenol	5	10	ND	ND			
Phenanthrene	5	10	ND	ND			
Phenol	5	10	ND	ND			
Pyrene	5	10	ND	ND			
1,2,4-Trichlorobenzene	5	10	ND	ND			
2,4,5-Trichlorophenol	5	10	ND	ND			
2,4,6-Trichlorophenol	5	10	ND	ND			
Our Lab I.D.			Method Blank	68173.01			
Surrogates	**%Rec.Limit**		**% Rec.**	**% Rec.**			
2-Fluorophenol	25-121		42.8	25.2			
2-Fluorobiphenyl	30-115		70.7	68.4			
Nitrobenzene-d5	23-120		66.8	60.7			
Phenol-d6	10-94		59.5	13.8			
p-Terphenyl-D14	18-137		100	93.4			
2,4,6-Tribromophenol	19-122		72.0	85.0			

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 608, Organochlorine Pesticides and PCBs

QC Batch No: 011813LB1

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			608	608			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Aroclor-1016 (PCB-1016)	0.50	0.50	ND	ND			
Aroclor-1221 (PCB-1221)	0.50	0.50	ND	ND			
Aroclor-1232 (PCB-1232)	0.50	0.50	ND	ND			
Aroclor-1242 (PCB-1242)	0.50	0.50	ND	ND			
Aroclor-1248 (PCB-1248)	0.50	0.50	ND	ND			
Aroclor-1254 (PCB-1254)	0.50	0.50	ND	ND			
Aroclor-1260 (PCB-1260)	0.50	0.50	ND	ND			
Aldrin	0.005	0.005	ND	ND			
Chlordane	0.10	0.10	ND	ND			
alpha-Chlordane	0.10	0.10	ND	ND			
4,4'-DDD (DDD)	0.05	0.05	ND	ND			
4,4'-DDE (DDE)	0.05	0.05	ND	ND			
4,4'-DDT (DDT)	0.01	0.01	ND	ND			
Dieldrin	0.01	0.01	ND	ND			
Endosulfan I	0.01	0.01	ND	ND			
Endosulfan II	0.01	0.01	ND	ND			
Endosulfan sulfate	0.05	0.05	ND	ND			
Endrin	0.01	0.01	ND	ND			
Endrin aldehyde	0.01	0.01	ND	ND			
Endrin ketone	0.01	0.01	ND	ND			
Gamma-Chlordane	0.10	0.10	ND	ND			
Heptachlor	0.01	0.01	ND	ND			
Heptachlor epoxide	0.01	0.01	ND	ND			
alpha-Hexachlorocyclohexane (Alpha-BHC)	0.01	0.01	ND	ND			
beta-Hexachlorocyclohexane (Betta-BHC)	0.005	0.005	ND	ND			
delta-Hexachlorocyclohexane (Delta-BHC)	0.005	0.005	ND	ND			
gamma-Hexachlorocyclohexane	0.02	0.02	ND	ND			

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ANALYTICAL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 608, Organochlorine Pesticides and PCBs

QC Batch No: 011813LB1

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/18/2013	01/18/2013			
Preparation Method			608	608			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			ug/L	ug/L			
Dilution Factor			1	1			
Analytes	MDL	PQL	Results	Results			
(Gamma-BHC, Lindane)							
Methoxychlor	0.10	0.10	ND	ND			
Toxaphene	0.50	0.50	ND	ND			
Our Lab I.D.			Method Blank	68173.01			
Surrogates	%Rec.Limit		% Rec.	% Rec.			
Decachlorobiphenyl	30-150		98.4	114			
Tetrachloro-m-xylene	30-150		84.0	99.1			

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 200PPM, Priority Pollutant Metals (13 Metals)

QC Batch No: 0117132C2

Our Lab I.D.			Method Blank	68173.01			
Client Sample I.D.				MW2			
Date Sampled				01/17/2013			
Date Prepared			01/17/2013	01/17/2013			
Preparation Method			200.2	200.2			
Date Analyzed			01/18/2013	01/18/2013			
Matrix			Aqueous	Aqueous			
Units			mg/L	mg/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Antimony	0.05	0.10	ND	ND			
Arsenic	0.05	0.10	ND	ND			
Beryllium	0.01	0.05	ND	ND			
Cadmium	0.01	0.05	ND	ND			
Chromium	0.01	0.05	ND	ND			
Copper	0.01	0.05	ND	ND			
Lead	0.05	0.10	ND	ND			
Mercury (By EPA 245.1)	0.001	0.002	ND	ND			
Nickel	0.01	0.05	ND	ND			
Selenium	0.05	0.10	ND	ND			
Silver	0.01	0.05	ND	ND			
Thallium	0.05	0.10	ND	ND			
Zinc	0.01	0.05	ND	0.0103J			

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Our Lab I.D.							N/A	68173.01	
Client Sample I.D.							Method Blank	MW2	
Date Sampled							01/17/2013	01/17/2013	
Matrix							Aqueous	Aqueous	
Analytes	**D.F.**	**Method**	**Units**	**MDL**	**PQL**	**Analyzed**	**Results**	**Results**	
pH	1	150.1	pH unit	0.01	0.01	01/17/2013	NA	8.95	
Total Dissolved Solids	1	160.1	mg/L	5.0	10.0	01/18/2013	ND	591	
Total Suspended Solids (TSS)	1	160.2	mg/L	0.50	5.00	01/17/2013	ND	ND	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	1	1613	pg/L	2.0	2.0	01/25/2013	ND	ND	
Oil and Grease	1	1664	mg/L	0.5	1.0	01/17/2013	ND	ND	
Boron	1	200.7	mg/L	0.050	0.100	01/21/2013	ND	1.94	
Chloride	1	300.0	mg/L	0.5	1.0	01/18/2013	ND	50.0	
Nitrate as Nitrogen	1	300.0	mg/L	0.05	0.10	01/18/2013	ND	0.050J	
Nitrite as Nitrogen	1	300.0	mg/L	0.01	0.02	01/18/2013	ND	ND	
Sulfate	1	300.0	mg/L	0.5	1.0	01/18/2013	ND	58.2	
Cyanide (Total)	1	335.2	mg/L	0.01	0.05	01/21/2013	ND	ND	
Ammonia as Nitrogen	1	350.3	mg/L	0.05	0.10	01/18/2013	ND	0.435	
Nitrogen, Total Kjeldahl	1	351.3	mg/L	0.05	0.10	01/18/2013	ND	0.664	
Phosphorus (total)	1	365.2	mg/L	0.05	0.10	01/21/2013	ND	ND	
Biochemical Oxygen Demand (BOD)	1	405.1	mg/L	5.0	5.0	01/22/2013	ND	ND	
Asbestos, Total	1	EPA-100.2	MF/L	0.19	0.19	01/28/2013	NA	ND	
Coliform, total	1	SM-9221A-D	MPN/100 mL	2.0	2.0	01/19/2013	NA	ND	
Coliform, fecal	1	SM-9221A-E	MPN/100 mL	2.0	2.0	01/19/2013	NA	ND	
Fecal Enterococci	1	SM-9230A-B	MPN/100 mL	2.0	2.0	01/21/2013	NA	ND	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 150.1, pH - Electrometric (EPA/600/4-79-020)

QC Batch No: 011713-1; Dup or Spiked Sample: 68162.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/17/2013; Units: pH unit

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
pH	7.63	7.60	<1	<15	7.00	7.00	100	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 160.1, Total Dissolved Solids, Gravimetric, Dried at 180 C

QC Batch No: 011713-1; Dup or Spiked Sample: 68162.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/18/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Total Dissolved Solids	1,230	1,260	2.4	<15	100	105	105	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 160.2, Residue, Non-Filterable, Gravimetric, Dried at 103-105 C

QC Batch No: 011713-1; Dup or Spiked Sample: 68163.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/17/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Total Suspended Solids (TSS)	ND	ND	<1	<15	100	84.0	84.0	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 1613, 2,3,7,8-TCDD by HRGC/HRMS

QC Batch No: 012512; Dup or Spiked Sample: B012512; LCS: Clean Water; LCS Prepared: 01/25/2013; LCS Analyzed: 01/25/2013; Units: pg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	50.0	50.5	101	50.0	53.5	107	5.8	67-158	<30	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 1664, Oil and Grease, Gravimetric

QC Batch No: 011713-1; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/17/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Oil and Grease	40.0	37.4	93.5	40.0	36.8	92.0	1.6	80-120	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 200.7, Boron by ICP

QC Batch No: 0121132C1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Boron	0.200	1.00	1.16	96.0	1.00	1.17	97.0	1.04	80-120	<20

QC Batch No: 0121132C1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Boron	1.00	0.950	95.2	1.00	0.970	97.0	1.87	80-120	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 200PPM, Priority Pollutant Metals (13 Metals)

QC Batch No: 0117132C2; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/17/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Antimony	0.00	1.00	0.990	99.1	1.00	1.00	99.5	<1	80-120	<15
Arsenic	0.00	1.00	1.03	103	1.00	1.02	102	<1	80-120	<15
Beryllium	0.00	1.00	1.14	114	1.00	1.14	114	<1	80-120	<15
Cadmium	0.00	1.00	1.02	102	1.00	1.00	100	1.98	80-120	<15
Chromium	0.00	1.00	0.990	99.2	1.00	0.980	98.4	<1	80-120	<15
Copper	0.00	1.00	0.980	97.8	1.00	0.980	98.0	<1	80-120	<15
Lead	0.00	1.00	0.970	96.5	1.00	0.960	96.0	<1	80-120	<15
Mercury (By EPA 245.1)	0.00	0.0100	0.0116	116	0.0100	0.0119	119	2.6	80-120	<15
Nickel	0.00	1.00	0.990	98.6	1.00	0.980	98.0	<1	80-120	<15
Selenium	0.00	1.00	1.03	103	1.00	1.04	104	<1	80-120	<15
Silver	0.00	1.00	0.120M	12.1	1.00	0.150M	14.6	18.7	80-120	<15
Thallium	0.00	1.00	0.970	96.5	1.00	0.970	96.9	<1	80-120	<15
Zinc	0.0103	1.00	1.07	106	1.00	1.06	105	<1	80-120	<15

QC Batch No: 0117132C2; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/17/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Antimony	1.00	0.990	99.2	1.00	1.01	101	1.80	80-120	<15	
Arsenic	1.00	1.02	102	1.00	1.03	103	<1	80-120	<15	
Beryllium	1.00	1.11	111	1.00	1.11	111	<1	80-120	<15	
Cadmium	1.00	0.990	99.2	1.00	0.990	98.6	<1	80-120	<15	
Chromium	1.00	0.970	96.9	1.00	0.970	96.5	<1	80-120	<15	
Copper	1.00	0.940	93.6	1.00	0.940	93.6	<1	80-120	<15	
Lead	1.00	0.940	93.6	1.00	0.940	93.8	<1	80-120	<15	
Mercury (By EPA 245.1)	0.0100	0.0112	112	0.0100	0.0111	111	<1	80-120	<15	
Nickel	1.00	0.950	94.5	1.00	0.940	94.1	<1	80-120	<15	
Selenium	1.00	1.03	103	1.00	1.03	103	<1	80-120	<15	
Silver	1.00	0.960	96.3	1.00	0.960	96.2	<1	80-120	<15	
Thallium	1.00	0.920	92.4	1.00	0.940	93.6	1.29	80-120	<15	
Zinc	1.00	1.01	101	1.00	0.997	99.7	1.30	80-120	<15	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 300.0, Determination of Inorganic Anion in water by IC

QC Batch No: 011813-1; Dup or Spiked Sample: 68168.01; LCS: Clean Water; LCS Prepared: 01/18/2013; LCS Analyzed: 01/18/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Chloride	20.0	19.6	98.0	20.0	19.6	98.0	<1	80-120	<20	
Nitrate as Nitrogen	2.00	2.00	100	2.00	2.06	103	3.0	80-120	<20	
Nitrite as Nitrogen	2.00	2.04	102	2.00	2.02	101	<1	80-120	<20	
Sulfate	20.0	20.6	103	20.0	20.4	102	<1	80-120	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 335.2, Cyanide, Total, Titrimetric, Spectrophotometric

QC Batch No: 012113; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Cyanide (Total)	0.00	0.200	0.176	88.0	0.200	0.187	93.5	6.1	80-120	<15

QC Batch No: 012113; Dup or Spiked Sample: 68173.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Cyanide (Total)	ND	ND	<1	<15	0.200	0.182	91.0	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 350.3, Ammonia as N, Potentiometric, ISE (EPA/600/4-79-020)

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Ammonia as Nitrogen	0.414	0.500	0.838	84.8	0.500	0.852	87.6	3.2	80-120	<15

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit						
Ammonia as Nitrogen	0.500	0.505	101	80-120						

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 351.3, Nitrogen, Kjeldahl (EPA/600/4-79/020)

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Nitrogen, Total Kjeldahl	0.469	0.500	0.880	82.2	0.500	0.889	84.0	2.2	80-120	<15

QC Batch No: 011813-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Nitrogen, Total Kjeldahl	0.469	0.452	3.7	<15	0.500	0.484	96.8	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 365.2, Phosphorus, Total, Colorimetric, Ascorbic Acid

QC Batch No: 012113-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Phosphorus (total)	0.00	0.196	0.210	107	0.196	0.212	108	<1	80-120	<15

QC Batch No: 012113-1; Dup or Spiked Sample: 68172.01; LCS: Clean Water; QC Prepared: 01/21/2013; QC Analyzed: 01/21/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Phosphorus (total)	ND	ND	<1	<15	0.196	0.204	104	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 405.1, Biochemical Oxygen Demand, 5 days, 20C (EPA/600/4-79-020)

QC Batch No: 011713-1; Dup or Spiked Sample: 68171.01; LCS: Clean Water; LCS Prepared: 01/17/2013; LCS Analyzed: 01/22/2013; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Biochemical Oxygen Demand (BOD)	ND	ND	<1	<15	198	189	95.4	80-120		

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 608, Organochlorine Pesticides and PCBs

QC Batch No: 011813LB1; Dup or Spiked Sample: B011813LB1; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: ug/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Aroclor-1260 (PCB-1260)	0.00	5.00	4.83	96.6	5.00	4.14	82.8	15.4	50-150	<50
Aldrin	0.00	0.400	0.387	96.8	0.400	0.412	103	6.2	40-140	<40
4,4'-DDT (DDT)	0.00	1.00	0.975	97.5	1.00	1.07	107	9.3	40-140	<40
Dieldrin	0.00	1.00	0.862	86.2	1.00	0.942	94.2	8.9	40-140	<40
Endrin	0.00	1.00	0.988	98.8	1.00	1.08	108	8.9	40-140	<40
Heptachlor	0.00	0.400	0.355	88.8	0.400	0.408	102	13.8	40-140	<40
gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane)	0.00	0.400	0.400	100	0.400	0.428	107	6.8	40-140	<40
Surrogates										
Decachlorobiphenyl	0.00	1.00	1.04	104	1.00	0.929	92.9	10.7	30-150	<20
Tetrachloro-m-xylene	0.00	1.00	1.08	108	1.00	0.924	92.4	14.4	30-150	<20

QC Batch No: 011813LB1; Dup or Spiked Sample: B011813LB1; LCS: Clean Water; QC Prepared: 01/18/2013; QC Analyzed: 01/18/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit
Aroclor-1260 (PCB-1260)	5.00	5.00	100	60-140
Aldrin	0.400	0.395	98.8	60-140
4,4'-DDT (DDT)	1.00	1.06	106	60-140
Dieldrin	1.00	0.926	92.6	60-140
Endrin	1.00	1.07	107	60-140
Heptachlor	0.400	0.390	97.5	60-140
gamma-Hexachlorocyclohexane (Gamma-BHC, Lindane)	0.400	0.440	110	60-140
Surrogates				
Decachlorobiphenyl	1.00	0.938	93.8	30-150
Tetrachloro-m-xylene	1.00	1.07	107	30-150

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 624, Purgeable Volatile Organics by GC/MS

QC Batch No: 0118131A1; Dup or Spiked Sample: B0118131A1; LCS: Clean Water; QC Prepared: 01/18/2013;MS Analyzed: 01/19/2013; LCS Analyzed: 01/18/2013; Units: ug/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Benzene	0.00	50.0	43.8	87.6	50.0	42.6	85.2	2.78	75-125	<20
Chlorobenzene	0.00	50.0	54.5	109	50.0	53.5	107	1.85	75-125	<20
1,1-Dichloroethene	0.00	50.0	49.6	99.2	50.0	49.8	99.6	<1	75-125	<20
Methyl-tert-butyl ether (MTBE)	0.00	50.0	39.1	78.2	50.0	39.3	78.6	<1	75-125	<20
Toluene (Methyl benzene)	0.00	50.0	49.5	99.0	50.0	48.3	96.6	2.45	75-125	<20
Trichloroethene	0.00	50.0	59.0	118	50.0	53.0	106	10.7	75-125	<20
Surrogates										
Bromofluorobenzene	0.00	50.0	38.5	77.0	50.0	38.1	76.2	1.04	75-125	<20
1,2-Dichloroethane-d4	0.00	50.0	46.7	93.3	50.0	39.1	78.2	16.2	75-125	<20
Toluene-d8	0.00	50.0	52.0	104	50.0	52.0	104	<1	75-125	<20

QC Batch No: 0118131A1; Dup or Spiked Sample: B0118131A1; LCS: Clean Water; QC Prepared: 01/18/2013;MS Analyzed: 01/19/2013; LCS Analyzed: 01/18/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Benzene	50.0	46.5	93.0	50.0	44.5	89.0	4.40	75-125	<20	
Chlorobenzene	50.0	57.1	114	50.0	54.3	109	4.48	75-125	<20	
1,1-Dichloroethene	50.0	57.6	115	50.0	54.2	108	6.28	75-125	<20	
Methyl-tert-butyl ether (MTBE)	50.0	45.2	90.4	50.0	42.8	86.0	4.99	75-125	<20	
Toluene (Methyl benzene)	50.0	51.4	103	50.0	49.2	98.0	4.98	75-125	<20	
Trichloroethene	50.0	60.4	121	50.0	58.0	116	4.22	75-125	<20	
LCS										
Chloroform (Trichloromethane)	50.0	50.5	101	50.0	48.0	96.0	5.08	75-125	<20	
Ethylbenzene	50.0	52.6	105	50.0	50.3	101	3.88	75-125	<20	
1,1,1-Trichloroethane	50.0	51.0	102	50.0	49.2	98.0	4.00	75-125	<20	
o-Xylene	50.0	52.1	104	50.0	49.1	98.0	5.94	75-125	<20	
m,p-Xylenes	100	111	111	100	106	106	4.61	75-125	<20	
Surrogates										
Bromofluorobenzene	50.0	39.1	78.2	50.0	39.2	78.3	<1	75-125	<20	
1,2-Dichloroethane-d4	50.0	39.9	79.9	50.0	39.4	78.8	1.38	75-125	<20	
Toluene-d8	50.0	50.6	101	50.0	50.2	100	<1	75-125	<20	

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Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1; Dup or Spiked Sample: B012213JB1; LCS: Clean Water; QC Prepared: 01/22/2013; QC Analyzed: 01/22/2013; Units: ug/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Acenaphthene	0.00	100	69.9	69.9	100	73.8	73.8	5.4	46-118	<20
4-Chloro-3-methylphenol	0.00	200	149	74.5	200	156	78.0	4.6	39-98	<20
2-Chlorophenol	0.00	200	129	64.5	200	140	70.0	8.2	27-123	<20
1,4-Dichlorobenzene	0.00	100	65.4	65.4	100	72.6	72.6	10.4	36-97	<20
2,4-Dinitrotoluene	0.00	100	80.2	80.2	100	82.3	82.3	2.6	24-96	<20
N-Nitroso-Di-n-propylamine	0.00	100	70.1	70.1	100	70.9	70.9	1.1	41-116	<20
4-Nitrophenol	0.00	200	52.6	26.3	200	64.0	32.0	19.6	10-80	<20
Pentachlorophenol	0.00	200	168	84.0	200	168	84.0	<1	40-125	<20
Phenol	0.00	200	54.8	27.4	200	67.0	33.5	20.0	12-89	<20
Pyrene	0.00	100	88.6	88.6	100	88.0	88.0	<1	26-127	<20
1,2,4-Trichlorobenzene	0.00	100	75.0	75.0	100	82.2	82.2	9.2	39-98	<20
Surrogates										
2-Fluorophenol	0.00	200	77.2	38.6	200	97.0	48.5	22.7	25-121	<20
2-Fluorobiphenyl	0.00	100	67.1	67.1	100	74.4	74.4	10.3	30-115	<20
Nitrobenzene-d5	0.00	100	64.6	64.6	100	67.4	67.4	4.2	23-120	<20
p-Terphenyl-D14	0.00	100	99.7	99.7	100	96.9	96.9	2.8	18-137	<20
Phenol-d6	0.00	200	51.0	25.5	200	65.8	32.9	25.3	10-94	<20
2,4,6-Tribromophenol	0.00	200	187	93.5	200	190	95.0	1.6	19-122	<20

QC Batch No: 012213JB1; Dup or Spiked Sample: B012213JB1; LCS: Clean Water; QC Prepared: 01/22/2013; QC Analyzed: 01/22/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit
Acenaphthene	100	73.0	73.0	46-118
4-Chloro-3-methylphenol	200	153	76.5	39-98
2-Chlorophenol	200	137	68.5	27-123
1,4-Dichlorobenzene	100	71.1	71.1	36-97
2,4-Dinitrotoluene	100	83.0	83.0	24-96
N-Nitroso-Di-n-propylamine	100	71.5	71.5	41-116
4-Nitrophenol	200	56.8	28.4	10-80
Pentachlorophenol	200	164	82.0	40-125

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QUALITY CONTROL RESULTS

Project ID: MALIBU INSTITUTE
Project Name: Malibu Institute Baseline

AETL Job Number	Submitted	Client
68173	01/17/2013	EPD

Method: 625, Semivolatile Organic Compounds by GC/MS

QC Batch No: 012213JB1; Dup or Spiked Sample: B012213JB1; LCS: Clean Water; QC Prepared: 01/22/2013; QC Analyzed: 01/22/2013; Units: ug/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit						
Phenol	200	57.8	28.9	12-89						
Pyrene	100	86.9	86.9	26-127						
1,2,4-Trichlorobenzene	100	80.6	80.6	39-98						
Surrogates										
2-Fluorophenol	200	86.8	43.4	25-121						
2-Fluorobiphenyl	100	72.9	72.9	30-115						
Nitrobenzene-d5	100	67.9	67.9	23-120						
p-Terphenyl-D14	100	97.9	97.9	18-137						
Phenol-d6	200	57.2	28.6	10-94						
2,4,6-Tribromophenol	200	189	94.5	19-122						

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Data Qualifiers and Descriptors

Data Qualifier:

#:	Recovery is not within acceptable control limits.
*:	In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
B:	Analyte was present in the Method Blank.
D:	Result is from a diluted analysis.
E:	Result is beyond calibration limits and is estimated.
H:	Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
J:	Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
M:	Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
MCL:	Maximum Contaminant Level
NS:	No Standard Available
S6:	Surrogate recovery is outside control limits due to matrix interference.
S8:	The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
X:	Results represent LCS and LCSD data.

Definition:

%Limi:	Percent acceptable limits.
%REC:	Percent recovery.
Con.L:	Acceptable Control Limits
Conce:	Added concentration to the sample.
LCS:	Laboratory Control Sample
MDL:	Method Detection Limit is a statistically derived number which is specific for each instrument, each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.

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Data Qualifiers and Descriptors

MS:	Matrix Spike
MS DU:	Matrix Spike Duplicate
ND:	Analyte was not detected in the sample at or above MDL.
PQL:	Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.
Recov:	Recovered concentration in the sample.
RPD:	Relative Percent Difference

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ATTACHMENT E

ECOFLUID CASE STUDY: PAHRUMP, NEVADA

20722 South Main Street • Carson, CA 90265 • P: 310.241.6565 • F: 310.241.6566

TOWN OF PAHRUMP WWTP, NV

CASE STUDY

In 2005, the Town of Pahrump, Nevada decided to upgrade their existing treatment plant in response to the large and rapid growth in the area. The new USBF® plant would increase flows from 10,000gpd to a Phase 1 capacity of 50,000gpd and a future Phase 2 capacity of 100,000gpd. Phase 1 of the packaged plant consists of two USBF® filters and disinfection is by chlorination to produce Class A effluent: BOD_5, TSS and Total Nitrogen of less than 10 mg/l, and median fecal coliform of less than 2.2/100 ml.

OPERATING RESULTS

	Effluent			
	BOD	TSS	TN	Fecal Coliform
	mg/L	mg/L	mg/L	CFU/100ml
1-Mar-07	5	5	4.3	< 2
1-Apr-07	8	5	6.3	< 2
1-May-07	5	5	8.0	< 1
1-Jun-07	2	5	8.1	< 1
1-Jul-07	2	5	6.7	< 2
1-Aug-07	10	10	7.1	< 1
1-Sep-07	3	6	9.0	< 1
1-Oct-07	4	3	7.1	< 1
1-Nov-07	5	10	8.9	< 1
1-Dec-07	3	5	3.4	< 1
22-Jan-08	5	6	2.4	< 1
13-Feb-08	4	5	1.4	< 1
11-Mar-08	4	5	3.5	< 1
8-Apr-08	8	6	7.7	< 1
5-May-08	8	5	8.0	< 1
4-Jun-08	4	5	8.9	< 1
1-Jul-08	4	5	8.0	< 1
6-Aug-08	4	8	8.0	< 1
10-Sep-08	2	5	6.7	< 1
8-Oct-08	3	5	6.7	< 1
3-Nov-08	3	7	7.4	< 1
8-Dec-08	8	5	8.0	< 1
6-Jan-09	3	9	5.1	< 1
2-Feb-09	6	10	4.6	< 1
11-Mar-09	3	8	5.3	< 1
Average	**4.6**	**6.1**	**6.4**	**< 1**

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ATTACHMENT F

ECOFLUID CASE STUDY: MILL SPRINGS, MILL BAY, BC, CANADA

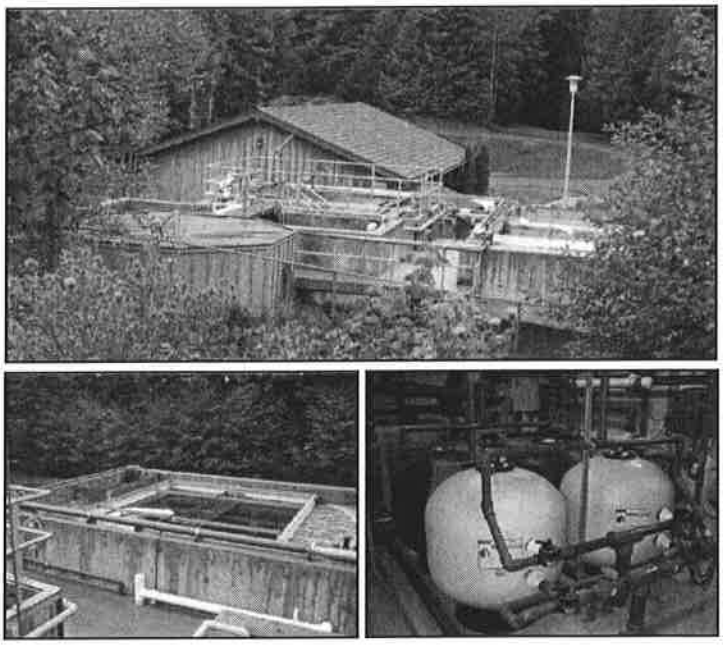
20722 South Main Street • Carson, CA 90265 • P: 310.241.6565 • F: 310.241.6566

MILL SPRINGS WWTP, MILL BAY, BC

CASE STUDY

The Mill Springs plant came about in 1998. With no centralized wastewater treatment facility nearby, a developer started evaluating the possibility of a private wastewater treatment plant to serve this planned development in Mill Bay, BC. The plant initially served 60 homes (currently ~120), but after all nine phases are complete it will consist of 400 homes over approximately 200 acres.

After three expansions in 2004, 2005, and 2008 the plant currently consists of a coarse bar screen, USBF® bioreactors, a microscreen filter, sand filters, and UV disinfection system.



USBF® Bioreactor (above, left) and Sand Filters/UV Disinfection (above, right)

Since the effluent is discharged in the vicinity of an aquifer, **Class A+ reclaimed water quality effluent** was stipulated: BOD_5, TSS and Total Nitrogen of less than 10 mg/l, average Turbidity less than 2 NTU and median fecal coliform of less than 2.2/100 ml. Since Day 1 ECOfluid has operated the plant under contract with the owner and the plant has consistently met the design parameters.

OPERATING RESULTS

Date	BOD_5 [mg/l]	TSS [mg/l]	Turbidity [NTU]	Total Nitrogen [mg/l]	Fecal Coliform [CFU/100ml]
Sep-09	< 10	< 1	0.6	3.5	< 1
Oct-09	< 10	< 1	0.4	3.9	< 1
Nov-09	< 10	< 1	0.6	6.2	< 1
Dec-09	< 10	2	1.4	11.9	< 1
Jan-10	< 10	3	0.7	6.3	< 1
Feb-10	16	2	1.6	2.0	< 1
Mar-10	< 10	< 1	0.5	2.7	< 1
Apr-10	< 10	< 4	1.7	4.4	< 2
May-10	2	< 4	1.1	3.4	< 1
Jun-10	2	1	1.8	4.3	< 1
Jul-10	3	< 4	2.8	4.4	< 1
Average	**< 10**	**< 2**	**1.2**	**4.8**	**< 1**

Notes: (1) Less than (<) signifies detectable limit (different labs, different limits)

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ATTACHMENT G

ECOFLUID CASE STUDY: UNIVERCITY CHILDCARE,
BURNABY, BC, CANADA

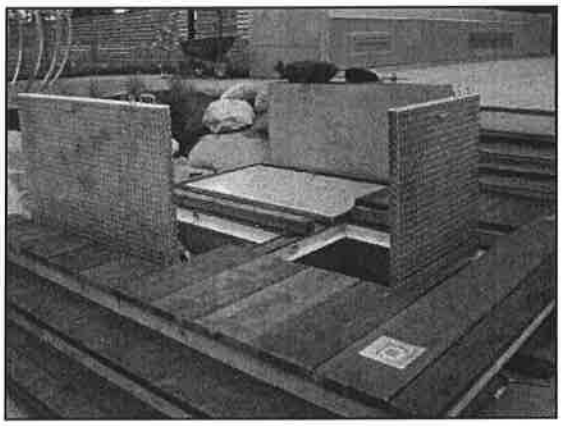
20722 South Main Street • Carson, CA 90265 • P: 310.241.6565 • F: 310.241.6566

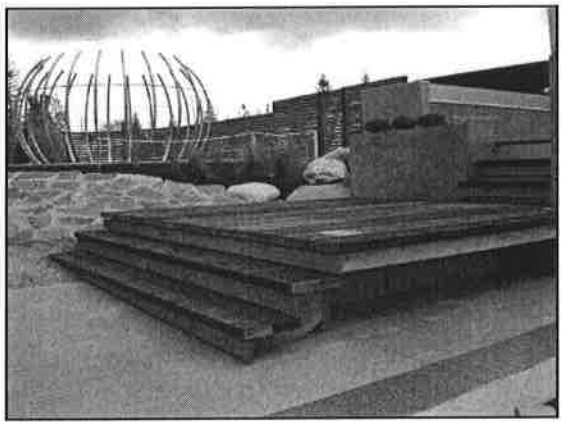
UNIVERCITY CHILDCARE WWTP, BURNABY, BC
CASE STUDY

This USBF® wastewater treatment plant is installed to meet the stringent requirements of the Living Building Challenge (beyond LEED). The system treats wastewater from approximately 50 children and 12 staff at the new UniverCity Childcare Facility at Simon Fraser University.

The plant was designed in accordance with the Ministry of Health guidelines and produces Type 3 effluent consistently containing less than 10 mg/L of TSS and BOD_5, and a fecal coliform count of less than 400 CFU / 100 mL.

Living Building: UniverCity Childcare





The bioreactor consists of the USBF® biology and a UV feed tank. It is completely hidden beneath the exterior stair landing.

Wastewater from the building is pumped via a lift station and treated in the USBF® biology. It is then pumped to UV disinfection and is subsequently discharged to the effluent disposal field.

The effluent disposal field is located at the top of the property, below the gravel walkway and garden.

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ATTACHMENT H

WATERWORLD SNUG COVE USBFMBR ARTICLE

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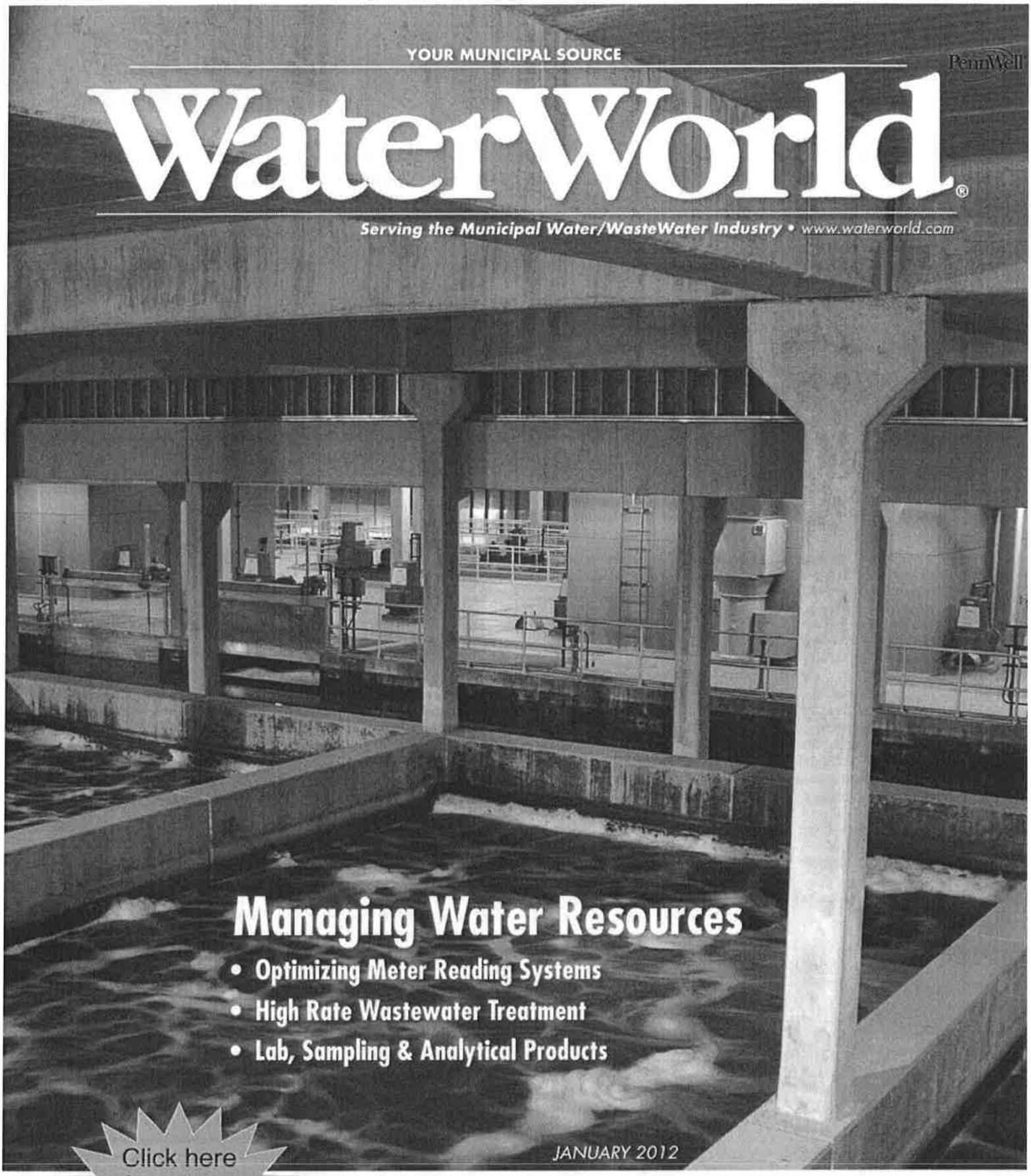

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The new headworks (left), process building, and sludge dewatering unit and bin.

Design Build Project Upgrades Plant Performance

The first phase of the Bowen Island Municipality's Snug Cove wastewater treatment plant in British Columbia, Canada, was built in 1999. The original plant consisted of two Upflow Sludge Blanket Filtration (USBF) bioreactors each designed to treat 80 m^3 of wastewater per day at 185 mg/l BOD, or 14.8 kg BOD per day. The permitted ocean outfall effluent discharge parameters were relatively undemanding, 45/45 mg/l respectively for BOD and TSS and an acute 96 hour LT50 fish bioassay test.

A new membrane filtration system provides tertiary treatment.

The plant configuration was very basic consisting of a pump station and the USBF bioreactors only. No post-filtration was employed. From the day the plant was started up, it was operated by ECOfluid Systems under contract with Bowen Island Municipality.

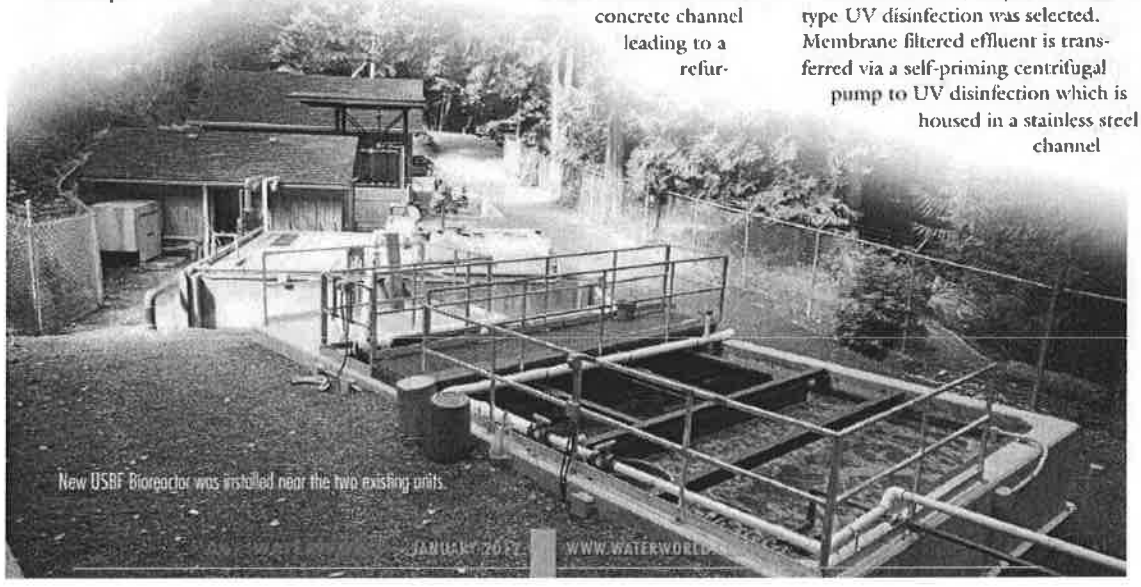
The plant performance in terms of effluent parameters was excellent. All parameters were significantly below the permitted parameters, and the reduction of pollutants included reduction of nutrients, nitrogen and phosphorus. However, starting in the summer of 2005, increased stress on the plant was observed during the high tourist season due to biological overloading.

In 2009, after securing Provincial and Federal Grants, the Municipality embarked on a plant expansion and upgrade. The objectives of the approximately $2.3 million project were:

- Installation of new mechanical headworks
- Plant expansion to double the hydraulic and the biological capacity with a provision to triple it in the future.
- Incorporation of "tertiary" treatment allowing the municipality treated effluent reuse for irrigation, and in the future, in dual plumbing applications. This would require effluent parameters to meet the Municipal Sewage Regulations "Unrestricted Public Access" parameters of BOD and TSS of respectively less than 10 mg/l, Turbidity of 2 NTU (avg.), Fecal Coliform of 2.2 CFU/100 ml (avg.), Ammonia of less than 1 mg/l, and Total Nitrogen of less than 20 mg/l.
- Waste sludge dewatering, reducing the cost of trucking wastewater sludge off the island and the carbon footprint.
- Incorporation of a Pressurized Outfall Station
- Septage receiving pilot facility to evaluate septage processing in the USBF bioreactors, while again, reducing the cost of sludge disposal and the carbon footprint.

The initial design work carried out by a team of Kerr Wood Leidal (KWL) and ECOfluid Systems commenced in early 2010, and in August 2010 ECOfluid was awarded a Design-Build contract to execute the project.

As a part of the upgrade, all flows (forcemain and gravity) were diverted to a new inclined mechanical auger screen installed within a concrete channel leading to a refurbished influent pump station. The all-weather IPEC screen collects and compacts screenings into a continuous bagging system.



New USBF Bioreactor was installed near the two existing units.

USBF Bioreactor

A new bioreactor was installed adjacent to the two existing ones. The Sludge Blanket Filter (SBF) of the bioreactor is fabricated from epoxy coated steel and provides separation of the anoxic and aerobic compartments.

The bioreactor anoxic compartment was equipped with a new submersible mixer designed to mix the influent sewage with activated sludge recycled from the bottom of the SBF, thus providing the necessary conditions for enhanced nitrogen removal by nitrification/denitrification processes, and phosphorus removal by biological "luxury uptake".

Tertiary Treatment

The tertiary treatment consists of membrane filtration, UV disinfection, chlorination and reclaimed water storage.

For filtration, Mitsubishi SteraporeSUN™ immersed hollow fiber membranes were selected. The membranes are installed within a separate tank receiving effluent pre-filtered by the Sludge Blanket Filter (<10mg/l TSS). The configuration (sometimes known as CAS-MF) not only results in safer multi-barrier two stage filtration but it has many other advantages over conventional immersed MBR systems. Fine screening is not required, flux rate increases, fouling decreases, and energy input is reduced. Additionally, the biology and the membrane filtration are separated and the processes can be better individually optimized.

For disinfection, Trojan channel-type UV disinfection was selected. Membrane filtered effluent is transferred via a self-priming centrifugal pump to UV disinfection which is housed in a stainless steel channel located in a new process building.

Finally, the tertiary effluent is transferred into a new PVC lined reclaimed water storage tank. The tank is provided with a chlorine make-up circulation loop to maintain minimal residual chlorine when required.

Design-Build

ECOfluid was aware that the upgrade of the existing facility presented many unknowns and taking on the Design-Build project with a firm budget presented a significant risk. With that said, the Design-Build model provided flexibility and allowed the company to quickly deal with onsite construction issues as and when they occurred.

With preliminary design/engineering complete in September 2010, ECOfluid selected Alexander Construction to construct the facility structures due to their industry experience which included previous work with existing, online plants. Ground was broken in October 2010.

A new waste sludge dewatering system helped the utility lower disposal costs.

Conclusion

As expected, many project challenges presented themselves during construction.

The first challenge was the fact the project was located on an island only accessible via a 30 minute ferry ride. Managing larger deliveries, sub-trades and onsite personnel was further complicated due to the small and compact site.

The weather brought another challenge as unprecedented, even for British Columbia, wet winter and spring led to many construction delays.

Despite the challenges, the Design-Build contract was substantially completed in June 2011. The new facility has met all of the objectives of the contract, the most important of which being the immediate increase of the hydraulic and biological capacity of the plant and the improved quality of effluent discharged to the environment. WW

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TRANSMITTAL COVER SHEET

DATE: May 15, 2012

SENT TO: Dr. Eric Wu, Los Angeles RWQCB

FROM: Kevin Poffenbarger, EPD Consultants, Inc.

SUBJECT: Updated Report of Waste Discharge for The Malibu Institute, 901 Encinal Canyon Road, Malibu, Los Angeles County, California (File No 11-199)

Dear Dr. Wu,

In response to the March 15, 2012 Incomplete Application for the subject property, please find enclosed the following:

1. Revised Application / Report of Waste Discharge Form 200, dated May 1, 2012. Section V of the revised ROWD provides the requested documentation of item I.G (CEQA/NEPA) from "SWRCB Form 200 Appendix and Instructions."
2. LA County Department of Regional Planning GIS Map for the subject property, identifying streams and surface water bodies located on the subject property. All proposed Onsite Wastewater System components are set back a minimum of 100-ft from the streams and surface water bodies.
3. Check #2029 in the amount of $10,873.35 for the annual WDR fee.
4. Engineering Feasibility Report and Report of Waste Discharge for an Onsite Wastewater System dated October 16, 2011 for the subject property.

In response to item three (3) of the March 15, 2012 Incomplete Application, the nearest community sewer line is situated greater than 7-miles distant from the subject property.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

I. FACILITY INFORMATION

A. Facility:

Name: The Malibu Institute			
Address: 901 Encinal Canyon Road			
City: Malibu	County: LA	State: CA	Zip Code: 90265
Contact Person: Thomas Hix		Telephone Number: 650.941.7514	

B. Facility Owner:

Name: Malibu Associates, LLC			Owner Type (Check One) 1. ☐ Individual 2. ☑ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other:
Address: 480 San Antonio Road, Ste 205			
City: Mountain View	State: CA	Zip Code: 94040	
Contact Person: Thomas Hix		Telephone Number: 650.941.7514	Federal Tax ID:

C. Facility Operator (The agency or business, not the person):

Name: same			Operator Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other:
Address:			
City:	State:	Zip Code:	
Contact Person:		Telephone Number:	

D. Owner of the Land:

Name: same			Owner Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☐ Other:
Address:			
City:	State:	Zip Code:	
Contact Person:		Telephone Number:	

E. Address Where Legal Notice May Be Served:

Address: same		
City:	State:	Zip Code:
Contact Person:		Telephone Number:

F. Billing Address:

Address: same		
City:	State:	Zip Code:
Contact Person:		Telephone Number:

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☑ **A. WASTE DISCHARGE TO LAND** ☐ **B. WASTE DISCHARGE TO SURFACE WATER**

Check all that apply:

- ☑ Domestic/Municipal Wastewater Treatment and Disposal
- ☐ Cooling Water
- ☐ Mining
- ☐ Waste Pile
- ☑ Wastewater Reclamation
- ☐ Other, please describe: _____
- ☐ Animal Waste Solids
- ☐ Land Treatment Unit
- ☐ Dredge Material Disposal
- ☐ Surface Impoundment
- ☐ Industrial Process Wastewater
- ☐ Animal or Aquacultural Wastewater
- ☐ Biosolids/Residual
- ☐ Hazardous Waste (see instructions)
- ☐ Landfill (see instructions)
- ☐ Storm Water

III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

1. Assessor's Parcel Number(s)	2. Latitude	3. Longitude
Facility: Tentative Tract 71735	**Facility:** 34.087511	**Facility:** -118.855476
Discharge Point: same	**Discharge Point:** same	**Discharge Point:** same

IV. REASON FOR FILING

- ☐ New Discharge or Facility
- ☐ Changes in Ownership/Operator (see instructions)
- ☐ Change in Design or Operation
- ☐ Waste Discharge Requirements Update or NPDES Permit Reissuance
- ☑ Change in Quantity/Type of Discharge
- ☐ Other: _____

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: LOS ANGELES COUNTY

Has a public agency determined that the proposed project is exempt from CEQA? ☐ Yes ☒ No

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency: N/A

Has a "Notice of Determination" been filed under CEQA? ☐ Yes ☒ No

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☒ EIR ☐ Negative Declaration

Expected CEQA Completion Date: JULY 2013

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

Refer to EPD Consultants, Inc Engineering Feasibility Report, dated October 16, 2011

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: Kevin Poffenbarger, EPD Consultants, Inc Title: President

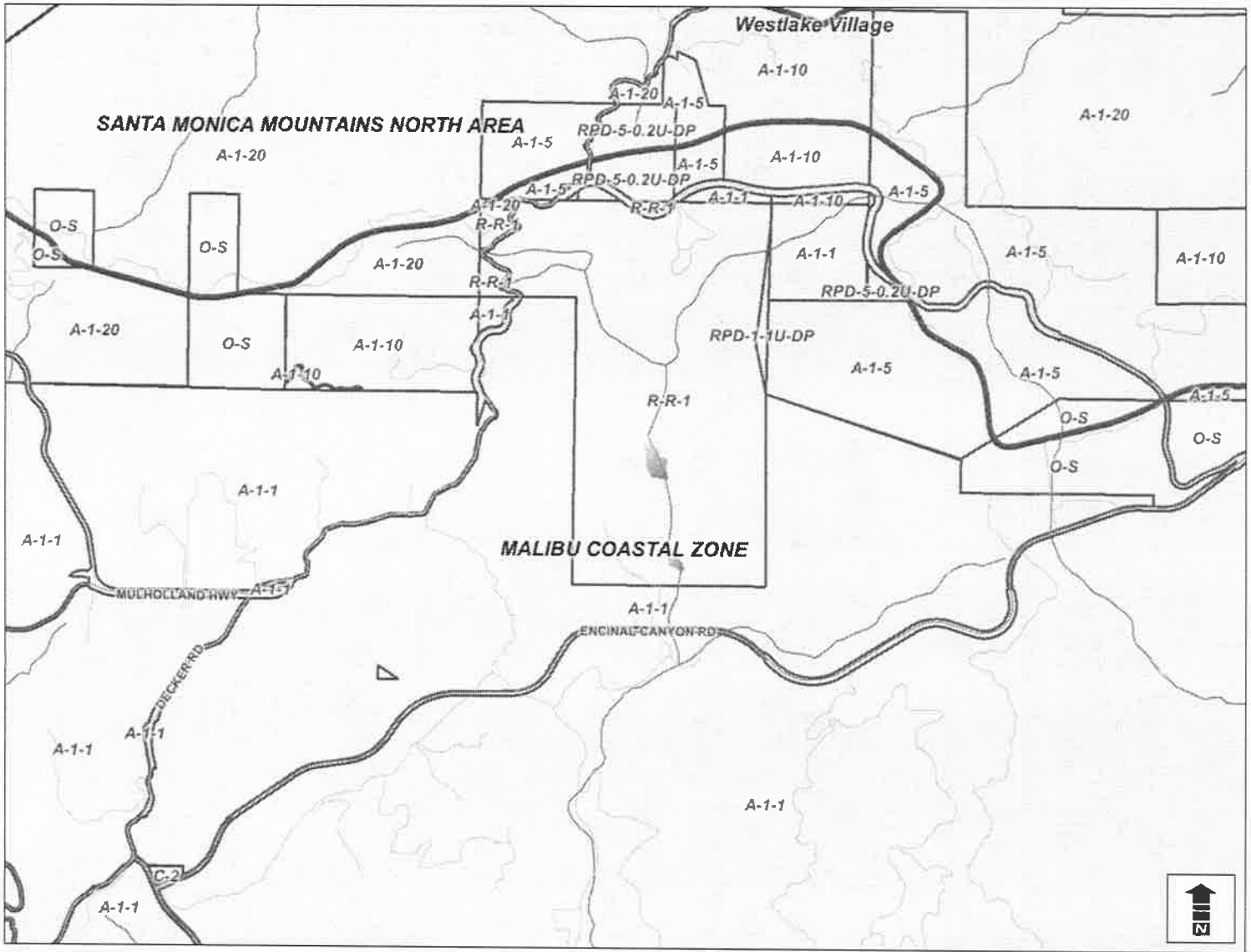
Signature: Date: 5/1/12

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

Los Angeles County
Department *of* Regional Planning

901 Encinal Canyon



Legend

Base Layers

- LOS ANGELES COUNTY
- OTHER COUNTY
- PACIFIC OCEAN
- UNINCORPORATED AREAS
- INCORPORATED CITIES
- HYDRO - PERENNIAL
- HYDRO - INTERMITTENT
- HYDRO - DRY
- HYDRO - LINE
- FREEWAYS
- NATIONAL FOREST
- PARCEL BOUNDARY
- SUPERVISORIAL DISTRICT
- TRANSIT - RAILROAD
- TRANSIT - RAPID TRANSIT
- TRANSIT - UNDERGROUND
- SUBDIVISION ACTIVITY - APPROVED
- SUBDIVISION ACTIVITY - INACTIVE
- SUBDIVISION ACTIVITY - PENDING
- SUBDIVISION ACTIVITY - RECORDED
- ARB ASSESSOR MAP BOOK/ GRID
- SEA (SIGNIFICANT ECOLOGICAL AREA)
- CSD (COM. STANDARDS DISTRICT)
- CSD - AREA SPECIFIC
- VERY HIGH FIRE HAZARD SEVERITY
- TOD (TRANSIT ORIENTED DISTRICT)
- RSD (EQUESTRIAN DISTRICT)
- THE THOMAS GUIDE - PAGE
- THE THOMAS GUIDE - PAGE GRID
- ZD (ZONED DISTRICT)
- ZONING INDEX MAP GRID
- ZONING MAP GRID
- TOWNSHIP & RANGE GRID
- USGS QUAD SHEET GRID

Zoning

- ZONE A-1
- ZONE A-2
- ZONE B-1
- ZONE B-2
- ZONE C-1
- ZONE C-2
- ZONE C-3
- ZONE C-H
- ZONE C-M
- ZONE C-R
- ZONE C-RU
- ZONE C-2
- ZONE D-2
- ZONE I1
- ZONE I2
- ZONE M-1
- ZONE M-1.5
- ZONE M-2
- ZONE M-3
- ZONE MPD
- ZONE MXD
- ZONE O-S
- ZONE P-R
- ZONE R-1
- ZONE R-2
- ZONE R-3-U1U
- ZONE R-R-U1U
- ZONE R-W
- ZONE RPD
- ZONE S-R
- ZONE SP
- ZONE SR-D
- ZONE W

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ONSITE WASTEWATER SYSTEM

FOR

THE MALIBU INSTITUTE
901 ENCINAL CANYON ROAD
MALIBU, LOS ANGELES COUNTY, CALIFORNIA

PREPARED FOR:
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PREPARED BY:
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VICINITY MAP

SOURCE: LA & VENTURA COUNTIES 2008 THOMAS GUIDE DIGITAL EDITION, PGS. 586, 587, 626 & 627

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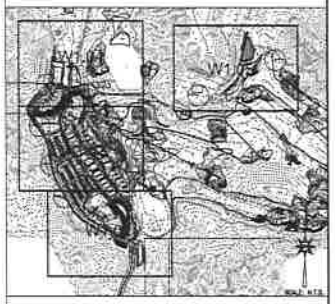
KEY MAP



DRAWING INDEX

SHT No.	DESCRIPTION
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W1.02	PARTIAL ONSITE WASTEWATER SYSTEM SITE PLAN
W1.03	PARTIAL ONSITE WASTEWATER SYSTEM SITE PLAN
W1.04	PARTIAL ONSITE WASTEWATER SYSTEM SITE PLAN
W1.05	PARTIAL ONSITE WASTEWATER SYSTEM SITE PLAN
W2.01	PROCESS PIPING SCHEMATIC FLOW DIAGRAM

NO.	REVISIONS	DATE	BY
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2	NEW SITE PLAN	11/12	CB

REGISTERED PROFESSIONAL ENGINEER — No. 68083 — CIVIL — STATE OF CALIFORNIA

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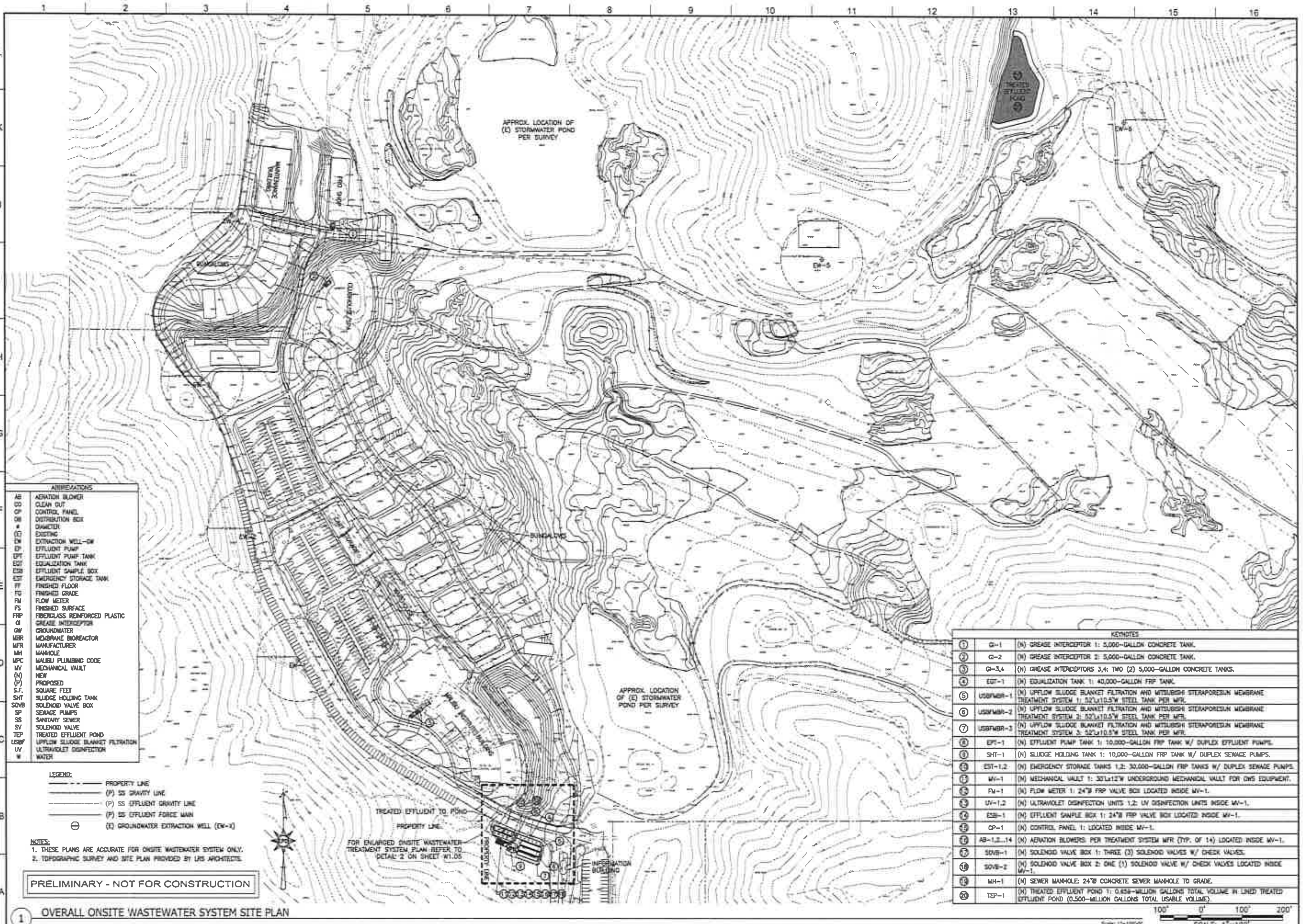
ADDRESS: 901 ENCINAL CANYON ROAD
MALIBU, CA 90265
DATE: 9/16/11
SCALE: AS SHOWN
DRAWN BY: EFL

PROJECT NO. K118
DRAWING NO. T-1
SHEET 1 OF 7 SHEETS



KEYNOTES		
1	GI-1	(N) GREASE INTERCEPTOR 1: 5,000-GALLON CONCRETE TANK.
2	GI-2	(N) GREASE INTERCEPTOR 2: 5,000-GALLON CONCRETE TANK.
3	GI-3,4	(N) GREASE INTERCEPTORS 3,4: TWO (2) 5,000-GALLON CONCRETE TANKS.
4	EQT-1	(N) EQUALIZATION TANK 1: 40,000-GALLON FRP TANK.
5	USBFMBR-1	(N) UPFLOW SLUDGE BLANKET FILTRATION AND MITSUBISHI STERAPORESUN MEMBRANE TREATMENT SYSTEM 1: 52'Lx10.5'W STEEL TANK PER MFR.
6	USBFMBR-2	(N) UPFLOW SLUDGE BLANKET FILTRATION AND MITSUBISHI STERAPORESUN MEMBRANE TREATMENT SYSTEM 2: 52'Lx10.5'W STEEL TANK PER MFR.
7	USBFMBR-3	(N) UPFLOW SLUDGE BLANKET FILTRATION AND MITSUBISHI STERAPORESUN MEMBRANE TREATMENT SYSTEM 3: 52'Lx10.5'W STEEL TANK PER MFR.
8	EPT-1	(N) EFFLUENT PUMP TANK 1: 10,000-GALLON FRP TANK W/ DUPLEX EFFLUENT PUMPS.
9	SHT-1	(N) SLUDGE HOLDING TANK 1: 10,000-GALLON FRP TANK W/ DUPLEX SEWAGE PUMPS.
10	EST-1,2	(N) EMERGENCY STORAGE TANKS 1,2: 30,000-GALLON FRP TANKS W/ DUPLEX SEWAGE PUMPS.
11	MV-1	(N) MECHANICAL VAULT 1: 30'Lx12'W UNDERGROUND MECHANICAL VAULT FOR OWS EQUIPMENT.
12	FM-1	(N) FLOW METER 1: 24"Ø FRP VALVE BOX LOCATED INSIDE MV-1.
13	UV-1,2	(N) ULTRAVIOLET DISINFECTION UNITS 1,2: UV DISINFECTION UNITS INSIDE MV-1.
14	ESB-1	(N) EFFLUENT SAMPLE BOX 1: 24"Ø FRP VALVE BOX LOCATED INSIDE MV-1.
15	CP-1	(N) CONTROL PANEL 1: LOCATED INSIDE MV-1.
16	AB-1,2...14	(N) AERATION BLOWERS: PER TREATMENT SYSTEM MFR (TYP. OF 14) LOCATED INSIDE MV-1.
17	SOVB-1	(N) SOLENOID VALVE BOX 1: THREE (3) SOLENOID VALVES W/ CHECK VALVES.
18	SOVB-2	(N) SOLENOID VALVE BOX 2: ONE (1) SOLENOID VALVE W/ CHECK VALVES LOCATED INSIDE MV-1.
19	MH-1	(N) SEWER MANHOLE: 24"Ø CONCRETE SEWER MANHOLE TO GRADE.
20	TEP-1	(N) TREATED EFFLUENT POND 1: 0.650-MILLION GALLONS TOTAL VOLUME IN LINED TREATED EFFLUENT POND (0.500-MILLION GALLONS TOTAL USABLE VOLUME)

100' 0' 100' 200'

SCALE: 1"=100'

ABBREVIATIONS	
AB	AERATION BLOWER
CO	CLEAN OUT
CP	CONTROL PANEL
DB	DISTRIBUTION BOX
Ø	DIAMETER
(E)	EXISTING
EW	EXTRACTION WELL-GW
EP	EFFLUENT PUMP
EPT	EFFLUENT PUMP TANK
EQT	EQUALIZATION TANK
ESB	EFFLUENT SAMPLE BOX
EST	EMERGENCY STORAGE TANK
FF	FINISHED FLOOR
FG	FINISHED GRADE
FM	FLOW METER
FS	FINISHED SURFACE
FRP	FIBERGLASS REINFORCED PLASTIC
GI	GREASE INTERCEPTOR
GW	GROUNDWATER
MBR	MEMBRANE BIOREACTOR
MFR	MANUFACTURER
MH	MANHOLE
MPC	MALIBU PLUMBING CODE
MV	MECHANICAL VAULT
(N)	NEW
(P)	PROPOSED
S.F.	SQUARE FEET
SHT	SLUDGE HOLDING TANK
SOVB	SOLENOID VALVE BOX
SP	SEWAGE PUMPS
SS	SANITARY SEWER
SV	SOLENOID VALVE
TEP	TREATED EFFLUENT POND
USBF	UPFLOW SLUDGE BLANKET FILTRATION
UV	ULTRAVIOLET DISINFECTION
W	WATER

LEGEND:

- PROPERTY LINE
- (P) SS GRAVITY LINE
- (P) SS EFFLUENT GRAVITY LINE
- (P) SS EFFLUENT FORCE MAIN
- ⊕ (E) GROUNDWATER EXTRACTION WELL (EW-X)

NOTES:

1. THESE PLANS ARE ACCURATE FOR ONSITE WASTEWATER SYSTEM ONLY.
2. TOPOGRAPHIC SURVEY AND SITE PLAN PROVIDED BY LRS ARCHITECTS.

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(1) OVERALL ONSITE WASTEWATER SYSTEM SITE PLAN

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PROJECT: ONSITE WASTEWATER SYSTEM THE MALIBU INSTITUTE

ADDRESS: 901 ENCINAL CANYON ROAD MALIBU, CA 90265

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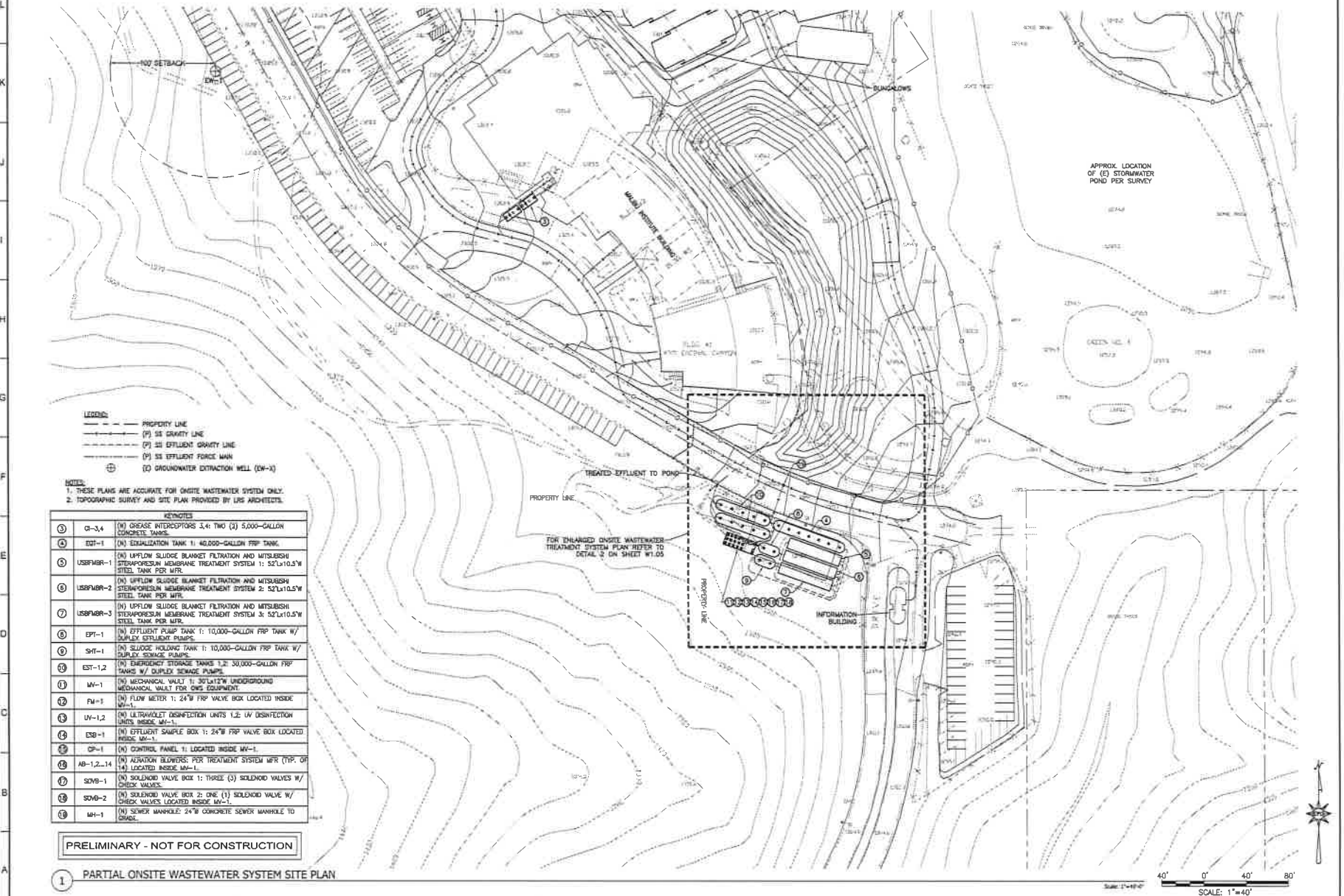
PROJECT NO. K118

DRAWING NO. W1.01

SHEET 2 OF 7 SHEETS



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ADDRESS: 901 ENCINAL CANYON ROAD MALIBU, CA 90265
DATE: 9/16/11
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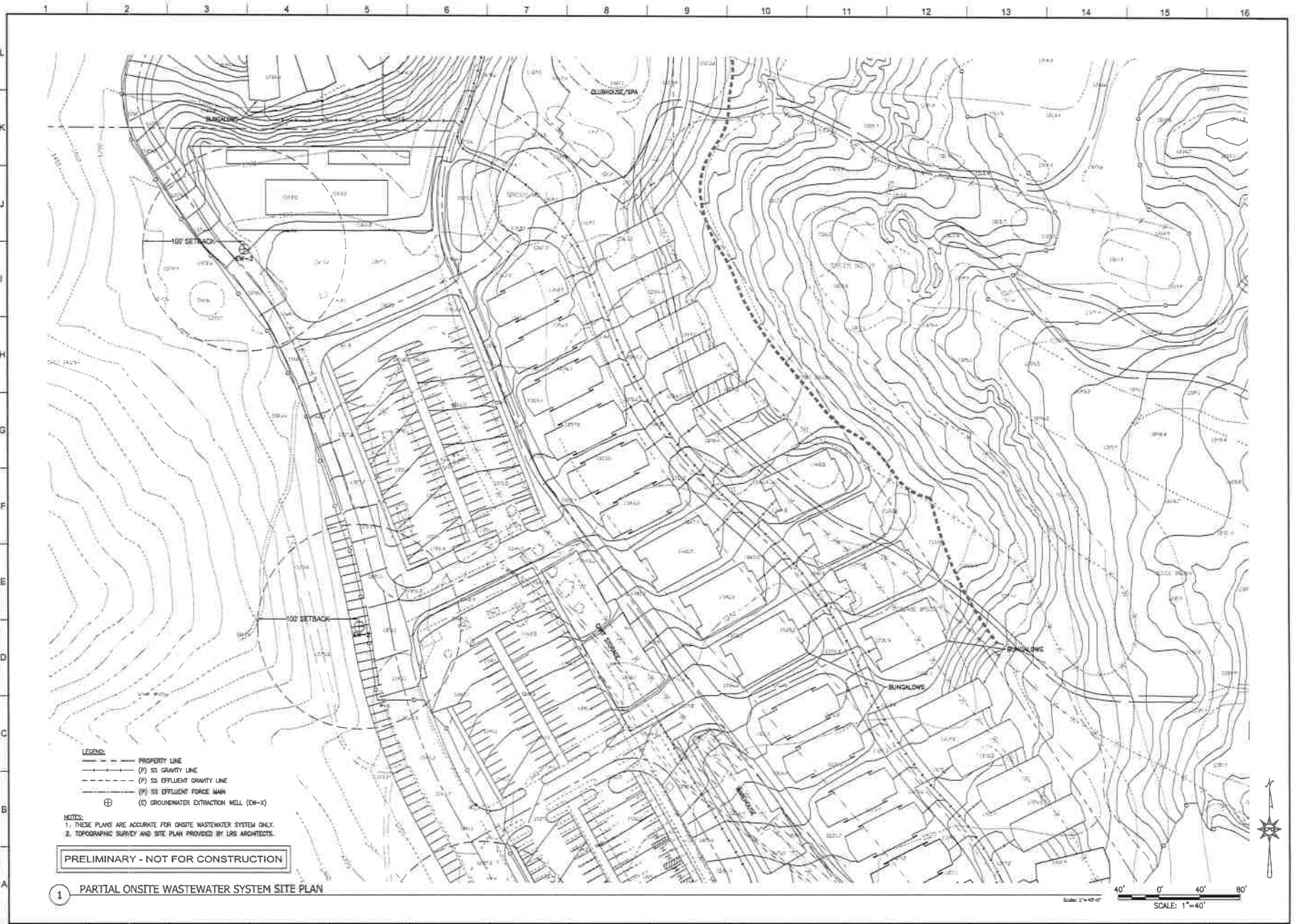
PROJECT NO.: K118
DRAWING NO.: W1.02
SHEET 3 or 7 SHEETS



1 PARTIAL ONSITE WASTEWATER SYSTEM SITE PLAN

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1	RWQCB SUBMITTAL	10/11	SJ
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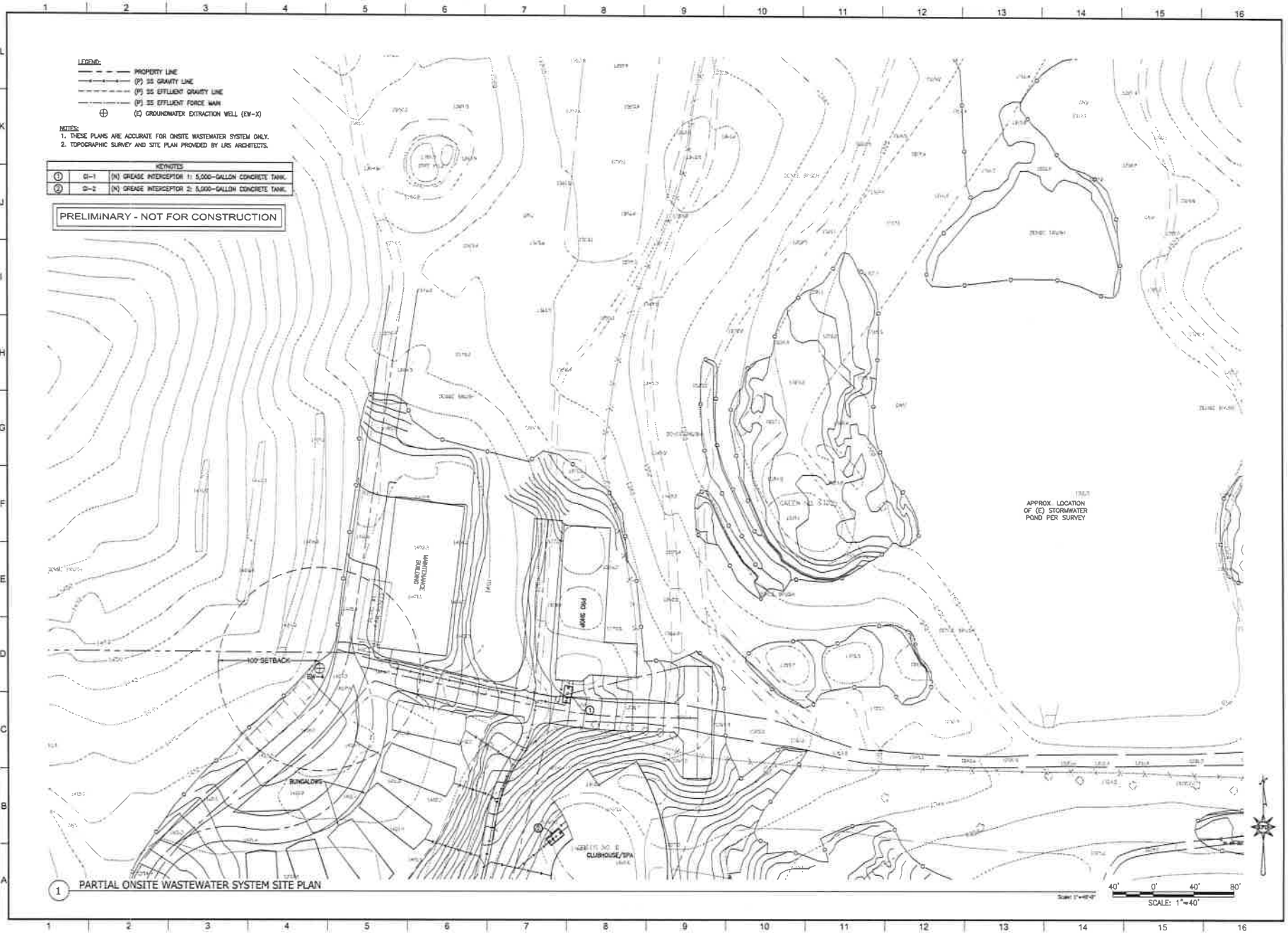
SHEET 4 OF 7 SHEETS



1 PARTIAL ONSITE WASTEWATER SYSTEM SITE PLAN

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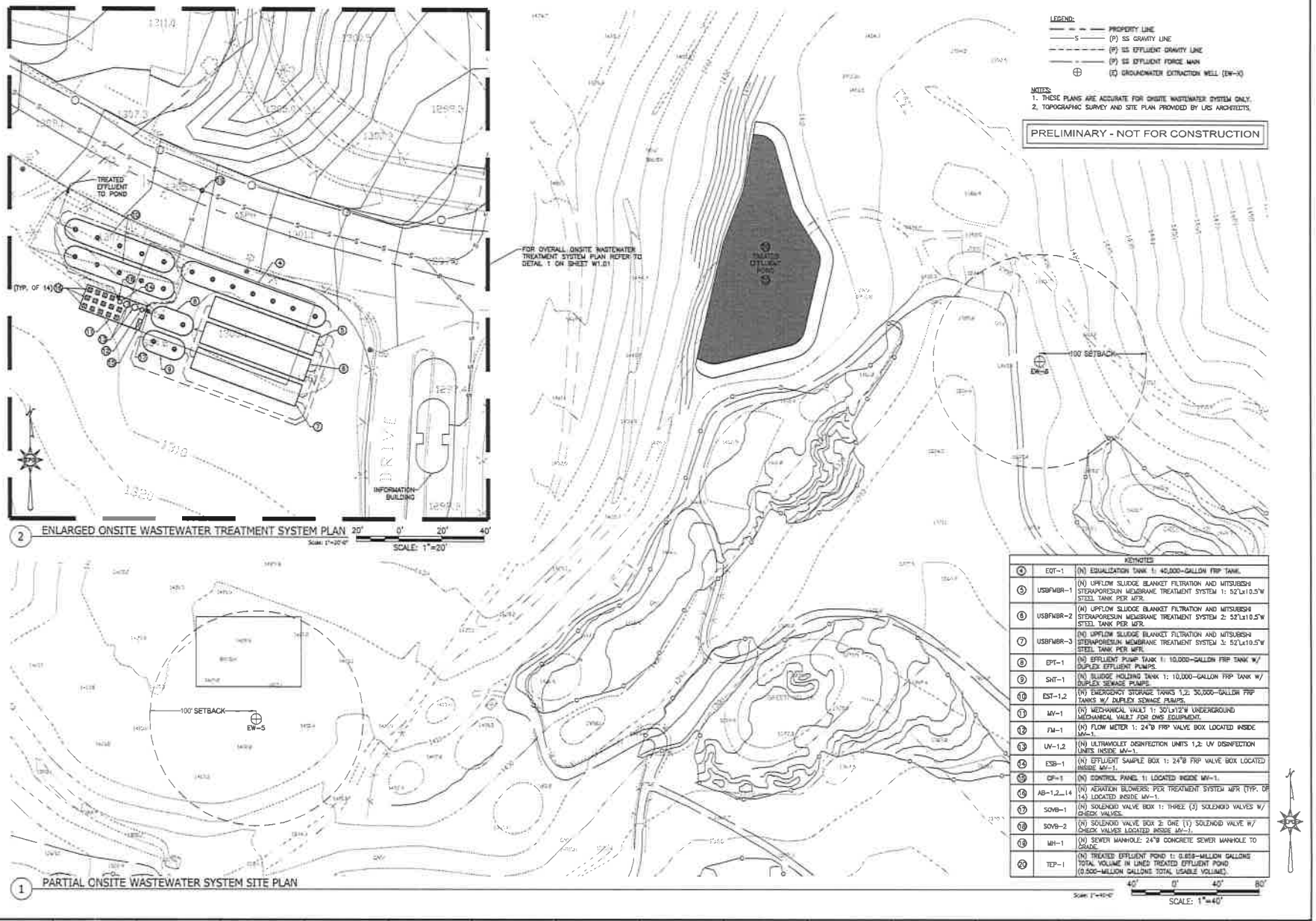

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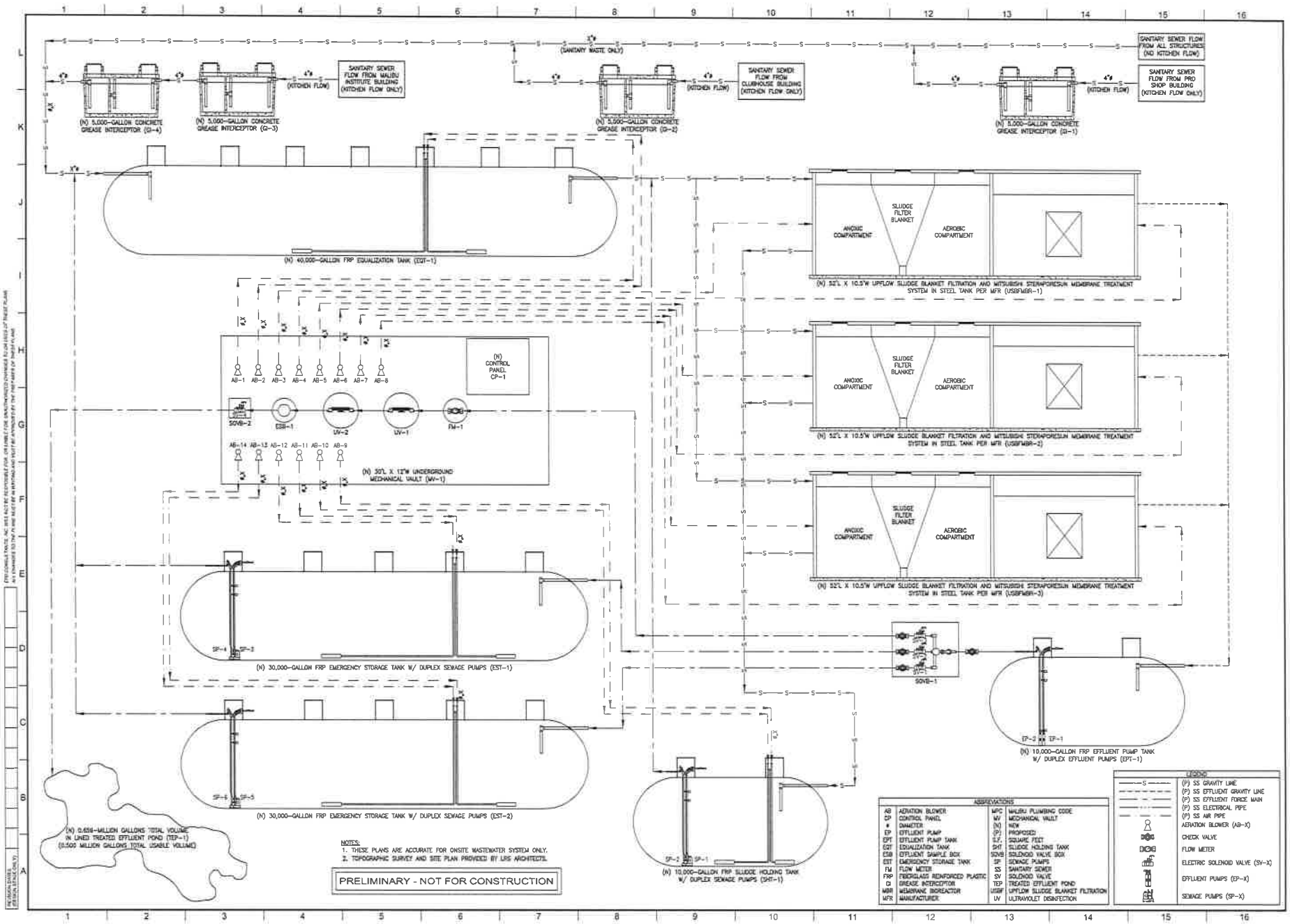

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2. TOPOGRAPHIC SURVEY AND SITE PLAN PROVIDED BY LRS ARCHITECTS.

PRELIMINARY - NOT FOR CONSTRUCTION

ABBREVIATIONS			
AB	AERATION BLOWER	MPC	MALIBU PLUMBING CODE
CP	CONTROL PANEL	MV	MECHANICAL VAULT
ø	DIAMETER	(N)	NEW
EP	EFFLUENT PUMP	(P)	PROPOSED
EPT	EFFLUENT PUMP TANK	S.F.	SQUARE FEET
EQT	EQUALIZATION TANK	SHT	SLUDGE HOLDING TANK
ESB	EFFLUENT SAMPLE BOX	SOVB	SOLENOID VALVE BOX
EST	EMERGENCY STORAGE TANK	SP	SEWAGE PUMPS
FM	FLOW METER	SS	SANITARY SEWER
FRP	FIBERGLASS REINFORCED PLASTIC	SV	SOLENOID VALVE
GI	GREASE INTERCEPTOR	TEP	TREATED EFFLUENT POND
MBR	MEMBRANE BIOREACTOR	USBF	UPFLOW SLUDGE BLANKET FILTRATION
MFR	MANUFACTURER	UV	ULTRAVIOLET DISINFECTION

LEGEND	
S	(P) SS GRAVITY LINE
S	(P) SS EFFLUENT GRAVITY LINE
S	(P) SS EFFLUENT FORCE MAIN
E	(P) SS ELECTRICAL PIPE
A	(P) SS AIR PIPE
	AERATION BLOWER (AB-X)
	CHECK VALVE
	FLOW METER
	ELECTRIC SOLENOID VALVE (SV-X)
	EFFLUENT PUMPS (EP-X)
	SEWAGE PUMPS (SP-X)

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SHEET TITLE: PROCESS PIPING SCHEMATIC FLOW DIAGRAM
PROJECT: ONSITE WASTEWATER SYSTEM THE MALIBU INSTITUTE
ADDRESS: 901 ENCINAL CANYON ROAD MALIBU, CA 90265

DATE	SCALE	DRAWN BY
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PROJECT NO. K118
DRAWING NO. W2.01
SHEET 7 OF 7 SHEETS

Appendix G.2

Water Quality and Hydromodification Technical Report,
Geosyntec Consultants, June 2013

Prepared for

Malibu Associates, LLC
901 Encinal Canyon Road
Malibu, California 90265

THE MALIBU INSTITUTE

FINAL WATER QUALITY AND HYDROMODIFICATION TECHNICAL REPORT

Prepared by

Geosyntec consultants

engineers | scientists | innovators

3415 S. Sepulveda Blvd., Ste. 500
Los Angeles, CA 90034

PNW0167

June 2013

The Malibu Institute
Final Water Quality and Hydromodification Technical Report

Prepared for

Malibu Associates, LLC
Malibu, California

Prepared by

Geosyntec Consultants
Los Angeles, California

June 2013

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Figure 7: Conceptual Diagram of BMPs within the Development Site

Figure 8: Conceptual Diagram of Pollutant Load Model

ACRONYMS AND ABBREVIATIONS

ACOE	United States Army Corps of Engineers
ASBS	Areas of Special Biological Significance
ASCE	American Society of Civil Engineers
BAT/BCT	Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology
BMP	best management practice
CALGreen Code	The California Green Building Standards Code
CASQA	California Stormwater Quality Association
CCA	California Coastal Act
CCC	California Coastal Commission
CCZ	California Coastal Zone
CDFG	California Department of Fish and Game
CEC	Constituents of Emerging Concerns
CEQA	California Environmental Quality Act
CLAWD	California Los Angeles Water Division
CSMP	Construction Site Monitoring Program
CTR	California Toxics Rule
CUP	Conditional Use Permit
CWA	Clean Water Act
DL	detection limit
DWR	Department of Water Resources
EMC	event mean concentration
EPA	Environmental Protection Agency
ESHA	Environmentally Sensitive Habitat Area
ETL	Environmental Toxicology Laboratory
gal	gallons
HDSF Res	High density single family residential
LACDPW	Los Angeles County Department of Public Works
LACDRP	Los Angeles County Department of Regional Planning
LARWQCB	Los Angeles Regional Water Quality Control Board
LCP	Local Coastal Program
LID	low impact development
LUP	Land Use Plan
MGC	Malibu Golf Club
MEP	maximum extent practicable

MS4	Municipal Separate Storm Sewer System
MSL	mean sea level
ND	non-detect
NELs	Numeric Effluent Limitations
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OWTS	On-site Wastewater Treatment Systems
PAHs	Polynuclear Aromatic Hydrocarbons
PIPP	Public Information and Participation Program
POC	pollutant of concern
PPCPs	Pharmaceuticals and Personal Care Products
RWQCB	Regional Water Quality Control Board
SCCWRP	Southern California Coastal Water Research Project
SQMP	Stormwater Quality Management Program
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Stormwater Pollution Prevention Plan
SWQDv	Stormwater Quality Design Volume
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TSS	total suspended solids
USGS	US Geological Survey
WMA	Watershed Management Area
WMC	Watershed Management Committee
WQBELs	Water Quality-Based Effluent Limitations

1. INTRODUCTION

The Malibu Institute (the Applicant) proposes to create a sports-oriented educational retreat affiliated with the University of Southern California (USC) to complement a remodeled 18-hole golf course on a 650-acre Project site currently operated as the Malibu Golf Club (MGC) in the unincorporated Malibu area of Los Angeles County (Figure 1). The Project will provide for the development of educational and meeting facilities, along with visitor-serving overnight accommodations consisting of 40 bungalow units with 4 beds per unit, a clubhouse with fitness and spa facilities, a restaurant and lounge, a swimming pool, a golf pro-shop and grill, and associated support facilities including a maintenance building, a golf cart storage barn, a warehouse, and a security/information building. In total, the Project proposes to construct a combined 224,287 square feet of structures, which will include the reuse of the foundation of the existing 12,475 square foot clubhouse and cart barn as part of the Institute building and the removal of 11,160 square feet of existing structures, for a total increase of 200,652 square feet of structures on the Project site. An existing 875 square foot guesthouse located on the northern portion of the Project site will be retained by the Project for use as a caretaker's residence. An on-site wastewater recycling system is proposed to replace existing on-site septic tanks. The wastewater recycling system will convey effluent to a proposed on-site recycled water treatment system, to be installed underground, where it will be treated to a standard suitable for landscape irrigation on the golf course.

The primary access from Encinal Canyon Road and Clubhouse Drive, Trancas Lakes Drive, will provide access to the expanded parking area located close to all of the proposed facilities. A network of internal walkways and paths will promote circulation among the various facilities of the Malibu Institute by foot or electric cart. Existing parking facilities are currently provided at two surface parking lots and curbside parking located along Trancas Lakes Drive located to the south and west of the existing clubhouse facilities. To ensure there is ample parking, and to comply with County development standards, the Project will provide 383 parking spaces (RCE, 2013), which will be more than the 378 total parking spaces required by the Los Angeles County Code based on the proposed uses. These parking spaces will be provided by remodeled surface parking lot facilities located in the same areas as the existing parking lots. The Project will repave the existing southern parking facility and provide landscaping to visually screen the surface lot from Encinal Canyon Road. The western surface parking lot will be expanded and existing non-pervious asphalt paving will be removed and replaced with pervious paving materials to facilitate stormwater infiltration and improve water quality. The surface parking lots also would feature a sub-drain collection system to detain stormwater runoff, which could then

be used for irrigation of the golf course or landscape areas. The expanded western parking area will be visually screened from Encinal Canyon Road by topographical features, and the new parking stalls will be covered by shade structures with photovoltaic panels installed on top of the structures. The photovoltaic panels will be provided with the goal of supplying the majority of the Project's electricity needs. In addition, existing outdoor overhead lighting at both parking lots, which currently can be seen from off-site, will be replaced with shielded down-lighting designed to comply with Dark Skies initiatives and the County's Rural Outdoor Lighting District Ordinance.

The existing golf course facilities currently are accessed from Encinal Canyon Road, through a main entrance on Clubhouse Drive. This main entrance will continue to serve as the site access for the Project's guests and employees.

The Project also will redesign the existing public golf course to incorporate new "green" features, including a smart irrigation system, drought-tolerant grass, and native vegetation. All proposed improvements will be constructed within the previously disturbed area of the MGC, and all of the proposed structures will be clustered within a 20.8-acre development area in the southern portion of the Project site. The reconfigured 18-hole golf course will be redesigned using 17 acres of the existing holes on the golf course, allowing the proposed facilities, including the redesigned golf course, to be constructed within previously disturbed areas. Over 450 acres of native coastal scrub and chaparral, including oak woodland forest, will be left undisturbed and will become permanently dedicated open space (Figure 2).

This Water Quality and Hydromodification Technical Report was developed to assess the potential water quality and hydromodification impacts and benefits of the proposed Project.

2. ENVIRONMENTAL SETTING

2.1 Physical Setting

The Project site is located at 901 Encinal Canyon Road, within the unincorporated Malibu area of Los Angeles County. Regionally, the Project site is located in the western portion of the Santa Monica Mountains approximately forty-five miles west of downtown Los Angeles. Locally, the Project site is situated northwest of the City of Malibu, and south of the Cities of Thousand Oaks and Westlake Village in a rural area of the Santa Monica Mountains lying south of the primary east-west ridgeline. Portions of the Project site located south of Mulholland Highway also fall within the California Coastal Zone as defined by the California Coastal Act. Adjacent land uses are primarily undeveloped private and public lands with large lot rural residential development common along the northern and western boundaries.

As mapped on the "Point Dume" USGS 7.5 minute topographic quadrangle (in portions of Sections 2, 3, 10, 11 and 15, of T.1S, R.19W), the majority of the Project site falls within the upper watershed area of Trancas Canyon with the exception of a small, northerly extension of the Project site that spans the drainage divide and falls into the upper watershed of an unnamed tributary to the Carlisle Canyon watershed. Topographically, the Project site is situated in a bowl created by the crest of the Upper Trancas Canyon drainage basin. The tributary area is just over 1,300 acres, with 1,286 acres tributary to Trancas Canyon and 19 acres tributary to an unnamed tributary of Carlisle Canyon which drains to Lake Sherwood (Envicom, 2012[a]; Triad/Holmes Associates, 2013). The on-site topography ranges in elevation from peaks that reach 1,900 feet to 2,300 feet above mean sea level (MSL) in the northeast and northwest, to valley bottom elevations that fall to approximately 1,300 feet above MSL. To the southeast, adjacent mountain ridges range from 1,400 feet to 1,900 feet above MSL. Landforms southwest of the site have gentler slopes and range from 1,400 feet to 1,700 feet above MSL. The overall elevation differences between the Project site and the surrounding mountains generally contribute to the formation of a centralized water drainage pattern with branching tributaries. A series of man-made lakes retain water on-site as water features within the existing golf course.

2.2 Climate

Daily rainfall is available for Los Angeles County's Lechuza Patrol precipitation gage (LA454-[LCZC1], located at 34°04'35"N, 118°52'51"W at an elevation of 1,620 ft.), located approximately 1.5 miles southwest of the MGC. The average estimated annual rainfall at the Project site (based upon the Lechuza gage), based on a 47-year record (1949 to 1996), is 21.5 inches per year.

2.3 Vegetation

The dominant plant community on the Project site is chaparral, which contains or is locally dominated by, plant species classed as coastal scrub. Scattered elements of woodland are present among the chaparral as isolated oak trees. In some places, openings among the brush and scrub are dominated by herbaceous cover classed as grassland. The rockland areas are so sparsely covered that only a few species of vascular plants, including spikemoss and ferns, and saxicolous bryophytes and lichens are the dominant cover (Envicom, 2012[a]).

Sensitive plant communities are protected pursuant to the California Environmental Quality Act (CEQA), and impacts to sensitive plant communities must therefore be avoided or mitigated. The sensitive plant communities on the Project site include Red Willow Thickets, Purple Needlegrass Grassland, Creeping Ryegrass Grassland, Foothill Needlegrass Grassland, Giant Wildrye

Grassland, California Sycamore Woodland, California Walnut Groves California Bay Forest Blue Elderberry Stands, and Spike-Moss Mats (Envicom, 2012(a)).

2.4 Habitat

The Project site is situated mostly within the Malibu Coastal Zone. A specific portion of the Project site, namely, a Willow/Sycamore/Coast Live Oak community in the northeast portion of the Project site previously has been designated as an Environmentally Sensitive Habitat Area (ESHA) in the Malibu Local Coastal Program Land Use Plan. The property's eastern border marginally includes a portion of the Los Angeles County designated Zuma Canyon Significant Ecological Area Buffer (Buffer 3A). The general area is described as containing a variety of relatively undisturbed biotic communities including chaparral, redshank chaparral, coastal sage scrub, native and non-native grassland, oak and walnut woodland, and riparian woodland. The coastal sage scrub and chaparral communities that primarily occupy the upper and lower Trancas Canyon watershed are well developed and relatively undisturbed in the eastern and western portion of the Project site. The California Coastal Commission (CCC) has determined that riparian corridors, as well as large contiguous relatively pristine stands of coastal sage scrub and chaparral in the Santa Monica Mountains, meet the definition of ESHA. Coastal sage scrub and chaparral have many important roles in the ecosystem, including the provision of critical linkages between riparian corridors, and essential habitat for species that require several habitat types (Envicom, 2012(a)).

2.5 Geology

The Project is located within the Transverse Ranges geomorphic province, characterized by general east-west trending convergent deformational structural features which are a result of north-south crustal shorting due to plate tectonics. The Project is located above Quaternary-age alluvium (Qa) and Tertiary-age extrusive rocks of the Conejo Volcanics (Tcvb), containing basalt flows and breccia, some andesite, arkose, and tuff (Envicom, 2012(a)). Native alluvial material consists of clayey sand (SC), ranging in color from dark yellowish brown to dark bluish gray and ranging in texture from fine to coarse-grained. Bedrock material consists of aphanitic volcanic rock of Conejo Volcanics. Perched groundwater was encountered during a geotechnical investigation at a depth of 13 ft below ground surface near the northern parking lot at the Project site (Sladden Engineering, 2012).

The Project site is located in an active seismic zone. Geologic hazards investigated include, but are not limited to, the following:

- Surface rupture along active fault traces. No signs of active surface faulting or surface rupture were observed during Sladden Engineering's review of non-stereo digitized photographs of the Project site and its vicinity.

- Ground shaking by active faults, which could produce ground accelerations at the Project site on the order of 0.43g.

- Liquefaction, which occurs when loose, saturated granular soil loses strength as a result of a decrease in granular sand volume and a positive increase in pore pressures. This result occurs with a combination of liquefaction-susceptible soil, groundwater within 50 ft of the surface, and strong seismic shaking. Due to the shallow bedrock at the Project site, liquefaction poses negligible risk (Sladden Engineering, 2012).

A steep-sided central ridgeline arcs along the Project site in a northwest-southeast orientation as it extends southerly into the middle of the Project site. The Project site is situated near the backbone crest of the Santa Monica Mountains, so the headwater drainage profiles are generally steep. Locations with rock outcrops and shallow bedrock features can be found along the sides and crests of the higher-elevated slopes that surround the developed golf course portions of the site (Envicom, 2012[a]).

2.6 Project Area Land Uses

Existing Land Uses

The Project site is comprised of an irregularly shaped assemblage of 29 parcels that total approximately 650 acres, spanning from Encinal Canyon Road on the south to the intersection of Mulholland Drive and Westlake Boulevard on the north. The majority of the Project site is zoned R-R-1 (Resort and Recreation), with the portions to the north, east, southeast, southwest, and south on the periphery of the Project site zoned either A-1-1 (Light Agriculture – 1 Dwelling Unit per Acre) or A-1-20 (Light Agriculture – 1 Dwelling Unit per 20 Acres). Small portions of the Project site north of Mulholland Drive and the northeast area of the Project site are zoned RPD-5-0.2U-DP.

Proposed Land Uses

A summary of the existing and proposed land uses for the entire Project site is provided in Table 2-1 and the existing and proposed land uses are illustrated in Figures 3a and 3b. For purposes of modeling, as described in Section 6, site land uses were grouped into categories of high density single family residential (HDSF Res), commercial, open space, and golf course. The HDSF Res

land use is being used in the water quality model (Section 6.2) to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site. This is a conservative assumption in that these temporary accommodations will be occupied less often than would true residences.

Table 2-1: Malibu Institute Existing and Proposed Land Uses

Land Use	Existing Land Use Areas (ac)	Proposed Land Use Areas (ac)
HDSF Residential*	0.0	9.6
Commercial	12.8	11.3
Open	522.2	522.2
Golf course	115.1	107.0
Total	650	650

* For purposes of water quality modeling (Section 6.2), "HDSF Residential" represents 160 rooms to be used for overnight accommodations. There will not be any true residential land uses on the Project site.

2.7 Receiving Waters

The Project site encompasses portions of two watersheds, one draining to Trancas Canyon Creek to the south (631 acres) and the other draining to Lake Sherwood to the north (19 acres) (Figure 4). Trancas Canyon is a major tributary that feeds to Trancas Beach at the Santa Monica Bay, approximately four miles south of the Project site. The headwaters of the mainstem of Trancas Canyon Creek traverse and are located, to large extent, on the Project site. Steep drainages leading from the crest of the range pass through rockland and chaparral covered slopes and converge onto the artificial fill that constitutes the developed golf course within the central valley areas of the Project site. Two original segments of the Trancas Creek "blueline stream" indicated on the Point Dume, California USGS topographic map (1950 edition) no longer exist across the golf course. Rather, the streams were replaced with underground culverts during the construction of the golf course in the 1970s. Near the entrance to the golf course (Clubhouse Drive from Encinal Canyon Road), excess water flows from the golf course ponds is discharged back into the mainstem of the creek, which subsequently passes through a large culvert under Encinal Canyon Road to continue downstream via a natural streamcourse. One other tributary to the mainstem originates offsite to the northwest, within an area characterized by rural residential developments along Mulholland Highway. The streamcourse follows along the southwestern boundary of the Project site and leaves it to pass under Encinal Canyon Road. Approximately 1,000 feet downstream of the Encinal Canyon Road, the streamcourse is tributary with the mainstem of Trancas Creek.

The northernmost 19 acres of the Project site is comprised of open space and is tributary to the Carlisle Canyon watershed. Lake Sherwood is located within the Carlisle Canyon watershed

approximately two miles north of the Project site border and is located in Ventura County. Lake Sherwood drains to Potrero Valley Creek. Figure 4 illustrates the receiving waters with respect to the Project site. No development is proposed within the portion of the Project site contributing to the Carlisle Canyon watershed.

Surface Water Beneficial Uses

The Los Angeles Regional Water Quality Control Board (LARWQCB) Basin Plan (1994) lists beneficial uses of major water bodies within this region (Table 2-2). Trancas Canyon Creek, Trancas Beach, and Lake Sherwood are listed as having specific beneficial uses. These surface water bodies, as well as the Trancas Canyon Creek and Carlisle Canyon Watersheds, are shown on Figure 4. As identified in Table 2-2, the existing and potential beneficial uses of these water bodies include the following:

- MUN: Community, military, or individual water supply systems including, but not limited to, drinking water supply
- GWR: Groundwater recharge for natural or artificial recharge of groundwater
- NAV: Waters used for shipping, travel, or other transportation by private, military, or commercial vessels
- REC1: Water contact recreation involving body contact with water and ingestion is reasonably possible
- REC2: Non-contact water recreation for activities in proximity to water, but not involving body contact
- WARM: Warm freshwater habitat to support warm water ecosystems
- WILD: Wildlife habitat waters that support terrestrial or wetland ecosystems
- RARE: Waters that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.
- WET: Waterbodies that may have wetlands habitat associated with only a portion of the waterbody. Any regulatory action would require a detailed analysis of the area.
- COMM: Water used for commercial or recreational collection of fish, shellfish, or other organisms including those intended for human consumption or bait.

- MAR: Water supporting maritime ecosystems including preservation or enhancement of marine habitats, vegetation, or wildlife.
- SPWN: Waters that support high quality aquatic habitats suitable for reproduction and early development of fish.
- SHELL: Waters that support habitats of filter-feeding shellfish for human consumption or sports purposes.

Table 2-2: Beneficial Uses of Receiving Waters

Water Body	Beneficial Use												
	MUN	GWR	NAV	REC1	REC2	WARM	WILD	RARE	WET	COMM	MAR	SPWN	SHELL
Trancas Canyon Creek (Part of Los Angeles Coastal Streams) (Hydrologic Subarea 404.37)	E			E_m	E	E	E	E					
Lake Sherwood (Hydrologic Subarea 404.26)	P	E	E	E	E	E	E		E				
Trancas Beach (Hydrologic Subarea 404.37)			E	E	E		E			E	E	P	E

E – Existing beneficial use
P – Potential beneficial use
$_m$ – Access prohibited by Los Angeles County Department of Public Works in the concrete-channelized areas
Source: Table 2-1 of the Water Quality Control Plan for the Los Angeles Region (Basin Plan, 1994)

Existing Surface Water Quality

Fuji International, the former owner of the Project site, obtained the original Conditional Use Permit (CUP) in 1998 and agreed to its terms. The CUP was then transferred to MGC in 1999. The CUP requires an annual report regarding water quality monitoring and testing results to assure compliance with standards established by the Los Angeles County Department of Agricultural Commissioners/Weights and Measures Environmental Toxicology Laboratory (ETL), Los Angeles County Department of Health Services, and the LARWQCB. Additionally, the MGC must achieve a 50 percent reduction of pesticides, herbicides and fertilizer residues from the 1998 baseline levels within the first 3 years of the permit and continue to meet the reduced levels throughout the life of the permit. The MGC has implemented the following BMPs:

- Conduct sampling and monitoring to ensure compliance; and
- Continue to reach reduced rates annually through the life of permit.

Per Condition 24.8 of the CUP, water quality samples are to be collected at one entry point and one exit point of the Project site. Following a 2001 meeting between the Malibu Associates' predecessor and interest, the National Park Service, and the Los Angeles County Department of Regional Planning (LACDRP), three entry points were selected to be sampled in addition to the two previous sample locations (Figure 5). The four upland sampling sites are located in small ponded areas, which appear to receive runoff from within the Project site; therefore, it is questionable whether these four sites actually represent upstream (off-site) water quality. The downstream sampling site is located at the point where the Trancas Creek exits the Project site (location MGC-5 on Figure 5). The CUP outlines specific water quality criteria, water quality monitoring protocols, and water quality sampling sites for the Project site. Water quality sampling analysis examined total phosphorus, nitrate, nitrite, ammonia, organic nitrogen, pH, specific conductivity and a suite of organochlorine pesticides such as DDT, toxaphene and dieldrin (Geosyntec, 2012[b]).

Baseline Water Quality Sampling

Conditions 23 to 26 of the CUP outline a water quality monitoring program scheduled to begin the fall of 2000 and last through the fall of 2002 to establish baseline water quality conditions within the Project site. Condition 23 of the CUP states:

> *To establish both water quality goals in Trancas Watershed, a series of water quality tests during the wet and dry seasons for the first two years of this permit is required to establish a water quality baseline. Beginning by the Fall of 2000 the Los Angeles County Department of Agriculture Commission/Weights Measures, Environmental Toxicology Laboratory shall collect water test samples with support and assistance as may be needed from the Resource Conservation District of the Santa Monica Mountains.*

Condition 24.8 of the CUP provides:

> *Water shall be tested at an entry point of water across the golf course, and at the exit point of water from the golf course. The exact locations shall be determined by the Resource Conservation District of the Santa Monica Mountains.*

Ongoing Water Quality Sampling Requirements

CUP Condition 24.7, requires four tests to be performed annually following the initial two-year testing program, consisting of two tests during the wet season and two tests during the dry season. Initial wet season sampling must occur within 24 hours following the first rain event of

the season that produces at least one-half inch of rain within a 24-hour period and causes the stream to flow. The CUP does not specifically state the time range of seasons, but from reviewing monthly average precipitation records, it is reasonable to assume May through September was considered the dry season and October through April was considered the wet season. The CUP lacks detail concerning how or under what conditions dry season sampling should take place (Geosyntec, 2012[b]).

Selected General Constituents

The general constituents to be tested are pH and specific conductivity. Water pH is a measure of the hydrogen ion concentration expressed on a logarithmic scale, with values ranging from 0 to 14. While the pH of "pure" water at 25 ºC is 7.0 and precipitation is slightly acidic, the pH of natural waters is usually slightly basic (higher than 7.0) due to the buffering of water provided by soils. The pH of water affects the solubility and bioavailability of various chemical constituents such as nutrients and heavy metals. Water pH is therefore an indirect indicator of potential for aquatic toxicity.

Specific conductivity is the measure of water's ability to conduct electricity, which is used as an indirect indicator of the concentrations of total dissolved solids (TDS) and salinity. These constituents are considered to be contaminants in fresh water when elevated. Note that evaporation and evapotranspiration can increase conductivity (and TDS/salinity) and it likely that is what, in part, is causing higher conductivity at the downstream station. Groundwater can also be a source of TDS.

Results for these constituents are summarized in Table 2-3 and discussed below (Geosyntec, 2012[b]).

Table 2-3: Wet and Dry Weather Water Quality Monitoring Data for General and Conventional Parameters (2002-2012)

Constituent	CUP Required Level	Sample Location	No. of Samples	Minimum	Maximum	Average
pH	See footnote a	MGC-1	2	6.8	6.9	6.9
		MGC-2	2	6.9	7.1	7.0
		MGC-3	4	7.1	7.9	7.4
		MGC-4	3	6.5	7.0	6.7
		MGC-5[b]	29	6.5	7.9	7.4
Specific Conductivity	NA	MGC-1	0	NA	NA	NA
		MGC-2	0	NA	NA	NA

Constituent	CUP Required Level	Sample Location	No. of Samples	Minimum	Maximum	Average
		MGC-3	1	520	520	520
		MGC-4	0	NA	NA	NA
		MGC-5[b]	31	3	1980	1246

[a] According to the MGC CUP (1999), "The pH of inland surface waters shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.5 units from natural conditions as a result of waste discharge. The pH of bays or estuaries shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.2 units from natural conditions as a result of waste discharge."
[b] Downstream compliance point

Selected Nutrients

The selected nutrients to be monitored were total nitrogen (TN), organic nitrogen, ammonia (NH_3) and total phosphate (TP). TP is the less bioavailable form of phosphorus compared to dissolved phosphorus, and is often made up of a high proportion of particulate phosphorus. Nitrate, nitrite, and ammonia are the more bioavailable forms of nitrogen, and of these, nitrate has the higher concentration in natural waters and is more important than ammonia as a nutrient. Organic nitrogen often enters waters through atmospheric deposition and makes a considerable contribution to nitrogen inputs in aquatic ecosystems. Excessive nutrients in receiving waters can impair water quality by causing eutrophication (enrichment) which promotes the growth of algae. Excessive algae affect light penetration and causes dissolved oxygen depletion, which may kill fish and other aquatic species. In addition, some algae produce blooms that are toxic to other organisms. Table 2-4 summarizes available nutrient monitoring data (Geosyntec, 2012[b]).

Table 2-4: Wet and Dry Weather Water Quality Monitoring Data for Nutrients (2002-2012)

Constituent	CUP Required Level	Sample Location	No. of Samples	Minimum	Maximum	Average
Total Phosphorus-P (mg/L)	0.1 (see footnote a)	MGC-1	8	0.126	0.440	0.262
		MGC-2	10	0.025	0.830	0.196
		MGC-3	15	0.025	0.870	0.267
		MGC-4	13	0.055	0.910	0.339
		MGC-5[c]	31	0.025	0.976	0.359
Total Nitrogen (mg/L)	See footnote b	MGC-1	8	1.518	4.475	3.101
		MGC-2	10	0.560	6.795	3.315
		MGC-3	15	0.435	5.062	2.281
		MGC-4	13	0.660	8.118	3.768

Constituent	CUP Required Level	Sample Location	No. of Samples	Minimum	Maximum	Average
		MGC-5[c]	31	0.298	4.745	1.907
Organic Nitrogen (mg/L)	See footnote b	MGC-1	8	0.660	2.412	1.359
		MGC-2	10	0.400	3.054	1.220
		MGC-3	15	0.330	4.246	1.360
		MGC-4	13	0.500	4.300	1.875
		MGC-5[c]	31	0.050	3.090	1.177
Ammonia Nitrogen (mg/L)	See footnote b	MGC-1	8	0.050	0.227	0.105
		MGC-2	10	0.050	0.320	0.137
		MGC-3	15	0.050	0.285	0.114
		MGC-4	13	0.050	0.700	0.181
		MGC-5[c]	31	0.050	0.413	0.159
Nitrite-Nitrogen (mg/L)	See footnote b	MGC-1	8	0.015	0.128	0.050
		MGC-2	10	0.015	0.128	0.026
		MGC-3	15	0.015	0.088	0.028
		MGC-4	13	0.015	0.080	0.022
		MGC-5[c]	31	0.015	1.320	0.096
Nitrate-Nitrogen (mg/L)	See footnote b	MGC-1	8	0.015	2.710	1.587
		MGC-2	10	0.015	5.080	1.932
		MGC-3	15	0.015	1.970	0.779
		MGC-4	13	0.015	6.661	1.691
		MGC-5[c]	31	0.015	2.140	0.475

[a] According to the MGC CUP (1999), "Phosphate levels shall be less than 0.1 mg per liter exiting the property. Phosphate levels shall be monitored through the measurement of total phosphorus."
[b] According to the MGC CUP (1999), "Nitrogen levels shall be less than 1 mg per liter exiting the property. Nitrogen levels shall be monitored through the measurement of nitrate-N, nitrite-N, organic-N, and ammonia-N. The *combined* nitrogen levels from these sources shall not exceed 1 mg per liter."
[c] Downstream compliance point

Across all sites and all samples collected (including baseline data), TP concentrations ranged from less than detection limits (i.e. non-detect) to 0.98 mg/L with an average concentration of 0.31 mg/L. Across all sites, TN concentrations ranged from 0.30 to 8.12 mg/L with an average concentration of 2.60 mg/L (Table 2-4). The CUP defines TN as the summation of nitrate, nitrite, organic nitrogen and ammonia, thus the TN values listed in Table 2-4 were calculated based on the sum of the individual samples of these constituents. In the event a lab result was returned as non-detect, a value of half the method detection limit was used in its place when computing these summary statistics, which is a standard practice for handling non-detect values

in environmental datasets. Although a significant percentage of non-detects were measured for both nitrite (83% of all samples) and ammonia (38% of all samples), the perceived bias in using half their detection limits in place of real data when calculating TN concentrations was found not to impact the results, since their detection limits are very small when compared to other measured nitrogen constituents.

Table 2-5 shows the frequency with which monitored sites exceeded the CUP required levels under Condition 25 and the average nutrient concentration in excess of the water quality criteria. Non-detects were also assigned a value of one half of the detection limit for this analysis. TP concentrations at Location MGC-5 (Figure 5) exceeded the water quality criteria of 0.10 mg/L in 97% of the samples analyzed. TN concentrations at Site 5 exceeded the CUP required level of 1.0 mg/L in 74% of the samples analyzed.

Table 2-5: Comparison of Observed Wet and Dry Weather Water Quality Monitoring Data and CUP Required Levels for TP and TN (2002-2012)

	MGC-1		MGC-2		MGC-3		MGC-4		MGC-5[a]	
	TN	TP	TN	TP	TN	TP	TN	TP	TN	TP
Number of Comparisons	8	8	10	10	15	15	13	13	31	31
Exceedance Frequency	100%	100%	80%	60%	87%	80%	77%	77%	74%	97%
CUP Required Level (mg/L)	1.0	0.1	1.0	0.1	1.0	0.1	1.0	0.1	1.0	0.1
Average Concentration in Excess of Criteria (mg/L)	2.1	0.2	3.0	0.2	0.9	0.2	3.7	0.3	1.3	0.3

[a] Downstream compliance point

Selected Pesticides, Herbicides, and Fungicides

Pursuant to Condition 25 of the CUP, select constituents to be tested include pesticides, herbicides, and/or fungicides. The pesticides, herbicides, and/or fungicides to be monitored must be selected through screening for organochlorines, nutrient-containing pesticides, carbamates, synthetic pyrethroids, triazines, 2, 4-D, 2, 4, 5-TP, and glyphosphate. Testing must be conducted for the three most critical water soluble pesticides, herbicides and/or fungicides, defined by the three highest volumes or toxicity used on the golf course.

Of the pesticide, herbicide, and fungicide constituents tested between 1/29/02 and 8/3/12 (max n=18), only two analytes were detected - diazinon (1 of 18 samples, or 5.6% detection rate) and profenphos (3 of 18 samples, or 16.7% detection rate)—as organophosphate (OP) insecticides. Table 2-6 summarizes these results (Geosyntec, 2012[b]). Analysis for organochlorine pesticides were conducted only for samples collected at Location MGC-5 (Figure 5), the downstream

compliance point. Organochlorine pesticides were not found at levels exceeding detection limits at Location MGC-5 (Figure 5) (Geosyntec, 2012[b]).

Table 2-6: Wet and Dry Weather Water Quality Monitoring Detection Data for Selected Pesticides, Herbicides, and Fungicides (2002-2012)

Constituent	Category	CUP Required Level	Sample Location	Date	Result
Diazinon	N and P Containing Pesticides and Triazines (EPA Method 507)	ND[a] (DL=0.25 µg/L)	MGC-5[b]	6/14/02	0.49
Profenphos	N and P Containing Pesticides and Triazines (EPA Method 507)	ND[a] (DL=0.5 µg/L)	MGC-5[b]	1/24/12	2.4
			MGC-5[b]	5/17/12	1.43
			MGC-5[b]	8/23/12	2.34

[a] No presence of pesticides, fungicides or herbicides. Presence of pesticides, fungicides and herbicides will be by pesticides screening for organochlorines, nitrogen/phosphorus containing pesticides, carbamates, synthetic pyrethroids, triazines, 2,4-D, 2,4,5-TP, and glyphosate.
[b] Downstream compliance point

2.8 Groundwater

Groundwater Beneficial Uses

The majority of the Project site is located outside of a designated regional groundwater basin. According to the Basin Plan (1994), "With the exception of ground water in Malibu Valley (DWR Basin No. 4-22), ground waters along the southern slopes of the Santa Monica Mountains are not considered to comprise a major basin and accordingly have not been designated a basin number by the California Department of Water Resources (DWR)…."

Approximately 19 acres of the northern portion of the Project site, but outside of the Project's development area, contribute to the Hidden Valley groundwater basin, as defined in the Basin Plan (1994). The DWR designation is 4-16. Groundwater underlying other portions of the Project site is not within a designated groundwater basin. Although the Project site is mostly outside of the Hidden Valley Basin, surface runoff that infiltrates within the Carlisle Canyon watershed ultimately flows toward the Hidden Valley Basin.

As identified in Table 2-7, the beneficial uses of the Hidden Valley Basin include the following:

- MUN: Community, military, or individual water supply systems including, but not limited to, drinking water supply;

- IND: Industrial activities that do not depend primarily on water quality; and
- AGR: Agricultural supply waters used for farming, horticulture, or ranching.

Table 2-7: Groundwater Beneficial Uses

Groundwater Basin	Beneficial Use		
	MUN	IND	AGR
Hidden Valley	E	P	E

E – Existing beneficial use
P – Potential beneficial use
Source: Table 2-2 of the Water Quality Control Plan for the Los Angeles Region (Basin Plan, 1994)

The Basin Plan (1994) lists groundwater water quality objectives for bacteria, chemical constituents, pesticides, radioactivity, salinity, tastes and odors, and toxicity. The water quality objectives are applicable to all groundwater, regardless of beneficial use. However, since the developed portion of the Project site is outside of the Hidden Valley Basin, or any other major groundwater basin, groundwater quality objectives are not explored further in this analysis.

Groundwater Quality

Groundwater samples were collected on January 17, 2013 from extraction wells EW-1 and EW-5 (shown in Figure 6). The results are summarized in a report by EPD Consultants (2013). The detected constituents provided in EPD Consultants' report are shown in Table 2-8. Groundwater was sampled for standard constituents (including bacteria, oil and grease, biochemical oxygen demand, nutrients, and TSS), volatile organic compounds, semi-volatile organic compounds, metals, pesticides, and PCBs. According to the report, there is no indication of a regional water table at the site, though shallow groundwater may occur in the canyon bottoms and perched, localized groundwater may occur on the hillsides.

Table 2-8: Detected Results from Existing Groundwater Monitoring Wells at the Project Site.

Constituents	Units	EW-1	EW-5
Standard Constituents			
pH	pH Units	8.85	8.95
Boron	mg/L	0.200	1.94
Chloride	mg/L	10.8	50.0
Ammonia-N	mg/L	0.414	0.435
TKN	mg/L	0.469	0.664
Nitrate-N	mg/L	0.150	0.05
Nitrite-N	mg/L	0.100	ND
Sulfate	mg/L	36.7	58.2
Total Dissolved Solids	mg/L	531	591
Metals			
Zinc	mg/L	ND	0.0103

3. REGULATORY SETTING

3.1 Clean Water Act

In 1972, the Federal Water Pollution Control Act (later referred to as the Clean Water Act [CWA]) was amended to require National Pollutant Discharge Elimination System (NPDES) permits for the discharge of pollutants to "waters of the United States" from any point source. In 1987, the CWA was amended to require the United States Environmental Protection Agency (EPA) to establish regulations for permitting of municipal and industrial stormwater discharges under the NPDES permit program. The EPA published final regulations regarding stormwater discharges on November 16, 1990. The regulations require Municipal Separate Storm Sewer System (MS4) discharges to surface waters be regulated by a NPDES permit.

In addition, the CWA requires states to adopt water quality standards for receiving water bodies and to have those standards approved by the EPA. Water quality standards consist of designated beneficial uses for a particular receiving water body (e.g., wildlife habitat, agricultural supply, fishing, etc.), along with water quality criteria necessary to support those uses. Water quality criteria are prescribed concentrations or levels of constituents – such as lead, suspended sediment, and fecal coliform bacteria – or narrative statements which represent the quality of water that support a particular use. Because California did not establish a complete list of

acceptable water quality criteria, EPA established, in the California Toxics Rule (CTR), numeric water quality criteria for certain toxic constituents in receiving waters with human health or aquatic life designated uses (40 CFR 131.38).

3.2 CWA Section 303(d) – TMDLs

When designated beneficial uses of a particular receiving water body are being compromised by water quality, Section 303(d) of the CWA requires identifying and listing that water body as "impaired". Once a water body has been deemed impaired, a Total Maximum Daily Load (TMDL) must be developed for the impairing pollutant(s). A TMDL is an estimate of the total load of pollutants from point, non-point, and natural sources that a water body may receive without exceeding applicable water quality standards (with a "factor of safety" included). Once established, the TMDL allocates the loads among current and future pollutant sources to the water body.

In 2003, a Wet Weather and Dry Weather Bacteria TMDL were approved by the EPA for the Santa Monica Beach area (EPA 2003). The greater Santa Monica Beach includes multiple impaired waterbodies/beaches, including the receiving waters of Trancas Creek and Trancas Beach. In 2005, a report issued by the CDM Consultants to the County of Los Angeles Water Division (CLAWD) (CDM 2005) characterized the Trancas Creek Canyon watershed as having a 1% probability of exceeding bacteria water quality criteria for summer dry weather, a 5% chance during winter dry weather and a 31% chance of exceedance during wet weather. A nutrient TMDL does not exist for any waterbodies incorporated within the Trancas Basin. The CDM report combined multiple factors, including land use types and available water quality data, to calculate a subwatershed pollution source prioritization scheme for the North Santa Monica Bay Area. Results placed the Trancas subwatershed as a priority 4 on a 5 point scale (with a score of 1 showing the highest risk for pollution loading).

Additionally, the EPA approved two TMDLs for DDT/PCBs and Debris for the Santa Monica Bay in 2012 (EPA 2012a, EPA 2012b). While U.S. production of both DDT and PCBs stopped in the 1970s, these chemicals still persist in the natural environment. DDT and PCBs sources are generally associated with urban runoff and unpermitted point source discharges. The high affinity for these pollutants to bind and settle with sediment particles make them prevalent in benthic zone of water bodies. Additionally, the highly urbanized areas that surround the Santa Monica Bay, along with the high usage of the area beaches, have allowed for significant trash and debris loading into the Bay, resulting in repeated listings on the federal 303(d) and eventual issuance of a Debris TMDL.

3.3 California Toxics Rule

The CTR is a federal regulation issued by the EPA providing water quality criteria for potentially toxic constituents in receiving waters with human health or aquatic life designated uses in the State of California. CTR criteria are applicable to the receiving water body and therefore must be calculated based upon the probable hardness values of the receiving waters for evaluation of acute (and chronic) toxicity criteria. At higher hardness values for the receiving water, copper, lead, and zinc are more likely to be complex (bound with) components in the water column. This in turn reduces the bioavailability and resulting potential toxicity of these metals.

Due to the intermittent nature of stormwater runoff (especially in Southern California), the acute criteria generally are considered to be more applicable to stormwater conditions than chronic criteria and therefore typically are used in assessing project impacts. Acute criteria represent the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (one hour) without deleterious effects; chronic criteria equal the highest concentration to which aquatic life can be exposed for an extended period of time (four days) without deleterious effects.

3.4 California Porter-Cologne Act

The federal CWA places the primary responsibility for the control of surface water pollution and for planning the development and use of water resources with the states, although it does establish certain guidelines for the states to follow in developing their programs and allows EPA to withdraw control from states with inadequate implementation mechanisms.

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) power to protect water quality and is the primary vehicle for implementation of California's responsibilities under the federal Clean Water Act. The Porter-Cologne Act grants the SWRCB and the RWQCBs authority and responsibility to adopt plans and policies, to regulate discharges of waste to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, or oil or petroleum product.

Each RWQCB must formulate and adopt a water quality control plan (Basin Plan) for its region. The Basin Plan must conform to the policies set forth in the Porter-Cologne Act and established

by the SWRCB in its state water policy. To implement state and federal law, the Basin Plan establishes beneficial uses for surface water and groundwater in the region, and sets forth narrative and numeric water quality standards to protect those beneficial uses. The Porter-Cologne Act also provides that a RWQCB may include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

3.5 Basin Plan

The LARWQCB Basin Plan (1994) provides numeric and narrative criteria for a range of water quality constituents applicable to certain receiving water bodies and groundwater basins within the Los Angeles region. Specific criteria are provided for the larger, waters, bays and estuaries, inland surface waters, and groundwater. Those waters not specifically listed (generally smaller tributaries) are assumed to have the same beneficial uses as the streams, lakes, or reservoirs to which they are tributary. In general, the narrative criteria require that degradation of water quality does not occur due to increases in pollutant loads that will adversely impact the designated beneficial uses of a water body. For example, the Los Angeles Basin Plan requires: "Inland surface waters shall not contain suspended or settleable solids in amounts which cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors." Water quality criteria apply within receiving waters as opposed to applying directly to runoff; therefore, water quality criteria from the Basin Plan are utilized as benchmarks as one method to evaluate the potential ecological impacts of project runoff on the receiving waters of a project.

The Basin Plan also contains water quality criteria for groundwater basins. For example, the Basin Plan requires: "Ground waters shall not contain taste or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses".

3.6 California Coastal Commission

In 1976, the passage of the California Coastal Act (CCA) created the California Coastal Commission (CCC). The CCC is responsible for working together with municipal and county governments to minimize the environmental degradation that results from near shore development throughout California's coastal areas. The CCC has jurisdiction in areas within the California Coastal Zone (CCZ), which is loosely defined as any inland area ranging from hundreds of yards to five miles inland, in which development may have a deleterious effect on the environment. Pursuant to the CCA, coastal cities and counties that are either partially or completely within the CCZ are mandated to manage conservation and development of coastal areas through the development and approval of a planning and regulatory program called the Local Coastal Program (LCP). A LCP typically includes a Land Use Plan (LUP) as well as

additional maps, zoning ordinances and documents necessary to implement the LCP, typically known as the Local Implementation Plan (LIP). Local governments are responsible for developing and submitting the LCP to the CCC for approval. Once approved by the CCC, the LCP supersedes the governing powers originally possessed by the CCC. In such case, the local government has authority to make decisions on development plans in the coastal zone while the CCC retains appellate authority over local government decisions.

Currently, the unincorporated areas of Los Angeles County east of Ventura County, west of the city of Los Angeles and north of Malibu within the CCZ, also referred to as the Santa Monica Mountains Coastal Zone (SMMCZ), are regulated by the Malibu LCP of 1986 (CCC, 1986). However, the CCC has not certified a LIP for the SMMCZ, so projects within the SMMCZ still need to obtain Coastal Development Permits from the CCC not the County. Most of the Project site is located within the SMMCZ. In 2007, the LACDRP approved a new LCP for this area, entitled the Santa Monica Mountains Local Coastal Program, to replace the Malibu LCP; however as of the date of preparation of this memorandum, the Santa Monica Mountains Local Coastal Program has not been certified by the CCC (LACDRP, 2009).

LCPs require special policies, ordinances and programs that establish BMPs during construction activities and throughout the life of a project for the protection of marine and coastal water quality.

Common LCP guidelines regarding water quality, as outlined by the CCC, are as follows:

- Ensure implementation of appropriate polluted runoff management measures as found in the California Nonpoint Source Encyclopedia.

- Implement BMPs through revisions to policies and ordinances on grading, drainage and erosion control, landscaping requirements and post-construction water quality control requirements.

- Integrate NPDES permits, TMDLs and other requirements of the state and regional water resources control boards into provisions of the LCP.

- Provide guidance on review of permit applications for potential impacts on coastal water quality, including approval from public works staff that the new development will not adversely impact stormwater quality.

- Provide guidance on the incorporation of appropriate BMPs in new or expanding development.

- Require that significant development include a plan, certified by an appropriate licensed professional, which describes how site design, source control and treatment control BMPs will be used to mitigate adverse impacts of a development.

- Require treatment control BMPs for significant development that comply with applicable water quality permits (e.g., municipal stormwater permits) and that will address potential adverse impacts of development.

These requirements are similar to MS4 Permit new and redevelopment requirements. However, they are subject to interpretation by the CCC.

3.7 Los Angeles County MS4 Permit

In 2012, the LARWQCB issued a NPDES Permit and Waste Discharge Requirements (Order No. R4-2012-0175) under the CWA and the Porter-Cologne Act for discharges of urban runoff in public storm drains in Los Angeles County. The permittees are the County and cities within the County (collectively "the co-permittees"). This permit regulates stormwater discharges from MS4s in the area of the Project site. The NPDES permit details requirements for new development and significant redevelopment, including specific sizing criteria for treatment BMPs and flow control requirements. To implement the requirements of the NPDES permit, the co-permittees have developed development planning guidance and control measures that control and mitigate stormwater quality and quantity impacts to receiving waters as a result of new development and redevelopment. They are also required to implement other municipal source detection and elimination programs, as well as maintenance measures.

The 2012 NPDES Permit specifies criteria for managing integrated water quality, flow reduction, and resources. For instance, it requires all new development and significant redevelopment projects control pollutants, pollutants loads, and runoff volume emanating from a project site by minimizing the impervious surface area and controlling runoff from impervious surfaces through infiltration, bioretention, and/or rainwater harvest and use. Part VI.D.7.c.i(2) of the MS4 Permit specifies that projects must also retain on-site the Stormwater Quality Design Volume (SWQDv) defined as runoff from either: a) 0.75 inch, 24-hour rain event; or b) the 85th percentile, 24-hour event, whichever is greater. If a project cannot retain 100% of the SWQDv on-site, projects also may comply with this Order through alternative compliance measures (i.e., off-site mitigation projects designed to provide equal or greater water quality protection to the same subwatershed's surface waters than the proposed project). New development/re-development projects are subject to either these SWQDv control requirements or Hydromodification (Flow/Volume/Duration) Control Criteria, whichever are more stringent.

Part VI.D.7.c.iv of the MS4 Permit notes increased volume, velocity, and discharge duration of stormwater runoff from developed areas may potentially accelerate downstream erosion and impair habitat-related beneficial uses in natural drainage systems. As a result, Part VI.D.7.c.iv of the Permit stipulates permittees must implement hydrologic controls to minimize changes in post-development hydrologic stormwater runoff discharge rates, velocities, and durations by maintaining a project's pre-project stormwater runoff flow rates and durations.

New development/redevelopment projects that are exempted from hydromodification controls include maintenance and replacement activities, projects that do not increase effective impervious area within the subwatershed, and projects located within drainages to waterbodies that are not susceptible to channel erosion or other hydromodification effects.

The four options provided by the MS4 Permit for meeting the hydromodification controls are: 1) designing a project to retain the stormwater runoff from the 95th percentile, 24-hour storm; 2) ensuring the runoff flow rate, volume, velocity and duration does not exceed the pre-development condition for the 2-year, 24-hour rainfall event; 3) ensuring the Erosion Potential (Ep) in the receiving water channel approximates 1, indicating an equilibrium state for work done on the stream; or 4) implementing the hydromodification requirements in the LA County LID Manual (2009).

Additionally, the Order establishes Water Quality-Based Effluent Limitations (WQBELs) consistent with the assumptions and requirements of all available TMDL waste load allocations assigned to discharges from the co-permittees' MS4s.

Stormwater Quality Management Program

The 2001 MS4 Permit contained the following provisions for implementation of the Stormwater Quality Management Program (SQMP) by the co-permittees. The 2001 version of the SQMP remains in effect until the County of Los Angeles submits a Notice of Intent (NOI) for an Enhanced Watershed Management Plan (EWMP), which is a requirement of the new MS4 Permit. An NOI is anticipated to be submitted by June of 2013.

- *General Requirements* – Each permittee is required to implement the SQMP to comply with applicable stormwater program requirements and implement additional controls where necessary to reduce the discharge of pollutants in stormwater to the maximum extent practicable (MEP).

- *BMP Implementation* – Permittees are required to implement the most effective combination of BMPs for stormwater/urban runoff pollution control.

- *SQMP Revision* – Permittees are required to revise the SQMP to comply with regional, watershed specific requirements, and/or wasteload allocations for implementation of TMDLs for impaired waterbodies.

- *Responsibilities of the Principal Permittee* – The responsibilities of the Los Angeles County Department of Public Works (as the Principal Permittee) include, but are not limited to, coordinating activities necessary to comply with the NPDES permit, providing personnel and fiscal resources for SQMP updates and annual reports and summaries of reports required under the SQMP, and implementing a County-wide Monitoring Program and evaluating results of the monitoring program.

- *Responsibilities of Permittees* – Each permittee is required to comply with the requirements of the SQMP applicable to the discharges within its boundaries.

- *Watershed Management Committees (WMCs)* – WMCs are comprised of a voting representative from each permittee within the Watershed Management Areas (WMAs). WMCs are required to facilitate efforts and exchange of information between permittees, establish additional goals for WMAs, prioritize pollution control efforts, monitor implementation of tasks designated for the WMA, and assess the effectiveness of and recommend revisions to the SQMP.

- *Legal Authority* – permittees are granted the necessary legal authority to prohibit non-storm water discharges to the storm drain system.

The objective of the SQMP is to reduce pollutants in urban stormwater discharges to the "maximum extent practicable" in order to attain water quality objectives and to protect the beneficial uses of receiving waters in Los Angeles County. Special provisions are provided in the MS4 permit to facilitate implementation of the SQMP. These provisions include:

- *BMP substitution* – Substitution of site-specific BMPs is allowed provided the alternative BMP will meet or exceed pollutant reduction of the original BMP, the fiscal burden of the original BMP is substantially greater than the proposed alternative, and the alternative BMP will be implemented within a similar time period.

- *Public Information and Participation Program (PIPP)* – This requires the permittee to identify how public education needs were determined, who is responsible for developing and implementing the program, and the method used to determine its effectiveness.

- *Industrial/Commercial Facilities Control Program* – This requires the permittee to develop a plan for managing stormwater runoff from industrial and commercial facilities. This program will track, inspect, and ensure compliance at industrial and commercial facilities that are sources of pollutants in stormwater.

- *Development Planning Program* – This requires the permittee to implement a development-planning program that requires new development and redevelopment projects to minimize impacts from stormwater and urban runoff.

- *Development Construction Program* – This requires the permittee to implement a program to control runoff from construction activity to minimize erosion and transportation of sediment and prevent non-stormwater discharges from equipment and vehicle washing.

- *Public Agency Activities Program* – This requires municipalities to evaluate existing public agency activities that have an impact on stormwater quality (such as vehicle maintenance, landscape maintenance and weed control, and construction and maintenance of streets, roads, and flood control systems) and to develop a program to reduce stormwater impacts with a schedule for implementation.

- *Illicit Connections and Illicit Discharges Elimination Program* – This requires each permittee to have a plan for finding and preventing illegal connections and discharges and a mechanism for enforcing against illegal connections and discharges.

3.8 Standard Urban Stormwater Mitigation Plan

In September, 2002, the LARWQCB approved the County of Los Angeles development planning program requirements, including the Standard Urban Stormwater Mitigation Plan requirements (collectively, the development planning program requirements, including Standard Urban Stormwater Mitigation Plan requirements, are referred to in this report as SUSMP requirements) as part of the MS4 program to address stormwater pollution from new construction and redevelopment. The SUSMP contains a list of minimum BMPs that must be employed to infiltrate or treat stormwater runoff, control peak flow discharge, and reduce the post-project discharge of pollutants from stormwater conveyance systems. The SUSMP defines, based upon land use type, the types of practices that must be included and issues that must be addressed as appropriate to the development type and size. Compliance with SUSMP requirements is used as one method to evaluate significance of project development impacts on surface water runoff.

The County of Los Angeles *Manual for the Standard Urban Stormwater Mitigation Plan* (SUSMP Manual) details the requirements for new development and significant redevelopment BMPs (LACDPW, 2002). The SUSMP Manual is a model guidance document for use by permittees and individual project owners to select post-construction BMPs and otherwise comply with the SUSMP requirements. It addresses water quality and drainage issues by specifying design standards for structural or treatment control BMPs that infiltrate or treat stormwater runoff and control peak flow discharge. BMPs are defined in the SUSMP Manual and SUSMP requirements as any program, technology, process, sizing criteria, operational methods or measures, or engineered systems, which, when implemented, prevent, control, remove, or reduce pollution. Treatment BMP design criteria and guidance are also contained in the MS4 Permit, the SUSMP Manual, and in the *Los Angeles County Department of Public Works Stormwater Best Management Practice Design and Maintenance Manual For Publicly Maintained Storm Drain Systems* (LACDPW, 2009).

One of the most important requirements within the SUSMP is the specific sizing criteria for stormwater treatment BMPs for new development and significant redevelopment projects. The SUSMP includes sizing criteria for volume-based and flow-based BMPs. The sizing criteria options for volume-based BMPs, such as extended detention basins, are as follows:

1. The 85th percentile 24-hour runoff event storm event determined as the maximized capture stormwater volume for the area, from the formula recommended in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (WEF, 1998);

2. The volume of annual runoff based on unit basin storage volume, to achieve 80% or more volume treatment by the method recommended in California Stormwater Best Management Practices Handbook – Industrial/Commercial (1993);

3. The volume of runoff produced from a 0.75 inch storm event, prior to its discharge to a stormwater conveyance system; or

4. The volume of runoff produced from a historical-record based reference 24-hour rainfall criterion for “treatment” (0.75 inch average for the Los Angeles County Area) that achieves approximately the same reduction in pollutant loads and flows as achieved by mitigation of the 85th percentile, 24-hour runoff event.

Flow-based BMPs, such as vegetated swales, should be designed to infiltrate or treat the maximum flow rate generated from one of the following scenarios:

1. The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity (or an alternative intensity based on drainage area time of concentration);

2. The flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity for Los Angeles County (or a more local gauge); or

3. The flow of runoff produced from a rain event that will result in treatment of the same portion of runoff as treated using volumetric standards above.

The SUSMP includes general design specifications for individual priority project categories. These include:

- Single-Family Hillside Home;
- 100,000-square foot commercial developments;
- Restaurants;
- Retail gasoline outlets;
- Automotive repair shops; and
- Parking lots.

For example, commercial developments must have properly designed loading and unloading dock areas, repair and maintenance bays, and vehicle equipment wash areas. Restaurants need to have properly designed equipment and accessory wash areas. Parking lots have to be properly designed to limit oil contamination and have regular maintenance of parking lot stormwater treatment systems (e.g., storm drain filters and biofilters).

New development and significant redevelopment projects are required to incorporate appropriate SUSMP requirements into project plans as part of the development plan approval process for building and grading permits. SUSMP requirements are currently incorporated in the existing Los Angeles County LID Ordinance (see Section 3.14).

3.9 Construction Permits

Pursuant to the CWA Section 402(p), which requires adoption of regulations for permitting certain stormwater discharges, the SWRCB issued a statewide general NPDES Permit for stormwater discharges from construction sites (Water Quality Order 2009-0009-DWQ, originally

adopted by the SWRCB on September 2, 2009 and modified by 2010-0014-DWQ [NPDES No. CAS000002]).

Under this Construction General Permit, discharges of stormwater from construction sites with a disturbed area of one or more acres (effective July 1, 2010) are required to either obtain individual NPDES permits for stormwater discharges or to be covered by the Construction General Permit. Coverage under the Construction General Permit is accomplished by the following: completing a construction site risk assessment to determine appropriate coverage level; preparing a Stormwater Pollution Prevention Plan (SWPPP), including site maps, a Construction Site Monitoring Program (CSMP), and sediment basin design calculations; for projects located outside of a Phase I or Phase II permit area, completing a post-construction water balance calculation for hydromodification controls; and completing a Notice of Intent. All of these documents must be electronically submitted to the SWRCB for General Permit coverage. The primary objective of the SWPPP is to identify and apply proper construction, implementation, and maintenance of BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction. The SWPPP also outlines the monitoring and sampling program required for the construction site. As a result of a recent lawsuit, the Numeric Effluent Limitations (NELs) for pH and turbidity at Risk Level 3/LUP Type 3 construction sites contained in Order 2009-0009-DWQ are no longer in effect.

3.10 Water Discharge Permits

This permit governs construction-related dewatering discharges within project development areas (the "General Dewatering Permit"). This permit addresses discharges from temporary dewatering operations associated with construction and permanent dewatering operations associated with development. The discharge requirements include provisions mandating notification, sampling and analysis, and reporting of dewatering and testing-related discharges. The General Dewatering Permit authorizes such construction-related activities so long as all conditions of the permit are fulfilled. Compliance with the requirements of the General Dewatering Permit is used as one method to evaluate project construction-related impacts on surface water quality.

3.11 Discharge of Dredged Materials

Hydrologic conditions of concern for a new project may include instream changes in sediment transport, erosion, and sedimentation, and ultimately channel stability. There is a nexus between these concerns and the stream, habitat, and species protection programs administered by the

United States Army Corps of Engineers (ACOE), California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service.

Section 404 of the Clean Water Act is a program that regulates the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development (including physical alterations to drainages to accommodate storm drainage, stabilization, and flood control improvements), water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. USEPA and the ACOE have issued Section 404(b)(1) Guidelines (40 CFR 230) that regulate dredge and fill activities, including water quality aspects of such activities. Subpart C at Sections 230.20 thru 230.25 contains water quality regulations applicable to dredge and fill activities. Among other topics, these guidelines address discharges which alter substrate elevation or contours, suspended particulates, water clarity, nutrients and chemical content, current patterns and water circulation, water fluctuations (including those that alter erosion or sediment rates), and salinity gradients.

Section 401 of the Clean Water Act requires any person applying for a federal permit or license which may result in a discharge of pollutants into "waters of the United States" to obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. Subject to certain limitations, no license or permit may be issued by a federal agency until the Section 401 certification has been granted. Further, no license or permit may be issued if certification has been denied. CWA Section 404 permits and authorizations are subject to Section 401 certification by the RWQCBs.

3.12 Area of Special Biological Significance

Areas of Special Biological Significance (ASBS) are areas designated by the SWRCB for the protection of sensitive marine species or biological communities from undesirable alterations in natural water quality (SWRCB 1979). The SWRCB has developed regulations and procedures related specifically to ASBS (see Water Quality Control Plan for the Ocean Waters of California [Ocean Plan], and Revised Procedures for the Designation of ASBS [1999]). These regulations and procedures contain certain prohibitions related to flows to ASBS and also contain requirements that best management practices (BMPs) be implemented for urban runoff and stormwater flows.

Currently, drainage from the Project site travels south via Trancas Creek and discharges in the Laguna Point to Latigo Point Area of Special Biological Significance (LPLP-ASBS). The LPLP-

ASBS covers 11,842 acres of coastal land and spans from Ventura County through the western portion of Los Angeles County. The LPLP-ASBS was designated in 1974 by Resolution 74-28 and is referenced as index number 24. The status of stormwater management in ASBS watersheds is evolving as the State works on issues with ASBS requirements and stormwater management.

3.13 Lake or Streambed Alteration Agreement

The CDFG is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the law requires the proponent of a project that may impact a river, stream, or lake to notify the CDFG before beginning the project. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation.

Section 1602 of the Fish and Game Code requires any person who proposes a project that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake or use materials from a streambed to notify the CDFG before beginning the project. Similarly, under section 1602 of the Fish and Game Code, before any State or local governmental agency or public utility begins a construction project that will: 1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; 2) use materials from a streambed; 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, it must first notify the CDFG of the project. If the CDFG determines that the project may adversely affect existing fish and wildlife resources, a Lake or Streambed Alteration Agreement is required.

3.14 Los Angeles County Low Impact Development Ordinance and Manual

Chapter 12.84 of the Los Angeles County Code requires the use of low impact development (LID) standards in development projects. This chapter applies to all development within the unincorporated area of the County after January 1, 2009, except for those developments that filed a complete discretionary or ministerial permit application with the Los Angeles County Department of Regional Planning, Public Works, or any County-controlled design control board, prior to January 1, 2009.

Chapter 12.84 requires applicable development projects to:

- Mimic undeveloped stormwater and urban runoff rates and volumes in any storm event up to and including the "50-year capital design storm event," as defined by LACDPW;

- Prevent pollutants of concern (POCs) from leaving a development site in stormwater as the result of storms, up to and including a water quality design storm event; and

- Minimize hydromodification impacts to natural drainage systems.

To meet these standards, development projects that consist of five or more residential units, or nonresidential development, shall comply with the following:

> The excess volume (ΔV, defined as the post-developed runoff volume minus the pre-developed runoff volume for the 85th percentile storm event) from each lot upon which such development is occurring shall be infiltrated at the lot level, or in the alternative, the excess volume from the entire development site, including streets and public right-of-way, shall be infiltrated in sub-regional facilities. The tributary area of a sub-regional facility shall be limited to five acres, but may be exceeded with approval of the Director of LACDPW. When infiltration of all excess volume is not technically feasible, on-site storage, reuse, or other water conservation uses of the excess volume is required and shall be implemented as authorized by the Director of LACDPW.

LACDPW has developed a LID Standards Manual that outlines stormwater runoff quantity and quality control development principles, technologies, and design standards for achieving the LID Standards of Chapter 12.84. The LID Standards Manual requires large scale residential and nonresidential development projects to prioritize the selection of BMPs to treat stormwater pollutants, reduce stormwater runoff volume, and promote groundwater infiltration and stormwater reuse in an integrated approach to protecting water quality and managing water resources. The Manual states BMPs should be implemented in the following order of preference:

- BMPs that promote infiltration;

- BMPs that store and beneficially use stormwater runoff; and

- BMPs that utilize the runoff for other water conservation uses, including, but not limited to, BMPs that incorporate vegetation to promote pollutant removal and runoff volume reduction and integrate multiple uses, and BMPs that percolate runoff through engineered soil and allow it to discharge downstream slowly.

If compliance with the above LID requirements is technically infeasible, in whole or in part, the project must incorporate design features demonstrating compliance with the LID requirements to the maximum extent practicable. The LID goals of increasing groundwater recharge, enhancing water quality, and preventing degradation to downstream natural drainage courses will be considered by DPW in the determination of infeasibility.

The LID Standards Manual outlines site conditions where infiltration may not be possible:

- Locations where seasonal high groundwater is within 10 feet of the surface;
- Within 100 feet of a groundwater well used for drinking water;
- Brownfield development sites or other locations where pollutant mobilization is a documented concern;
- Locations with potential geotechnical hazards as outlined in a report prepared and stamped by a licensed geotechnical engineer;
- Locations with natural, undisturbed soil infiltration rates of less than 0.5 inches per hour that do not support infiltration-based BMPs;
- Locations where infiltration could cause adverse impacts to biological resources;
- Development projects in which the use of infiltration BMPs would conflict with local, State or Federal ordinances or building codes; and
- Locations where infiltration would cause health and safety concerns.

The LID Standards Manual outlines where storage and reuse of the ΔV may not be possible:

- Projects that would not provide sufficient irrigation or (where permitted) domestic grey water demand for use of stored runoff due to limited landscaping or extensive use of low water use plant palettes in landscaped areas;
- Projects that are required to use recycled water for irrigation of landscaping;
- Development projects in which the storage and reuse of stormwater runoff would conflict with local, state or federal ordinances or building codes;

- Locations where storage facilities would cause potential geotechnical hazards as outlined in a report prepared and stamped by a licensed geotechnical engineer; and

- Locations where storage facilities would cause health and safety concerns.

The LID Standards Manual also contains drainage analysis requirements for hydromodification impacts to off-site property. The LID Standards Manual provides for the following exemptions from conducting a full analysis for hydromodification impacts, although project applicants must still demonstrate the project mitigates for hydromodification impacts to the satisfaction of the Director of Public Works:

- Projects that disturb less than one acre;

- Less than 10,000 square feet of new impervious area;

- Projects that do not increase impervious area or decrease the infiltration capacity of pervious areas compared to pre-project conditions;

- Projects that are replacement, maintenance, or repair of an existing permitted flood control facility;

- Projects within a watershed or subwatershed where a geomorphically-based watershed study has been prepared that establishes that the potential for hydromodification impacts is not present based on appropriate assessment and evaluation of relevant factors, including: runoff characteristics, soil conditions, watershed size and conditions, channel conditions, and proposed levels of development within the watershed;

- Projects that discharge directly or via a storm drain into concrete or significantly hardened channels, which in turn discharge into a sump area under tidal influence, or other receiving water that is not susceptible to hydromodification impacts; and

- Projects that have hydrologic control measures that include sufficient subregional, regional, in-stream control measures, or a combination thereof such that hydromodification will not occur.

The existing LID Ordinance and Manual remains in effect until the Ordinance is updated to meet the requirements of the new MS4 Permit. The updated version may be more stringent than the MS4 Permit requirements. A draft is anticipated by the end of June 2013.

3.15 Recycled Water Policy

On February 3, 2009, by its Resolution No. 2009-0011, the SWRCB adopted a Recycled Water Policy in an effort to move towards a sustainable water future. In this Policy, the SWRCB stated, "We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater."

The following goals were included in this Policy:

- Increase the use of recycled water over 2002 levels by at least one million acre-feet per year by 2020 and at least two million acre-feet per year by 2030.
- Increase the use of stormwater over use in 2007 by at least 500,000 acre-feet per year by 2020 and at least one million acre-feet per year by 2030.
- Increase the amount of water conserved in urban and industrial areas by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

The SWRCB also stated in this Policy it expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

The Recycled Water Policy provides direction to the Regional Water Quality Control Boards regarding appropriate criteria in issuing permits for recycled water projects intended to streamline permitting of the vast majority of recycled water projects, while also reserving sufficient authority and flexibility to address site-specific conditions. The Policy also addresses the benefits of recycled water and encourages other public agencies to use this presumption in evaluating the impacts of recycled water projects on the environment as required by CEQA. The Policy addresses a mandate for use of recycled water and indicates the SWRCB will exercise their authority to the fullest extent possible to encourage the use of recycled water, consistent with State and federal water quality laws and indicates the water industry and environmental community have agreed jointly to advocate for $1 billion in State and federal funds over the next five years to fund projects needed to meet the goals and mandates established in this Policy.

The Policy indicates some groundwater basins contain salts and nutrients that exceed or threaten to exceed water quality objectives established in Basin Plans and states that it is the intent of this Policy that all salts and nutrients be managed on a basin-wide or watershed-wide basis through development of regional or sub-regional management plans. The Policy describes the components of these salt and nutrient management plans.

Finally, the Policy addresses the control of incidental runoff from landscape irrigation projects, recycled water groundwater recharge projects, antidegradation, control of emerging constituents and chemicals of emerging concern and incentives for use of recycled water.

In accordance with the provisions of the Recycled Water Policy, a Constituents of Emerging Concerns (CEC) Advisory Panel has been established to address questions about regulating CECs with respect to the use of recycled water. The Panel's primary charge is to provide guidance for developing monitoring programs that assess potential CEC threats from various water recycling practices, including groundwater recharge/reuse and urban landscape irrigation. On June 25, 2010, the CEC Advisory Panel provided recommendations to the SWRCB and California Department of Public Health in their Final Report "*Monitoring Strategies for Chemicals of Emerging Concern in Recycled Water – Recommendations of a Scientific Advisory Panel*" (Anderson et al, 2010). The SWRCB used those recommendations to produce a Recycled Water Policy Draft Amendment.

The draft amendment, issued on May 7, 2012, provides direction to the Regional Water Quality Control Boards on monitoring requirements for CECs in recycled water. The monitoring requirements pertain to the production and use of recycled water for groundwater recharge reuse by surface and subsurface application methods, and for landscape irrigation. The amendment identifies three classes of constituents to monitor:

- *Health-relevant CECs:* CECs of toxicological relevance to human health.
- *Indicator CECs:* An individual CEC used for evaluating a family of CECs with similar physicochemical or biodegradable characteristics.
- *Surrogates:* A measurable physical or chemical property, such as chlorine residual or electrical conductivity, that provides a direct correlation with the concentration of an indicator compound. Surrogates are used to monitor the efficiency of CEC treatment.

Tables indicating the specific CECs and surrogates are listed in the policy amendment, but are subject to change on a case-by-case basis and shall be appropriate for the treatment process or processes.

Only Groundwater Recharge Reuse facilities will be required to monitor for CECs and surrogates. Surface application and subsurface application facilities will have different mandatory CECs and a different monitoring schedule. Landscape irrigators will only have to monitor for surrogates.

3.16 Municipal Recycled Water Landscape Irrigation Use Permit

The General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water (Water Quality Order No. 2009-0006-DWQ) (Landscape Irrigation General Permit) regulates landscape irrigation with recycled water. Specified uses of recycled water considered to be "landscape irrigation" include any of the following: (i) parks, greenbelts, and playgrounds; (ii) school yards; (iii) athletic fields; (iv) golf courses; (v) cemeteries; (vi) residential landscaping and common areas (not including individually owned residential areas); (vii) commercial landscaping, except eating areas; (viii) industrial landscaping, except eating areas; and (ix) freeway, highway, and street landscaping. Producers or distributors of recycled water must submit a Notice of Intent for coverage under the Landscape Irrigation General Permit. This permit is not required for individual recycled water users and does not cover use of harvested stormwater for irrigation.

Producer and Distributor Responsibilities

Producers must produce disinfected tertiary recycled water as defined by CCR Title 22, sections 60301.230 and 60301.320, which address disinfection requirements and "filtered wastewater" requirements, respectively. Producers are responsible for ensuring recycled water meets the quality standards for disinfected tertiary recycled water as described in Title 22 and any associated waste discharge requirement order for the water reclamation plant. Distributors are responsible for drafting and submitting an Operations and Maintenance (O&M) Plan to the SWRCB. The plan contents are contained in the permit, and include operation and maintenance/management of transport facilities and associated infrastructure necessary to convey and distribute recycled water from the point of production to the point of use. Additionally, distributors must designate a Recycled Water Use Supervisor for each use area. The permit also addresses BMPs, including general operations and maintenance, which producers and distributors must apply to manage recycled water and prevent water quality impacts.

Usage

The permit establishes terms and conditions of discharge to ensure the discharge does not unreasonably affect beneficial uses of groundwater and surface water. This includes minimum

setback distances, signage, application control, and use restrictions, along with other preventative measures, such as backflow prevention and cross-contamination programs.

3.17 On-site Wastewater Treatment Systems Policy

On June 19, 2012, SWRCB adopted Resolution No. 2012-0032, adopting the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of On-site Wastewater Treatment Systems (OWTS Policy). This Policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements and sets the level of performance and protection expected from OWTS. The administrative record for the OWTS Policy was approved by the Office of Administrative Law on November 13, 2012, and the OWTS Policy becomes effective on May 13, 2013.

The Policy sets standards for OWTS that are constructed or replaced, that are subject to a major repair, that pool or discharge waste to the surface of the ground, and that have affected, or will affect, groundwater or surface water to a degree that makes it unfit for drinking water or other uses, or cause a health or other public nuisance condition. The OWTS Policy also includes minimum operating requirements for OWTS that may include siting, construction, and performance requirements; requirements for OWTS near certain waters listed as impaired under CWA Section 303(d); requirements authorizing local agency implementation of the requirements; corrective action requirements; minimum monitoring requirements; exemption criteria; requirements for determining when an existing OWTS is subject to major repair; and a conditional waiver of waste discharge requirements.

The Regional Water Quality Control Boards are required to incorporate the standards established in the OWTS Policy, or standards that are more protective of the environment and public health, into their basin plans within 12 months of the effective date of the OWTS Policy (May 13, 2013). Implementation of the OWTS Policy will be overseen by the SWRCB and the Regional Water Quality Control Boards. Local agencies (e.g., county and city departments and independent districts) have the opportunity to implement local agency management programs if approved by the applicable Regional Water Quality Control Board.

3.18 California Green Building Standards Codes (CALGreen Code)

In August of 2009, the State of California enacted The California Green Building Standards Code (CALGreen Code) as Part 11 of The California Building Standards Code (Title 24). CALGreen measures are designed to improve public health, safety, and general welfare by utilizing design and construction methods that reduce the negative environmental impact of development and encourage sustainable construction practices.

CALGreen provides mandatory direction to developers of all new construction and renovations of residential and non-residential structures regarding all aspects of design and construction, including but not limited to site drainage design, stormwater management, and water use efficiency. Required measures are accompanied by a set of voluntary standards designed to encourage developers and cities to aim for a higher standard of development.

Under CALGreen, all residential and non-residential sites are required to be planned and developed to keep surface water from entering buildings and to incorporate efficient outdoor water use measures. Construction plans are required to show appropriate grading and surface water management methods such as swales, water collection and disposal systems, french drains, and rain gardens. Plans should also include outdoor water use plans that utilize weather or soil moisture controlled irrigation systems. In addition to the above mentioned requirements, non-residential structures are also required to develop:

- A Storm Water Pollution Prevention Plan (SWPPP);
- Irrigation water budget for landscapes greater than 2,500-square feet; and
- A quantified plan to reduce wastewater by 20 percent through utilizing water efficient fixtures or non-potable water systems such as use of harvested rainwater, grey water, and/or recycled water.

CALGreen also offers a tiered set of voluntary measures to encourage residential and non-residential development that goes beyond the mandatory standards for reduced soil erosion, rainwater capture and infiltration, and use of recycled and/or grey water systems. Nonresidential developers are further encouraged to integrate LID BMPs that result in zero net increase in runoff due to development and can treat runoff from the 85th percentile storms.

4. POLLUTANTS OF CONCERN AND SIGNIFICANCE CRITERIA

4.1 Surface Water Quality Pollutants of Concern

POCs were selected based upon the 303(d) listing of constituents that are determined by the SWRCB to be impacting the beneficial uses of a receiving water (Table 2-2), constituents listed in the CUP for the MGC, and constituents that are anticipated or potentially could be generated by the Project at concentrations or loads that could cause impairment of beneficial uses. All of the listed POCs also pertain to the Santa Monica Bay.

The POCs associated with the current 303(d) list for Trancas Beach include:

- DDT;
- Fecal coliform (pathogens); and
- PCBs.

The POCs not associated with the current 303(d) list for Trancas Beach, but addressed in the CUP include:

- pH;
- Water soluble pesticides, fungicides, and herbicides;
- Dissolved oxygen;
- NO_3-N, NO_2-N, organic-N, NH_3-N; and
- TP.

The following constituents, although not contained in the 303(d) list for Trancas Beach or the CUP as impairing beneficial uses, are considered POCs because they are commonly found in urban runoff at levels of concern and have the potential to cause impairment to beneficial uses:

- Sediments (TSS and turbidity);
- Trash & debris;
- Heavy metals (copper, lead, and zinc);
- Organic compounds;
- Hydrocarbons (oil and grease, polycyclic aromatic hydrocarbons [PAHs]);
- Oxygen demanding substances; and

- Temperature.

Constituents That Are Not of Concern

This section lists other constituents listed in the Basin Plan (1994), but are either not considered to be POCs for the Project or are covered by constituents that are considered POCs and are being analyzed.

- *Biostimulatory substances.* Biostimulatory substances are substances that promote growth of algae and nuisance vegetation. These include nutrients from fertilizers and organic wastes. The Basin Plan (1994) states that these substances shall not be present in concentrations that "promote aquatic growths to the extent that such growths cause nuisance of adversely affect beneficial uses." Nutrients, which are POCs, will be used as an indicator of biostimulatory substances and are being addressed as POCs.
- *Chemical constituents:* Chemical constituents in excessive amounts in drinking water are harmful to human health. The Basin Plan (1994) objective for chemical constituents states: "At a minimum, water designated MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in…Title 22 of the California Code of Regulations." Trancas Canyon Creek and Lake Sherwood are designated 'MUN'. The chemical constituents referenced under this water quality objective, such as trace metals, bacteria, and nitrate, are either subsumed by the POC category above, and are therefore adequately represented by assessment of those constituents, or are not usually detected in urban runoff.
- *Chlorine, total residual:* Chlorine and its reaction products are harmful to aquatic life and therefore should not be present in surface water discharges at concentrations that exceed 0.1 mg/L and shall not persist in any concentration that causes impairments in the receiving waters. Wastewater disinfection is a common source of chlorine. The Project proposes to construct an on-site Wastewater Recycling System. The filtered, liquid primary treated effluent portion of the wastewater would be discharged to a low pressure effluent sewer system that would feed into the on-site wastewater treatment system with effluent meeting Title 22 standards for reuse as irrigation for the remodeled golf course. Therefore, the treated effluent will not pose a risk in discharging chlorine to the Project area's surface waters.

  This constituent also will be addressed by irrigation practices to minimize discharges of chlorine, along with procedures for draining pools and/or any water features.

- *Color, taste, and odor:* The Basin Plan contains narrative objectives for color, taste, or odor that causes a nuisance or adversely affects beneficial uses. Undesirable tastes and odors in water may be a nuisance and may indicate the presence of a pollutant(s). In addition to odors and tastes in water, the Basin Plan states that waters "shall not contain substances which impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin". Odor associated with water can result from decomposition of organic matter or the reduction of inorganic compounds, such as sulfate. Other potential sources of odor causing substances, such as industrial processes, will not occur as part of the Project. Color in water may arise naturally, such as from minerals, plant matter, or algae, or may be caused by industrial pollutants.
- *Exotic vegetation*: According to the Basin Plan (1994), exotic plants quickly can out-compete native vegetation and cause water quality impairments and therefore "shall not be introduced around stream courses to the extent that such growth causes nuisance or adversely affects beneficial uses." The Project's golf course redesign will incorporate drought-tolerant grass and native vegetation and will not introduce exotic plants to the Project site. Also, nutrients, which are subsumed by the POC category above and already adequately represented, will be used as an indicator of biostimulatory substances that may promote the growth of exotic vegetation, making exotic vegetation of no concern.
- *Floating material*: The Basin Plan (1994) contains narrative objectives for floating material, stating that floating material may provide substrate for bacterial and algal growth and insect vectors and therefore "water shall not contain floating materials, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses." Since nutrients, which are POCs, will be used as an indicator of biostimulatory substances, there is no major risk of the growth of algae or nuisance vegetation. Also, trash and debris are considered to be POCs and are therefore already adequately represented.
- *Toxicity*: Constituents that may cause toxicity can include trace metals (e.g., copper, lead, and zinc), pesticides, and polycyclic aromatic hydrocarbons. These primary indicators are subsumed by the POC category above, and are therefore adequately represented by assessment of those constituents.

4.2 Groundwater Quality Pollutants of Concern

The Project area that is part of the Lake Sherwood tributary contributes to the Hidden Valley basin; however, the development area of the Project site does not contribute to a major groundwater basin as listed in the Basin Plan. Therefore, there are no Basin Plan groundwater

quality objectives to be met as a direct result of this Project. The Project area is situated above areas of perched groundwater (Sladden Engineering, 2012), so there is still potential for groundwater contamination.

Pollutants of Concern from Infiltration of Stormwater Runoff

Research conducted by Pitt, et al. (1994) on groundwater effects resulting from stormwater infiltration indicate potential for groundwater contamination depends on several pollutant- and site-specific environmental factors. Some site-specific factors include:

- Precipitation, irrigation, dry weather runoff, and temperature patterns;
- Soil properties, such as texture, clay mineral, organic matter and microbial content, and presence of structural voids; and
- Depth to the groundwater table.

Chemical characteristics of the POCs include:

- Mobility (measured by parameters such as solubility, sorption coefficients, and vapor pressure) and persistence (measured by the half-life) in soil;
- Use patterns; and
- Abundance in stormwater and dry weather runoff.

Most bacteria are filtered out by soils. Metals tend to associate with particulate matter and, if metals are not in dissolved form, their potential for infiltrating to groundwater is reduced. When metals do exist in the dissolved form in runoff, they often adsorb to soil particles and are filtered out by the soils; removal in the soil column largely prevents infiltration to groundwater. This behavior has been confirmed by data collected beneath stormwater detention/retention ponds in Fresno (conducted as part of the Nationwide Urban Runoff Program), which showed that trace metals tended to be adsorbed in the upper few feet in the bottom sediments (Brown and Caldwell, 1984). Radionuclides behave similarly to other heavy metals, in that their mobility in soils is retarded by adsorption onto the soil mineral and organic matter (Staunton et al., 2008).

Pesticides have been found in urban runoff from residential areas, especially in dry weather flows associated with landscape irrigation runoff (Pitt, et. al, 1994). In addition to the chemical characteristics listed above, the potential for leaching to groundwater is also a function of the

pesticide formulation. A pesticide can leach to groundwater when its residence time in the soil is less than the time required to remove it or transform it to an innocuous form by chemical or biological processes. US Geological Survey (USGS) National Water Quality Assessment Program data from agricultural areas across the US indicate that pesticides with greater persistence in soil are more likely to be detected in shallow groundwater than compounds that are less persistent (USGS, 2007). For example, within areas of relatively equal use, atrazine (soil half-life of 146 days) was detected in shallow groundwater much more frequently than the less persistent metolachlor (soil half-life of 26 days). Generally, pesticides with low water solubilities, high octanol-water partitioning coefficients, and high carbon partitioning coefficients are less mobile. The greatest pesticide mobility occurs in areas with coarse-grained or sandy soils without a hardpan layer, with low clay and organic matter content, and high permeability. Thus, heavy repetitive use of mobile pesticides on irrigated and sandy soils likely contaminates groundwater (Pitt, et. al, 1994).

The research (Pitt, et. al, 1994) shows that for a variety of pesticides found in stormwater, the potential for groundwater contamination is low when sedimentation or filtration pretreatment is used (as opposed to, for example, using an infiltration trench that discharges to highly porous soils). This includes the types of treatment mitigation measures proposed for this Project (for example, bioretention areas, and swales), which promote sedimentation and/or filtration. In addition, bioretention areas will be amended with organic matter, which further enhances their ability to sorb and immobilize pesticides.

Of the surface water POCs discussed above, nitrate is the most mobile and therefore was selected as the pollutant of concern for groundwater impacts from infiltration of urban runoff. High nitrate levels in drinking water can cause health problems in humans. The primary health concern is with the consumption of water with elevated nitrate which is the condition known as methemoglobinemia, or “blue baby syndrome.”

Pollutants of Concern from Application of Reclaimed Wastewater

Reclaimed wastewater that will be used by the Project to irrigate the golf course would meet California Code of Regulations Title 22 standards for tertiary treatment so it is appropriate for unrestricted use. This requires a specific effluent quality for BOD, TSS, total coliform, and turbidity. However, the salinity of reclaimed wastewater is often elevated compared to the salinity of the potable water source, unless salinity removal process is incorporated into the wastewater treatment process. The General Permit for Landscape Irrigation Uses of Municipal Recycled Water recognizes the potential impacts from salinity in reclaimed water to groundwater resources. Therefore, salinity is considered a constituent of concern for groundwater impacts

from reclaimed water use. TDS will be used as an indicator of salinity and the more mobile constituents in reclaimed water, such as nitrate.

High TDS concentrations in groundwater can impact its beneficial use for drinking water or agricultural irrigation uses. However, many groundwaters are naturally high in TDS and therefore may be less affected.

Reclaimed water may be a source of Contaminants of Emerging Concern (CECs). Emerging contaminants are new chemicals or existing chemicals that were not previously considered POCs, but have more recently been found to have adverse effects on ecological systems. Many of these emerging contaminants arise from household or commercial maintenance or other products or human ingested products. They are not completely removed during wastewater treatment processes, thus can be released in wastewater treatment plant effluent. While there are hundreds of different CECs, they can be grouped into a number of general categories (Colker and Day, 2005; USGS, 2010) as discussed below.

Pharmaceuticals and Personal Care Products (PPCPs)

PPCPs encompass a broad array of chemicals, including antibiotics and other prescription drugs, pain relievers, fragrances, lotions, sunscreen agents, and a number of other products. These chemicals are commonly found in municipal wastewater plants, as they are typically excreted or washed off by consumers into the municipal sewer system. Wastewater treatment plants often cannot biodegrade these complex synthetic chemicals and they are discharged in effluent into the environment. Many of these chemicals are endocrine disrupters and can affect the reproductive cycle of aquatic organisms.

Industrial and Household Chemicals

Industrial and household CECs include cleaning agents, mechanical lubricants and solvents, and flame retardants. These synthetic chemicals are generally very toxic, and are often considered endocrine disrupters, adversely affecting aquatic organisms. These chemicals are difficult to treat and generally have low removal rates in traditional wastewater treatment systems.

Nanomaterials

Nanomaterials have recently been explored and used in industries from biotechnology to electronic circuitry. While nanomaterials are efficient and useful for these new applications, due to their size and reactivity, they could potentially negatively affect ecosystems and water bodies.

Summary of Groundwater Pollutants of Concern

In summary, nitrate, TDS, pesticides and CECs are POCs for groundwater.

4.3 Hydrologic Conditions of Concern (Hydromodification)

Urbanization modifies natural watershed and stream hydrologic and geomorphic processes by introducing increased volumes and duration of flow via increased runoff from impervious surfaces and drainage infrastructure. Several studies have evaluated effects of increased runoff associated with the introduction of impervious surfaces and drainage facilities on geomorphic processes (SCCWRP, 2005; Geosyntec, 2002; Bledsoe & Watson, 2001; Booth, 1990; Hollis, 1975; Hammer, 1972). Potential changes to the hydrologic regime may include increased runoff volumes, frequency of runoff events, long-term cumulative duration, as well as increased peak flows. Urbanization also may introduce dry weather flows where only wet weather flows existed prior to development. These changes are referred to as "hydromodification."

Hydromodification intensifies sediment transport and often leads to stream channel enlargement and loss of habitat and associated riparian species (SCCWRP, 2005; Geosyntec, 2002; Bledsoe & Watson, 2001; MacRae, 1992; Booth, 1990). Under some circumstances, especially in more arid areas, development also can cause a reduction in the amount of sediment supplied to the stream system from upland areas, which also can contribute to stream channel incision and widening beyond hydrologic changes alone. These changes also have the potential to impact downstream channels and habitat integrity. A project that increases runoff due to impervious surfaces and traps sediment from upland watershed sources creates compounding effects.

A change to the Project site's hydrologic regime would be considered a condition of concern if the change could have a significant impact on downstream natural channels and habitat integrity, alone or in conjunction with impacts of other projects.

4.4 Significance Criteria and Thresholds for Significance

Significance criteria and thresholds for significance are based on the CEQA Guidelines Appendix G, and are summarized below.

Significance Thresholds for Water Quality

The Project would have an impact on surface or groundwater quality if it would:

- Substantially alter the existing drainage pattern of the site or area which would result in a substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
- 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;
- 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);
- Contribute to any violations of water quality standards or waste discharge requirements; or
- Otherwise substantially degrade water quality.

The criteria that will be used for evaluating the significance of a potential impact for each pollutant of concern based on the thresholds for significance are summarized below. The application of the criteria discussed below to a decision regarding significance requires an integrated or "weight of evidence" approach, rather than a decision based on any one of the individual criterion.

CEQA Standard

In order to determine significance under CEQA, potentially substantial increases to pollutant concentrations and/or loads resulting from development will be evaluated for significant adverse impacts to receiving water quality by comparing pre-development and post-development water quality concentrations and loads. Analysis of potential significant impacts will be based on the results of water quality modeling and qualitative analysis that takes into account water quality controls or BMPs that will be selected consistent with the Phase II General Permit.

If post-development pollutant loads and concentrations, with capture in BMPs, are predicted to remain the same or to be reduced compared to existing conditions, then it will be concluded the Project is not expected to cause a significant adverse impact to the ambient water quality of the receiving waters for that constituent. If post-development pollutant loads or concentrations, with capture in BMPs and compliance of the Project with the Phase II General Permit, are predicted to

increase compared to existing conditions, the potential impacts will be assessed by evaluating the effect of the potential increase in pollutant concentration on water quality criteria.

Water Quality Criteria

Comparison of post-development water quality concentrations in the runoff discharge with benchmark receiving water quality criteria as provided in the Basin Plan (1994) and the CTR will facilitate analysis of the potential for runoff to cause or contribute to exceedances of receiving water quality standards or adversely affect beneficial uses. The water quality criteria will be considered benchmarks for comparison purposes only as such criteria apply within receiving waters as opposed to directly to runoff discharges.

Narrative and numeric water quality objectives contained in the Basin Plan (1994) apply to the Project's receiving waters. Water quality criteria contained in the CTR provide concentrations that are not to be exceeded in receiving waters more than once in a three year period for those waters designated with aquatic life or human health related beneficial uses. Projections of runoff water quality will be compared to acute CTR criteria, as stormwater runoff is associated with episodic events of limited duration, whereas chronic criteria apply to 4-day exposures.

Because water quality criteria are established to protect beneficial uses of receiving waters, analyses that result in no violations of water quality criteria support a finding of less than significant impact.

MS4 Permit Requirements for New Development

Satisfaction of the MS4 Permit requirements for new development and redevelopment will establish compliance with water quality regulatory requirements applicable to stormwater runoff. Under the regulations in the permit, the effectiveness of stormwater treatment controls is primarily based the ability to infiltrate, harvest, and/or biotreat runoff from the 85th percentile rainfall event or the 0.75-inch event, with other types of treatment allowed if these measures are demonstrated to be infeasible on-site.

Construction General Permit Requirements

All development projects which disturb one or more acres are required to obtain coverage under the SWRCB's General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit 2009-0009-DWQ). The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) that describes erosion and sediment control BMPs, as well as material

management/non-stormwater BMPs that will be used during the construction phase of development. Compliance with these requirements during the construction phase of a project, including implementation of BMPs consistent with Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology (BAT/BCT), as required by the Construction General Permit, will be assessed as part of the impact determination.

BAT/BCT refers to Clean Water Act technology-based standards applicable to construction site stormwater discharges. Federal law specifies factors relating to the assessment of BAT, including the following: age of the equipment and facilities involved; the process employed; the engineering aspects of the application of various types of control techniques; process changes; the cost of achieving effluent reduction; non-water quality environmental impacts (including energy requirements); and other factors as the Administrator deems appropriate (Clean Water Act §304(b)(2)(B)). Factors relating to the assessment of BCT include the following: reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived; comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources; the age of the equipment and facilities involved; the process employed; the engineering aspects of the application of various types of control techniques; process changes; non-water quality environmental impact (including energy requirements); and other factors as the Administrator deems appropriate (Clean Water Act §304(b)(4)(B)). USEPA has not issued regulations specifying BAT or BCT for construction site discharges.

Significance Thresholds for Hydrologic Conditions of Concern

Pursuant to the CEQA Guidelines Appendix G, significant adverse impacts to natural drainage systems created by altered hydrologic conditions of concern are presumed to occur if the Project would substantially alter the existing drainage pattern of a natural drainage, stream, or river causing substantial erosion, siltation, or channel instability in a manner that adversely affects beneficial uses.

Cumulative Impacts

CEQA requires the analysis of cumulative impacts of a project when the project's incremental effects may be significant when assessed along with the effects of closely related past, present, and reasonably foreseeable future projects. The discussion of cumulative impacts must reflect the potential severity of the impacts and their likelihood of occurrence, but the discussion and analysis need not provide as great a detail as is provided for the direct effects attributable to the Project alone. This report, therefore, analyzes the potential for cumulative water quality impacts,

cumulative groundwater quality impacts, and cumulative hydrologic impacts in accordance with the thresholds for direct impacts.

As required by CEQA, the focus of the cumulative impacts analysis for the Project will be on the Project's incremental contribution to significant adverse water quality and hydrologic impacts to the Trancas Canyon and Carlisle Canyon watersheds, taking into account the reasonably foreseeable water quality and hydrologic impacts of other projects that may develop impervious surfaces and urban land uses within these watersheds in accordance with the General Plan. The cumulative impacts analysis considers the Project's incremental contribution to significant cumulative water quality and hydrologic impacts to the Trancas Canyon, Lake Sherwood, Trancas Beach, and Santa Monica Bay watersheds in light of the water quality and hydrology impact mitigation achieved by the LID BMPs. The analysis also will consider whether the Project, including BMPs, and future projects will comply with the Basin Plan (1994), the CTR, the MS4 General Permit, the Construction General Permit, and the General Dewatering Permit, which have been adopted for the purpose of avoiding or substantially lessening the cumulative water quality and hydrologic impact problems within the geographic area in which the Project is located.

5. WATER QUALITY AND HYDROMODIFICATION CONTROL PROJECT DESIGN FEATURES

BMPs incorporated into the Project to address surface water quality and hydromodification impacts include erosion and sediment control BMPs during the construction phase of the Project and site design, source controls, LID, and hydromodification control BMPs during the post-construction (operational) phase. Effective management of construction phase runoff means protecting bare areas from erosion and keeping sediment and other pollutants associated with construction activities (e.g., trash, paint, solvents, sanitary waste from portable restrooms, and concrete curing compounds) from discharging from the Project site. Effective management of post-development wet- and dry-weather runoff water quality begins with limiting increases in runoff pollutants and flows at the source. Site design, source control, and LID BMPs are practices designed to minimize runoff and the introduction of pollutants into runoff. Hydromodification control BMPs are designed to control increases in post-development runoff flows, volumes, and/or durations to protect stream channel geomorphology and habitat. These BMPs (i.e., water quality features) are considered a part of the Project for this impact analysis.

5.1 Erosion and Sediment Control BMPs to be Implemented During Construction

Grading associated with the remodeled golf course would take place within the previously graded areas of the fairways, tee boxes, and greens and would not require the removal of native oak or sycamore trees. Grading for buildout of the Project would occur within previously disturbed areas and would require approximately 120,000 cubic yards of cut and 120,000 cubic yards of fill, which would be balanced on-site. No soil import or export is proposed.

Site construction would comply with the requirements of the Construction General Permit, as discussed in Section 3.9.

The California Stormwater Quality Association (CASQA) has several BMP fact sheets that describe erosion and sediment control practices and how these practices are effectively installed and/or applied (CASQA, 2009). The following BMPs may implemented, as necessary, at the Project site during the construction phase according to CASQA guidance for the purpose of sediment control:

- Silt fences;
- Sediment basins or sediment traps;
- Fiber rolls or other temporary berms;

- Street sweeping and vacuuming; and
- Storm drain inlet protection.

The following erosion control BMPs may also be implemented, as necessary, according to CASQA guidelines:

- Scheduling of construction activities according to local climate;
- Preservation of existing vegetation;
- Geotextiles and mats;
- Wood mulch;
- Velocity dissipation devices; and
- Soil preparation/roughening.

5.2 Source Control BMPs

Routine non-structural source control BMPs applicable to the Project site are described below.

Property Owners, Tenant, and Occupant Education

Properly trained employees are essential to ensuring BMPs are appropriately utilized and maintained. Employee training and responsibility is under direct control of a supervisor. Employees must be familiar with the Pesticide Management Plan and be familiar with any information and signage throughout the Project site in the case that visitor questions would arise. Public and player education signage and pamphlets will cover topics including:

- Green construction and drainage;
- Efficient irrigation;
- Wildlife enhancement initiatives;
- Litter controls;
- Avoidance of natural areas;
- Vehicle maintenance;
- Proper disposal of chemicals; and
- Golf course runoff management.

Pest and Fertilizer Management

Employees are expected to be knowledgeable about the potential water quality impacts of poor management practices and the benefits of BMPs, as described in the Malibu Golf Club Best Management Practices guidance document (Radwich, 2013). This guidance document describes the use, application rate, spill response procedures, proper storage and handling, and potential adverse impacts of pesticides, and also provides general fertilizer and nutrient management principles. Employees will be trained in basic hazardous waste management, storage, handling, and disposal. Pesticide application must be supervised by an employee who has an Agricultural Pest Control Advisor (PAC) License and is registered within Los Angeles County. Fertilizing also must be carried out under the direction of the site manager. Fertilizer will be maintained in a dedicated moisture-free, well-ventilated storage area. Additionally, new staff will undergo training in the use of machinery and application of fertilizers and pesticides.

BMP Maintenance

Improper maintenance is one of the most common reasons why stormwater BMPs do not function as designed, or fail entirely. It is important to identify responsibility for implementation of each non-structural source control BMP and scheduled cleaning and/or maintenance of all LID, treatment control, and hydromodification control facilities. BMP maintenance and inspection will be carried out as appropriate for each BMP system based on the O&M Plan.

Spill Contingency Plan

A Spill Contingency Plan will be in place to manage fueling activities and the use and storage of chemicals on the Project site (as currently described in the Malibu Golf Club Best Management Practices guidance document (Radwich, 2013). The Plan will include stockpiling of cleanup materials, notification of responsible agencies (e.g., Los Angeles County Environmental Health, Fire Department, etc.), disposal of cleanup materials, and documentation.

Litter Control Practices

Daily litter control operations include an effective litter patrol and the emptying of trash receptacles daily (or, if more frequently, on an as needed basis). This requirement, coupled with the frequent maintenance and assessment activities throughout the site, ensures litter does not interfere with either the guest experience or negatively impact the receiving waters. The same philosophy is extended to the maintenance yard. All litter will be picked up as soon as it is

observed and placed in the trash dumpster. Litter control also will include pet limitations on-site and proper pet waste disposal.

Storm Drain System Stenciling and Signage

Water quality protection will be publicized by use of signs informing guests of water quality initiatives and encouraging environmental stewardship. Explanatory flyers posted in the pro-shop and distributed to visitors will be used to inform guests about the various efforts, and resulting benefits, of the water quality practices employed on-site. Storm drain inlets will be stenciled or otherwise signed to indicate the need for water quality protection.

Proper Design of Outdoor Material and Equipment Storage Areas

Improper storage of materials outdoors provides an opportunity for POCs to enter the stormwater conveyance system. The Project will incorporate the following source control BMPs for outdoor material storage areas:

- Materials with the potential to contaminate stormwater will be placed in a locked enclosure, such as a shed or cabinet, or protected by secondary containment structures such as berms, dikes, or curbs;
- Permanent storage areas will be paved and sufficiently impervious to contain leaks and spills; and
- Permanent storage areas will have a roof or awning to reduce collection of stormwater within the secondary containment area.
- An inventory of the pesticides kept in their respective storage building and the Material Safety Data Sheets (MSDS) will be accessible on the premises and also inside the chemical storage areas (except in the case of solvent and degreaser storage).

Proper Design of Other Potential Pollutant Source Areas

The Project will incorporate the following source control BMPs:

- Exposed building materials (roof, downspouts, fencing, etc.) will be made of inert materials. No exposed copper or zinc roofing materials, pressure treated woods, etc., will be allowed;
- Proper design of trash storage areas will prevent transport of trash and debris and other pollutants by wind or water into nearby storm drain inlets and receiving waters;

- Proper design of loading docks will reduce the potential for spilled materials to enter the storm drain system;
- Proper design of repair/maintenance bays will prevent the discharge of metals, oil and grease, solvents, battery acid, coolant, and fuels to the storm drain system;
- Proper design of vehicle/equipment wash areas and restaurant equipment/ accessory wash areas will prevent the discharge of metals, oil and grease, solvents, phosphates, and suspended solids to the storm drain system;
- Proper design of fueling areas at retail gasoline outlets and automotive repair shops will prevent the discharge of oil and grease, solvents, car battery acid, coolant, and fuels to the storm drain system; and
- Proper design of parking areas will reduce the discharge of heavy metals, oil and grease, PAHs, and suspended solids to the storm drain system. Heavily used lots will incorporate treatment measures to remove oil and petroleum hydrocarbons from the parking lot runoff. Adequate operation and maintenance will be conducted for sludge and oil removal systems and to prevent system fouling and plugging.

Efficient Irrigation Systems and Landscape Design

To provide an environmentally superior golf course design, sustainability features proposed to be provided for the remodeled course include installation of a "smart" irrigation system, a reduction in the amount of turf area from approximately 85 acres to 62 acres, the use of drought-tolerant grasses for the turf areas, and the removal of non-native landscaping from areas surrounding the golf course playing area, which would be re-vegetated with native drought-tolerant trees and shrubs. The water-saving features to be provided with the remodeled golf course would reduce water consumption for irrigation by approximately 35% compared to the existing golf course facility.

Vehicle and Equipment Wash and Fueling Areas

According to the Malibu Golf Club Best Management Practices (Radwich, 2013), discharges to surface or ground water should be eliminated through the containment and collection of equipment washwaters and proper management of the collected material. Where allowed by the local Department of Environmental Protection (DEP) District office or local authorities, stormwater, and washwater other than that from pesticide application equipment may be discharged to a swale or retention area that does not connect to a surface water body or provide a direct conduit to the ground water. For these reasons, all machines with wet clippings are washed

with fresh water on the golf course in the area which they were used, allowing the clippings and material to be dispersed back onto the turf, acting as a filter and avoiding discharging the wastewater improperly down a drain.

Washwater generated from the cleaning of equipment other than pesticide application equipment does not have to be collected and applied to the course. This washwater must not, however, be discharged to surface water either directly or through ditches, storm drains, or canals. Equipment washwater can contain soaps, fertilizer residues, solids, and lubricating oil residues but should not contain solvents and degreasers. Equipment used to apply pesticides shall not be washed on pads using oil/water separators, since the pesticides will contaminate the oil that is salvaged (Radwich, 2013). Golf carts and equipment will have their own designated wash and fueling areas, which will be bermed, fenced, and/or covered to protect the surrounding area from rainfall and overspray.

Septic Removal and Wastewater Disinfection

The Project would remove multiple septic tanks throughout the Project site and install an on-site wastewater treatment system with effluent meeting Title 22 standards for reuse as irrigation for the remodeled golf course. An On-site Wastewater System (OWS) currently serves the existing golf course facilities. The Project proposes to abandon the existing OWS in its entirety, and construct an on-site Wastewater Recycling System. The proposed wastewater system would consist of a network of decentralized primary tanks located as close to the point of wastewater generation as feasible. The primary tanks would retain solids in the wastewater, with a design pump-out interval of ten to twelve years. The filtered, liquid primary treated effluent portion of the wastewater would be discharged to a low pressure effluent sewer system that would feed into the Recycled Water Treatment System. The Recycled Water Treatment System would use a combination of aeration, ultrafiltration, and disinfection that treats the effluent to a standard suitable for unrestricted, non-potable reuse on-site as landscape and golf course irrigation.

Pavement Sweeping Program

Parking lots and roadways will be swept daily to reduce the amount of trash/debris, solids, and associated pollutants from becoming suspended in stormwater runoff and entering storm drains and infiltration basins. This also will reduce BMP maintenance frequency and prevent clogging and excessive sedimentation in the BMPs.

5.3 LID and Treatment BMPs

The Project will incorporate many "green" features. The Malibu Institute building, which will contain the educational and meeting facilities, will use the building footprint and foundation of the existing clubhouse and cart barn. The Project will replace over 185,000 square feet of existing non-pervious parking lots and cart paths with pervious pavement material to allow infiltration of stormwater and improve water quality. The buildings and accommodations will incorporate sustainable and green design with the goal of achieving LEED™ Platinum certification (or equivalent) for all buildings on the Project site. Design features also will include green roofs on many of the Project buildings, the use of color and shade structures to reduce the heat island effect, charging stations for electric vehicles, the use of highly efficient geothermal HVAC equipment, the use of native, drought-tolerant landscaping, and the use of a shuttle van or bus service for larger groups visiting the Project site. Water conservation and design features will include low flow/ultra low-flow fixtures, energy star appliances, and the use of drip irrigation systems. The Project will use photovoltaic panels over shade structures in the expanded surface parking area to generate most of the energy needs for the Project and will replace existing outdoor overhead parking lot lighting, which currently can be seen from off-site, with lighting complying with Dark Skies initiatives and the County's Rural Lighting Outdoor Lighting District Ordinance. The Project will remove 1,590 non-native trees, including palm trees, which were introduced with development of the existing golf course, and provide landscaping with native, drought-tolerant species, to reduce irrigation demands and to provide habitat features and a plant palette more consistent with that of the Santa Monica Mountains. The Project will incorporate a recycling program as part of its operations as well as additional sustainability features from the County's Green Building Ordinance, Low Impact Development Ordinance, and Drought Tolerant Landscaping Ordinance.

The environmentally sensitive design of the remodeled golf course will include sand-capping (sand addition) of the fairways to promote infiltration of stormwater, and the use of BMPs to reduce the rate of stormwater runoff, and improve the water quality of runoff that exits the Project site. Additionally, the existing impervious asphalt cart paths will be removed, and a non-continuous cart path will be provided consisting of a living pervious material, further enhancing infiltration and improving water quality. The remodeled golf course will continue to be operated as a public golf course, as well as being available to guests of the Malibu Institute.

LID Performance Standard

The development area (buildings, parking areas, and associated infrastructure) is 20.8 acres, or 4% of the entire Project site. BMPs proposed within the development area include an infiltration

basin to retain on-site an amount of runoff equal to the 85th percentile, 24-hour event, or 1.15 inches of water, in addition to the LID-required detention necessary to limit flows to historic rates. Runoff in the development area will be limited to predevelopment rates. Storm drainage facilities are proposed to limit surface flows in this area and will include a network of vegetated swales, bioswales, inlets, and piping. Consistent with existing conditions, sediment will continue to be collected in existing basins located along the perimeter of the golf course, as well as in areas of the golf course where velocities drop below 2 feet per second (Triad/Holmes Associates, 2013).

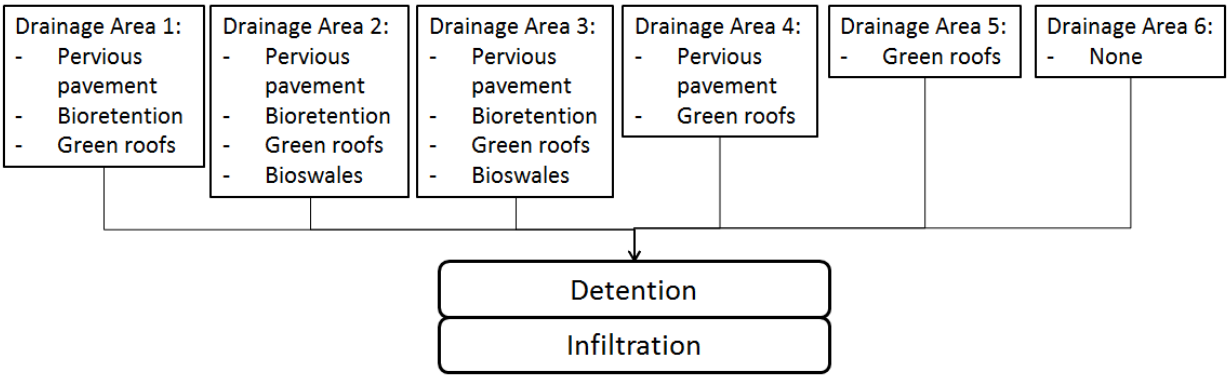
Description of LID and Treatment Control BMPs

The proposed LID and treatment control BMPs described below are from the Drainage Concept/Hydrology Report for TR071735 (Triad/Holmes Associates, 2013):

- *"Pervious Pavement:* For the purpose of LID calculations, the rates for areas of pervious pavement were assumed to be 0.95 imperviousness, in order to not duplicate the advantages of the pervious storage capacities (i.e., conservative assumption in that the imperviousness would actually be expected to be lower) . There are no freeze issues in this area, so storage is located directly under the pervious pavement. None of the pervious paved surfaces exceed 10% maximum (recommended by the LID manual).
- *"Bioswales:* The Bioswales have been designed to include bioretention. A void factor of 0.4 is assumed for the rock bioretention [volume (area of gravels beneath underdrains)]. Storm drainage pipes are included for collection of other runoff and to limit velocities in the bioswales.
- *"Green Roofs:* Green roofs are used to [intercept] rain that falls directly on the green roof area. For the purpose of the LID calculations, these areas have an assumed 0.95 impervious coefficient, (which is much higher than how a green roof will behave, unless the soils are saturated).
- *"Infiltration Basins:* At the outer edges of the Project area, there are impervious paved surfaces. The runoff from these is directed to infiltration basins to treat the final runoff from the site."

Figure 7 illustrates this concept within the 20.8 acre development area. Runoff from each of six drainage areas enters some combination of the BMPs above, with all runoff ultimately being directed to the infiltration and detention basins before leaving the Project site. The infiltration basin is designed to infiltrate the SWQDv, as required by the MS4 Permit (Triad/Holmes Associates, 2013).

Figure 7: Conceptual Diagram of BMPs within the Development Site



5.4 Hydromodification Control BMPs

A series of progressive hydromodification control measures will be used in the Project to prevent and control hydromodification impacts to Trancas Canyon Creek downstream of the Project site. First in the series of progressive control measures is the preservation of natural hydrologic conditions and protection of sensitive hydrologic features, sediment sources and sensitive habitats to avoid and minimize the need for mitigation. Second in the series of progressive controls is the mitigation of the changes to natural hydrologic conditions that are unavoidable through the incorporation of site design practices (e.g., reducing connected impervious surfaces), implementation of stormwater volume-reducing LID BMPs (project-based hydrologic source control), and incorporation of hydromodification control facilities, as needed.

Hydromodification Performance Standard

The Project's performance standard for hydromodification control is as follows:

> Hydromodification control BMPs will be selected and applied such that all off-site drainage impacts caused by changes in peak flow rates, velocities, depth/width ratios, and storm volumes are fully mitigated for the SUSMP, LID, 2, 5, 10, 25, and 50-year storm events. The SUSMP and LID design storm events are assumed to be the equivalent of the 85th percentile 24-hour runoff event (County of Los Angeles, 2009). Flow control facilities that result in post-development peak flow rates, velocities, depth/width ratios, and storm volumes less than or equal to existing conditions are considered to comply with this performance standard.

The performance standard for hydromodification is based on the hydromodification design criteria as outlined in the Los Angeles County Low Impact Development Manual (LID Manual) (County of Los Angeles, 2009), which is referenced in the Los Angeles County MS4 NPDES Permit Part VI.D.7.c.iv.(1)(c)(i) as alternative compliance criteria. Post-development conditions which meet the Los Angeles County MS4 NPDES permit performance criteria for hydromodification will be appropriately protective of hydromodification impacts under the California Environmental Quality Act. The LA County LID Manual requires as part of hydromodification requirements that projects determine long-term impacts of streambed accretion and degradation for major drainage courses with Capital Storm flow rates (Q) greater than 5,000 cubic feet per second using HEC-RAS, SAMS, or HEC-6. This analysis was not incorporated into this performance standard because Capital Storm flow rates associated with receiving waters where the Project discharges are less than the threshold noted.

Description of Hydromodification Control BMPs and Performance Standard Implementation

The following sections describe the hydromodification control BMPs that have been incorporated into the Project to meet the hydromodification control performance standard. BMPs incorporated have been designed to achieve the hydromodification performance standard at the Project site's discharge point into receiving waters. With the BMPs below, the Project will actually improve hydrologic conditions as compared to current conditions. Most of the development is occurring as a re-development; therefore, the incorporation of the BMPs described below will result in improved hydrologic conditions and will not reduce existing sediment supplies by covering native vegetated areas.

Preserve Natural Hydrologic Conditions

The Project will avoid, to the extent possible, the need to mitigate for hydromodification impacts by preserving natural hydrologic conditions and protecting sensitive hydrologic features, sediment sources, and sensitive habitats. The total Project site consists of 650 acres and 514 of these acres will remain unchanged as a result of this development (79% unchanged). Additionally, the re-grading of the development area will be performed so that existing natural drainage patterns are maintained.

Hydrologic Source Control

Disconnecting impervious areas from the drainage network and adjacent impervious areas is a key approach to protecting channel stability. Hydrologic source controls included in the Project that will limit impervious area and disconnect imperviousness to avoid and minimize hydromodification impacts include:

- *Site Design:* Site design BMPs that help to reduce runoff volume from the Project will include the routing of stormwater runoff to vegetated areas and/or LID BMPs. This Project will result in less impervious area compared to existing conditions, which will promote the natural filtration of runoff.

- *LID BMPs:* The Project's LID BMPs also will serve as hydromodification source control BMPs. LID BMPs, including pervious pavement, bioswales, vegetated roofs, and infiltration basins, will provide volume reduction such that the entire design storm (85th percentile – 24 hour) volume from development will be fully captured and infiltrated on the Site. In addition, these facilities are expected to receive and eliminate any dry weather flows.

Project-Based Flow Control

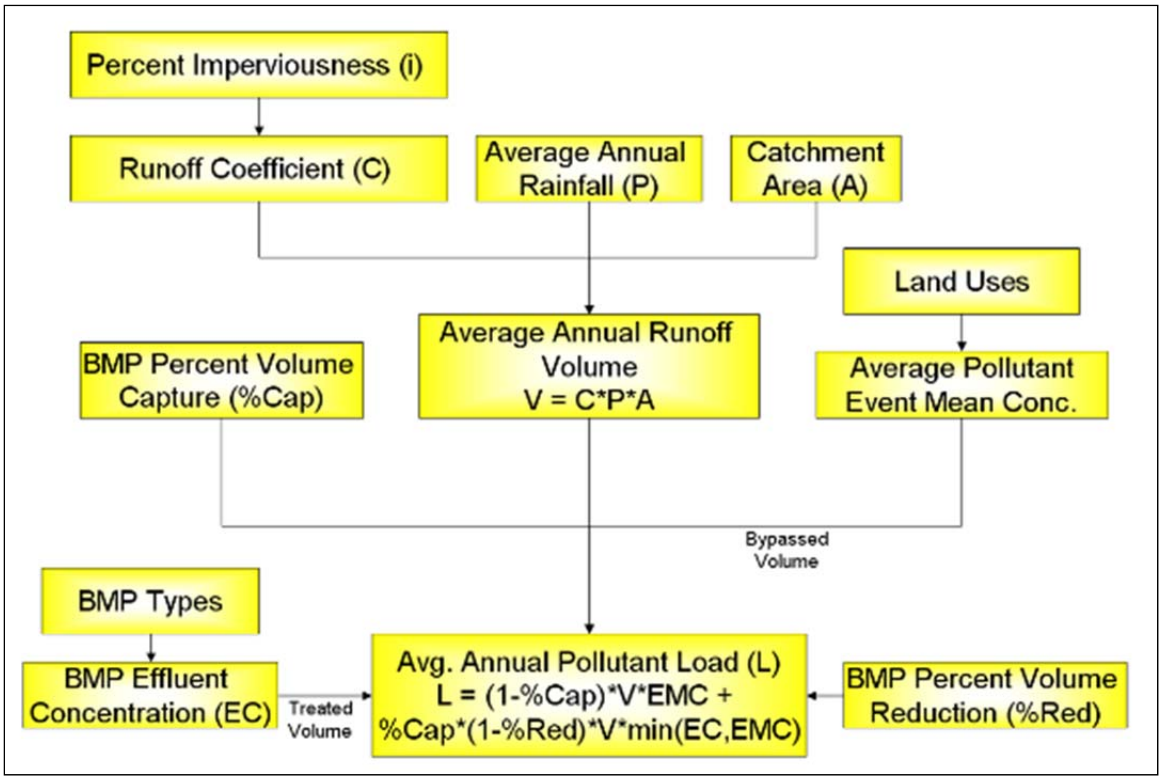
Two detention basins also are proposed to maintain historic runoff rates, velocities, volumes, and depth/width ratios of discharges to the natural drainage. A small detention basin is proposed to capture runoff from an impervious parking lot and a larger detention basin is proposed to capture runoff from the remaining portion of the development area. Both of these detention basins were sized to capture and distribute up to the 50 year storm and are outlet controlled so that the discharging flow will be equal or less than the existing discharge to the natural drainage for the 2-, 5-, 10-, 25-, and 50-year storms as compared to existing site conditions. Stream erosion/deposition and sediment transport processes are functions of the long-term cumulative effects of geomorphically significant flows. Maintaining the peak values of geomorphically significant flows maintains the existing capacity to transport sediment. Flow control maintains the existing (pre-development) peak runoff rates and velocities within prescribed limits to minimize hydromodification impacts in natural receiving waters. The LID BMPs included in the Project provide volume reduction in addition to water quality improvements that would result in the Project site having less volume released than the current site.

6. ANALYSIS METHODOLOGY

6.1 Water Quality Model Overview

To estimate average stormwater runoff volumes as well as pollutant loads and concentrations, a spreadsheet-based pollutant loadings model was constructed. Figure 8 shows the conceptual design of the storm water pollutant load model. Inputs include Project land uses, percent imperviousness, average annual rainfall, drainage area boundaries and acreages, pollutant event mean concentrations (EMC) by land use type, BMP types, BMP effluent concentrations, BMP percent volume reduction, and BMP percent volume capture. The calculations were done for the existing, proposed without BMPs, and proposed with BMPs conditions.

Figure 8: Conceptual Diagram of Pollutant Load Model



6.2 Model Input Parameters

Hydrologic Parameters

Land uses, percent imperviousness, and drainage areas were derived from The Malibu Institute Drainage Concept/Hydrology Report (Triad/Holmes Associates, 2013). The total analysis area (650 acres) was defined by the Project site. As mentioned previously, for purposes of modeling, land uses were grouped into categories of HDSF Res[1], commercial, open space, and golf course (Figure 3a).

Percent imperviousness values were computed for the 20.8 acre development area, the 629.2 acre remaining area, and the 650 acre total analysis area (Table 6-1), based on the imperviousness data provided in The Malibu Institute Drainage Concept/Hydrology Report (Triad/Holmes Associates, 2013). There is an overall decrease in imperviousness with the Project under the proposed conditions despite the increase in development. This is a result of the addition of green roofs and pervious pavement, which are considered to be only partly impervious in the table below, covering the impervious building rooftops and replacing nearly half of the impervious pavement.

Table 6-1: Impervious Areas within the Project Site

Total Property Acreage		**Units**	**Development Area**	**Remaining Area**	**Total Site**
		acres	20.8	629.2	650
Development Condition					
Existing	Imperviousness[1]	%	28%	0.3%	1.2%
	Impervious acreage[1]	acres	5.8	2.0	7.8
Proposed	Imperviousness[1]	%	12%	0%	0.6%
	Impervious acreage[1]	acres	2.6	1.5	4.1
	Partly impervious[2]	%	51%	0.08%	1.7%
	Partly impervious acreage[2]	acres	10.5	0.5	11.0

[1] Impervious pavement, buildings, impervious golf cart pathways
[2] Green roofs, pervious pavement, pervious golf cart pathways

[1] The HDSF Res land use is being used in the water quality model to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site. This is a conservative assumption in that these temporary accommodations will be occupied less often than would true residences.

Land Use EMC Data

For the existing and "proposed with BMPs" conditions, average annual pollutant loads were computed for each land use by multiplying average annual runoff volumes by the corresponding geometric mean pollutant event mean concentration (EMC), based on local land use runoff monitoring data originates from Los Angeles County. Average annual runoff volume is calculated by multiplying the runoff coefficient by the average annual precipitation (in) and the drainage area (ac) of each land use, as shown in Figure 7. Runoff coefficients were provided by Triad/Holmes Associates for each type of land cover (impervious pavement, buildings, landscape areas, bioretention, pervious and impervious pavement, green roof, undeveloped, and golf course) which were then weighted and redistributed based on the broader land use categories assigned to the Project site (Table 6-2).

Table 6-2: Runoff Coefficients (C) Assigned to Each Land Use

Land Use	Existing Condition		Proposed Condition	
	Area (ac)	C	Area (ac)	C
HDSF Residential*	0.0	NA	9.6	0.25
Commercial	12.8	0.50	11.3	0.47
Open	522.2	0.02	522.2	0.02
Golf course	115.1	0.114	107.0	0.109
Total	650	0.046	650	0.046

* The HDSF Res land use is being used in the water quality model to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site.

The Los Angeles County Stormwater Monitoring Program was initiated with the goal of providing technical data and information to support effective watershed stormwater quality management programs in Los Angeles County and southern California. Specific objectives of that project included monitoring and assessing pollutant concentrations from specific land uses and watershed areas. In order to achieve this objective, the County undertook an extensive stormwater sampling project that included eight land use stations and five mass emission stations that were tested for 82 water quality parameters. These data were published in two reports: *Los Angeles County 2000-2001 Stormwater Monitoring Report, 2001 and Los Angeles County 1994-2000 Integrated Receiving Water Impacts Report, 2000.*

The Los Angeles County dataset utilized to define potential pollutant loads from land uses at that project were collected from an aggregate of 110 storms in the greater Los Angeles area over 6 years, representing a total of 4,826 sample analyses for all monitored constituents for the commercial and single family residential land use characterization stations. For this modeling

effort, recent regional EMC data from Los Angeles County were applied (LACDPW, 2001). These data were used because of the relatively close location to the Project site and because the monitored land uses were representative of the proposed development (except the golf course). Data from developed land uses that were similar to the uses anticipated for this Project were selected to the extent possible. For example, data from stormwater monitoring of an open space site by Los Angeles County is used to represent stormwater concentrations from open space areas within the Project site.

The land use stations used to develop water quality modeling parameters are listed in Table 6-3 with a brief description of the station site and the years monitoring data were collected.

Table 6-3: LA County Land Use Monitoring Stations used for Water Quality Modeling

Station Name	Station	Modeled Land Use	Site Description	Years Monitoring Conducted
Santa Monica Pier	S08	Commercial	The monitoring site is located near intersection of Appian Way and Moss Avenue in Santa Monica. The storm drain discharges below the Santa Monica Pier. Catchment area is approximately 81 acres. The Santa Monica Mall and Third St. Promenade dominate the watershed with remaining land uses consisting of office buildings, small shops, restaurants, hotels and high-density apartments.	1995-1999
Project 620	S18	Single-Family Residential (HDSF Res*)	Located in Los Angeles River watershed in City of Glendale. The monitoring station is at the intersection of Glenwood Road and Cleveland Avenue. Land use is predominantly high-density, single family residential. Drainage area is approximately 120 acres.	1995-2001
Sawpit Creek	S11	Open Space (Vacant)	Located in Los Angeles River watershed in City of Monrovia. The monitoring station is Sawpit Creek, downstream of Monrovia Creek. Sawpit Creek is a natural watercourse at this location. Catchment area is approximately 3,300 acres.	1995-2001

* The HDSF Res land use is being used in the water quality model to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site.

The Los Angeles County stormwater quality monitoring data used for the water quality model is summarized in Table 6-4 (number of samples and percent detect shown for each land use-pollutant combination). The computed arithmetic mean EMC values are reported in Table 6-5.

Golf course EMCs for metals were assumed equal to values for the open/vacant land use, while nutrients and TSS EMCs were based on golf course runoff monitoring studies (Copp, et al, 1995; Kolasa, 1999; Reicher et al, 1999; Kaapro, 2000; Casey and Klaine, 2001.) The other POCs, such as pathogens, hydrocarbons, pesticides, and trash and debris, are not amenable to this type of sampling either because of short holding times (e.g., pathogens), difficulties in obtaining a representative sample (e.g., hydrocarbons), or low detection levels (e.g., pesticides). These pollutants were addressed qualitatively using literature information and best professional judgment due to the lack of statistically reliable monitoring data for these pollutants.

Table 6-4: LA County Land Use EMC Data Summary

Pollutant	Commercial		HDSF Res[1]		Golf Course		Open/Vacant	
	No. Samples	% Detect	No. Samples	% Detect	No. Samples	% Detect	No. Samples	% Detect
TSS	31	100%	41	100%	Unknown	Unknown	48	98%
Nitrate	33	79%	43	70%	Unknown	Unknown	50	98%
TKN	36	97%	46	100%	Unknown	Unknown	50	100%
Total Phosphorus	32	97%	42	100%	Unknown	Unknown	46	59%
Total Copper	40	100%	48	96%	21	100%	52	62%
Total Lead	40	55%	48	48%	21	100%	57	12%
Total Zinc	40	100%	48	56%	21	100%	52	23%

[1] The HDSF Res land use is being used in the water quality model to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site.

Table 6-5: Arithmetic Mean Land Use EMC Values

Pollutant	Units	Commercial	HDSF Res[1]	Golf Course[2]	Open/Vacant
TSS	mg/L	67	124	38	217
Nitrate	mg/L-N	0.55	0.78	0.43	1.17
TKN	mg/L	3.44	2.96	1.8	0.96
Total Phosphorus	mg/L	0.4	0.4	0.32	0.12
Total Copper	µg/L	31.4	18.7	10.6	10.6
Total Lead	µg/L	12.4	11.3	3.0	3.0
Total Zinc	µg/L	237.1	71.9	26.3	26.3

[1] The HDSF Res land use is being used in the water quality model to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site.

[2] Golf course EMC values for nutrients and TSS are geometric mean values.

BMP Performance

Various data sources were examined to estimate the anticipated performance of the proposed BMPs, including the American Society of Civil Engineers (ASCE) and EPA database recently compiled by ASCE's Urban Runoff Research Council (Strecker, et al., 2001). The ASCE National Stormwater BMP Database is the most recent and robust database available to analyze the effects of a variety of BMPs on stormwater quality (available at www.bmpdatabase.org). The ASCE Database is comprised of studies that have monitored the effectiveness of a variety of BMPs in treating water quality pollutants. Typical information included in each study is a description of the BMP, the drainage area with dominant land uses, influent concentrations, effluent concentrations, and removal efficiencies.

There is increasing evidence that stormwater treatment BMPs are better characterized by effluent (treated stormwater flowing out of a BMP) quality rather than percent removal (Strecker, et al, 2001). Percent removal is simply the percentage reduction of pollutant concentration in the effluent compared with the influent (stormwater flowing into a BMP) pollutant concentration. For example, if, for a given constituent, the influent concentration to a BMP is 50 mg/L and the BMP results in an effluent concentration of 10 mg/L, the percent removal is 80 percent. The characterization of pollutant removal for a BMP with effluent water quality is preferred because it is less influenced by influent water quality. A BMP may show high removal efficiency if the concentration of the constituent entering the BMP is high, however if the concentration of the constituent entering the BMP is low, the removal efficiency is typically lower. The results of the analysis of the stormwater monitoring data in the ASCE/EPA database (Strecker, et al., 2001) show little relationship between influent and effluent water quality for structural BMPs. Therefore, where data were available, performance was defined in terms of BMP effluent water quality (along with the estimated amount of runoff treated and untreated) because this is considered a more reliable measure of performance compared to percent removal efficiency.

The development area of the Project site is divided into two sub-drainage areas, each of which would be treated by some combination of upgradient BMPs in addition to a downstream detention/infiltration basin. For the purpose of modeling pollutant load reduction within the developed portion, the effluent concentrations are represented solely by detention basin effluent concentrations, regardless of the combination of upgradient distributed BMPs (e.g., bioswales, inlet filters, etc.). This is based on the fact that a detention basin is located at the downstream end of each sub-drainage within the development area, and all runoff from the site is therefore ultimately treated by detention basins. This is a conservative assumption in that in most drainage areas, runoff will actually be treated by multiple BMPs in series, resulting in a higher degree of treatment (and volume losses) than would result from a single BMP alone. For example, the

model does not include treatment through the inlet filters or the bioswales, although the inlet filters and swales will contribute to the overall effectiveness of the "treatment train". Therefore, the actual quality of runoff from the Project would likely be better than predicted by the model.

For the proposed condition, average annual pollutant loads were computed for each drainage area by multiplying average annual runoff volumes by the mean arithmetic BMP effluent concentrations for detention basins (except when mean effluent concentrations exceeded the influent, in which case the effluent was set equal to the influent and no reduction was achieved). This information is based on 1999-2005 data from the International Stormwater BMP Database (BMP Database, 2006). Table 6-6 summarizes the number of BMP data points that form the basis for each effluent value reported, and Table 6-7 summarizes the BMP effluent concentrations used for the pollutant load analysis.

Table 6-6: Number of Detention Basin Effluent Concentration Studies

Pollutant	No. of Studies
TSS	177
NO3-N	103
TKN	97
Total Phosphorus	174
Total Copper	184
Total Lead	146
Total Zinc	215

Table 6-7: International BMP Database Arithmetic Estimates of Detention Basin Effluent Concentrations

Pollutant	Units	Detention Basin Effluent Concentration
TSS	mg/L	40.5
NO3-N	mg/L	0.77
TKN	mg/L	1.61
Total Phosphorus	mg/L	0.19
Total Copper	mg/L	0.017
Total Lead	mg/L	0.023
Total Zinc	mg/L	0.093

The Nomograph Method, presented in the Orange County Technical Guidance Document (OCPW, 2011) was used to determine the percent capture (treatment) volume of the detention

basins in the development area (20.8 acres total), assuming a 96-hour drawdown of the detention basins (LARWQCB, 2012) and a 1.15-inch design storm. Orange County's approach was used because the Los Angeles County Hydrology Manual does not contain similar methodology for percent capture estimates. In this analysis, no upstream hydrologic source controls (i.e., swales, biofilters, green roofs, etc.) were considered as part of the capture efficiency of the Project site. To determine the capture efficiency, a single basin was modeled to fulfill the storage requirement of 2 ac-ft (Triad/Holmes Associates, 2013). Per this analysis, it was determined the detention basin's capture efficiency was approximately 93% of the runoff over the average wet year.

The water quality model takes into account conditions when the treatment detention basins are full and flows are bypassed. The detention basins were modeled assuming 93% average annual volume capture (i.e., entering the BMP and receiving treatment), and therefore 7% percent of the average annual runoff volume is bypassed or overflows (i.e., assumed to receive no treatment). However, since the ponds are in-line, there likely would be some treatment.

The sand caps are assumed to be sized to meet or exceed the County's flow and volume-based BMP design requirements as described in the MS4 Permit. Since these design criteria are generally based on 80% average annual volume treatment or more, an assumption of 80% volume capture is considered reasonable and conservative.

In addition to water quality improvements, the treatment control BMPs also will provide runoff volume reduction benefits. Analysis of influent and effluent flow monitoring data contained in the International Stormwater BMP Database for dry extended detention basins demonstrates about 30% percent or greater volume reduction through these systems. Therefore, 30% volume reduction was conservatively estimated to occur in the Project's infiltration basins. To be conservative, no additional volume reduction was considered in the upstream distributed BMPs (bioswales, green roofs, pervious pavement, and bioretention). Although volume reduction data are not available for sand caps (this is a particularly unique treatment BMP type), like the bioswales, the sand caps similarly will encourage infiltration and evapotranspiration while simultaneously providing stormwater retention and filtration benefits. Given the relatively high BMP-area-to-drainage-area ratio of the sand caps, thus maximizing infiltration/evapotranspiration surface area, this is considered a conservative assumption for these devices.

Finally, average annual pollutant loads were computed as shown earlier in the conceptual pollutant load model diagram. For the proposed condition, this involves computing the volume treated for each land use-BMP combination. This is calculated as the product of the percent runoff volume captured by the BMP and the percent of the captured volume not reduced by infiltration or evaporation. To compute loads, these volumes were then multiplied by the

minimum of the average land use EMCs and the average detention basin effluent concentrations. Bypassed loads were then added; these were computed as the product of runoff volume bypassed, land use EMCs, and runoff volumes. Average annual pollutant concentrations were then determined by dividing average annual total pollutant loads by average annual runoff volumes for each pollutant and for each Project condition (existing and proposed).

6.3 Hydromodification Model Overview

The hydrology and hydraulics of the 2-, 5-, 10-, 25-, and 50-year storm events were analyzed by Triad/Holmes and Associates (2013) using the Modified Rational Method (Modrat) and StormCad/HEC-RAS, respectively, per the requirements of the LA County LID Manual hydromodification criteria. More specifically, the LAR04 program was used to implement the Modrat, which is a modified version of Los Angeles County Public Works Department's F0601 program. This program uses the Los Angeles County Flood Control District program source code for the F0601 series programs but also includes an independent program module which assists the user in preparing an input data file for use by the F0601 program. Additionally, the LID calculator was used to model the LID/SUSMP 85th percentile 24-hour design storm to predict the volume requiring mitigation as a result of the proposed development.

The hydrology of pre- and post-development conditions was modeled for all runoff discharging into Trancas Creek from the 650-acre Project site. The area tributary to the Project discharge point was divided into subcatchments (individual catchment sizes vary) and catchment characteristics including area, soil type, imperviousness, rainfall depth, and time of concentration were determined. Times of concentration for each catchment for each storm event analyzed were determined using the LA County Public Works Tc Calculator. Catchments were hydrologically connected by stream segments, represented in the model by length, roughness, channel type, and size. Specific model inputs are described in more detail in the Triad/Holmes and Associates (2013) Malibu Institute Drainage Concept/Hydrology Report for TR071735.

The hydraulics of the pre- and post-development conditions were modeled for Trancas Creek in HEC-RAS for a reach extending through the Project site per the methodology outlined in the 1982 LA County Flood Control District Hydraulics Design Manual (LA County Flood Control District, 1982). Cross-sections were spaced at 5 to 10 foot intervals for the entire reach depending on reach slopes. The flow rates developed for the 2-, 5-, 10-, 25-, and 50-year storms based on the Modrat analysis discussed above were used as hydrologic input to the HEC-RAS model. Additional details on the HEC-RAS model can be found in Appendix C to the Triad/Holmes and Associates (2013) Malibu Institute Drainage Concept/Hydrology Report for TR071735.

6.4 Project Design Feature Assumptions

Water quality and hydromodification BMPs were reflected in post-development hydrologic models performed by Triad/Homes Associates. It was not feasible to add hydrologic constraints within the LAR04 model to represent the proposed detention basins. However, because the detention basins were designed to produce flows equal to or less than the pre-development conditions, the pre-development hydrology conditions were used in these areas within the LAR04 model. Separately, the detention basins were modeled to determine the size capable of reducing post-development peak flow rates, velocities, depth/width ratios, and storm volumes to pre-development conditions for the 2-, 5-, 10-, 25-, and 50-year storms. Additionally, the stormdrains on the Project site are considered to be undersized and therefore were not modeled, except for the existing 66" RCP stormdrain. Therefore, the runoff on the golf course was modeled as surface flow, except when conveyed through the 66" RCP stormdrain. Additional details and assumptions can be found in the Malibu Institute Drainage Concept/Hydrology Report for TR071735 prepared by Triad/Holmes Associates (Triad/Holmes Associates, 2013).

7. IMPACT ASSESSMENT

The modeled pollutant impact assessment is presented in Section 7.1 and the qualitative analyses of the remaining POCs follow in Section 7.2. Analyses of dry weather impacts and compliance with NPDES Permit requirements, groundwater impacts, and cumulative impacts are also included in this section. The assessment uses a weight of evidence approach using the various significance criteria and thresholds, as presented in Section 4.4

7.1 Impact Assessment for Modeled Pollutants of Concern

In this section, model results for each pollutant are evaluated in relation to the following significance criteria:

(1) Comparison of post-development versus pre-development stormwater quality concentrations and loads;

(2) Comparison with MS4 Permit, Construction General Permit, and General Dewatering Permit requirements for new development; and

(3) Evaluation in light of receiving water benchmarks.

Pursuant to the third criterion, predicted runoff pollutant concentrations in the post-development condition with runoff treatment BMPs are compared with benchmark receiving water quality criteria as provided in the Basin Plan (1994) and the CTR. The water quality criteria and waste load allocations are considered benchmarks for comparison purposes only, since they do not apply directly to runoff from the Project site, but the comparison provides useful information to evaluate potential impacts. A weight of evidence approach is employed in this analysis considering the various significance criteria.

Results from the water quality model for significance criterion 1 are reported in Tables 7-1 and 7-2, which show predicted mean annual pollutant loads (lb/yr) and mean annual concentrations, respectively, for the modeled POCs for the Project. Projections are reported for three Project conditions:

(1) Existing condition;

(2) Proposed conditions without BMPs; and

(3) Proposed conditions with BMPs.

Tables 7-1 and 7-2 show for all modeled pollutants, the Project's proposed site conditions with BMPs included yield lower pollutant loads and concentrations than the Project's proposed site

with no BMPs, as well as the existing site conditions. This is because the Project will primarily redevelop areas that currently do not receive BMP treatment and the overall imperiousness of the Project site is decreasing because of the green roofs, pervious pavement, and bioretention, which are taken into account in the runoff coefficients of each land use and factor into load and volume reductions. These BMPs, however, are not taken into account in the concentration reductions of the modeled constituents since only the detention basin was modeled as treatment for the Project site. That considered, concentration reductions are likely to be even greater than what was shown in the model. Table 7-3 compares the Project's proposed condition runoff quality to the benchmark water quality objectives and criteria.

Table 7-1: Predicted Average Annual Runoff Volume and Pollutant Loads for the Project

Parameter	Units	Existing Conditions	Proposed Conditions, w/o BMPs	Proposed Conditions, w/ BMPs	Percent Change, existing vs. proposed w/ BMPs[a]
Volume	ac-ft	53.7	53.4	44.6	-17%
TSS	lb/yr	15,508	16,333	13,876	-11%
Total Nitrogen	lb/yr	375	381	270	-28%
NO3-N	lb-N/yr	104	107	95	-9%
TKN	lb/yr	271	274	175	-35%
Total Phosphorus	lb/yr	39.0	39.2	25.6	-34%
Total Copper	lb/yr	2.192	2.168	1.348	-38%
Total Lead	lb/yr	0.731	0.776	0.573	-22%
Total Zinc	lb/yr	10.391	9.788	4.752	-54%

[a] + = percent increase - = percent decrease

Table 7-2: Predicted Average Annual Pollutant Concentrations for the Project

Parameter	Units	Existing Conditions	Proposed Conditions, w/o BMPs	Proposed Conditions, w/ BMPs	Percent Change, existing vs. proposed w/ BMPs[a]
TSS	mg/L	106	112	115	+8%
Total Nitrogen	mg/L	2.57	2.62	2.22	-13%
NO3-N	mg/L	0.71	0.74	0.78	+10%
TKN	mg-N/L	1.85	1.89	1.44	-22%
Total Phosphorus	mg/L	0.267	0.270	0.211	-21%
Total Copper	mg/L	0.015	0.015	0.011	-26%
Total Lead	mg/L	0.005	0.005	0.005	-6%
Total Zinc	mg/L	0.071	0.067	0.039	-45%

[a] + = percent increase - = percent decrease

Table 7-3: Comparison of Predicted Pollutant Concentrations with Water Quality Criteria

Parameter	Units	Predicted Avg. Annual Project Stormwater Discharge Concentrations	MGC CUP (1999) Required Levels	CTR Benchmarks[b]
TSS	mg/L	115	narrative[a]	NA
Total Nitrogen[c]	mg/L	2.22	1.00	NA
NO3-N	mg-N/L	0.78	-	NA
TKN	mg/L	1.44	-	NA
Total Phosphorus	mg/L	0.21	0.10	NA
Total Copper	mg/L	0.011	NA	0.020
Total Lead	mg/L	0.005	NA	0.128
Total Zinc	mg/L	0.039	NA	0.161

[a] "Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses."

[b] CTR freshwater acute CMC limits for metals (assume 10th percentile hardness, 142 mg/L as CaCO3)

[c] According to the MGC CUP (1999), "Nitrogen levels shall be less than 1 mg per liter exiting the property. Nitrogen levels shall be monitored through the measurement of nitrate-N, nitrite-N, organic-N, and ammonia-N. The *combined* nitrogen levels from these sources shall not exceed 1 mg per liter."

Runoff Volume

Comparison of Existing and Proposed Project Conditions: Average annual runoff volume is expected to decrease from 53.7 ac-ft/year in the existing condition to 44.6 ac-ft/yr in the

Project's proposed condition (with BMPs). This volume reduction is attributable to a decrease in imperviousness (due to green roofs, bioretention, pervious pavement, etc.) and the volume reduction achieved within the infiltration basins and sand caps proposed for the Project. Though not reflected in the model, the combination of bioretention systems, pervious pavement, and green roofs also are predicted to provide runoff volume reduction, and the existing on-site ponds will be cleaned of sediment, increasing their capacity; therefore, the actual volume reductions are expected to be greater than shown. A reduction in runoff volume indicates a Project benefit, in that runoff is retained on site, contributing to increased groundwater recharge and evapotranspiration.

Total Suspended Solids

Comparison of Existing and Proposed Project Conditions: The TSS concentration is expected to increase marginally from 106 mg/L in the existing condition to 115 mg/L in the proposed condition (with BMPs), while the average annual TSS load is expected to decrease by 11% in Project stormwater runoff due to volume loss and treatment capabilities of the proposed BMPs. The slight increase in TSS concentration partly may be attributed to the introduction of HDSF Residential land use[2] (TSS EMC = 124 mg/L), which has a higher EMC value than the golf course land use (TSS EMC = 38 mg/L) it will replace.

Also, the runoff volume reduction achieved in the detention basins within the development area partly may be responsible for increasing TSS effluent concentrations due to a decrease in dilution on a site-wide basis (i.e., there is less runoff from the development area in the proposed condition than in the existing condition, which has the effect of providing less calculated "dilution" for the runoff from open space). Therefore, as runoff volume decreases, concentration increases slightly. When the 20.8 acre development area is analyzed separately, however, concentration decreases from 63 mg/L in the existing condition to 45 mg/L in the proposed condition (with BMPs), illustrating the development itself is not causing the increase in TSS concentrations.

Comparison with Water Quality Criteria: The water quality criterion for TSS is narrative, and the predicted average annual TSS concentration in stormwater runoff from the Project (with BMPs) could not be quantitatively assessed relative to a quantitative water quality criterion. Based on the predicted reduction in average TSS load, the Project's comprehensive site design,

[2] The HDSF Res land use is being used in the water quality model to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site.

source control, and treatment control strategy, and the low predicted Project concentration, the TSS in stormwater runoff from the Project is not expected to "cause a nuisance or adversely affect beneficial uses in the receiving waters," consistent with the Basin Plan's (1994) narrative objective.

Nutrients

Comparison of Existing and Proposed Project Conditions: Average annual loads for TKN and total phosphorus are predicted to decrease with implementation of the Project by 35% and 34%, respectively. Average annual concentrations similarly are predicted to decrease through treatment mechanisms of the proposed BMPs by 22% and 21%, respectively. Although the nitrate concentration is expected to increase by 10%, the nitrate load is expected to decrease by 9% due to volume loss through the BMP. Also, the total nitrogen load (sum of TKN and nitrate loads) is predicted to decrease, from 375 lb/yr to 269 lb/yr (28% decrease).

Source control BMPs that target nutrients include educational materials on the proper handling of fertilizers and pet waste management, the use of integrated pest management practices for golf courses and common area landscape management, the development of a Golf Course Water Quality Management Plan (including plans for optimized fertilizer application practices), the use of native and/or non-invasive vegetation, and the use of efficient irrigation systems in common and golf course areas. Only the effects of the detention basin BMP are reflected in the model results. As a result, the analysis is conservative.

Comparison with Water Quality Criteria: The Basin Plan (1994) contains biostimulatory-based "desired goals" for total nitrogen. The combined predicted average annual concentration for nitrate and TKN is higher than the desired goal for total nitrogen of 1.0 mg/L. The predicted average annual concentration for TP also is higher than the desired goal of 0.1 mg/L. However, if no BMPs were implemented at the site, the proposed conditions would increase these pollutant concentrations above the concentrations estimated for the existing conditions and land uses. With the BMPs, the Project will improve nutrient loadings as compared to current conditions for TKN and TP. Similarly to TSS, nitrate concentration is shown to increase in the model because the largest source and highest concentration of nitrate is from open space in both the existing and proposed conditions. In the proposed condition, there is less runoff from the development area than in the existing condition, which has the effect of providing less "dilution" for the runoff from open space. Also, detention basins typically do not provide statistically significant reductions to nitrate concentrations.

Based on the comprehensive site design, source control, and treatment control strategy, potential impacts associated with nutrients are predicted to be less than significant due to the overall reduction of nutrient loads from existing to proposed conditions.

Metals

Comparison of Existing and Proposed Project Conditions: Average annual loads for total copper, total lead, and total zinc are predicted to decrease by 38%, 22%, and 54%, respectively, from the existing to proposed condition, based on changes in land use, volume reduction, and treatment within the BMPs. Average annual concentrations of these metals are also predicted to decrease by 26%, 6%, and 45%, respectively.

Sources of metals include automobile components, infrastructure materials, and atmospheric deposition. Specific source controls that will be implemented to minimize increases in trace metals include directing drainage from impervious areas to vegetated BMPs. Source controls that target metals include education for site operators and guests and proper BMP maintenance. Only the effects of the detention basin BMPs are reflected in the model results.

Comparison with Water Quality Criteria: The CTR criteria are the applicable water quality objectives for protection of aquatic life. The CTR criteria are expressed for acute (1 hour) and chronic (4-day average) conditions; however, only acute conditions were considered to be applicable for stormwater discharges because the duration of stormwater discharge is consistently less than 4 days. The CTR criteria are calculated on the basis of the hardness of the receiving waters. Lower hardness concentrations result in lower, more stringent CTR criteria.

The comparison of the predicted average annual stormwater discharge concentrations for the proposed condition to the benchmark CTR values shows that total lead, copper, and zinc concentrations are predicted to be less than the benchmark water quality criteria.

Therefore, because the metals concentrations will be reduced over existing conditions and they are predicted to be less than the CTR, the Project is expected to have a less than significant impact on surface water quality resulting from the discharge of trace metals.

7.2 Impact Assessment for Pollutants of Concern Addressed without Modeling

The following POCs were analyzed *qualitatively* due to either limited storm water monitoring data, because the constituents are more difficult to measure (and therefore sufficient monitoring data is not available or is not statistically reliable), because available data indicates levels of the

pollutants below detection limits, and/or because meaningful determinations about the effect of the pollutants on water quality could not be made from a quantitative analysis:

- Pesticides
- Pathogens
- Hydrocarbons
- Trash and debris
- Oxygen demanding substances
- Temperature
- pH

Pesticides

Pesticides can be of concern where past farming practices involved the application of persistent organochlorine pesticides or with maintained landscape areas, like golf courses.

In the proposed condition, pesticides may be applied to common landscaped areas, residential lawns and gardens, and the golf course. Pesticides that have been commonly found in urban streams include the organophosphate pesticides chlorpyrifos and diazinon (Katznelson and Mumley, 1997). However, only 0 to 13% of the samples in the Los Angeles County database had detectable levels of diazinon (depending on the land use) while levels of chlorpyrifos were below detection limits for all land uses in all samples taken between 1994 and 2000 (LACDPW, 2000). Other pesticides presented in the database seldom were measured above detection limits. Furthermore, these data represent flows from areas without treatment controls, unlike the Project, which will incorporate treatment control BMPs.

Diazinon and chlorpyrifos are two pesticides of concern due to their potential toxicity in receiving waters. The EPA banned all indoor uses of diazinon in 2002 and stopped all sales for all outdoor non-agricultural use in 2003 (EPA, June, 2002)[3]. With no agricultural uses planned

[3] Changes to the use of chlorpyrifos include reductions in the residue tolerances for agricultural use, phases out nearly all indoor and outdoor residential uses, and also stops non-residential uses where children may be exposed. Retail sales of chlorpyrifos were stopped by December 31, 2001, and structural (e.g. construction) uses were phased out by December 31, 2005. Some continued uses will be allowed, for example public health use for fire ant eradication and mosquito control will be permitted by professionals.

Permissible uses of diazinon will also be restricted. All indoor uses are prohibited (as of 12/2002) and retailers were required to end sales for indoor use on December, 2002. All outdoor non-agricultural uses were phased out by December 31, 2004. Therefore it is likely that the EPA ban will eliminate most of the use of diazinon within the

for the Project, diazinon would not be used at the Project site. The EPA also has phased out most indoor and outdoor residential uses of chlorpyrifos and has stopped all non-residential uses where children may be exposed. Use of chlorpyrifos in the Project area is not expected, with the possible exception of emergency fire ant eradications until such time as reasonable alternative products are available and only with appropriate application practices in accordance with the golf course and landscape pesticide management program.

Source control measures, such as education programs for owners, occupants, and employees in the proper application, storage, and disposal of pesticides, are the most promising strategies for controlling the pesticides used post-development. Structural treatment controls are less practical because of the variety of pesticides and wide range of chemical properties that affect their ability to treat these compounds. However, most pesticides, including historical pesticides that may be present at the site, are relatively insoluble in water and therefore tend to adsorb to the surfaces of sediment, which will be stabilized with development, or if eroded, will be settled or filtered out of the water column in the water quality treatment BMPs. Thus, treatment in the bioretention, vegetated swales, media filtration, and detention basins should achieve some removal of pesticides from stormwater as TSS is reduced.

While pesticides are subject to degradation, they vary in how long they maintain their ability to eradicate pests. Some break down almost immediately into nontoxic byproducts, while others can remain active for longer periods of time. While pesticides that degrade rapidly are less likely to adversely affect non-targeted organisms, in some instances it may be more advantageous to apply longer-lasting pesticides if it results in fewer applications or smaller amounts of pesticide use. Careful consideration will be made as to the appropriate type of pesticides for use on the Project site. While pesticide use is likely to occur due to maintenance of landscaped areas, particularly around the overnight accommodations of the development, careful selection, storage and application of these chemicals for use in common areas will help prevent adverse water quality impacts from occurring. Additionally, as discussed above, removal of sediments in the BMPs also will remove sediment-adsorbed pesticides. Based on the incorporation of site design, source control, and treatment control BMPs, potential post-development impacts associated with pesticides are expected to be less than significant.

NRSP area. The use of diazinon for many agricultural crops has been eliminated (EPA 2001), while some use of this chemical will continue to be permitted for some agricultural activities.

Pathogens

Pathogens are viruses, bacteria, and protozoa that can cause illness in humans. Identifying pathogens in water is difficult as the number of pathogens is exceedingly small requiring sampling and filtering large volumes of water. Traditionally water managers have relied on measuring "pathogen indicators", such as total and fecal coliform, as an indirect measure of the presence of pathogens. Although such indicators were considered reliable for sewage samples, indicator organisms are not necessarily reliable indicators of viable pathogenic viruses, bacteria, or protozoa in stormwater because coliform bacteria, in addition to being found in the digestive systems of warm-blooded animals, are also found in plants and soil. Certain pathogen indicators can multiply in the field if the substrate, temperature, moisture, and nutrient conditions are suitable. Paulsen and List summarize the debate over the use of pathogenic indicators and indicate scientific studies show no correlation between pathogens and therefore may not indicate a significant potential for causing human illness (Paulsen and List, 2005). In a recent field study conducted by Schroeder, et. al, pathogens (in the form of viruses, bacteria, or protozoa) were found to occur in 12 of 97 samples taken, but the samples that contained pathogens did not correlate with the concentrations of indicator organisms (Schroeder, et. al, 2002).

There are numerous sources of pathogen indicators, including birds and other wildlife, as well as domesticated animals and pets, soils, and plant matter. Anthropogenic sources, which are the focus of the Project BMPs, may include poorly functioning septic systems, cross-connections between sewer and storm drains, and the utilization of outdoor areas for human waste disposal by people without access to indoor sanitary facilities.

Natural levels of bacteria are present in the Project's receiving waters and that control of such natural sources is not required nor desired by regulatory agencies. For example, the LARWQCB TMDL for Bacteria in the Malibu Creek Watershed makes provisions for background levels of bacteria associated with natural sources (LARWQCB, 2004).

Data collected from undeveloped watersheds or watersheds with little development indicate that bacterial standards are often exceeded from undeveloped areas. For example, monitoring data obtained by Los Angeles County (LACDPW, 2000) for the vacant land use showed a mean fecal coliform concentration of 1,397 MPN/100 mL in 21 samples (compared to the REC1 water quality criteria of 400 MPN/100 mL). EPA has recognized that routine exceedances of ambient water quality criteria due to natural sources of pollution occur. In response, EPA has recommended changes to designated uses as the most appropriate way to address these situations (Paulsen and List, 2005).

EPA has compiled an extensive database on stormwater data collected as part of its program to regulate stormwater (Pitt, et. al, 2003). These data were drawn from 65 programs in 17 states throughout the United States. The data indicate that median fecal concentrations range from about 4,500 to 7,700 MPN/100 mL for a range of commercial and residential land uses, compared to a median value of around 3,000 MPN/100 mL for open space and vacant land. These data represent urban areas that in general do not have source and treatment controls, and therefore are not indicative of runoff from the Project.

Additionally, a study conducted by PBS&J in coastal watersheds near Laguna Beach in Orange County (PBS&J, 1999) found indicator bacteria concentrations in receiving waters downstream from the developed/urban watersheds were not significantly different than concentrations in receiving waters downstream from undeveloped watersheds. Additional analysis conducted by Paulsen and List (Paulsen and List, 2005) further supported these findings. These studies suggest the development of the Project would not result in appreciable changes in pathogen levels in the receiving waters compared to existing conditions. In fact, due to the volume reductions and BMP treatment, the pathogen loads are expected to decrease.

The primary sources of fecal coliform from the Project likely would be sediment, wildlife, and growth in the storm drain system itself. Other sources of pathogens and pathogen indicators, such as cross-connections between sanitary and storm sewers, are unlikely given modern sanitary sewer installation methods and inspection and maintenance practices following the construction of the Project.

The levels of bacteria in runoff from the Project will be reduced by virtue of the proposed source control and treatment control BMPs. The most effective means of controlling wastes from human interaction with wildlife is through source control, specifically education regarding feeding of waterfowl near waterbodies, providing products and disposal containers that encourage and facilitate cleaning up after pets, and storm drain cleaning practices.

Although there are limited data on the effectiveness of vegetated swales to treat pathogen indicators, the treatment processes known to be occurring in swales involve sunlight (ultraviolet light) degradation, sedimentation, and infiltration, all of which can reduce pathogen concentrations and loads. The proposed swales are to be located on relatively infiltrative soils and pathogen removal by filtration is a common and effective practice in wastewater treatment.

In addition to removal/treatment by vegetated swales, sand caps are proposed for the Project. Bioretention is a filtration-type BMP similar in function to the sand caps, as it relies on filtration through the soil column for water quality treatment. Filtration is one of the more effective means

of treating pathogen indicators. The City of Austin, Texas conducted a number of studies on the effectiveness of sedimentation/ filtration treatment systems for treating stormwater runoff (City of Austin, 1990; CWP, 1996). Most of the structures were designed to treat the first ½ inch of runoff. Data from four sand filters indicated a range of removals from 37 percent to 83 percent for fecal coliform, and 25 percent to 81 percent for fecal streptococci. Research on the use of filtration to remove bacteria also has been conducted in Florida by the Southwest Florida Water Management District (Kurz, 1999). Significant ($p<0.05$) reductions in total and fecal coliform bacteria and the other indicators were observed between inflow and outflow samples for sand filtration. Percent reductions were measured using flow-weighted sampling techniques. Total coliform bacteria removals were less than 70 percent, and fecal coliform bacteria reduction varied from 65 percent to 100 percent. In a literature summary, EPA reported typical pathogen removal for infiltration basins and trenches as 65 to 100 percent (EPA, 1993). Over 50% average indicator bacteria concentration reductions were also reported in the following additional sand filter performance studies: Caltrans, 2004, Schueler, 2002, Glick, et. al, 1998, Galli, 1990, and Rusciano, 2005.

In summary, the Project will include a comprehensive set of source and treatment control BMPs selected to manage pathogen indicators, reduce their loadings and therefore potential post-development water quality impacts related to pathogens are considered less than significant.

Hydrocarbons

Various forms of hydrocarbons (oil and grease) are common constituents associated with urban runoff; however, these constituents are difficult to measure and are typically measured with grab samples, making it difficult to develop reliable EMCs for modeling. Based on this consideration, hydrocarbons were not modeled but are addressed qualitatively.

Hydrocarbons are a broad class of compounds, most of which are non-toxic. Hydrocarbons are hydrophobic (low solubility in water), have the potential to volatilize, and most forms are biodegradable. A subset of hydrocarbons, Polynuclear Aromatic Hydrocarbons (PAHs) can be toxic depending on the concentration levels, exposure history, and sensitivity of the receptor organisms. Of particular concern are those PAH compounds associated with transportation-related sources.

The concentration of hydrocarbons in runoff is expected to decrease under post-development conditions due to the treatment BMPs proposed. Source control BMPs that address petroleum hydrocarbons include educational materials on used oil programs, carpooling, and public transportation alternatives to driving; BMP maintenance; and street sweeping private streets.

Lastly, the parking lot site design, source controls, treatment BMPs and vegetation and soils within the treatment control BMPs will adsorb the low levels of emulsified oils in stormwater runoff, preventing discharge of hydrocarbons and visible film in the discharge or the coating of objects in the receiving water.

The majority of PAHs in stormwater adsorb to the organic carbon fraction of particulates in the runoff, including soot carbon generated from vehicle exhaust (Ribes, et. al, 2003). For example, a stormwater runoff study by Marslek, et. al (1997) found that the dissolved-phase PAHs represented less than 11 percent of the total concentration of PAHs. Consequently, the vegetated swales, detention basins, bioretention, and sand caps proposed as BMPs, which are designed to treat pollutants through stormwater capture/reuse, filtration, and infiltration, will be effective at treating PAHs.

Los Angeles County conducted PAH analyses on 27 stormwater samples from a variety of land uses in the period 1994-2000 (LACDPW, 2000). For those land uses where sufficient samples were taken and were above detection levels to estimate statistics, the mean concentrations of individual PAH compounds ranged from 0.04 to 0.83 µg/L. The reported means were less than acute toxicity criteria available from the literature (Suter and Tsao, 1996). Moreover, the Los Angeles County data do not account for any treatment, whereas the treatment in the BMPs should result in a significant reduction in hydrocarbon concentrations inclusive of PAHs. This makes it very unlikely that impacts will occur to the receiving water due to hydrocarbon loads or concentrations. In addition, the Project will reduce loadings of PAHs over the existing conditions. On this basis, hydrocarbon concentrations in post-development runoff discharges are not expected to significantly impact the receiving waters of the Project site.

During the construction phase of the Project, hydrocarbons in site runoff could result from construction equipment/vehicle fueling or spills. Construction related impacts are addressed in Section 7.3 below. However, pursuant to the Construction General Permit, the Construction Stormwater Pollution Prevention Plan must include BMPs that address proper handling of petroleum products on the construction site, such as proper petroleum product storage and spill response practices, and those BMPs must effectively prevent the release of hydrocarbons to runoff per the Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology standards. PAH that are adsorbed to sediment during the construction phase would be effectively controlled via the erosion and sediment control BMPs. For these reasons, construction-related impacts related to hydrocarbons on water quality are considered less than significant.

Trash and Debris

Urban development tends to generate significant amounts of trash and debris. Trash refers to any human-derived materials including paper, plastics, metals, glass and cloth. Debris is defined as any organic material transported by stormwater, including leaves, twigs, and grass clippings (DLWC, 1996). Debris can be associated with the natural condition. Trash and debris is often characterized as material retained on a 5-mm mesh screen. It contributes to the degradation of receiving waters by imposing an oxygen demand, attracting pests, disturbing physical habitats, clogging storm drains and conveyance culverts and mobilizing nutrients, pathogens, metals, and other pollutants that may be attached to the surface. Sources of trash in developed areas can be both accidental and intentional. During wet weather events, gross debris deposited on paved surfaces can be transported to storm drains, where it can be eventually discharged to receiving waters. Trash and debris can also be mobilized by wind and transported directly into waterways. Trash and debris can impose an oxygen demand on the water body as organic matter decomposes.

Urbanization could significantly increase trash and debris loads if left unchecked. However, the BMPs, including source control and treatment BMPs, will minimize the adverse impacts of trash and debris and with the site BMPs should reduce them over existing conditions. Source controls such as public education and storm drain stenciling can be effective in reducing the amount of trash and debris that is available for mobilization during wet and dry weather events. Common area litter control will include a litter patrol, covered trash receptacles, and emptying of trash receptacles in a timely fashion. Catch basin inserts will be provided for parking lot inlets (when stormwater is routed to a below ground inlet instead of directly to a bioswale or bioretention area). The BMPs will remove or prevent the release of floating materials, including solids, liquids, foam, or scum, from runoff discharges and will prevent impacts on dissolved oxygen in the receiving water due to decomposing debris. Based on these considerations, post-development trash and debris will not significantly impact the receiving waters of the Project site.

During the construction phase, there is potential for an increase in trash and debris loads due to lack of proper contractor good housekeeping practices at the construction site. Per the Construction General Permit, the SWPPP for the site will include BMPs for trash control (catch basin inserts, good housekeeping practices, etc.). Compliance with the Permit Requirements and inclusion of these BMPs meeting BAT/BCT in the SWPPP will reduce impacts from trash and debris to a less than significant level. See Section 7.3 below for a full discussion of Construction Related Impacts.

Oxygen Demanding Substances

Concentrations of the oxygen demanding substances, including TN and TP in stormwater runoff, are expected to decrease after Project development, as discussed above. In addition, BMPs for application, use and management of fertilizers during and after construction will be a part of the integrated fertilizer and pest management program. Structural controls, such as proper cover of trash/food service areas and landscape maintenance storage areas, will be employed to prevent rainfall from coming in contact with refuse, oil and grease, and other organic matter such as grass clippings. With incorporation of these BMPs the Project will comply with the requirements of the MS4 Permit and implementation plans, and Project impacts with respect to oxygen demanding substances will be less than significant.

Temperature

Stormwater runoff from the Project site will be treated by infiltration basins, pervious pavement, green roofs, bioretention, sand caps, and bioswales sized to meet or exceed regulatory requirements. These BMPs will provide temperature reduction in two ways: slowing down runoff and increasing infiltration, thereby increasing base flows and reducing the total amount of water discharging to the creek and resulting in a decrease to stormwater temperatures from the Project site. Based on this, as well as the fact that beneficial uses for the Project receiving waters include warm freshwater habitat, potential post-development impacts associated with temperature are expected to be less than significant.

pH

The pH of water is an indication of its relative acidity. The pH level of water can disrupt biological function of organisms if either too basic or acidic. A rise in pH can cause ammonia to become toxic to fish, while a drop in pH may increase metals concentrations due to the increased ability of metals to dissolve into the water from a sediment-bound state (Missouri DNR, 2007). Water pH is therefore an indirect indicator of aquatic toxicity. Constituents that may cause toxicity can include trace metals (e.g., copper, lead, and zinc), pesticides, and polycyclic aromatic hydrocarbons. These primary indicators are adequately represented by direct assessment and will be reduced to acceptable levels through the on-site BMPs, making pH less of a concern for the Project site.

The Basin Plan (1994) specifies that "the pH of inland surface waters shall not be depressed below 6. 5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.5 units from natural conditions as a result of waste discharge." Existing data from Location MGC-5 (Figure 5) shows that the average pH level exiting the most

downstream point of the site is 7.35 (n = 29). These results provide supporting evidence that effluent pH from the Project site falls within the acceptable pH range as defined by the Basin Plan.

7.3 Construction Related Impacts

The analysis of potential impacts of construction activities, construction materials, and non-stormwater runoff on water quality during the construction phase focused primarily on sediment (TSS and turbidity) and certain non-sediment related pollutants. Construction-related activities that are primarily responsible for sediment releases are related to exposing previously stabilized soils to potential mobilization by rainfall/runoff and wind. Such activities include removal of vegetation from the site, grading of the site, and trenching for infrastructure improvements. Environmental factors that affect erosion include topographic, soil, and rainfall characteristics. Non sediment-related pollutants that are also of concern during construction relate to construction materials and non-stormwater flows and include construction materials (e.g., paint, stucco, etc.), chemicals, liquid products, and petroleum products used in building construction or the maintenance of heavy equipment. Concrete-related pollutants are also of concern during construction.

Construction impacts due to Project development will be minimized through compliance with the Construction General Permit. This permit requires the discharger to perform a risk assessment for the proposed development (with differing requirements based upon the determined level) and to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), which must include erosion and sediment control BMPs that meet or exceed measures required by the determined risk level of the Construction General Permit, as well as BMPs that control the other potential construction-related pollutants. A Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction is a required component of the SWPPP. BMPs required by the Construction General Permit will be incorporated as required for the determined level of risk. For example, although most project are categorized as Risk Level 2, if final design analysis indicates that the Project will fall under Risk Level 3, the additional Level 3 permit requirements will be implemented, as necessary.

The General Order for Dewatering will minimize impacts from construction dewatering and other non-stormwater discharges regulated by the General Order. The discharger would be required to screen the effluent for priority pollutants to ensure there are no pollutants present that would preclude coverage under the General Order, comply with numeric effluent limitations, conduct effluent and receiving water monitoring during the discharge, and submit a discharge report to the LARWQCB for every discharge.

Erosion and Sediment Control BMPs to be implemented during Construction

Erosion control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap or filter sediment once mobilized. A SWPPP will be developed as required by, and in compliance with, the Construction General Permit. The General Permit requires the SWPPP to include BMPs to be selected and implemented based on the determined project risk level to effectively control erosion and sediment to the BAT/BCT. The types of BMPs to be implemented as needed during construction are listed in Section 5.1.

Based on these factors, the impact of construction-related runoff from the Project will be less than significant.

7.4 MS4 Permit Related Impacts

The Project will meet the hydromodification performance criteria designated in the LA County MS4 NPDES Permit under Part VI.D.7.c.iv.(1)(c)(d)(i) (as discussed in Section 3.7) and, therefore, MS4 Permit impacts related to hydromodification are considered less than significant.

The Project also will meet the water quality performance criteria designated in the LA County MS4 NPDES Permit under Part VI.D.7.c.i.(2)(b) (as discussed in Section 3.7) and, therefore, MS4 Permit impacts related to water quality are considered less than significant.

7.5 LID Ordinance Related Impacts

All site BMPs will be designed in accordance with the County of Los Angeles LID Standards Manual (County of Los Angeles, 2009). As a result, the Project will have a less than significant impact on LID impacts related to water quality.

7.6 Dry Weather Runoff Related Impacts

The above discussion focused on the changes in water quality during wet weather. However, water quality effects during dry weather conditions also are important. The following describes potential Project impacts on dry weather water quality.

A combination of efficient irrigation practices (as a source control BMP) and the use of infiltration-type treatment control BMPs will ensure dry weather flows from pervious Project areas are captured to the maximum extent practicable.

Dry weather flows are typically low in sediment because the flow rates are relatively low and the more coarse suspended sediment is generally not entrained in these flows or tends to settle out or

are filtered out by vegetation. As a consequence, pollutants that tend to be associated with suspended solids (e.g., phosphorus, most trace metals, and some pesticides) are typically found in very low concentrations in dry weather flows. Therefore, the focus is on constituents that tend to be dissolved (e.g., nitrate) or constituents that are so small as to be effectively transported (e.g., pathogen indicators).

The Las Virgenes Municipal Water District (LVMWD) currently provides potable water service to the MGC, and would continue to provide potable water for the Project. Additional irrigation water for the golf course is supplied by six private wells located on-site, which would continue to be used by the Project to supplement imported water supplies to meet irrigation demands. The redesigned golf course would be constructed with water conservation features to reduce irrigation demands by approximately 33 percent, and would be irrigated by a combination of potable water provided by LVMWD, well water from on-site private wells, and reclaimed water from the Project's proposed On-site Wastewater Recycling System. In order to reduce the potential generation of dry weather flows, landscape watering would be controlled by utilizing advanced metering systems designed to minimize or eliminate excess watering. Moreover, any dry weather flows would be routed to the LID BMPs, which would completely contain them, preventing dry weather discharges from the Project. On this basis, the impact of the Project on dry weather water quality would be less than significant.

7.7 Hydromodification Impacts

Development typically increases impervious surfaces on formerly undeveloped (or less developed) landscapes, reducing the capture and infiltration of rainfall. As a watershed develops, a larger percentage of rainfall becomes runoff during any given storm. In addition, runoff reaches the stream channel more efficiently due to the development of storm drain systems, so the peak discharge rates for rainfall events and floods are higher for an equivalent event than they were prior to development. Further, the introduction of irrigation and other dry weather flows can change the seasonality of runoff reaching natural receiving waters. These changes, in turn, affect the stability and habitat of natural drainages, including the physical and biological character of these drainages. This process, termed "hydromodification" (SCCWRP, 2005) is addressed in this section.

Significant adverse hydromodification impacts are presumed to occur if the Project would:

- Substantially alter the existing drainage pattern of a natural drainage, stream, or river causing substantial erosion, siltation, or channel instability in a manner that adversely affects beneficial uses.

Three strategies will be used by the Project to prevent and control hydromodification impacts to the natural drainage:

- Preservation of natural hydrologic conditions;
- Project-based hydrologic source control; and
- Project-based flow control.

Hydromodification control BMPs developed for the Project are intended to protect the Project's receiving water from hydromodification that typically occurs as a result of development. As a result of the Project, the flow rates, velocities, depth/width ratios, and total storm volumes during the 2-, 5-, 10-, 25-, and 50-year storm events are not expected to increase over existing conditions due to the preservation of 81% of the site's current natural hydrologic features, no increase in overall Project site imperviousness, the incorporation of LID BMPs to cumulatively infiltrate the LID/SUSMP 85th percentile 24-hour storm, and the inclusion of two outlet controlled detention basins which control flows associated with storm events exceeding the 85th percentile 24-hour storm event up to the 50-year 24-hour storm event.

The LID calculator, used in accordance with the LID Manual to meet the LID and SUSMP hydromodification requirements, calculates the proposed flow and volume requiring mitigation from the 85th percentile 24-hour storm due to a project. The calculator does not provide a means of determining existing flows, existing and proposed velocities, or existing and proposed depth/width ratios. However, due to the proposed LID BMPs, the Project is expected to fully mitigate the 85th percentile 24-hour storm, protecting the receiving water from any hydromodification. The results from this analysis using the LID calculator are shown in the following table.

Table 7-4: LID BMP Mitigation Potential Compared to Predicted Site Runoff Volume

Runoff Volume from the 85th Percentile – 24-hour Storm (LID/SUSMP Design Storm)			Mitigation Potential of LID BMPs (ft^3)	% of Site Volume Mitigated
Pre-Development (ft^3)	Post-Development (ft^3)	Change in Runoff Volume (ft^3)		
7,563	37,188	29,625	81,444	100

The entire volume from the 85th percentile 24-hour storm will be mitigated as a result of the proposed BMPs on the Project site, resulting in the associated post-developed peak flows, velocities, and depth/width ratios being less than existing conditions and therefore consistent with the performance standard.

The following results from the hydrology and hydraulic analysis comparing the pre- and post-development hydrologic and hydraulic conditions illustrate the Project will achieve the hydromodification performance standard for the 2-, 5-, 10-, 25-, and 50-year storms as well.

Table 7-5: Existing and Proposed Conditions at the Project Site Outlet for all Hydrologic Conditions Analyzed

Design Storm		2-yr	5-yr	10-yr	25-yr	50-yr
Maximum Flow[a] (cfs)	Existing	84.1	207.6	383.4	678	911
	Proposed/BMPs	82.3	203.1	373.3	650	870
Maximum Velocity (fps)	Existing	6.6	8.8	10.5	12.5	14.1
	Proposed/BMPs	6.6	8.7	10.5	12.4	13.9
Total Runoff Volume (ac-ft)	Existing	45.7	74.5	98.6	128	151
	Proposed/BMPs	44.4	72.5	96.2	125	148
Depth/width Ratio[b] (ft/ft)	Existing	0.180	0.284	0.387	0.510	0.719
	Proposed/BMPs	0.180	0.281	0.384	0.504	0.710

[a] The modeling output data were analyzed at the point of discharge from the Site to the natural drainage to determine the maximum flows, maximum velocities, and depth/width ratios. The total runoff volume was calculated as the total volume produced by each design storm.

[b] The depth was calculated to be the difference between the water surface elevation and the minimum channel elevation provided in the HEC-RAS model output.

Furthermore, while the changes in sediment transport were not assessed per methods designated in the LA County LID Manual (LA County, 2009) due to flow threshold non-applicability, existing sediment processes were maintained to the extent feasible. Because sediment has historically been deposited and trapped on the golf course, existing sediment delivery from the portion of the site being developed as part of this Project is very low and is not expected to be impacted by the Project. Additionally, the proposed development does not increase the impervious area of the Project site based on existing conditions and provides increased slope stabilization, thus limiting any increase in sediment delivery.

In summary, on-site hydromodification control BMPs designed to meet the Project's hydromodification control performance standard will protect the Project's receiving waters from excessive erosion and degradation caused by discharges from the Project. For this reason, hydromodification impacts resulting from the Project will be less than significant.

7.8 Groundwater Impacts

Discharge from the Project's development area to groundwater could occur via two pathways: 1) through infiltration of urban runoff captured and infiltrated in the proposed LID BMPs, and 2) through infiltration of recycled wastewater used for irrigation. The development area of the Project site does not contribute to a major groundwater basin as listed in the Basin Plan. Therefore, there are no applicable Basin Plan groundwater quality objectives to be met. The LID BMPs include filtering through organic soils, which will provide removal of most pollutants prior to deeper infiltration. This behavior has been confirmed by data collected beneath stormwater detention/retention ponds in Fresno (conducted as part of the Nationwide Urban Runoff Program), which showed trace metals tended to be adsorbed in the upper few feet in the bottom sediments (Brown and Caldwell, 1984).

Additionally, per the SWRCB's Recycled Water Policy, cumulative groundwater impacts must be managed under a regional Salt and Nutrient Management Plan. Based on compliance with these requirements designed to protect beneficial uses, cumulative groundwater quality impacts will be mitigated to a less than significant level.

7.9 Cumulative Impacts

Cumulative Surface Water and Hydromodification Impacts

As discussed above, the anticipated quality of effluent expected from the BMPs will not contribute concentrations of POCs that would be expected to cause or contribute to a violation of the water quality standards in the Project's surface receiving waters. Therefore, the Project's incremental effects on surface water quality are not expected to be significant. In addition, the proposed infiltration BMPs will be sized to meet the hydromodification control standard. Therefore, the Project's incremental effects on hydromodification will be less than significant. With reduced runoff as compared to existing conditions, the Project will improve hydromodification conditions over the existing condition.

The Project's surface runoff water quality, after BMPs, both during construction and post-development, is predicted to comply with adopted regulatory requirements designed by the SWRCB and LARWQCB to assure regional development does not adversely affect water quality and hydromodification in receiving streams, including the MS4 General Permit, Construction General Permit and General Dewatering Permit requirements, and benchmark Basin Plan water quality objectives, CTR criteria, and CWA 303(d) listings. Based on compliance with these requirements designed to protect beneficial uses, cumulative water quality and hydromodification impacts will be mitigated to a less than significant level. Any future urban

development occurring in the Trancas Canyon Creek and Carlisle Canyon Watersheds also must comply with these requirements.

Also, runoff from the Project site under the proposed condition (with BMPs) is predicted to yield lower pollutant loads and concentrations for most of the modeled constituents (TSS, NO3-N, TKN, total nitrogen, TP, total copper, total lead, and total zinc) than in both the existing and proposed (without BMPs) conditions. Additionally, in the context of the proposed site design, source controls, and treatment control BMPs, potential impacts associated with the qualitatively analyzed POCs in the proposed condition will be less than significant. In combination, the model results (which show an overarching improvement in stormwater runoff quality and reduction in runoff volume) and the impacts from the qualitatively assessed POCs demonstrate no cumulative negative impacts from the Project on surface water quality and hydromodification.

Cumulative Groundwater Impacts

As discussed above, the anticipated quality of stormwater runoff discharges from the Project's development area, reclaimed water used for irrigation, and discharges from septic systems would not contribute POCs expected to cause or contribute to a violation of the groundwater quality standards. BMPs incorporated into the Project in the form of LID BMPs will result in no adverse effects on groundwater recharge. The Project's incremental effects on groundwater quality will be less than significant.

The Project's discharges to groundwater, after BMPs, during construction and post-development, are predicted to comply with adopted regulatory requirements that are designed by the LARWQCB and SWRCB to assure regional development does not adversely affect water quality, including MS4 General Permit requirements and Construction General Permit requirements. In addition, per the SWRCB's Recycled Water Policy, cumulative groundwater impacts must be managed under a regional Salt and Nutrient Management Plan that also addresses CECs. Based on compliance with these requirements designed to protect beneficial uses, cumulative groundwater quality impacts will be mitigated to a less than significant level.

8. CONCLUSIONS

This section summarizes the potential effects of the Project on water quality and hydromodification.

The POCs evaluated in this water quality assessment were pathogens, pH, water soluble pesticides, fungicides, herbicides, specific conductivity, dissolved oxygen, NO3-N, NO2-N, organic-N, NH3-N, TP, TSS, trash & debris, metals (copper, lead, and zinc), organic compounds, hydrocarbons, and temperature.

Quantitative water quality pollutant loading modeling was conducted for TSS, nitrate, TKN, total phosphorus, total copper, total lead, and total zinc in support of this water quality analysis. The model considered only the effectiveness of structural BMPs without consideration of the effectiveness of source control BMPs in reducing pollutant loading. Qualitative assessments were conducted for other POCs.

Average annual runoff volumes are expected to decrease as a result of the Project. Stormwater pollutant loads are directly related to runoff volume, therefore, reduction of runoff volume is a key water quality-related benefit of the Project.

The stormwater quality modeling and qualitative analysis of the POCs supports the following conclusions:

- Average annual runoff volumes from the Project are predicted to decrease;
- On-site hydromodification control BMPs designed to meet the Project's hydromodification control performance standard will protect the Project's receiving waters from excessive erosion and degradation caused by discharges from the Project and will result in improved hydromodification conditions over the existing conditions at the Project site;
- The flow rates, velocities, and depth/width ratios and storm volumes during the SUSMP, LID, 2-, 5-, 10-, 25-, and 50-year storm events are not expected to increase over existing conditions due to the preservation of 81% of the site's natural hydrologic features, no increase in imperviousness, the incorporation of LID BMPs which cumulatively infiltrate the 85th percentile 24-hour storm, and the inclusion of two outlet controlled detention basins which control flows associated with storm events exceeding the 85th percentile 24-hour storm event up to the 50-year 24-hour storm event;

- Average annual loads for total copper, total zinc, total lead, TSS, nitrate, TKN, total nitrogen, total phosphorus are all predicted to decrease with the Project; and

- For all identified POCs, assessment results indicate no significant adverse impacts to water quality from the Project.

Accordingly, the Project will have a less than significant impact on water quality and hydromodification.

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FIGURES

Image Reference: Envicom Corporation (Envicom). August 2012(b). Project Description: The Malibu Institute Project. Prepared for Malibu Associates, LLC.

Project Vicinity
Malibu Institute WQTR
Los Angeles County, California

Geosyntec consultants

PNW0167 | June 2013

Figure **1**

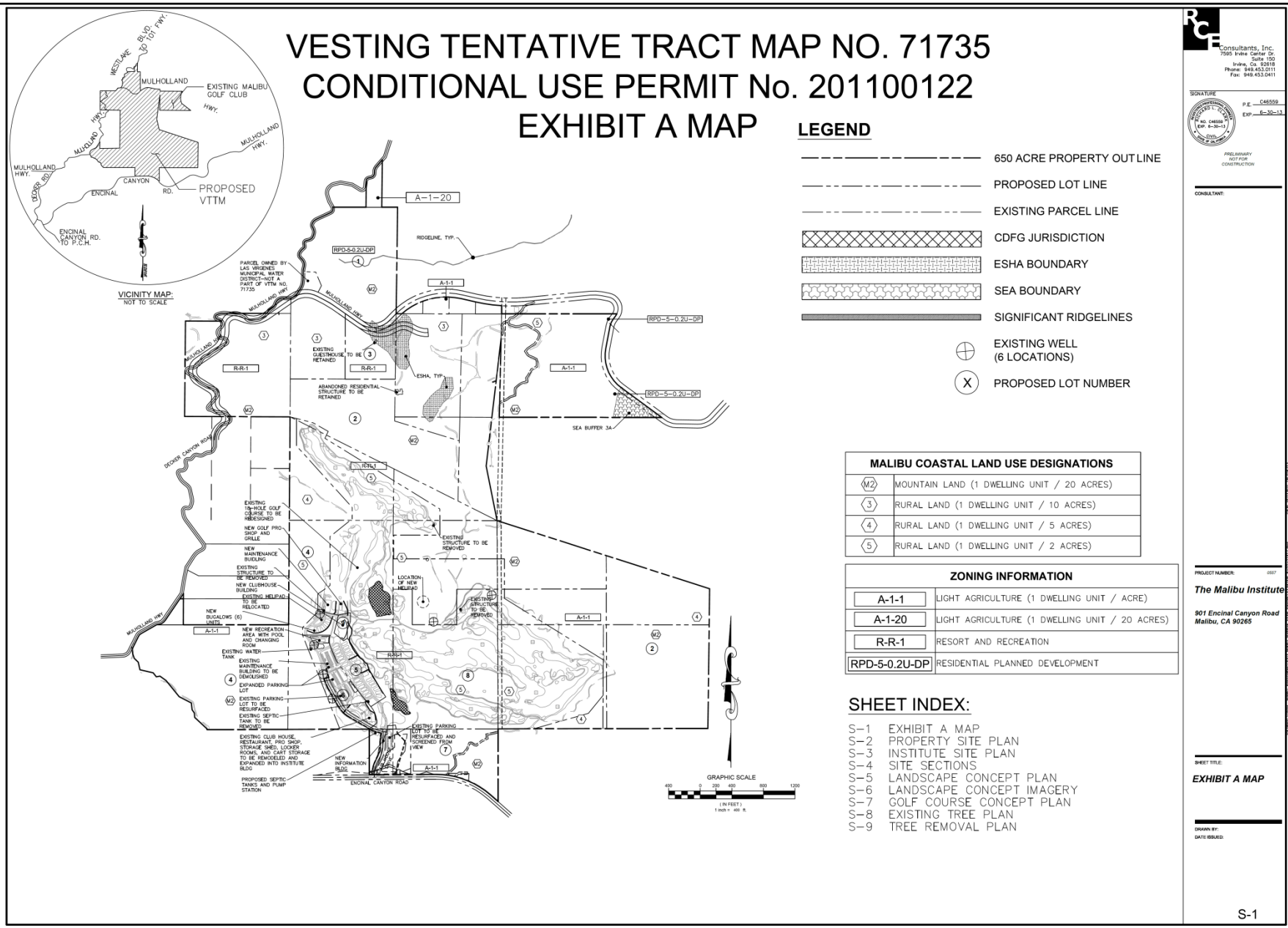


Image Reference: RCE Consultants, Inc. June, 2013. Vesting Tentative Tract Map No. 71735 Conditional Use Permit No. 201100122 Exhibit A Map.

Project Site
Malibu Institute WQTR
Los Angeles County, California

Geosyntec consultants

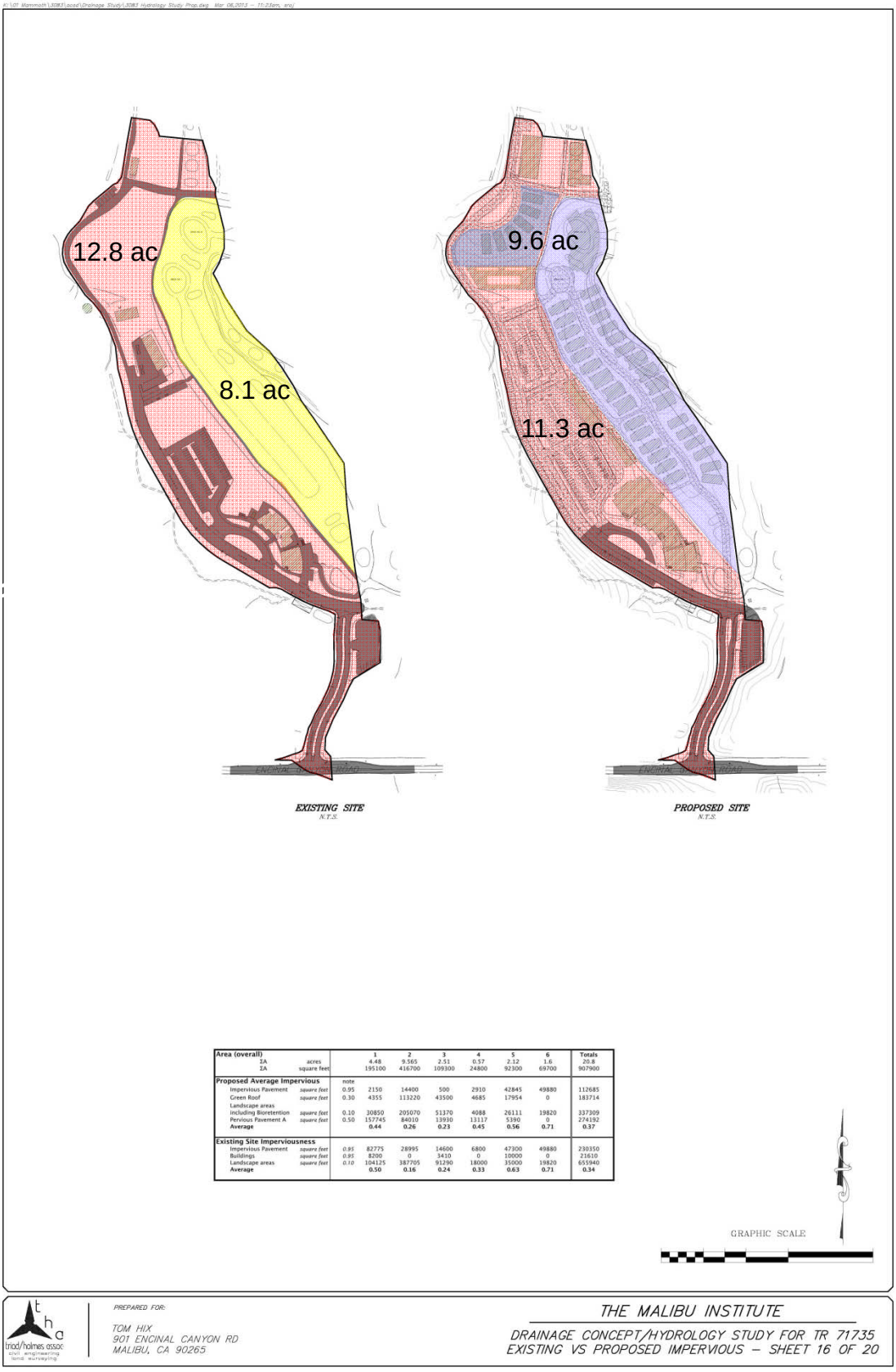
PNW0167 | June 2013

Figure **2**

Land Uses for EMC Assignment

- Commercial
- Golf Course
- HDSF Residential*

*The HDSF Res land use is being used in the water quality model to represent the portion of the Project site occupied by 160 rooms to be used for overnight accommodations. However, there will not be any actual residential land uses on the Project site.



Area (overall)			1	2	3	4	5	6	Totals
2A	acres		4.48	9.565	2.51	0.57	2.12	1.6	20.8
2A	square feet		195100	416700	109300	24800	92300	69700	907900
Proposed Average Impervious		note							
Impervious Pavement	square feet	0.95	2150	14400	500	2910	42845	49880	112685
Green Roof	square feet	0.30	4355	113220	43500	4685	17954	0	183714
Landscape areas including Bioretention	square feet	0.10	30850	205070	51370	4088	26111	19820	337309
Pervious Pavement A	square feet	0.50	15774S	84010	13930	13117	5390	0	274192
Average			0.44	0.26	0.23	0.45	0.56	0.71	0.37
Existing Site Imperviousness									
Impervious Pavement	square feet	0.95	82775	28995	14600	6800	47300	49880	230350
Buildings	square feet	0.95	8200	0	3410	0	10000	0	21610
Landscape areas	square feet	0.10	104125	387705	91290	18000	35000	19820	655940
Average			0.50	0.16	0.24	0.33	0.63	0.71	0.34

Image Reference: Triad/Holmes Associates. October 2012, Revised March 2013. The Malibu Institute Drainage Concept/ Hydrology Report for TR071735. Prepared for Malibu Associates, LLC.

Modeled land use delineation overlay added by Geosyntec

Existing and Proposed Impervious Areas
Malibu Institute WQTR
Los Angeles County, California

Geosyntec consultants

PNW0167 | June 2013

Figure **3a**

Area (overall)			1	2	3	4	5	6	Totals
2A	acres		4.48	9.57	2.51	0.57	2.12	1.60	20.8
2A	square feet		195100	416700	109300	24800	92300	69700	907900
Area for LID calc not including green roofs	acres		4.38	6.97	1.51	0.46	1.71	1.60	
Impervious[2]	%		0.81	0.38	0.29	0.78	0.65	0.71	
Soil Type			45	45	45	45	45	45	
Flowpath length (feet)	feet		1275	1855	995	280	595	605	
Flowpath slope	%		0.06	0.06	0.05	0.05	0.04	0.03	
Elevation upper	feet		1410	1400	1356	1335	1322	1315	
Elevation Lower	feet		1328	1296	1305	1322	1300	1298	
Qpm[2]	CFS		0.66	0.55	0.1	0.07	0.21	0.21	1.8
Qpm[2]	gpm		298	246	43	30	96	93	806
85th percentile storm volume[2]			1.15	1.15	1.15	1.15	1.15	1.15	
Developed Storage Volume[1]	cubic feet		13766	11334	2000	1386	4418	4284	37188
Undeveloped Storage Volume[1]	cubic feet		2072	3109	646	214	784	738	7563
BMP devices (proposed site)									
Pervious Pavement A[3]	square feet	0.95	157745	84010	13930	13117	5390	0	274192
Volume of storage	cubic feet		31549	16802	2786	2623.4	1078	0	54838.4
Green Roof[5]	square feet		4355	113220	43500	4685	17954	0	183714
Bioretention[6]	length		1000	4000	870	0			5870
area at 4 foot width	square feet	4 0.10	4000	16000	3480	0	0	0	23480
Volume of Storage	cubic feet		3200	12800	2784	0	0	0	18784
Infiltration Basin Volume of Storage	cubic feet						4500	4400	8900
Other areas (proposed site)									
Impervious Pavement	square feet	0.95	2150	14400	500	2910	42845	49880	112685
Landscape areas	square feet	0.10	26850	189070	47890	4088	26111	19820	313829
Potential Volume Mitigated	cubic feet		34749 see note[4]	29602 see note[4]	5570 see note[4]	2623 see note[4]	4500	4400	81444.4
Volume Mitigated	cubic feet		13766	11334	2000	1386	4418	4284	37188
percent mitigated			100%	100%	100%	100%	100%	100%	100%

[1] from LID calculator
[2] interpolated from map at http://dpw.lacounty.gov/wrd/hydrologygis/
[3] Pervious Pavement A is designed with a reservoir layer of 6". Assumes a 30% void ratio.
[4] BMP's highlighted by shading are not included as working toward mitigation, due to its location.
[5] Green Roofs are assumed to produce no runoff under an 85th percentile storm, so the area under green roofs has been removed from developed and undeveloped areas for determination of .
[6] Bioretention Swales are designed with a 2 foot reservoir layer. Assumes a 30% void ratio.

Image Reference: Triad/Holmes Associates. October 2012, Revised March 2013. The Malibu Institute Drainage Concept/ Hydrology Report for TR071735. Prepared for Malibu Associates, LLC.

Drainage Areas and LID Features
Malibu Institute WQTR
Los Angeles County, California

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Figure **3b**

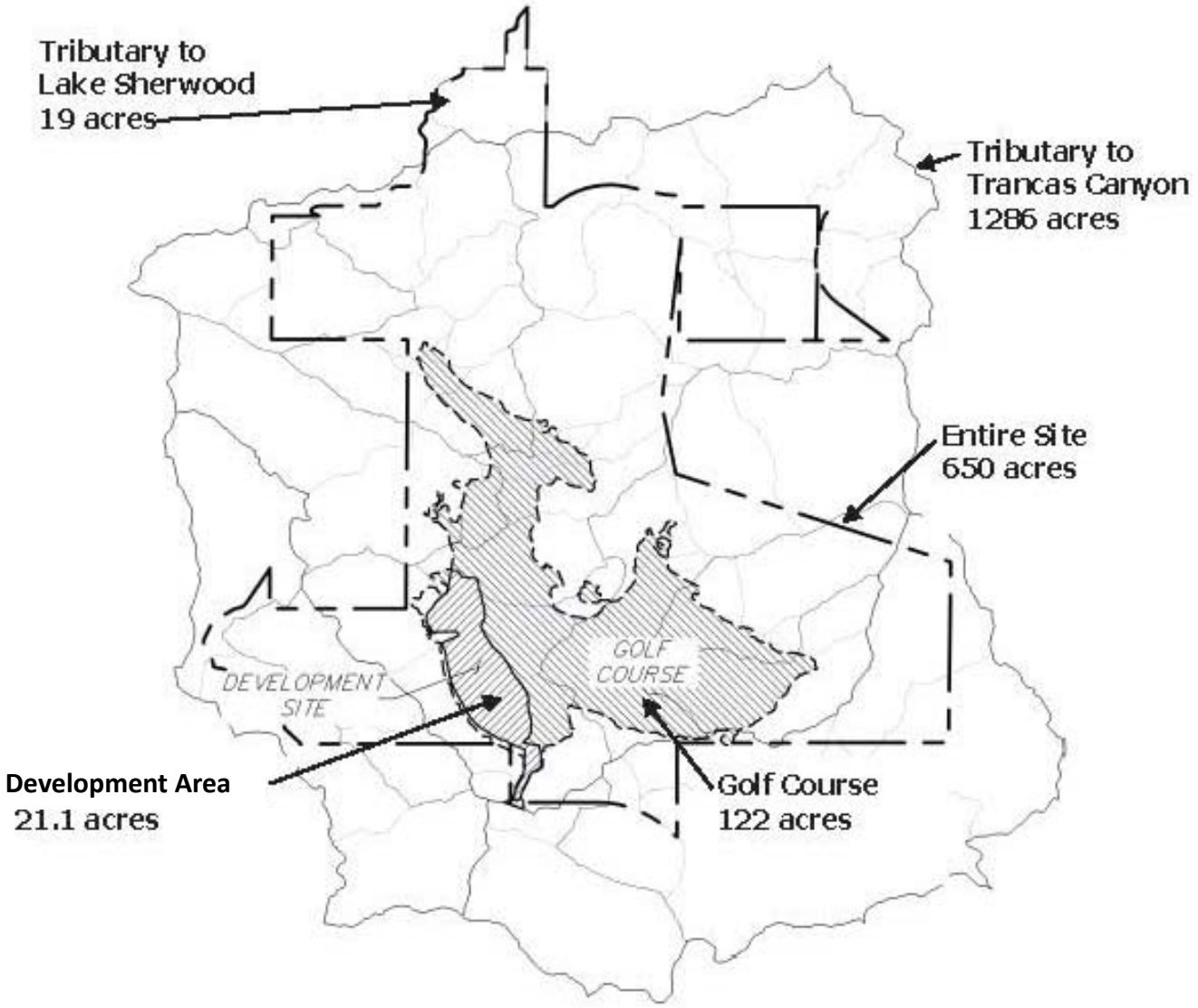

Image Reference: Triad/Holmes Associates. October 2012, Revised March 2013. The Malibu Institute Drainage Concept/ Hydrology Report for TR071735. Prepared for Malibu Associates, LLC.

Receiving Waters
Malibu Institute WQTR
Los Angeles County, California

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Figure **4**

Image Reference: Geosyntec Consultants, 2012(a). DRAFT Water Quality Monitoring Plan for Malibu Golf Club Conditional Use Permit. Prepared for Malibu Associates, LLC.

Surface Water Quality Sampling Locations
Malibu Institute WQTR
Los Angeles County, California

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Figure **5**

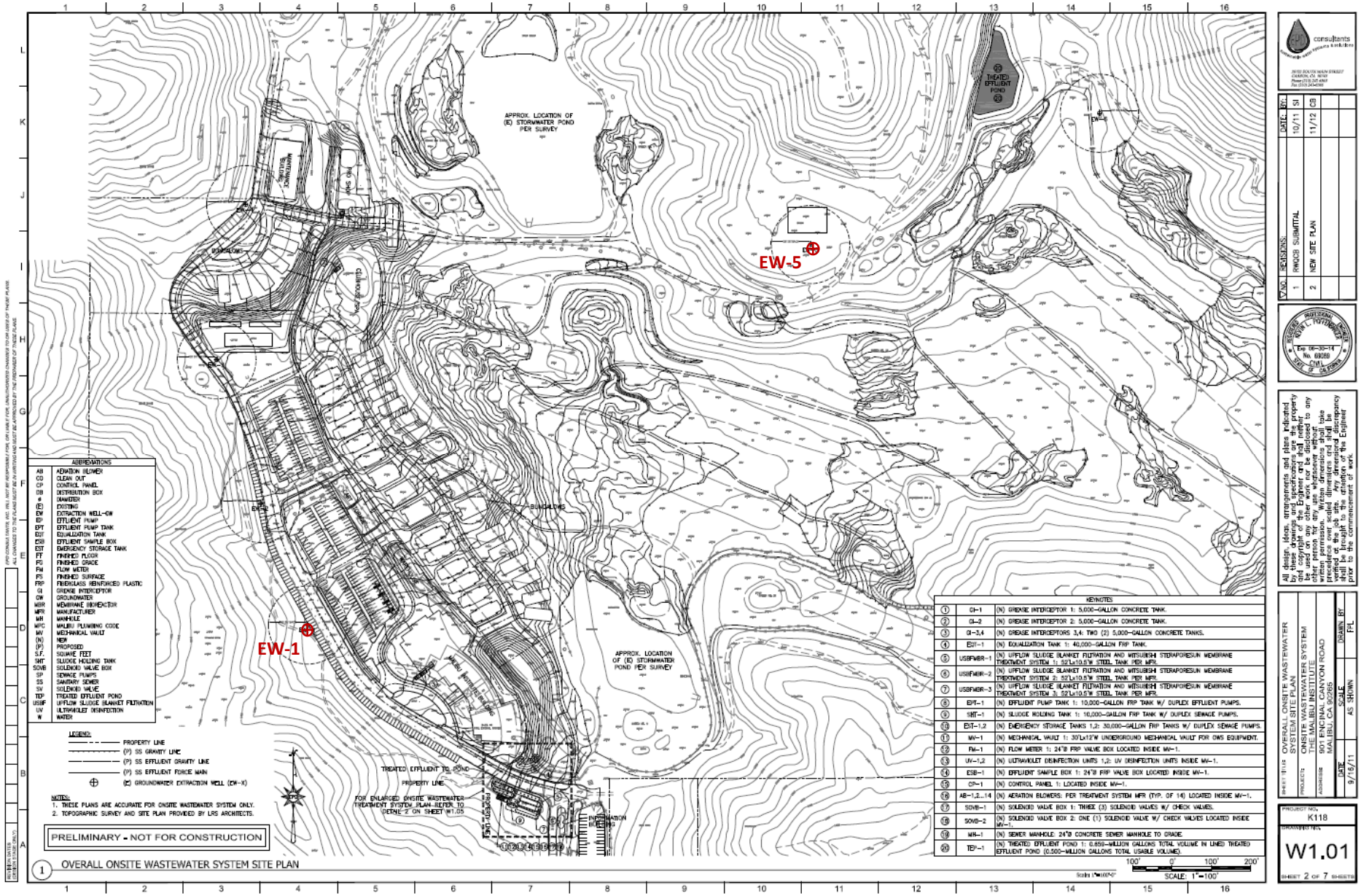

Image Reference: EPD Consultants, Inc., 2013. Onsite Wastewater System for the Malibu Institute. Prepared for Malibu Associates, LLC.

Groundwater Extraction Well Locations
Malibu Institute WQTR
Los Angeles County, California

Geosyntec consultants

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Figure 6

Appendix G.3

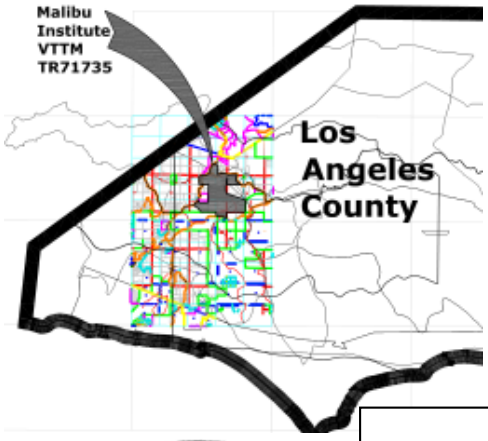
Malibu Institute Drainage Concept/Hydrology Report for TR071735, Triad/Holmes and Associates, October 2013

THE MALIBU INSTITUTE

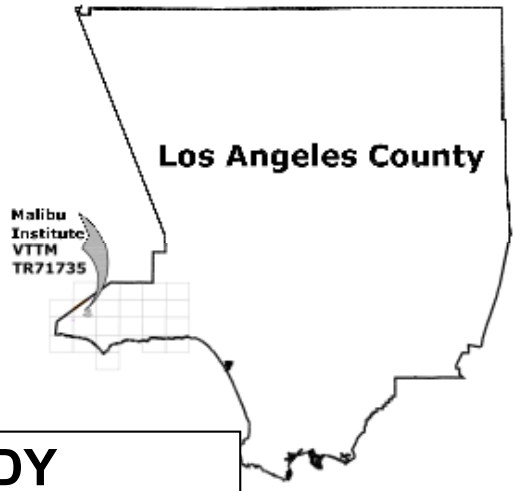
Drainage Concept/Hydrology Report for TR071735

Located in Los Angeles County
State of California

Including:
Hydrology
Hydraulics
Sediment Analysis
LID/SUSMP Design Feature Guidance
BMP Discussion
Storm Drain Structure Guidance



VTTM TR71735



October 2012
Revised October 18 2013

HYDROLOGY STUDY APPROVED

CHECKED BY: Ernesto Rivera RCE NO. 67550 DATE 10/22/13

APPROVED BY: _____ DATE 10/22/13

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

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Appendices

A Site Maps
- Cover
- Existing Storm Drainage Maps (6 sheets)
- Proposed Storm Drainage Maps (6 sheets)
- Site Improvement and Detention Sheet
- Existing vs Proposed Imperviousness
- LID
- Hec Ras (3 sheets)
- Sediment (3 sheets)

B Hydrologic Analysis
- Summary of LAR 04 output

C Surface Flow Analysis
- HecRAS 50 year Burned and Bulked Output Tables

D LID Calculations (including retention)

E Debris Analysis

F Infiltration Results

G Detention Basin Analysis (Development Site Area)
- Site hydrographs
- Site Detention Calculations

H Photos (external reference files)
- Photo Reference spreadsheet
- Photos (see electronics for higher quality color zoomable photographs)

I Los Angeles County Reference
- Los Angeles County Low Impact Development Manuel – BMP Reference Sheet
- 1-H1.14 - Point 50-year 24-hour Isohyet with site, soils and debris potential area
- Runoff Coefficient Curve – Soil type 028
- Runoff Coefficient Curve – Soil type 031
- Runoff Coefficient Curve – Soil type 045
- Debris Production Rates – B-1
- Peak Bulking Factors – B-4
- Cu values

1 Introduction

Located in Los Angeles County, in Malibu, 5 miles from the coast with the Pacific Ocean, The Malibu Institute will renovate and update the 1970's-era Malibu Golf Club. The course and facilities have had no significant improvements in over thirty years, and they need upgrades. The proposed upgrades will provide an enhanced golf experience, create an educational retreat, and dedicate over 450 acres of natural habitat as permanent open space.

1.1 Project Overview

'Malibu Golf Club' has been open to the public since 1977. This project will update the facilities to better meet the demands of the public.

The golf course will remain within its present limits. This project includes minor changes to update the course. These changes will not include significant grading changes. Included changes will be conversion of existing impervious paved paths to pervious surfaces and a subsurface drainage layer under the golf course greens.

This report has been prepared in conjunction with the VTTM 71735 prepared by RCE Consultants, Inc which includes the site grading of a development site of approximately 19.5 acres that will include new and revised buildings, roads and parking. The new buildings will be constructed with 'green' roofs, while roads and parking will be constructed with pervious surfaces.

Throughout the golf course area, drainage facilities will generally be left unchanged. Within the development site drainage facilities revisions will include rerouted storm drainage to address new building, parking and road locations, as well as retention facilities, detention facilities and best management practices (BMP's).

1.2 Project Requirements

This project will follow the standard Los Angeles County requirements. In addition to those requirements the Malibu Institute plans to follow Leed requirements and add many low impact development (LID) features.

Hydrology has been calculated using the Los Angeles County "tc Calculator", and "Civil Designs – LAR04" program. The methodologies followed are from the Los Sediment collection facilities will be provided to meet the "2006 Los Angeles Hydrology Manual".

- ❒ 50 year Design Storm Depth Isohyetal = 8.8
- ❒ Soils Zones = 28, 31, and 45
- ❒ Debris Region = DPA 4, for 'burned and bulked' analysis, with a bulking factor of 1.66 for debris producing areas.
- ❒ Storms analyzed for 2, 5, 10, 25, and 50 year for detention basin.
- ❒ Storms also analyzed for 50 year burned and 50 year burned and bulked for site debris carrying devices.
- ❒ Storms analyzed for 4th day rates and volumes, for all storm levels.
- ❒ Storms analyzed for 1st through 4th day to develop input Hydrographs for detention analysis.
- ❒ LID calculator used to determine Qpm at 0.2 cfs per acre, and runoff volume at storms of 85th percentile occurrence for areas within the development site.
- ❒ Hydraulics have been performed using HecRAS programs in conformance with the "1982 Los Angeles County – Design Manual Hydraulics"
- ❒ Existing Sediment facilities and sedimentation requirements have been analyzed based on the Sedimentation Manual – Second Edition.

Post-construction Treatment Control BMPs include Mitigation by Volumetric Treatment Control by collection of the volume of runoff produced from a 1.15 inch storm event (85th percentile), prior to its discharge to a storm water conveyance system.

Detention facilities have been preliminarily designed for the development site area of 19.5 acres to collect storage necessary to offset inflow from the developed site to meet the 'undeveloped' runoff rate for storms of 2, 5, 10, 25 and 50 year 1st through 4th day intensity and volume. The detention facility will include a sump that will contain the retention for the water quality infiltration requirements.

Note to reviewer:

Naming conventions have been used to keep track of and improve access for review.

Example ma005p.OUT – Malibu | LAR04 entire site | 5 year storm | proposed | output

The first letter in file name is m – for Malibu. This is followed by a letter or group of letters for process –

- ❒ *RAS - Hec ras*
- ❒ *DET - detention calculations in Retard program*
- ❒ *a - entire site including offsite in LAR04 program*
- ❒ *s - Development site in LAR04 program*
- ❒ *p – Parking area*
- ❒ *SED - sediment calculations spreadsheet*

*Following this is the storm frequency, **002** thru **50**, then an **x** for existing, **p** for proposed, or **u** for undeveloped. The suffix includes:*

- ❒ *inl - input in LAR04*
- ❒ *OUT - output*
- ❒ *pr - profile*
- ❒ *cs - cross sections*
- ❒ *prj – HecRAS project file*
- ❒ *g01 – HecRAS geometry file*
- ❒ *p01 – HecRAS plan file*
- ❒ *f01 – HecRAS steady flow data*

Suffixes are incorporated into name when printed to 'portable document format' (PDF)

2 Existing Conditions

2.1 Site

The Malibu Institute covers approximately 650 acres. It is on a coastal hillside facing mostly south. The site is very hilly, with elevations ranging from peaks at approximately elevation 2300 along the west side of the site, to as low as elevation 1300 at the sites southerly exit where the Country Club road intersects Encinal Canyon Road. Most of the site is tributary to the Trancas Canyon Basin, but a small portion at the north flows to the northwest and is eventually tributary to Lake Sherwood. There is a tributary that travels in a southeasterly direction clipping the southwest corner of the site and a tributary that travels southwesterly clipping the southeast corner of the site. These tributaries are both portions of the Trancas Canyon Basin.

The site includes rock outcroppings and steeply sloping sections, along with channelization and existing basins and ponds.

2.2 Sediment Analysis

The site is fully within the DPA 4 region of the Point Dume debris development area. Existing debris structures were field located, and measured. We were unable to obtain original plans or approval information on these existing basins. The locations of the debris facilities are shown on the sediment basin drawings. Based on our calculations, with results shown on drawing sheet 20, the existing facilities collect over 90% of the DDE for this site.

Mulholland Highway at the north of the site has three sediment basins that are located within the tributaries affected by this site. There are basins along the perimeter of the golf course that collect some of the sediment developed. There is a lake located in the middle of the golf course that is within the flow path of runoff and sediment. Historically in larger storms sediment is deposited onto golf course areas.

It is the intent of this project to leave the existing sediment basins unchanged. These basins in their existing format come close to meeting the present day debris design event requirements. An increase to debris collection could have a negative effect on the consideration of Hungry water.

2.3 Flood Maintenance District

With the exception of the very most northern part of this property, this site is located within the Los Angeles County Flood Maintenance Boundary. The flood Maintenance Boundary as related to this site is shown in Figure 2.3-1 below. The site is not however identified as being within a floodway or flood hazard area. It is also not located within a FEMA Flood Zone A.

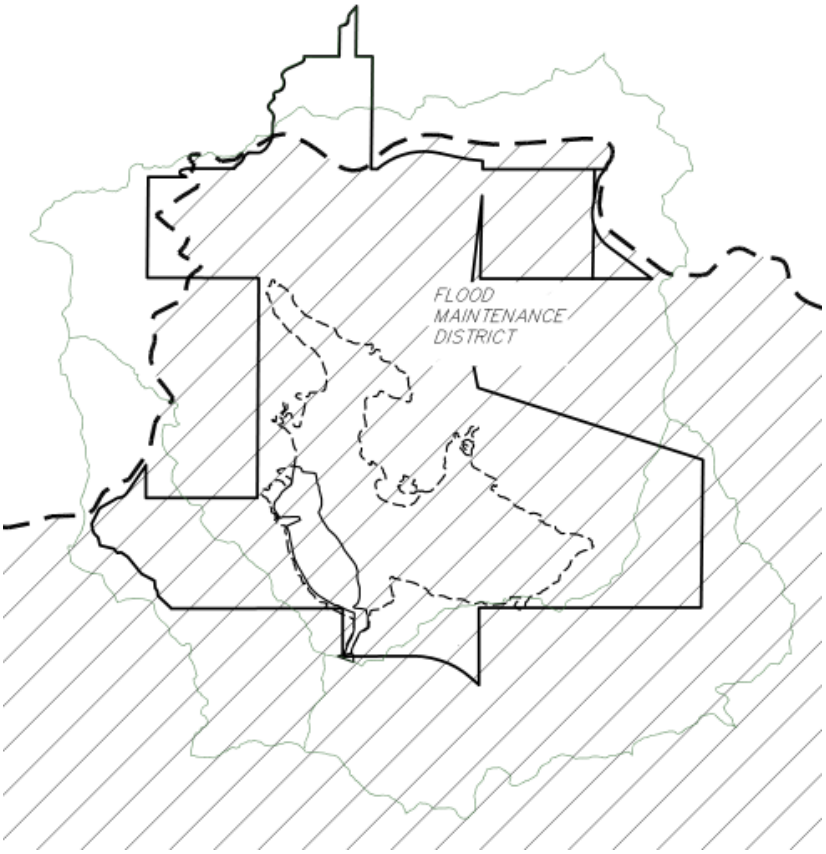

Figure 2.3a

2.4 Location

The site is located in the west side Los Angeles County. In particular it is located within Sections 3, 10, 11, and 15 in Township 1 North, Range 19 West of the San Bernardino Meridian. Most of the site is located within IM_No 144-017, with a small amount of the south portion of the site extending into IM_No 129-017. Based on State Plane Coordinate System California Zone 5 – NAD 83, the site is limited on the north by 1,863,100N, the south by 1,854,800N, the west by 6,299,600W, and east by 6,307,000W.

2.5 Rainfall Intensity

The rainfall intensity for this site is 8.8. The site is shown on the Point Dume Isohyet map included in Appendix I.

2.6 Significant Ecological Areas (SEA)

The northern most portion of this site is overlapped by the SEA boundary. There are no improvements planned for this portion of the site.

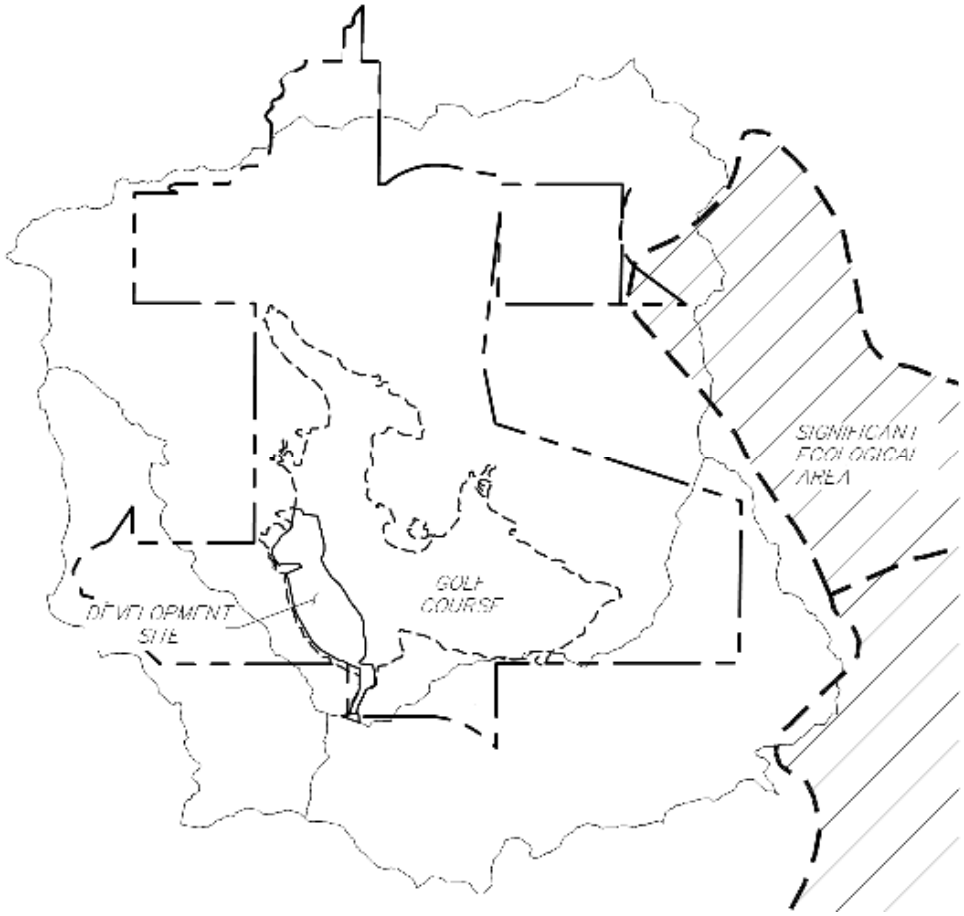

Figure 2.6.1 Significant Ecological Areas

2.7 Soil Types

Three soil types are identified within the boundaries of this property. Most of the site is within soil type 045, but a small section of the north part of site is type 028, and a small section of the south part of the site is type 031. These soil types along with their appropriate Runoff Coefficient Curves have been included in Appendix E.

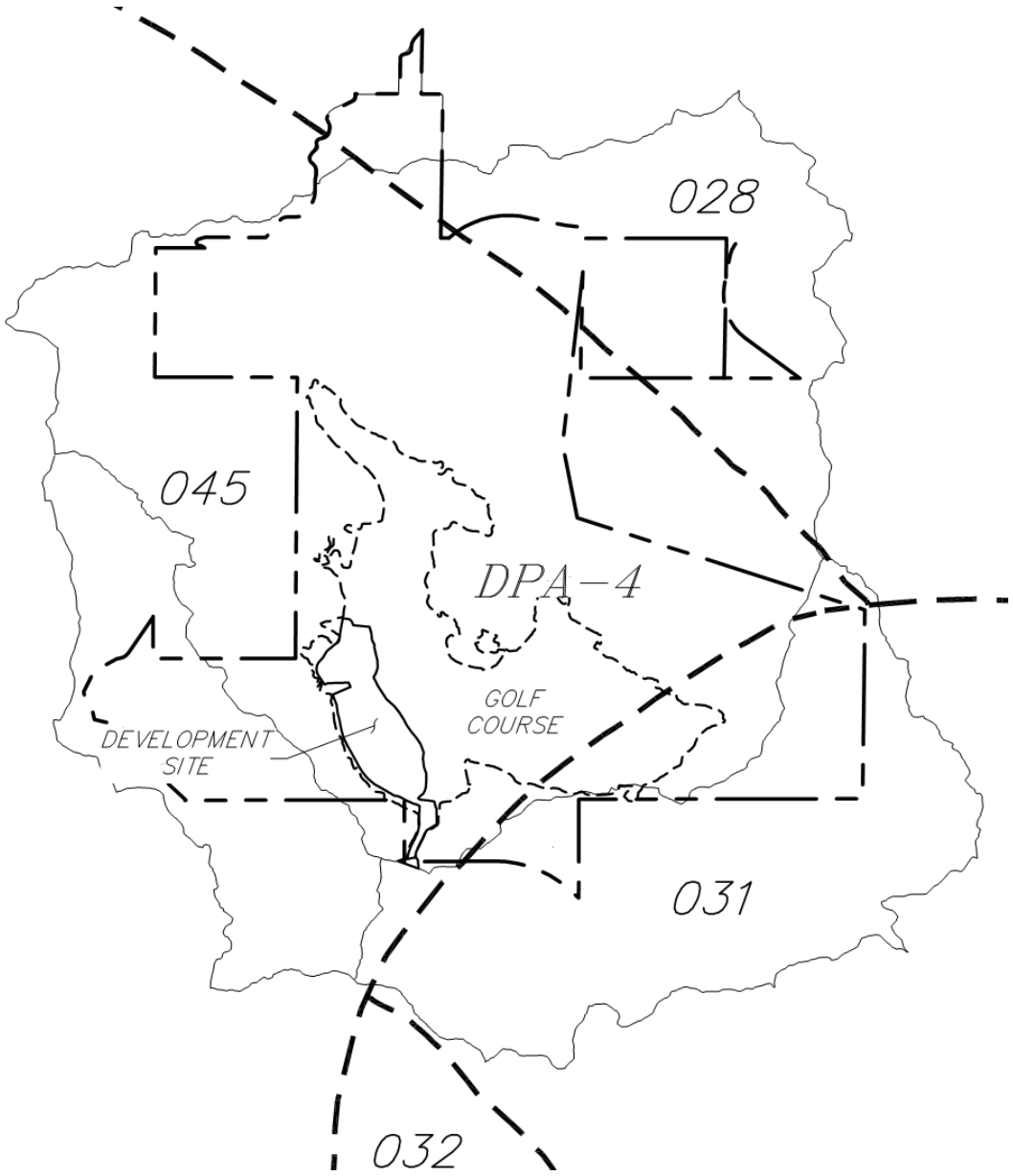

Figure 2.7.1 Soils Curve Areas

2.8 Existing Storm Drain

This site does not connect to or have within its boundaries public storm drainage system. We were unable to obtain any as built information on the storm drainage facilities, so they were determined thru onsite survey collection. We have included in Appendix A maps which show approximate locations of the existing storm drainage facilities. Photos of various facilities were also collected during this research, and are included in Appendix H.

County crews have been observed performing maintenance on storm drainage facilities along Encinal Canyon Road at the south edge of the site, as well as Sediment collection facilities above Mulholland Road above the site.

2.9 Watershed Basins

Below is an exhibit that displays the Watershed Basins for the areas directly surrounding the site. We have further analyzed these basins using the latest available topographic information obtained from InfoTech and Los Angeles County.

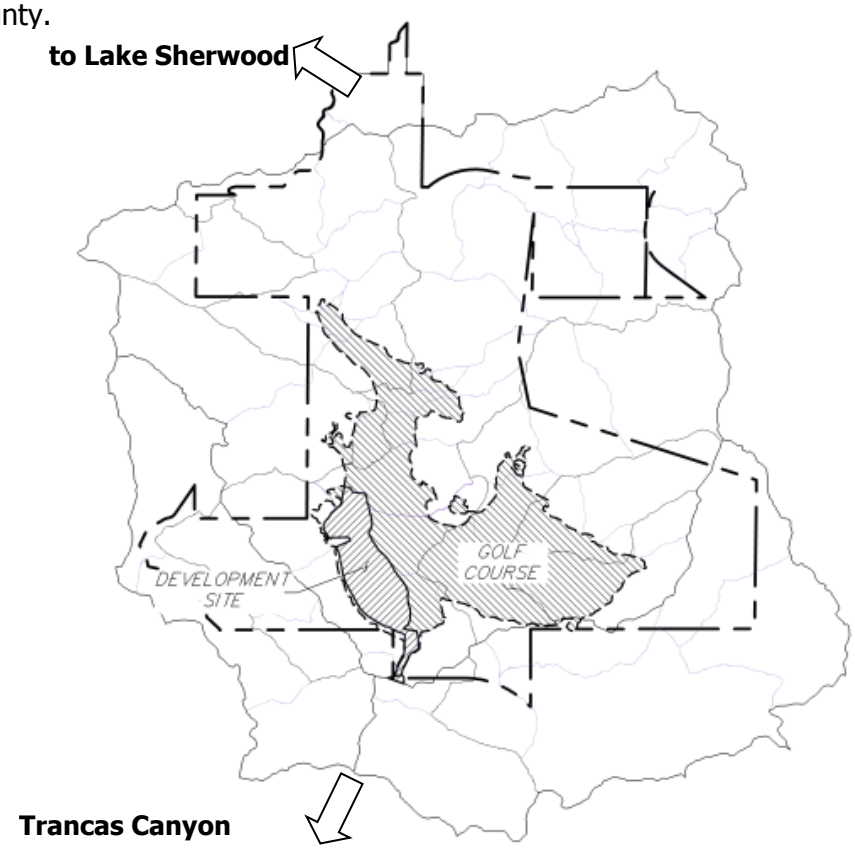

Figure 2.9.1 General Watershed Boundaries

3 Proposed Project

3.1 Overall Site

Improvements are planned for the area indicated on the following plan as Golf Course and as Development Site. There are no improvements planned outside of these areas.

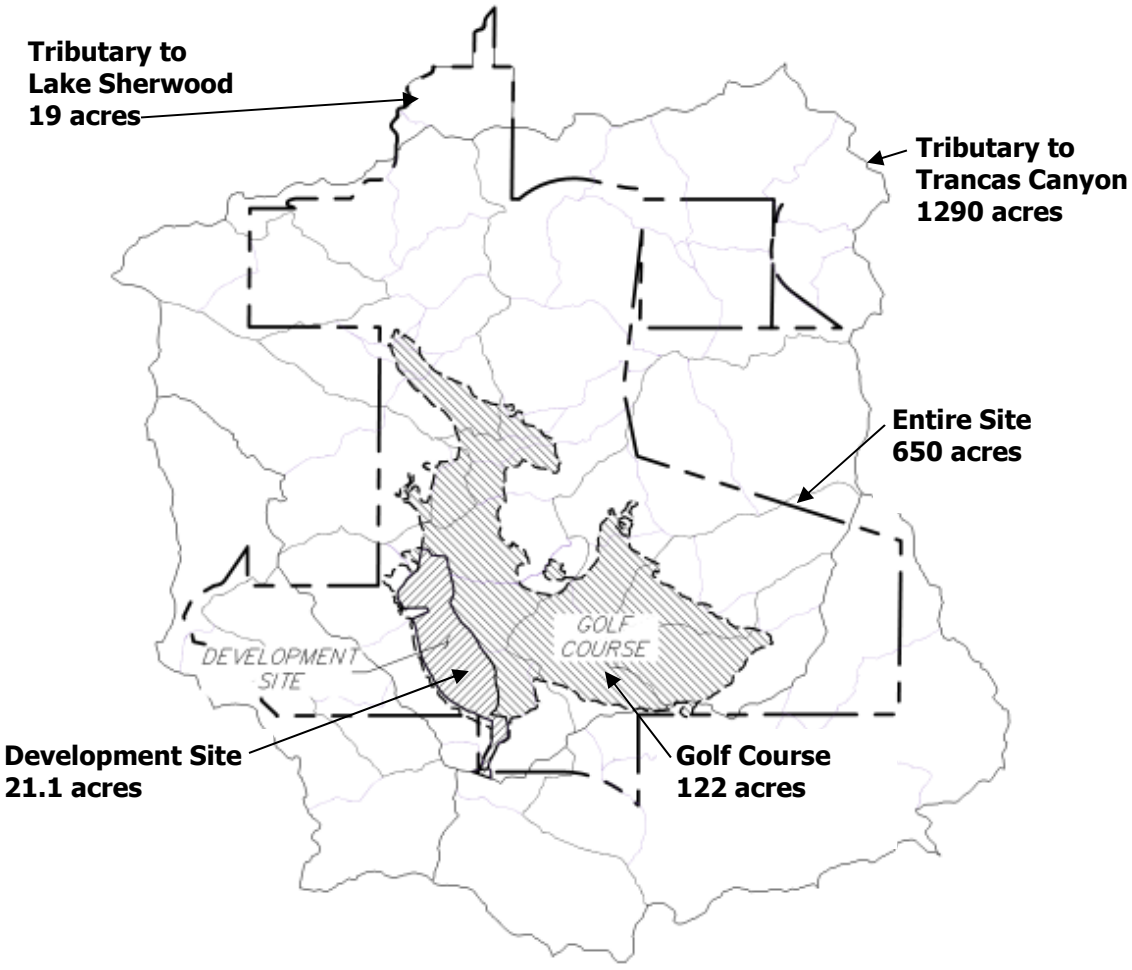

Figure 3.1.1 Proposed Site with Areas

The area analyzed for runoff rates includes the 1290 acres tributary to Trancas Canyon. There is no change from the existing runoff rates to the proposed runoff rates. Therefore no downstream mitigation is planned.

The Entire site area of 650 acres was analyzed for potential flood flows to and through the 8′ wide x 10 foot tall culvert under Encinal Canyon Road. The runoff quantity at this point for a storm of 50 year intensity is over 880 cfs. Based on the HecRAS analysis, this runoff exits through this culvert without overtopping Encinal Canyon Road, at a velocity of 14 cfs.

Figure 3.1.2 Encinal Canyon Road - 8′ x 10′ culvert

At the north end of the property, there is a portion of the overall site that is tributary to Lake Sherwood. The runoff from this area is not significantly concentrated. Since this project proposes no changes or development in this area, so analysis is provided.

3.1.1 Golf Course

Onsite, there are changes to the golf course, and to the golf course paths. These changes result in a net balance or reduction in the runoff quantity and rate that is close to immeasurable.

There will be regrading to alter the layout of the Golf Course. A sand cap will be installed on all Fairway surfaces. There will be revisions to some of the golf course flight paths, tee and hole locations. The regrading will be performed in a way that does not alter the path of the runoff.

The paths presently occupy 2 acres of surface with widths generally less than 8 feet. Of these paths 0.5 acres will remain in their present location and surface of asphalt with a runoff coefficient of 0.90. 1.5 acres of these paths will be relocated and will be constructed with Pavers, which will have an effective coefficient of runoff below 0.50.

Of the sites 650 acres, 528 acres have remained unchanged. Within the tributary area another 636 acres are offsite and also unchanged.

There will be a reduction in the amount of impervious surfaces on the Golf Course site. There will not be an increase in runoff due to the Golf Course improvements. Since there is no impervious development and will be a reduction in imperviousness, no new retention facilities are proposed for these areas. Since runoff rates are not increased, no new detention facilities are proposed.

3.2 Site Development Area

The site development area is approximately 19.5 acres (for drainage calculation purposes). This area is the primary focus for its potential impact on runoff rates and infiltration considerations. This area has significant improvements.

The proposed project will consist of 6.3 acres of pervious road and parking surfaces, 4.2 acres of vegetated roofs, 7.5 acres of Landscape and 1.5 acres of typical impervious paved surfaces.

The existing parking lot located along the entrance road will remain unchanged.

4 Hydrology (Drawings in Appendix A, Calculations Appendix B)

4.1 Design Storm

The hydrology model is based on the 2, 5, 10, 25, 50, 50 year burned, and 50 year burned and bulked design storm events. The depth of this design storm is based on Los Angeles County Department of Public Works (LADWP) Hydrology Manual methodology, outlined in Chapter 5 – Rainfall and Design Storm Characteristics.

The site is within the LADPW isohyet map, identified as Point Dume. The site is also completely within an area identified to have isohyets of 8.8. This was distributed over a 24-hour unit hyetograph (per LA County Hydrology Manual section 5.2)

This site has been modeled using LAR04 software. Runoff rates were developed for 4th day storms.

4.2 Tributary Areas and Sub Areas

Tributary Areas, width, slope, and basin dimensions were determined by topographic properties based on two sets of topographic information. For the proposed areas within the site limits we used the topographic information obtained from RCE

Consultants, Inc. For all areas outside the property limits we used topographic information provided by InfoTech enterprises. Tributary areas were reduced in size until the 2 year clear water Tc was determined to be less than 30 minutes.

The results of the determination of tributary areas are shown on the Drainage Plans included in Appendix A. Tributary areas were numbered per county criteria, for use with the Tc Calculator and the LAR 04 program**.** The first set of numbering, 2 digit numbers, are used for the overall site analysis. The second set of numbering, 3 digit numbers, are used for the development site analysis.

4.3 Additional Considerations

It was assumed that runoff on the Golf Course would generally remain as surface flow, since most of the existing storm drainage pipes are undersized. Therefore, with the exception of the 66" RCP, onsite culverts were ignored for the HecRAS analysis.

The proposed runoff rates were evaluated based on inclusion of the detention facilities. Since those facilities were designed to retain the flow to an undeveloped rate – the undeveloped percentage of imperviousness was used for the areas of the site. The existing infiltration factor was determined based on pervious and impervious surfaces in the existing areas. The overall imperviousness rate for the exiting site was determined to be 0.34. This factor was used in the overall existing site hydrology analysis Tc Calculator and Lar04 calculations.

No errors were noted during the HecRAS runs. Warnings were indicated due to changes in elevation from one cross section to the next, which is common in steep areas. Warnings were also noted for large changes in cross sectional area, which is common in areas with undefined channels. The program essentially asks for more cross sections. The typical spacing for cross sections is usually selected based on the consideration 0.15*depth of flow / percentage slope. Since flow depths are quite shallow, that creates a high section frequency. We selected 5 foot intervals at upper areas, and 10 foot intervals at lower areas. This did not significantly change any water surface elevations or flow velocities by adding the interpolated sections. The added sections also did not reduce warnings significantly.

5 Hydraulics (Drawings in Appendix A, Calculations in Appendix C)

5.1 Underground Facilities

The runoff rates determined in the Hydrology analysis have been assigned to the individual existing underground facilities on the site. Based on this most of these underground facilities have the capacity for a storm of 2 to 5 year intensity.

5.2 Overland Flow

Overland flow has been analyzed for the 2, 5, 10, 25 and 50 year storms, as well as burned and bulked for the 50 year event, thru the 4th day. The overland flow path is shown on the drawings (Appendix A). Flow velocities are shown as well to identify if and where erosion could be an issue, and to show where flows will allow sediment to drop out.

Of note, for storms 10 year capacity and lower, runoff will be contained in the 66 inch reinforced concrete pipe (RCP) from the lake located along HecRAS "river A", "reach C", station 320+00, to its outlet. HecRas Plan linework for the 2 through 10 year storm are based on the HecRAS runs for above and for below this lake. HecRas Plan linework for the 25, 50 and 50 year burned and bulked storm are based on the HecRAS runs for the 66 inch pipe to be clogged or through the lake.

The Culvert under Encinal Canyon Road has the capacity for all stormwater conditions. This has been modelled using the Bridge tab, inline culvert. The results of this analysis show that the water surface never reaches an elevation that would allow runoff to flow over Encinal Canyon Road.

It is assumed that all other golf course storm drains will be beyond max capacity in all storms, so they have been ignored to show the highest possible potential flood levels.

5.3 Development Area Storm Drainage

Within the development area, proposed storm drainage facilities have been estimated for the purpose of preliminarily sizing and locating detention facilities. The final design of the onsite drainage facilities will need to be designed during the grading plan check phase. Site and parking area specific hydrology was developed. The output of this hydrology was used for input to the detention basin program. Calculations were performed for the 2, 5, 10, 25 and 50 year storms with basin

sizing at each. The basins shown on the site and LID plans were oversized to verify that there would be enough room for these facilities.

5.4 Lower Employee Parking

Shown on the profile is the Lower Employee Parking. This area is planned to remain in its existing configuration. The hydraulic model shows that this site is below the 50 year burned and bulked flood water surface by an amount of 2 feet. This is displayed on the Profile Drawing Sheet 19. We recommend that since this is employee parking that employees be directed to other parking if there has been a fire on the tributary surfaces and at the same time there is a greater than 50% chance of a rain storm as predicted by the NOAA weather site.

6 Overland Flow Analysis

6.1 Limit of Flow Analysis

There is no change to the flow or characteristics of flow to the offsite runoff downstream from the site. Therefore no flood analysis has been performed for offsite. The analysis has been performed in areas of concentration.

6.2 Golf Course Overland Flow Analysis (see Appendix C for HecRAS analysis and Appendix A for drawings)

Since onsite runoff can exceed the storm drainage facility capacity, hydraulic analysis has been performed to determine the potential flood elevations onsite in overland flow conditions. The analysis has been performed at the 2,5,10, 25, 50 and 50 year burned and bulked storm level. The intention of the improvements is to leave all existing storm drain pipes in place. Any maintenance required to onsite storm drain pipes will be performed by Malibu Golf Institute. Any maintenance required for overland flow conditions experienced in large storms will be performed by Malibu Golf Institute.

Flood paths and flow widths have been displayed on a map to use in design and placement of onsite buildings and facilities. Based on preliminary Tentative Tract Plan 71735 design elevations for the buildings, the finished floor of all buildings will be a minimum of 2 feet above the potential 50 year burned and bulked flood elevations.

Flood Velocities in areas of the golf course reach as high as 14 feet per second, for a storm of 50 year intensity, burned and bulked. For the same storm velocities can be as low as 0.2 feet per second. Based on the potential for high velocity rates, all areas of grading must be stabilized to limit erosion. It is expected that areas with low velocity rates may experience sediment collection. The proposed velocities do not change significantly from historic conditions.

7 Sediment Analysis (Drawings Sed1-Sed4)

7.1 Basin Descriptions

There are many existing sediment basins located on this site. Most of these existing sediment basins are located adjacent to an Environmentally Sensitive Habitat Area (ESHA) along the perimeter of the Golf Course. Calculations are included in Appendix E and drawing sheets 20-22 show the existing basins with their capacities. Most can not be modified due to ESHA considerations. The spreadsheet was used to determine tributary areas, along with the tributaries effective 'Debris Production Rate'. Downstream of all of these basins are areas on the golf course where velocities drop below 2 feet per second. At these low flow rates most sediment will drop out. Over 90% of the DDE is collected in these existing basins.

7.2 Proposed new Sediment Basins

No new sediment basins are proposed.

7.3 Sediment storage on Golf Course

Sediment has historically deposited on the golf course. This condition appears to have limited sediment delivery from the site as there is no apparent sediment in the area before or after the 8 foot wide by 12 foot tall culvert under Encinal Canyon Road. There are no changes proposed. There is no increase in Velocity due to the proposed improvements

7.4 Hungry Water

Since there are no significant changes proposed in the sediment collection system, there will be no significant change in the potential for "hungry water" downstream of the site.

8 LID - Water Quality

8.1 General

This site is located in the Western side of Los Angeles County. Referring to the maps on the link (http://dpw.lacounty.gov/wrd/hydrologygis/), it was determined that at storm of 85th percentile produces 1.15 inches of stormwater. Infiltration rates were determined and added to a LID drawing. BMP calculations are also included in the Drawing. Volumes and Rates are shown on drawing and are determined using the LID calculators available at the link (http://dpw.lacounty.gov/wmd/dsp_LowImpactDevelopment.cfm). The screen captures of these calculations are included in Appendix D. This project proposes volumetric solutions to mitigate stormwater runoff quality.

8.2 BMPs (Volumetric Runoff Mitigation)

BMPs will be incorporated as indicated in Appendix I, the drawings and the following discussion:

Pervious Pavement: For the purpose of LID calculations, the rates for areas of pervious pavement were assumed to be 0.95 imperviousness, in order to not duplicate the advantages of the pervious storage capacities. There are no freeze issues in this area, so storage is located directly under the pervious pavement. None of the pervious paved surfaces exceed 10% maximum (recommended by the LID manual).

BioSwales: The Bioswales have been designed to include bio-retention. A void factor of 0.3 is assumed for the rock bio-retention area. Storm drainage pipes are included for collection of other runoff and to limit velocities in the bio-swales.

Vegetated Roofs: Vegetated roofs are used to collect rainfall that falls on them. For the purpose of the LID calculations, these area have an assumed 0.95 imperviousness factor. This allows us to determine the amount of runoff stored in these areas in the 85th percentile storm.

Infiltration Basins: At the limit of the project, there are impervious paved surfaces. The runoff from these is directed to infiltration basins to treat the final runoff from the site. Calculations determining these sizes are shown on the LID drawing.

Infiltration results: Based on the infiltration results included in appendix F, most of the site has been assumed to have an infiltration rate of 0.4 inches per hour. The area under the proposed site detention basin "A" has an infiltration rate of 0.7 inches per hour. Calculations have been performed for each of the above BMP's and for the detention basins to verify that each facility will be empty in less than 4 days. For this purpose we used a safety factor of 2 and we used the lower infiltration rate for all calculations. The results of these calculations are included in the calculations in appendix D and Appendix G, as well as being shown on drawing sheets 14 and 16.

8.3 Hydromodification analysis

Detention Basins: There are 19.5 acres of Malibu Institute Improvements that are referred to as the development area. Within this development area, this project proposes to maintain historic runoff rates for the 2, 5, 10, 25, and 50 year storms through the use of detention basins with a controlled outflow. The parameters of this device have been generally assumed to include a device as included in Appendix G. Under this design the storage requirements will be approximately 1.0 acre feet.

At the controlled outflow, the site detention facilities will be empty in 5 hours. The sump of the detention facility includes retention storage. This retention storage will infiltrate in 3.5 days.

At the limits of the site as it crosses Encinal Canyon Road the runoff rate and velocity for storms of 2, 5, 10, 25, 50 year and 50 year burned and bulked year proposed storm is lower than for the existing storm. Results are shown on the drawings of these velocities and rates. Calculations are included in Appendix B - Hydrology, C – Hec RAS, and G – Detention.

9 Conclusion

The tributary area analyzed is just over 1300 acres. 1290 acres are tributary to Trancas Canyon and 19 acres tributary to Lake Sherwood. The Malibu Institute overall site is 650 acres. Changes to the site are limited to the Golf Course and the Development site areas.

The Golf Course which includes some grading, plus sand-capping of the fairways is approximately 121 acres, or 20% of the site. The Golf Course may see conditions of flooding during storms in excess of 5 year intensities. In 50 year burned and bulked intensity storms (capital storm), the water surface of flows in the golf course will be a minimum of 2 feet below the elevation of any finished floor. Graded areas of the golf course must be stabilized to successfully limit erosion - velocities can be as high as 14 feet per second in a 50 Year Burned and Bulked storm.

The employee parking area is located in the floodway produced by a storm of 50 year burned and bulked intensity. There will be no flooding in this parking lot during a clean water 50 year intensity storm. It is recommended that this parking area remain empty if the tributary area has burned and there are unvegetated unprotected surfaces and at the same time a rain storm is predicted at a greater than 50% chance by NOAA.

The Development Site, for drainage purposes is 19.5 acres or 4% of the site. BMPs will be included in the design and construction of the Development Site. Runoff in the development area will be limited to predevelopment rates. This will include the SUSMP required retention basin to infiltrate an amount to offset impervious surfaces, as well as the LID required detention necessary to limit flows to historic rates. Storm Drainage improvements are proposed to limit surface flows in this area. The storm drainage facilities will include a network of vegetated swales, bio-swales, inlets, and piping.

Sediment will be collected in the existing basins located along the perimeter of the golf course. No new sediment basins are proposed, to limit changes to the runoff, such as the potential to increasing the chance of a "hungry water" condition.

Runoff rates at the storm drainage culvert under Encinal Canyon Road upon a 4th day. 50 year intensity burned and bulked storm, reach approximately 2367 cfs. Velocities at this location for the proposed condition are approximately 14 feet per second. These rates are slightly lower than the historic rates.

Maintenance is a requirement of all storm drainage facilities. The onsite storm drainage facilities will be owned and maintained by The Malibu Institute. Offsite existing facilities along Encinal Canyon Road and Mulholland Road will continue to be maintained by the County of Los Angeles. No new facilities are proposed offsite. Additional calculations will be required during the final design to verify conformance with agency requirements.

Appendix A Site Maps

THE MALIBU INSTITUTE

DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735

VICINITY MAP
N. T. S.

LOCATION MAP
N. T. S.

LEGEND AND DEFINITIONS

- = PROJECT SITE AND BOUNDARY
- = EXISTING GOLF COURSE
- = IMPERVIOUS SURFACE
- = PERVIOUS SURFACE
- = BUILDING
- = LANDSCAPE
- = ESHA BOUNDARY
- = TRIBUTARY BOUNDARY
- = FLOW DIRECTION
- = EXISTING 50 YEAR INUNDATION AREA
- = EXISTING STORM LIMIT
- = EXISTING STORM DRAIN PIPE
- = EXISTING STORM DRAIN PIPE TO BE REMOVED OR ABANDONED IN PLACE
- = PROPOSED STORM DRAIN PIPE
- = SEDIMENT BASIN TRIBUTARY AREA
- (1) = SEDIMENT BASIN AND NUMBER
- 4.1 fps = VELOCITY IN FEET PER SECOND AND FLOW DIRECTION FOR STORM OF 50 YEAR INTENSITY

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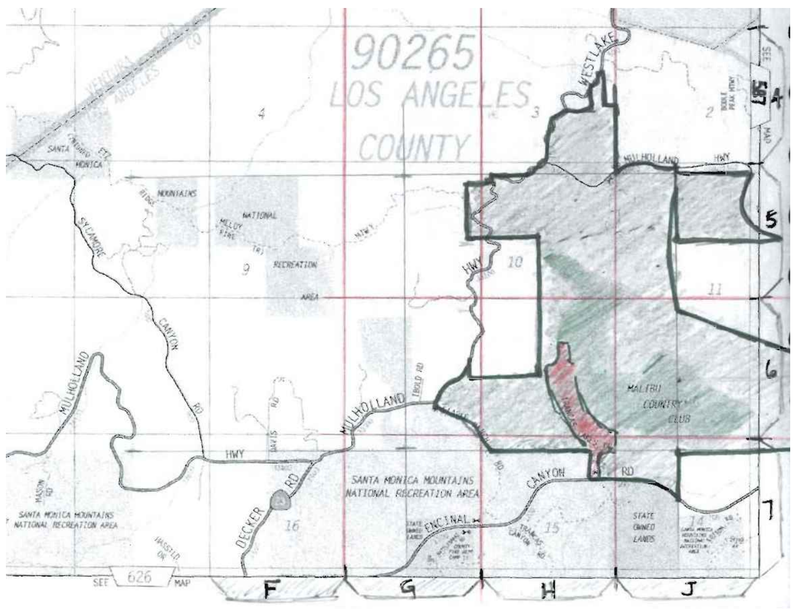
PROPERTY IS NOT WITHIN COUNTY ADOPTED FLOODWAY

PROPERTY IS NOT WITHIN FEMA FLOOD ZONE "A"



THOMAS GUIDE PAGE 586
N. T. S.

REGISTERED PROFESSIONAL ENGINEER ERNESTO J. RIVERA No. 67550 Exp: 06-30-15 CIVIL STATE OF CALIFORNIA

HYDROLOGY STUDY APPROVED

CHECKED BY: _____ RCE NO. 67550 DATE 10/22/13

APPROVED BY: _____ DATE 10/22/13

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

STORM DRAIN MAINTENANCE

ON-SITE
- ALL DRAINAGE AND WATER QUALITY DEVICES SHALL BE MAINTAINED BY THE MALIBU INSTITUTE

ALL DRAINAGE AND WATER QUALITY DEVICES

MULHOLLAND HIGHWAY
- LOS ANGELES COUNTY (EXCEPT AS NOTED WITH *)
- * CALTRANS

ENCINAL CANYON ROAD
- LOS ANGELES COUNTY

SHEET INDEX

SHEET 1 – COVER SHEET
SHEET 2 – E1 EXISTING ENTIRE SITE
SHEET 3 – E2 EXISTING GOLF COURSE
SHEET 4 – E3 EXISTING 100 SCALE
SHEET 5 – E4 EXISTING 100 SCALE
SHEET 6 – E5 EXISTING 100 SCALE
SHEET 7 – EXISTING DATA TABLES
SHEET 8 – P1 PROPOSED ENTIRE SITE
SHEET 9 – P2 PROPOSED GOLF COURSE
SHEET 10 – P3 PROPOSED 100 SCALE
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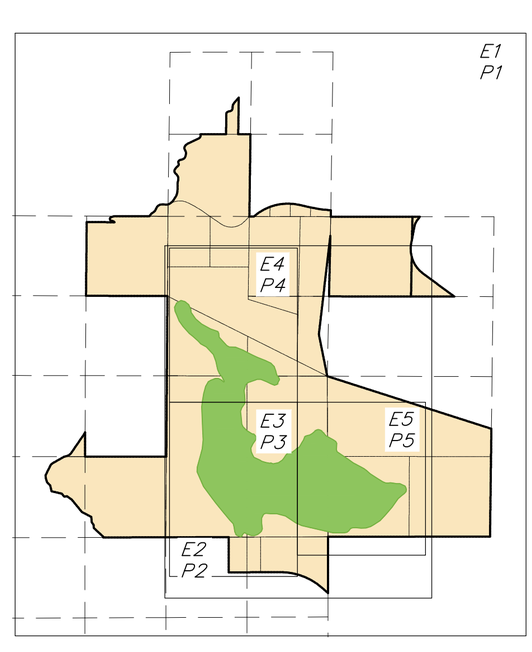
SHEET 13 – PROPOSED DATA TABLES
SHEET 14 – PROPOSED SITE
SHEET 15 – EXISTING VS PROPOSED IMPERVIOUS
SHEET 16 – LOW IMPACT DEVELOPMENT PLAN (LID)
SHEET 17 – HEC RAS PLAN
SHEET 18 – HEC RAS SITE SECTIONS
SHEET 19 – HEC RAS PROFILES
SHEET 20 – SEDIMENT BASIN TRIBUTARY MAP
SHEET 21 – EXISTING SEDIMENT BASINS 1
SHEET 22 – EXISTING SEDIMENT BASINS 2



SHEET INDEX MAP
N. T. S.

PREPARED & SUBMITTED BY:

tha triad/holmes assoc. civil engineering land surveying

REGISTERED PROFESSIONAL ENGINEER PAUL EDWARD ROTEN 56891 CIVIL STATE OF CALIFORNIA

DATE SIGNED: 10/21/2013

PREPARED FOR:

TOM HIX
901 ENCINAL CANYON RD
MALIBU, CA 90265

THE MALIBU INSTITUTE

DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
COVER SHEET – SHEET 1 OF 22

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028

045

031

032

AA

AB

AC

AD

EA

EB

DA

FEATURE 1

EXISTING
TRIB. AREA 655.2 AC
STORM	Q
2	91.2
5	216.2
10	407.8
25	717.4
50	992.1
5089	2377.2

EXISTING
TRIB. AREA 1286.1 AC
STORM	Q
2	157.1
5	417.1
10	818.4
25	1558.6
50	1403.6
5089	4574.9

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

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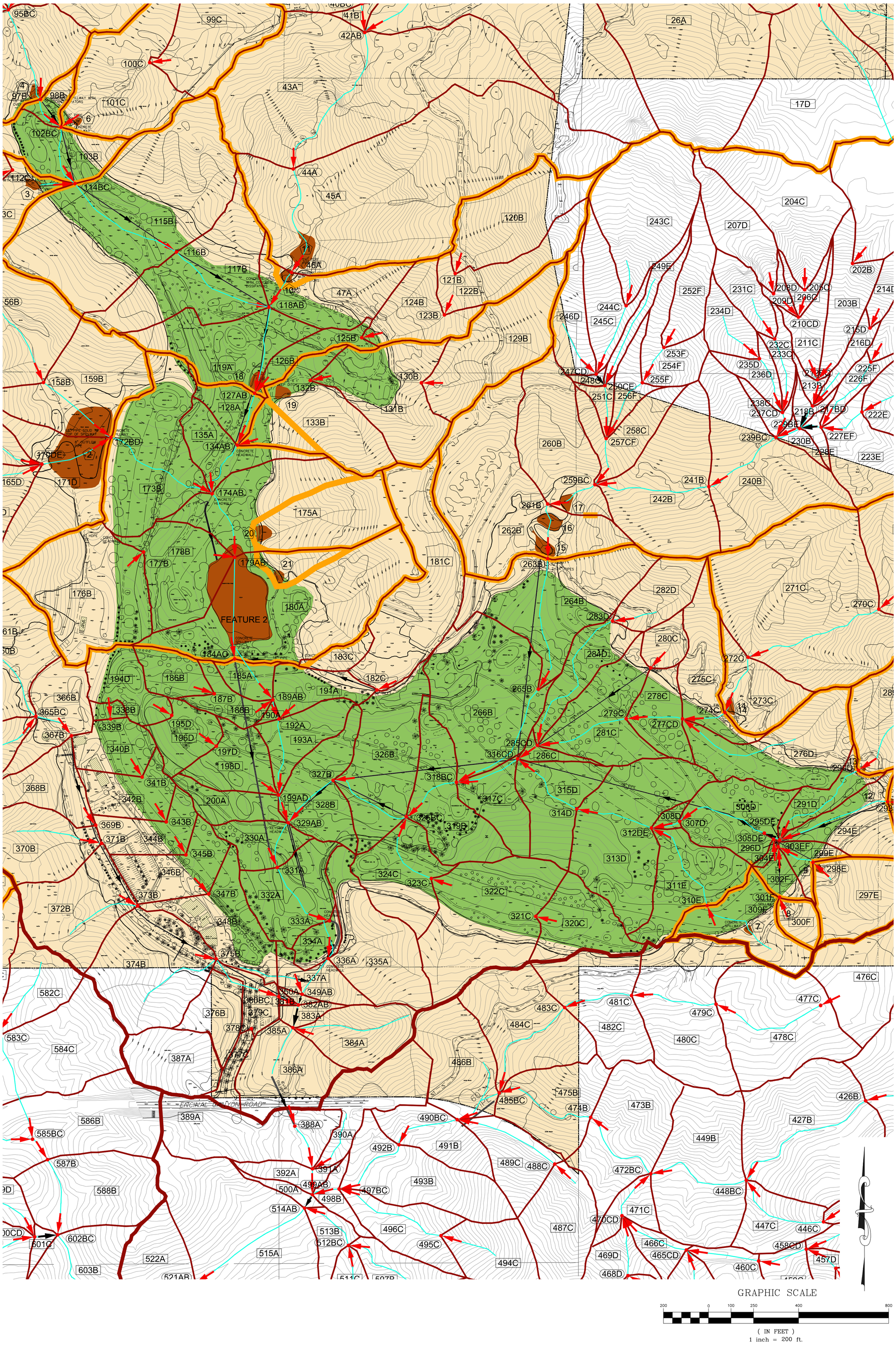
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING CONDITIONS ENTIRE SITE – SHEET 2 OF 22 – E1



GRAPHIC SCALE

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(IN FEET)
1 inch = 200 ft.

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING CONDITIONS GOLF COURSE – SHEET 3 OF 22 – E2

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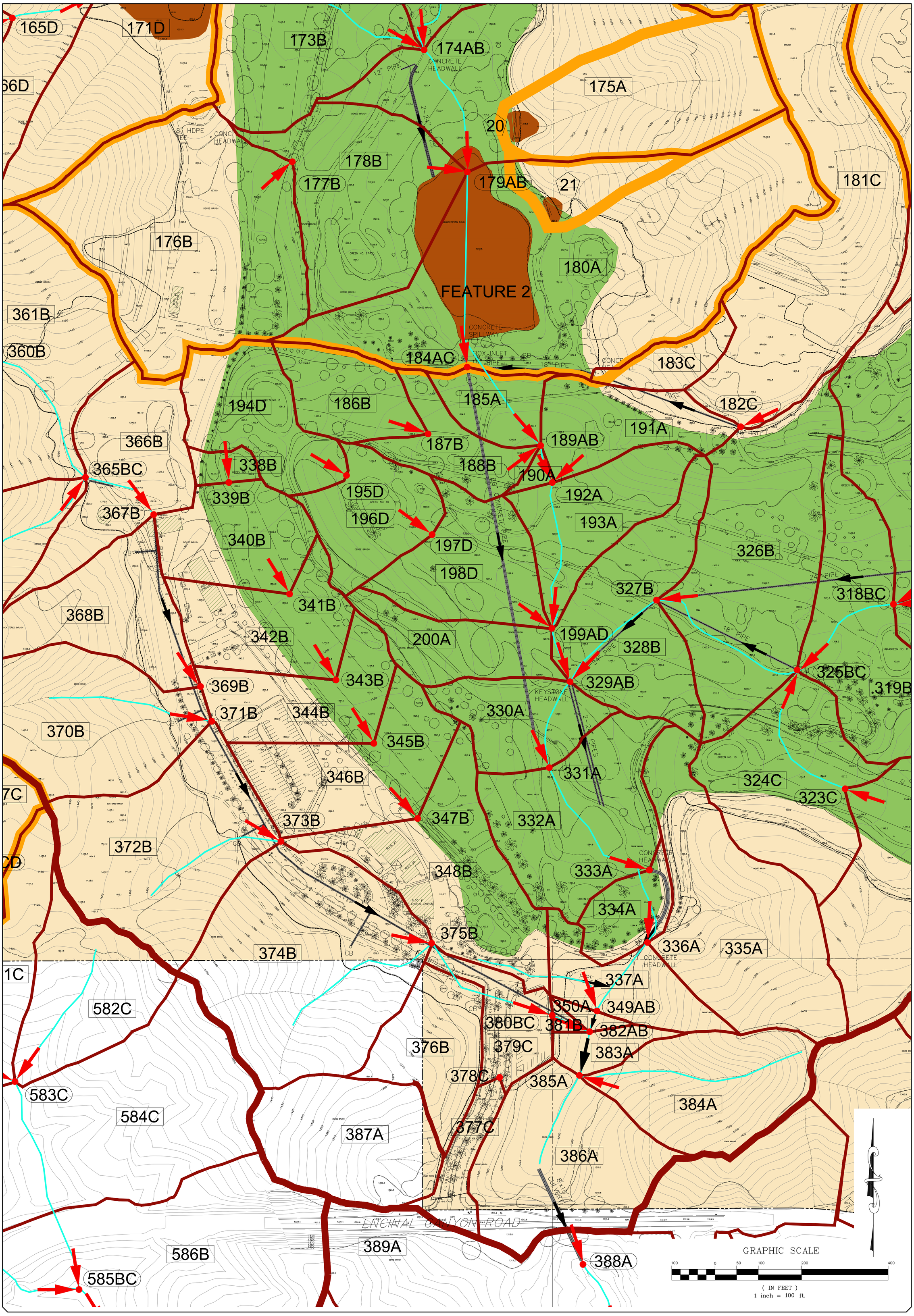

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING CONDITIONS 100 SCALE – SHEET 4 OF 22 – E3

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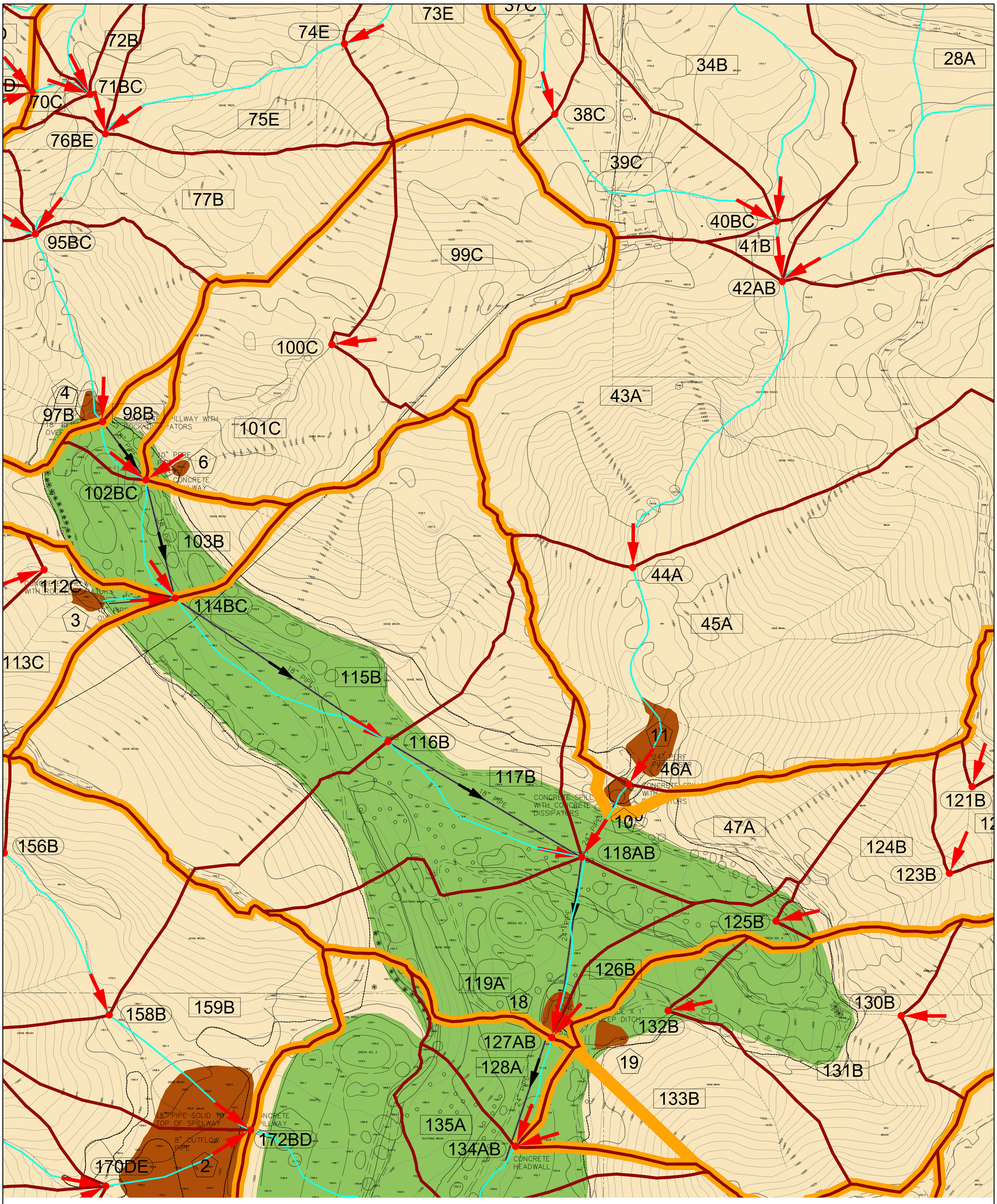

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING CONDITIONS 100 SCALE – SHEET 5 OF 22 – E4

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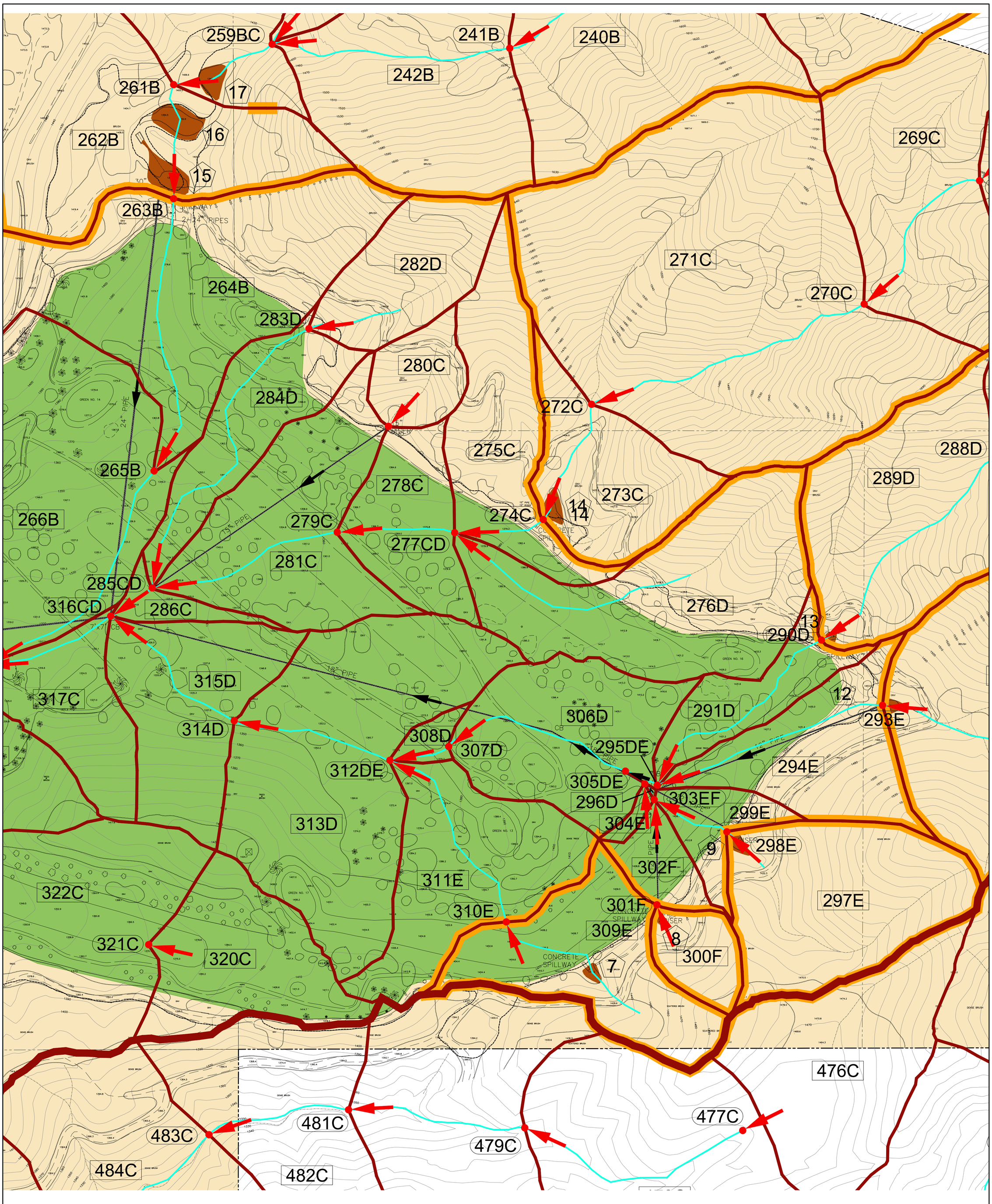

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING CONDITIONS 100 SCALE – SHEET 6 OF 22 – E5

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								2 year		5 year		10 year		25 year		50 year		50 year Burned		50 Year Burned and Bulked								Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Tc (minutes)	Isohyetal	Imperviousness	Tributary Q (cfs	Conveyance Q (cfs)	Tributary Q (cfs	Conveyance Q (cfs)	Tributary Q (cfs	Conveyance Q (cfs)	Tributary Q (cfs	Conveyance Q (cfs)	Tributary Q (cfs	Conveyance Q (cfs)	Tributary Q (cfs	Conveyance Q (cfs)	Trib burned and bulked acreage	cummulative burned and bulked acreage	Trib burned only acreage	cummulative burned only	Trib Weighted Bulking Factor	Tributary Q (cfs)	Conveyance Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope
1A	17.8	17.8	28	4	7	8.8	0.02	4.0	4.0	16.8	16.8	27.9	27.9	42.8	42.8	55.0	55.0	65.1	65.1	17.8	17.8			1.66	108.0	1.66	108.0	PIPE	48	100	0.04
2A		17.8	28	4	7	8.8	0.02		4.0		16.8		27.9		42.8		55.0		65.1		17.8					1.66	108.0	Mtn Chnl		506	0.11858
3A	4.1	21.9	28	4	5	8.8	0.02	2.4	5.7	6.7	20.5	10.2	33.1	13.4	50.8	15.7	64.8	18.2	77.2	4.1	21.9			1.66	30.3	1.66	128.2				
4B	9.7	9.7	28	4	5	8.8	0.02	4.9	4.9	14.2	14.2	24.2	24.2	31.6	31.6	37.2	37.2	43.2	43.2	9.7	9.7			1.66	71.6	1.66	71.6				
5B		9.7	28	4	5	8.8	0.02		4.9		14.2		24.2		31.6		37.2		43.2		9.7					1.66	71.6	Mtn Chnl		534	0.31835
6B	1.9	11.6	28	4	5	8.8	0.02	1.1	5.7	3.1	16.4	4.7	25.8	6.2	34.3	7.3	40.6	8.5	47.6	1.9	11.6			1.66	14.0	1.66	79.0				
7AB	11.6	33.5	28	4		8.8		5.7	11.4	16.4	36.8	25.8	57.8	34.3	84.0	40.6	104.4	47.6	124.1		33.5					1.66	205.9	Mtn Chnl		257	0.07782
8A	3.1	36.6	28	4	5	8.8	0.02	1.6	12.6	4.5	39.8	7.7	61.9	10.1	89.7	11.9	111.3	13.8	132.4	3.1	36.6			1.66	22.9	1.66	219.8				
9C	30.6	30.6	28	4	6	8.8	0.02	7.8	7.8	30.7	30.7	51.1	51.1	79.8	79.8	104.1	104.1	122.0	122.0	30.6	30.6			1.66	202.5	1.66	202.5	PIPE	48	100	0.02
10C		30.6	28	4	6	8.8	0.02		7.8		30.7		51.1		79.8		104.1		122.0		30.6					1.66	202.5	PIPE	2-24	100	0.04
11C	2.4	33	28	4	5	8.8	0.02	1.3	9.1	3.9	34.6	6.0	56.2	7.8	86.3	9.2	111.8	10.7	131.0	2.4	33.0			1.66	17.7	1.66	217.5				
12AC	33	69.6	28	4		8.8		9.1	21.4	34.6	72.7	56.2	116.4	86.3	173.5	111.8	219.2	131.0	260.6		69.6					1.66	432.6	Mtn Chnl		405	0.03457
13A	3.4	73	28	4	5	8.8	0.02	1.1	21.7	3.9	74.1	6.1	117.7	9.8	175.6	13.0	216.4	15.1	260.6	3.4	73.0			1.66	25.1	1.66	432.6				
14D	9.9	9.9	28	4	5	8.8	0.02	4.3	4.3	13.2	13.2	21.6	21.6	32.3	32.3	38.0	38.0	44.1	44.1	9.9	9.9			1.66	73.1	1.66	73.1	PIPE	36	100	0.04
15D		9.9	28	4	5	8.8	0.02		4.3		13.2		21.6		32.3		38.0		44.1		9.9					1.66	73.1	Mtn Chnl		1124	0.18683
16D	6.8	16.7	28	4	6	8.8	0.02	2.0	5.5	7.3	17.9	12.3	28.8	17.7	41.3	23.1	49.1	27.1	59.3	6.8	16.7			1.66	45.0	1.66	98.5				
17D	8.6	25.3	28	4	5	8.8	0.02	2.7	7.9	10.0	26.5	15.5	43.4	24.8	62.2	33.0	76.2	38.3	91.6	8.6	25.3			1.66	63.5	1.66	152.0				
18D		25.3	28	4	5	8.8	0.02		7.9		26.5		43.4		62.2		76.2		91.6		25.3					1.66	152.0	Mtn Chnl		806	0.10918
19D	7.8	33.1	28	4	5	8.8	0.02	2.7	9.4	9.7	30.2	15.3	47.9	22.5	71.8	29.9	88.6	34.7	109.1	7.8	33.1			1.66	57.6	1.66	181.2				
20AD	33.1	106.1	28	4		8.8		9.4	30.6	30.2	104.3	47.9	165.6	71.8	247.4	88.6	305.0	109.1	369.7		106.1					1.66	613.8	Mtn Chnl		201	0.02985
21A	0.7	106.8	28	4	5	8.8	0.02	0.6	30.3	1.3	103.4	1.7	163.9	2.3	244.4	2.7	304.1	3.1	368.1	0.7	106.8			1.66	5.2	1.66	611.0				
22E	9.7	9.7	28	4	5	8.8	0.02	6.1	6.1	18.3	18.3	24.2	24.2	31.6	31.6	37.2	37.2	43.2	43.2	9.7	9.7			1.66	71.6	1.66	71.6	PIPE	18	100	0.06
23E		9.7	28	4	5	8.8	0.02		6.1		18.3		24.2		31.6		37.2		43.2		9.7					1.66	71.6	Mtn Chnl		1051	0.15033
24E	9	18.7	28	4	7	8.8	0.02	2.3	7.2	9.0	22.0	15.0	32.5	23.5	45.7	27.8	55.3	32.9	66.7	9.0	18.7			1.66	54.6	1.66	110.8				
25AE	18.7	125.5	28	4		8.8		7.2	36.8	22.0	122.9	32.5	195.7	45.7	285.0	55.3	357.3	66.7	432.0		125.5					1.66	717.1	Mtn Chnl		652	0.02454
26A	16.7	142.2	28	4	7	8.8	0.02	3.9	37.6	16.7	124.2	26.2	197.1	40.1	288.8	51.6	360.5	61.0	446.2	16.7	142.2			1.66	101.3	1.66	740.6				
27A		142.2	28	4	7	8.8	0.02		37.6		124.2		197.1		288.8		360.5		446.2		142.2					1.66	740.6	Mtn Chnl		1018	0.04322
28A	24.5	166.7	28	4	6	8.8	0.02	6.3	37.5	24.6	118.5	41.0	187.9	63.9	277.4	83.3	348.0	97.7	443.4	24.5	166.7			1.66	162.1	1.66	736.0				
29B	12.5	12.5	28	4	5	8.8	0.02	5.5	5.5	16.7	16.7	27.3	27.3	40.8	40.8	47.9	47.9	55.6	55.6	12.5	12.5			1.66	92.3	1.66	92.3	PIPE	36	100	0.02
30B	3.2	15.7	28	4	5	8.8	0.02	1.3	6.8	4.3	21.0	7.0	34.3	10.4	51.2	12.3	60.2	14.2	69.9	3.2	15.7			1.66	23.6	1.66	116.0				
31B		15.7	28	4	5	8.8	0.02		6.8		21.0		34.3		51.2		60.2		69.9		15.7					1.66	116.0	Mtn Chnl		673	0.17533
32B	3.3	19	28	4	5	8.8	0.02	1.5	7.8	4.8	23.8	7.2	38.3	10.8	53.5	12.7	63.9	14.7	75.6	3.3	19.0			1.66	24.4	1.66	125.4				
33B		19	28	4	5	8.8	0.02		7.8		23.8		38.3		53.5		63.9		75.6		19.0					1.66	125.4	Mtn Chnl		790	0.11392
34B	7.1	26.1	45	4	6	8.8	0.02	0.7	7.9	1.3	23.0	6.2	39.2	12.6	56.6	17.4	68.5	24.5	87.0	7.1	26.1			1.66	40.6	1.66	144.5				
35C	4.3	4.3	28	4	5	8.8	0.02	2.2	2.2	6.3	6.3	10.7	10.7	14.0	14.0	16.5	16.5	19.1	19.1	4.3	4.3			1.66	31.8	1.66	31.8				
36C		4.3	28	4	5	8.8	0.02		2.2		6.3		10.7		14.0		16.5		19.1		4.3					1.66	31.8	Mtn Chnl		700	0.17143
37C	2.4	6.7	45	4	6	8.8	0.02	0.3	2.1	0.4	5.9	2.1	10.6	4.3	15.4	5.9	18.5	8.3	23.5	2.4	6.7			1.66	13.7	1.66	39.0				
38C		6.7	45	4	6	8.8	0.02		2.1		5.9		10.6		15.4		18.5		23.5		6.7					1.66	39.0	Mtn Chnl		583	0.10292
39C	2.8	9.5	45	4	6	8.8	0.02	0.3	2.2	0.5	5.7	2.4	10.5	5.6	14.9	6.9	19.3	9.7	27.0	2.8	9.5			1.66	16.0	1.66	44.9				
40BC	9.5	35.6	45	4		8.8		2.2	10.0	5.7	28.2	10.5	49.6	14.9	71.1	19.3	87.5	27.0	114.1		35.6					1.66	189.4	Mtn Chnl		128	0.03125
41B	0.3	35.9	45	4	5	8.8	0.02	0.1	9.9	0.4	27.9	0.5	48.3	0.7	70.6	0.9	86.5	1.2	112.5	0.3	35.9			1.66	1.9	1.66	186.8				
42AB	35.9	202.6	45	4		8.8		9.9	45.0	27.9	139.2	48.3	217.8	70.6	323.0	86.5	406.4	112.5	522.6		202.6					1.66	867.5	Mtn Chnl		814	0.3317
43A	13.8	216.4	45	4	5	8.8	0.02	1.5	45.7	2.5	140.7	13.2	217.5	27.7	321.7	38.9	405.2	53.6	529.2	13.8	216.4			1.66	88.9	1.66	878.5				
44A		216.4	45	4	5	8.8	0.02		45.7		140.7		217.5		321.7		405.2		529.2		216.4					1.66	878.5	Mtn Chnl		624	0.02244
45A	17.3	233.7	45	4	6	8.8	0.02	1.8	45.0	3.0	139.0	13.3	214.0	30.6	316.3	42.4	399.0	59.6	531.3	17.3	233.7			1.66	99.0	1.66	882.0				
46A		233.7	45	4	6	8.8	0.02		45.0		139.0		214.0		316.3		399.0		531.3		233.7					1.66	882.0	PIPE	24	141	0.02128
47A	3	236.7	45	4	5	8.8	0.03	0.5	45.1	3.5	139.0	5.1	214.1	7.0	316.5	8.5	399.2	8.5	531.6		233.7	3.0	3.0	1.00	8.5	1.65	878.1				
48B	7.7	7.7	45	4	5	8.8	0.02	0.9	0.9	1.5	1.5	9.4	9.4	17.9	17.9	21.7	21.7	29.9	29.9	7.7	7.7			1.66	49.6	1.66	49.6	PIPE	18	100	0.02
49B		7.7	45	4	5	8.8	0.02		0.9		1.5		9.4		17.9		21.7		29.9		7.7					1.66	49.6	Valley Chnl		256	0.39844
50B	0.4	8.1	45	4	5	8.8	0.02	0.1	1.0	0.1	1.6	0.7	9.9	0.9	17.9	1.1	21.8	1.6	30.3	0.4	8.1			1.66	2.6	1.66	50.3				
51C	3.8	3.8	45	4	5	8.8	0.02	0.5	0.5	0.8	0.8	6.4	6.4	8.9	8.9	10.7	10.7	14.8	14.8	3.8	3.8			1.66	24.5	1.66	24.5	PIPE	18	100	0.02
52C		3.8	45	4	5	8.8	0.02		0.5		0.8		6.4		8.9		10.7		14.8		3.8					1.66	24.5	Mtn Chnl		433	0.16166
53C	2.5	6.3	45	4	5	8.8	0.02	0.3	0.7	0.5	1.3	3.5	7.7	5.8	11.4	7.1	14.5	9.7	21.2	2.5	6.3			1.66	16.1	1.66	35.2				
54BC	6.3	14.4	45	4		8.8		0.7	1.7	1.3	2.9	7.7	17.5	11.4	28.4	14.5	35.3	21.2	50.7		14.4					1.66	84.1	Mtn Chnl		740	0.25405
55B	6.3	20.7	45	4	6	8.8	0.02	0.7	2.3	1.1	3.9	5.5	20.6	11.2	36.6	15.4	45.5	21.7	66.9	6.3	20.7			1.66	36.0	1.66	111.1				
56C	4.9	4.9	45	4	5	8.8	0.02	0.5	0.5	0.9	0.9	4.7	4.7	9.8	9.8	13.8	13.8	19.0	19.0	4.9	4.9			1.66	31.6	1.66	31.6				
57C		4.9	45	4	5	8.8	0.02		0.5		0.9		4.7		9.8		13.8		19.0		4.9					1.66	31.6	Mtn Chnl		504	0.25794
58C	5.9	10.8	45	4	6	8.8	0.02	0.6	1.1	1.0	1.9	5.1	8.9	10.5	19.3	14.4	26.2	20.3	37.3	5.9	10.8			1.66	33.7	1.66	61.9				
59C		10.8	45	4	6	8.8	0.02		1.1		1.9		8.9		19.3		26.2		37.3		10.8					1.66	61.9	Mtn Chnl		429	0.24242
60C	4.1	14.9	45	4	5	8.8	0.02	0.5	1.6	0.8	2.6	5.0	11.4	9.6	23.3	11.6	32.3	15.9	47.6	4.1	14.9			1.66	26.4	1.66	79.0				
61C		14.9	45	4	5	8.8	0.02		1.6		2.6		11.4		23.3		32.3		47.6		14.9					1.66	79.0	Valley Chnl		510	0.01569
62C	2.4	17.3	45	4	5	8.8	0.02	0.3	1.8	0.5	2.9	2.9	10.3	5.6	21.0	6.8	30.1	9.3	48.2	2.4	17.3			1.66	15.5	1.66	80.0				
63D	2.5	2.5	45	4	5	8.8	0.02	0.3	0.3	0.5	0.5	2.4	2.4	5.0	5.0	7.1	7.1	9.7	9.7	2.5	2.5			1.66	16.1	1.66	16.1				
64D		2.5	45	4	5	8.8	0.02		0.3		0.5		2.4		5.0		7.1		9.7		2.5					1.66	16.1	Valley Chnl		397	0.31738
65D	1	3.5	45	4	5	8.8	0.02	0.1	0.4	0.2	0.7	1.4	3.7	2.3	6.8	2.8	9.0	3.9	12.7	1.0	3.5			1.66	6.4	1.66	21.0				
66D	3.1	6.6	45	4	6	8.8	0.02	0.3	0.7	0.6	1.2	2.7	6.4	6.2	13.0	7.6	16.6	10.7	23.4	3.1	6.6			1.66	17.7	1.66	38.8				
67D		6.6	45	4	6	8.8	0.02		0.7		1.2		6.4		13.0		16.6		23.4		6.6					1.66	38.8	Valley Chnl		256	0.08594
68D	0.9	7.5	45	4	5	8.8	0.02	0.1	0.8	0.2	1.4	1.3	7.1	2.1	14.4	2.5	18.4	3.5	26.1	0.9	7.5			1.66	5.8	1.66	43.3				
69CD	7.5	24.8	45	4		8.8		0.8	2.5	1.4	4.2	7.1	15.0	14.4	30.7	18.4	42.9	26.1	69.5		24.8					1.66	115.3	Valley Chnl		138	0.08696
70C	0.3	25.1	45	4	5	8.8	0.02	0.0	2.5	0.4	4.2	0.5	15.0	0.7	31.0	0.9	43.2	1.2	69.6	0.3	25.1			1.66	1.9	1.66	115.6				
71BC	25.1	45.8	45	4		8.8		2.5	4.8	4.2	8.1	15.0	35.6	31.0	66.5	43.2	87.3	69.6	136.3		45.8					1.66	226.2	Mtn Chnl		114	0.10526
72B	0.4	46.2	45	4	5	8.8	0.02	0.1	4.8	0.5	8.1	0.7	35.6	0.9	66.2	1.1	86.6	1.6	136.4	0.4	46.2			1.66	2.6	1.66	226.4				
73E	4	4	45	4	5	8.8	0.02	0.5	0.5	0.8	0.8	4.9	4.9	9.3	9.3	11.3	11.3	15.5	15.5	4.0	4.0			1.66	25.8	1.66	25.8				
74E		4	45	4	5	8.8	0.02		0.5		0.8		4.9		9.3		11.3		15.5		4.0					1.66	25.8	Mtn Chnl		567	0.16226
75E	5.3	9.3	45	4	5	8.8	0.02	0.6	1.0	1.0	1.7	5.7	8.9	10.6	16.2	15.0	20.3	20.6	30.5	5.3	9.3			1.66	34.1	1.66	50.5				
76BE	9.3	55.5	45	4		8.8		1.0	5.8	1.7	9.8	8.9	43.5	16.2	80.4	20.3	105.2	30.5	164.5		55.5					1.66	273.1	Mtn Chnl		282	0.1844
77B	3.7	59.2	45	4	6	8.8	0.02	0.4	6.2	0.7	10.3	3.2	45.6	6.6	85.0	9.1	108.9	12.8	172.4	3.7	59.2			1.66	21.2	1.66	286.2				
78C	4	4	45	4	5	8.8	0.02	0.5	0.5	0.8	0.8	4.9	4.9	9.3	9.3	11.3	11.3	15.5	15.5	4.0	4.0			1.66	25.8	1.66	25.8				
79C		4	45	4	5	8.8	0.02		0.5		0.8		4.9		9.3		11.3		15.5		4.0					1.66	25.8	Mtn Chnl		516	0.31008
80C	8.2	12.2	45	4	5	8.8	0.02	0.9	1.3	1.5	2.3	7.9	11.8	16.4	24.0	23.1	30.8	31.8	43.9	8.2	12.2			1.66	52.8	1.66	72.8				
81C		12.2	45	4	5	8.8	0.02		1.3		2.3		11.8		24.0		30.8		43.9		12.2					1.66	72.8	Mtn Chnl		501	0.16766
82C	7.7	19.9	45	4	5	8.8	0.02	0.8	2.1	1.4	3.6	7.4	17.5	15.4	33.9	21.7	44.3	29.9	65.5	7.7	19.9			1.66	49.6	1.66	108.7	PIPE	18	100	0.14
83C	3.5	23.4	45	4	5	8.8	0.02	0.4	2.5	0.7	4.2	4.3	20.0	8.2	39.7	9.9	52.6	13.6	77.2	3.5	23.4			1.66	22.6	1.66	128.2				
84C		23.4	45	4	5	8.8	0.02		2.5		4.2		20.0		39.7		52.6		77.2		23.4					1.66	128.2	Mtn Chnl		614	0.25081
85C	9.3	32.7	45	4	6	8.8	0.02	1.0	3.4	1.6	5.7	7.2	25.4	16.5	52.6	22.8	69.5	32.1	103.9	9.3	32.7			1.66	53.2	1.66	172.5				
86C		32.7	45	4	6	8.8	0.02		3.4		5.7		25.4		52.6		69.5		103.9		32.7					1.66	172.5	Mtn Chnl		755	0.10331
87C	3.9	36.6	45	4	6	8.8	0.02	0.4	3.7	0.7	6.2	3.0	24.2	6.9	49.7	9.6	67.8	13.4	107.5	3.9	36.6			1.66	22.3	1.66	178.4				
88D	4.6	4.6	45	4	5	8.8	0.02	0.5	0.5	0.9	0.9	5.6	5.6	10.7	10.7	13.0	13.0	17.9	17.9	4.6	4.6			1.66	29.6	1.66	29.6				
89D		4.6	45	4	5	8.8	0.02		0.5		0.9		5.6		10.7		13.0		17.9		4.6					1.66	29.6	Mtn Chnl		517	0.28627
90D	2.7	7.3	45	4	5	8.8	0.02	0.3	0.8	0.6	1.4	3.8	7.8	6.3	14.0	7.6	17.5	10.5	25.1	2.7	7.3			1.66	17.4	1.66	41.6				
91D		7.3	45	4	5	8.8	0.02		0.8		1.4		7.8		14.0		17.5		25.1		7.3					1.66	41.6	Mtn Chnl		458	0.22926
92D	2.8	10.1	45	4	5	8.8	0.02	0.3	1.1	0.6	1.9	3.4	9.5	6.5	16.7	7.9	21.5	10.9	31.9	2.8	10.1			1.66	18.0	1.66	52.9				
93CD	10.1	46.7	45	4		8.8		1.1	4.7	1.9	7.9	9.5	30.1	16.7	62.2	21.5	85.2	31.9	136.8		46.7					1.66	227.0	Mtn Chnl		225	0.22667
94C	1.6	48.3	45	4	5	8.8	0.02	0.2	4.9	0.3	8.1	2.3	29.9	3.7	61.5	4.5	85.7	4.5	137.3	1.6	48.3			1.66	7.5	1.66	227.9				
95BC	48.3	107.5	45	4		8.8		4.9	11.0	8.1	18.4	29.9	72.6	61.5	142.1	85.7	192.7	137.3	307.0		107.5					1.66	509.7	Mtn Chnl		461	0.03
96B	6.5	114	45	4	5	8.8	0.02	0.8	11.3	1.3	18.9	7.9	69.2	15.1	137.1	18.3	186.1	25.2	306.5	6.5	114.0			1.66	41.9	1.66	508.9				
97B		114	45	4	5	8.8	0.02		11.3		18.9		69.2		137.1		186.1		306.5		114.0					1.66	508.9	PIPE	18	150	0.03
98B	0.6	114.6	45	4	5	8.8	0.03	0.1	11.4	0.7	18.9	1.0	69.2	1.4	137.0	1.7	186.0	1.7	306.8		114.0	0.6	0.6	1.00	1.7	1.66	508.2				
99C	4.8	4.8	45	4	5	8.8	0.02	0.5	0.5	0.9	0.9	5.9	5.9	11.2	11.2	13.5	13.5	18.6	18.6	4.8	4.8			1.66	30.9	1.66	30.9				
100C		4.8	45	4	5	8.8	0.02		0.5		0.9		5.9		11.2		13.5		18.6		4.8					1.66	30.9	Mtn Chnl		557	0.18312
101C	5.3	10.1	45	4	6	8.8	0.02	0.6	1.1	0.9	1.8	4.6	9.2	9.4	18.2	13.0	23.0	18.3	33.9	5.3	10.1			1.66	30.3	1.66	56.3				
102BC	10.1	124.7	45	4		8.8		1.1	12.3	1.8	20.5	9.2	72.8	18.2	144.8	23.0	196.2	33.9	329.6		124.1		0.6			1.66	546.0	PIPE	18	255	0.03
103B	3.1	127.8	45	4	5	8.8	0.03	0.4	12.6	0.6	21.0	3.4	73.0	6.3	145.1	8.8	196.8	8.8	331.5		124.1	3.1	3.7	1.00	8.8	1.64	544.0				
104C	3.4	3.4	45	4	5	8.8	0.02	0.4	0.4	0.7	0.7	3.7	3.7	6.8	6.8	9.6	9.6	13.2	13.2	3.4	3.4			1.66	21.9	1.66	21.9				
105C		3.4	45	4	5	8.8	0.02		0.4		0.7		3.7		6.8		9.6		13.2		3.4					1.66	21.9	Valley Chnl		517	0.35783
106C	2.2	5.6	45	4	5	8.8	0.02	0.2	0.6	0.4	1.1	2.4	5.9	4.4	11.0	6.2	14.5	8.5	20.3	2.2	5.6			1.66	14.2	1.66	33.7				
107D	2.9	2.9	45	4	5	8.8	0.02	0.3	0.3	0.6	0.6	3.5	3.5	6.8	6.8	8.2	8.2	11.3	11.3	2.9	2.9			1.66	18.7	1.66	18.7				
108D		2.9	45	4	5	8.8	0.02		0.3		0.6		3.5		6.8		8.2		11.3		2.9					1.66	18.7	Mtn Chnl		273	0.27106
109D	1.5	4.4	45	4	5	8.8	0.02	0.2	0.5	0.3	0.9	2.5	5.1	3.5	9.0	4.2	11.0	5.8	15.6	1.5	4.4			1.66	9.7	1.66	25.8				
110CD	4.4	10	45	4		8.8		0.5	1.1	0.9	1.9	5.1	10.9	9.0	20.0	11.0	25.4	15.6	35.9		10.0					1.66	59.6	Mtn Chnl		325	0.16615
111C	3	13	45	4	5	8.8	0.02	0.3	1.5	0.6	2.5	3.7	13.6	7.0	23.5	8.5	30.8	11.6	44.4	3.0	13.0			1.66	19.3	1.66	73.8				
112C		13	45	4	5	8.8	0.02		1.5		2.5		13.6		23.5		30.8		44.4		13.0					1.66	73.8	PIPE	10	138	0.06522
113C	2.3	15.3	45	4	5	8.8	0.02	0.2	1.7	0.4	2.9	2.0	15.3	4.6	27.6	6.5	36.1	8.9	52.0	2.3	15.3			1.66	14.8	1.66	86.4				
114BC	15.3	143.1	45	4		8.8		1.7	14.1	2.9	23.3	15.3	80.0	27.6	158.2	36.1	217.6	52.0	366.5		139.4		3.7			1.64	602.1	PIPE	18	540	0.0487
115B	12	155.1	45	4	6	8.8	0.03	1.3	15.2	2.2	25.2	10.6	84.8	21.5	168.6	29.6	229.7	29.6	384.2		139.4	12.0	15.7	1.00	29.6	1.59	612.2				
116B		155.1	45	4	6	8.8	0.03		15.2		25.2		84.8		168.6		229.7		384.2		139.4		15.7			1.59	612.2	PIPE	18	475	0.04147
117B	5.5	160.6	45	4	6	8.8	0.03	0.6	15.7	1.0	26.1	4.3	87.7	9.8	172.8	13.6	234.9	13.6	392.2		139.4	5.5	21.2	1.00	13.6	1.57	616.9				
118AB	160.6	397.3	45	4		8.8		15.7	59.9	26.1	165.0	87.7	272.6	172.8	414.7	234.9	539.4	392.2	838.3		373.1		24.2			1.62	1357.9	PIPE	24	285	0.08702
119A	3.7	401	45	4	6	8.8	0.03	0.4	60.0	0.7	165.5	3.3	272.4	6.6	415.1	9.1	542.8	9.1	842.0		373.1	3.7	27.9	1.00	9.1	1.61	1359.1				
120B	4	4	45	4	5	8.8	0.02	0.4	0.4	0.7	0.7	3.8	3.8	8.0	8.0	11.3	11.3	15.5	15.5	4.0	4.0			1.66	25.8	1.66	25.8				
121B		4	45	4	5	8.8	0.02		0.4		0.7		3.8		8.0		11.3		15.5		4.0					1.66	25.8	Mtn Chnl		202	0.28713
122B	2.6	6.6	45	4	5	8.8	0.02	0.3	0.7	0.5	1.2	2.5	6.2	5.2	13.0	7.3	17.4	10.1	24.3	2.6	6.6			1.66	16.7	1.66	40.3				
123B		6.6	45	4	5	8.8	0.02		0.7		1.2		6.2		13.0		17.4		24.3		6.6					1.66	40.3	Valley Chnl		393	0.36132
124B	2.4	9	45	4	5	8.8	0.02	0.3	1.0	0.5	1.7	2.9	8.9	5.6	17.1	6.8	22.5	9.3	31.9	2.4	9.0			1.66	15.5	1.66	52.9				
125B		9	45	4	5	8.8	0.02		1.0		1.7		8.9		17.1		22.5		31.9		9.0					1.66	52.9	Valley Chnl		591	0.11168
126B	1.1	10.1	45	4	6	8.8	0.03	0.1	1.1	0.2	1.9	1.1	9.2	2.0	18.0	2.7	23.9	2.7	33.0		9.0	1.1	1.1	1.00	2.7	1.59	52.4				
127AB	10.1	411.1	45	4		8.8		1.1	60.8	1.9	167.1	9.2	274.1	18.0	419.4	23.9	560.9	33.0	867.2		382.1		29.0			1.61	1399.2	PIPE	24	293	0.0116
128A	1.1	412.2	45	4	5	8.8	0.03	0.2	60.7	0.3	167.0	1.9	274.0	2.6	419.3	3.1	561.3	3.1	867.9		382.1	1.1	30.1	1.00	3.1	1.61	1398.8				
129B	4.6	4.6	45	4	5	8.8	0.02	0.5	0.5	0.8	0.8	4.4	4.4	9.2	9.2	13.0	13.0	17.9	17.9	4.6	4.6			1.66	29.6	1.66	29.6				
130B		4.6	45	4	5	8.8	0.02		0.5		0.8		4.4		9.2		13.0		17.9		4.6					1.66	29.6	Valley Chnl		514	0.16732
131B	4.4	9	45	4	5	8.8	0.03	0.5	1.0	0.9	1.7	4.8	8.9	8.9	17.4	12.5	23.0	12.5	27.8		4.6	4.4	4.4	1.00	12.5	1.34	37.1				
132B		9	45	4	5	8.8	0.03		1.0		1.7		8.9		17.4		23.0		27.8		4.6		4.4			1.34	37.1	Valley Chnl		500	0.046
133B	4.3	13.3	45	4	5	8.8	0.02	0.5	1.4	0.8	2.4	3.7	11.5	8.6	22.1	12.1	29.2	16.7	38.3	4.3	8.9		4.4	1.66	27.7	1.44	55.2				
134AB	13.3	425.5	45	4		8.8		1.4	61.8	2.4	169.1	11.5	276.2	22.1	431.7	29.2	582.0	38.3	896.9		391.0		34.5			1.61	1440.9	Valley Chnl		272	0.00735
135A	1.9	427.4	45	4	5	8.8	0.03	0.2	61.6	0.4	168.0	2.4	275.7	4.5	430.7	5.4	577.4	5.4	894.8		391.0	1.9	36.4	1.00	5.4	1.60	1435.1				
136B	7.3	7.3	45	4	5	8.8	0.02	0.8	0.8	1.3	1.3	6.3	6.3	14.6	14.6	20.6	20.6	28.3	28.3	7.3	7.3			1.66	47.0	1.66	47.0				
137B		7.3	45	4	5	8.8	0.02		0.8		1.3		6.3		14.6		20.6		28.3		7.3					1.66	47.0	Mtn Chnl		496	0.20565
138B	6.2	13.5	45	4	6	8.8	0.02	0.6	1.4	1.1	2.4	4.8	10.2	11.0	24.4	15.2	32.8	21.4	46.8	6.2	13.5			1.66	35.5	1.66	77.7				
139B		13.5	45	4	6	8.8	0.02		1.4		2.4		10.2		24.4		32.8		46.8		13.5					1.66	77.7	Mtn Chnl		464	0.09052
140B	2.5	16	45	4	6	8.8	0.02	0.3	1.6	0.4	2.7	2.2	10.5	4.4	24.8	6.1	34.1	8.6	50.2	2.5	16.0			1.66	14.3	1.66	83.4				
141B		16	45	4	6	8.8	0.02		1.6		2.7		10.5		24.8		34.1		50.2		16.0					1.66	83.4	Mtn Chnl		216	0.12963
142B	0.9	16.9	45	4	5	8.8	0.02	0.1	1.7	0.2	2.9	1.1	10.5	2.1	24.5	2.5	33.7	3.5	51.8	0.9	16.9			1.66	5.8	1.66	86.0				
143B		16.9	45	4	5	8.8	0.02		1.7		2.9		10.5		24.5		33.7		51.8		16.9					1.66	86.0	Mtn Chnl		716	0.24581
144B	7	23.9	45	4	6	8.8	0.02	0.7	2.3	1.2	3.8	6.1	10.9	12.4	25.3	17.1	36.3	24.1	61.9	7.0	23.9			1.66	40.0	1.66	102.7				
145B		23.9	45	4	6	8.8	0.02		2.3		3.8		10.9		25.3		36.3		61.9		23.9					1.66	102.7	Mtn Chnl		287	0.21603
146B	2.7	26.6	45	4	5	8.8	0.02	0.3	2.5	0.5	4.1	3.3	11.7	6.3	25.3	7.6	36.3	10.5	65.1	2.7	26.6			1.66	17.4	1.66	108.1				
147C	3.4	3.4	45	4	6	8.8	0.02	0.4	0.4	0.6	0.6	3.0	3.0	6.8	6.8	8.3	8.3	11.7	11.7	3.4	3.4			1.66	19.5	1.66	19.5				
148C		3.4	45	4	6	8.8	0.02		0.4		0.6		3.0		6.8		8.3		11.7		3.4					1.66	19.5	Mtn Chnl		438	0.20091
149C	7	10.4	45	4	5	8.8	0.02	0.8	1.1	1.3	1.8	6.7	8.6	14.0	19.2	19.8	24.9	27.2	36.0	7.0	10.4			1.66	45.1	1.66	59.7				
150C		10.4	45	4	5	8.8	0.02		1.1		1.8		8.6		19.2		24.9		36.0		10.4					1.66	59.7	Mtn Chnl		504	0.22619
151C	4.8	15.2	45	4	6	8.8	0.02	0.5	1.6	0.9	2.7	4.2	11.8	9.6	25.3	11.8	33.3	16.5	49.5	4.8	15.2			1.66	27.5	1.66	82.1				
152C		15.2	45	4	6	8.8	0.02		1.6		2.7		11.8		25.3		33.3		49.5		15.2					1.66	82.1	Mtn Chnl		238	0.26891
153C	1.9	17.1	45	4	5	8.8	0.02	0.2	1.8	0.4	3.0	2.0	12.8	3.8	27.6	5.4	36.5	7.4	53.5	1.9	17.1			1.66	12.2	1.66	88.8				
154BC	17.1	43.7	45	4		8.8		1.8	4.2	3.0	7.0	12.8	24.0	27.6	50.1	36.5	68.8	53.5	115.7		43.7					1.66	192.0	Mtn Chnl		404	0.19307
155B	2.3	46	45	4	5	8.8	0.02	0.3	4.4	0.5	7.2	3.2	24.1	5.4	51.5	6.5	70.8	8.9	119.5	2.3	46.0			1.66	14.8	1.66	198.4				
156B		46	45	4	5	8.8	0.02		4.4		7.2		24.1		51.5		70.8		119.5		46.0					1.66	198.4	Mtn Chnl		438	0.11416
157B	6.8	52.8	45	4	6	8.8	0.02	0.7	4.9	1.2	8.2	5.9	27.5	12.0	56.3	16.7	76.2	23.4	131.7	6.8	52.8			1.66	38.9	1.66	218.6				
158B		52.8	45	4	6	8.8	0.02		4.9		8.2		27.5		56.3		76.2		131.7		52.8					1.66	218.6	Valley Chnl		431	0.03712
159B	4.8	57.6	45	4	5	8.8	0.02	0.5	5.3	0.9	8.8	4.6	27.4	9.6	55.9	13.5	76.4	18.6	136.5	4.8	57.6			1.66	30.9	1.66	226.6				
160D	3.8	3.8	45	4	6	8.8	0.02	0.4	0.4	0.7	0.7	3.3	3.3	6.7	6.7	9.3	9.3	13.1	13.1	3.8	3.8			1.66	21.7	1.66	21.7				
161D		3.8	45	4	6	8.8	0.02		0.4		0.7		3.3		6.7		9.3		13.1		3.8					1.66	21.7	Mtn Chnl		353	0.25496
162D	1.4	5.2	45	4	5	8.8	0.02	0.2	0.6	0.3	0.9	2.0	4.5	3.3	8.7	4.0	11.9	5.4	17.1	1.4	5.2			1.66	9.0	1.66	28.4				
163D		5.2	45	4	5	8.8	0.02		0.6		0.9		4.5		8.7		11.9		17.1		5.2					1.66	28.4	Mtn Chnl		455	0.32967
164D	3.5	8.7	45	4	5	8.8	0.02	0.4	0.9	0.6	1.5	3.4	7.1	7.0	13.6	9.9	17.9	13.6	27.0	3.5	8.7			1.66	22.6	1.66	44.9				
165D		8.7	45	4	5	8.8	0.02		0.9		1.5		7.1		13.6		17.9		27.0		8.7					1.66	44.9	Mtn Chnl		207	0.16425
166D	1.9	10.6	45	4	5	8.8	0.02	0.2	1.1	0.4	1.9	2.3	8.0	4.4	15.9	5.4	21.2	7.4	32.6	1.9	10.6			1.66	12.2	1.66	54.0				
167E	6.6	6.6	45	4	6	8.8	0.02	0.7	0.7	1.2	1.2	5.7	5.7	11.7	11.7	16.2	16.2	22.7	22.7	6.6	6.6			1.66	37.7	1.66	37.7				
168E		6.6	45	4	6	8.8	0.02		0.7		1.2		5.7		11.7		16.2		22.7		6.6					1.66	37.7	Mtn Chnl		539	0.2449
169E	3.8	10.4	45	4	6	8.8	0.02	0.4	1.1	0.7	1.8	3.3	8.1	7.6	17.0	9.3	23.1	13.1	33.7	3.8	10.4			1.66	21.7	1.66	56.0				
170DE	10.4	21	45	4		8.8		1.1	2.2	1.8	3.7	8.1	16.1	17.0	33.0	23.1	44.2	33.7	66.3		21.0					1.66	110.1	Valley Chnl		307	0.01303
171D	4.5	25.5	45	4	6	8.8	0.02	0.5	2.6	0.8	4.4	3.9	18.3	8.0	36.6	11.0	49.2	15.5	75.2	4.5	25.5			1.66	25.7	1.66	124.9				
172BD	25.5	83.1	45	4		8.8		2.6	7.8	4.4	13.1	18.3	44.4	36.6	91.0	49.2	122.5	75.2	209.3		83.1					1.66	347.5	Valley Chnl		543	0.06262
173B	5.6	88.7	45	4	5	8.8	0.03	0.6	8.3	1.1	13.9	5.5	45.0	11.3	90.2	15.9	122.7	15.9	210.8		83.1	5.6	5.6	1.00	15.9	1.62	341.2				
174AB	88.7	516.1	45	4		8.8		8.3	69.2	13.9	181.8	45.0	307.5	90.2	518.8	122.7	698.9	210.8	1105.6		474.1		42.0			1.61	1775.9	PIPE	2-24	270	0.01296
175A	7	523.1	45	4	6	8.8	0.02	0.7	69.4	1.3	182.4	6.1	307.7	14.0	519.9	17.1	702.2	24.1	1117.7	7.0	481.1		42.0	1.66	40.0	1.61	1796.2				
176B	5.9	5.9	45	4	5	8.8	0.05	0.8	0.8	1.4	1.4	6.6	6.6	12.1	12.1	17.0	17.0	17.0	17.0			5.9	5.9	1.00	17.0	1.00	17.0				

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING DATA TABLES – SHEET 7 OF 22

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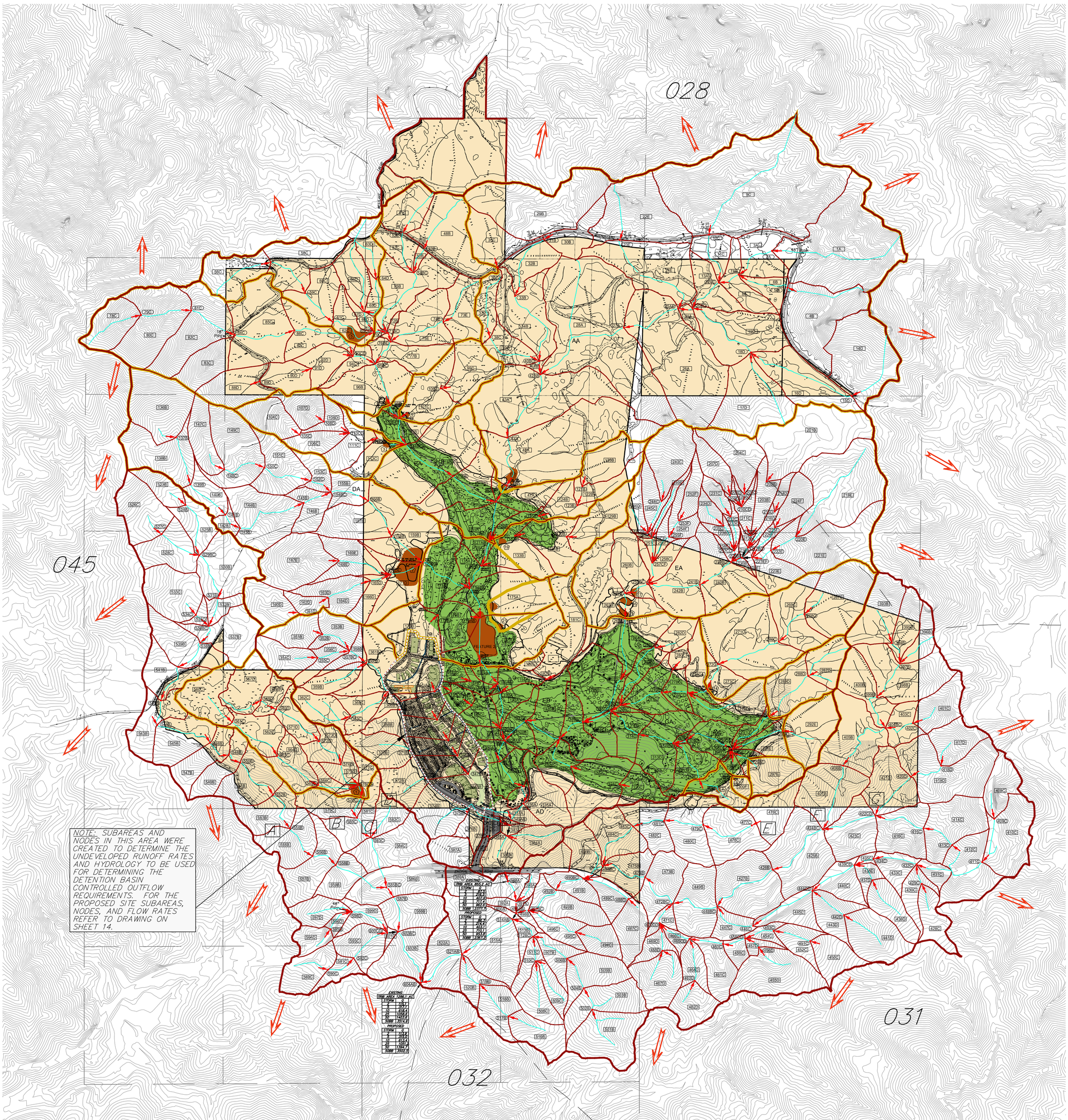
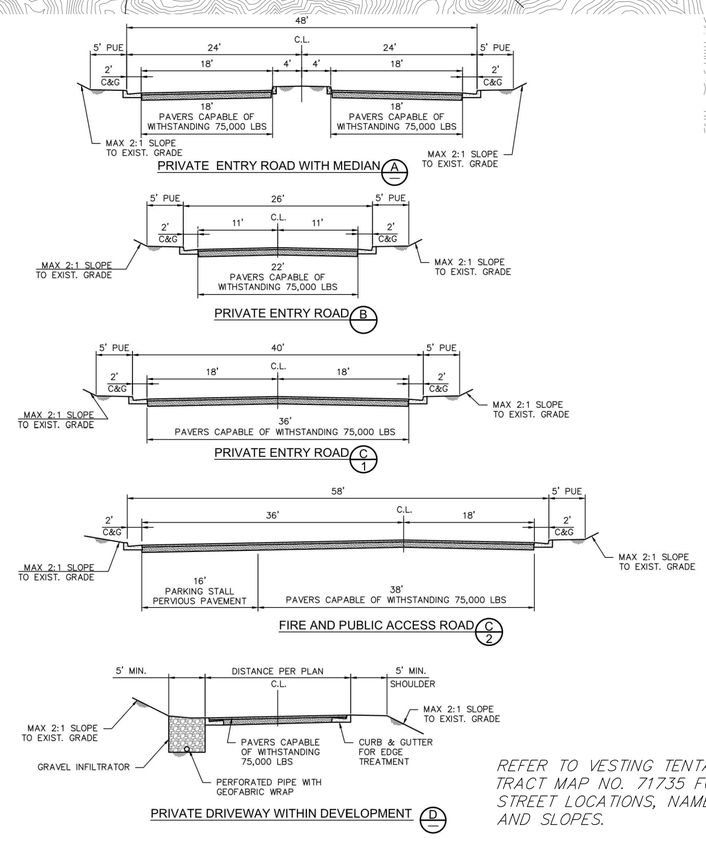


Location	Area	Comulative Area (acres)	Conveyance Q (cfs)											
			2 year		5 year		10 year		25 year		50 year		50 year BB	
			E	P	E	P	E	P	E	P	E	P	E	P
A	553B	66.9	5	5	8.2	8.2	20.8	20.8	41.2	41.2	56.8	56.8	111.1	111.1
B	579C	30.2	2.9	2.9	4.9	4.9	16.5	16.5	32.5	32.5	44.8	44.8	77.3	77.3
C	581C	33.7	3.2	3.2	5.4	5.4	16.8	16.8	32.8	32.8	45.2	45.2	81.7	81.7
D	582C	35.9	3.4	3.4	5.7	5.7	17	17	33.1	33.1	45.7	45.7	84.7	84.7
E	476C	3.9	0.4	0.4	5.3	5.3	8.5	8.5	12.5	12.5	14.7	14.7	17.2	17.2
F	407B	41.8	4.9	4.9	31.5	31.5	50.2	50.2	74.6	74.6	93.8	93.8	123.7	123.7
G	421D	17.7	2.6	2.6	21.1	21.1	32.5	32.5	45.4	45.4	54.1	54.1	65.1	65.1



REFER TO VESTING TENTATIVE TRACT MAP NO. 71735 FOR STREET LOCATIONS, NAMES, AND SLOPES.

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

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REGISTERED PROFESSIONAL ENGINEER
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56891
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THE MALIBU INSTITUTE

DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
PROPOSED CONDITIONS ENTIRE SITE - SHEET 8 OF 22 - P1

NOTE: SUBAREAS AND NODES IN THIS AREA WERE CREATED TO DETERMINE THE UNDEVELOPED RUNOFF RATES AND HYDROLOGY TO BE USED FOR DETERMINING THE DETENTION BASIN CONTROLLED OUTFLOW REQUIREMENTS. FOR THE PROPOSED SITE SUBAREAS, NODES, AND FLOW RATES REFER TO DRAWING ON SHEET 14.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
PROPOSED CONDITIONS GOLF COURSE - SHEET 9 OF 22 - P2

NOTE: SUBAREAS AND NODES IN THIS AREA WERE CREATED TO DETERMINE THE UNDEVELOPED RUNOFF RATES AND HYDROLOGY TO BE USED FOR DETERMINING THE DETENTION BASIN CONTROLLED OUTFLOW REQUIREMENTS. FOR THE PROPOSED SITE SUBAREAS, NODES, AND FLOW RATES REFER TO DRAWING ON SHEET 14.

THIS PIPE MAY CARRY DEBRIS. TO BE DESIGNED WITH SELF CLEANING VELOCITY

PROVIDE INLET FILTER EACH INLET (TYPICAL)

DETENTION BASIN "A"

STORM	IN	OUT	STORAGE	DEPTH
2 YR	9.1 cfs	2.0 cfs	0.30 AF	1.92'
5 YR	20.1 cfs	3.3 cfs	0.54 AF	2.96'
10 YR	31.8 cfs	13.5 cfs	0.66 AF	3.43'
25 YR	44.5 cfs	28.4 cfs	0.79 AF	3.85'
50 YR	53.6 cfs	38.2 cfs	0.84 AF	4.04'

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

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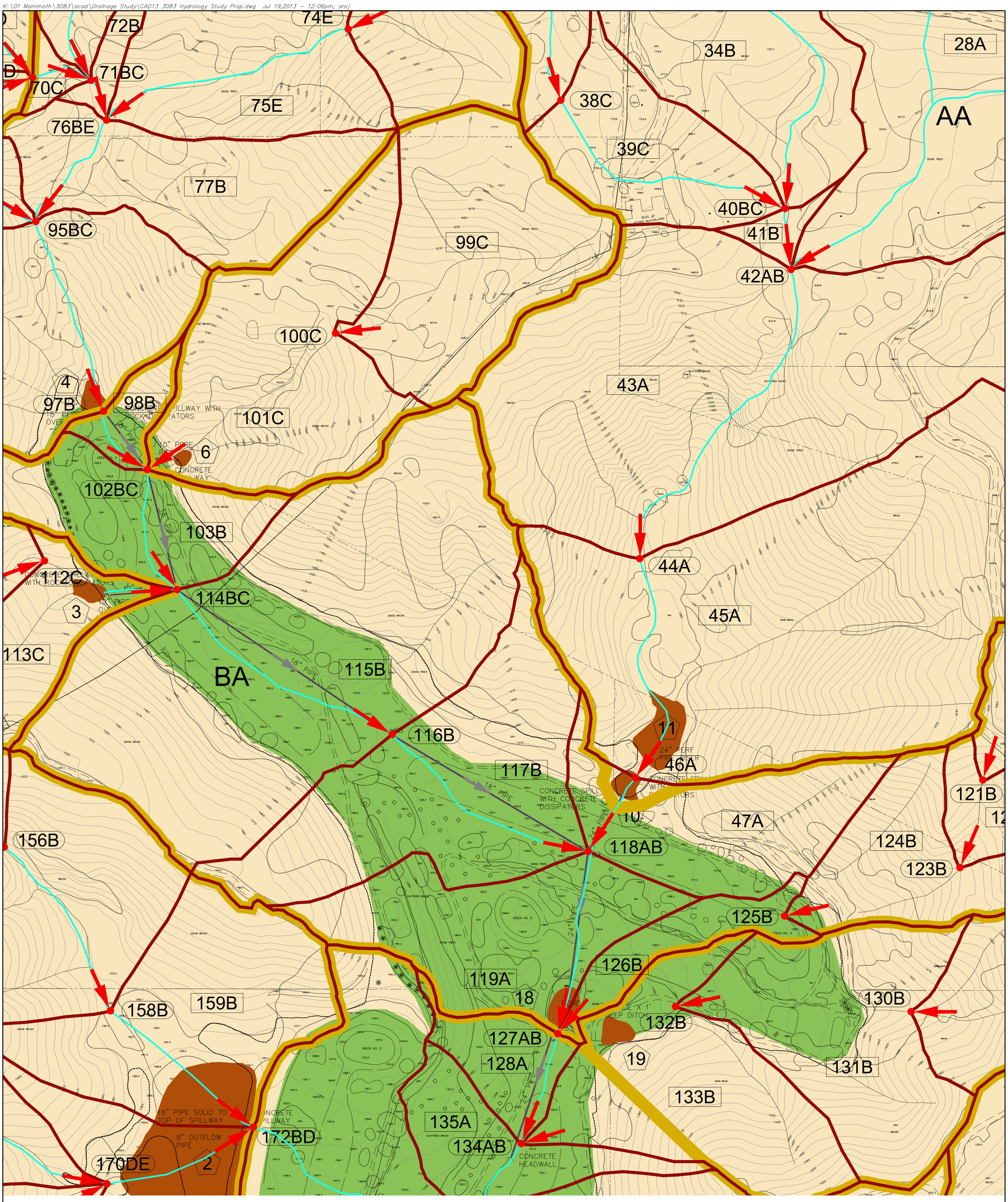
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
PROPOSED CONDITIONS 100 SCALE - SHEET 10 OF 22 - P3



GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
PROPOSED CONDITIONS 100 SCALE - SHEET 11 OF 22 - P4

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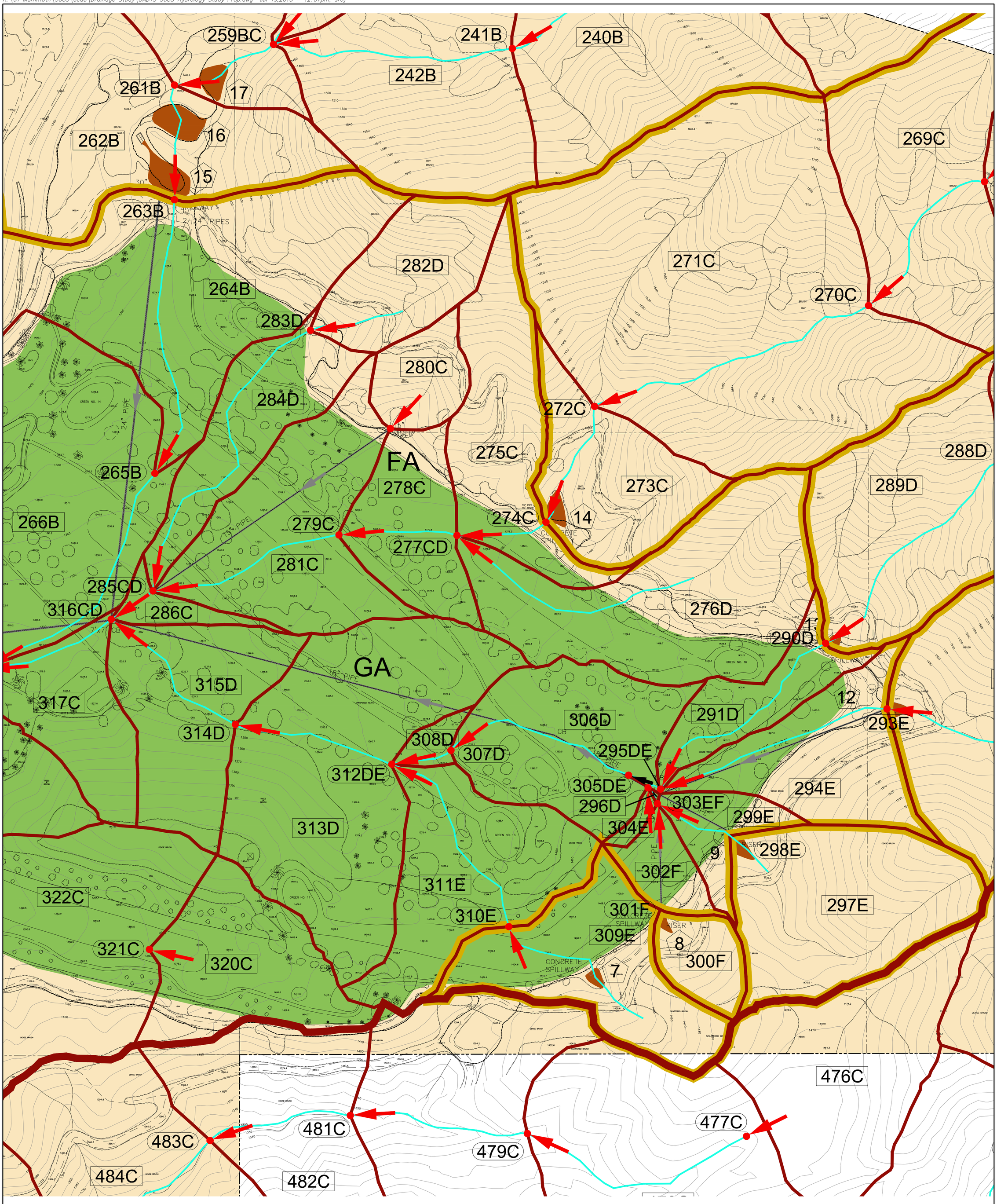

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
PROPOSED CONDITIONS 100 SCALE - SHEET 12 OF 22 - P5

Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Tc (minutes)	Isohyetal	Imperviousness	2 year Tributary Q (cfs	2 year Conveyance Q (cfs)	5 year Tributary Q (cfs	5 year Conveyance Q (cfs)	10 year Tributary Q (cfs	10 year Conveyance Q (cfs)	25 year Tributary Q (cfs	25 year Conveyance Q (cfs)	50 year Tributary Q (cfs	50 year Conveyance Q (cfs)	50 year Burned Tributary Q (cfs	50 year Burned Conveyance Q (cfs)	50 Year Burned and Bulked Trib burned and bulked acreage	cummulative burned and bulked acreage	Trib burned only acreage	cummulative burned only	Trib Weighted Bulking Factor	Tributary Q (cfs)	Conveyance Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope
1A	17.8	17.8	28	4	7	8.8	0.02	4.0	4.0	16.8	16.8	27.9	27.9	42.8	42.8	55.0	55.0	65.1	65.1	17.8	17.8			1.66	108.0	1.66	108.0	PIPE	48	100	0.04
2A		17.8	28	4	7	8.8	0.02		4.0		16.8		27.9		42.8		55.0		65.1		17.8					1.66	108.0	Mtn Chnl		506	0.11858
3A	4.1	21.9	28	4	5	8.8	0.02	2.4	5.7	6.7	20.5	10.2	33.1	13.4	50.8	15.7	64.8	18.2	77.2	4.1	21.9			1.66	30.3	1.66	128.2				
4B	9.7	9.7	28	4	5	8.8	0.02	4.9	4.9	14.2	14.2	24.2	24.2	31.6	31.6	37.2	37.2	43.2	43.2	9.7	9.7			1.66	71.6	1.66	71.6				
5B		9.7	28	4	5	8.8	0.02		4.9		14.2		24.2		31.6		37.2		43.2		9.7					1.66	71.6	Mtn Chnl		534	0.31835
6B	1.9	11.6	28	4	5	8.8	0.02	1.1	5.7	3.1	16.4	4.7	25.8	6.2	34.3	7.3	40.6	8.5	47.6	1.9	11.6			1.66	14.0	1.66	79.0				
7AB	11.6	33.5	28	4		8.8		5.7	11.4	16.4	36.8	25.8	57.8	34.3	84.0	40.6	104.4	47.6	124.1		33.5					1.66	205.9	Mtn Chnl		257	0.07782
8A	3.1	36.6	28	4	5	8.8	0.02	1.6	12.6	4.5	39.8	7.7	61.9	10.1	89.7	11.9	111.3	13.8	132.4	3.1	36.6			1.66	22.9	1.66	219.8				
9C	30.6	30.6	28	4	6	8.8	0.02	7.8	7.8	30.7	30.7	51.1	51.1	79.8	79.8	104.1	104.1	122.0	122.0	30.6	30.6			1.66	202.5	1.66	202.5	PIPE	48	100	0.02
10C		30.6	28	4	6	8.8	0.02		7.8		30.7		51.1		79.8		104.1		122.0		30.6					1.66	202.5	PIPE	2-24	100	0.04
11C	2.4	33	28	4	5	8.8	0.02	1.3	9.1	3.9	34.6	6.0	56.2	7.8	86.3	9.2	111.8	10.7	131.0	2.4	33.0			1.66	17.7	1.66	217.5				
12AC	33	69.6	28	4		8.8		9.1	21.4	34.6	72.7	56.2	116.4	86.3	173.5	111.8	219.2	131.0	260.6		69.6					1.66	432.6	Mtn Chnl		405	0.03457
13A	3.4	73	28	4	5	8.8	0.02	1.1	21.7	3.9	74.1	6.1	117.7	9.8	175.6	13.0	216.4	15.1	260.6	3.4	73.0			1.66	25.1	1.66	432.6				
14D	9.9	9.9	28	4	5	8.8	0.02	4.3	4.3	13.2	13.2	21.6	21.6	32.3	32.3	38.0	38.0	44.1	44.1	9.9	9.9			1.66	73.1	1.66	73.1	PIPE	36	100	0.04
15D		9.9	28	4	5	8.8	0.02		4.3		13.2		21.6		32.3		38.0		44.1		9.9					1.66	73.1	Mtn Chnl		1124	0.18683
16D	6.8	16.7	28	4	6	8.8	0.02	2.0	5.5	7.3	17.9	12.3	28.8	17.7	41.3	23.1	49.1	27.1	59.3	6.8	16.7			1.66	45.0	1.66	98.5				
17D	8.6	25.3	28	4	5	8.8	0.02	2.7	7.9	10.0	26.5	15.5	43.4	24.8	62.2	33.0	76.2	38.3	91.6	8.6	25.3			1.66	63.5	1.66	152.0				
18D		25.3	28	4	5	8.8	0.02		7.9		26.5		43.4		62.2		76.2		91.6		25.3					1.66	152.0	Mtn Chnl		806	0.10918
19D	7.8	33.1	28	4	5	8.8	0.02	2.7	9.4	9.7	30.2	15.3	47.9	22.5	71.8	29.9	88.6	34.7	109.1	7.8	33.1			1.66	57.6	1.66	181.2				
20AD	33.1	106.1	28	4		8.8		9.4	30.6	30.2	104.3	47.9	165.6	71.8	247.4	88.6	305.0	109.1	369.7		106.1					1.66	613.8	Mtn Chnl		201	0.02985
21A	0.7	106.8	28	4	5	8.8	0.02	0.6	30.3	1.3	103.4	1.7	163.9	2.3	244.4	2.7	304.1	3.1	368.1	0.7	106.8			1.66	5.2	1.66	611.0				
22E	9.7	9.7	28	4	5	8.8	0.02	6.1	6.1	18.3	18.3	24.2	24.2	31.6	31.6	37.2	37.2	43.2	43.2	9.7	9.7			1.66	71.6	1.66	71.6	PIPE	18	100	0.06
23E		9.7	28	4	5	8.8	0.02		6.1		18.3		24.2		31.6		37.2		43.2		9.7					1.66	71.6	Mtn Chnl		1051	0.15033
24E	9	18.7	28	4	7	8.8	0.02	2.3	7.2	9.0	22.0	15.0	32.5	23.5	45.7	27.8	55.3	32.9	66.7	9.0	18.7			1.66	54.6	1.66	110.8				
25AE	18.7	125.5	28	4		8.8		7.2	36.8	22.0	122.9	32.5	195.7	45.7	285.0	55.3	357.3	66.7	432.0		125.5					1.66	717.1	Mtn Chnl		652	0.02454
26A	16.7	142.2	28	4	7	8.8	0.02	3.9	37.6	16.7	124.2	26.2	197.1	40.1	288.8	51.6	360.5	61.0	446.2	16.7	142.2			1.66	101.3	1.66	740.6				
27A		142.2	28	4	7	8.8	0.02		37.6		124.2		197.1		288.8		360.5		446.2		142.2					1.66	740.6	Mtn Chnl		1018	0.04322
28A	24.5	166.7	28	4	6	8.8	0.02	6.3	37.5	24.6	118.5	41.0	187.9	63.9	277.4	83.3	348.0	97.7	443.4	24.5	166.7			1.66	162.1	1.66	736.0				
29B	12.5	12.5	28	4	5	8.8	0.02	5.5	5.5	16.7	16.7	27.3	27.3	40.8	40.8	47.9	47.9	55.6	55.6	12.5	12.5			1.66	92.3	1.66	92.3	PIPE	36	100	0.02
30B	3.2	15.7	28	4	5	8.8	0.02	1.3	6.8	4.3	21.0	7.0	34.3	10.4	51.2	12.3	60.2	14.2	69.9	3.2	15.7			1.66	23.6	1.66	116.0				
31B		15.7	28	4	5	8.8	0.02		6.8		21.0		34.3		51.2		60.2		69.9		15.7					1.66	116.0	Mtn Chnl		673	0.17533
32B	3.3	19	28	4	5	8.8	0.02	1.5	7.8	4.8	23.8	7.2	38.3	10.8	53.5	12.7	63.9	14.7	75.6	3.3	19.0			1.66	24.4	1.66	125.4				
33B		19	28	4	5	8.8	0.02		7.8		23.8		38.3		53.5		63.9		75.6		19.0					1.66	125.4	Mtn Chnl		790	0.11392
34B	7.1	26.1	45	4	6	8.8	0.02	0.7	7.9	1.3	23.0	6.2	39.2	12.6	56.6	17.4	68.5	24.5	87.0	7.1	26.1			1.66	40.6	1.66	144.5				
35C	4.3	4.3	28	4	5	8.8	0.02	2.2	2.2	6.3	6.3	10.7	10.7	14.0	14.0	16.5	16.5	19.1	19.1	4.3	4.3			1.66	31.8	1.66	31.8				
36C		4.3	28	4	5	8.8	0.02		2.2		6.3		10.7		14.0		16.5		19.1		4.3					1.66	31.8	Mtn Chnl		700	0.17143

HYDROLOGY STUDY APPROVED

REGISTERED PROFESSIONAL ENGINEER — ERNESTO J. RIVERA — No. 67550 — Exp: 06-30-15 — CIVIL — STATE OF CALIFORNIA

CHECKED BY: [signature] RCE NO. 67550 DATE 10/22/13

APPROVED BY: [signature] DATE 10/22/13

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

triad/holmes assoc.
civil engineering
land surveying

PREPARED FOR:

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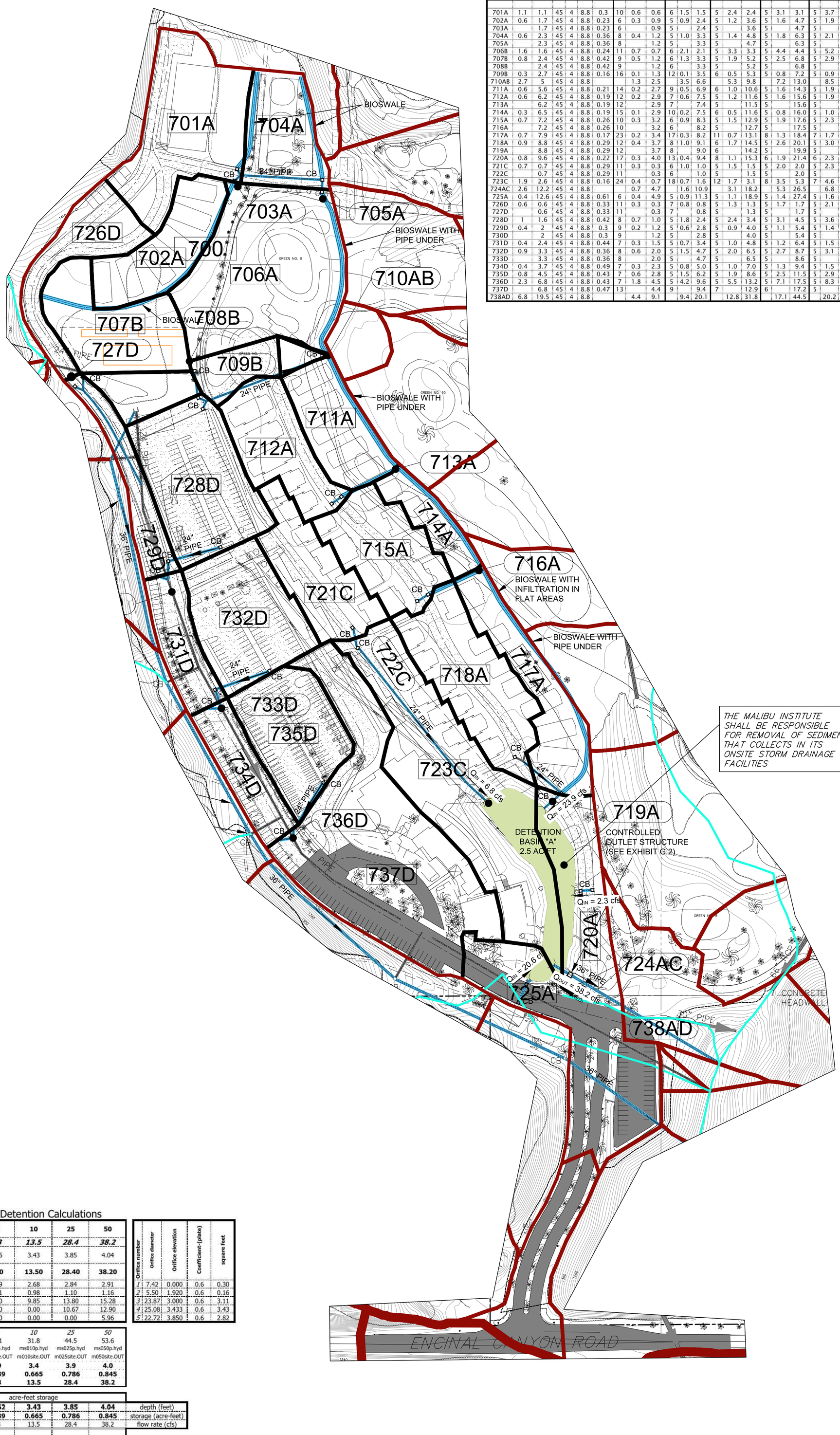
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
PROPOSED DATA TABLES — SHEET 13 OF 22

Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	2 year Tc (minutes)	2 year Tributary Q (cfs	2 year Conveyance Q (cfs)	5 year Tc (minutes)	5 year Tributary Q (cfs	5 year Conveyance Q (cfs)	10 year Tc (minutes)	10 year Tributary Q (cfs	10 year Conveyance Q (cfs)	25 year Tc (minutes)	25 year Tributary Q (cfs	25 year Conveyance Q (cfs)	50 year Tc (minutes)	50 year Tributary Q (cfs	50 year Conveyance Q (cfs)	Conveyance estimates for hydrology (not to be used as design basis) Conveyance Type	Pipe Diameter (inches)	Length	Slope
701A	1.1	1.1	45	4	8.8	0.3	10	0.6	0.6	6	1.5	1.5	5	2.4	2.4	5	3.1	3.1	5	3.7	3.7	PIPE	18	100	0.040
702A	0.6	1.7	45	4	8.8	0.23	6	0.3	0.9	5	0.9	2.4	5	1.2	3.6	5	1.6	4.7	5	1.9	5.6	PIPE	18	20	0.050
703A		1.7	45	4	8.8	0.23	6		0.9	5		2.4	5		3.6	5		4.7	5		5.6	PIPE	24	145	0.207
704A	0.6	2.3	45	4	8.8	0.36	8	0.4	1.2	5	1.0	3.3	5	1.4	4.8	5	1.8	6.3	5	2.1	7.5	PIPE	24	20	0.050
705A		2.3	45	4	8.8	0.36	8		1.2	5		3.3	5		4.7	5		6.3	5		7.5	PIPE	24	302	0.033
706B	1.6	1.6	45	4	8.8	0.24	11	0.7	0.7	6	2.1	2.1	5	3.3	3.3	5	4.4	4.4	5	5.2	5.2				
707B	0.8	2.4	45	4	8.8	0.42	9	0.5	1.2	6	1.3	3.3	5	1.9	5.2	5	2.5	6.8	5	2.9	8.1				
708B		2.4	45	4	8.8	0.42	9		1.2	6		3.3	5		5.2	5		6.8	5		8.1	PIPE	24	230	0.074
709B	0.3	2.7	45	4	8.8	0.16	16	0.1	1.3	12	0.1	3.5	6	0.5	5.3	5	0.8	7.2	5	0.9	8.5				
710AB	2.7	5	45	4	8.8			1.3	2.5		3.5	6.6		5.3	9.8		7.2	13.0		8.5	15.4	PIPE	24	233	0.043
711A	0.6	5.6	45	4	8.8	0.21	14	0.2	2.7	9	0.5	6.9	6	1.0	10.6	5	1.6	14.3	5	1.9	17.0				
712A	0.6	6.2	45	4	8.8	0.19	12	0.2	2.9	7	0.6	7.5	5	1.2	11.6	5	1.6	15.6	5	1.9	18.6	PIPE	18	110	0.091
713A		6.2	45	4	8.8	0.19	12		2.9	7		7.4	5		11.5	5		15.6	5		18.6	PIPE	24	232	0.078
714A	0.3	6.5	45	4	8.8	0.19	15	0.1	2.9	10	0.2	7.5	6	0.5	11.6	5	0.8	16.0	5	1.0	19.1				
715A	0.7	7.2	45	4	8.8	0.26	10	0.3	3.2	6	0.9	8.3	5	1.5	12.9	5	1.9	17.6	5	2.3	21.1	PIPE	18	110	0.091
716A		7.2	45	4	8.8	0.26	10		3.2	6		8.2	5		12.7	5		17.5	5		21.0	PIPE	24	465	0.045
717A	0.7	7.9	45	4	8.8	0.17	23	0.2	3.4	17	0.3	8.2	11	0.7	13.1	8	1.3	18.4	7	1.7	22.2				
718A	0.9	8.8	45	4	8.8	0.29	12	0.4	3.7	8	1.0	9.1	6	1.7	14.5	5	2.6	20.1	5	3.0	24.3	PIPE	18	100	0.030
719A		8.8	45	4	8.8	0.29	12		3.7	8		9.0	6		14.2	5		19.9	5		23.9	PIPE	24	40	0.075
720A	0.8	9.6	45	4	8.8	0.22	17	0.3	4.0	13	0.4	9.4	8	1.1	15.3	6	1.9	21.4	6	2.3	25.8				
721C	0.7	0.7	45	4	8.8	0.29	11	0.3	0.3	6	1.0	1.0	5	1.5	1.5	5	2.0	2.0	5	2.3	2.3	PIPE	18	50	0.050
722C		0.7	45	4	8.8	0.29	11		0.3	6		1.0	5		1.5	5		2.0	5		2.3	PIPE	18	350	0.083
723C	1.9	2.6	45	4	8.8	0.16	24	0.4	0.7	18	0.7	1.6	12	1.7	3.1	8	3.5	5.3	7	4.6	6.8				
724AC	2.6	12.2	45	4	8.8			0.7	4.7		1.6	10.9		3.1	18.2		5.3	26.5		6.8	32.3	PIPE	24	40	0.050
725A	0.4	12.6	45	4	8.8	0.61	6	0.4	4.9	5	0.9	11.3	5	1.1	18.9	5	1.4	27.4	5	1.6	33.5	PIPE	24	20	0.100
726D	0.6	0.6	45	4	8.8	0.33	11	0.3	0.3	7	0.8	0.8	5	1.3	1.3	5	1.7	1.7	5	2.1	2.1				
727D		0.6	45	4	8.8	0.33	11		0.3	7		0.8	5		1.3	5		1.7	5		2.1	PIPE	24	363	0.055
728D	1	1.6	45	4	8.8	0.42	8	0.7	1.0	5	1.8	2.4	5	2.4	3.4	5	3.1	4.5	5	3.6	5.3	PIPE	18	120	0.017
729D	0.4	2	45	4	8.8	0.3	9	0.2	1.2	5	0.6	2.8	5	0.9	4.0	5	1.1	5.4	5	1.4	6.4	PIPE	18	20	0.050
730D		2	45	4	8.8	0.3	9		1.2	5		2.8	5		4.0	5		5.4	5		6.3	PIPE	24	246	0.041
731D	0.4	2.4	45	4	8.8	0.44	7	0.3	1.5	5	0.7	3.4	5	1.0	4.8	5	1.2	6.4	5	1.5	7.6	PIPE	18	20	0.050
732D	0.9	3.3	45	4	8.8	0.36	8	0.6	2.0	5	1.5	4.7	5	2.0	6.5	5	2.7	8.7	5	3.1	10.3	PIPE	18	120	0.017
733D		3.3	45	4	8.8	0.36	8		2.0	5		4.7	5		6.5	5		8.6	5		10.3	PIPE	24	260	0.038
734D	0.4	3.7	45	4	8.8	0.49	7	0.3	2.3	5	0.8	5.0	5	1.0	7.0	5	1.3	9.4	5	1.5	11.2	PIPE	18	20	0.100
735D	0.8	4.5	45	4	8.8	0.43	7	0.6	2.8	5	1.5	6.2	5	1.9	8.6	5	2.5	11.5	5	2.9	13.7	PIPE	18	110	0.018
736D	2.3	6.8	45	4	8.8	0.43	7	1.8	4.5	5	4.2	9.6	5	5.5	13.2	5	7.1	17.5	5	8.3	20.7	PIPE	24	370	0.041
737D		6.8	45	4	8.8	0.47	13		4.4	9		9.4	7		12.9	6		17.2	5		20.4	PIPE	24	120	0.033
738AD	6.8	19.5	45	4	8.8			4.4	9.1		9.4	20.1		12.8	31.8		17.1	44.5		20.2	53.6	PIPE	36	338	0.012



Basin A Site Detention Calculations

Storm Frequency	storm frequency	2	5	10	25	50
Outflow rate	cfs, maximum allowable	*2*	*3.3*	*13.5*	*28.4*	*38.2*
water surface for Q	feet, elevation	1.92	2.96	3.43	3.85	4.04
Sum Q thru orifices	cfs, calculated	**2.00**	**3.30**	**13.50**	**28.40**	**38.20**
Q o2	Q=CA*(2*g*h)^.5	2.00	2.49	2.68	2.84	2.91
Q o5	"	0.00	0.81	0.98	1.10	1.16
Q o10	"	0.00	0.00	9.85	13.80	15.28
Q o25	"	0.00	0.00	0.00	10.67	12.90
Q o50	"	0.00	0.00	0.00	0.00	5.96

Orifice number	Orifice diameter	Orifice elevation	Coefficient-(plate)	square feet
1	7.42	0.000	0.6	0.30
2	5.50	1.920	0.6	0.16
3	23.87	3.000	0.6	3.11
4	25.08	3.433	0.6	3.43
5	22.72	3.850	0.6	2.82

retard entry and output data						
	storm frequency	*2*	*5*	*10*	*25*	*50*
	max Q into Control	9.1	20.1	31.8	44.5	53.6
	Proposed Hydrograph	ms002p.hyd	ms005p.hyd	ms010p.hyd	ms025p.hyd	ms050p.hyd
	Retard Output	m002site.OUT	m005site.OUT	m010site.OUT	m025site.OUT	m050site.OUT
	depth from retard program	**1.9**	**2.9**	**3.4**	**3.9**	**4.0**
	max volume (acre feet)	**0.298**	**0.539**	**0.665**	**0.786**	**0.845**
	max rate out of basin	**2.0**	**3.3**	**13.5**	**28.4**	**38.2**

Basin Storage capacity				acre-feet storage					
				1.92	**2.962**	**3.43**	**3.85**	**4.04**	depth (feet)
Depth feet	Storage acre/ft	Rate		**0.301**	**0.539**	**0.665**	**0.786**	**0.845**	storage (acre-feet)
				2	3.3	13.5	28.4	38.2	flow rate (cfs)
0	**0**	**0.00**		0.00					
1	0.14	1.80		0.14					
1.92	0.30	2.00		0.30	0.30				
2	**0.32**	**2.10**			0.32				
2.96	0.54	3.30			0.54	0.54			
3.43	0.665	13.50				0.66	0.66		
3.6	0.71	17.00					0.71		
3.85	0.786	28.40					0.79	0.79	
4	**0.83**	**28.50**						0.83	
4.04	0.845	38.20						0.84	
5	1.17	40.00							
6	**1.55**								
7	2.00								
7.5	2.25								
8	**2.52**								

Time to empty								
	Volume	cf	13114	10365	5480	5265	2568	
	Average flow rate	cf	1.00	2.65	8.4	20.95	33.3	
	step time	sec	13114	3911	652	251	77	
		hrs	3.6	1.1	0.2	0.1	0.0	**total hours 5.0**

NOTE: REFER TO THE LOW IMPACT DEVELOPMENT PLAN (LID) - sHEET 16 OF 22 FOR wATER QUALITY IMPROVEMENTS, INCLUDEING INFILTRATION SYSTEM DESIGN INFORMATION.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

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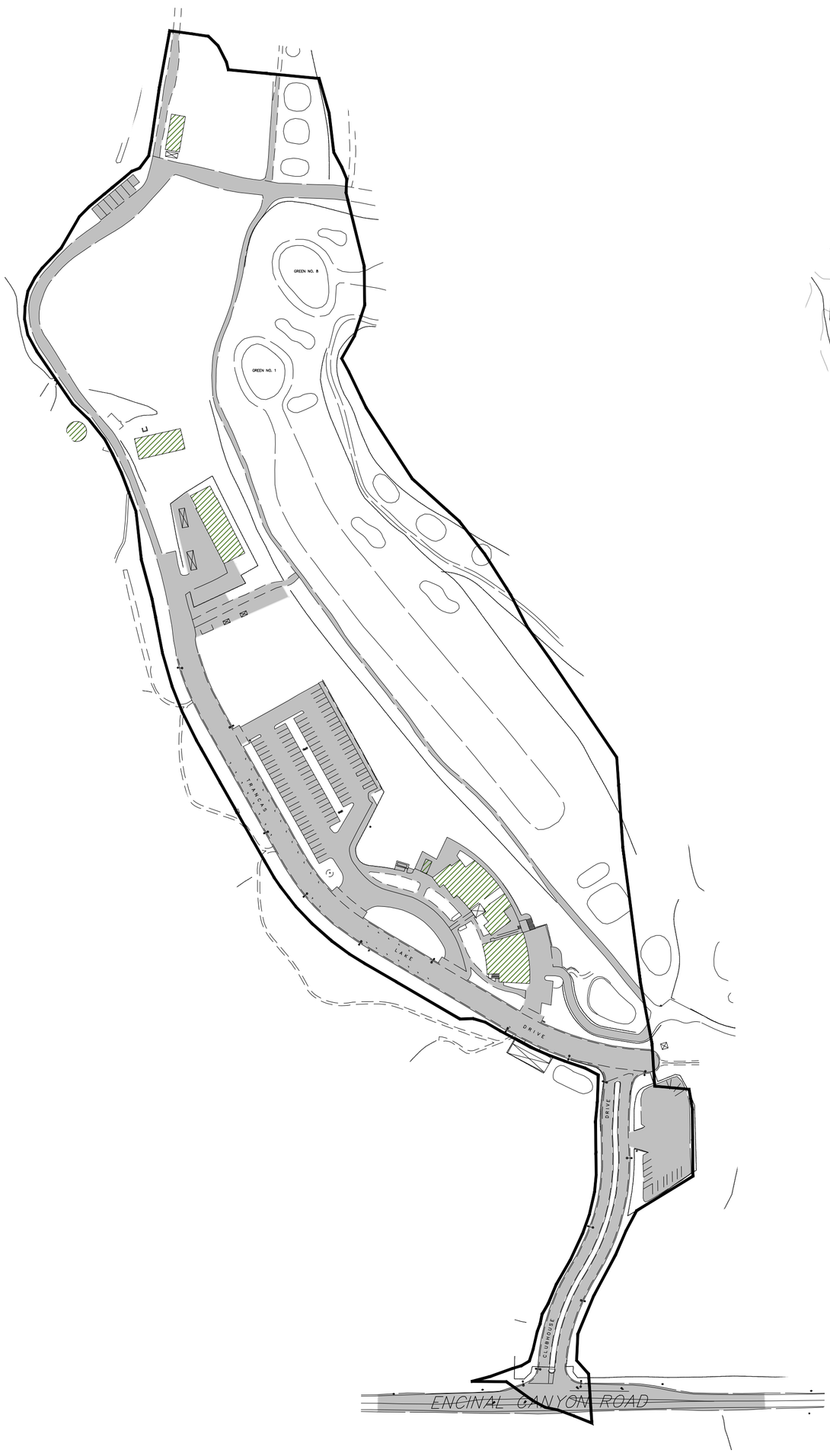
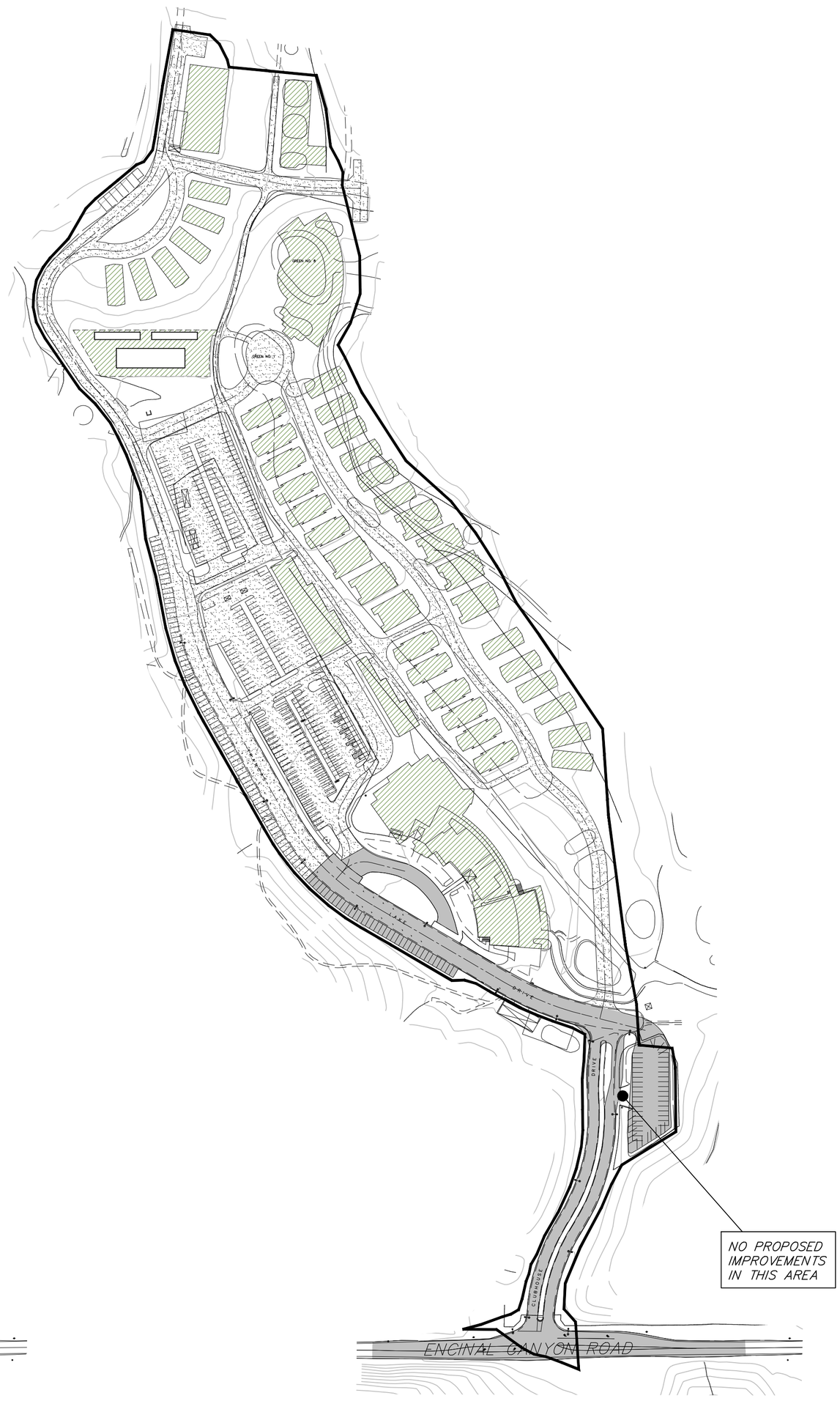
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
PROPOSED SITE - SHEET 14 OF 22



EXISTING SITE
N.T.S.



PROPOSED SITE
N.T.S.

Area (overall)			1	2	3	4	5	Totals
ΣA	acres		4.49	9.74	2.52	0.58	2.13	19.5
ΣA	square feet		195600	424300	109800	25300	92800	847800
Proposed Average Impervious		note						
Impervious Pavement	*square feet*	0.95	2150	14400	500	2910	42845	62805
Green Roof	*square feet*	0.30	4355	113220	43500	4685	17954	183714
Landscape areas including Bioretention	*square feet*	0.10	31350	212670	51870	4588	26611	327089
Pervious Pavement A	*square feet*	0.50	157745	84010	13930	13117	5390	274192
Average			**0.44**	**0.26**	**0.23**	**0.44**	**0.55**	**0.34**
Existing Site Imperviousness								
Impervious Pavement	*square feet*	*0.95*	82775	28995	14600	6800	47300	180470
Buildings	*square feet*	*0.95*	8200	0	3410	0	10000	21610
Landscape areas	*square feet*	*0.10*	104625	395305	91790	18500	35500	645720
Average			**0.50**	**0.16**	**0.24**	**0.33**	**0.62**	**0.30**

GRAPHIC SCALE

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING VS PROPOSED IMPERVIOUS - SHEET 15 OF 22

LID devices by area, imperviousness, storage volumes

Area (overall)			1	2	3	4	5	Totals
ΣA	acres		4.49	9.74	2.52	0.58	2.13	19.5
ΣA	square feet		195600	424300	109800	25300	92800	847800
Area for LID calc not including green roofs	acres		4.39	7.14	1.52	0.47	1.72	
Impervious[7]	%		0.81	0.37	0.29	0.76	0.65	
Soil Type			45	45	45	45	45	
Flowpath length (feet)	feet		1275	1855	995	280	595	
Flowpath slope	%		0.06	0.06	0.05	0.05	0.04	
Elevation upper	feet		1410	1400	1356	1335	1322	
Elevation Lower	feet		1328	1296	1305	1322	1300	
Qpm[1]	CFS		0.67	0.77	0.17	0.08	0.26	1.95
Qpm[1]	gpm		302	344	74.4	36.8	118	875
85th percentile storm volume[2]			1.15	1.15	1.15	1.15	1.15	
Developed Storage Volume[1]	cubic feet		**13646**	**11831**	**2073**	**1386**	**4418**	**33354**
Undeveloped Storage Volume[1]	cubic feet		2072	3109	646	214	784	6825
BMP devices (proposed site)							see note[4]	
Pervious Pavement A[3]	square feet	0.95	157745	84010	13930	13117	5390	274192
Volume of storage	cubic feet		**31549**	**16802**	**2786**	**2623.4**	**1078**	54838.4
Green Roof[5]	square feet		4355	113220	43500	4685	17954	183714
Bioretention[6]	length		1000	4000	870	0		5870
area at 4 foot width	square feet	4 0.10	4000	16000	3480	0	0	23480
Volume of Storage	cubic feet		**3200**	**12800**	**2784**	**0**	**0**	18784
Infiltration Retention Storage[9] Volume of Storage	cubic feet						**4500**	4500
Other areas (proposed site)								
Impervious Pavement	square feet	0.95	2150	14400	500	2910	42845	62805
Landscape areas	square feet	0.10	27350	196670	48390	4588	26611	303609
Potential Volume Mitigated	cubic feet		**34749** see note[8]	**29602** see note[8]	**5570** see note[8]	**2623** see note[8]	**4500**	77044.4
Volume Mitigated	cubic feet		**13646**	**11831**	**2073**	**1386**	**4418**	**33354**
percent mitigated			**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

[1] *from LID calculator*

[2] *interpolated from map at http://dpw.lacouty.gov/wrd/hydrologygis/*

[3] *Pervious Pavement A is designed with a reservoir layer of 6". Assumes a 30% void ratio. With a 0.4 in/hr perc rate and a 2 time safety factor, these areas will empty in 9 hours. (6in*0.30 *12"/ (0.4in/hr /2)*

[4] *BMP's highlighted by shading are not included as working toward mitigation, due to the BMP's location.*

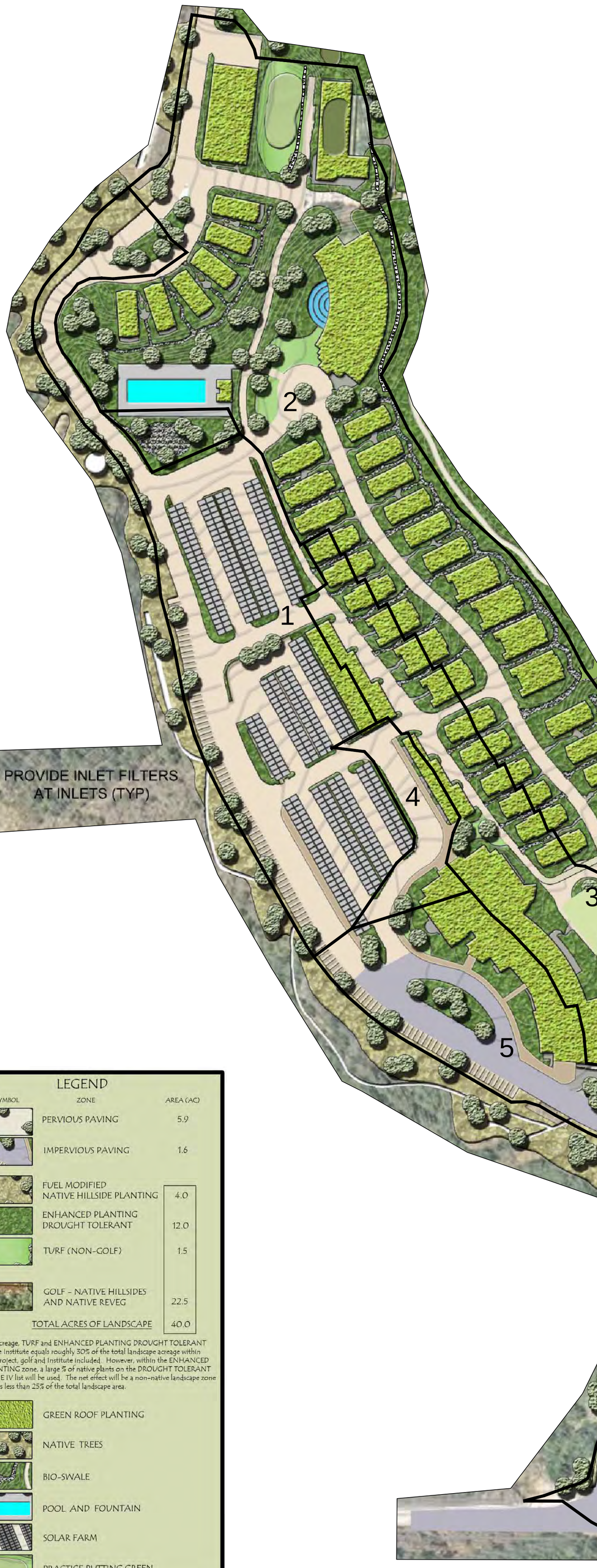
[5] *Green Roofs are assumed to produce no runoff under an 85th percentile storm, so the area under green roofs has been removed from developed and undeveloped areas for determination of infiltration requirements.*

[6] *Bioretention Swales are designed with a 2 foot reservoir layer. Assumes a 30% void ratio. With a 0.4 in/hr perc rate and a 2 time safety factor, these areas will empty in 1.5 days. (2 feet*0.30*12"/(0.4in/2)/hr/24hr/day)*

[7] *Impervious rate for storage development is determined by considering paved (including pervious paved surfaces) to be at a rate of 95%, and landscape to be at a rate of 10% imperviousness The higher impervious number was used for pervious concrete so as to better estimate the storage requirements.*

[8] *Potential Volume Mitigation exceeds Volume developed..*

[9] *Infiltration rate for overall site is 0.4 in/hr. The 4500 cubic feet of retention storage will be accommodated in the lower 1.5 feet of the detention basin. This basin with a 0.4 in/hr perc rate and a 2 time safety factor, it will empty in less than 4 days. (1.5 feet*12"/(0.4in/hr/2)/24hr/day)*



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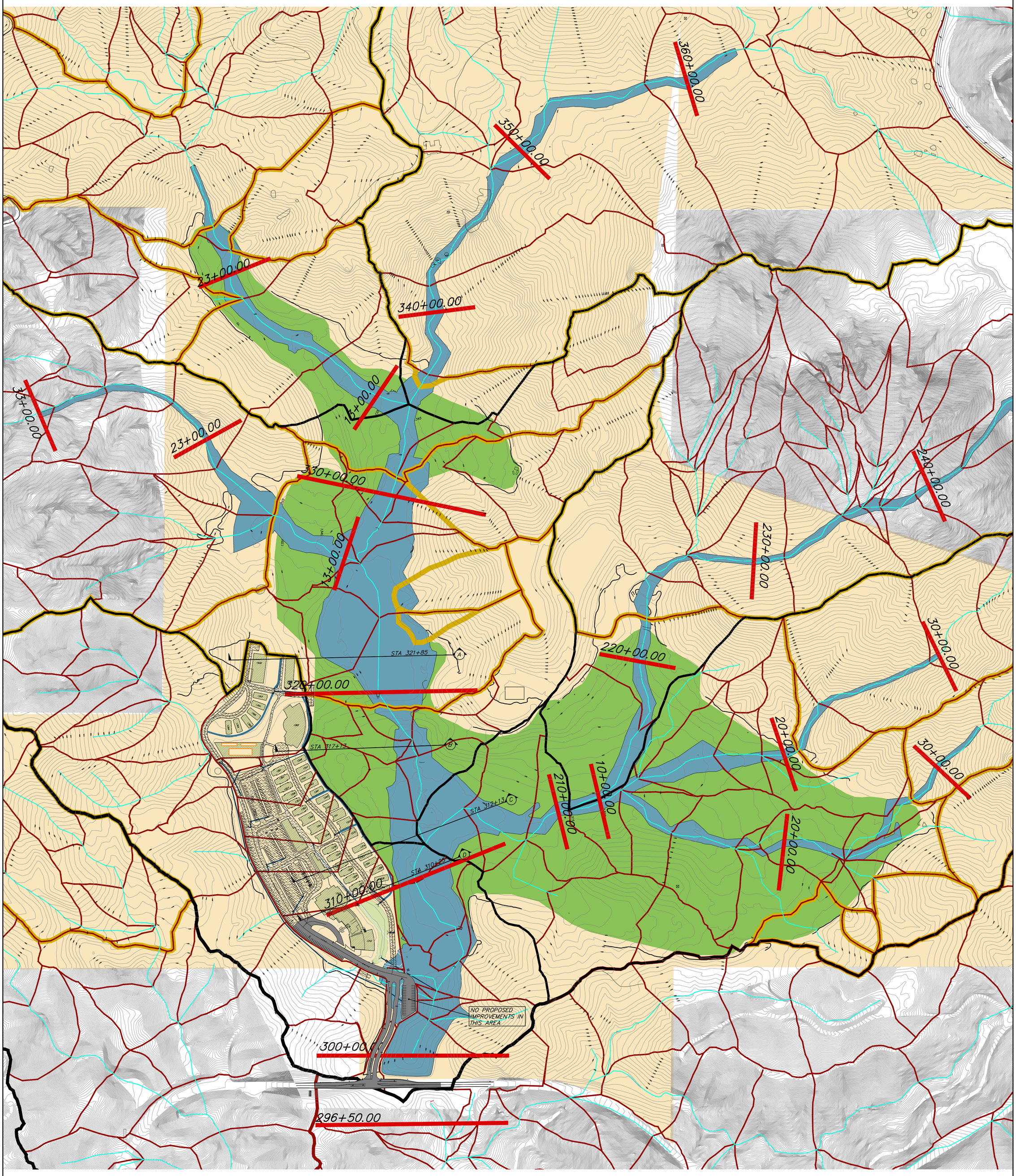
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
LOW IMPACT DEVELOPMENT PLAN (LID) – SHEET 16 OF 22



50 YEAR BB

FLOOD LIMITS LEGEND

NOTE: THE FLOOD LINEWORK SHOWN IS FOR PROPOSED RUNOFF CONDITIONS. THE EXISTING LINEWORK IS IDENTICAL TO THE PROPOSED.

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
HEC RAS PLAN - SHEET 17 OF 22

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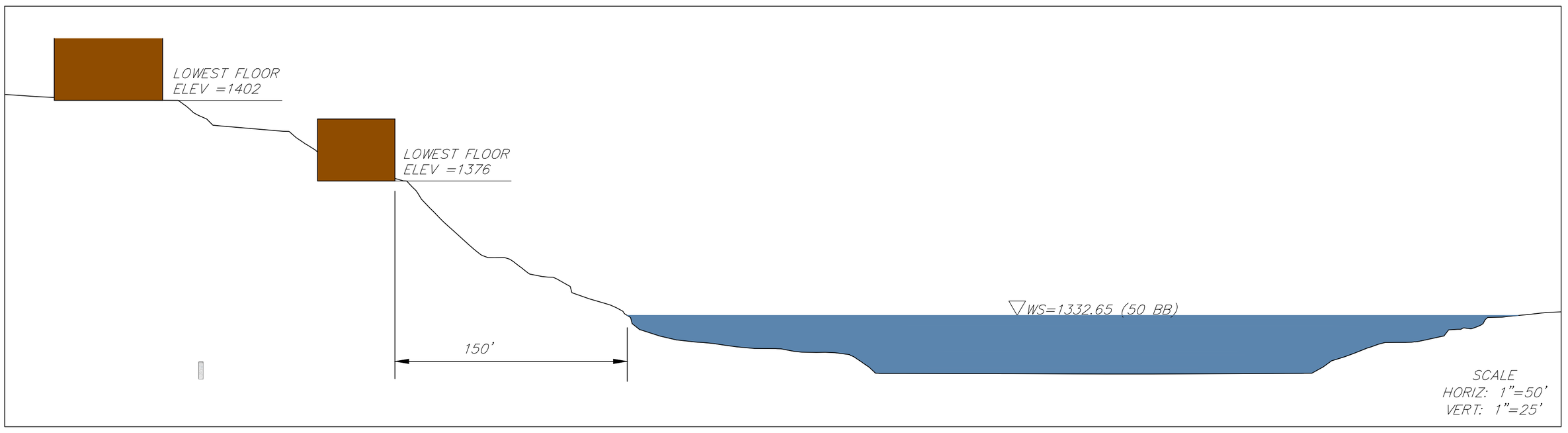
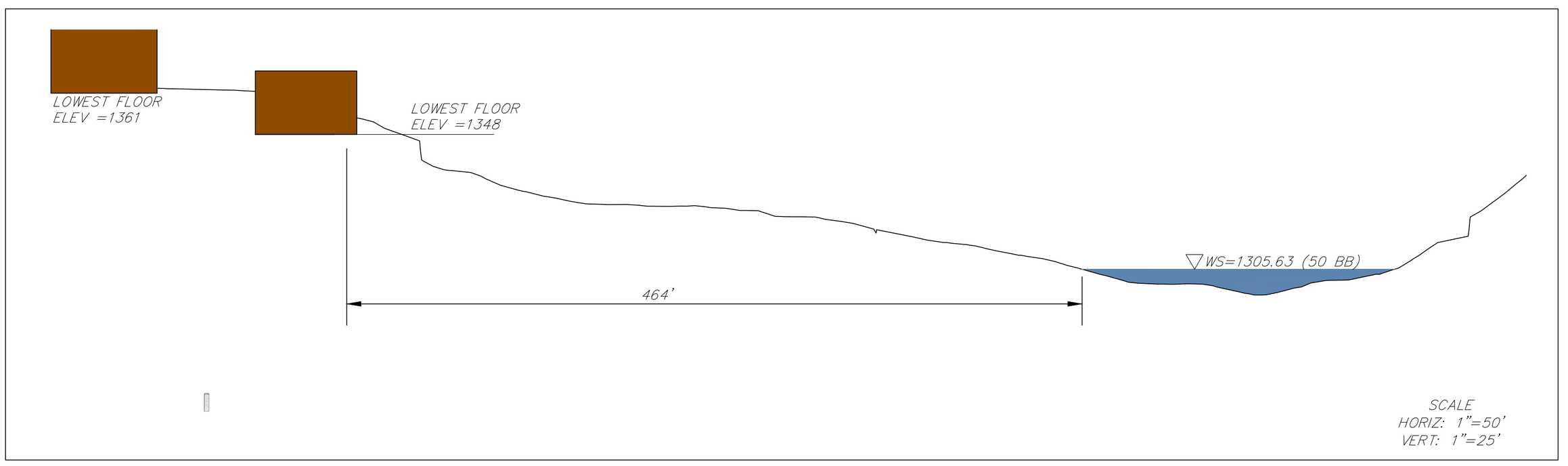
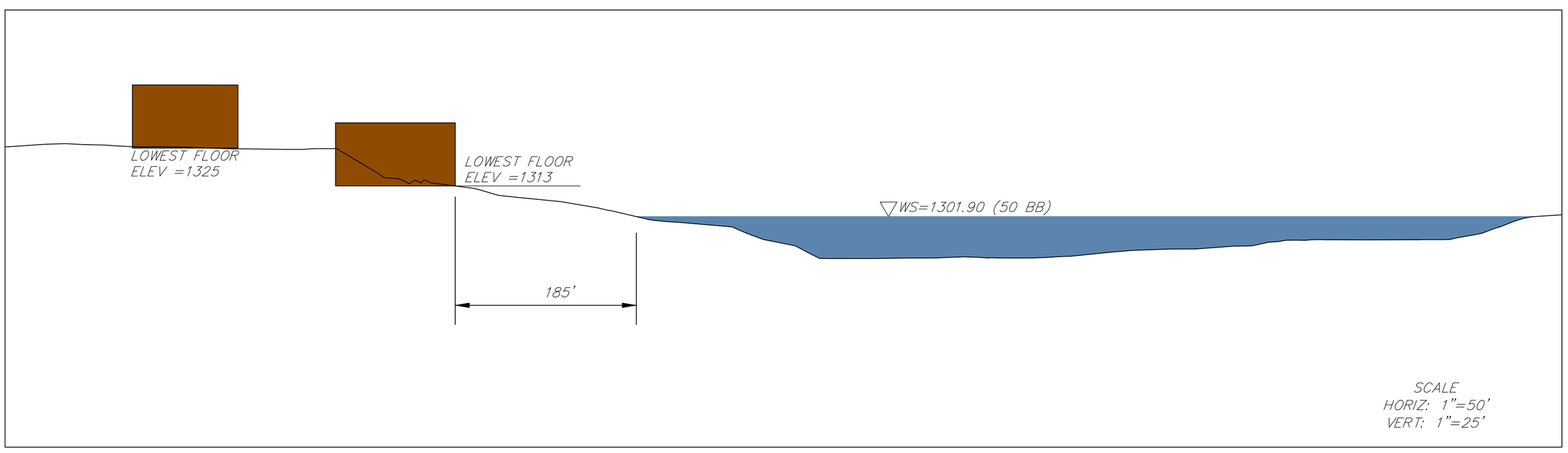


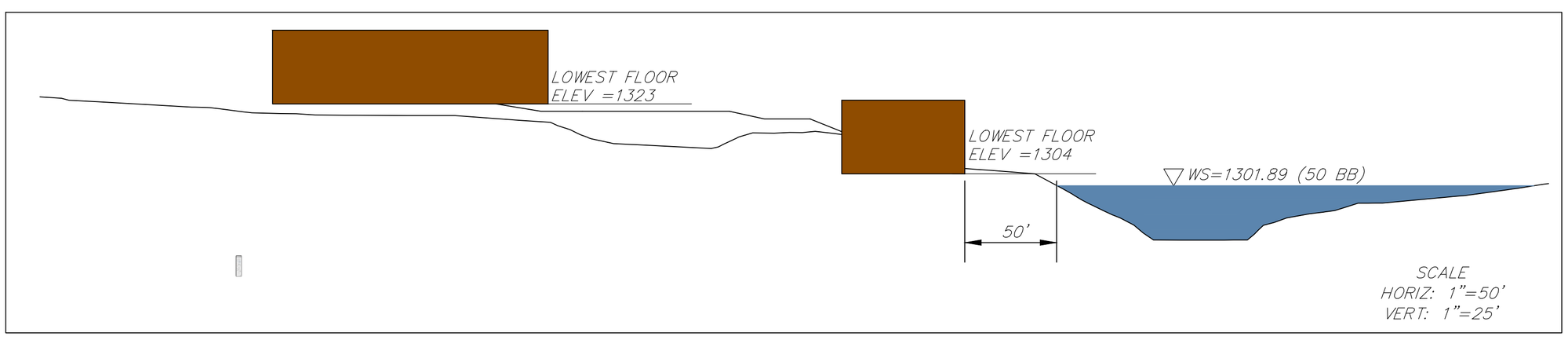
SECTION A (STA 321+85)



SECTION B (STA 317+13)



SECTION C (STA 312+13)



SECTION D (310+25)

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
HEC RAS SECTIONS AT PROPOSED SITE – SHEET 18 OF 22

AD

AC

AB

1400

1350

1300

1250

1200

EX ELEV 1295.5

EX PARKING LOT

EX. ELEV 1295.7

FF EL 1304

FF EL 1306

FF EL 1308

FF EL 1309

FF EL 1313

FF EL 1314

FF EL 1332

FF EL 1332

FF EL 1341

FF EL 1346

FF EL 1340

FF EL 1341

FF EL 1343

FF EL 1344

FF EL 1347

FF EL 1348

FF EL 1362

FF EL 1376

WS (50 BB) =1332.65 FT
VELOCITY (50 BB) =0.45 FT/S

WS (50 BB) =1301.89 FT
VEL (50 BB) =1.15 FT/S

WS (50 BB) =1301.90 FT
VEL (50 BB) =1.80 FT/S

WS (50 BB)
=1305.63 FT
VEL (50 BB)
=5.04 FT/S

WS (50 CLEAR) 1275.89 FT

WS (25)

BEGIN CULVERT
STA 300+00

SECTION
D–D
STA 310+25

SECTION
C–C
STA 312+13

SECTION
B–B
STA 317+13

SECTION
A–A
STA 321+85

NOTE: ALL FINISHED FLOOR (FF) ELEVATIONS SHOWN ARE OF LOWEST FLOOR

SCALE
HORIZ: 1"=100'
VERT: 1"=50'

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
HEC RAS PROFILES – SHEET 19 OF 22

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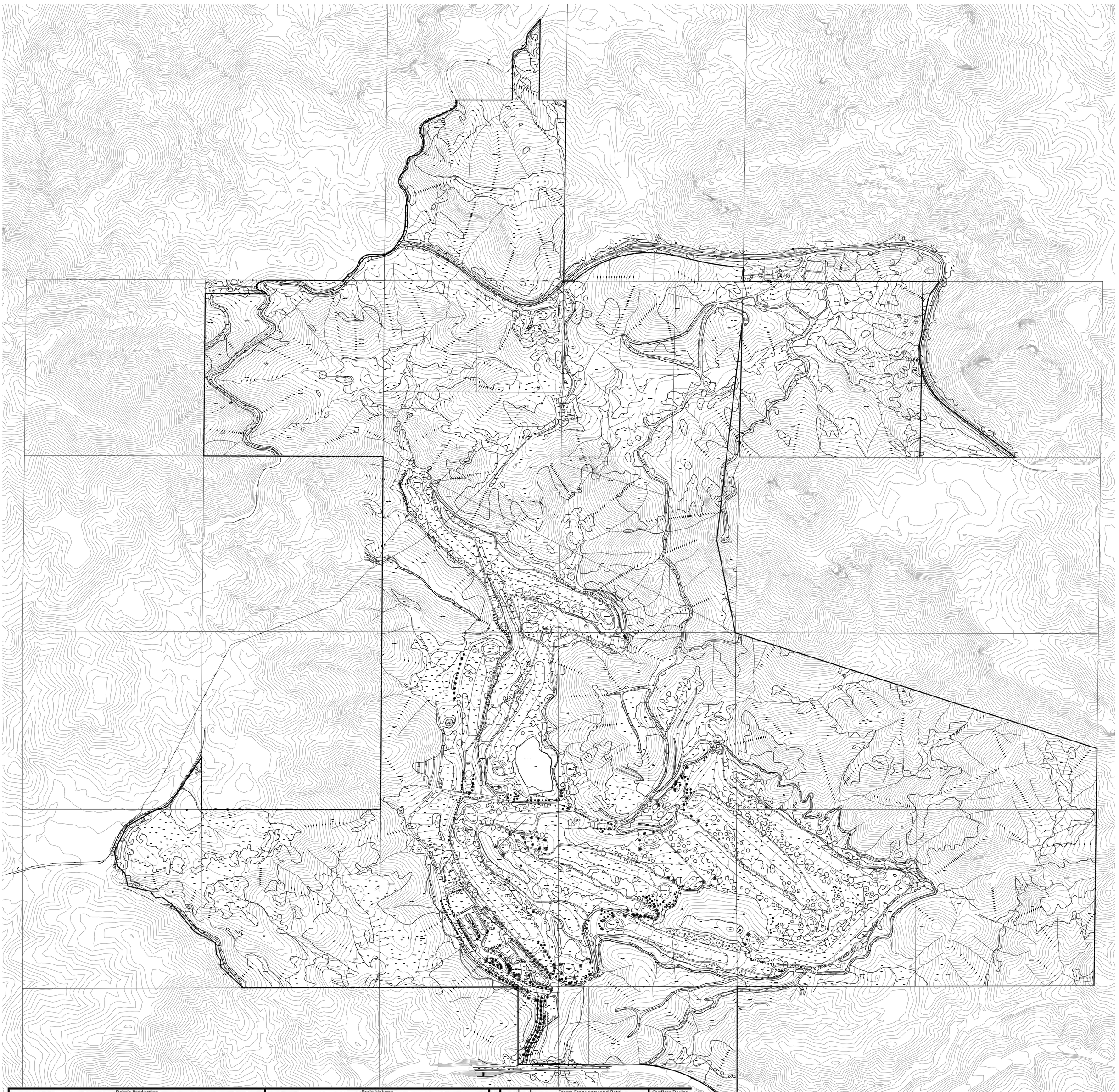

Basin Number	Tributary (T) or Cummulative (C) area			Total Tributary Acres	Tributary Square Miles	Undeveloped Acres	Undeveloped Square Miles	Developed Acres	Debris Production Factor (Cubic Yards per square mile)	Debris Production Factor (Cubic Yards per Acre)	Debris Production Factor (Cubic Yards per square mile)	Undeveloped Debris Production Factor (Cubic Yards per Acre)	Debris Production Rate (cy)	DDE factor	Design Debris Event (DDE) rate (cy)	Basin drawing sheet no	Level Capacity	(1) Spillway elevation	(2) Natural Ground below spillway	(3) Spillway Height	(4) delta EL	(5) Upstream Cone EL	(6) Horizontal to upstream cone el	(7) Natural Slope	(8) Debris Cone Slope (MAX 5%)	Cone Volume (to a maximum of level capacity)	Total Basin Volume including Cone (MAX 5000)	Capacity meets DDE	Hydrologic area	2	5	10	25	50	50 burned	50 burned and bulked	Outflow Device Type
2*	C	6	6	83.1	0.130	83.1	0.130	0	67840	106	67840	106	8809	0.2	1762	18	10750	1357.5	1350	7.5	15	1365	430	3.5%	1.7%	10750	5000	YES	172BD	172	7.8	13.1	44.4	91.0	122.5	209.3	347.5	10' wier
3*	T	5	4	2.3	0.004	2.1	0.003	0.2	72320	113	72320	113	237	0.2	47	18	260	1402	1400	2	4	1404	90	4.4%	2.2%	75	335	YES	113C	113	0.2	0.4	2.0	4.6	6.5	8.9	14.8	8' wier
4*	C	6	6	114.0	0.178	112.2	0.175	1.8	58880	92	58880	92	10322	0.2	2064	18	190	1408	1404	4	8	1412	105	7.6%	3.8%	190	380	no	97B	97	11.3	18.9	69.2	137.1	186.1	306.5	508.9	8' wier
5*	C	6	6	24.8	0.039	24.1	0.038	0.7	72320	113	72320	113	2723	0.2	545	18	2860	1562	1554	8	16	1570	390	4.1%	2.1%	2293	5000	YES	69CD	69	2.5	4.2	15.0	30.7	42.9	69.5	115.3	Dirt wier
6*	C	6	6	10.1	0.016	10.0	0.016	0.1	72320	113	72320	113	1130	0.2	226	18	60	1402.4	1400	2.4	4.8	1404	40	10.0%	5.0%	22	82	no	101C	101	1.1	1.8	9.2	18.2	23.0	33.9	56.3	8' wier
7	T	5	4	2.8	0.004	1.4	0.002	1.4	72320	113	72320	113	158	0.2	32	19	56	1413	1412.3	0.7	1.4	1413.7	45	3.1%	1.6%	10	66	YES	309E	309	1.1	4.1	6.9	9.0	10.6	10.6	17.5	6.5' wier
8	T	5	4	0.8	0.001	0.8	0.001	0	72320	113	72320	113	90	0.2	18	19	25	1418	1417	1	2	1419	47	4.3%	2.1%	6	31	YES	300F	300	0.6	1.5	2.0	2.6	3.0	3.5	5.9	6.5' wier
9	T	5	4	3.5	0.005	3.5	0.005	0	72320	113	72320	113	396	0.2	79	19	36	1421	1419	2	4	1423	70	5.7%	2.9%	18	54	no	297E	297	0.4	5.2	7.6	11.2	13.2	15.4	25.6	6.5' wier
10																*19*	*290*	*1354.2*	*1350*	*4.2*	*8.4*	*1358.4*	*81*	*10.4%*	*5.2%*	*225*	*515*											25' wier
11																*19*	*940*	*1359.75*	*1356*	*3.75*	*7.5*	*1363.5*	*206*	*3.6%*	*1.8%*	*622*	*1562*											25' wier
sum 10,11	C	6	6	233.7	0.365	233.7	0.365	0	48000	75	48000	75	17528	0.2	3506		1230									847	2077	no	46A	46	45.0	139.0	214.0	316.3	399.0	531.3	882.0	
12	C	6	6	5.8	0.009	5.8	0.009	0	72320	113	72320	113	655	0.2	131	19	65	1448	1446	2	4	1450	67	6.0%	3.0%	29	94	no	292E	292	1.3	8.6	14.3	18.6	21.9	25.6	42.5	6' wier
13	C	6	6	7.9	0.012	7.9	0.012	0	72320	113	72320	113	893	0.2	179	20	30	1445.7	1444	1.7	3.4	1447.4	42	8.1%	4.0%	13	43	no	290D	290	1.9	11.4	15.9	21.6	25.7	30.7	51.0	5' wier
14	C	6	6	26.9	0.042	26.9	0.042	0	72320	113	72320	113	3040	0.2	608	20	165	1387.9	1384	3.9	7.8	1391.8	100	7.8%	3.9%	127	292	no	274C	274	2.7	4.6	17.7	38.5	53.2	81.4	135.1	5' wier
15																*20*	*475*	*1392.2*	*1388*	*4.2*	*8.4*	*1396.4*	*165*	*5.1%*	*2.5%*	*381*	*856*											20' wier
16																*20*	*485*	*1398*	*1394*	*4*	*8*	*1402*	*170*	*4.7%*	*2.4%*	*485*	*970*											None
17																*20*	*270*	*1401.8*	*1398*	*3.8*	*7.6*	*1405.6*	*150*	*5.1%*	*2.5%*	*252*	*522*											None
sum 15,16,17	C	6	6	97.3	0.152	97.3	0.152	0	62080	97	62080	97	9438	0.2	1888		1230									1118	2348	YES	263B	263	14.9	42.4	98.6	162.3	209.7	297.4	493.7	
18*	C	6	6	411.1	0.642	403.0	0.630	8.1	40960	64	41600	65	25800	0.2	5160	21	340	1324.8	1320.6	4.2	8.4	1329	135	6.2%	3.1%	340	680	no	127AB	127	60.8	167.1	274.1	419.4	560.9	867.2	1399.2	Dirt wier
19*	C	6	6	13.3	0.021	11.8	0.018	1.5	72320	113	72320	113	1333	0.2	267	21	125	1327	1326	1	2	1328	72	2.8%	1.4%	41	166	no	133B	133	1.4	2.4	11.5	22.1	29.2	38.3	55.2	Dirt wier
20*	T	5	4	7.0	0.011	7.0	0.011	0	72320	113	72320	113	791	0.2	158	21	100	1319	1318	1	2	1320	67	3.0%	1.5%	50	150	no	175A	175	0.7	1.3	6.1	14.0	17.1	24.1	40.0	Dirt wier
21*	T	5	4	9.4	0.015	9.4	0.015	0	72320	113	72320	113	1062	0.2	212	21	40	1320	1319	1	2	1321	35	5.7%	2.9%	19	59	no	180A	180	1.1	1.8	9.2	19.0	26.7	26.7	26.7	Dirt wier
Feature 2	C	6	6	546.6	0.854	540.7	0.845	5.9	39680	62	39680	62	33523	0.2	6705	21	50000	1300	1290	10	20	1310	2000	1.0%	0.5%	50000	5000	YES	184AC	184	67.9	177.5	305.6	508.7	684.6	1094.9	1737.3	Dirt wier
			4																																		
Site Basin	C	6	6	23.9	0.037	23.9	0.037	0	72320	113	72320	113	2701	0.2	540	20	282	1387.9	1384	3.9	7.8	1391.8	100	7.8%	3.9%	279	561	YES	365BC	365	2.6	4.4	20.8	40.6	53.5	77.7	129.0	5' wier

*Basins noted with an asterisk are tributary to Feature 2, the large lake at the center of the site.

SUBTOTAL DDE	24126
SUBTOTAL UNCOLLECTED DDE	1709
SUBTOTAL DDE COLLECTED	22417

Debris Development Areas Uncollected

366	T	5	4	0.9	0.001	0.9	0.001	0	72320	113	72320	113	102	0.2	20													no	366B	366	0.1	0.2	1.3	2.1	2.5	2.5	4.2	
368	T	5	4	1.6	0.003	1.6	0.003	0	72320	113	72320	113	181	0.2	36													no	368B	368	0.2	0.3	1.5	3.2	4.5	4.5	7.5	
370	T	5	4	3.6	0.006	3.6	0.006	0	72320	113	72320	113	407	0.2	81													no	370B	370	0.4	0.6	3.1	6.4	8.8	8.8	14.6	
372	T	5	4	3.3	0.005	3.3	0.005	0	72320	113	72320	113	373	0.2	75													no	372B	372	0.4	0.7	4.0	7.7	9.3	9.3	15.5	
374	T	5	4	4.0	0.006	4.0	0.006	0	72320	113	72320	113	452	0.2	90													no	374B	374	0.4	0.7	3.5	7.1	9.8	9.8	16.3	
376	T	5	4	1.6	0.003	1.6	0.003	0	72320	113	72320	113	181	0.2	36													no	376B	376	0.3	0.5	2.8	3.8	4.6	4.6	4.6	
383	T	5	4	0.4	0.001	0.4	0.001	0	72320	113	72320	113	45	0.2	9													no	383A	383	0.1	0.4	0.7	0.9	1.1	1.1	1.9	

UNCOLLECTED SITE DDE	348
TOTAL DDE (SUBTOTAL&SITE)	24474
UNCOLLECTED DDE (SUBTOTAL&SITE)	2057
PERCENTAGE DDE COLLECTED	92%

GRAPHIC SCALE

400 0 200 400 800 1600

(IN FEET)

1 inch = 400 ft.

thA
triad/holmes assoc
civil engineering
land surveying

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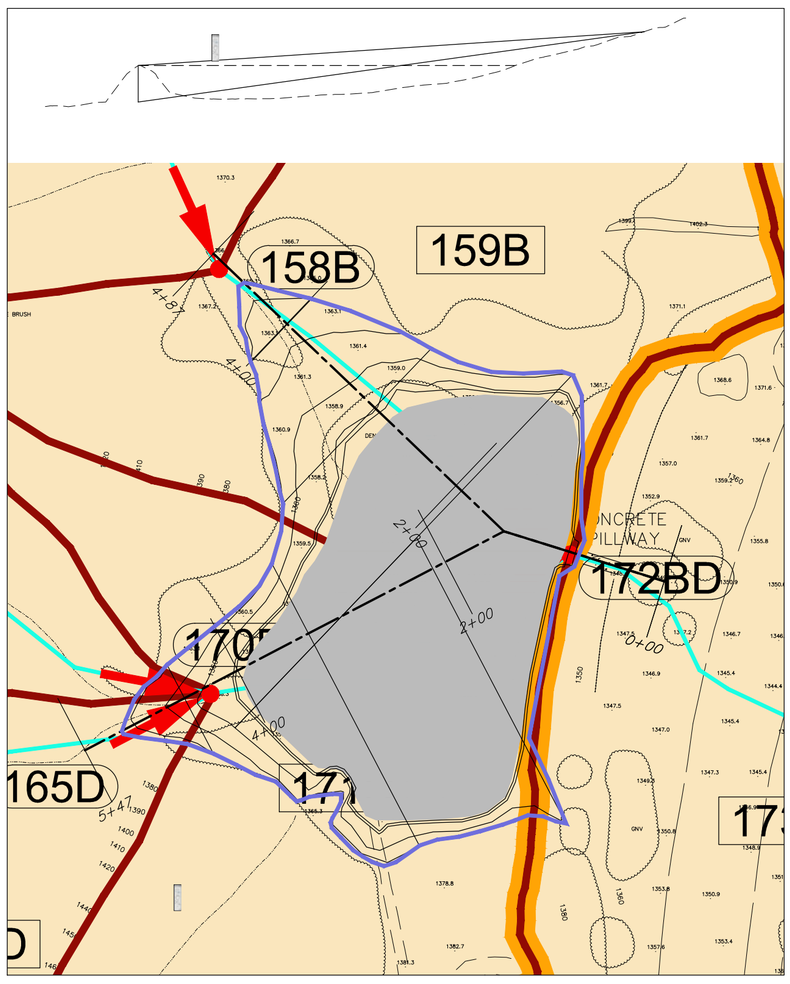
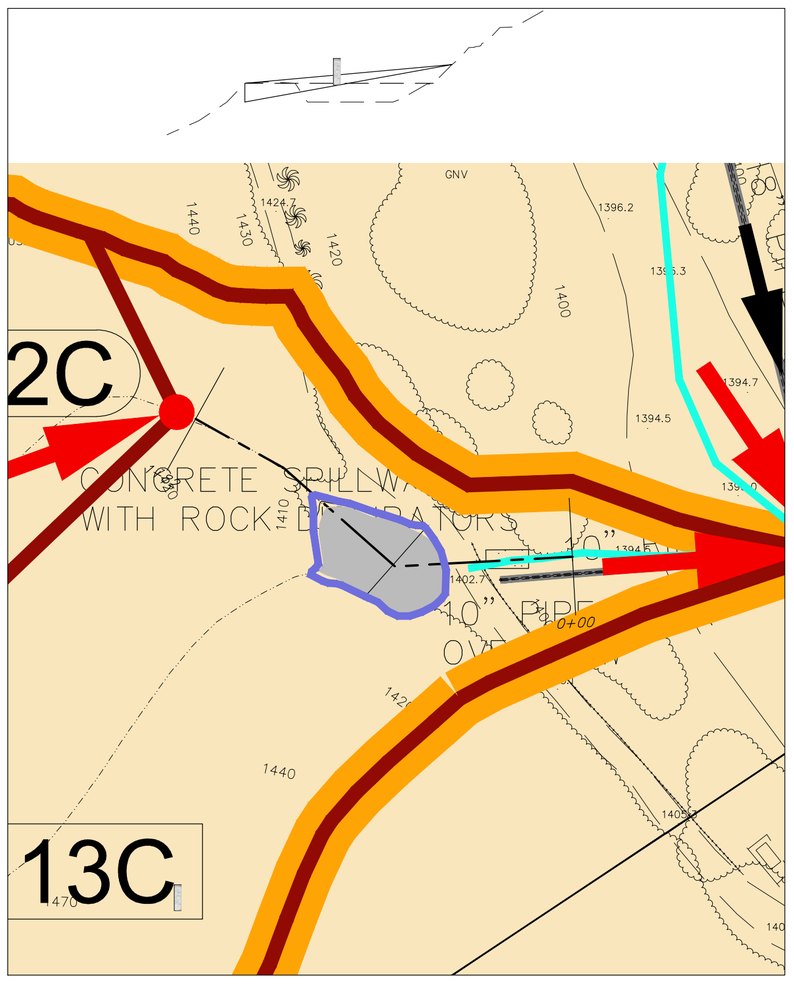
THE MALIBU INSTITUTE

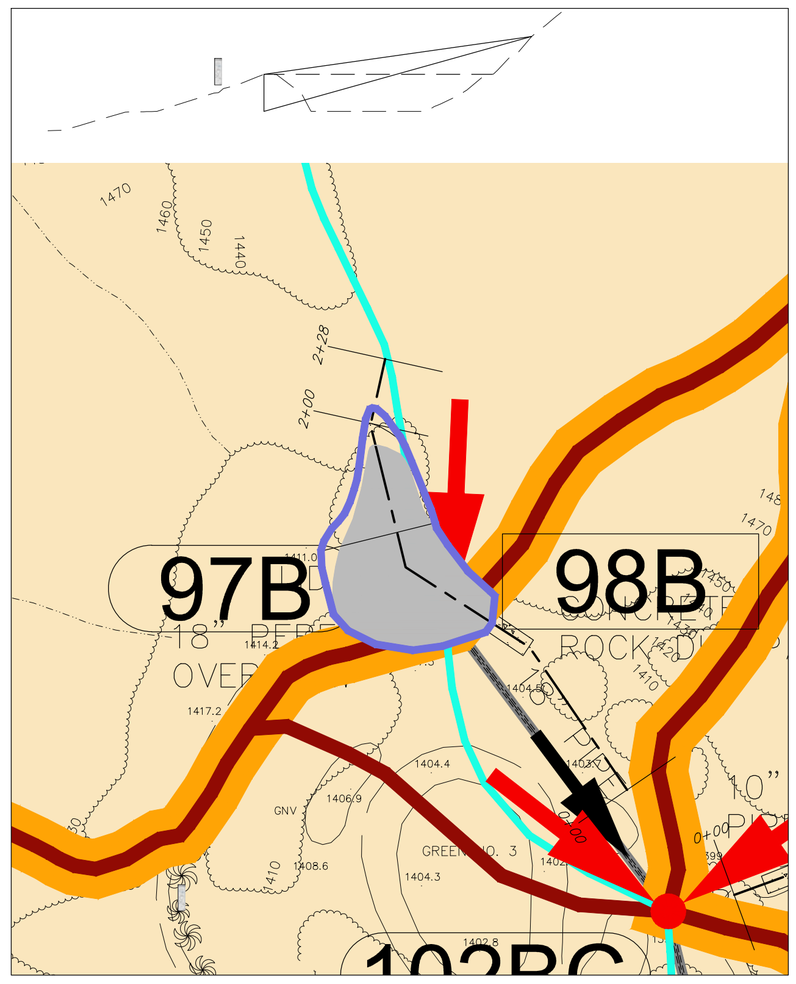
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
SEDIMENT BASIN TRIBUTARY MAP - SHEET 20 OF 22



SEDIMENT BASIN NO. 2
SCALE – 1"=100'



SEDIMENT BASIN NO. 3
SCALE – 1"=50'



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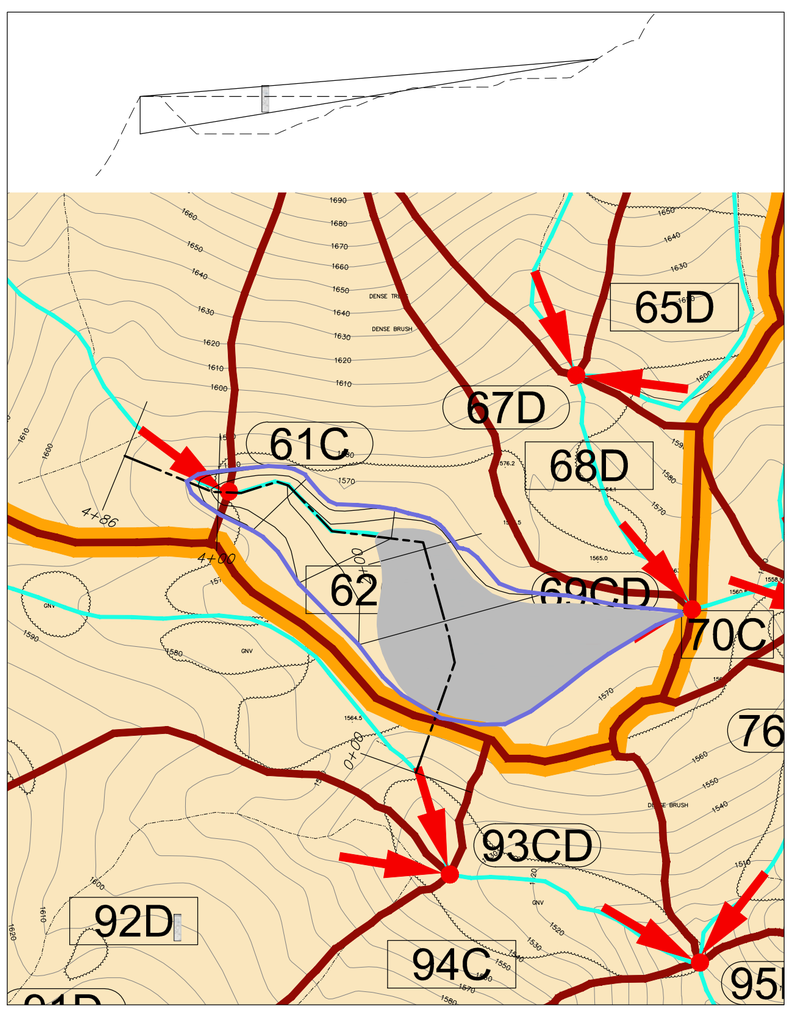

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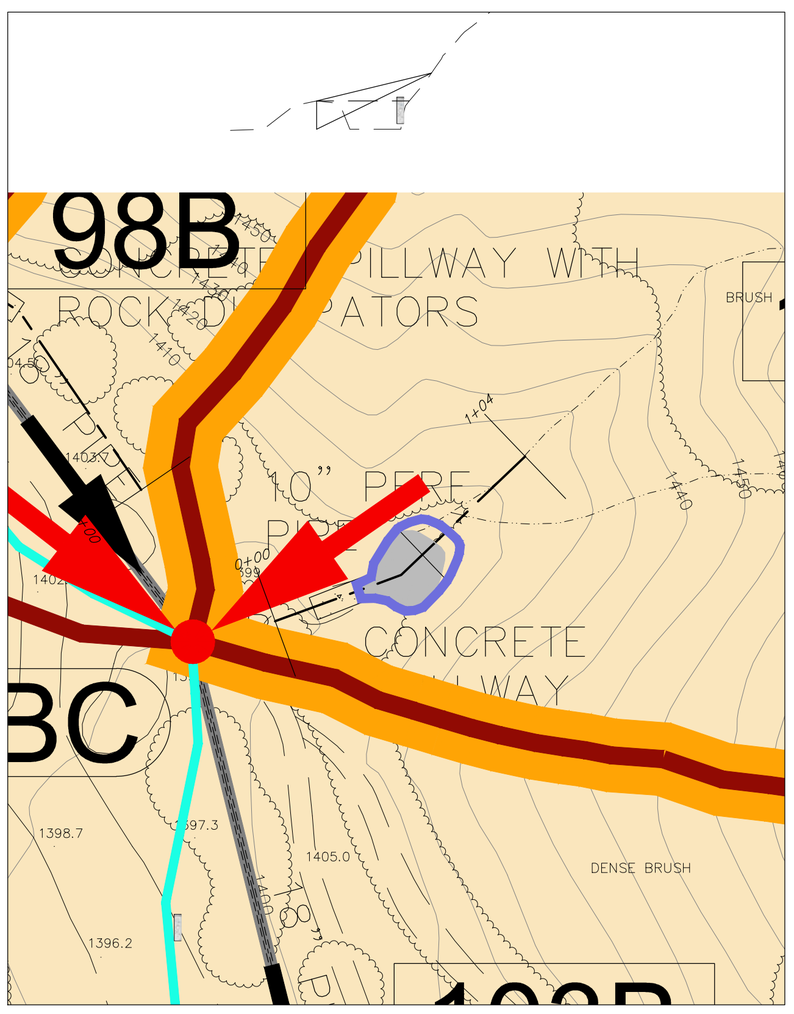
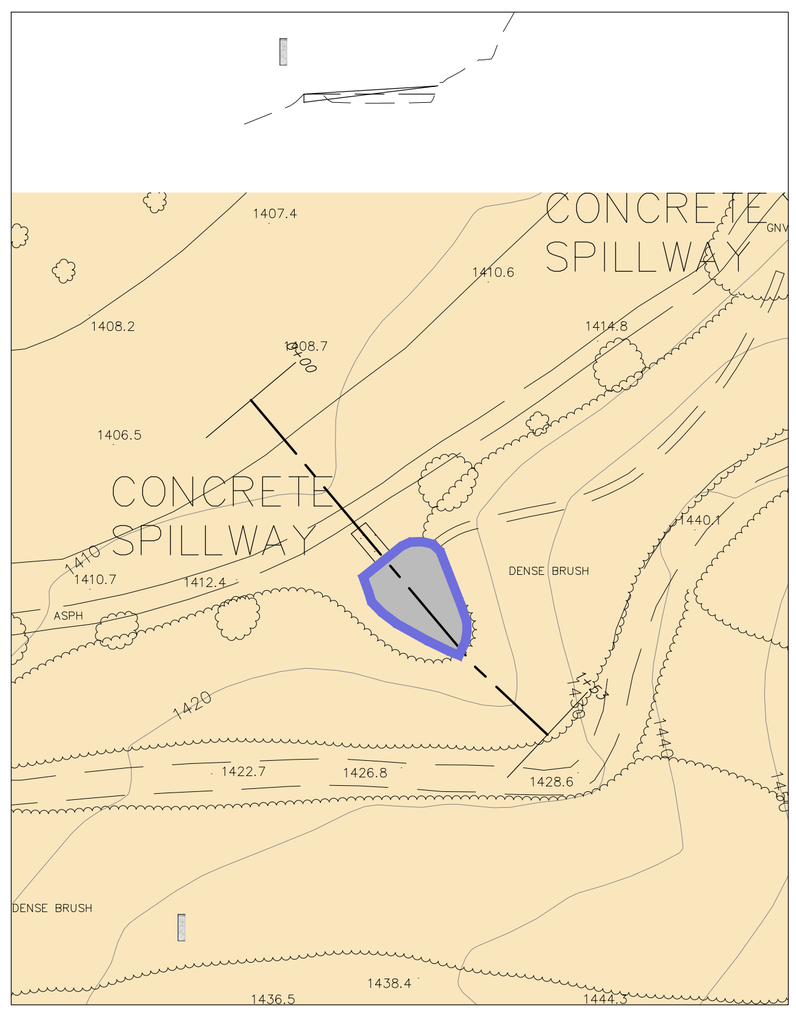
SCALE – 1"=100'



SEDIMENT BASIN NO. 6
SCALE – 1"=40'



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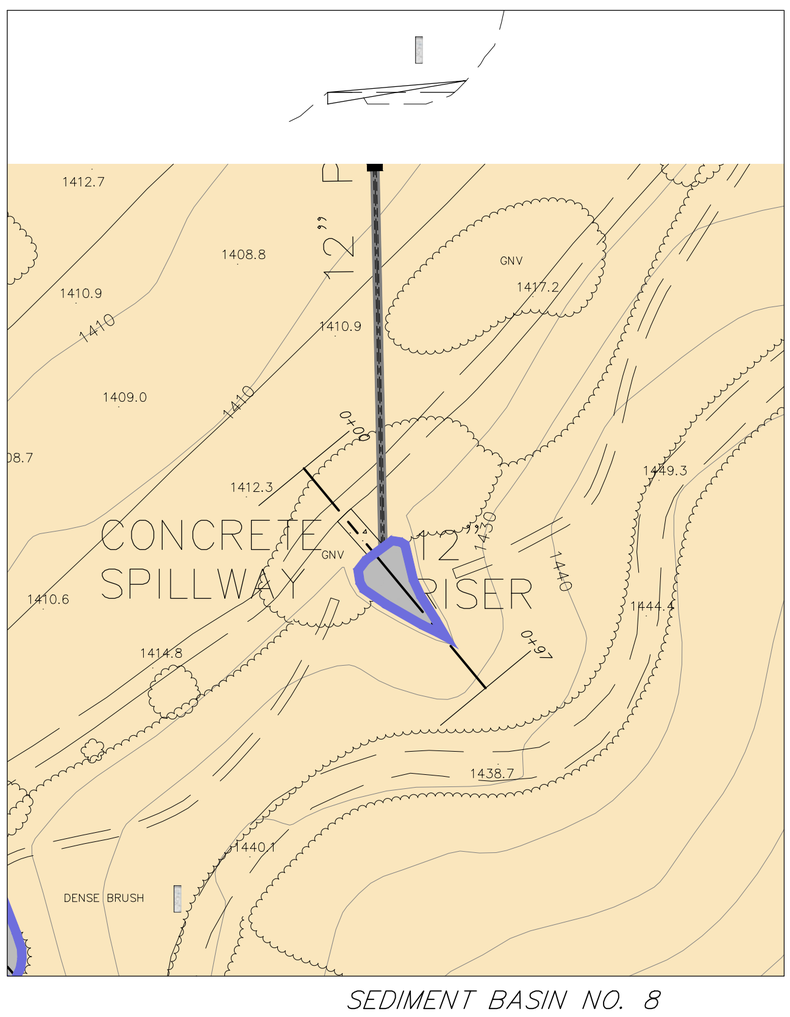
SCALE – 1"=40'



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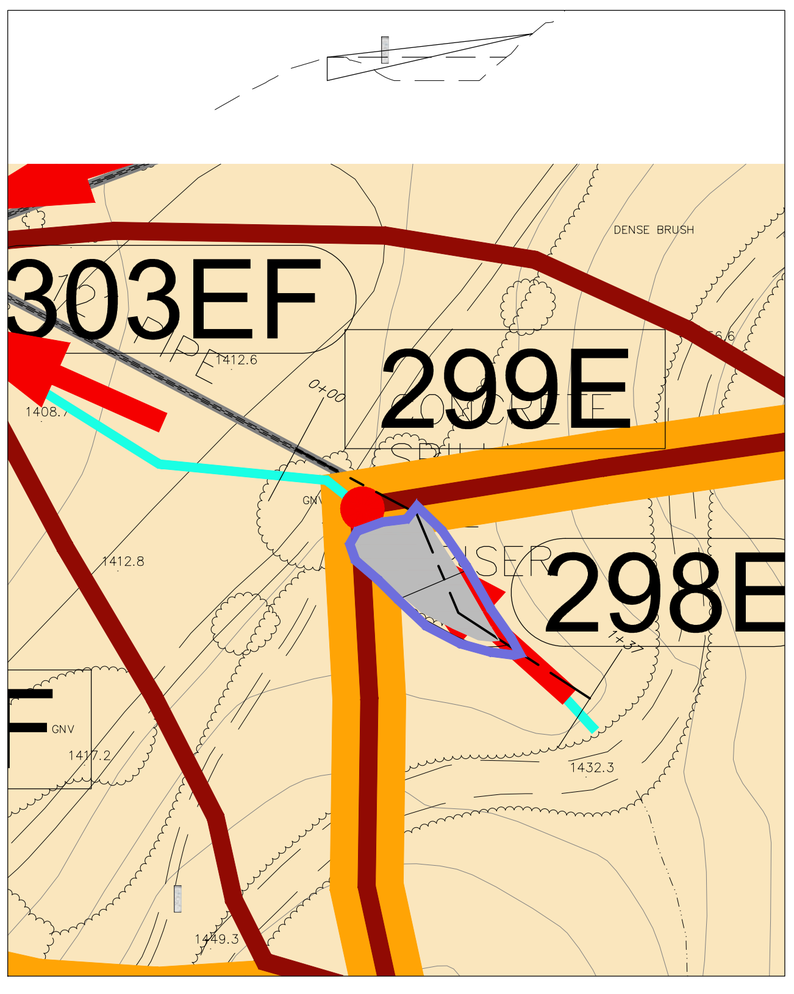
SCALE – 1"=40'



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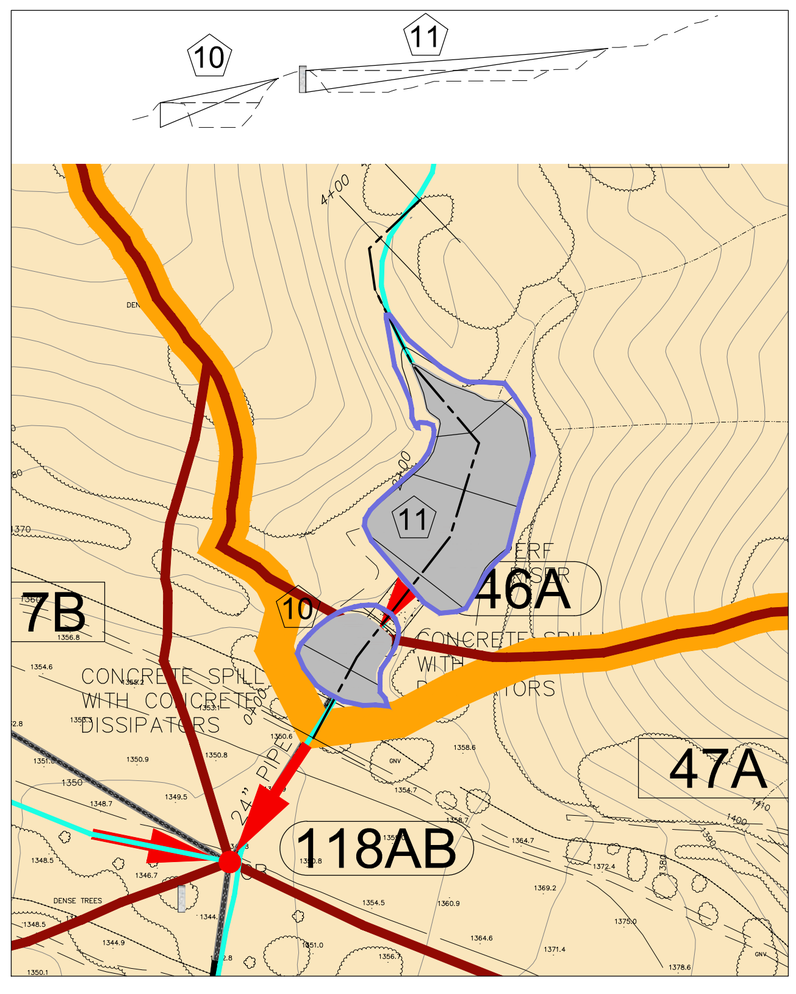

SEDIMENT BASIN NO. 10 AND 11
SCALE – 1"=80'

LEGEND

CONE LIMITS

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civil engineering
land surveying

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DRAINAGE CONCEPT/HYDROLOGY STUDY FOR TR 71735
EXISTING SEDIMENT BASINS – SHEET 21 OF 22

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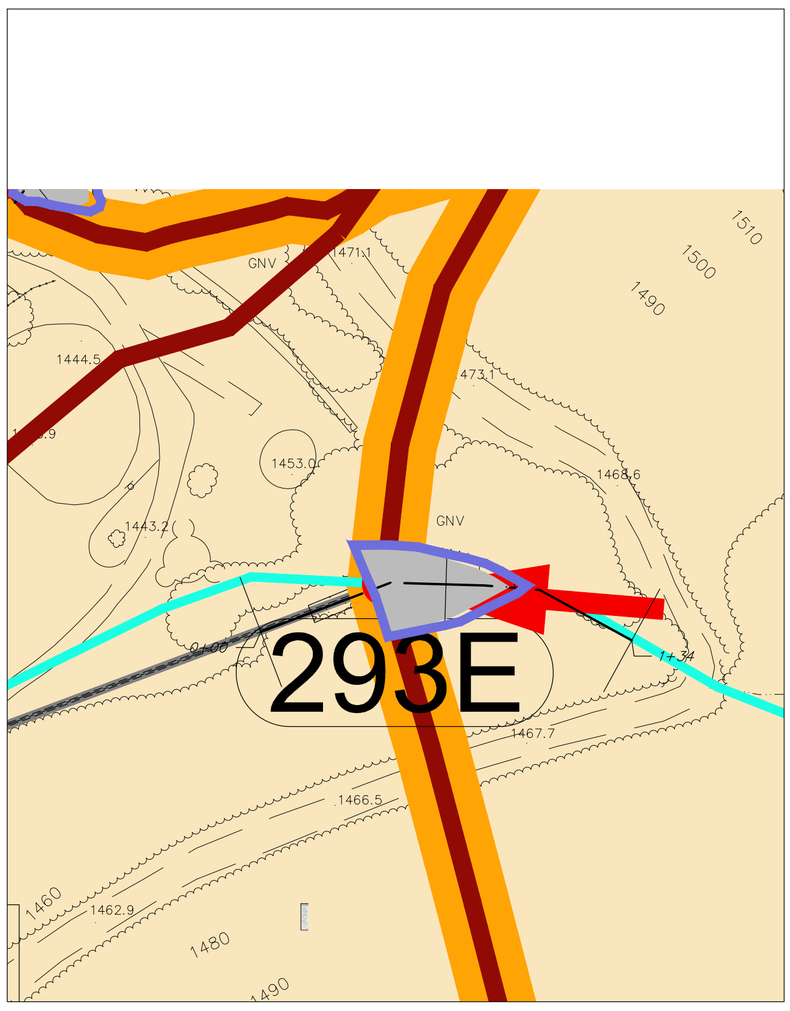
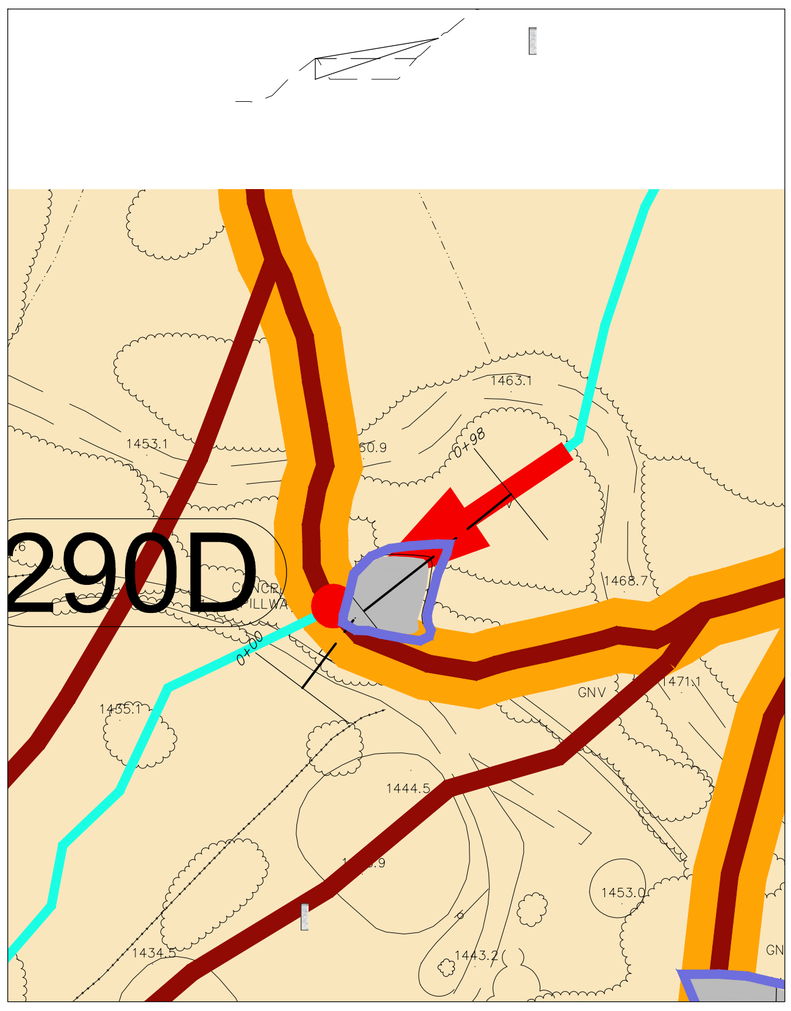
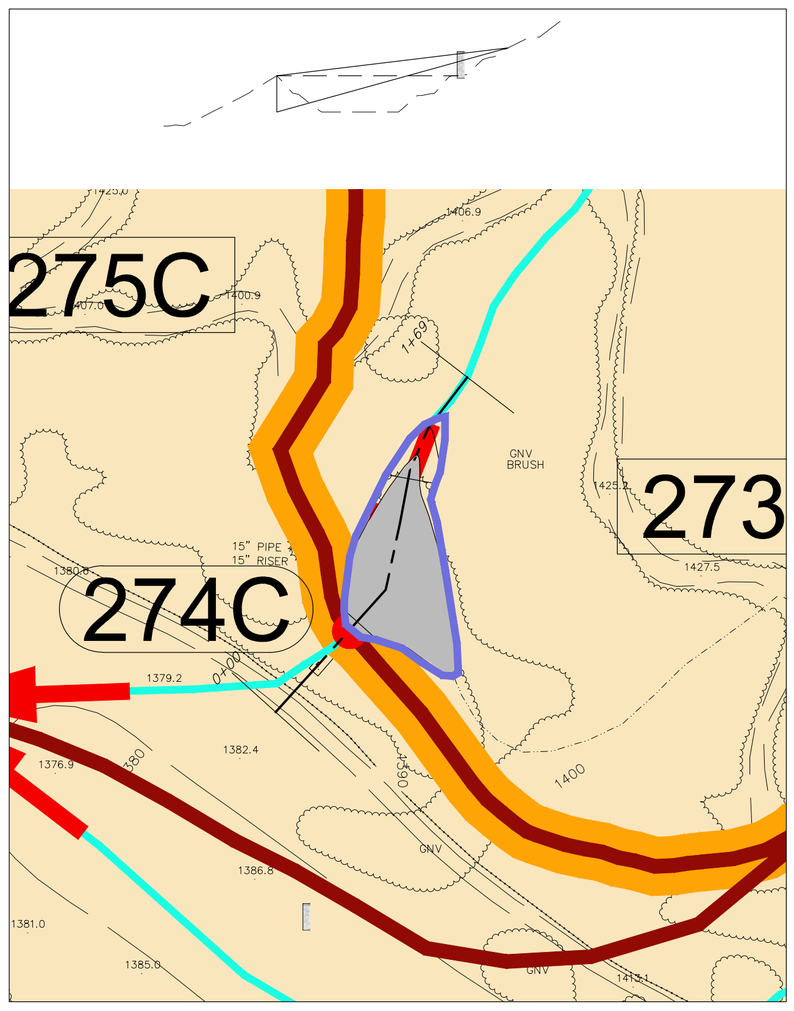


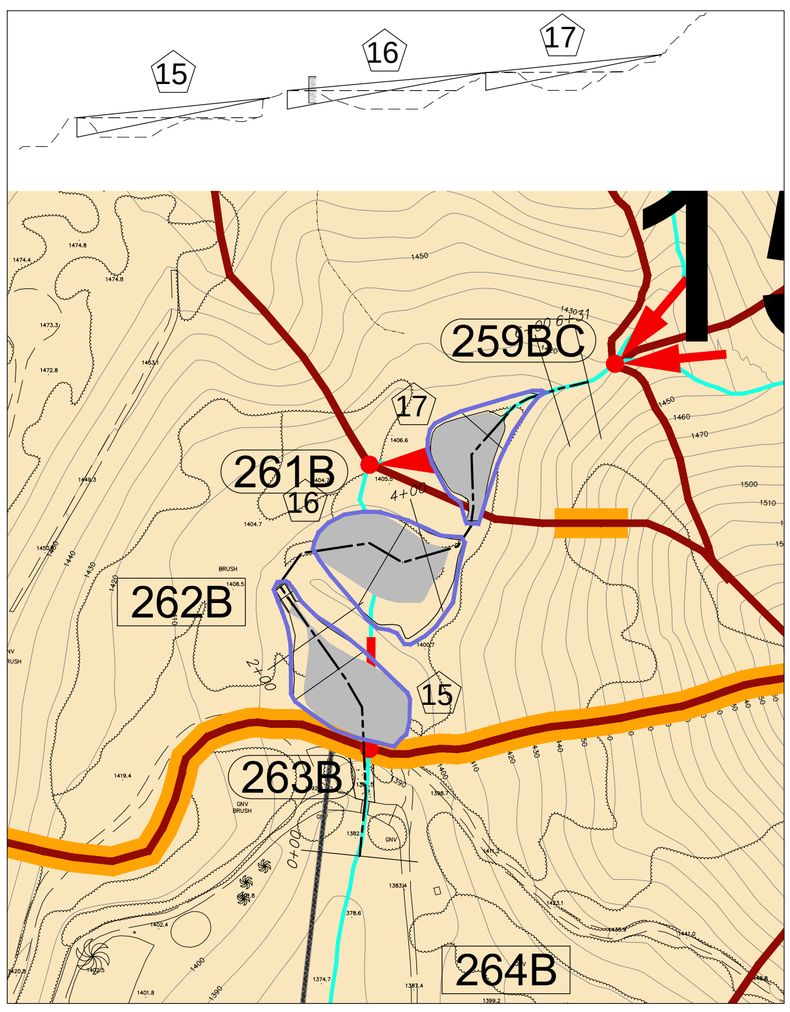
SEDIMENT BASIN NO. 12
SCALE – 1"=40'



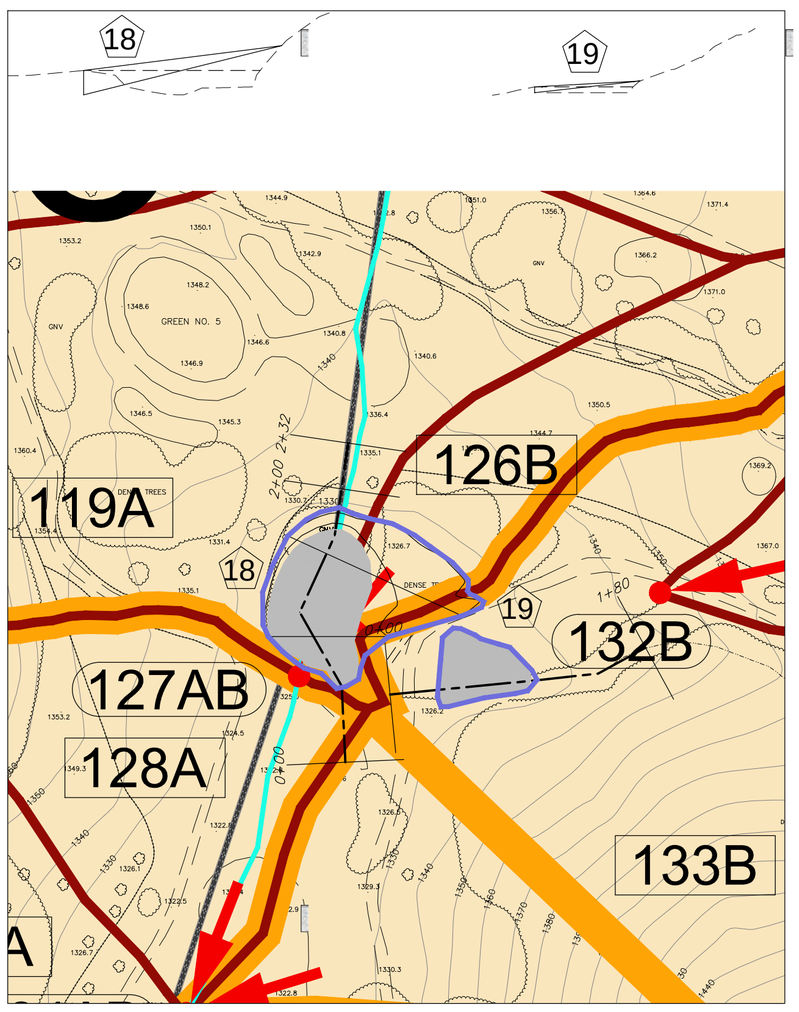
SEDIMENT BASIN NO. 13
SCALE – 1"=40'



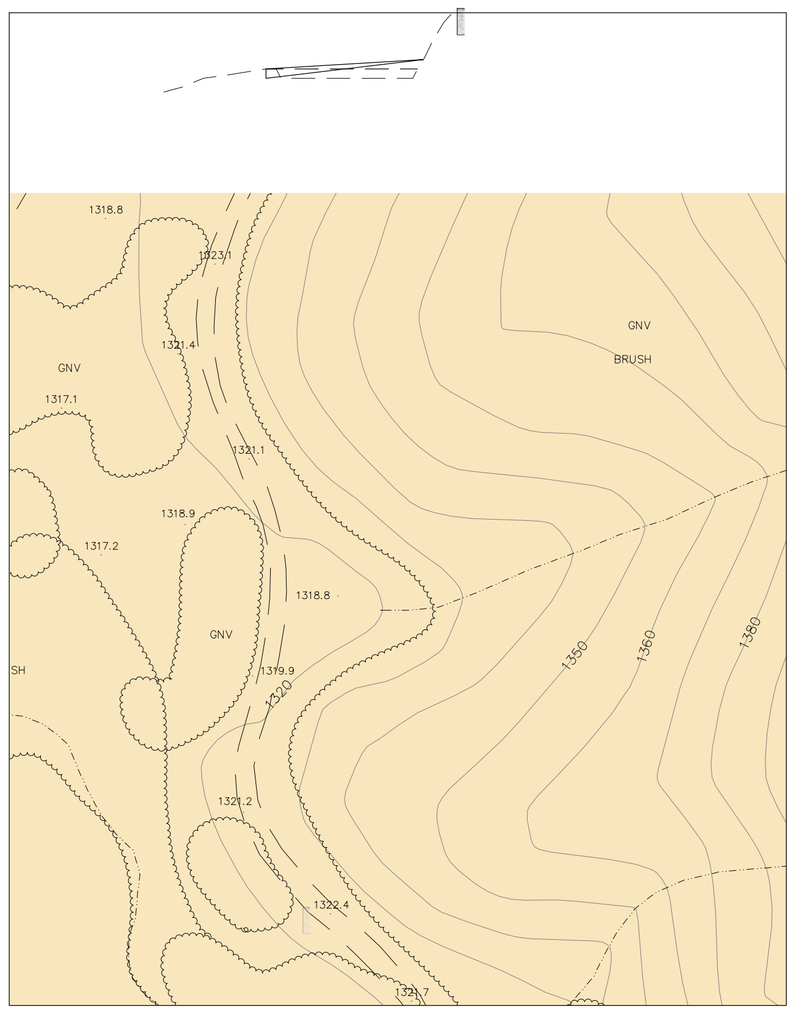
SEDIMENT BASIN NO. 14
SCALE – 1"=50'



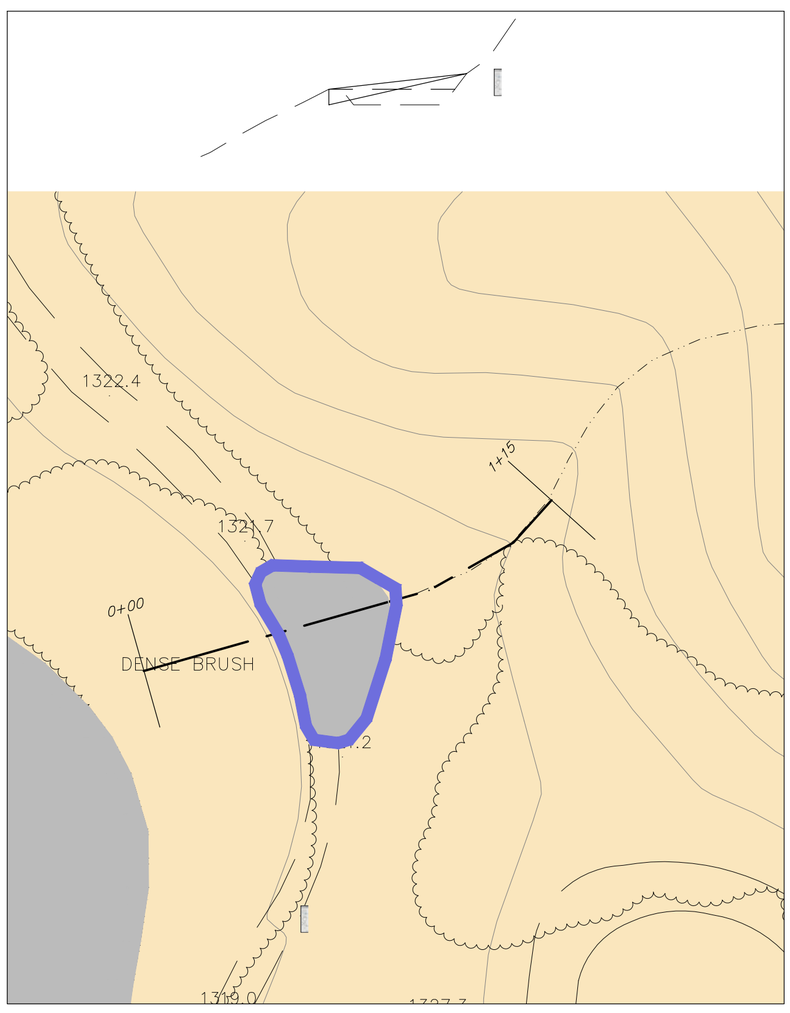
SEDIMENT BASIN NO. 15, 16, AND 17
SCALE – 1"=100'



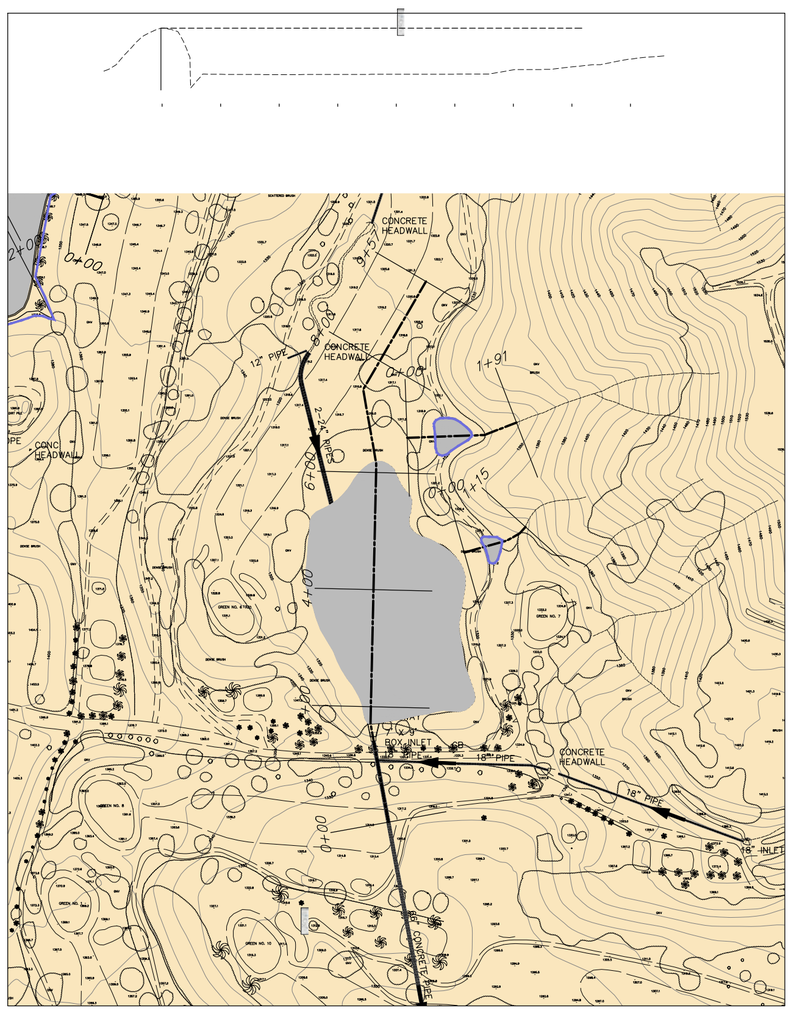
SEDIMENT BASIN NO. 18 AND 19
SCALE – 1"=80'



SEDIMENT BASIN NO. 20
SCALE – 1"=50'



SEDIMENT BASIN NO. 21
SCALE – 1"=30'



FEATURE 2
SCALE – 1"=100'

LEGEND

CONE LIMITS

triad/holmes assoc
civil engineering
land surveying

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EXISTING SEDIMENT BASINS – SHEET 22 OF 22

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Appendix B Hydrologic Analysis

- Tc Calculator output
- LAR 04 output

TC Calculator Output

							2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8			Isohyetal=8.8							
Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only	Conveyance Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope
1A	17.8	17.8	28	4	8.8	0.02	28	4.0	4.0	13	16.8	16.8	10	27.9	27.9	8	42.8	42.8	7	55.0	55.0	7	65.1	65.1	17.8		1.66	108.0	PIPE	48	100	0.04
2A		17.8	28	4	8.8	0.02	28		4.0	13		16.8	10		27.9	8		42.8	7		55.0	7		65.1	17.8		1.66	108.0	Mtn Chnl		506	0.11858
3A	4.1	21.9	28	4	8.8	0.02	10	2.4	5.7	6	6.7	20.5	5	10.2	33.1	5	13.4	50.8	5	15.7	64.8	5	18.2	77.2	21.9		1.66	128.2				
4B	9.7	9.7	28	4	8.8	0.02	12	4.9	4.9	7	14.2	14.2	5	24.2	24.2	5	31.6	31.6	5	37.2	37.2	5	43.2	43.2	9.7		1.66	71.6				
5B		9.7	28	4	8.8	0.02	12		4.9	7		14.2	5		24.2	5		31.6	5		37.2	5		43.2	9.7		1.66	71.6	Mtn Chnl		534	0.31835
6B	1.9	11.6	28	4	8.8	0.02	10	1.1	5.7	6	3.1	16.4	5	4.7	25.8	5	6.2	34.3	5	7.3	40.6	5	8.5	47.6	11.6		1.66	79.0				
7AB	11.6	33.5	28	4	8.8			5.7	11.4		16.4	36.8		25.8	57.8		34.3	84.0		40.6	104.4		47.6	124.1	33.5		1.66	205.9	Mtn Chnl		257	0.07782
8A	3.1	36.6	28	4	8.8	0.02	12	1.6	12.6	7	4.5	39.8	5	7.7	61.9	5	10.1	89.7	5	11.9	111.3	5	13.8	132.4	36.6		1.66	219.8				
9C	30.6	30.6	28	4	8.8	0.02	24	7.8	7.8	12	30.7	30.7	9	51.1	51.1	7	79.8	79.8	6	104.1	104.1	6	122.0	122.0	30.6		1.66	202.5	PIPE	48	100	0.02
10C		30.6	28	4	8.8	0.02	24		7.8	12		30.7	9		51.1	7		79.8	6		104.1	6		122.0	30.6		1.66	202.5	PIPE	2-24	100	0.04
11C	2.4	33	28	4	8.8	0.02	11	1.3	9.1	6	3.9	34.6	5	6.0	56.2	5	7.8	86.3	5	9.2	111.8	5	10.7	131.0	33.0		1.66	217.5				
12AC	33	69.6	28	4	8.8			9.1	21.4		34.6	72.7		56.2	116.4		86.3	173.5		111.8	219.2		131.0	260.6	69.6		1.66	432.6	Mtn Chnl		405	0.03457
13A	3.4	73	28	4	8.8	0.02	19	1.1	21.7	10	3.9	74.1	8	6.1	117.7	6	9.8	175.6	5	13.0	216.4	5	15.1	260.6	73.0		1.66	432.6				
14D	9.9	9.9	28	4	8.8	0.02	14	4.3	4.3	8	13.2	13.2	6	21.6	21.6	5	32.3	32.3	5	38.0	38.0	5	44.1	44.1	9.9		1.66	73.1	PIPE	36	100	0.04
15D		9.9	28	4	8.8	0.02	14		4.3	8		13.2	6		21.6	5		32.3	5		38.0	5		44.1	9.9		1.66	73.1	Mtn Chnl		1124	0.18683
16D	6.8	16.7	28	4	8.8	0.02	21	2.0	5.5	11	7.3	17.9	8	12.3	28.8	7	17.7	41.3	6	23.1	49.1	6	27.1	59.3	16.7		1.66	98.5				
17D	8.6	25.3	28	4	8.8	0.02	20	2.7	7.9	10	10.0	26.5	8	15.5	43.4	6	24.8	62.2	5	33.0	76.2	5	38.3	91.6	25.3		1.66	152.0				
18D		25.3	28	4	8.8	0.02	20		7.9	10		26.5	8		43.4	6		62.2	5		76.2	5		91.6	25.3		1.66	152.0	Mtn Chnl		806	0.10918
19D	7.8	33.1	28	4	8.8	0.02	18	2.7	9.4	9	9.7	30.2	7	15.3	47.9	6	22.5	71.8	5	29.9	88.6	5	34.7	109.1	33.1		1.66	181.2				
20AD	33.1	106.1	28	4	8.8			9.4	30.6		30.2	104.3		47.9	165.6		71.8	247.4		88.6	305.0		109.1	369.7	106.1		1.66	613.8	Mtn Chnl		201	0.02985
21A	0.7	106.8	28	4	8.8	0.02	6	0.6	30.3	5	1.3	103.4	5	1.7	163.9	5	2.3	244.4	5	2.7	304.1	5	3.1	368.1	106.8		1.66	611.0				
22E	9.7	9.7	28	4	8.8	0.02	9	6.1	6.1	5	18.3	18.3	5	24.2	24.2	5	31.6	31.6	5	37.2	37.2	5	43.2	43.2	9.7		1.66	71.6	PIPE	18	100	0.06
23E		9.7	28	4	8.8	0.02	9		6.1	5		18.3	5		24.2	5		31.6	5		37.2	5		43.2	9.7		1.66	71.6	Mtn Chnl		1051	0.15033
24E	9	18.7	28	4	8.8	0.02	24	2.3	7.2	12	9.0	22.0	9	15.0	32.5	7	23.5	45.7	7	27.8	55.3	7	32.9	66.7	18.7		1.66	110.8				
25AE	18.7	125.5	28	4	8.8			7.2	36.8		22.0	122.9		32.5	195.7		45.7	285.0		55.3	357.3		66.7	432.0	125.5		1.66	717.1	Mtn Chnl		652	0.02454
26A	16.7	142.2	28	4	8.8	0.02	27	3.9	37.6	12	16.7	124.2	10	26.2	197.1	8	40.1	288.8	7	51.6	360.5	7	61.0	446.2	142.2		1.66	740.6				
27A		142.2	28	4	8.8	0.02	27		37.6	12		124.2	10		197.1	8		288.8	7		360.5	7		446.2	142.2		1.66	740.6	Mtn Chnl		1018	0.04322
28A	24.5	166.7	28	4	8.8	0.02	24	6.3	37.5	12	24.6	118.5	9	41.0	187.9	7	63.9	277.4	6	83.3	348.0	6	97.7	443.4	166.7		1.66	736.0				
29B	12.5	12.5	28	4	8.8	0.02	14	5.5	5.5	8	16.7	16.7	6	27.3	27.3	5	40.8	40.8	5	47.9	47.9	5	55.6	55.6	12.5		1.66	92.3	PIPE	36	100	0.02
30B	3.2	15.7	28	4	8.8	0.02	15	1.3	6.8	8	4.3	21.0	6	7.0	34.3	5	10.4	51.2	5	12.3	60.2	5	14.2	69.9	15.7		1.66	116.0				
31B		15.7	28	4	8.8	0.02	15		6.8	8		21.0	6		34.3	5		51.2	5		60.2	5		69.9	15.7		1.66	116.0	Mtn Chnl		673	0.17533
32B	3.3	19	28	4	8.8	0.02	13	1.5	7.8	7	4.8	23.8	6	7.2	38.3	5	10.8	53.5	5	12.7	63.9	5	14.7	75.6	19.0		1.66	125.4				
33B		19	28	4	8.8	0.02	13		7.8	7		23.8	6		38.3	5		53.5	5		63.9	5		75.6	19.0		1.66	125.4	Mtn Chnl		790	0.11392
34B	7.1	26.1	45	4	8.8	0.02	29	0.7	7.9	22	1.3	23.0	10	6.2	39.2	7	12.6	56.6	6	17.4	68.5	6	24.5	87.0	26.1		1.66	144.5				
35C	4.3	4.3	28	4	8.8	0.02	12	2.2	2.2	7	6.3	6.3	5	10.7	10.7	5	14.0	14.0	5	16.5	16.5	5	19.1	19.1	4.3		1.66	31.8				
36C		4.3	28	4	8.8	0.02	12		2.2	7		6.3	5		10.7	5		14.0	5		16.5	5		19.1	4.3		1.66	31.8	Mtn Chnl		700	0.17143
37C	2.4	6.7	45	4	8.8	0.02	28	0.3	2.1	22	0.4	5.9	10	2.1	10.6	7	4.3	15.4	6	5.9	18.5	6	8.3	23.5	6.7		1.66	39.0				
38C		6.7	45	4	8.8	0.02	28		2.1	22		5.9	10		10.6	7		15.4	6		18.5	6		23.5	6.7		1.66	39.0	Mtn Chnl		583	0.10292
39C	2.8	9.5	45	4	8.8	0.02	28	0.3	2.2	21	0.5	5.7	10	2.4	10.5	6	5.6	14.9	6	6.9	19.3	6	9.7	27.0	9.5		1.66	44.9				
40BC	9.5	35.6	45	4	8.8			2.2	10.0		5.7	28.2		10.5	49.6		14.9	71.1		19.3	87.5		27.0	114.1	35.6		1.66	189.4	Mtn Chnl		128	0.03125
41B	0.3	35.9	45	4	8.8	0.02	12	0.1	9.9	5	0.4	27.9	5	0.5	48.3	5	0.7	70.6	5	0.9	86.5	5	1.2	112.5	35.9		1.66	186.8				
42AB	35.9	202.6	45	4	8.8			9.9	45.0		27.9	139.2		48.3	217.8		70.6	323.0		86.5	406.4		112.5	522.6	202.6		1.66	867.5	Mtn Chnl		814	0.3317
43A	13.8	216.4	45	4	8.8	0.02	28	1.5	45.7	21	2.5	140.7	9	13.2	217.5	6	27.7	321.7	5	38.9	405.2	5	53.6	529.2	216.4		1.66	878.5				
44A		216.4	45	4	8.8	0.02	28		45.7	21		140.7	9		217.5	6		321.7	5		405.2	5		529.2	216.4		1.66	878.5	Mtn Chnl		624	0.02244
45A	17.3	233.7	45	4	8.8	0.02	29	1.8	45.0	23	3.0	139.0	11	13.3	214.0	7	30.6	316.3	6	42.4	399.0	6	59.6	531.3	233.7		1.66	882.0				
46A		233.7	45	4	8.8	0.02	29		45.0	23		139.0	11		214.0	7		316.3	6		399.0	6		531.3	233.7		1.66	882.0	PIPE	24	141	0.02128
47A	3	236.7	45	4	8.8	0.03	14	0.5	45.1	5	3.5	139.0	5	5.1	214.1	5	7.0	316.5	5	8.5	399.2	5	8.5	531.6	233.7	3.0	1.65	878.1				
48B	7.7	7.7	45	4	8.8	0.02	22	0.9	0.9	17	1.5	1.5	7	9.4	9.4	5	17.9	17.9	5	21.7	21.7	5	29.9	29.9	7.7		1.66	49.6	PIPE	18	100	0.02
49B		7.7	45	4	8.8	0.02	22		0.9	17		1.5	7		9.4	5		17.9	5		21.7	5		29.9	7.7		1.66	49.6	Valley Chnl		256	0.39844
50B	0.4	8.1	45	4	8.8	0.02	16	0.1	1.0	12	0.1	1.6	5	0.7	9.9	5	0.9	17.9	5	1.1	21.8	5	1.6	30.3	8.1		1.66	50.3				
51C	3.8	3.8	45	4	8.8	0.02	19	0.5	0.5	15	0.8	0.8	5	6.4	6.4	5	8.9	8.9	5	10.7	10.7	5	14.8	14.8	3.8		1.66	24.5	PIPE	18	100	0.02
52C		3.8	45	4	8.8	0.02	19		0.5	15		0.8	5		6.4	5		8.9	5		10.7	5		14.8	3.8		1.66	24.5	Mtn Chnl		433	0.16166
53C	2.5	6.3	45	4	8.8	0.02	22	0.3	0.7	17	0.5	1.3	6	3.5	7.7	5	5.8	11.4	5	7.1	14.5	5	9.7	21.2	6.3		1.66	35.2				
54BC	6.3	14.4	45	4	8.8			0.7	1.7		1.3	2.9		7.7	17.5		11.4	28.4		14.5	35.3		21.2	50.7	14.4		1.66	84.1	Mtn Chnl		740	0.25405
55B	6.3	20.7	45	4	8.8	0.02	28	0.7	2.3	22	1.1	3.9	10	5.5	20.6	7	11.2	36.6	6	15.4	45.5	6	21.7	66.9	20.7		1.66	111.1				
56C	4.9	4.9	45	4	8.8	0.02	27	0.5	0.5	21	0.9	0.9	9	4.7	4.7	6	9.8	9.8	5	13.8	13.8	5	19.0	19.0	4.9		1.66	31.6				
57C		4.9	45	4	8.8	0.02	27		0.5	21		0.9	9		4.7	6		9.8	5		13.8	5		19.0	4.9		1.66	31.6	Mtn Chnl		504	0.25794
58C	5.9	10.8	45	4	8.8	0.02	28	0.6	1.1	22	1.0	1.9	10	5.1	8.9	7	10.5	19.3	6	14.4	26.2	6	20.3	37.3	10.8		1.66	61.9				
59C		10.8	45	4	8.8	0.02	28		1.1	22		1.9	10		8.9	7		19.3	6		26.2	6		37.3	10.8		1.66	61.9	Mtn Chnl		429	0.24242
60C	4.1	14.9	45	4	8.8	0.02	22	0.5	1.6	17	0.8	2.6	7	5.0	11.4	5	9.6	23.3	5	11.6	32.3	5	15.9	47.6	14.9		1.66	79.0				
61C		14.9	45	4	8.8	0.02	22		1.6	17		2.6	7		11.4	5		23.3	5		32.3	5		47.6	14.9		1.66	79.0	Valley Chnl		510	0.01569

Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked		
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8			Isohyetal=8.8		
							Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)
62C	2.4	17.3	45	4	8.8	0.02	24	0.3	1.8	18	0.5	2.9	7	2.9	10.3	5	5.6	21.0	5	6.8	30.1	5	9.3	48.2	17.3		
63D	2.5	2.5	45	4	8.8	0.02	27	0.3	0.3	20	0.5	0.5	9	2.4	2.4	6	5.0	5.0	5	7.1	7.1	5	9.7	9.7	2.5		
64D		2.5	45	4	8.8	0.02	27		0.3	20		0.5	9		2.4	6		5.0	5		7.1	5		9.7	2.5		
65D	1	3.5	45	4	8.8	0.02	20	0.1	0.4	15	0.2	0.7	6	1.4	3.7	5	2.3	6.8	5	2.8	9.0	5	3.9	12.7	3.5		
66D	3.1	6.6	45	4	8.8	0.02	28	0.3	0.7	21	0.6	1.2	10	2.7	6.4	6	6.2	13.0	6	7.6	16.6	6	10.7	23.4	6.6		
67D		6.6	45	4	8.8	0.02	28		0.7	21		1.2	10		6.4	6		13.0	6		16.6	6		23.4	6.6		
68D	0.9	7.5	45	4	8.8	0.02	20	0.1	0.8	16	0.2	1.4	6	1.3	7.1	5	2.1	14.4	5	2.5	18.4	5	3.5	26.1	7.5		
69CD	7.5	24.8	45	4	8.8			0.8	2.5		1.4	4.2		7.1	15.0		14.4	30.7		18.4	42.9		26.1	69.5	24.8		
70C	0.3	25.1	45	4	8.8	0.02	5	0.4	4.2	5	4.2	8.1	5	0.5	15.0	5	0.7	31.0	5	0.9	43.2	5	1.2	69.6	25.1		
71BC	25.1	45.8	45	4	8.8			4.2	8.1		4.2	4.8		15.0	35.6		31.0	66.5		43.2	87.3		69.6	136.3	45.8		
72B	0.4	46.2	45	4	8.8	0.02	10	0.1	4.8	5	0.5	8.1	5	0.7	35.6	5	0.9	66.2	5	1.1	86.6	5	1.6	136.4	46.2		
73E	4	4	45	4	8.8	0.02	23	0.5	0.5	17	0.8	0.8	7	4.9	4.9	5	9.3	9.3	5	11.3	11.3	5	15.5	15.5	4.0		
74E		4	45	4	8.8	0.02	23		0.5	17		0.8	7		4.9	5		9.3	5		11.3	5		15.5	4.0		
75E	5.3	9.3	45	4	8.8	0.02	26	0.6	1.0	20	1.0	1.7	8	5.7	8.9	6	10.6	16.2	5	15.0	20.3	5	20.6	30.5	9.3		
76EB	9.3	55.5	45	4	8.8			1.0	5.8		1.7	9.8		8.9	43.5		16.2	80.4		20.3	105.2		30.5	164.5	55.5	282	0.18444
77B	3.7	59.2	45	4	8.8	0.02	29	0.4	6.2	22	0.7	10.3	10	3.2	45.6	7	6.6	85.0	6	9.1	108.9	6	12.8	172.4	59.2	286.2	
78C	4	4	45	4	8.8	0.02	22	0.5	0.5	17	0.8	0.8	7	4.9	4.9	5	9.3	9.3	5	11.3	11.3	5	15.5	15.5	4.0		
79C		4	45	4	8.8	0.02	22		0.5	17		0.8	7		4.9	5		9.3	5		11.3	5		15.5	4.0		
80C	8.2	12.2	45	4	8.8	0.02	26	0.9	1.3	20	1.5	2.3	9	7.9	11.8	6	16.4	24.0	5	23.1	30.8	5	31.8	43.9	12.2		
81C		12.2	45	4	8.8	0.02	26		1.3	20		2.3	9		11.8	6		24.0	5		30.8	5		43.9	12.2	501	0.16766
82C	7.7	19.9	45	4	8.8	0.02	27	0.8	2.1	20	1.4	3.6	9	7.4	17.5	6	15.4	33.9	5	21.7	44.3	5	29.9	65.5	19.9	100	0.14
83C	3.5	23.4	45	4	8.8	0.02	23	0.4	2.5	18	0.7	4.2	7	4.3	20.0	5	8.2	39.7	5	9.9	52.6	5	13.6	77.2	23.4		
84C		23.4	45	4	8.8	0.02	23		2.5	18		4.2	7		20.0	5		39.7	5		52.6	5		77.2	23.4	614	0.25081
85C	9.3	32.7	45	4	8.8	0.02	29	1.0	3.4	23	1.6	5.7	11	7.2	25.4	7	16.5	52.6	6	22.8	69.5	6	32.1	103.9	32.7		
86C		32.7	45	4	8.8	0.02	29		3.4	23		5.7	11		25.4	7		52.6	6		69.5	6		103.9	32.7	755	0.10331
87C	3.9	36.6	45	4	8.8	0.02	29	0.4	3.7	23	0.7	6.2	11	3.0	24.2	7	6.9	49.7	6	9.6	67.8	6	13.4	107.5	36.6		
88D	4.6	45	4	8.8	0.02	23		0.5	17		0.9	0.9	7	5.6	10.7	5	10.7	13.0	5	13.0	17.9	5	17.9	17.9	4.6		
89D		4.6	45	4	8.8	0.02	23		0.5	17		0.9	7		5.6	5		10.7	5		13.0	5		17.9	4.6		
90D	2.7	7.3	45	4	8.8	0.02	22	0.3	0.8	16	0.6	1.4	6	3.8	7.8	5	6.3	14.0	5	7.6	17.5	5	10.5	25.1	7.3		
91D		7.3	45	4	8.8	0.02	22		0.8	16		1.4	6		7.8	5		14.0	5		17.5	5		25.1	7.3	458	0.22926
92D	2.8	10.1	45	4	8.8	0.02	23	0.3	1.1	17	0.6	1.9	7	3.4	9.5	5	6.5	16.7	5	7.9	21.5	5	10.9	31.9	10.1		
93CD	10.1	46.7	45	4	8.8			1.1	4.7		1.9	7.9		9.5	30.1		16.7	62.2		21.5	85.2		31.9	136.8	46.7	225	0.22667
94C	1.6	48.3	45	4	8.8	0.02	22	0.2	4.9	16	0.3	8.1	6	2.3	29.9	5	3.7	61.5	5	4.5	85.7	5	4.5	137.3	48.3		
95BC	48.3	107.5	45	4	8.8			4.9	11.0		8.1	18.4		29.9	72.6		61.5	142.1		85.7	192.7		137.3	307.0	107.5	461	0.03
96B	6.5	114	45	4	8.8	0.02	23	0.8	11.3	17	1.3	18.9	7	7.9	69.2	5	15.1	137.1	5	18.3	186.1	5	25.2	306.5	114.0		
97B		114	45	4	8.8	0.02	23		11.3	17		18.9	7		69.2	5		137.1	5		186.1	5		306.5	114.0	150	0.03
98B	0.6	114.6	45	4	8.8	0.03	14	0.1	11.4	5	0.7	18.9	5	1.0	69.2	5	1.4	137.0	5	1.7	186.0	5	1.7	306.8	114.0	0.6	1.66	508.2
99C	4.8	4.8	45	4	8.8	0.02	24	0.5	0.5	18	0.9	0.9	7	5.9	11.2	5	11.2	11.2	5	13.5	13.5	5	18.6	18.6	4.8		1.66	30.9
100C		4.8	45	4	8.8	0.02	24		0.5	18		0.9	7		5.9	5		11.2	5		13.5	5		18.6	4.8		1.66	30.9
101C	5.3	10.1	45	4	8.8	0.02	28	0.6	1.1	22	0.9	1.8	10	4.6	9.2	7	9.4	18.2	6	13.0	23.0	6	18.3	33.9	10.1		1.66	56.3
102BC	10.1	124.7	45	4	8.8			1.1	12.3		1.8	20.5		9.2	72.8		18.2	144.8		23.0	196.2		33.9	329.6	124.1	0.6	1.66	546.0	PIPE	18	255	0.03
103B	3.1	127.8	45	4	8.8	0.03	26	0.4	12.6	20	0.6	21.0	8	3.4	73.0	6	6.3	145.1	5	8.8	196.8	5	8.8	331.5	124.1	3.7	1.64	544.0												
104C	3.4	3.4	45	4	8.8	0.02	26	0.4	0.4	19	0.7	0.7	8	3.7	3.7	6	6.8	6.8	5	9.6	9.6	5	13.2	13.2	3.4		1.66	21.9												
105C		3.4	45	4	8.8	0.02	26		0.4	19		0.7	8		3.7	6		6.8	5		9.6	5		13.2	3.4		1.66	21.9	Valley Chnl		517	0.35783
106C	2.2	5.6	45	4	8.8	0.02	26	0.2	0.6	20	0.4	1.1	8	2.4	5.9	6	4.4	11.0	5	6.2	14.5	5	8.5	20.3	5.6		1.66	33.7												
107D	2.9	2.9	45	4	8.8	0.02	22	0.3	0.3	17	0.6	0.6	7	3.5	3.5	5	6.8	6.8	5	8.2	8.2	5	11.3	11.3	2.9		1.66	18.7												
108D		2.9	45	4	8.8	0.02	22		0.3	17		0.6	7		3.5	5		6.8	5		8.2	5		11.3	2.9		1.66	18.7	Mtn Chnl		273	0.27106
109D	1.5	4.4	45	4	8.8	0.02	19	0.2	0.5	14	0.3	0.9	5	2.5	5.1	5	3.5	9.0	5	4.2	11.0	5	5.8	15.6	4.4		1.66	25.8												
110CD	4.4	10	45	4	8.8			0.5	1.1		0.9	1.9		5.1	10.9		9.0	20.0		11.0	25.4		15.6	35.9	10.0		1.66	59.6	Mtn Chnl		325	0.16615
111C	3	13	45	4	8.8	0.02	23	0.3	1.5	17	0.6	2.5	7	3.7	13.6	5	7.0	23.5	5	8.5	30.8	5	11.6	44.4	13.0		1.66	73.8												
112C		13	45	4	8.8	0.02	23		1.5	17		2.5	7		13.6	5		23.5	5		30.8	5		44.4	13.0		1.66	73.8	PIPE	10	138	0.06522
113C	2.3	15.3	45	4	8.8	0.02	28	0.2	1.7	21	0.4	2.9	10	2.0	15.3	6	4.6	27.6	5	6.5	36.1	5	8.9	52.0	15.3		1.66	86.4												
114BC	15.3	143.1	45	4	8.8			1.7	14.1		2.9	23.3		15.3	80.0		27.6	158.2		36.1	217.6		52.0	366.5	139.4	3.7	1.64	602.1	PIPE	18	540	0.0487
115B	12	155.1	45	4	8.8	0.03	29	1.3	15.2	23	2.2	25.2	10	10.6	84.8	7	21.5	168.6	6	29.6	229.7	6	29.6	384.2	139.4	15.7	1.59	612.2												
116B		155.1	45	4	8.8	0.03	29		15.2	23		25.2	10		84.8	7		168.6	6		229.7	6		384.2	139.4	15.7	1.59	612.2	PIPE	18	475	0.04147
117B	5.5	160.6	45	4	8.8	0.03	29	0.6	15.7	23	1.0	26.1	11	4.3	87.7	7	9.8	172.8	6	13.6	234.9	6	13.6	392.2	139.4	21.2	1.57	616.9												
118AB	160.6	397.3	45	4	8.8			15.7	59.9		26.1	165.0		87.7	272.6		172.8	414.7		234.9	539.4		392.2	838.3	373.1	24.2	1.62	1357.9	PIPE	24	285	0.08702
119A	3.7	401	45	4	8.8	0.03	28	0.4	60.0	22	0.7	165.5	10	3.3	272.4	7	6.6	415.1	6	9.1	542.8	6	9.1	842.0	373.1	27.9	1.61	1359.1												
120B	4	4	45	4	8.8	0.02	27	0.4	0.4	20	0.7	0.7	9	3.8	3.8	6	8.0	8.0	5	11.3	11.3	5	15.5	15.5	4.0		1.66	25.8												
121B		4	45	4	8.8	0.02	27		0.4	20		0.7	9		3.8	6		8.0	5		11.3	5		15.5	4.0		1.66	25.8	Mtn Chnl		202	0.28713
122B	2.6	6.6	45	4	8.8	0.02	27	0.3	0.7	20	0.5	1.2	9	2.5	6.2	6	5.2	13.0	5	7.3	17.4	5	10.1	24.3	6.6		1.66	40.3												
123B		6.6	45	4	8.8	0.02	27		0.7	20		1.2	9		6.2	6		13.0	5		17.4	5		24.3	6.6		1.66	40.3	Valley Chnl		393	0.36132

Conveyance, type, Pipe sizes and Capacities, lengths and slopes	
Conveyance Type	
Pipe Diameter (inches)	
Length	
Slope	

Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	2 year		5 year		10 year		25 year		50 year		50 year Burned and Bulked			Conveyance, type, Pipe sizes and Capacities, lengths and slopes				
							Isohyetal=3.4		Isohyetal=5.1		Isohyetal=6.3		Isohyetal=7.7		Isohyetal=8.8		Isohyetal=8.8							
							Tributary Q (cfs	Tc (minutes)	Tributary Q (cfs	Tc (minutes)	Tributary Q (cfs	Tc (minutes)	Tributary Q (cfs	Tc (minutes)	Tributary Q (cfs	Tc (minutes)	Tributary Q (cfs	Tc (minutes)	cummulative burned and bulked acreage	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Conveyance Q (cfs)
1248	2.4	9	45	4	8.8	0.02	22	0.3	1.0	17	0.5	1.7	2.9	8.9	5.6	17.1	6.8	22.5	9.3	31.9	9.0			52.9
1258		9	45	4	8.8	0.02	22		1.0	17		1.7	7	8.9		17.1		22.5	5	31.9	9.0			52.9
1268		10.1	45	4	8.8	0.03	28	0.1	1.1	22	0.2	1.9	9	1.1	2.0	9.2	1.8	23.9	6	2.7	33.0	9.0	1.1	59.1	52.4
127AB		10.1	411.1	45	4	8.8		1.1	60.8		1.9	167.1	9	9.2	27.4.1	18.0	419.4	23.9	560.9	382.1	29.0	1.61	1399.2	PIPE	24	293	0.0116
128A		1.1	412.2	45	4	8.8	0.03	17	0.2	60.7	12	0.3	167.0	5	1.9	27.4.0	5	2.6	419.3	5	3.1	561.3	382.1	30.1	1.61	1398.8				
1298		4.6	4.6	45	4	8.8	0.02	28	0.5	0.5	21	0.8	0.8	9	4.4	4.4	9.2	9.2	5	13.0	13.0	5	17.9	17.9	4.6		1.66	29.6			
1308			4.6	45	4	8.8	0.02	28		0.5	21		0.8	9		4.4		9.2		13.0		17.9	4.6	Valley Chnl	514	0.16732				
1318		4.4	9	45	4	8.8	0.03	26	0.5	1.0	20	0.9	1.7	8	4.8	8.9	6	8.9	17.4	5	12.5	23.0	5	12.5	27.8	4.6	4.4	1.34	37.1			
1328			9	45	4	8.8	0.03	26		1.0	20		1.7	8		8.9		17.4	5	23.0		27.8	4.6	Valley Chnl	500	0.046				
1338		4.3	13.3	45	4	8.8	0.02	28	0.5	1.4	21	0.8	2.4	10	3.7	11.5	6	8.6	22.1	5	12.1	29.2	5	16.7	38.3	8.9	4.4	1.44	55.2			
134AB		13.3	425.5	45	4	8.8		1.1	2.2		2.4	169.1		11.5	276.2	22.1	431.7	29.2	582.0	38.3	896.9	391.0	34.5	1.61	1440.9	Valley Chnl		272	0.007735	
135A		1.9	427.4	45	4	8.8	0.03	23	0.2	61.6	18	0.4	168.0	7	2.4	275.7	5	4.5	430.7	5	5.4	577.4	5	5.4	894.8	391.0	36.4	1.60	1435.1			
136B		7.3	7.3	45	4	8.8	0.02	28	0.8	0.8	21	1.3	1.3	10	6.3	6.3	6	14.6	14.6	5	20.6	20.6	5	28.3	28.3	7.3		1.66	47.0			
137B			7.3	45	4	8.8	0.02	28		0.8	21		1.3	10		6.3	6	14.6		20.6	5	28.3	7.3	Mtn Chnl	496	0.20565				
138B	6.2	13.5	45	4	8.8	0.02	29	0.6	1.4	23	1.1	2.4	11	4.8	10.2	7	11.0	24.4	6	15.2	32.8	6	21.4	46.8	13.5		1.66	77.7			
139B		13.5	45	4	8.8	0.02	29		1.4	23		2.4	11		10.2	7	24.4	6	32.8	6	46.8	13.5	Mtn Chnl	464	0.090552				
140B	2.5	16	45	4	8.8	0.02	29	0.3	1.6	22	0.4	2.7	10	2.2	10.5	7	4.4	24.8	6	6.1	34.1	6	8.6	50.2	16.0		1.66	83.4			
141B		16	45	4	8.8	0.02	29		1.6	22		2.7	10		10.5	7	24.8	6	34.1	6	50.2	16.0	Mtn Chnl	216	0.12963				
142B	0.9	16.9	45	4	8.8	0.02	23	0.1	1.7	17	0.2	2.9	7	1.1	10.5	5	2.1	24.5	5	2.5	33.7	5	3.5	51.8	16.9		1.66	86.0			
143B		16.9	45	4	8.8	0.02	23		1.7	17		2.9	7		10.5	5		24.5	5		33.7	5		51.8	16.9	Mtn Chnl		716	0.24581	
144B	7	23.9	45	4	8.8	0.02	29	0.7	2.3	22	1.2	3.8	10	6.1	10.9	7	12.4	25.3	6	17.1	36.3	6	24.1	61.9	23.9		1.66	102.7			
145B		23.9	45	4	8.8	0.02	29		2.3	22		3.8	10		10.9	7		25.3	6		36.3	6		61.9	23.9		1.66	102.7	287	0.21603	
146B	2.7	26.6	45	4	8.8	0.02	23	0.3	4.1	17	0.5	4.1	7	3.3	11.7	5	6.3	25.3	5	7.6	36.3	5	10.5	65.1	26.6		1.66	108.1			
147C	3.4	3.4	45	4	8.8	0.02	28	0.4	0.4	21	0.6	0.6	10	3.0	3.0	6	6.8	6.8	6	8.3	8.3	6	11.7	11.7	3.4		1.66	19.5			
148C		3.4	45	4	8.8	0.02	28		0.4	21		0.6	10		3.0	6		6.8	6		8.3	6		11.7	3.4		1.66	19.5	438	0.20091	
149C	7	10.4	45	4	8.8	0.02	27	0.8	1.1	21	1.3	1.8	9	6.7	8.6	6	14.0	19.2	5	19.8	24.9	5	27.2	36.0	10.4		1.66	59.7			
150C		10.4	45	4	8.8	0.02	27		1.1	21		1.8	9		8.6	6		19.2	6		24.9	5		36.0	10.4	Mtn Chnl		504	0.22619	
151C	4.8	15.2	45	4	8.8	0.02	28	0.5	1.6	21	0.9	2.7	10	4.2	11.8	6	9.6	25.3	6	11.8	33.3	6	16.5	49.5	15.2		1.66	82.1			
152C		15.2	45	4	8.8	0.02	28		1.6	21		2.7	10		11.8	6		25.3	6		33.3	6		49.5	15.2	Mtn Chnl		238	0.26891	
153C	1.9	17.1	45	4	8.8	0.02	24	0.2	1.8	19	0.4	3.0	8	2.0	12.8	6	3.8	27.6	5	5.4	36.5	5	7.4	53.5	17.1		1.66	88.8			
154BC	17.1	43.7	45	4	8.8			1.8	4.2		3.0	7.0		12.8	24.0		27.6	50.1		36.5	68.8		53.5	115.7	43.7		1.66	192.0	404	0.19307	
155B	2.3	46	45	4	8.8	0.02	22	0.3	4.4	16	0.5	7.2	6	3.2	24.1	5	5.4	51.5	5	6.5	70.8	5	8.9	119.5	46.0		1.66	198.4			
156B		46	45	4	8.8	0.02	22		4.4	16		7.2	6		24.1	5		51.5	5		70.8	5		119.5	46.0	Mtn Chnl		438	0.11416	
157B	6.8	52.8	45	4	8.8	0.02	29	0.7	4.9	22	1.2	8.2	10	5.9	27.5	7	12.0	56.3	6	16.7	76.2	6	23.4	131.7	52.8		1.66	218.6			
158B		52.8	45	4	8.8	0.02	29		4.9	22		8.2	10		27.5	7		56.3	6		76.2	6		131.7	52.8	Valley Chnl		431	0.03712	
159B	4.8	57.6	45	4	8.8	0.02	27	0.5	5.3	20	0.9	8.8	9	4.6	27.4	6	9.6	55.9	5	13.5	76.4	5	18.6	136.5	57.6		1.66	226.6			
160D	3.8	3.8	45	4	8.8	0.02	28	0.4	0.4	22	0.7	0.7	10	3.3	3.3	7	6.7	6.7	6	9.3	9.3	6	13.1	13.1	3.8		1.66	21.7			
161D		3.8	45	4	8.8	0.02	28		0.4	22		0.7	10		3.3	7		6.7	6		9.3	6		13.1	3.8	Mtn Chnl		353	0.25496	
162D	1.4	5.2	45	4	8.8	0.02	22	0.2	0.6	16	0.3	0.9	6	2.0	4.5	5	3.3	8.7	5	4.0	11.9	5	5.4	17.1	5.2		1.66	28.4			
163D		5.2	45	4	8.8	0.02	22		0.6	16		0.9	6		4.5	5		8.7	5		11.9	5		17.1	5.2	Mtn Chnl		455	0.32967	
164D	3.5	8.7	45	4	8.8	0.02	28	0.4	0.9	21	0.6	1.5	9	3.4	7.1	6	7.0	13.6	5	9.9	17.9	5	13.6	27.0	8.7		1.66	44.9			
165D		8.7	45	4	8.8	0.02	28		0.9	21		1.5	9		7.1	6		13.6	5		17.9	5		27.0	8.7	Mtn Chnl		207	0.16425	
166D	1.9	10.6	45	4	8.8	0.02	23	0.2	1.1	18	0.4	1.9	7	2.3	8.0	5	4.4	15.9	5	5.4	21.2	5	7.4	32.6	10.6		1.66	54.0			
167E	6.6	6.6	45	4	8.8	0.02	29	0.7	0.7	22	1.2	1.2	10	5.7	11.7	7	11.7	22.7	6	16.2	16.2	6	22.7	22.7	6.6		1.66	37.7			
168E		6.6	45	4	8.8	0.02	29		0.7	22		1.2	10		5.7	7		11.7	6		16.2	6		22.7	6.6	Mtn Chnl		539	0.2449	
169E	3.8	10.4	45	4	8.8	0.02	28	0.4	1.1	21	0.7	1.8	10	3.3	8.1	6	7.6	17.0	6	9.3	23.1	6	13.1	33.7	10.4		1.66	56.0			
170DE	10.4	21	45	4	8.8			1.1	2.2		1.8	3.7		8.1	16.1		17.0	33.0		23.1	44.2		33.7	66.3	21.0	Valley Chnl		307	0.01303	
171D	4.5	25.5	45	4	8.8	0.02	29	0.5	2.6	22	0.8	4.4	10	3.9	18.3	7	8.0	36.6	6	11.0	49.2	6	15.5	75.2	25.5		1.66	124.9			
172BD	25.5	83.1	45	4	8.8			2.6	7.8		4.4	13.1		18.3	44.4		36.6	91.0		49.2	122.5		75.2	209.3	83.1	Valley Chnl		543	0.06262	
173B	5.6	88.7	45	4	8.8	0.03	28	0.6	8.3	21	1.1	13.9	9	5.5	45.0	6	11.3	90.2	5	15.9	122.7	5	15.9	210.8	83.1	5.6	1.62	341.2			
174AB	88.7	516.1	45	4	8.8			8.3	69.2		13.9	181.8		45.0	307.5		90.2	518.8		122.7	698.9		210.8	1105.6	474.1	42.0	1.61	1775.9	PIPE	2-24	270	0.01296
175A	7	523.1	45	4	8.8	0.02	28	0.7	69.4	21	1.3	182.4	10	6.1	307.7	6	14.0	519.9	6	17.1	702.2	6	24.1	1117.7	481.1	42.0	1.61	1796.2			
176B	5.9	5.9	45	4	8.8	0.05	24	0.8	0.8	18	1.4	1.4	8	6.6	6.6	6	12.1	12.1	5	17.0	17.0	5	17.0	17.0	5.9	1.00	17.0				
177B		5.9	45	4	8.8	0.05	24		0.8	18		1.4	8		6.6	5		12.1	5		17.0	5		17.0	5.9	1.00	17.0	Valley Chnl		420	0.0619	
178B	3.4	9.3	45	4	8.8	0.03	28	0.4	1.2	22	0.6	2.0	10	3.0	9.1	7	6.1	17.5	6	8.4	23.4	6	8.4	23.4	9.3	1.00	23.4				
179AB	9.3	532.4	45	4	8.8			1.2	70.0		2.0	183.8		9.1	308.9		17.5	528.5		23.4	714.7		23.4	1131.0	481.1	51.3	1.60	1805.5	Valley Chnl		499	0.002
180A	9.4	541.8	45	4	8.8	0.03	28	1.1	67.8	21	1.8	177.3	9	9.2	305.3	6	19.0	509.0	5	26.7	685.1	5	26.7	1091.4	481.1	60.7	1.59	1731.0			
181C	5.9	5.9	45	4	8.8	0.02	26	0.6	0.6	19	1.1	1.1	8	6.3	6.3	6	11.8	11.8	5	16.6	16.6	5	22.9	22.9	5.9		1.66	38.0			
182C		5.9	45	4	8.8	0.02	26		0.6	19		1.1	8		6.3	6		11.8	5		16.6	5		22.9	5.9		1.66	38.0	PIPE	66	363	0.14325
183C	0.6	6.5	45	4	8.8	0.02	19	0.1	1.2	15	0.1	1.2	5	1.0	7.1	5	1.4	13.0	5	1.7	17.2	5	2.3	24.0	6.5		1.66	39.8	PIPE	66	350	0.03401
184AC	6.5	548.3	45	4	8.8			0.7	68.0		1.2	177.8		2.0	305.8		12.4	509.9		16.6	686.3		23.5	1097.8	487.6	60.7	1.59	1742.2	PIPE	66	896	0.03069
185A	0.8	549.1	45	4	8.8	0.03	18	0.1	67.9	14	0.2	177.2	5	1.4	305.4	5	1.9	508.5	5	2.3	684.3	5	2.3	1096.8	487.6	61.5	1.59	1739.7			

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Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked		
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8			Isohyetal=8.8		
							Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)
1868	1.3	1.3	4	4	8.8	0.03	23	0.2	0.2	18	0.3	0.3	7	1.6	1.6	5	3.1	3.1	5	3.7	3.7	5	3.7	3.7	5	3.7	3.7
1878		1.3	4	4	8.8	0.03	23		0.2	18		0.3	7		1.6	5		3.1	5		3.7	5		3.7	5		1.3	1.00	3.7
1888	1.1	2.4	4	4	8.8	0.03	26	0.1	0.3	20	0.2	0.5	8	1.2	2.7	6	2.2	5.0	5	3.1	6.3	5	3.1	6.3			2.4	1.00	6.3
189AB	2.4	551.5	45	4	8.8			0.3	67.9		0.5	177.4		2.7	305.5		5.0	508.8		6.3	684.7		6.3	1097.3		487.6	63.9	1.58	1737.6	Valley Chnl	90	0.06667
190A	0.1	551.6	45	4	8.8	0.03	26	0.0	67.9	20	0.0	177.3	8	0.1	305.4	6	0.2	508.3	5	0.3	683.0	5	0.3	1088.2		487.6	64.0	1.58	1723.0			
191A	1.5	553.1	45	4	8.8	0.02	26	0.2	67.9	19	0.3	177.4	8	1.6	305.5	6	3.0	508.5	5	4.2	683.2	5	5.8	1089.0		489.1	64.0	1.58	1724.6			
192A		553.1	45	4	8.8	0.02	26		67.9	19		177.4	8		305.5	6		508.5	5		683.2	5		1089.0		489.1	64.0	1.58	1724.6	Valley Chnl	380	0.01316
193A	1.8	554.9	45	4	8.8	0.03	29	0.2	67.8	22	0.3	176.4	10	1.6	304.9	7	3.2	507.1	6	4.4	680.6	6	4.4	1088.3		489.1	65.8	1.58	1721.5			
194D	1.9	1.9	45	4	8.8	0.03	23	0.2	0.2	17	0.4	0.4	7	2.4	2.4	5	4.5	4.5	5	5.4	5.4	5	5.4	5.4			1.9	1.00	5.4			
195D		1.9	45	4	8.8	0.03	23		0.2	17		0.4	7		4.5	5		5.4	5		5.4	5		5.4			1.9	1.00	5.4	Valley Chnl	254	0.12598
196D	1.5	3.4	45	4	8.8	0.03	20	0.2	0.4	15	0.3	0.7	6	2.1	4.4	5	3.5	7.3	5	4.3	8.9	5	4.3	8.9			3.4	1.00	8.9			
197D		3.4	45	4	8.8	0.03	20		0.4	15		0.7	6		4.4	5		7.3	5		8.9	5		8.9			3.4	1.00	8.9	Valley Chnl	375	0.00267
198D	1.9	5.3	45	4	8.8	0.03	24	0.2	0.6	18	0.4	0.9	7	2.4	2.8	5	4.5	5.0	5	5.4	6.1	5	5.4	6.1			5.3	1.00	6.1			
199AD	5.3	560.2	45	4	8.8			0.6	68.1		0.9	177.0		2.8	306.0		5.0	510.2		6.1	685.0		6.1	1093.7	489.1	71.1	1.58	1723.8	Valley Chnl	97	0.01031
200A	1.3	561.5	45	4	8.8	0.03	24	0.2	68.0	19	0.3	177.0	7	1.6	306.1	6	2.6	510.0	5	3.7	684.6	5	3.7	1092.5	489.1	72.4	1.57	1720.6			
201B	10.7	10.7	28	4	8.8	0.02	27	2.5	2.5	12	10.7	10.7	8	25.7	25.7	7	33.1	33.1	7	39.1	39.1				10.7		1.66	64.9			
202B		10.7	28	4	8.8	0.02	27		2.5	12		10.7	10		25.7	8		33.1	7		39.1						1.66	64.9	Valley Chnl	555	0.45766
203B	2.2	12.9	45	4	8.8	0.02	27	0.2	2.7	20	0.4	11.1	9	2.1	18.7	6	4.4	30.0	5	6.2	38.2	5	8.5	46.4	12.9		1.66	77.0			
204C	4.5	4.5	45	4	8.8	0.02	27	0.5	0.5	21	0.8	0.8	9	4.3	4.3	6	9.0	9.0	5	12.7	12.7	5	17.5	17.5	4.5		1.66	29.0			
205C		4.5	45	4	8.8	0.02	27		0.5	21		0.8	9		4.3	6		9.0	5		12.7	5		17.5	4.5		1.66	29.0	Mtn Chnl	137	0.42336
206C	0.5	5	45	4	8.8	0.02	16	0.1	0.6	12	0.1	0.9	5	0.8	5.0	5	1.2	10.0	5	1.4	13.4	5	1.9	18.6	5.0		1.66	30.9			
207D	2.3	2.3	45	4	8.8	0.02	24	0.3	0.3	19	0.4	0.4	8	2.5	2.5	6	4.6	4.6	5	6.5	6.5	5	8.9	8.9	2.3		1.66	14.8			
208D		2.3	45	4	8.8	0.02	24		0.3	19		0.4	8		2.5	6		4.6	5		6.5	5		8.9	2.3		1.66	14.8	Valley Chnl	166	0.46988
209D	0.3	2.6	45	4	8.8	0.02	14	0.0	0.3	6	0.3	0.7	5	0.5	2.9	5	0.7	5.2	5	0.9	7.1	5	1.2	9.8	2.6		1.66	16.3			
210CD	2.6	7.6	45	4	8.8			0.3	0.9		0.7	1.6	7	2.9	7.9	5	5.2	15.1	5	7.1	20.4		9.8	28.4	7.6		1.66	47.2	Valley Chnl	301	0.34551
211C	1.1	8.7	45	4	8.8	0.02	23	0.1	1.0	17	0.2	1.8	7	1.3	9.0	5	2.6	17.1	5	3.1	22.4	5	4.3	31.4	8.7		1.66	52.1			
212BC	8.7	21.6	45	4	8.8			1.0	3.7		1.8	12.9		9.0	27.7		17.1	47.1		22.4	60.5		31.4	77.8	21.6		1.66	129.1	Mtn Chnl	135	0.13333
213B	0.3	21.9	45	4	8.8	0.02	14	0.0	3.7	5	0.4	12.9	5	0.5	27.9	5	0.7	46.6	5	0.9	61.0	5	1.2	78.6	21.9		1.66	130.4			
214D	0.8	0.8	45	4	8.8	0.02	17	0.1	0.1	14	0.2	0.2	5	1.3	1.3	5	1.9	1.9	5	2.3	2.3	5	3.1	3.1	0.8		1.66	5.2			
215D		0.8	45	4	8.8	0.02	17		0.1	14		0.2	5		1.3	5		1.9	5		2.3	5		3.1	0.8		1.66	5.2	Valley Chnl	448	0.34375
216D	0.7	1.5	45	4	8.8	0.02	22	0.1	0.2	16	0.1	0.3	6	1.0	2.2	5	1.6	3.1	5	2.0	3.8	5	2.7	5.4	1.5		1.66	8.9			
217BD	1.5	23.4	45	4	8.8			0.2	3.9		0.3	13.2		2.2	29.8		3.1	49.6		3.8	64.7		5.4	83.8	23.4		1.66	139.1	Mtn Chnl	130	0.09231
218B	0.3	23.7	45	4	8.8	0.02	16	0.0	3.9	12	0.1	13.3	5	0.5	29.4	5	0.7	49.5	5	0.9	63.6	5	1.2	83.3	23.7		1.66	138.3			
219E	11.2	11.2	28	4	8.8	0.02	23	3.0	3.0	12	11.2	11.2	9	18.7	29.2	7	29.2	29.2	6	38.1	38.1	6	44.6	44.6	11.2		1.66	74.1			
220E		11.2	28	4	8.8	0.02	23		3.0	12		11.2	9		18.7	7		29.2	6		38.1	6		44.6	11.2		1.66	74.1	Valley Chnl	282	0.35816
221E	9.1	20.3	28	4	8.8	0.02	21	2.7	5.6	11	9.8	21.0	8	16.4	35.1	7	23.7	52.8	6	31.0	68.9	6	36.3	80.7	20.3		1.66	134.0			
222E		20.3	28	4	8.8	0.02	21		5.6	11		21.0	8		35.1	7		52.8	6		68.9	6		80.7	20.3		1.66	134.0	Valley Chnl	208	0.14904
223E	3	23.3	45	4	8.8	0.02	23	0.3	6.0	17	0.6	21.5	7	3.7	38.5	5	7.0	58.5	5	8.5	75.8	5	11.6	90.6	23.3		1.66	150.4			
224F	2.5	2.5	45	4	8.8	0.02	22	0.3	0.3	17	0.5	0.5	7	3.1	3.1	5	5.8	5.8	5	7.1	7.1	5	9.7	9.7	2.5		1.66	16.1			
225F		2.5	45	4	8.8	0.02	22		0.3	17		0.5	7		3.1	5		5.8	5		7.1	5		9.7	2.5		1.66	16.1	Valley Chnl	378	0.40212
226F	0.8	3.3	45	4	8.8	0.02	23	0.1	0.4	18	0.2	0.7	7	1.0	4.0	5	1.9	7.0	5	2.3	8.6	5	3.1	12.0	3.3		1.66	20.0			
227EF	3.3	26.6	45	4	8.8			0.4	6.3		0.7	22.2		4.0	42.5		7.0	65.4		8.6	84.2		12.0	102.4	26.6		1.66	169.9	Mtn Chnl	115	0.06957
228E	0.3	26.9	45	4	8.8	0.02	14	0.0	6.4	5	0.4	22.1	5	0.5	42.6	5	0.7	65.3	5	0.9	84.3	5	1.2	103.0	26.9		1.66	171.0			
229BE	26.9	50.6	45	4	8.8			6.4	10.3		22.1	35.3		42.6	72.0		65.3	113.6		84.3	147.9		103.0	186.3	50.6		1.66	309.3	Mtn Chnl	132	0.16667
230B	0.4	51	45	4	8.8	0.02	16	0.1	10.3	6	0.4	35.2	5	0.7	71.4	5	0.9	114.2	5	1.1	146.0	5	1.6	185.1	51.0		1.66	307.3			
231C	1.3	1.3	45	4	8.8	0.02	19	0.2	0.2	15	0.3	0.3	5	2.2	2.2	5	3.0	3.0	5	3.7	3.7	5	5.1	5.1	1.3		1.66	8.4			
232C		1.3	45	4	8.8	0.02	19		0.2	15		0.3	5		2.2	5		3.0	5		3.7	5		5.1	1.3		1.66	8.4	Valley Chnl	352	0.29545
233C	0.7	2	45	4	8.8	0.02	22	0.1	0.3	17	0.1	0.4	6	1.0	3.0	5	1.6	4.2	5	2.0	5.2	5	2.7	7.2	2.0		1.66	12.0			
234D	1.2	1.2	45	4	8.8	0.02	18	0.2	0.2	14	0.3	0.3	5	2.0	2.0	5	2.8	2.8	5	3.4	3.4	5	4.7	4.7	1.2		1.66	7.7			
235D		1.2	45	4	8.8	0.02	18		0.2	14		0.3	5		2.0	5		2.8	5		3.4	5		4.7	1.2		1.66	7.7	Valley Chnl	277	0.28881
236D	0.9	2.1	45	4	8.8	0.02	19	0.1	0.3	14	0.2	0.5	5	1.5	3.2	5	2.1	4.6	5	2.5	5.6	5	3.5	7.8	2.1		1.66	12.9			
237CD	2.1	4.1	45	4	8.8			0.3	0.5		0.5	0.9		3.2	6.0		4.6	8.8		5.6	10.7		7.8	15.0	4.1		1.66	24.9	Valley Chnl	135	0.23704
238C	0.5	4.6	45	4	8.8	0.02	16	0.1	0.6	6	0.5	1.3	5	0.8	6.7	5	1.2	9.5	5	1.4	11.7	5	1.9	16.4	4.6		1.66	27.3			
239BC	4.6	55.6	45	4	8.8			0.6	10.9		1.3	36.2		6.7	77.1		9.5	122.3		11.7	157.6		16.4	201.5	55.6		1.66	334.5	Mtn Chnl	395	0.0962
240B	6.2	61.8	45	4	8.8	0.02	28	0.7	11.5	21	1.1	37.0	9	6.0	80.0	6	12.4	122.4	5	17.5	164.8	5	24.1	214.3	61.8		1.66	355.7			
241B		61.8	45	4	8.8	0.02	28		11.5	21		37.0	9		80.0	6		122.4	5	16.4	164.8	5	21.4.3		61.8		1.66	355.7	Mtn Chnl	550	0.16364
242B	5.8	67.6	45	4	8.8	0.02	24	0.7	12.0	19	1.1	37.7	8	6.2	80.8	5	13.5	128.4	5	16.4	167.9	5	22.5	221.8	67.6		1.66	368.2			
243C	5.2	5.2	45	4	8.8	0.02	27	0.6	0.6	20	1.0	1.0	9	5.0	5.0	6	10.4	10.4	5	14.7	14.7	5	20.2	20.2	5.2		1.66	33.5			
244C		5.2	45	4	8.8	0.02	27		0.6	20		1.0	9		5.0	6		10.4	5		14.7	5		20.2	5.2		1.66	33.5	Mtn Chnl	339	0.33628
245C	2.2	7.4	45	4	8.8	0.02	27	0.2	0.8	20	0.4	1.4	9	2.1	6.9	6	4.4	14.2	5	6.2	18.7	5	8.5	26.3	7.4		1.66	43.6			
246D	1.7	1.7	45	4	8.8	0.02	24	0.2	0.2	19	0.3	0.3	8	1.8	1.8	6	3.4	3.4	5	4.8	4.8	5	6.6	6.6	1.7		1.66	11.0			
247CD	1.7	9.1	45	4	8.8			0.2	1.0		0.3	1.7		1.8	8.7		3.4	17.6		4.8	23.3		6.6	32.8	9.1		1.66	54.5	Mtn Chnl	94	0.19149

Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked			Conveyance Type	Pipe Diameter (inches)	Length	Slope
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8			Isohyetal=8.8			Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
							Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only	Conveyance Weighted Bulking Factor	Conveyance Q (cfs)			
248C	0.2	9.3	1.0	45	4	8.8	0.02	11	0.0	1.0	5	0.2	1.7	5	0.3	8.7	5	0.5	17.6	5	0.6	23.3	5	0.8	32.9	9.3		1.66	54.5			
249E	0.8	10.1	45	4	8.8			22	0.1	0.1	17	0.2	0.2	6	1.1	1.7	5	1.9	1.9	5	2.3	2.3	5	3.1	3.1	0.8		1.66	5.2			
250CE	0.8	10.1	45	4	8.8			0.1	1.1		0.2	1.9		1.1	9.6		1.9	19.2		2.3	25.2		3.1	35.5	10.1		1.66	59.0	Mtn Chnl	252	0.4127
251C	0.4	10.5	45	4	8.8	0.02	14	0.1	1.1	5	0.5	2.0	5	0.7	9.6	5	0.9	19.3	5	1.1	25.8	5	1.6	36.8	10.5		1.66	61.1			
252F	1.8	1.8	45	4	8.8	0.02	26	0.2	0.2	19	0.3	0.3	8	1.9	1.9	6	3.6	3.6	5	5.1	5.1	5	7.0	7.0	1.8		1.66	11.6			
253F		1.8	45	4	8.8	0.02	26		0.2	19		0.3	8		1.9	6		3.6	5		5.1	5		7.0	1.8		1.66	11.6	Mtn Chnl	200	0.41
254F	1.9	3.7	45	4	8.8	0.02	26	0.2	0.4	20	0.4	0.7	8	2.0	3.9	6	3.8	7.3	5	5.4	9.8	5	7.4	13.7	3.7		1.66	22.8			
255F		3.7	45	4	8.8	0.02	26		0.4	20		0.7	8		3.9	6		7.3	5		9.8	5		13.7	3.7		1.66	22.8	Valley Chnl	322	0.378888
256F	1	4.7	45	4	8.8	0.02	23	0.1	0.5	18	0.2	0.9	7	1.2	5.0	5	2.3	9.0	5	2.8	11.8	5	3.9	16.7	4.7		1.66	27.7			
257CF	4.7	15.2	45	4	8.8			0.5	1.7		0.9	2.9		5.0	14.5		9.0	27.8		11.8	37.6		16.7	53.5	15.2		1.66	88.8	Mtn Chnl	269	0.282553
258C	2	17.2	45	4	8.8	0.02	23	0.2	1.9	17	0.4	3.2	7	2.4	16.0	5	4.7	30.5	5	5.6	40.4	5	7.8	58.7	17.2		1.66	97.4			
259BC	17.2	84.8	45	4	8.8			1.9	13.8		3.2	40.8		16.0	95.8		30.5	156.7		40.4	203.0		58.7	275.0	84.8		1.66	456.5	Mtn Chnl	282	0.049695
260B	4.3	89.1	45	4	8.8	0.02	26	0.5	14.2	20	0.8	41.2	8	4.6	94.7	6	8.6	156.4	5	12.1	202.3	5	16.7	280.7	89.1		1.66	466.0			
261B		89.1	45	4	8.8	0.02	26		14.2	20		41.2	8		94.7	6		156.4	5		202.3	5		280.7	89.1		1.66	466.0	Valley Chnl	253	0.079705
262B	8.2	97.3	45	4	8.8	0.02	29	0.8	14.9	23	1.4	42.4	11	6.3	98.6	7	14.5	162.3	6	20.1	209.7	6	28.3	297.4	97.3		1.66	493.7			
263B		97.3	45	4	8.8	0.02	29		14.9	23		42.4	11		98.6	7		162.3	6		209.7	6		297.4	97.3		1.66	493.7	PIPE	24	910	0.076692
264B	5.9	103.2	45	4	8.8	0.03	29	0.7	15.5	22	1.1	43.2	10	5.2	99.1	7	10.6	165.6	6	14.6	215.9	6	14.6	304.4	97.3	5.9	1.62	493.9			
265B		103.2	45	4	8.8	0.03	29		15.5	22		43.2	10		99.1	7		165.6	6		215.9	6		304.4	97.3	5.9	1.62	493.9	Valley Chnl	617	0.058835
266B	6.3	109.5	45	4	8.8	0.03	29	0.7	16.0	23	1.2	43.8	10	5.6	98.7	7	11.3	164.4	6	15.5	215.6	6	15.5	306.4	97.3	12.2	1.59	486.0			
267C	7.8	7.8	45	4	8.8	0.02	27	0.8	0.8	20	1.5	1.5	9	7.5	7.5	6	15.6	15.6	5	22.0	22.0	5	30.3	30.3	7.8		1.66	50.3			
268C		7.8	45	4	8.8	0.02	27		0.8	20		1.5	9		7.5	6		15.6	5		22.0	5		30.3	7.8		1.66	50.3	Mtn Chnl	445	0.179378
269C	5.4	13.2	45	4	8.8	0.02	29	0.6	1.4	23	0.9	2.4	11	4.2	10.9	7	9.6	24.1	6	13.2	32.4	6	18.6	46.1	13.2		1.66	76.4			
270C		13.2	45	4	8.8	0.02	29		1.4	23		2.4	11		10.9	7		24.1	6		32.4	6		46.1	13.2		1.66	76.4	Mtn Chnl	665	0.246662
271C	11.4	24.6	45	4	8.8	0.02	28	1.2	2.5	21	2.1	4.3	10	9.9	17.8	6	22.8	37.1	6	27.9	51.4	6	39.3	77.2	24.6		1.66	128.2			
272C		24.6	45	4	8.8	0.02	28		2.5	21		4.3	10		17.8	6		37.1	6		51.4	6		77.2	24.6		1.66	128.2	Mtn Chnl	292	0.075534
273C	2.3	26.9	45	4	8.8	0.02	24	0.3	2.7	19	0.4	4.6	8	2.5	17.7	5	5.4	38.5	5	6.5	53.2	5	8.9	81.4	26.9		1.66	135.1			
274C		26.9	45	4	8.8	0.02	24		2.7	19		4.6	8		17.7	5		38.5	5		53.2	5		81.4	26.9		1.66	135.1	Valley Chnl	188	0.079979
275C	2.7	29.6	45	4	8.8	0.02	27	0.3	3.0	21	0.5	5.1	9	2.6	18.6	6	5.4	41.3	5	7.6	56.4	5	10.5	87.0	29.6		1.66	144.4			
276D	4.5	4.5	45	4	8.8	0.03	29	0.5	0.5	23	0.8	0.8	10	4.0	4.0	7	8.1	8.1	6	11.1	11.1	6	11.1	11.1	4.5		1.00	11.1			
277CD	4.5	34.1	45	4	8.8			0.5	3.4		0.8	5.8		4.0	21.8		8.1	47.6		11.1	63.9		11.1	96.1	29.6	4.5	1.57	151.2	Valley Chnl	270	0.025993
278C	1.7	35.8	45	4	8.8	0.03	24	0.2	3.6	18	0.4	6.1	7	2.1	21.8	6	3.4	48.4	5	4.8	65.1	5	4.8	96.8	29.6	6.2	1.55	149.7			
279C		35.8	45	4	8.8	0.03	24		3.6	18		6.1	7		21.8	6		48.4	5		65.1	5		96.8	29.6	6.2	1.55	149.7	Valley Chnl	455	0.08352
280C	0.9	36.7	45	4	8.8	0.02	14	0.1	3.6	6	0.8	6.1	5	1.5	21.6	5	2.1	47.8	5	2.5	64.5	5	3.5	96.7	30.5	6.2	1.55	149.7	PIPE	15	713	0.100228
281C	3.4	40.1	45	4	8.8	0.03	29	0.4	4.0	22	0.6	6.7	10	3.0	22.0	7	6.1	50.2	6	8.4	67.4	6	8.4	100.8	30.5	9.6	1.50	151.3			
282D	1.9	1.9	45	4	8.8	0.02	20	0.2	0.2	16	0.4	0.4	6	2.7	2.7	5	4.4	4.4	5	5.4	5.4	5	7.4	7.4	1.9		1.66	12.2			
283D		1.9	45	4	8.8	0.02	20		0.2	16		0.4	6		2.7	5		4.4	5		5.4	5		7.4	1.9		1.66	12.2	Valley Chnl	681	0.123335
284D	1.9	3.8	45	4	8.8	0.03	29	0.2	0.4	23	0.4	0.7	11	1.5	3.7	7	3.4	7.0	6	4.7	8.8	6	4.7	10.9	1.9	1.9	1.33	14.5			
285CD	3.8	43.9	45	4	8.8			0.4	4.3		0.7	7.3		3.7	23.9		7.0	55.1		8.8	74.7		10.9	109.8	32.4	11.5	1.49	163.3	Valley Chnl	200	0.04
286C	0.4	44.3	45	4	8.8	0.03	26	0.1	4.4	19	0.1	7.4	8	0.4	23.8	6	0.8	54.5	5	1.1	72.9	5	1.1	108.7	32.4	11.9	1.48	161.1			
287D	3.1	3.1	31	4	8.8	0.02	10	1.7	1.7	5	5.9	5.9	5	7.7	7.7	5	10.0	10.0	5	11.7	11.7	5	13.7	13.7	3.1		1.66	22.7			
288D		3.1	31	4	8.8	0.02	10		1.7	5		5.9	5		7.7	5		10.0	5		11.7	5		13.7	3.1		1.66	22.7	Mtn Chnl	608	0.233555
289D	4.8	7.9	31	4	8.8	0.02	27	0.5	1.9	7	7.1	11.4	6	10.4	15.9	5	15.4	21.6	5	18.1	25.7	5	21.2	30.7	7.9		1.66	51.0			
290D		7.9	31	4	8.8	0.02	27		1.9	7		11.4	6		15.9	5		21.6	5		25.7	5		30.7	7.9		1.66	51.0	Valley Chnl	530	0.086879
291D	1.2	9.1	31	4	8.8	0.03	28	0.1	2.0	8	1.6	12.2	6	2.6	16.9	5	3.9	23.4	5	4.5	27.9	5	4.5	32.8	7.9	1.2	1.57	51.6			
292E	5.8	5.8	31	4	8.8	0.02	18	1.3	1.3	7	8.6	8.6	5	14.3	14.3	5	18.6	18.6	5	21.9	21.9	5	25.6	25.6	5.8		1.66	42.5			
293E		5.8	31	4	8.8	0.02	18		1.3	7		8.6	5		14.3	5		18.6	5		21.9	5		25.6	5.8		1.66	42.5	PIPE	12	514	0.078024
294E	2.3	8.1	31	4	8.8	0.03	14	0.8	2.0	7	3.4	11.8	5	5.7	18.5	5	7.4	24.7	5	8.7	29.3	5	8.7	33.4	5.8	2.3	1.47	49.2			
295DE	8.1	17.2	31	4	8.8			2.0	3.5	11.8	23.1		18.5	33.7		24.7	46.6		29.3	55.1		33.4	63.4	13.7	3.5	1.53	96.7	Valley Chnl	514	0.078024
296D		17.2	31	4	8.8	0.03	5		3.5	5		22.5	5		32.3	5		45.0	5		53.6	5		62.0	13.7	3.5	1.53	94.7			
297E	3.5	3.5	31	4	8.8	0.02	27	0.4	0.4	7	5.2	5.2	6	7.6	7.6	5	11.2	11.2	5	13.2	13.2	5	15.4	15.4	3.5		1.66	25.6			
298E		3.5	31	4	8.8	0.02	27		0.4	7		5.2	6		7.6	5		11.2	5		13.2	5		15.4	3.5		1.66	25.6	PIPE	12	174	0.080046
299E	0.8	4.3	31	4	8.8	0.03	8	0.5	0.9	5	1.5	6.4	5	2.0	9.3	5	2.6	13.2	5	3.0	15.9	5	3.0	18.1	3.5	0.8	1.54	27.8			
300F	0.8	0.8	31	4	8.8	0.02	7	0.6	0.6	5	1.5	1.5	5	2.0	2.0	5	2.6	2.6	5	3.0	3.0	5	3.5	3.5	0.8		1.66	5.9			
301F		0.8	31	4	8.8	0.02	7		0.6	5		1.5	5		2.0	5		2.6	5		3.0	5		3.5	0.8		1.66	5.9	PIPE	12	264	0.045783
302F	0.6	1.4	31	4	8.8	0.03	8	0.4	1.0	5	1.1	2.4	5	1.5	3.2	5	1.9	4.2	5	2.3	5.0	5	2.3	5.5	0.8	0.6	1.38	7.5			
303EF	1.4	5.7	31	4	8.8			1.0	1.9		2.4	8.9		3.2	12.5		4.2	17.4		5.0	20.9		5.5	23.6	4.3	1.4	1.50	35.3	PIPE	18	1220	0.068777
304E	0.1	5.8	31	4	8.8	0.03	7	0.1	1.7	5	0.2	8.4	5	0.3	11.9	5	0.3	16.6	5	0.4	19.6	5	0.4	22.3	4.3	1.5	1.49	33.2			
305DE	5.8	23	31	4	8.8			1.7	4.7		8.4	30.4		11.9	44.2		16.6	61.6		19.6	73.1		22.3	84.3	18.0	5.0	1.52	127.9	Valley Chnl	470	0.057745
306D	2.9	25.9	31	4	8.8	0.03	29	0.3	4.9	8	3.9	32.1	6	6.3	46.3	5	9.3	64.4	5	11.0	76.9	5	11.0	88.1	18.0	7.9	1.46	128.4			
307D		25.9	31	4	8.8	0.03	29		4.9	8		32.1	6		46.3	5		64.4	5		76.9	5		88.1	18.0	7.9	1.46	128.4	Valley Chnl	140	0.06429
308D	0.2	26.1	31	4	8.8	0.03	7	0.2	4.9	5	0.4	32.1	5	0.5	46.4	5	0.6	64.1	5	0.8	77.0	5	0.8	88.3	18.0	8.1	1.46	128.4			
309E	2.8	2.8	31	4	8.8	0.02	13	1.1	1.1	7	4.1	4.1	5	6.9	6.9	5	9.0	9.0	5	10.6	10.6	5	10.6	10.6	2.8		1.66	17.5			

							2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8			Isohyetal=8.8							
Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only	Conveyance Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope
310E		2.8	31	4	8.8	0.02	13		1.1	7		4.1	5		6.9	5		9.0	5		10.6	5		10.6	2.8		1.66	17.5	Valley Chnl		480	0.075
311E	3.3	6.1	31	4	8.8	0.03	28	0.4	1.4	8	4.5	8.2	6	7.2	13.1	5	10.6	17.3	5	12.5	20.5	5	12.5	20.5	2.8	3.3	1.30	26.7				
312DE	6.1	32.2	31	4	8.8			1.4	6.1		8.2	38.2		13.1	55.4		17.3	76.9		20.5	92.1		20.5	103.4	20.8	11.4	1.43	147.5	Valley Chnl		350	0.07429
313D	5.9	38.1	31	4	8.8	0.03	29	0.7	6.6	8	8.0	42.4	6	12.9	61.2	5	19.0	85.4	5	22.3	103.3	5	22.3	115.1	20.8	17.3	1.36	156.5				
314D		38.1	31	4	8.8	0.03	29		6.6	8		42.4	6		61.2	5		85.4	5		103.3	5		115.1	20.8	17.3	1.36	156.5	Valley Chnl		407	0.04914
315D	2.7	40.8	45	4	8.8	0.03	27	0.3	6.8	20	0.5	42.1	8	3.0	62.1	6	5.5	86.1	5	7.7	104.8	5	7.7	116.9	20.8	20.0	1.34	156.2				
316CD	40.8	85.1	45	4	8.8			6.8	11.0		42.1	48.4		62.1	83.9		86.1	140.6		104.8	176.1		116.9	225.5	53.2	31.9	1.41	318.5	PIPE	24	819	0.03541
317C	1.8	86.9	45	4	8.8	0.03	16	0.3	11.1	12	0.5	47.4	5	3.0	83.7	5	4.2	139.9	5	5.1	178.3	5	5.1	226.2	53.2	33.7	1.40	317.6				
318BC	86.9	196.4	45	4	8.8			11.1	26.7		47.4	83.3		83.7	176.5		139.9	301.2		178.3	389.2		226.2	530.8	150.5	45.9	1.51	799.2	Valley Chnl		362	0.03591
319B	3.4	199.8	45	4	8.8	0.03	26	0.4	26.9	20	0.7	83.1	8	3.7	174.2	6	6.9	296.9	5	9.7	388.7	5	9.7	529.6	150.5	49.3	1.50	792.9				
320C	2.5	2.5	31	4	8.8	0.03	15	0.8	0.8	7	3.7	3.7	6	5.5	5.5	5	8.1	8.1	5	9.4	9.4	5	9.4	9.4		2.5	1.00	9.4				
321C		2.5	31	4	8.8	0.03	15		0.8	7		3.7	6		5.5	5		8.1	5		9.4	5		9.4		2.5	1.00	9.4	Valley Chnl		495	0.06061
322C	6.1	8.6	45	4	8.8	0.03	26	0.7	1.4	20	1.2	4.7	8	6.7	11.4	6	12.3	19.0	5	17.3	24.0	5	17.3	24.0		8.6	1.00	24.0				
323C		8.6	45	4	8.8	0.03	26		1.4	20		4.7	8		11.4	6		19.0	5		24.0	5		24.0		8.6	1.00	24.0	Valley Chnl		390	0.06154
324C	3	11.6	45	4	8.8	0.03	27	0.3	1.7	21	0.6	5.1	9	2.9	13.7	6	6.1	23.0	5	8.5	29.3	5	8.5	29.3		11.6	1.00	29.3				
325BC	11.6	211.4	45	4	8.8			1.7	28.1		5.1	86.1		13.7	180.1		23.0	309.3		29.3	401.9		29.3	548.3	150.5	60.9	1.47	805.9	PIPE	18	360	0.03472
326B	4.5	215.9	45	4	8.8	0.03	28	0.5	28.5	21	0.9	86.7	9	4.4	180.3	6	9.1	309.9	5	12.8	403.8	5	12.8	551.0	150.5	65.4	1.46	804.5				
327B		215.9	45	4	8.8	0.03	28		28.5	21		86.7	9		180.3	6		309.9	5		403.8	5		551.0	150.5	65.4	1.46	804.5	PIPE	24	232	0.01815
328B	2.8	218.7	45	4	8.8	0.03	28	0.3	28.8	21	0.5	86.9	9	2.7	180.5	6	5.7	310.1	6	6.9	405.8	6	6.9	553.6	150.5	68.2	1.45	805.1				
329AB	218.7	780.2	45	4	8.8			28.8	84.8		86.9	212.8		180.5	398.4		310.1	707.5		405.8	947.5		553.6	1528.3	639.6	140.6	1.54	2355.2	PIPE	2-24	294	0.01837
330A	1.5	781.7	45	4	8.8	0.03	23	0.2	84.8	17	0.3	212.7	7	1.9	398.4	5	3.5	707.3	5	4.3	947.1	5	4.3	1527.8	639.6	142.1	1.54	2352.8				
331A		781.7	45	4	8.8	0.03	23		84.8	17		212.7	7		398.4	5		707.3	5		947.1	5		1527.8	639.6	142.1	1.54	2352.8	Valley Chnl		227	0.0022
332A	2.9	784.6	45	4	8.8	0.03	22	0.4	84.4	17	0.6	211.5	6	4.1	397.5	5	6.8	702.2	5	8.2	940.5	5	8.2	1515.6	639.6	145.0	1.54	2331.0				
333A		784.6	45	4	8.8	0.03	22		84.4	17		211.5	6		397.5	5		702.2	5		940.5	5		1515.6	639.6	145.0	1.54	2331.0	PIPE	66	233	0.03863
334A	0.8	785.4	45	4	8.8	0.03	22	0.1	84.4	17	0.2	211.5	6	1.1	397.3	5	1.9	702.1	5	2.3	940.0	5	2.3	1514.6	639.6	145.8	1.54	2328.7				
335A	4.1	789.5	45	4	8.8	0.02	23	0.5	84.6	17	0.8	211.7	7	5.0	397.6	5	9.6	702.5	5	11.6	940.5	5	15.9	1516.7	643.7	145.8	1.54	2332.9				
336A		789.5	45	4	8.8	0.02	23		84.6	17		211.7	7		397.6	5		702.5	5		940.5	5		1516.7	643.7	145.8	1.54	2332.9	Valley Chnl		207	0.00483
337A	1.3	790.8	45	4	8.8	0.02	20	0.2	84.4	15	0.3	211.1	6	1.8	396.9	5	3.0	699.7	5	3.7	935.3	5	5.1	1512.4	645.0	145.8	1.54	2326.5				
338B	0.3	0.3	45	4	8.8	0.34	5	0.2	0.2	5	0.5	0.5	5	0.7	0.7	5	0.9	0.9	5	1.0	1.0	5	1.0	1.0		0.3	1.00	1.0				
339B		0.3	45	4	8.8	0.34	5		0.2	5		0.5	5		0.7	5		0.9	5		1.0	5		1.0		0.3	1.00	1.0	Mtn Chnl		280	0.07143
340B	1.7	2	45	4	8.8	0.34	14	0.8	0.9	10	1.6	1.8	7	3.0	3.2	6	4.4	4.8	5	5.9	6.2	5	5.9	6.2		2.0	1.00	6.2				
341B		2	45	4	8.8	0.34	14		0.9	10		1.8	7		3.2	6		4.8	5		6.2	5		6.2		2.0	1.00	6.2	Mtn Chnl		230	0.06522
342B	1.9	3.9	45	4	8.8	0.34	11	1.0	1.8	7	2.4	3.8	6	3.7	6.1	5	5.6	8.6	5	6.5	10.8	5	6.5	10.8		3.9	1.00	10.8				
343B		3.9	45	4	8.8	0.34	11		1.8	7		3.8	6		6.1	5		8.6	5		10.8	5		10.8		3.9	1.00	10.8	Mtn Chnl		180	0.06667
344B	1.8	5.7	45	4	8.8	0.34	12	0.9	2.6	8	2.1	5.5	6	3.5	8.6	5	5.3	12.3	5	6.2	15.2	5	6.2	15.2		5.7	1.00	15.2				
345B		5.7	45	4	8.8	0.34	12		2.6	8		5.5	6		8.6	5		12.3	5		15.2	5		15.2		5.7	1.00	15.2	Mtn Chnl		202	0.06931
346B	2.4	8.1	45	4	8.8	0.34	14	1.1	3.5	10	2.3	7.3	7	4.2	11.8	6	6.2	17.0	5	8.3	20.5	5	8.3	20.5		8.1	1.00	20.5				
347B		8.1	45	4	8.8	0.34	14		3.5	10		7.3	7		11.8	6		17.0	5		20.5	5		20.5		8.1	1.00	20.5	Valley Chnl		356	0.02247
348B	3	11.1	45	4	8.8	0.34	13	1.4	4.7	9	3.1	9.0	7	5.3	14.5	6	7.7	21.1	5	10.3	25.7	5	10.3	25.7		11.1	1.00	25.7	Valley Chnl		100	0.05
349AB	11.1	801.9	45	4	8.8			4.6	85.5		8.9	213.1		14.4	401.0		21.1	706.7		25.4	945.3		25.4	1526.0	645.0	156.9	1.53	2336.0	Valley Chnl		50	0.004
350A	0.1	802	45	4	8.8	0.02	9	0.0	85.5	5	0.1	212.9	5	0.2	400.7	5	0.2	706.5	5	0.3	943.6	5	0.4	1522.9	645.1	156.9	1.53	2331.4				
351B	2.7	2.7	45	4	8.8	0.02	24	0.3	0.3	19	0.5	0.5	8	2.9	2.9	6	5.4	5.4	5	7.6	7.6	5	10.5	10.5	2.7		1.66	17.4				
352B		2.7	45	4	8.8	0.02	24		0.3	19		0.5	8		2.9	6		5.4	5		7.6	5		10.5	2.7		1.66	17.4	Mtn Chnl		322	0.31056
353B	2.6	5.3	45	4	8.8	0.02	20	0.3	0.6	15	0.6	1.0	6	3.7	6.0	5	6.1	10.1	5	7.3	13.4	5	10.1	19.0	5.3		1.66	31.5				
354C	3.3	3.3	45	4	8.8	0.02	28	0.4	0.4	21	0.6	0.6	10	2.9	2.9	6	6.6	6.6	6	8.1	8.1	6	11.4	11.4	3.3		1.66	18.9				
355C		3.3	45	4	8.8	0.02	28		0.4	21		0.6	10		2.9	6		6.6	6		8.1	6		11.4	3.3		1.66	18.9	Valley Chnl		327	0.37309
356C	1.8	5.1	45	4	8.8	0.02	24	0.2	0.6	18	0.4	1.0	7	2.2	5.0	5	4.2	10.2	5	5.1	12.5	5	7.0	17.6	5.1		1.66	29.3				
357BC	5.1	10.4	45	4	8.8			0.6	1.2		1.0	2.0		5.0	11.0		10.2	20.3		12.5	25.8		17.6	36.6	10.4		1.66	60.8	Mtn Chnl	24	204	0.13725
358B	1.4	11.8	45	4	8.8	0.02	23	0.2	1.3	17	0.3	2.3	7	1.7	12.2	5	3.3	22.3	5	4.0	28.5	5	5.4	40.6	11.8		1.66	67.4				
359B	2.3	14.1	45	4	8.8	0.02	28	0.2	1.6	21	0.4	2.7	9	2.2	14.3	6	4.6	26.9	5	6.5	33.9	5	8.9	48.3	14.1		1.66	80.2				
360B		14.1	45	4	8.8	0.02	28		1.6	21		2.7	9		14.3	6		26.9	5		33.9	5		48.3	14.1		1.66	80.2	Mtn Chnl	24	374	0.09626
361B	4.4	18.5	45	4	8.8	0.02	28	0.5	2.0	22	0.8	3.4	10	3.8	16.6	7	7.8	31.7	6	10.8	40.7	6	15.2	59.6	18.5		1.66	99.0				
362C	3.1	3.1	45	4	8.8	0.02	26	0.3	0.3	20	0.6	0.6	9	3.0	3.0	6	6.2	6.2	5	8.7	8.7	5	12.0	12.0	3.1		1.66	20.0				
363C		3.1	45	4	8.8	0.02	26		0.3	20		0.6	9		3.0	6		6.2	5		8.7	5		12.0	3.1		1.66	20.0	Mtn Chnl	24	469	0.22175
364C	2.5	5.6	45	4	8.8	0.02	24	0.3	0.6	18	0.5	1.0	7	3.1	5.0	5	5.8	9.4	5	7.1	12.9	5	9.7	18.9	5.6		1.66	31.3				
365BC	5.6	24.1	45	4	8.8			0.6	2.6		1.0	4.4		5.0	20.7		9.4	40.9		12.9	53.0		18.9	77.4	24.1		1.66	128.4	PIPE		75	0.08
366B	2.4	26.5	45	4	8.8	0.04	20	0.3	2.9	15	0.6	4.9	6	3.5	22.2	5	5.7	44.2	5	6.9	57.4	5	6.9	82.7	24.1	2.4	1.60	132.3				
367B		26.5	45	4	8.8	0.04	20		2.9	15		4.9	6		22.2	5		44.2	5		57.4	5		82.7	24.1	2.4	1.60	132.3	PIPE		400	0.0575
368B	2.3	28.8	45	4	8.8	0.04	26	0.3	3.2	20	0.5	5.4	9	2.3	23.7	6	4.7	46.3	5	6.6	61.3	5	6.6	86.4	24.1	4.7	1.55	134.1				
369B		28.8	45	4	8.8	0.04	26		3.2	20		5.4	9		23.7	6		46.3	5		61.3	5		86.4	24.1	4.7	1.55	134.1	Mtn Chnl		60	0.01538
370B	3.7	32.5	45	4	8.8	0.02	29	0.4	3.5	22	0.7	6.0	10	3.2	26.1	7	6.6	51.1	6	9.1	67.3	6	9.1	93.4	27.8	4.7	1.56	146.1				
371B		32.5	45	4	8.8	0.02	29		3.5	22		6.0	10		26.1	7		51.1	6		67.3	6		93.4	27.8	4.7	1.56	146.1	PIPE		304	0.04934

Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	2 year		5 year		10 year		25 year		50 year		50 year Burned and Bulked				Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
							Isohyetal=3.4		Isohyetal=5.1		Isohyetal=6.3		Isohyetal=7.7		Isohyetal=8.8		Isohyetal=8.8							
							Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Conveyance Weighted Bulking Factor	Conveyance cummulative burned only	Conveyance cummulative burned and bulked acreage	Conveyance Type	Pipe Diameter (inches)	Length	Slope
3728	3.8	36.3	45	4	8.8	0.34	11	2.0	4.8		7	4.9	9.3		5	8.5	27.9		5	11.1	56.6		5	13.1	74.9		27.8	8.5	1.51	152.8				
3738		36.3	45	4	8.8	0.34	11		4.8		7		9.3		5		27.9		5		56.6		5		74.9		27.8	8.5	1.51	152.8	PIPE		538	0.035532
3748	5	41.3	45	4	8.8	0.34	13	2.4	7.0		7	5.2	14.1		7	8.8	32.7		5	14.6	62.6		5	17.2	82.8		27.8	13.5	1.44	157.9	BOX			
3758		41.3	45	4	8.8	0.34	13		7.0		9		14.1		7		32.7		5	27.1	62.6		5	17.2	82.8		27.8	13.5	1.44	157.9	PIPE		342	0.081887
3768	1.6	42.9	45	4	8.8	0.05	17	0.3	7.2		12	0.5	14.5		5	2.8	33.4		5	3.8	63.7		5	4.6	84.8		27.8	15.1	1.43	158.5				
3772	0.7	0.7	45	4	8.8	0.5	10	0.5	0.5		7	1.1	1.1		5	1.8	1.8		5	2.3	2.3		5	2.6	2.6			0.7	1.00	2.6				
3780		0.7	45	4	8.8	0.5	10		0.5		7		1.1		5		1.8		5		2.3		5		2.6			0.7	1.00	2.6	Valley Chnl	185		0.037384
3792		1.7	45	4	8.8	0.5	7	0.9	1.3		5	1.9	2.8		5	2.5	3.9		5	3.2	5.1		5	3.8	5.9			1.7	1.00	5.9				
3808	1.7	44.6	45	4	8.8			1.3	8.3			2.8	16.8			3.9	36.0			5.1	67.1			5.9	88.9		27.8	16.8	1.41	162.5	Valley Chnl	131		0.190842
3818	0.1	44.7	45	4	8.8	0.02	8	0.0	8.3		5	0.1	16.7		5	0.2	36.0		5	0.3	89.0		5	0.3	115.2		27.9	16.8	1.41	162.7				
3824B	44.7	846.7	45	4	8.8			8.3	87.8			16.7	217.8			36.0	409.8			67.1	723.1			89.0	969.8		673.0	173.7	1.52	2403.1	Valley Chnl	102		0.0098
3834	0.4	847.1	45	4	8.8	0.02	15	0.1	87.7		6	0.4	217.5		5	0.7	409.5		5	0.9	722.9		5	1.1	967.8		673.4	173.7	1.52	2397.8				
3848	2.5	849.6	45	4	8.8	0.02	23	0.3	87.8		18	0.5	217.6		7	3.1	409.6		5	5.8	723.2		5	7.1	968.1		675.9	173.7	1.53	2398.9				
3858		849.6	45	4	8.8	0.02	23		87.8		18		217.6		7		409.6		5		723.2		5		968.1		675.9	173.7	1.53	2398.9	Mtn Chnl	226		0.00442
3864	3.1	852.7	45	4	8.8	0.02	15	0.7	87.5		15	0.7	216.5		6	4.4	408.2		5	7.2	717.3		5	8.7	962.9		679.0	173.7	1.53	2376.9	PIPE	200		0.03
3874	2.5	855.2	45	4	8.8	0.02	20	0.3	87.5		15	0.5	216.5		6	3.5	408.0		5	5.8	717.5		5	7.1	962.7		681.5	173.7	1.53	2377.7	PIPE	240		0.041167
3884		855.2	45	4	8.8	0.02	20		87.5		15		216.5		6		407.9		5		717.4		5		962.6		681.5	173.7	1.53	2377.7	Mtn Chnl	221		0.0362
3894	4.1	859.3	45	4	8.8	0.02	29	0.4	87.5		23	0.7	216.2		11	3.2	408.0		7	7.3	716.7		6	10.0	958.5		685.6	173.7	1.53	2375.8				
3904	2.7	862	45	4	8.8	0.02	29	0.3	87.6		22	0.5	216.3		10	2.3	408.1		7	4.8	716.9		6	6.6	958.8		688.3	173.7	1.53	2377.0				
3914		862	45	4	8.8	0.02	29		87.6		22		216.3		10		408.1		7		716.9		6		958.8		688.3	173.7	1.53	2377.0	Mtn Chnl	116		0.05172
3924	0.8	862.8	45	4	8.8	0.02	20	0.1	87.5		15	0.2	216.2		6	1.1	407.8		5	1.9	715.2		5	2.3	958.8		689.1	173.7	1.53	2372.2				
3938	5.4	5.4	45	4	8.8	0.02	26	0.6	0.6		20	1.0	1.0		9	5.2	5.2		6	10.8	10.8		5	15.2	15.2		5.4		1.66	34.8				
3948		5.4	45	4	8.8	0.02	26		0.6		20		1.0		9		10.8		5		21.0		5	21.0	21.0		5.4		1.66	34.8	Mtn Chnl	231		0.19913
3958	3	8.4	28	4	8.8	0.02	14	1.3	1.9		7	4.4	5.3		6	6.6	18.8		5	9.8	18.8		5	13.4	32.1		8.4		1.66	53.2				
3968	2.1	10.5	31	4	8.8	0.02	27	0.2	2.1		7	3.1	8.4		6	4.6	15.7		5	6.8	25.6		5	9.3	32.5		10.5		1.66	68.6				
3978		10.5	31	4	8.8	0.02	27		2.1		7		8.4		6		15.7		5		25.6		5		32.5									
3988	7.4	17.9	31	4	8.8	0.02	29	0.8	2.8		8	10.0	17.4		6	16.1	27.9		5	23.8	42.9		5	27.9	53.3		17.9		1.66	111.0				
3998		17.9	31	4	8.8	0.02	29		2.8		8		17.4		6		27.9		5		42.9		5		53.3		17.9		1.66	111.0	Mtn Chnl	427		0.17733
4008	4.3	22.2	31	4	8.8	0.02	29	0.4	3.2		8	5.8	22.1		6	9.4	34.1		5	13.8	51.5		5	16.2	63.6		19.0	79.7	22.2	132.4				
4018		3.6	31	4	8.8	0.02	26	0.4	0.4		7	5.3	5.3		5	8.9	8.9		5	11.6	11.6		5	13.6	13.6		15.9	15.9	3.6	26.4				
4028	2.9	6.1	31	4	8.8	0.02	9	1.5	1.7		5	4.7	8.1		5	6.2	12.8		5	8.0	17.0		5	9.4	20.2		11.0	24.0	6.1	39.8				
4048	6.1	28.3	31	4	8.8			1.7	4.0			8.1	29.5			12.8	46.3			17.0	67.5			20.2	83.0		240	103.7	28.3	172.2	Mtn Chnl	700		0.15714
4058	7.2	35.5	31	4	8.8	0.02	27	0.8	4.5		7	10.6	33.7		6	15.7	53.6		5	23.1	77.4		5	27.1	95.2		31.8	120.8	35.5	200.5				
4068		35.5	31	4	8.8	0.02	27		4.5		7		33.7		6		53.6		5		77.4		5		95.2		120.8		35.5	200.5	Mtn Chnl	663		0.048827
4078	6.3	41.8	31	4	8.8	0.02	28	0.7	4.9		8	8.5	31.5		6	13.7	50.2		5	20.2	74.6		5	23.7	93.8		27.8	123.7	41.8	205.3				
4088	3	3	31	4	8.8	0.02	29	0.3	0.3		8	4.0	4.0		6	6.5	9.6		5	9.6	9.6		5	11.3	11.3		13.2	13.2	3.0	22.0				
4098		3	31	4	8.8	0.02	29		0.3		8		4.0		6		6.5		5		9.6		5		11.3		13.2		3.0	22.0	Valley Chnl	462		0.08658
4108	6.3	9.3	31	4	8.8	0.02	29	0.7	1.0		8	8.5	12.1		6	13.7	19.4		5	20.2	27.7		5	23.7	32.7		27.8	38.6	9.3	64.1				
4118		9.3	31	4	8.8	0.02	29		1.0		8		12.1		6		19.4		5		27.7		5		32.7		38.6		9.3	64.1	Valley Chnl	338		0.35503
4128	6	15.3	31	4	8.8	0.02	16	1.6	2.6		7	8.9	20.6		5	14.8	32.1		5	19.3	45.2		5	22.6	53.4		26.5	63.1	15.3	104.8				
4138		15.3	31	4	8.8	0.02	16		2.6		7		20.6		5		32.1		5		45.2		5		53.4			63.1	15.3	104.8	Mtn Chnl	374		0.13369
4148	5.9	21.2	31	4	8.8	0.02	17	1.4	3.8		7	8.7	27.7		5	14.6	41.9		5	19.0	58.5		5	22.2	69.5		26.0	82.8	21.2	137.5				
4158		21.2	31	4	8.8	0.02	17		3.8		7		27.7		5		41.9		5		58.5		5		69.5		82.8		21.2	137.5	Mtn Chnl	538		0.09665
4168	4.8	26	31	4	8.8	0.02	27	0.5	4.0		7	7.1	29.8		6	10.4	46.7		5	15.4	64.4		5	18.1	77.5		21.2	94.0	26.0	156.0				
4178	3.4	3.4	31	4	8.8	0.02	12	1.4	1.4		6	5.6	5.6		5	8.4	8.4		5	10.9	10.9		5	12.8	12.8		15.0	15.0	3.4	24.9				
4188		3.4	31	4	8.8	0.02	12		1.4		6		5.6		5		8.4		5		10.9		5		12.8		15.0		3.4	24.9	Mtn Chnl	375		0.11733
4198	9.1	12.5	31	4	8.8	0.02	29	0.9	2.2		8	12.3	16.8		6	19.8	26.4		5	29.2	36.7		5	34.3	43.4		40.2	51.4	12.5	85.3				
4208		12.5	31	4	8.8	0.02	29		2.2		8		16.8		6		26.4		5		36.7		5		43.4			51.4	12.5	85.3	Mtn Chnl	525		0.10667
4218	5.2	17.7	31	4	8.8	0.02	28	0.5	2.6		8	7.0	21.1		6	11.3	32.5		5	16.7	45.4		5	19.6	54.1		22.9	65.1	17.7	108.0				
4228CD	17.7	43.7	31	4	8.8			2.6	6.5			21.1	50.8			32.5	78.6			45.4	109.8			54.1	131.6		65.1	158.8	43.7	263.7	Mtn Chnl	568		0.03521
4238C	5	48.7	31	4	8.8	0.02	27	0.5	6.5		7	7.4	46.1		6	10.9	74.5		5	16.1	105.4		5	18.8	129.1		22.1	159.6	48.7	264.9				
4248C	48.7	90.5	31	4	8.8			6.5	11.3			46.1	77.7			74.5	124.7			105.4	179.3			129.1	222.9		159.6	283.2	90.5	470.1	Mtn Chnl	710		0.05634
4258	8.1	98.6	31	4	8.8	0.02	28	0.9	11.6		8	10.9	74.4		6	17.6	119.4		5	26.0	175.3		5	30.5	219.8		35.7	281.5	98.6	467.2				
4268		98.6	31	4	8.8	0.02	28		11.6		8		74.4		6		119.4		5		175.3		5		219.8			281.5	98.6	467.2	Mtn Chnl	402		0.12438
4278	7.4	106	31	4	8.8	0.02	28	0.8	12.1		8	10.0	74.2		6	16.1	118.8		5	23.8	175.2		5	27.9	219.8		32.7	285.8	106.0	474.4				
4288C	2.9	2.9	31	4	8.8	0.02	28	0.3	0.3		7	4.3	4.3		6	6.3	9.3		5	9.3	9.3		5	10.9	10.9		12.8	12.8	2.9	21.2				
4298C		2.9	31	4	8.8	0.02	28		0.3		7		4.3		6		6.3		5		9.3		5		10.9			12.8	2.9	21.2	Mtn Chnl	217		0.2765
4308	2	4.9	31	4	8.8	0.02	28	0.2	0.5		8	2.7	6.9		6	4.4	10.5		5	6.4	14.7		5	7.5	17.3		8.8	20.5	4.9	33.9				
4318C	1.2	6.1	31	4	8.8	0.02	11	0.6	1.1		6	2.0	8.8		5	3.0	13.0		5	3.9	18.5		5	4.5	21.8		5.3	25.8	6.1	42.7				
4328C		6.1	31	4	8.8	0.02	11		1.1		6		8.8		5		13.0		5		18.5		5		21.8			25.8	6.1	42.7	Mtn Chnl	449		0.06682
4338C	2.2	8.3	31	4	8.8	0.02	11	1.0	1.5		6	3.6	9.1		5	5.4	14.0		5	7.1	20.4		5	8.3	24.7		9.7	30.0	8.3	49.8				

Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	2 year			5 year			10 year			25 year			50 year			50 Year Burned and Bulked			Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8						
							Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	Conveyance Q (cfs)	Tributary Q (cfs	Tc (minutes)	cummulative burned and bulked acreage	Conveyance Q (cfs)	Conveyance Weighted Bulking Factor	cummulative burned only	Conveyance Type	Pipe Diameter (inches)	Length	Slope
434C	8.3	8.3	31	4	8.8	0.02	11	1.5		6	9.1		5	14.0		5	20.4		5	24.7		5	30.0	8.3	1.66	49.8	Valley Chnl	205	0.097S6
435C	0.4	8.7	31	4	8.8	0.02	8	0.3	1.7	5	0.8	9.2	5	1.0	14.3	5	1.3	20.8	5	1.5	25.1	5	1.8	30.7	8.7	1.66	51.0			
436D	3.3	3.3	31	4	8.8	0.02	28	0.4	0.4	8	4.4	4.4	6	7.2	7.2	5	10.6	10.6	5	12.4	12.4	5	14.6	14.6	3.3	1.66	24.2			
437D		3.3	31	4	8.8	0.02	28		0.4	8		4.4	6		7.2	5		10.6	5		12.4	5		14.6	3.3	1.66	24.2	Mtn Chnl	271	0.1476
438D	1.2	4.5	31	4	8.8	0.02	10	0.6	0.9	5	2.3	5.8	5	3.0	9.1	5	3.9	13.0	5	4.5	15.3	5	5.3	18.2	4.5	1.66	30.1			
439CD	4.5	13.2	31	4	8.8			0.9	2.6		5.8	14.3		9.1	22.6		13.0	32.7		15.3	39.3		18.2	47.5	13.2	1.66	78.9	Valley Chnl	480	0.083333
440C	2.9	16.1	31	4	8.8	0.02	14	1.0	3.4	7	4.3	16.6	5	7.2	25.6	5	9.3	37.4	5	10.9	45.4	5	12.8	55.6	16.1	1.66	92.3			
441D	5.3	5.3	31	4	8.8	0.02	29	0.6	0.6	8	7.1	7.1	6	11.5	11.5	5	17.0	17.0	5	20.0	20.0	5	23.4	23.4	5.3	1.66	38.8			
442D		5.3	31	4	8.8	0.02	29		0.6	8		7.1	6		11.5	5		17.0	5		20.0	5		23.4	5.3	1.66	38.8	Mtn Chnl	408	0.19608
443D	3	8.3	31	4	8.8	0.02	28	0.3	0.9	7	4.4	11.1	6	6.5	16.7	5	9.6	23.6	5	11.3	27.9	5	13.2	33.1	8.3	1.66	54.9			
444CD	8.3	24.4	31	4	8.8			0.9	4.2		11.1	27.1		16.7	41.9		23.6	59.4		27.9	71.2		33.1	86.5	24.4	1.66	143.5	Valley Chnl	671	0.07452
445C	3	27.4	31	4	8.8	0.02	28	0.3	4.4	8	4.0	29.2	6	6.5	44.4	5	9.6	63.1	5	11.3	75.9	5	13.2	93.2	27.4	1.66	154.7			
446C		27.4	31	4	8.8	0.02	28		4.4	8		29.2	6		44.4	5		63.1	5		75.9	5		93.2	27.4	1.66	154.7	Mtn Chnl	494	0.26316
447C	2	29.4	31	4	8.8	0.02	10	1.1	4.4	5	3.8	28.6	5	4.9	45.0	5	6.4	64.6	5	7.5	78.7	5	8.8	97.1	29.4	1.66	161.2			
448C	29.4	135.4	31	4	8.8			4.4	14.6		28.6	91.1		45.0	147.5		64.6	221.3		78.7	279.3		97.1	363.8	135.4	1.66	603.9	Mtn Chnl	534	0.05618
449B	5.6	141	31	4	8.8	0.02	17	1.4	14.6	7	8.3	90.3	5	13.8	145.6	5	18.0	220.0	5	21.1	278.0	5	24.7	364.9	141.0	1.66	605.7			
450C	3.3	3.3	31	4	8.8	0.02	29	0.3	0.3	8	4.4	4.4	6	7.2	7.2	5	10.6	10.6	5	12.4	12.4	5	14.6	14.6	3.3	1.66	24.2			
451C		3.3	31	4	8.8	0.02	29		0.3	8		4.4	6		7.2	5		10.6	5		12.4	5		14.6	3.3	1.66	24.2	Mtn Chnl	380	0.23684
452C	2.3	5.6	31	4	8.8	0.02	16	0.6	0.9	7	3.4	7.5	5	5.7	11.2	5	7.4	15.9	5	8.7	18.8	5	10.2	22.3	5.6	1.66	37.0			
453C		5.6	31	4	8.8	0.02	16		0.9	7		7.5	5		11.2	5		15.9	5		18.8	5		22.3	5.6	1.66	37.0	Mtn Chnl	317	0.23659
454C	1	6.6	31	4	8.8	0.02	9	0.6	1.3	5	1.9	8.1	5	2.5	12.7	5	3.2	17.8	5	3.8	21.1	5	4.4	25.4	6.6	1.66	42.1			
455D	7	7	31	4	8.8	0.02	29	0.7	0.7	8	9.4	9.4	6	15.2	15.2	5	22.5	22.5	5	26.4	26.4	5	30.9	30.9	7.0	1.66	51.3			
456D		7	31	4	8.8	0.02	29		0.7	8		9.4	6		15.2	5		22.5	5		26.4	5		30.9	7.0	1.66	51.3	Mtn Chnl	191	0.18325
457D	0.7	7.7	31	4	8.8	0.02	9	0.4	1.1	5	1.3	10.3	5	1.7	16.5	5	2.3	23.0	5	2.6	27.0	5	3.1	31.8	7.7	1.66	52.7			
458CD	7.7	14.3	31	4	8.8			1.1	2.4		10.3	18.2		16.5	28.9		23.0	40.7		27.0	48.1		31.8	57.1	14.3	1.66	94.8	Valley Chnl	235	0.19149
459C	1.1	15.4	31	4	8.8	0.02	7	0.8	3.0	5	2.1	19.3	5	2.7	30.3	5	3.5	43.2	5	4.1	51.3	5	4.9	61.0	15.4	1.66	101.3			
460C		15.4	31	4	8.8	0.02	7		3.0	5		19.3	5		30.3	5		43.2	5		51.3	5		61.0	15.4	1.66	101.3	Valley Chnl	330	0.07576
461C	3.3	18.7	31	4	8.8	0.02	28	0.4	3.3	8	4.4	23.2	6	7.2	35.8	5	10.6	49.4	5	12.4	58.8	5	14.6	70.8	18.7	1.66	117.5			
462D	3.2	3.2	31	4	8.8	0.02	12	1.4	1.4	6	5.3	5.3	5	7.9	7.9	5	10.3	10.3	5	12.1	12.1	5	14.1	14.1	3.2	1.66	23.4			
463D		3.2	31	4	8.8	0.02	12		1.4	6		5.3	5		7.9	5		10.3	5		12.1	5		14.1	3.2	1.66	23.4	Mtn Chnl	438	0.23973
464D	2.1	5.3	31	4	8.8	0.02	14	0.7	1.9	7	3.1	7.9	5	5.2	11.2	5	6.8	14.8	5	7.9	17.6	5	9.3	20.9	5.3	1.66	34.7			
465CD	5.3	24	31	4	8.8			1.9	5.1		7.9	30.5		11.2	46.5		14.8	64.0		17.6	76.4		20.9	91.7	24.0	1.66	152.2	Mtn Chnl	340	0.07353
466C	0.8	24.8	31	4	8.8	0.02	11	0.4	5.0	5	1.5	30.1	5	2.0	46.0	5	2.6	63.6	5	3.0	75.7	5	3.5	91.7	24.8	1.66	152.2			
467D	4.5	4.5	31	4	8.8	0.02	12	1.9	1.9	6	7.4	7.4	5	11.1	11.1	5	14.5	14.5	5	17.0	17.0	5	19.9	19.9	4.5	1.66	33.0			
468D		4.5	31	4	8.8	0.02	12		1.9	6		7.4	5		11.1	5		14.5	5		17.0	5		19.9	4.5	1.66	33.0	Mtn Chnl	268	0.22388
469D	1.5	6	31	4	8.8	0.02	12	0.6	2.5	6	2.5	9.4	5	3.7	13.5	5	4.8	17.6	5	5.7	20.7	5	6.6	24.5	6.0	1.66	40.6			
470CD	6	30.8	31	4	8.8			2.5	7.1		9.4	36.4		13.5	55.7		17.6	78.6		20.7	94.2		24.5	113.5	30.8	1.66	188.4	Mtn Chnl	267	0.29963
471C	1	31.8	31	4	8.8	0.02	12	0.4	7.3	6	1.7	37.1	5	2.5	56.8	5	3.2	79.1	5	3.8	94.9	5	4.4	115.3	31.8	1.66	191.4			
472BC	31.8	172.8	31	4	8.8			7.3	17.4		37.1	101.7		56.8	167.3		79.1	265.4		94.9	337.0		115.3	445.7	172.8	1.66	739.9	Mtn Chnl	443	0.02257
473B	4.5	177.3	31	4	8.8	0.02	11	2.1	16.9	6	7.4	101.3	5	11.1	167.0	5	14.5	264.2	5	17.0	335.8	5	19.9	446.3	177.3	1.66	740.8			
474B		177.3	31	4	8.8	0.02	11		16.9	6		101.3	5		167.0	5		264.2	5		335.8	5		446.3	177.3	1.66	740.8	Mtn Chnl	489	0.02863
475B	3.2	180.5	31	4	8.8	0.02	12	1.4	16.7	6	5.3	100.9	6	7.9	166.3	5	10.3	262.3	5	12.1	334.1	5	14.1	443.8	180.5	1.66	736.7			
476C	3.9	3.9	31	4	8.8	0.02	29	0.4	0.4	8	5.3	5.3	6	8.5	8.5	5	12.5	12.5	5	14.7	14.7	5	17.2	17.2	3.9	1.66	28.6			
477C		3.9	31	4	8.8	0.02	29		0.4	8		5.3	6		8.5	5		12.5	5		14.7	5		17.2	3.9	1.66	28.6	Mtn Chnl	610	0.11803
478C	5.4	9.3	31	4	8.8	0.02	27	0.6	0.9	7	8.0	10.7	6	11.7	16.5	5	17.4	23.6	5	20.4	28.3	5	23.8	34.2	9.3	1.66	56.8			
479C		9.3	31	4	8.8	0.02	27		0.9	7		10.7	6		16.5	5		23.6	5		28.3	5		34.2	9.3	1.66	56.8	Mtn Chnl	382	0.10995
480C	5.6	14.9	31	4	8.8	0.02	12	2.4	3.0	6	9.2	16.2	5	13.8	24.4	5	18.0	36.0	5	21.1	43.3	5	24.7	52.7	14.9	1.66	87.5			
481C		14.9	31	4	8.8	0.02	12		3.0	6		16.2	5		24.4	5		36.0	5		43.3	5		52.7	14.9	1.66	87.5	Mtn Chnl	342	0.04094
482C	3.8	18.7	31	4	8.8	0.02	12	1.6	3.8	6	6.3	17.7	5	9.4	27.5	5	12.2	40.9	5	14.3	50.0	5	16.8	61.8	18.7	1.66	102.6			
483C		18.7	31	4	8.8	0.02	12		3.8	6		17.7	5		27.5	5		40.9	5		50.0	5		61.8	18.7	1.66	102.6	Mtn Chnl	522	0.0728
484C	4.2	22.9	31	4	8.8	0.02	14	1.4	4.1	7	6.2	17.9	5	10.4	27.6	5	13.5	43.1	5	15.8	53.5	5	18.5	67.7	22.9	1.66	112.4			
485BC	22.9	203.4	31	4	8.8			4.1	19.3		17.9	109.5		27.6	182.0		43.1	290.9		53.5	370.7		67.7	494.5	203.4	1.66	820.9	Mtn Chnl	256	0.00391
486B	3.2	206.6	31	4	8.8	0.02	26	0.4	19.0	7	4.7	108.4	6	7.0	179.3	5	10.3	285.2	5	12.1	365.3	5	14.1	489.4	206.6	1.66	812.4			
487C	3.3	3.3	31	4	8.8	0.02	16	0.9	0.9	7	4.9	4.9	5	8.2	8.2	5	10.6	10.6	5	12.4	12.4	5	14.6	14.6	3.3	1.66	24.2			
488C		3.3	31	4	8.8	0.02	16		0.9	7		4.9	5		8.2	5		10.6	5		12.4	5		14.6	3.3	1.66	24.2	Valley Chnl	470	0.17021
489C	2.1	5.4	31	4	8.8	0.02	12	0.9	1.7	6	3.5	8.0	5	5.2	11.9	5	6.8	15.7	5	7.9	18.6	5	9.3	22.0	5.4	1.66	36.5			
490BC	5.4	212	31	4	8.8			1.7	19.2		8.0	108.7		11.9	179.8		15.7	285.9		18.6	366.5		22.0	492.5	212.0	1.66	817.6	Mtn Chnl	360	0.04167
491B	2.2	214.2	31	4	8.8	0.02	9	1.3	19.2	5	4.2	108.6	5	5.4	179.2	5	7.1	284.6	5	8.3	364.9	5	9.7	491.0	214.2	1.66	815.1			
492B		214.2	31	4	8.8	0.02	9		19.2	5		108.6	5		179.2	5		284.6	5		364.9	5		491.0	214.2	1.66	815.1	Mtn Chnl	354	0.01412
493B	4	218.2	31	4	8.8	0.02	29	0.4	19.1	8	5.4	107.8	6	8.7	177.7	5	12.9	282.2	5	15.1	361.9	5	17.7	487.6	218.2	1.66	809.4			
494C	2.3	2.3	31	4	8.8	0.02	11	1.1	1.1	6	3.8	3.8	5	5.7	5.7	5	7.4	7.4	5	8.7	8.7	5	10.2	10.2	2.3	1.66	16.8			
495C		2.3	31	4	8.8	0.02	11		1.1	6		3.8	5		5.7	5		7.4	5		8.7	5		10.2	2.3	1.66	16.8	Mtn Chnl	526	0.1711
496C	2.3	4.6	31	4	8.8	0.02	27	0.3	1.1	7	3.4	6.0	6	5.0	8.7	5	7.4	11.7	5	8.7	14.1	5	10.2	17.0	4.6	1.66	28.2			
497D	0.7	7.7	31	4	8.8	0.02	9	0.4	1.1	5	1.3	10.3	5	1.7	16.5	5	2.3	23.0	5	2.6	27.0	5	3.1	31.8	7.7	1.66	52.7			
498C	4.2	22.9	31	4	8.8	0.02	14	1.4	4.1	7	6.2	17.9	5	10.4	27.6	5	13.5	43.1	5	15.8	53.5	5	18.5	67.7	22.9	1.66	112.4			
499BC	22.9	203.4	31	4	8.8			4.1	19.3		17.9	109.5		27.6	182.0		43.1	290.9		53.5	370.7		67.7	494.5	203.4	1.66	820.9	Mtn Chnl	256	0.00391
500B	3.2	206.6	31	4	8.8	0.02	26	0.4	19.0	7	4.7	108.4	6	7.0	179.3	5	10.3	285.2	5	12.1	365.3	5	14.1	489.4	206.6	1.66	812.4			
501C	3.3	3.3	31	4	8.8	0.02	16	0.9	0.9	7	4.9	4.9	5	8.2	8.2	5	10.6	10.6	5	12.4	12.4	5	14.6	14.6	3.3	1.66	24.2			
502C		3.3	31	4	8.8	0.02	16		0.9	7		4.9	6		7.2	5		10.6	5		12.4	5		14.6	3.3	1.66	24.2	Valley Chnl	470	0.17021
503C	2.3	5.4	31	4	8.8	0.02	12	0.9	1.7	6	3.5	8.0	5	5.2	11.9	5	6.8	15.7	5	7.9	18.6	5	9.3	22.0	5.4	1.66	36.5			
504BC	5.4	212	31	4	8.8			1.7	19.2		8.0	108.7		11.9	179.8		15.7	285.9		18.6	366.5		22.0	492.5	212.0	1.66	817.6	Mtn Chnl	360	0.04167
505B	2.2	214.2	31	4	8.8	0.02	9	1.3	19.2	5	4.2	108.6	5	5.4	179.2	5	7.1	284.6	5	8.3	364.9	5	9.7	491.0	214.2	1.66	815.1			
506D		214.2	31	4	8.8	0.02	9		19.2	5		108.6	5		179.2	5		284.6	5		364.9	5		491.0	214.2	1.66	815.1	Mtn Chnl	354	0.01412
507D	4	218.2	31	4	8.8	0.02	29	0.4	19.1	8	5.4	107.8	6	8.7	177.7	5	12.9	282.2	5	15.1	361.9	5	17.7	487.6	218.2	1.66	809.4			
508C	2.3	2.3	31	4	8.8	0.02	11	1.1	1.1	6	3.8	3.8	5	5.7	5.7	5	7.4	7.4	5	8.7	8.7	5	10.2	10.2	2.3	1.66	16.8			
509C		2.3	31	4	8.8	0.02	11		1.1	6		3.8	5		5.7	5		7.4	5		8.7	5		10.2	2.3	1.66	16.8	Mtn Chnl	526	0.1711
510C	2.3	4.6	31	4	8.8	0.02	27	0.3	1.1	7	3.4	6.0	6	5.0	8.7	5	7.4	11.7	5	8.7	14.1	5	10.2	17.0	4.6	1.66	28.2			

							2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8			Isohyetal=8.8							
Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only	Conveyance Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope
497BC	4.6	222.8	31	4	8.8			1.1	19.3		6.0	108.1		8.7	178.1		11.7	282.9		14.1	362.9		17.0	489.9	222.8		1.66	813.2	Mtn Chnl		122	0.08197
498B	0.6	223.4	31	4	8.8	0.02	11	0.3	19.4	6	1.0	108.1	5	1.5	177.9	5	1.9	282.3	5	2.3	362.6	5	2.7	490.0	223.4		1.66	813.4				
499AB	223.4	1086.2	31	4	8.8			19.4	105.7		108.1	300.2		177.9	584.0		282.3	997.5		362.6	1321.4		490.0	2033.9	912.5	173.7	1.55	3161.6	Mtn Chnl		69	0.07246
500A	0.3	1086.5	31	4	8.8	0.02	9	0.2	105.7	5	0.6	300.2	5	0.7	583.9	5	1.0	996.7	5	1.1	1321.1	5	1.3	2033.7	912.8	173.7	1.55	3161.4				
501B	6.7	6.7	31	4	8.8	0.02	27	0.7	0.7	7	9.9	9.9	6	14.6	14.6	5	21.5	21.5	5	25.3	25.3	5	29.6	29.6	6.7		1.66	49.1				
502B		6.7	31	4	8.8	0.02	27		0.7	7		9.9	6		14.6	5		21.5	5		25.3	5		29.6	6.7		1.66	49.1	Mtn Chnl		249	0.04016
503B	4.8	11.5	31	4	8.8	0.02	27	0.5	1.2	7	7.1	15.7	6	10.4	22.4	5	15.4	31.8	5	18.1	37.8	5	21.2	45.0	11.5		1.66	74.7				
504B		11.5	31	4	8.8	0.02	27		1.2	7		15.7	6		22.4	5		31.8	5		37.8	5		45.0	11.5		1.66	74.7	Mtn Chnl		358	0.23743
505B	4.3	15.8	31	4	8.8	0.02	16	1.2	2.1	7	6.3	20.1	5	10.6	29.0	5	13.8	41.7	5	16.2	49.9	5	19.0	59.9	15.8		1.66	99.5				
506B		15.8	31	4	8.8	0.02	16		2.1	7		20.1	5		29.0	5		41.7	5		49.9	5		59.9	15.8		1.66	99.5	Mtn Chnl		438	0.19406
507B	2.3	18.1	31	4	8.8	0.02	16	0.6	2.6	7	3.4	21.7	5	5.7	31.2	5	7.4	45.6	5	8.7	54.7	5	10.2	66.1	18.1		1.66	109.7				
508C	2.8	2.8	31	4	8.8	0.02	27	0.3	0.3	7	4.1	4.1	6	6.1	6.1	5	9.0	9.0	5	10.6	10.6	5	12.4	12.4	2.8		1.66	20.5				
509C	1.7	4.5	31	4	8.8	0.02	26	0.2	0.5	7	2.5	6.6	5	4.2	10.3	5	5.5	14.5	5	6.4	17.0	5	7.5	19.9	4.5		1.66	33.0				
510C		4.5	31	4	8.8	0.02	26		0.5	7		6.6	5		10.3	5		14.5	5		17.0	5		19.9	4.5		1.66	33.0	Mtn Chnl		250	0.02
511C	1.6	6.1	31	4	8.8	0.02	14	0.6	0.8	7	2.4	7.1	5	4.0	10.5	5	5.1	15.1	5	6.0	18.2	5	7.1	22.1	6.1		1.66	36.7				
512BC	6.1	24.2	31	4	8.8			0.8	3.4		7.1	28.8		10.5	41.7		15.1	60.7		18.2	72.9		22.1	88.2	24.2		1.66	146.4	Mtn Chnl		305	0.09836
513B	1	25.2	31	4	8.8	0.02	26	0.1	3.5	7	1.5	28.8	5	2.5	41.8	5	3.2	61.1	5	3.8	73.3	5	4.4	88.9	25.2		1.66	147.6				
514AB	25.2	1111.7	31	4	8.8			3.5	106.7		28.8	301.7		41.8	587.4		61.1	1004.1		73.3	1332.5		88.9	2056.7	938.0	173.7	1.56	3202.0	Mtn Chnl		585	0.02051
515A	9.2	1120.9	31	4	8.8	0.02	26	1.0	106.5	7	13.6	300.9	6	20.0	584.9	5	29.6	999.0	5	34.7	1321.8	5	40.6	2047.8	947.2	173.7	1.56	3189.9				
516B	3.7	3.7	31	4	8.8	0.02	26	0.4	0.4	7	5.5	5.5	6	8.0	8.0	5	11.9	11.9	5	13.9	13.9	5	16.3	16.3	3.7		1.66	27.1				
517B		3.7	31	4	8.8	0.02	26		0.4	7		5.5	6		8.0	5		11.9	5		13.9	5		16.3	3.7		1.66	27.1	Mtn Chnl		431	0.19722
518B	3.3	7	31	4	8.8	0.02	28	0.4	0.7	8	4.4	9.4	6	7.2	13.9	5	10.6	19.5	5	12.4	23.1	5	14.6	27.5	7.0		1.66	45.6				
519B		7	31	4	8.8	0.02	28		0.7	8		9.4	6		13.9	5		19.5	5		23.1	5		27.5	7.0		1.66	45.6	Mtn Chnl		362	0.27624
520B	1.9	8.9	31	4	8.8	0.02	14	0.7	1.2	7	2.8	11.2	5	4.7	16.6	5	6.1	23.6	5	7.2	28.2	5	8.4	33.9	8.9		1.66	56.3				
521AB	8.9	1129.8	31	4	8.8			1.2	106.7		11.2	301.3		16.6	585.5		23.6	1000.1		28.2	1323.6		33.9	2052.2	956.1	173.7	1.56	3198.4	Mtn Chnl		527	0.02846
522A	4.5	1134.3	45	4	8.8	0.02	28	0.5	106.5	21	0.8	300.9	10	3.9	583.4	6	9.0	993.9	5	12.7	1317.1	5	17.5	2042.7	960.6	173.7	1.56	3184.4				
523B	2.2	2.2	45	4	8.8	0.02	26	0.2	0.2	20	0.4	0.4	9	2.1	2.1	6	4.4	4.4	5	6.2	6.2	5	8.5	8.5	2.2		1.66	14.2				
524B		2.2	45	4	8.8	0.02	26		0.2	20		0.4	9		2.1	6		4.4	5		6.2	5		8.5	2.2		1.66	14.2	Mtn Chnl		571	0.09632
525B	3	5.2	45	4	8.8	0.02	29	0.3	0.5	23	0.5	0.9	11	2.3	3.2	7	5.3	7.1	6	7.3	9.6	6	10.3	15.1	5.2		1.66	25.1				
526C	5.2	5.2	45	4	8.8	0.02	27	0.6	0.6	21	0.9	0.9	9	5.0	5.0	6	10.4	10.4	5	14.7	14.7	5	20.2	20.2	5.2		1.66	33.5				
527C		5.2	45	4	8.8	0.02	27		0.6	21		0.9	9		5.0	6		10.4	5		14.7	5		20.2	5.2		1.66	33.5	Valley Chnl		443	0.07901
528C	4.4	9.6	45	4	8.8	0.02	28	0.5	1.0	22	0.8	1.7	10	3.8	8.3	7	7.8	17.5	6	10.8	23.8	6	15.2	33.6	9.6		1.66	55.8				
529BC	9.6	14.8	45	4	8.8			1.0	1.5		1.7	2.5		8.3	11.3		17.5	24.5		23.8	33.3		33.6	48.8	14.8		1.66	80.9	Mtn Chnl		476	0.06513
530B	6.4	21.2	45	4	8.8	0.02	29	0.7	2.1	22	1.1	3.5	11	4.9	13.8	7	11.3	28.8	6	15.7	39.4	6	22.1	62.1	21.2		1.66	103.0				
531B		21.2	45	4	8.8	0.02	29		2.1	22		3.5	11		13.8	7		28.8	6		39.4	6		62.1	21.2		1.66	103.0	Mtn Chnl		275	0.10545
532B	1.4	22.6	45	4	8.8	0.02	23	0.2	2.2	17	0.3	3.7	7	1.7	13.6	5	3.3	28.7	5	4.0	39.9	5	5.4	64.1	22.6		1.66	106.4				
533C	5.5	5.5	45	4	8.8	0.02	28	0.6	0.6	21	1.0	1.0	10	4.8	4.8	6	11.0	11.0	6	13.5	13.5	6	19.0	19.0	5.5		1.66	31.5				
534C		5.5	45	4	8.8	0.02	28		0.6	21		1.0	10		4.8	6		11.0	6		13.5	6		19.0	5.5		1.66	31.5	Mtn Chnl		162	0.21605
535C	0.6	6.1	45	4	8.8	0.02	17	0.1	0.7	12	0.2	1.1	5	1.0	5.3	5	1.4	12.1	5	1.7	14.8	5	2.3	20.9	6.1		1.66	34.7				
536BC	6.1	28.7	45	4	8.8			0.7	2.8		1.1	4.7		5.3	16.8		12.1	36.3		14.8	50.8		20.9	81.5	28.7		1.66	135.2	Valley Chnl		214	0.09346
537B	5.2	33.9	45	4	8.8	0.02	28	0.5	3.3	21	0.9	5.6	10	4.5	19.6	6	10.4	42.1	6	12.7	59.1	6	17.9	95.2	33.9		1.66	158.1				
538B		33.9	45	4	8.8	0.02	28		3.3	21		5.6	10		19.6	6		42.1	6		59.1	6		95.2	33.9		1.66	158.1	Mtn Chnl		350	0.02857
539B	4.9	38.8	45	4	8.8	0.02	28	0.5	3.7	21	0.9	6.2	10	4.3	19.5	6	9.8	42.5	5	13.8	58.9	5	19.0	99.6	38.8		1.66	165.3				
540B		38.8	45	4	8.8	0.02	28		3.7	21		6.2	10		19.5	6		42.5	5		58.9	5		99.6	38.8		1.66	165.3	Mtn Chnl		385	0.04935
541B	3.7	42.5	45	4	8.8	0.02	29	0.4	4.0	23	0.6	6.7	11	2.9	19.7	7	6.6	41.6	6	9.1	57.8	6	12.8	102.2	42.5		1.66	169.7				
542B		42.5	45	4	8.8	0.02	29		4.0	23		6.7	11		19.7	7		41.6	6		57.8	6		102.2	42.5		1.66	169.7	Valley Chnl		256	0.02344
543B	4.1	46.6	45	4	8.8	0.02	20	0.5	4.1	15	0.9	6.9	6	5.8	19.9	5	9.6	41.8	5	11.6	57.9	5	15.9	104.1	46.6		1.66	172.8				
544B		46.6	45	4	8.8	0.02	20		4.1	15		6.9	6		19.9	5		41.8	5		57.9	5		104.1	46.6		1.66	172.8	Mtn Chnl		580	0.10345
545B	4.8	51.4	45	4	8.8	0.02	26	0.5	4.3	20	0.9	7.1	8	5.2	19.9	6	9.6	41.3	5	13.5	57.3	5	18.6	105.6	51.4		1.66	175.3				
546B		51.4	45	4	8.8	0.02	26		4.3	20		7.1	8		19.9	6		41.3	5		57.3	5		105.6	51.4		1.66	175.3	Mtn Chnl		248	0.12097
547B	3.6	55	45	4	8.8	0.02	24	0.4	4.5	18	0.7	7.4	7	4.4	20.0	5	8.4	41.5	5	10.2	57.2	5	14.0	107.2	55.0		1.66	177.9				
548B		55	45	4	8.8	0.02	24		4.5	18		7.4	7		20.0	5		41.5	5		57.2	5		107.2	55.0		1.66	177.9	Mtn Chnl		154	0.05195
549B	3.1	58.1	45	4	8.8	0.02	24	0.4	4.7	18	0.6	7.6	8	3.3	20.1	6	6.2	41.6	5	8.7	57.4	5	12.0	108.2	58.1		1.66	179.6				
550B		58.1	45	4	8.8	0.02	24		4.7	18		7.6	8		20.1	6		41.6	5		57.4	5		108.2	58.1		1.66	179.6	Mtn Chnl		464	0.12069
551B	4.9	63	45	4	8.8	0.02	23	0.6	4.9	18	1.0	7.9	7	6.0	20.5	5	11.4	41.4	5	13.8	57.0	5	19.0	109.9	63.0		1.66	182.5				
552B		63	45	4	8.8	0.02	23		4.9	18		7.9	7		20.5	5		41.4	5		57.0	5		109.9	63.0		1.66	182.5	Mtn Chnl		425	0.08471
553B	3.9	66.9	45	4	8.8	0.02	24	0.4	5.0	19	0.7	8.2	8	4.2	20.8	5	9.1	41.2	5	11.0	56.8	5	15.1	111.1	66.9		1.66	184.4				
554B		66.9	45	4	8.8	0.02	24		5.0	19		8.2	8		20.8	5		41.2	5		56.8	5		111.1	66.9		1.66	184.4	Mtn Chnl		385	0.22857
555B	4.5	71.4	45	4	8.8	0.02	26	0.5	5.3	19	0.9	8.7	8	4.8	21.9	6	9.0	41.3	5	12.7	56.9	5	17.5	113.0	71.4		1.66	187.5				
556B		71.4	45	4	8.8	0.02	26		5.3	19		8.7	8		21.9	6		41.3	5		56.9	5		113.0	71.4		1.66	187.5	Mtn Chnl		292	0.07534
557B	5.2	76.6	45	4	8.8	0.02	26	0.6	5.6	20	1.0	9.3	9	5.0	24.1	6	10.4	41.4	5	14.7	56.9	5	20.2	120.0	76.6		1.66	199.1				
558B		76.6	45	4	8.8	0.02	26		5.6	20		9.3	9		24.1	6		41.4	5		56.9	5		120.0	76.6		1.66	199.1	Mtn Chnl		307	0.01629
559B	2.7	79.3	45	4	8.8	0.02	24	0.3	5.7	18	0.5	9.4	8	2.9	23.0	6	5.4	40.7	5	7.6	55.8	5	10.5	120.2	79.3		1.66	199.4	PIPE		200	0.1

							2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				Conveyance, type, Pipe sizes and Capacities, lengths and slopes			
							Isohyetal=3.4			Isohyetal=5.1			Isohyetal=6.3			Isohyetal=7.7			Isohyetal=8.8			Isohyetal=8.8			Isohyetal=8.8							
Area	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal	Imperviousness	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only	Conveyance Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope
560C	4.6	4.6	45	4	8.8	0.02	29	0.5	0.5	22	0.8	0.8	10	4.0	4.0	7	8.2	8.2	6	11.3	11.3	6	15.9	15.9	4.6		1.66	26.3				
561C		4.6	45	4	8.8	0.02	29		0.5	22		0.8	10		4.0	7		8.2	6		11.3	6		15.9	4.6		1.66	26.3	Mtn Chnl		520	0.17692
562C	3.3	7.9	45	4	8.8	0.02	29	0.3	0.8	23	0.6	1.4	11	2.5	5.7	7	5.8	12.5	6	8.1	16.7	6	11.4	24.8	7.9		1.66	41.2				
563C		7.9	45	4	8.8	0.02	29		0.8	23		1.4	11		5.7	7		12.5	6		16.7	6		24.8	7.9		1.66	41.2	Mtn Chnl		517	0.12573
564C	3.6	11.5	45	4	8.8	0.02	27	0.4	1.1	21	0.7	1.9	9	3.5	6.4	6	7.2	13.7	5	10.2	19.2	5	14.0	31.4	11.5		1.66	52.2				
565C		11.5	45	4	8.8	0.02	27		1.1	21		1.9	9		6.4	6		13.7	5		19.2	5		31.4	11.5		1.66	52.2	Mtn Chnl		404	0.11139
566C	1.1	12.6	45	4	8.8	0.02	26	0.1	1.2	20	0.2	2.0	8	1.2	6.2	6	2.2	13.6	5	3.1	19.1	5	4.3	32.6	12.6		1.66	54.0				
567D	4.2	4.2	45	4	8.8	0.02	26	0.5	0.5	19	0.8	0.8	8	4.5	4.5	6	8.4	8.4	5	11.9	11.9	5	16.3	16.3	4.2		1.66	27.1				
568D		4.2	45	4	8.8	0.02	26		0.5	19		0.8	8		4.5	6		8.4	5		11.9	5		16.3	4.2		1.66	27.1	Valley Chnl		183	0.09836
569D	1.8	6	45	4	8.8	0.02	23	0.2	0.7	17	0.4	1.2	7	2.2	6.6	5	4.2	11.8	5	5.1	15.9	5	7.0	22.2	6.0		1.66	36.9				
570D		6	45	4	8.8	0.02	23		0.7	17		1.2	7		6.6	5		11.8	5		15.9	5		22.2	6.0		1.66	36.9	Valley Chnl		535	0.27664
571D	2.6	8.6	45	4	8.8	0.02	27	0.3	0.9	21	0.5	1.6	9	2.5	8.8	6	5.2	16.5	5	7.3	21.4	5	10.1	30.2	8.6		1.66	50.1				
572D		8.6	45	4	8.8	0.02	27		0.9	21		1.6	9		8.8	6		16.5	5		21.4	5		30.2	8.6		1.66	50.1	Mtn Chnl		348	0.15517
573D	2.6	11.2	45	4	8.8	0.02	26	0.3	1.2	20	0.5	2.1	9	2.5	10.6	6	5.2	19.4	5	7.3	25.3	5	10.1	36.7	11.2		1.66	60.9				
574D		11.2	45	4	8.8	0.02	26		1.2	20		2.1	9		10.6	6		19.4	5		25.3	5		36.7	11.2		1.66	60.9	Mtn Chnl		343	0.09329
575D	1.7	12.9	45	4	8.8	0.02	26	0.2	1.4	19	0.3	2.3	8	1.8	10.3	6	3.4	19.7	5	4.8	26.3	5	6.6	39.4	12.9		1.66	65.4				
576CD	12.9	25.5	45	4	8.8			1.4	2.5		2.3	4.3		10.3	16.5		19.7	33.2		26.3	44.7		39.4	71.9	25.5		1.66	119.3	Mtn Chnl		124	0.00806
577C	1.5	27	45	4	8.8	0.02	27	0.2	2.7	20	0.3	4.5	9	1.4	16.1	6	3.0	32.0	5	4.2	43.5	5	5.8	72.4	27.0		1.66	120.1				
578C		27	45	4	8.8	0.02	27		2.7	20		4.5	9		16.1	6		32.0	5		43.5	5		72.4	27.0		1.66	120.1	Mtn Chnl		240	0.2875
579C	3.2	30.2	45	4	8.8	0.02	29	0.3	2.9	23	0.6	4.9	11	2.5	16.5	7	5.7	32.5	6	7.8	44.8	6	11.0	77.3	30.2		1.66	128.3				
580C		30.2	45	4	8.8	0.02	29		2.9	23		4.9	11		16.5	7		32.5	6		44.8	6		77.3	30.2		1.66	128.3	Mtn Chnl		250	0.12
581C	3.5	33.7	45	4	8.8	0.02	29	0.4	3.2	23	0.6	5.4	11	2.7	16.8	7	6.2	32.8	6	8.6	45.2	6	12.1	81.7	33.7		1.66	135.5				
582C	2.2	35.9	45	4	8.8	0.02	26	0.2	3.4	20	0.4	5.7	9	2.1	17.0	6	4.4	33.1	5	6.2	45.7	5	8.5	84.7	35.9		1.66	140.5				
583C		35.9	45	4	8.8	0.02	26		3.4	20		5.7	9		17.0	6		33.1	5		45.7	5		84.7	35.9		1.66	140.5	Mtn Chnl		286	0.03147
584C	5.4	41.3	45	4	8.8	0.02	29	0.6	3.8	22	1.0	6.2	10	4.7	17.2	7	9.6	33.2	6	13.2	45.8	6	18.6	89.8	41.3		1.66	149.1	PIPE		200	0.125
585BC	41.3	120.6	45	4	8.8			3.8	9.4		6.2	15.5		17.2	39.6		33.2	71.7		45.7	97.9		89.5	209.5	120.6		1.66	347.7	Mtn Chnl		136	0.25735
586B	6.3	126.9	45	4	8.8	0.02	27	0.7	9.8	20	1.2	16.1	9	6.0	40.2	6	12.6	72.5	5	17.8	98.7	5	24.5	214.5	126.9		1.66	356.1				
587B		126.9	45	4	8.8	0.02	27		9.8	20		16.1	9		40.2	6		72.5	5		98.7	5		214.5	126.9		1.66	356.1	Mtn Chnl		367	0.04087
588B	4.2	131.1	45	4	8.8	0.02	26	0.5	9.9	19	0.8	16.3	8	4.5	40.3	6	8.4	72.5	5	11.9	98.5	5	16.3	216.0	131.1		1.66	358.6				
589C	3.7	3.7	45	4	8.8	0.02	24	0.4	0.4	19	0.7	0.7	8	4.0	4.0	6	7.4	7.4	5	10.4	10.4	5	14.4	14.4	3.7		1.66	23.8				
590C		3.7	45	4	8.8	0.02	24		0.4	19		0.7	8		4.0	6		7.4	5		10.4	5		14.4	3.7		1.66	23.8	Mtn Chnl		323	0.04644
591C	1.6	5.3	45	4	8.8	0.02	27	0.2	0.6	20	0.3	0.9	9	1.5	4.5	6	3.2	8.0	5	4.5	10.9	5	6.2	16.6	5.3		1.66	27.6				
592C		5.3	45	4	8.8	0.02	27		0.6	20		0.9	9		4.5	6		8.0	5		10.9	5		16.6	5.3		1.66	27.6	Mtn Chnl		458	0.12009
593C	3.4	8.7	45	4	8.8	0.02	23	0.4	0.9	17	0.7	1.5	7	4.2	5.3	5	7.9	9.7	5	9.6	13.3	5	13.2	23.1	8.7		1.66	38.3				
594D	1.7	1.7	45	4	8.8	0.02	29	0.2	0.2	23	0.3	0.3	11	1.3	1.3	7	3.0	3.0	6	4.2	4.2	6	5.9	5.9	1.7		1.66	9.7				
595D		1.7	45	4	8.8	0.02	29		0.2	23		0.3	11		1.3	7		3.0	6		4.2	6		5.9	1.7		1.66	9.7	Mtn Chnl		291	0.15464
596D	0.7	2.4	45	4	8.8	0.02	16	0.1	0.3	12	0.2	0.4	5	1.2	1.6	5	1.6	3.8	5	2.0	5.2	5	2.7	7.6	2.4		1.66	12.6				
597D	2.6	5	45	4	8.8	0.02	27	0.3	0.5	20	0.5	0.9	9	2.5	4.1	6	5.2	8.9	5	7.3	12.0	5	10.1	17.3	5.0		1.66	28.7				
598D		5	45	4	8.8	0.02	27		0.5	20		0.9	9		4.1	6		8.9	5		12.0	5		17.3	5.0		1.66	28.7	Mtn Chnl		441	0.24943
599D	2	7	45	4	8.8	0.02	24	0.2	0.7	18	0.4	1.3	7	2.4	5.8	5	4.7	11.1	5	5.6	14.9	5	7.8	22.4	7.0		1.66	37.2				
600CD	7	15.7	45	4	8.8			0.7	1.6		1.3	2.7		5.8	11.1		11.1	20.0		14.9	28.1		22.4	44.9	15.7		1.66	74.6	Mtn Chnl		116	0.0431
601C	0.3	16	45	4	8.8	0.02	15	0.0	1.6	6	0.3	2.7	5	0.5	10.8	5	0.7	20.3	5	0.9	28.4	5	1.2	45.7	16.0		1.66	75.8				
602BC	16	147.1	45	4	8.8			1.6	11.1		2.7	18.3		10.8	45.5		20.3	84.4		28.4	117.0		45.7	251.7	147.1		1.66	417.8	Mtn Chnl		563	0.08348
603B	4.7	151.8	45	4	8.8	0.02	26	0.5	11.3	20	0.9	18.5	8	5.1	45.8	6	9.4	84.7	5	13.3	116.4	5	18.2	252.4	151.8		1.66	419.0				
604AB	151.8	1286.1	45	4	8.8			11.3	115.1		18.5	317.1		45.8	618.4		84.7	1058.6		116.4	1403.6		252.4	2237.6	1112.4	173.7	1.57	3514.9				
605A		1286.1	45	4	8.8		30		115.1	30		317.1	30		618.4	30		1058.6	30		1403.6	30		2237.6	1112.4	173.7	1.57	3514.9				

Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal (rainfall depth)		Imperviousness	Storm Frequency, Clear water Q's													50 year Burned			50 Year Burned and Bulked				Conveyance, type, Pipe sizes and Capacities, lengths and slopes						
								2 year			5 year			10 year			25 year			50 year												
								Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
1A	17.8	17.8	28	4	A44	8.8	0.02	28	4.0	4.0	13	16.8	16.8	10	27.9	27.9	8	42.8	42.8	7	55.0	55.0	7	65.1	65.1	17.8		1.66	108.0	PIPE	48	100	0.04	1808	1804	287
2A		17.8	28	4	A44	8.8	0.02	28		4.0	13		16.8	10		27.9	8		42.8	7		55.0	7		65.1	17.8		1.66	108.0	Mtn Chnl		506	0.11858	1804	1744	
3A	4	21.8	28	4	A44	8.8	0.02	10	2.3	5.7	6	6.6	20.3	5	10.0	33.0	5	13.1	50.6	5	15.3	64.6	5	17.8	76.9	21.8		1.66	127.7							
4B	9.9	9.9	28	4	A44	8.8	0.02	12	5.0	5.0	7	14.5	14.5	5	24.7	24.7	5	32.3	32.3	5	38.0	38.0	5	44.1	44.1	9.9		1.66	73.1							
5B		9.9	28	4	A44	8.8	0.02	12		5.0	7		14.5	5		24.7	5		32.3	5		38.0	5		44.1	9.9		1.66	73.1	Mtn Chnl		534	0.31835	1914	1744	
6B	2	11.9	28	4	A44	8.8	0.02	10	1.2	5.9	6	3.3	16.8	5	5.0	26.5	5	6.5	35.2	5	7.7	41.7	5	8.9	48.8	11.9		1.66	81.1							
7AB	11.9	33.7	28	4	A44	8.8			5.9	11.5		16.8	37.1		26.5	58.3		35.2	84.6		41.7	105.1		48.8	124.9	33.7		1.66	207.3	Mtn Chnl		257	0.07782	1744	1724	
8A	3.2	36.9	28	4	A44	8.8	0.02	12	1.6	12.7	7	4.7	40.2	5	8.0	62.5	5	10.4	90.6	5	12.3	112.3	5	14.2	133.5	36.9		1.66	221.6							
9C	30.5	30.5	28	4	A44	8.8	0.02	24	7.8	7.8	12	30.6	30.6	9	51.0	51.0	7	79.5	79.5	6	103.7	103.7	6	121.6	121.6	30.5		1.66	201.8	PIPE	48	100	0.02	1852	1850	203
10C		30.5	28	4	A44	8.8	0.02	24		7.8	12		30.6	9		51.0	7		79.5	6		103.7	6		121.6	30.5		1.66	201.8	PIPE	2-24	100	0.04	1852	1848	90.5
11C	2.3	32.8	28	4	A44	8.8	0.02	11	1.2	9.0	6	3.8	34.3	5	5.7	55.9	5	7.5	85.8	5	8.8	111.1	5	10.2	130.2	32.8		1.66	216.2							
12AC	32.8	69.7	28	4	A44	8.8			9.0	21.5		34.3	72.9		55.9	116.7		85.8	173.9		111.1	219.6		130.2	261.0	69.7		1.66	433.3	Mtn Chnl		405	0.03457	1724	1710	
13A	3.4	73.1	28	4	A44	8.8	0.02	19	1.1	21.7	10	3.9	74.3	8	6.1	118.0	6	9.8	175.9	5	13.0	216.8	5	15.1	261.0	73.1		1.66	433.3							
14D	9.9	9.9	28	4	A44	8.8	0.02	14	4.3	4.3	8	13.2	13.2	6	21.6	21.6	5	32.3	32.3	5	38.0	38.0	5	44.1	44.1	9.9		1.66	73.1	PIPE	36	100	0.04	1854	1850	133
15D		9.9	28	4	A44	8.8	0.02	14		4.3	8		13.2	6		21.6	5		32.3	5		38.0	5		44.1	9.9		1.66	73.1	Mtn Chnl		1124	0.18683	2008	1798	
16D	6.9	16.8	28	4	A44	8.8	0.02	21	2.0	5.6	11	7.4	18.0	8	12.4	29.0	7	18.0	41.6	6	23.5	49.4	6	27.5	59.7	16.8		1.66	99.1							
17D	8.6	25.4	28	4	A44	8.8	0.02	20	2.7	7.9	10	10.0	26.6	8	15.5	43.6	6	24.8	62.5	5	33.0	76.5	5	38.3	92.0	25.4		1.66	152.7							
18D		25.4	28	4	A44	8.8	0.02	20		7.9	10		26.6	8		43.6	6		62.5	5		76.5	5		92.0	25.4		1.66	152.7	Mtn Chnl		806	0.10918	1798	1710	
19D	7.7	33.1	28	4	A44	8.8	0.02	18	2.7	9.4	9	9.5	30.2	7	15.1	47.9	6	22.2	71.9	5	29.5	88.6	5	34.3	109.2	33.1		1.66	181.3							
20AD	33.1	106.2	28	4	A44	8.8			9.4	30.6		30.2	104.5		47.9	165.9		71.9	247.8		88.6	305.4		109.2	370.2	106.2		1.66	614.5	Mtn Chnl		201	0.02985	1706	1700	
21A	0.1	106.3	28	4	A44	8.8	0.02	6	0.1	30.4	5	0.2	103.5	5	0.3	164.0	5	0.3	244.1	5	0.4	303.3	5	0.4	367.1	106.3		1.66	609.4							
22E	9.7	9.7	28	4	A44	8.8	0.02	9	6.1	6.1	5	18.3	18.3	5	24.2	24.2	5	31.6	31.6	5	37.2	37.2	5	43.2	43.2	9.7		1.66	71.6	PIPE	18	100	0.06	1870	1864	25.7
23E		9.7	28	4	A44	8.8	0.02	9		6.1	5		18.3	5		24.2	5		31.6	5		37.2	5		43.2	9.7		1.66	71.6	Mtn Chnl		1051	0.15033	1864	1706	
24E	9.1	18.8	28	4	A44	8.8	0.02	24	2.3	7.2	12	9.1	22.1	9	15.2	32.6	7	23.7	46.0	7	28.1	55.6	7	33.3	67.1	18.8		1.66	111.4							
25AE	18.8	125.1	28	4	A44	8.8			7.2	36.9		22.1	123.0		32.6	195.7		46.0	284.5		55.6	356.7		67.1	431.3	125.1		1.66	715.9	Mtn Chnl		652	0.02454	1700	1684	
26A	16.8	141.9	28	4	A44	8.8	0.02	27	3.9	37.7	12	16.8	124.3	10	26.3	197.0	8	40.4	288.6	7	51.9	359.8	7	61.4	445.5	141.9		1.66	739.5							
27A		141.9	28	4	A44	8.8	0.02	27		37.7	12		124.3	10		197.0	8		288.6	7		359.8	7		445.5	141.9		1.66	739.5	Mtn Chnl		1018	0.04322	1684	1640	
28A	24.4	166.3	28	4	A44	8.8	0.02	24	6.2	37.5	12	24.5	118.4	9	40.8	187.6	7	63.6	277.0	6	83.0	347.4	6	97.3	442.3	166.3		1.66	734.2							
29B	12.6	12.6	28	4	A44	8.8	0.02	14	5.5	5.5	8	16.9	16.9	6	27.5	27.5	5	41.1	41.1	5	48.3	48.3	5	56.1	56.1	12.6		1.66	93.1	PIPE	36	100	0.02	1854	1852	94.3
30B	3.1	15.7	28	4	A44	8.8	0.02	15	1.3	6.8	8	4.2	21.0	6	6.8	34.3	5	10.1	51.2	5	11.9	60.2	5	13.8	69.9	15.7		1.66	116.0							
31B		15.7	28	4	A44	8.8	0.02	15		6.8	8		21.0	6		34.3	5		51.2	5		60.2	5		69.9	15.7		1.66	116.0	Mtn Chnl		673	0.17533	1852	1734	
32B	3.4	19.1	28	4	A44	8.8	0.02	13	1.6	7.9	7	5.0	23.9	6	7.4	38.5	5	11.1	53.8	5	13.0	64.2	5	15.1	75.9	19.1		1.66	126.1							
33B		19.1	28	4	A44	8.8	0.02	13		7.9	7		23.9	6		38.5	5		53.8	5		64.2	5		75.9	19.1		1.66	126.1	Mtn Chnl		790	0.11392	1734	1644	
34B	7.1	26.2	45	4	A44	8.8	0.02	29	0.7	8.0	22	1.3	23.1	10	6.2	39.3	7	12.6	56.9	6	17.4	68.9	6	24.5	87.5	26.2		1.66	145.2							
35C	4.4	4.4	28	4	A44	8.8	0.02	12	2.2	2.2	7	6.4	6.4	5	11.0	11.0	5	14.4	14.4	5	16.9	16.9	5	19.6	19.6	4.4		1.66	32.5							
36C		4.4	28	4	A44	8.8	0.02	12		2.2	7		6.4	5		11.0	5		14.4	5		16.9	5		19.6	4.4		1.66	32.5	Mtn Chnl		700	0.17143	1824	1704	
37C	2.8	7.2	45	4	A44	8.8	0.02	28	0.3	2.2	22	0.5	6.2	10	2.4	11.1	7	5.0	16.4	6	6.9	19.7	6	9.7	25.1	7.2		1.66	41.7							
38C		7.2	45	4	A44	8.8	0.02	28		2.2	22		6.2	10		11.1	7		16.4	6		19.7	6		25.1	7.2		1.66	41.7	Mtn Chnl		583	0.10292	1704	1644	
39C	2.3	9.5	45	4	A44	8.8	0.02	28	0.2	2.3	21	0.4	5.8	10	2.0	10.7	6	4.6	15.5	6	5.6	20.0	6	7.9	27.7	9.5		1.66	45.9							
40BC	9.5	35.7	45	4	A44	8.8			2.3	10.0		5.8	28.4		10.7	50.0		15.5	72.0		20.0	88.4		27.7	115.1	35.7		1.66	191.1	Mtn Chnl		128	0.03125	1644	1640	
41B	0.3	36	45	4	A44	8.8	0.02	12	0.1	10.0	5	0.4	28.1	5	0.5	48.7	5	0.7	71.4	5	0.9	87.5	5	1.2	113.6	36.0		1.66	188.5							
42AB	36	202.3	45	4	A44	8.8			10.0	44.9		28.1	139.0		48.7	217.7		71.4	322.8		87.5	406.1		113.6	522.4	202.3		1.66	867.1	Mtn Chnl		814	0.3317	1640	1370	
43A	13.8	216.1	45	4	A44	8.8	0.02	28	1.5	45.7	21	2.5	140.6	9	13.2	217.3	6	27.7	321.4	5	38.9	405.0	5	53.6	528.8	216.1		1.66	877.7							
44A		216.1	45	4	A44	8.8	0.02	28		45.7	21		140.6	9		217.3	6		321.4	5		405.0	5		528.8	216.1		1.66	877.7	Mtn Chnl		624	0.02244	1370	1356	
45A	17.2	233.3	45	4	A44	8.8	0.02	29	1.8	45.0	23	3.0	138.9	11	13.2	213.8	7	30.5	316.1	6	42.1	398.6	6	59.3	530.8	233.3		1.66	881.1							
46A		233.3	45	4	A44	8.8	0.02	29		45.0	23		138.9	11		213.8	7		316.1	6		398.6	6		530.8	233.3		1.66	881.1	PIPE	24	141	0.02128	1351	1347	33
47A	3.6	236.9	45	4	A44	8.8	0.03	14	0.6	45.1	5	4.2	138.9	5	6.1	213.9	5	8.5	316.2	5	10.2	399.0	5	10.2	531.2	233.3	3.6	1.65	876.5							
48B	7.7	7.7	45	4	A44	8.8	0.02	22	0.9	0.9	17	1.5	1.5	7	9.4	9.4	5	17.9	17.9	5	21.7	21.7	5	29.9	29.9	7.7		1.66	49.6	PIPE	18	100	0.06	1846	1840	25.7
49B		7.7	45	4	A44	8.8	0.02	22		0.9	17		1.5	7		9.4	5		17.9	5		21.7	5		29.9	7.7		1.66	49.6	Valley Chnl		256	0.39844	1840	1738	
50B	0.4	8.1	45	4	A44	8.8	0.02	16	0.1	1.0	12	0.1	1.6	5	0.7	9.9	5	0.9	17.9	5	1.1	21.8	5	1.6	30.3	8.1		1.66	50.3							
51C	3.7	3.7	45	4	A44	8.8	0.02	19	0.5	0.5	15	0.8	0.8	5	6.2	6.2	5	8.6	8.6	5	10.4	10.4	5	14.4	14.4	3.7		1.66	23.8	PIPE	18	100	0.02	1810	1808	14.9
52C		3.7	45	4	A44	8.8	0.02	19		0.5	15		0.8	5		6.2	5		8.6	5		10.4	5		14.4	3.7		1.66	23.8	Mtn Chnl		433	0.16166	1808	1738	
53C	2.4	6.1	45	4	A44	8.8	0.02	22	0.3	0.7	17	0.5	1.2	6	3.4	7.5	5	5.6	11.0	5	6.8	14.0	5	9.3	20.5	6.1		1.66	34.0							
54BC	6.1	14.2	45	4	A44	8.8			0.7	1.7		1.2	2.8		7.5	17.2		11.0	28.0		14.0	34.8		20.5	50.0	14.2		1.66	83.0	Mtn Chnl		740	0.25405	1738	1550	
55B	6.4	20.6	45	4	A44	8.8	0.02	28	0.7	2.3	22	1.1	3.8	10	5.6	20.4	7	11.3	36.4	6	15.7	45.3	6	22.1	66.5	20.6		1.66	110.4							
56C	4.7	4.7	45	4	A44	8.8	0.02	27	0.5	0.5	21	0.9	0.9	9	4.5	4.5	6	9.4	9.4	5	13.3	13.3	5	18.2	18.2	4.7		1.66	30.3							
57C		4.7	45	4	A44	8.8	0.02	27		0.5	21		0.9	9		4.5	6		9.4	5		13.3	5		18.2	4.7		1.66	30.3	Mtn Chnl		504	0.25794	1804	1674	
58C	5.9	10.6	45	4	A44	8.8	0.02	28	0.6	1.1	22	1.0	1.9	10	5.1	8.8	7	10.5	18.9	6	14.4	25.6	6	20.3	36.6	10.6		1.66	60.7							
59C		10.6	45	4	A44	8.8	0.02	28		1.1	22		1.9	10		8.8	7		18.9	6		25.6	6		36.6	10.6		1.66	60.7	Mtn Chnl		429	0.24242	1674	1570	

								2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone		Isohyetal (rainfall depth)	Imperviousness	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
60C	4.1	14.7	45	4	A44	8.8	0.02	22	0.5	1.5	17	0.8	2.6	7	5.0	11.3	5	9.6	23.0	5	11.6	31.8	5	15.9	46.9	14.7		1.66	77.9							
61C		14.7	45	4	A44	8.8	0.02	22		1.5	17		2.6	7		11.3	5		23.0	5		31.8	5		46.9	14.7		1.66	77.9	Valley Chnl		510	0.01569	1570	1562	
62C	2.5	17.2	45	4	A44	8.8	0.02	24	0.3	1.8	18	0.5	2.9	7	3.1	10.2	5	5.8	20.7	5	7.1	29.7	5	9.7	47.8	17.2		1.66	79.3							
63D	2.4	2.4	45	4	A44	8.8	0.02	27	0.3	0.3	20	0.4	0.4	9	2.3	2.3	6	4.8	4.8	5	6.8	6.8	5	9.3	9.3	2.4		1.66	15.5							
64D		2.4	45	4	A44	8.8	0.02	27		0.3	20		0.4	9		2.3	6		4.8	5		6.8	5		9.3	2.4		1.66	15.5	Valley Chnl		397	0.31738	1710	1584	
65D	1.1	3.5	45	4	A44	8.8	0.02	20	0.1	0.4	15	0.2	0.7	6	1.6	3.7	5	2.6	6.8	5	3.1	9.0	5	4.3	12.7	3.5		1.66	21.1							
66D	3.1	6.6	45	4	A44	8.8	0.02	28	0.3	0.7	21	0.6	1.2	10	2.7	6.4	6	6.2	13.0	6	7.6	16.6	6	10.7	23.4	6.6		1.66	38.8							
67D		6.6	45	4	A44	8.8	0.02	28		0.7	21		1.2	10		6.4	6		13.0	6		16.6	6		23.4	6.6		1.66	38.8	Valley Chnl		256	0.08594	1584	1562	
68D	1	7.6	45	4	A44	8.8	0.02	20	0.1	0.8	16	0.2	1.4	6	1.4	7.3	5	2.3	14.6	5	2.8	18.6	5	3.9	26.4	7.6		1.66	43.8							
69CD	7.6	24.8	45	4	A44	8.8			0.8	2.5		1.4	4.2		7.3	15.1		14.6	30.7		18.6	42.7		26.4	69.4	24.8		1.66	115.3	Valley Chnl		138	0.08696	1562	1550	
70C	0.3	25.1	45	4	A44	8.8	0.02	13	0.0	2.5	5	0.4	4.2	5	0.5	15.2	5	0.7	30.9	5	0.9	43.0	5	1.2	69.5	25.1		1.66	115.3							
71BC	25.1	45.7	45	4	A44	8.8			2.5	4.8		4.2	8.1		15.2	35.5		30.9	66.5		43.0	87.1		69.5	135.9	45.7		1.66	225.6	Mtn Chnl		114	0.10526	1550	1538	
72B	0.4	46.1	45	4	A44	8.8	0.02	10	0.1	4.8	5	0.5	8.1	5	0.7	35.5	5	0.9	66.0	5	1.1	86.3	5	1.6	136.1	46.1		1.66	225.9							
73E	4	4	45	4	A44	8.8	0.02	23	0.5	0.5	17	0.8	0.8	7	4.9	4.9	5	9.3	9.3	5	11.3	11.3	5	15.5	15.5	4.0		1.66	25.8							
74E		4	45	4	A44	8.8	0.02	23		0.5	17		0.8	7		4.9	5		9.3	5		11.3	5		15.5	4.0		1.66	25.8	Mtn Chnl		567	0.16226	1630	1538	
75E	5.4	9.4	45	4	A44	8.8	0.02	26	0.6	1.0	20	1.0	1.7	8	5.8	9.0	6	10.8	16.4	5	15.2	20.6	5	21.0	30.8	9.4		1.66	51.2							
76BE	9.4	55.5	45	4	A44	8.8			1.0	5.8		1.7	9.8		9.0	43.5		16.4	80.7		20.6	105.3		30.8	164.5	55.5		1.66	273.1	Mtn Chnl		282	0.1844	1538	1486	
77B	3.7	59.2	45	4	A44	8.8	0.02	29	0.4	6.2	22	0.7	10.3	10	3.2	45.7	7	6.6	85.1	6	9.1	109.0	6	12.8	172.6	59.2		1.66	286.6							
78C	3.7	3.7	45	4	A44	8.8	0.02	22	0.4	0.4	17	0.7	0.7	7	4.5	4.5	5	8.6	8.6	5	10.4	10.4	5	14.4	14.4	3.7		1.66	23.8							
79C		3.7	45	4	A44	8.8	0.02	22		0.4	17		0.7	7		4.5	5		8.6	5		10.4	5		14.4	3.7		1.66	23.8	Mtn Chnl		516	0.31008	2010	1850	
80C	8.5	12.2	45	4	A44	8.8	0.02	26	0.9	1.3	20	1.6	2.3	9	8.2	11.7	6	17.0	23.9	5	24.0	31.0	5	33.0	44.0	12.2		1.66	73.1							
81C		12.2	45	4	A44	8.8	0.02	26		1.3	20		2.3	9		11.7	6		23.9	5		31.0	5		44.0	12.2		1.66	73.1	Mtn Chnl		501	0.16766	1850	1766	
82C	7.7	19.9	45	4	A44	8.8	0.02	27	0.8	2.1	20	1.4	3.6	9	7.4	17.4	6	15.4	34.0	5	21.7	44.5	5	29.9	65.6	19.9		1.66	108.9	PIPE	18	100	0.14	1780	1766	39.3
83C	3.8	23.7	45	4	A44	8.8	0.02	23	0.4	2.5	18	0.7	4.3	7	4.6	20.3	5	8.9	40.4	5	10.7	53.5	5	14.8	78.4	23.7		1.66	130.1							
84C		23.7	45	4	A44	8.8	0.02	23		2.5	18		4.3	7		20.3	5		40.4	5		53.5	5		78.4	23.7		1.66	130.1	Mtn Chnl		614	0.25081	1766	1612	
85C	9.4	33.1	45	4	A44	8.8	0.02	29	1.0	3.4	23	1.6	5.8	11	7.2	25.8	7	16.7	53.6	6	23.0	70.6	6	32.4	105.6	33.1		1.66	175.3							
86C		33.1	45	4	A44	8.8	0.02	29		3.4	23		5.8	11		25.8	7		53.6	6		70.6	6		105.6	33.1		1.66	175.3	Mtn Chnl		755	0.10331	1612	1534	
87C	3.5	36.6	45	4	A44	8.8	0.02	29	0.4	3.7	23	0.6	6.2	11	2.7	24.5	7	6.2	50.2	6	8.6	68.6	6	12.1	108.2	36.6		1.66	179.5							
88D	4.4	4.4	45	4	A44	8.8	0.02	23	0.5	0.5	17	0.9	0.9	7	5.4	5.4	5	10.3	10.3	5	12.4	12.4	5	17.1	17.1	4.4		1.66	28.4							
89D		4.4	45	4	A44	8.8	0.02	23		0.5	17		0.9	7		5.4	5		10.3	5		12.4	5		17.1	4.4		1.66	28.4	Mtn Chnl		517	0.28627	1788	1640	
90D	3	7.4	45	4	A44	8.8	0.02	22	0.4	0.8	16	0.6	1.5	6	4.2	7.9	5	7.0	14.1	5	8.5	17.6	5	11.6	25.3	7.4		1.66	42.1							
91D		7.4	45	4	A44	8.8	0.02	22		0.8	16		1.5	6		7.9	5		14.1	5		17.6	5		25.3	7.4		1.66	42.1	Mtn Chnl		458	0.22926	1640	1535	
92D	2.8	10.2	45	4	A44	8.8	0.02	23	0.3	1.1	17	0.6	1.9	7	3.4	9.7	5	6.5	17.0	5	7.9	21.7	5	10.9	32.2	10.2		1.66	53.5							
93CD	10.2	46.8	45	4	A44	8.8			1.1	4.7		1.9	8.0		9.7	30.3		17.0	62.8		21.7	86.1		32.2	137.7	46.8		1.66	228.5	Mtn Chnl		225	0.22667	1535	1484	
94C	1.6	48.4	45	4	A44	8.8	0.02	22	0.2	4.9	16	0.3	8.2	6	2.3	30.1	5	3.7	62.1	5	4.5	86.5	5	4.5	138.2	48.4		1.66	229.4							
95BC	48.4	107.6	45	4	A44	8.8			4.9	11.0		8.2	18.5		30.1	72.8		62.1	142.7		86.5	193.6		138.2	307.8	107.6		1.66	510.9	Mtn Chnl		461	0.03	1484	1470	
96B	6.6	114.2	45	4	A44	8.8	0.02	23	0.8	11.4	17	1.3	18.9	7	8.1	69.3	5	15.4	137.5	5	18.6	186.8	5	25.6	307.5	114.2		1.66	510.5							
97B		114.2	45	4	A44	8.8	0.02	23		11.4	17		18.9	7		69.3	5		137.5	5		186.8	5		307.5	114.2		1.66	510.5	PIPE	18	150	0.03	1406.8	1400	18.2
98B	0.7	114.9	45	4	A44	8.8	0.03	14	0.1	11.4	5	0.8	18.9	5	1.2	69.4	5	1.6	137.4	5	2.0	186.8	5	2.0	307.8	114.2	0.7	1.66	509.8							
99C	4.8	4.8	45	4	A44	8.8	0.02	24	0.5	0.5	18	0.9	0.9	7	5.9	5.9	5	11.2	11.2	5	13.5	13.5	5	18.6	18.6	4.8		1.66	30.9							
100C		4.8	45	4	A44	8.8	0.02	24		0.5	18		0.9	7		5.9	5		11.2	5		13.5	5		18.6	4.8		1.66	30.9	Mtn Chnl		557	0.18312	1502	1400	
101C	5.2	10	45	4	A44	8.8	0.02	28	0.5	1.1	22	0.9	1.8	10	4.5	9.1	7	9.2	18.1	6	12.7	22.8	6	17.9	33.6	10.0		1.66	55.7							
102BC	10	124.9	45	4	A44	8.8			1.1	12.4		1.8	20.6		9.1	73.1		18.1	145.3		22.8	196.9		33.6	330.4	124.2	0.7	1.66	547.3	PIPE	18	255	0.03	1400	1393	18.2
103B	3.3	128.2	45	4	A44	8.8	0.03	26	0.4	12.6	20	0.7	21.0	8	3.6	73.3	6	6.7	145.7	5	9.4	197.5	5	9.4	332.5	124.2	4.0	1.64	545.2							
104C	3.4	3.4	45	4	A44	8.8	0.02	26	0.4	0.4	19	0.7	0.7	8	3.7	3.7	6	6.8	6.8	5	9.6	9.6	5	13.2	13.2	3.4		1.66	21.9							
105C		3.4	45	4	A44	8.8	0.02	26		0.4	19		0.7	8		3.7	6		6.8	5		9.6	5		13.2	3.4		1.66	21.9	Valley Chnl		517	0.35783	1655	1470	
106C	2.1	5.5	45	4	A44	8.8	0.02	26	0.2	0.6	20	0.4	1.0	8	2.3	5.8	6	4.2	10.8	5	5.9	14.2	5	8.2	19.9	5.5		1.66	33.1							
107D	2.9	2.9	45	4	A44	8.8	0.02	22	0.3	0.3	17	0.6	0.6	7	3.5	3.5	5	6.8	6.8	5	8.2	8.2	5	11.3	11.3	2.9		1.66	18.7							
108D		2.9	45	4	A44	8.8	0.02	22		0.3	17		0.6	7		3.5	5		6.8	5		8.2	5		11.3	2.9		1.66	18.7	Mtn Chnl		273	0.27106	1544	1470	
109D	1.5	4.4	45	4	A44	8.8	0.02	19	0.2	0.5	14	0.3	0.9	5	2.5	5.1	5	3.5	9.0	5	4.2	11.0	5	5.8	15.6	4.4		1.66	25.8							
110CD	4.4	9.9	45	4	A44	8.8			0.5	1.1		0.9	1.9		5.1	10.8		9.0	19.8		11.0	25.1		15.6	35.5	9.9		1.66	58.9	Mtn Chnl		325	0.16615	1470	1416	
111C	3	12.9	45	4	A44	8.8	0.02	23	0.3	1.4	17	0.6	2.5	7	3.7	13.5	5	7.0	23.3	5	8.5	30.5	5	11.6	44.1	12.9		1.66	73.1							
112C		12.9	45	4	A44	8.8	0.02	23		1.4	17		2.5	7		13.5	5		23.3	5		30.5	5		44.1	12.9		1.66	73.1	PIPE	10	150	0.06522	1402	1393	5.6
113C	2.4	15.3	45	4	A44	8.8	0.02	28	0.3	1.7	21	0.4	2.9	10	2.1	15.2	6	4.8	27.6	5	6.8	36.0	5	9.3	52.0	15.3		1.66	86.3							
114BC	15.3	143.5	45	4	A44	8.8			1.7	14.1		2.9	23.4		15.2	80.4		27.6	158.8		36.0	218.6		52.0	367.8	139.5	4.0	1.64	603.8	PIPE	18	540	0.0487	1392.8	1367	23.2
115B	12.1	155.6	45	4	A44	8.8	0.03	29	1.3	15.2	23	2.2	25.3	10	10.7	85.2	7	21.6	169.5	6	29.9	230.8	6	29.9	385.7	139.5	16.1	1.59	613.9							
116B		155.6	45	4	A44	8.8	0.03	29		15.2	23		25.3	10		85.2	7		169.5	6		230.8	6		385.7	139.5	16.1	1.59	613.9	PIPE	18	475	0.04147	1366.5	1347	21.4
117B	5.4	161	45	4	A44	8.8	0.03	29	0.6	15.7	23	1.0	26.2	11	4.2	88.0	7	9.7	173.7	6	13.3	236.1	6	13.3	393.5	139.5	21.5	1.57	618.6							
118AB	161	397.9	45	4	A44	8.8			15.7	59.9		26.2	165.0		88.0	272.2		173.7	414.2		236.1	539.8		393.5	838.3	372.8	25.1	1.62	1356.6	PIPE	24	285	0.08702	1346.8	1322	66.7
119A	3	400.9	45	4	A44	8.8	0.03	28	0.3	60.0	22	0.6	165.3	10	2.7	272.0	7	5.4	414.6	6	7.4	542.5	6	7.4	841.3	372.8	28.1	1.61	1357.6							
120B	4.1	4.1	45	4	A44	8.8	0.02	27	0.4	0.4	20	0.8	0.8	9	3.9	3.9	6	8.2	8.2	5	11.6	11.6	5	15.9	15.9	4.1		1.66	26.4							
121B		4.1	45	4	A44	8.8	0.02	27		0.4	20		0.8	9		3.9	6		8.2	5		11.6	5		15.9	4.1		1.66	26.4	Mtn Chnl		202	0.28713	1590	1532	

Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal (rainfall depth)	Imperviousness	2 year		5 year		10 year		25 year		50 year		50 year Burned		50 Year Burned and Bulked				slopes					
							Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Tc (minutes)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
1228	2.5	6.6	45	4	A44	8.8	27	0.3	20	0.7	9	1.2	9	2.4	5	7.1	5	17.3	5	9.7	5	24.3	6.6		1.66	40.3	Valley Chnl		393	0.361 32	1532	1390	
123B		6.6	45	4	A44	8.8	27	0.7	20	0.7	9	1.2	9	6.2	6	7.1	5	17.3	5	9.7	5	24.3	10.3		1.66	40.3	Mtn Chnl	24	293	0.0116	1322	1318	24.4
1248	2.5	9.1	45	4	A44	8.8	22	0.3	17	1.0	7	3.1	7	9.0	5	7.1	5	22.7	5	9.7	5	32.2	9.1		1.66	53.5	Valley Chnl		591	0.111 68	1390	1324	
1258		9.1	45	4	A44	8.8	22		17	1.7	7		5	9.0	5		5	22.7	5		5	32.2	9.1		1.66	53.5	Mtn Chnl						
1268	1.1	10.2	45	4	A44	8.8	28	0.1	22	1.1	9	1.1	9	9.3	7	2.0	6	18.2	6	2.7	6	24.1	9.1	1.1	1.59	53.0	Valley Chnl		431	0.037 12	1366	1350	
1278	6.8	53	45	4	A44	8.8	29	0.7	22	4.9	10	8.3	10	5.9	7	27.5	6	16.7	6	23.4	6	132.0	53.0		1.66	219.2	Mtn Chnl						
1288		53	45	4	A44	8.8	29		19	4.9	22		15	27.5	7		6	56.3	6		5	106.3	53.0		1.66	219.2	Valley Chnl		438	0.200 91	1760	1672	
1298	5	58	45	4	A44	8.8	27	0.5	20	5.3	20	0.9	8.9	4.8	9	27.5	6	10.0	5	14.1	5	137.1	58.0		1.66	227.7	Mtn Chnl						
1608	3.8	3.8	45	4	A44	8.8	28	0.4	22	0.4	22	0.7	0.7	3.3	10	3.3	7	6.7	6	9.3	6	13.1	3.8		1.66	21.7							
1618		3.8	45	4	A44	8.8	28		22	0.4	22	0.7	10	3.3	7		6	6.7	6		6	13.1	3.8		1.66	21.7	Mtn Chnl		353	0.254 96	1634	1544	
1628	1.4	5.2	45	4	A44	8.8	22	0.2	16	0.6	16	0.3	0.9	2.0	6	4.5	5	3.3	5	8.7	5	4.0	11.9	5	1.66	28.4							
1638		5.2	45	4	A44	8.8	22		16	0.6	16		0.9		6		5		5		5		11.9	5	1.66	28.4	Mtn Chnl		455	0.329 67	1544	1394	
1648	3.5	8.7	45	4	A44	8.8	28	0.4	21	0.9	21	0.6	1.5	3.4	7	7.1	6	7.0	6	13.6	5	9.9	17.9	5	1.66	44.9							
1658		8.7	45	4	A44	8.8	28		21		9		1.5		9		6		5		5		13.6	5	1.66	44.9	Mtn Chnl		207	0.164 25	1394	1360	
1668	1.7	10.4	45	4	A44	8.8	23	0.2	18	1.1	21	0.3	1.8	2.1	7	7.9	5	4.0	5	15.6	5	4.8	20.9	5	1.66	52.9							
167E	6.6	6.6	45	4	A44	8.8	29	0.7	22	0.7	22	1.2	1.2	5.7	10	5.7	7	11.7	7	11.7	6	16.2	16.2	5	1.66	37.7							
168E		6.6	45	4	A44	8.8	29		22		22		1.2		10		6		6		6		22.7	6	1.66	37.7	Mtn Chnl		539	0.244 9	1492	1360	
169E	3.8	10.4	45	4	A44	8.8	28	0.4	21	1.1	21	0.7	1.8	3.3	10	8.1	6	7.6	6	9.3	6	23.1	10.4	6	1.66	56.0							
17DDE	10.4	20.8	45	4	A44	8.8		1.1	2.1		1.8	3.6	8.1	15.9	17.0	32.7		23.1	43.8		33.7	65.6	20.8		1.66	109.0	Valley Chnl		307	0.013 03	1360	1356	
171D	4.5	25.3	45	4	A44	8.8	29	0.5	22	2.6	22	0.8	4.3	10	3.9	18.1	7	8.0	6	11.0	6	48.8	25.3	6	1.66	123.7							
172BD	25.3	83.3	45	4	A44	8.8		2.6	7.8		4.3	13.1	18.1	44.4		36.2	9	91.0		122.4		209.5	83.3		1.66	347.7	Valley Chnl		543	0.062 62	1356	1322	
173B	5.6	88.9	45	4	A44	8.8	28	0.6	8.3	21	1.1	14.0	9	5.5	45.0	6	11.3	90.2	5	15.9	122.6	5	15.9	211.0	83.3	5.6	1.62	341.4						
174AB	88.9	516.2	45	4	A44	8.8		8.3	69.1		14.0	181.6		45.0	307.0		90.2	518.2		122.6	698.4		211.0	1105.4	474.2	42.0	1.61	1775.5	PIPE	2-24	270	0.012 96	1316	1313	51.5
175A	6.7	522.9	45	4	A44	8.8	28	0.7	69.3	21	1.2	182.4	10	5.8	307.2	6	13.4	519.2	6	16.4	701.6	6	23.1	1116.9	480.9	42.0	1.61	1794.8						
176B	4	4	45	4	A44	8.8	27	0.5	20	0.8	9	3.9	9	3.9	6	8.1	5	11.4	5	11.4	5	11.4	11.4	5	1.66	11.4							
177B		4	45	4	A44	8.8	27		20	0.5	20	0.8	9	3.9	6		5	11.4	5		5	11.4	4.0		1.66	11.4	Valley Chnl		420	0.061 9	1340	1314	
178B	3	7	45	4	A44	8.8	28	0.3	22	0.8	22	0.6	1.4	10	2.7	6.1	7	5.4	6	12.8	6	7.4	17.2	6	1.66	17.2							
179AB	7	529.9	45	4	A44	8.8			0.8	69.7		1.4	183.5		6.1	308.1		12.8	525.6		17.2	710.6		17.2	112.6	480.9	49.0	1.60	1801.8	Valley Chnl		499	0.002	1314	1313	
180A	8.6	538.5	45	4	A44	8.8	28	1.0	67.5	21	1.7	176.7	9	8.4	304.5	6	17.4	506.6	5	24.4	682.1	5	24.4	1087.7	480.9	57.6	1.59	1728.9						
181A	0.9	539.4	45	4	A44	8.8	19	0.1	67.6	15	0.2	176.7	5	1.5	304.6	5	2.1	506.7	5	2.5	682.2	5	3.5	1088.3	481.8	57.6	1.59	1729.8						
182A		539.4	45	4	A44	8.8	19		67.6	15		176.7	5		304.6	5		506.7	5		682.2	5		1088.3	481.8	57.6	1.59	1729.8	PIPE	66	896	0.030 92	1312.5	1285	590
183A	0.8	540.2	45	4	A44	8.8	18	0.1	67.4	14	0.2	176.1	5	1.4	304.0	5	1.9	505.2	5	2.3	679.2	5	2.3	1086.9	481.8	58.4	1.59	1726.7						
184B	0.9	0.9	45	4	A44	8.8	23	0.1	0.1	18	0.2	0.2	7	1.1	1.1	5	2.1	2.1	5	2.6	2.6	5	2.6	2.6		0.9	1.00	2.6						

								2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone		Isohyetal (rainfall depth)	Imperviousness	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
185B		0.9	45	4	A44	8.8	0.03	23		0.1	18		0.2	7		1.1	5		2.1	5		2.6	5		2.6		0.9	1.00	2.6	Valley Chnl		296	0.0777	1318	1295	
186B	1	1.9	45	4	A44	8.8	0.03	26	0.1	0.2	20	0.2	0.4	8	1.1	2.1	6	2.0	3.8	5	2.8	4.8	5	2.8	4.8		1.9	1.00	4.8							
187AB	1.9	542.1	45	4	A44	8.8			0.2	67.5		0.4	176.3		2.1	304.1		3.8	505.5		4.8	679.5		4.8	1087.7	481.8	60.3	1.59	1725.7	Valley Chnl		109	0.00917	1295	1294	
188A	0.1	542.2	45	4	A44	8.8	0.03	26	0.0	67.4	20	0.0	175.8	8	0.1	304.0	6	0.2	505.1	5	0.3	679.3	5	0.3	1084.4	481.8	60.4	1.59	1720.4						
189C	3.7	3.7	45	4	A44	8.8	0.02	26	0.4	0.4	19	0.7	0.7	8	4.0	4.0	6	7.4	7.4	5	10.4	10.4	5	14.4	14.4	3.7		1.66	23.8						
190C		3.7	45	4	A44	8.8	0.02	26		0.4	19		0.7	8		4.0	6		7.4	5		10.4	5		14.4	3.7		1.66	23.8	Valley Chnl		602	0.16611	1394	1294	
191C	3.1	6.8	45	4	A44	8.8	0.02	26	0.3	0.7	19	0.6	1.3	8	3.3	6.9	6	6.2	12.7	5	8.7	16.6	5	12.0	23.7	6.8		1.66	39.4						
192AC	6.8	549	45	4	A44	8.8			0.7	67.6		1.3	176.2		6.9	304.5		12.7	505.9		16.6	680.4		23.7	1089.2	488.6	60.4	1.59	1729.0	Valley Chnl		380	0.00263	1294	1293	
193A	2	551	45	4	A44	8.8	0.03	29	0.2	66.7	22	0.4	173.2	10	1.8	302.3	7	3.6	501.4	6	4.9	669.4	6	4.9	1077.9	488.6	62.4	1.59	1708.8						
194D	0.2	0.2	45	4	A44	8.8	0.03	23	0.0	0.0	17	0.0	0.0	7	0.3	0.3	5	0.5	0.5	5	0.6	0.6	5	0.6	0.6		0.2	1.00	0.6						
195D		0.2	45	4	A44	8.8	0.03	23		0.0	17		0.0	7		0.3	5		0.5	5		0.6	5		0.6		0.2	1.00	0.6	Valley Chnl		254	0.12598	1326	1294	
196D	1.2	1.4	45	4	A44	8.8	0.03	20	0.2	0.2	15	0.3	0.3	6	1.7	1.9	5	2.8	3.2	5	3.4	3.9	5	3.4	3.9		1.4	1.00	3.9						
197D		1.4	45	4	A44	8.8	0.03	20		0.2	15		0.3	6		1.9	5		3.2	5		3.9	5		3.9		1.4	1.00	3.9	Valley Chnl		375	0.00267	1294	1293	
198D	1.8	3.2	45	4	A44	8.8	0.03	24	0.2	0.3	18	0.4	0.5	7	2.2	2.4	5	4.2	4.4	5	5.1	5.3	5	5.1	5.3		3.2	1.00	5.3						
199AD	3.2	554.2	45	4	A44	8.8			0.3	66.9		0.5	173.5		2.4	302.9		4.4	502.7		5.3	671.2		5.3	1080.0	488.6	65.6	1.58	1708.5	Valley Chnl		97	0.01031	1293	1292	
200A	0.8	555	45	4	A44	8.8	0.03	24	0.1	66.8	19	0.2	173.5	7	1.0	302.5	6	1.6	502.0	5	2.3	670.0	5	2.3	1078.4	488.6	66.4	1.58	1704.9						
201B	10.7	10.7	28	4	A44	8.8	0.02	27	2.5	2.5	12	10.7	10.7	10	16.8	16.8	8	25.7	25.7	7	33.1	33.1	7	39.1	39.1	10.7		1.66	64.9						
202B		10.7	28	4	A44	8.8	0.02	27		2.5	12		10.7	10		16.8	8		25.7	7		33.1	7		39.1	10.7		1.66	64.9	Valley Chnl		555	0.45766	1854	1600	
203B	2.2	12.9	45	4	A44	8.8	0.02	27	0.2	2.7	20	0.4	11.1	9	2.1	18.7	6	4.4	30.0	5	6.2	38.2	5	8.5	46.4	12.9		1.66	77.0						
204C	4.3	4.3	45	4	A44	8.8	0.02	27	0.5	0.5	21	0.8	0.8	9	4.1	4.1	6	8.6	8.6	5	12.1	12.1	5	16.7	16.7	4.3		1.66	27.7						
205C		4.3	45	4	A44	8.8	0.02	27		0.5	21		0.8	9		4.1	6		8.6	5		12.1	5		16.7	4.3		1.66	27.7	Mtn Chnl		137	0.42336	1760	1702	
206C	0.5	4.8	45	4	A44	8.8	0.02	16	0.1	0.5	12	0.1	0.9	5	0.8	4.8	5	1.2	9.6	5	1.4	12.8	5	1.9	17.9	4.8		1.66	29.7						
207D	2.3	2.3	45	4	A44	8.8	0.02	24	0.3	0.3	19	0.4	0.4	8	2.5	2.5	6	4.6	4.6	5	6.5	6.5	5	8.9	8.9	2.3		1.66	14.8						
208D		2.3	45	4	A44	8.8	0.02	24		0.3	19		0.4	8		2.5	6		4.6	5		6.5	5		8.9	2.3		1.66	14.8	Valley Chnl		166	0.46988	1782	1704	
209D	0.3	2.6	45	4	A44	8.8	0.02	14	0.0	0.3	6	0.3	0.7	5	0.5	2.9	5	0.7	5.2	5	0.9	7.1	5	1.2	9.8	2.6		1.66	16.3						
210CD	2.6	7.4	45	4	A44	8.8			0.3	0.8		0.7	1.6		2.9	7.7		5.2	14.7		7.1	19.9		9.8	27.7	7.4		1.66	45.9	Valley Chnl		301	0.34551	1704	1600	
211C	1.1	8.5	45	4	A44	8.8	0.02	23	0.1	1.0	17	0.2	1.8	7	1.3	8.8	5	2.6	16.7	5	3.1	21.8	5	4.3	30.6	8.5		1.66	50.8						
212BC	8.5	21.4	45	4	A44	8.8			1.0	3.7		1.8	12.9		8.8	27.5		16.7	46.7		21.8	60.0		30.6	77.0	21.4		1.66	127.9	Mtn Chnl		135	0.13333	1600	1582	
213B	0.3	21.7	45	4	A44	8.8	0.02	14	0.0	3.7	5	0.4	12.9	5	0.5	27.7	5	0.7	46.2	5	0.9	60.4	5	1.2	77.8	21.7		1.66	129.2						
214D	0.8	0.8	45	4	A44	8.8	0.02	17	0.1	0.1	14	0.2	0.2	5	1.3	1.3	5	1.9	1.9	5	2.3	2.3	5	3.1	3.1	0.8		1.66	5.2						
215D		0.8	45	4	A44	8.8	0.02	17		0.1	14		0.2	5		1.3	5		1.9	5		2.3	5		3.1	0.8		1.66	5.2	Valley Chnl		448	0.34375	1736	1582	
216D	0.6	1.4	45	4	A44	8.8	0.02	22	0.1	0.2	16	0.1	0.3	6	0.9	2.0	5	1.4	2.9	5	1.7	3.6	5	2.3	5.0	1.4		1.66	8.3						
217BD	1.4	23.1	45	4	A44	8.8			0.2	3.9		0.3	13.2		2.0	29.5		2.9	49.1		3.6	63.9		5.0	82.7	23.1		1.66	137.3	Mtn Chnl		130	0.09231	1582	1570	
218B	0.4	23.5	45	4	A44	8.8	0.02	16	0.1	3.9	12	0.1	13.2	5	0.7	29.2	5	0.9	49.1	5	1.1	63.0	5	1.6	82.6	23.5		1.66	137.0						
219E	11.3	11.3	28	4	A44	8.8	0.02	23	3.0	3.0	12	11.3	11.3	9	18.9	18.9	7	29.5	29.5	6	38.4	38.4	6	45.0	45.0	11.3		1.66	74.8						
220E		11.3	28	4	A44	8.8	0.02	23		3.0	12		11.3	9		18.9	7		29.5	6		38.4	6		45.0	11.3		1.66	74.8	Valley Chnl		282	0.35816	1710	1609	
221E	9.1	20.4	28	4	A44	8.8	0.02	21	2.7	5.6	11	9.8	21.1	8	16.4	35.3	7	23.7	53.1	6	31.0	69.2	6	36.3	81.1	20.4		1.66	134.7						
222E		20.4	28	4	A44	8.8	0.02	21		5.6	11		21.1	8		35.3	7		53.1	6		69.2	6		81.1	20.4		1.66	134.7	Valley Chnl		208	0.14904	1609	1578	
223E	3	23.4	45	4	A44	8.8	0.02	23	0.3	6.0	17	0.6	21.6	7	3.7	38.7	5	7.0	58.7	5	8.5	76.1	5	11.6	91.0	23.4		1.66	151.1						
224F	2.5	2.5	45	4	A44	8.8	0.02	22	0.3	0.3	17	0.5	0.5	7	3.1	3.1	5	5.8	5.8	5	7.1	7.1	5	9.7	9.7	2.5		1.66	16.1						
225F		2.5	45	4	A44	8.8	0.02	22		0.3	17		0.5	7		3.1	5		5.8	5		7.1	5		9.7	2.5		1.66	16.1	Valley Chnl		378	0.40212	1730	1578	
226F	0.8	3.3	45	4	A44	8.8	0.02	23	0.1	0.4	18	0.2	0.7	7	1.0	4.0	5	1.9	7.0	5	2.3	8.6	5	3.1	12.0	3.3		1.66	20.0						
227EF	3.3	26.7	45	4	A44	8.8			0.4	6.4		0.7	22.3		4.0	42.6		7.0	65.6		8.6	84.5		12.0	102.8	26.7		1.66	170.6	Mtn Chnl		115	0.06957	1578	1570	
228E	0.4	27.1	45	4	A44	8.8	0.02	14	0.1	6.4	5	0.5	22.3	5	0.7	42.8	5	0.9	65.8	5	1.1	84.9	5	1.6	103.7	27.1		1.66	172.2						
229BE	27.1	50.6	45	4	A44	8.8			6.4	10.3		22.3	35.4		42.8	72.0		65.8	113.6		84.9	147.9		103.7	186.3	50.6		1.66	309.2	Mtn Chnl		132	0.16667	1570	1548	
230B	0.4	51	45	4	A44	8.8	0.02	16	0.1	10.3	6	0.4	35.3	5	0.7	71.4	5	0.9	114.2	5	1.1	146.0	5	1.6	185.1	51.0		1.66	307.3						
231C	1.2	1.2	45	4	A44	8.8	0.02	19	0.2	0.2	15	0.3	0.3	5	2.0	2.0	5	2.8	2.8	5	3.4	3.4	5	4.7	4.7	1.2		1.66	7.7						
232C		1.2	45	4	A44	8.8	0.02	19		0.2	15		0.3	5		2.0	5		2.8	5		3.4	5		4.7	1.2		1.66	7.7	Valley Chnl		352	0.29545	1684	1580	
233C	0.7	1.9	45	4	A44	8.8	0.02	22	0.1	0.2	17	0.1	0.4	6	1.0	2.8	5	1.6	4.0	5	2.0	4.9	5	2.7	6.9	1.9		1.66	11.4						
234D	1.2	1.2	45	4	A44	8.8	0.02	18	0.2	0.2	14	0.3	0.3	5	2.0	2.0	5	2.8	2.8	5	3.4	3.4	5	4.7	4.7	1.2		1.66	7.7						
235D		1.2	45	4	A44	8.8	0.02	18		0.2	14		0.3	5		2.0	5		2.8	5		3.4	5		4.7	1.2		1.66	7.7	Valley Chnl		277	0.28881	1660	1580	
236D	0.8	2	45	4	A44	8.8	0.02	19	0.1	0.3	14	0.2	0.4	5	1.3	3.1	5	1.9	4.3	5	2.3	5.3	5	3.1	7.4	2.0		1.66	12.3						
237CD	2	3.9	45	4	A44	8.8			0.3	0.5		0.4	0.8		3.1	5.7		4.3	8.3		5.3	10.2		7.4	14.3	3.9		1.66	23.7	Valley Chnl		135	0.23704	1580	1548	
238C	0.4	4.3	45	4	A44	8.8	0.02	16	0.1	0.5	6	0.4	1.2	5	0.7	6.2	5	0.9	8.9	5	1.1	10.9	5	1.6	15.4	4.3		1.66	25.5						
239BC	4.3	55.3	45	4	A44	8.8			0.5	10.9		1.2	36.2		6.2	76.8		8.9	121.9		10.9	156.9		15.4	200.5	55.3		1.66	332.8	Mtn Chnl		395	0.0962	1548	1510	
240B	6.3	61.6	45	4	A44	8.8	0.02	28	0.7	11.5	21	1.1	37.1	9	6.0	79.8	6	12.6	127.1	5	17.8	164.3	5	24.5	213.5	61.6		1.66	354.5						
241B		61.6	45	4	A44	8.8	0.02	28		11.5	21		37.1	9		79.8	6		127.1	5		164.3	5		213.5	61.6		1.66	354.5	Mtn Chnl		550	0.16364	1510	1420	
242B	5.8	67.4	45	4	A44	8.8	0.02	24	0.7	12.0	19	1.1	37.7	8	6.2	80.7	5	13.5	128.0	5	16.4	167.4	5	22.5	221.1	67.4		1.66	367.0						
243C	5.2	5.2	45	4	A44	8.8	0.02	27	0.6	0.6	20	1.0	1.0	9	5.0	5.0	6	10.4	10.4	5	14.7	14.7	5	20.2	20.2	5.2		1.66	33.5						
244C		5.2	45	4	A44	8.8	0.02	27		0.6	20		1.0	9		5.0	6		10.4	5		14.7	5		20.2	5.2		1.66	33.5	Mtn Chnl		339	0.33628	1732	1618	
245C	2.2	7.4	45	4	A44	8.8	0.02	27	0.2	0.8	20	0.4	1.4	9	2.1	6.9	6	4.4	14.2	5	6.2	18.7	5	8.5	26.3	7.4		1.66	43.6						
246D	1.7	1.7	45	4	A44	8.8	0.02	24	0.2	0.2	19	0.3	0.3	8	1.8	1.8	6	3.4	3.4	5	4.8	4.8	5	6.6	6.6	1.7		1.66	11.0						
247CD	1.7	9.1	45	4	A44	8.8			0.2	1.0		0.3	1.7		1.8	8.7		3.4	17.6		4.8	23.3		6.6	32.8	9.1		1.66	54.5	Mtn Chnl		94	0.19149	1618	1600	

								2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone		Isohyetal (rainfall depth)	Imperviousness	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
248C	0.2	9.3	45	4	A44	8.8	0.02	11	0.0	1.0	5	0.2	1.7	5	0.3	8.7	5	0.5	17.6	5	0.6	23.3	5	0.8	32.9	9.3		1.66	54.5							
249E	0.8	0.8	45	4	A44	8.8	0.02	22	0.1	0.1	17	0.2	0.2	6	1.1	1.1	5	1.9	1.9	5	2.3	2.3	5	3.1	3.1	0.8		1.66	5.2							
250CE	0.8	10.1	45	4	A44	8.8			0.1	1.1		0.2	1.9		1.1	9.6		1.9	19.2		2.3	25.2		3.1	35.5	10.1		1.66	59.0	Mtn Chnl		252	0.4127	1600	1496	
251C	0.4	10.5	45	4	A44	8.8	0.02	14	0.1	1.1	5	0.5	2.0	5	0.7	9.6	5	0.9	19.3	5	1.1	25.8	5	1.6	36.8	10.5		1.66	61.1							
252F	1.8	1.8	45	4	A44	8.8	0.02	26	0.2	0.2	19	0.3	0.3	8	1.9	1.9	6	3.6	3.6	5	5.1	5.1	5	7.0	7.0	1.8		1.66	11.6							
253F		1.8	45	4	A44	8.8	0.02	26		0.2	19		0.3	8		1.9	6		3.6	5		5.1	5		7.0	1.8		1.66	11.6	Mtn Chnl		200	0.41	1700	1618	
254F	2	3.8	45	4	A44	8.8	0.02	26	0.2	0.4	20	0.4	0.7	8	2.2	4.0	6	4.0	7.5	5	5.6	10.1	5	7.8	14.1	3.8		1.66	23.4							
255F		3.8	45	4	A44	8.8	0.02	26		0.4	20		0.7	8		4.0	6		7.5	5		10.1	5		14.1	3.8		1.66	23.4	Valley Chnl		322	0.37888	1618	1496	
256F	1	4.8	45	4	A44	8.8	0.02	23	0.1	0.5	18	0.2	0.9	7	1.2	5.1	5	2.3	9.2	5	2.8	12.1	5	3.9	17.1	4.8		1.66	28.3							
257CF	4.8	15.3	45	4	A44	8.8			0.5	1.7		0.9	2.9		5.1	14.6		9.2	28.0		12.1	37.9		17.1	53.9	15.3		1.66	89.4	Mtn Chnl		269	0.28253	1496	1420	
258C	2	17.3	45	4	A44	8.8	0.02	23	0.2	1.9	17	0.4	3.3	7	2.4	16.1	5	4.7	30.7	5	5.6	40.7	5	7.8	59.0	17.3		1.66	98.0							
259BC	17.3	84.7	45	4	A44	8.8			1.9	13.8		3.3	40.9		16.1	95.7		30.7	156.5		40.7	202.7		59.0	274.6	84.7		1.66	455.9	Mtn Chnl		282	0.04965	1420	1406	
260B	5.4	90.1	45	4	A44	8.8	0.02	26	0.6	14.3	20	1.0	41.5	8	5.8	95.1	6	10.8	157.1	5	15.2	203.5	5	21.0	282.7	90.1		1.66	469.2							
261B		90.1	45	4	A44	8.8	0.02	26		14.3	20		41.5	8		95.1	6		157.1	5		203.5	5		282.7	90.1		1.66	469.2	Valley Chnl		253	0.07905	1406	1386	
262B	9.1	99.2	45	4	A44	8.8	0.02	29	0.9	15.1	23	1.6	42.8	11	7.0	99.3	7	16.1	164.1	6	22.3	212.1	6	31.4	301.8	99.2		1.66	500.9							
263B		99.2	45	4	A44	8.8	0.02	29		15.1	23		42.8	11		99.3	7		164.1	6		212.1	6		301.8	99.2		1.66	500.9	PIPE	24	910	0.07692	1392	1340	62.7
264B	5.8	105	45	4	A44	8.8	0.03	29	0.6	15.7	22	1.1	43.5	10	5.1	100.2	7	10.4	167.6	6	14.3	217.6	6	14.3	306.2	99.2	5.8	1.62	497.1							
265B		105	45	4	A44	8.8	0.03	29		15.7	22		43.5	10		100.2	7		167.6	6		217.6	6		306.2	99.2	5.8	1.62	497.1	Valley Chnl		617	0.05835	1350	1314	
266B	6.3	111.3	45	4	A44	8.8	0.03	29	0.7	16.2	23	1.2	44.2	10	5.6	99.8	7	11.3	166.7	6	15.5	218.4	6	15.5	310.7	99.2	12.1	1.59	493.5							
267C	7.8	7.8	45	4	A44	8.8	0.02	27	0.8	0.8	20	1.5	1.5	9	7.5	7.5	6	15.6	15.6	5	22.0	22.0	5	30.3	30.3	7.8		1.66	50.3							
268C		7.8	45	4	A44	8.8	0.02	27		0.8	20		1.5	9		7.5	6		15.6	5		22.0	5		30.3	7.8		1.66	50.3	Mtn Chnl		445	0.17978	1654	1574	
269C	5.4	13.2	45	4	A44	8.8	0.02	29	0.6	1.4	23	0.9	2.4	11	4.2	10.9	7	9.6	24.1	6	13.2	32.4	6	18.6	46.1	13.2		1.66	76.4							
270C		13.2	45	4	A44	8.8	0.02	29		1.4	23		2.4	11		10.9	7		24.1	6		32.4	6		46.1	13.2		1.66	76.4	Mtn Chnl		665	0.24662	1574	1410	
271C	11.4	24.6	45	4	A44	8.8	0.02	28	1.2	2.5	21	2.1	4.3	10	9.9	17.8	6	22.8	37.1	6	27.9	51.4	6	39.3	77.2	24.6		1.66	128.2							
272C		24.6	45	4	A44	8.8	0.02	28		2.5	21		4.3	10		17.8	6		37.1	6		51.4	6		77.2	24.6		1.66	128.2	Mtn Chnl		292	0.07534	1410	1388	
273C	2.3	26.9	45	4	A44	8.8	0.02	24	0.3	2.7	19	0.4	4.6	8	2.5	17.7	5	5.4	38.5	5	6.5	53.2	5	8.9	81.4	26.9		1.66	135.1							
274C		26.9	45	4	A44	8.8	0.02	24		2.7	19		4.6	8		17.7	5		38.5	5		53.2	5		81.4	26.9		1.66	135.1	Valley Chnl		188	0.07979	1388	1373	
275C	2.8	29.7	45	4	A44	8.8	0.02	27	0.3	3.0	21	0.5	5.1	9	2.7	18.7	6	5.6	41.5	5	7.9	56.6	5	10.9	87.3	29.7		1.66	144.9							
276D	4.5	4.5	45	4	A44	8.8	0.03	29	0.5	0.5	23	0.8	0.8	10	4.0	4.0	7	8.1	8.1	6	11.1	11.1	6	11.1	11.1		4.5	1.00	11.1							
277CD	4.5	34.2	45	4	A44	8.8			0.5	3.4		0.8	5.8		4.0	21.9		8.1	47.7		11.1	64.1		11.1	96.4	29.7	4.5	1.57	151.7	Valley Chnl		270	0.02593	1373	1366	
278C	1.8	36	45	4	A44	8.8	0.03	24	0.2	3.6	18	0.4	6.1	7	2.2	21.8	6	3.6	48.7	5	5.1	65.4	5	5.1	97.2	29.7	6.3	1.54	150.2							
279C		36	45	4	A44	8.8	0.03	24		3.6	18		6.1	7		21.8	6		48.7	5		65.4	5		97.2	29.7	6.3	1.54	150.2	Valley Chnl		455	0.08352	1366	1328	
280C	0.9	36.9	45	4	A44	8.8	0.02	14	0.1	3.7	6	0.8	6.2	5	1.5	21.7	5	2.1	48.1	5	2.5	64.7	5	3.5	97.2	30.6	6.3	1.55	150.4	PIPE	15	713	0.10028	1393.5	1322	20.5
281C	3.3	40.2	45	4	A44	8.8	0.03	29	0.4	4.0	22	0.6	6.7	10	2.9	22.1	7	5.9	50.8	6	8.1	67.8	6	8.1	101.2	30.6	9.6	1.50	152.1							
282D	1.9	1.9	45	4	A44	8.8	0.02	20	0.2	0.2	16	0.4	0.4	6	2.7	2.7	5	4.4	4.4	5	5.4	5.4	5	7.4	7.4	1.9		1.66	12.2							
283D		1.9	45	4	A44	8.8	0.02	20		0.2	16		0.4	6		2.7	5		4.4	5		5.4	5		7.4	1.9		1.66	12.2	Valley Chnl		681	0.12335	1412	1328	
284D	1.9	3.8	45	4	A44	8.8	0.03	29	0.2	0.4	23	0.4	0.7	11	1.5	3.7	7	3.4	7.0	6	4.7	8.8	6	4.7	10.9	1.9	1.9	1.33	14.5							
285CD	3.8	44	45	4	A44	8.8			0.4	4.3		0.7	7.3		3.7	24.0		7.0	55.7		8.8	75.1		10.9	110.3	32.5	11.5	1.49	164.0	Valley Chnl		200	0.04	1328	1320	
286C	0.5	44.5	45	4	A44	8.8	0.03	26	0.1	4.4	19	0.1	7.4	8	0.6	23.9	6	1.0	54.9	5	1.4	73.2	5	1.4	109.1	32.5	12.0	1.48	161.7							
287D	3.2	3.2	31	4	A44	8.8	0.02	10	1.7	1.7	5	6.0	6.0	5	7.9	7.9	5	10.3	10.3	5	12.1	12.1	5	14.1	14.1	3.2		1.66	23.4							
288D		3.2	31	4	A44	8.8	0.02	10		1.7	5		6.0	5		7.9	5		10.3	5		12.1	5		14.1	3.2		1.66	23.4	Mtn Chnl		608	0.23355	1608	1466	
289D	4.8	8	31	4	A44	8.8	0.02	27	0.5	1.9	7	7.1	11.6	6	10.4	16.1	5	15.4	21.8	5	18.1	26.0	5	21.2	31.1	8.0		1.66	51.6							
290D		8	31	4	A44	8.8	0.02	27		1.9	7		11.6	6		16.1	5		21.8	5		26.0	5		31.1	8.0		1.66	51.6	Valley Chnl		530	0.08679	1446	1400	
291D	1.3	9.3	31	4	A44	8.8	0.03	28	0.2	2.0	8	1.8	12.5	6	2.8	17.3	5	4.2	23.9	5	4.9	28.5	5	4.9	33.5	8.0	1.3	1.57	52.5							
292E	6.1	6.1	31	4	A44	8.8	0.02	18	1.3	1.3	7	9.0	9.0	5	15.1	15.1	5	19.6	19.6	5	23.0	23.0	5	26.9	26.9	6.1		1.66	44.7							
293E		6.1	31	4	A44	8.8	0.02	18		1.3	7		9.0	5		15.1	5		19.6	5		23.0	5		26.9	6.1		1.66	44.7	PIPE	12	514	0.07802	1446	1406	9.95
294E	2.1	8.2	31	4	A44	8.8	0.03	14	0.7	2.0	7	3.1	12.0	5	5.2	19.2	5	6.8	24.9	5	7.9	30.0	5	7.9	34.0	6.1	2.1	1.49	50.7							
295DE	8.2	17.5	31	4	A44	8.8			2.0	3.6		12.0	23.5		19.2	34.3		24.9	47.5		30.0	55.8		34.0	64.5	14.1	3.4	1.53	98.8	Valley Chnl		514	0.07802	1446	1406	
296D		17.5	31	4	A44	8.8	0.03	5		3.5	5		22.9	5		32.9	5		45.8	5		54.5	5		63.2	14.1	3.4	1.53	96.8							
297E	3.5	3.5	31	4	A44	8.8	0.02	27	0.4	0.4	7	5.2	5.2	6	7.6	7.6	5	11.2	11.2	5	13.2	13.2	5	15.4	15.4	3.5		1.66	25.6							
298E		3.5	31	4	A44	8.8	0.02	27		0.4	7		5.2	6		7.6	5		11.2	5		13.2	5		15.4	3.5		1.66	25.6	PIPE	12	174	0.08046	1419.9	1406	10.1
299E	0.8	4.3	31	4	A44	8.8	0.03	8	0.5	0.9	5	1.5	6.4	5	2.0	9.3	5	2.6	13.2	5	3.0	15.9	5	3.0	18.1	3.5	0.8	1.54	27.8							
300F	0.8	0.8	31	4	A44	8.8	0.02	7	0.6	0.6	5	1.5	1.5	5	2.0	2.0	5	2.6	2.6	5	3.0	3.0	5	3.5	3.5	0.8		1.66	5.9							
301F		0.8	31	4	A44	8.8	0.02	7		0.6	5		1.5	5		2.0	5		2.6	5		3.0	5		3.5	0.8		1.66	5.9	PIPE	12	264	0.04583	1418	1406	7.63
302F	0.6	1.4	31	4	A44	8.8	0.03	8	0.4	1.0	5	1.1	2.4	5	1.5	3.2	5	1.9	4.2	5	2.3	5.0	5	2.3	5.5	0.8	0.6	1.38	7.5							
303EF	1.4	5.7	31	4	A44	8.8			1.0	1.9		2.4	8.9		3.2	12.5		4.2	17.4		5.0	20.9		5.5	23.6	4.3	1.4	1.50	35.3	PIPE	18	1220	0.06877	1405.9	1322	27.5
304E	0.1	5.8	31	4	A44	8.8	0.03	7	0.1	1.7	5	0.2	8.4	5	0.3	11.9	5	0.3	16.6	5	0.4	19.6	5	0.4	22.3	4.3	1.5	1.49	33.2							
305DE	5.8	23.3	31	4	A44	8.8			1.7	4.7		8.4	30.8		11.9	44.8		16.6	62.4		19.6	74.0		22.3	85.5	18.4	4.9	1.52	130.0	Valley Chnl		470	0.05745	1402	1375	
306D	2.9	26.2	31	4	A44	8.8	0.03	29	0.3	5.0	8	3.9	32.5	6	6.3	46.8	5	9.3	65.2	5	11.0	77.8	5	11.0	89.2	18.4	7.8	1.46	130.6							
307D		26.2	31	4	A44	8.8	0.03	29		5.0	8		32.5	6		46.8	5		65.2	5		77.8	5		89.2	18.4	7.8	1.46	130.6	Valley Chnl		140	0.06429	1375	1366	
308D	0.2	26.4	31	4	A44	8.8	0.03	7	0.2	4.9	5	0.4	32.5	5	0.5	46.9	5	0.6	64.9	5	0.8	77.9	5	0.8	89.5	18.4	8.0	1.46	130.6							
309E	2.8	2.8	31	4	A44	8.8	0.02	13	1.1	1.1	7	4.1	4.1	5	6.9	6.9	5	9.0	9.0	5	10.6	10.6	5	10.6	10.6	2.8		1.66	17.5							
310E		2.8	31	4	A44	8.8	0.02	13		1.1	7		4.1	5		6.9	5		9.0	5		10.6	5		10.6	2.8		1.66	17.5	Valley Chnl		480	0.075	1402	1366	

								2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone		Isohyetal (rainfall depth)	Imperviousness	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
311E	3.1	5.9	31	4	A44	8.8	0.03	28	0.4	1.3	8	4.2	7.9	6	6.8	12.6	5	10.0	16.6	5	11.7	19.7	5	11.7	19.7	2.8	3.1	1.31	25.9							
312DE	5.9	32.3	31	4	A44	8.8			1.3	6.1		7.9	38.4		12.6	55.8		16.6	77.4		19.7	92.6		19.7	104.2	21.2	11.1	1.43	149.3	Valley Chnl		350	0.07429	1366	1340	
313D	5.9	38.2	31	4	A44	8.8	0.03	29	0.7	6.6	8	8.0	42.6	6	12.9	61.4	5	19.0	85.8	5	22.3	103.7	5	22.3	115.8	21.2	17.0	1.37	158.2							
314D		38.2	31	4	A44	8.8	0.03	29		6.6	8		42.6	6		61.4	5		85.8	5		103.7	5		115.8	21.2	17.0	1.37	158.2	Valley Chnl		407	0.04914	1340	1320	
315D	2.8	41	45	4	A44	8.8	0.03	27	0.3	6.8	20	0.6	42.3	8	3.1	62.4	6	5.7	86.6	5	8.0	105.2	5	8.0	117.6	21.2	19.8	1.34	157.8							
316CD	41	85.5	45	4	A44	8.8			6.8	11.1		42.3	48.6		62.4	84.4		86.6	141.4		105.2	177.0		117.6	226.7	53.7	31.8	1.41	320.7	PIPE	24	819	0.03541	1322	1293	42.6
317C	1.6	87.1	45	4	A44	8.8	0.03	16	0.2	11.1	12	0.4	47.6	5	2.7	84.2	5	3.8	140.7	5	4.5	227.2	5	4.5	227.2	53.7	33.4	1.41	319.6							
318BC	87.1	198.4	45	4	A44	8.8			11.1	26.9		47.6	84.0		84.2	178.0		140.7	304.3		178.9	392.7		227.2	536.3	152.9	45.5	1.51	809.0	Valley Chnl		362	0.03591	1317	1304	
319B	3.5	201.9	45	4	A44	8.8	0.03	26	0.4	27.2	20	0.7	83.8	8	3.8	175.9	6	7.1	300.8	5	9.9	391.3	5	9.9	536.1	152.9	49.0	1.50	804.0							
320C	2.5	2.5	31	4	A44	8.8	0.03	15	0.8	0.8	7	3.7	3.7	6	5.5	5.5	5	8.1	8.1	5	9.4	9.4	5	9.4	9.4		2.5	1.00	9.4							
321C		2.5	31	4	A44	8.8	0.03	15		0.8	7		3.7	6		5.5	5		8.1	5		9.4	5		9.4		2.5	1.00	9.4	Valley Chnl		495	0.06061	1358	1328	
322C	6.1	8.6	45	4	A44	8.8	0.03	26	0.7	1.4	20	1.2	4.7	8	6.7	11.4	6	12.3	19.0	5	17.3	24.0	5	17.3	24.0		8.6	1.00	24.0							
323C		8.6	45	4	A44	8.8	0.03	26		1.4	20		4.7	8		11.4	6		19.0	5		24.0	5		24.0		8.6	1.00	24.0	Valley Chnl		390	0.06154	1328	1304	
324C	3	11.6	45	4	A44	8.8	0.03	27	0.3	1.7	21	0.6	5.1	9	2.9	13.7	6	6.1	23.0	5	8.5	29.3	5	8.5	29.3		11.6	1.00	29.3							
325BC	11.6	213.5	45	4	A44	8.8			1.7	28.4		5.1	86.8		13.7	182.4		23.0	313.2		29.3	406.3		29.3	554.8	152.9	60.6	1.47	817.0	PIPE	18	360	0.03472	1305.5	1293	19.6
326B	4.2	217.7	45	4	A44	8.8	0.03	28	0.5	28.8	21	0.8	87.4	9	4.1	182.6	6	8.5	313.8	5	11.9	408.4	5	11.9	557.3	152.9	64.8	1.46	815.7							
327B		217.7	45	4	A44	8.8	0.03	28		28.8	21		87.4	9		182.6	6		313.8	5		408.4	5		557.3	152.9	64.8	1.46	815.7	PIPE	24	232	0.01815	1293	1289	30.5
328B	3	220.7	45	4	A44	8.8	0.03	28	0.3	28.9	21	0.6	87.7	9	2.9	182.4	6	6.1	313.7	6	7.4	410.7	6	7.4	560.2	152.9	67.8	1.46	816.3							
329AB	220.7	775.7	45	4	A44	8.8			28.9	81.2		87.7	203.7		182.4	372.0		313.7	653.5		410.7	879.1		560.2	1447.0	641.5	134.2	1.55	2236.9	PIPE	2-24	294	0.01837	1290.2	1285	61.3
330A	1.1	776.8	45	4	A44	8.8	0.03	23	0.1	81.2	17	0.2	203.1	7	1.4	372.0	5	2.6	653.4	5	3.1	878.8	5	3.1	1447.1	641.5	135.3	1.55	2235.8							
331A		776.8	45	4	A44	8.8	0.03	23		81.2	17		203.1	7		372.0	5		653.4	5		878.8	5		1447.1	641.5	135.3	1.55	2235.8	Valley Chnl		227	0.0022	1284	1284	
332A	2.5	779.3	45	4	A44	8.8	0.03	22	0.3	80.9	17	0.5	202.4	6	3.6	370.7	5	5.9	649.7	5	7.1	873.0	5	7.1	1438.2	641.5	137.8	1.54	2219.5							
333A		779.3	45	4	A44	8.8	0.03	22		80.9	17		202.4	6		370.7	5		649.7	5		873.0	5		1438.2	641.5	137.8	1.54	2219.5	PIPE	66	233	0.03863	1284.8	1280	660
334A	1.3	780.6	45	4	A44	8.8	0.03	22	0.2	80.9	17	0.3	202.3	6	1.9	370.4	5	3.1	649.6	5	3.7	871.1	5	3.7	1434.7	641.5	139.1	1.54	2212.9							
335A	4	784.6	45	4	A44	8.8	0.02	23	0.5	81.0	17	0.8	202.5	7	4.9	370.6	5	9.3	650.0	5	11.3	871.6	5	15.5	1436.8	645.5	139.1	1.54	2216.9							
336A		784.6	45	4	A44	8.8	0.02	23		81.0	17		202.5	7		370.6	5		650.0	5		871.6	5		1436.8	645.5	139.1	1.54	2216.9	Valley Chnl		207	0.00483	1269	1268	
337A	0.9	785.5	45	4	A44	8.8	0.02	16	0.1	80.9	12	0.2	201.8	5	1.5	370.1	5	2.1	647.8	5	2.5	869.5	5	3.5	1432.7	646.4	139.1	1.54	2210.8							
338B	4.8	4.8	45	4	A44	8.8	0.02	29	0.5	0.5	22	0.9	0.9	10	4.2	4.2	7	8.5	8.5	6	11.8	11.8	6	11.8	11.8	4.8		1.66	19.5							
339B		4.8	45	4	A44	8.8	0.02	29		0.5	22		0.9	10		4.2	7		8.5	6		11.8	6		11.8	4.8		1.66	19.5	Valley Chnl		550	0.07273	1268	1267	
340B	4.8	9.6	45	4	A44	8.8	0.02	28	0.5	1.0	22	0.9	1.7	10	4.2	7.5	7	8.5	16.1	6	11.8	21.5	6	11.8	21.5	9.6		1.66	35.8							
341B		9.6	45	4	A44	8.8	0.02	28		1.0	22		1.7	10		7.5	7		16.1	6		21.5	6		21.5	9.6		1.66	35.8	Valley Chnl		500	0.06			
342B	4.8	14.4	45	4	A44	8.8	0.02	28	0.5	1.5	21	0.9	2.5	10	4.2	10.5	6	9.6	21.2	6	11.8	29.3	6	11.8	29.3	14.4		1.66	48.6							
343B		14.4	45	4	A44	8.8	0.02	28		1.5	21		2.5	10		10.5	6		21.2	6		29.3	6		29.3	14.4		1.66	48.6	Valley Chnl		475	0.06316			
344B	4.8	19.2	45	4	A44	8.8	0.02	29	0.5	1.9	22	0.9	3.3	10	4.2	13.2	7	8.5	26.9	6	11.8	35.7	6	11.8	35.7	19.2		1.66	59.2							
345AB	19.2	804.7	45	4	A44	8.8			1.9	81.5		3.3	203.1		13.2	372.1		26.9	651.4		35.7	874.8		35.7	1443.1	665.6	139.1	1.55	2230.9	Valley Chnl		470	0.04681			
346C	0.8	0.8	45	4	A44	8.8	0.02	29	0.1	0.1	23	0.1	0.1	11	0.6	0.6	7	1.4	1.4	6	2.0	2.0	6	2.0	2.0	0.8		1.66	3.3							
347C		0.8	45	4	A44	8.8	0.02	29		0.1	23		0.1	11		0.6	7		1.4	6		2.0	6		2.0	0.8		1.66	3.3	Valley Chnl		108	0.05556	1268	1262	
348C	0.8	1.6	45	4	A44	8.8	0.02	29	0.1	0.1	23	0.1	0.3	11	0.6	1.2	7	1.4	2.8	6	2.0	3.9	6	2.0	3.9	1.6		1.66	6.5							
349AC	1.6	806.3	45	4	A44	8.8			0.1	81.4		0.3	202.8		1.2	371.9		2.8	650.5		3.9	871.1		3.9	1438.7	667.2	139.1	1.55	2224.4	Valley Chnl		200	0.04			
350A	0.8	807.1	45	4	A44	8.8	0.02	26	0.1	81.4	19	0.2	202.5	8	0.9	371.5	6	1.6	649.1	5	2.3	870.4	5	3.1	1438.1	668.0	139.1	1.55	2223.7	Valley Chnl		200	0.04			
351B	0.1	0.1	45	4	A44	8.8	0.02	9	0.0	0.0	5	0.1	0.1	5	0.2	0.2	5	0.2	0.2	5	0.3	0.3	5	0.4	0.4	0.1		1.66	0.6							
352B	2.7	2.8	45	4	A44	8.8	0.02	24	0.3	0.3	19	0.5	0.6	8	2.9	3.1	6	5.4	5.6	5	7.6	7.9	5	10.5	10.9	2.8		1.66	18.0							
353B		2.8	45	4	A44	8.8	0.02	24		0.3	19		0.6	8		3.1	6		5.6	5		7.9	5		10.9	2.8		1.66	18.0	Mtn Chnl		322	0.31056	1540	1440	
354B	2.6	5.4	45	4	A44	8.8	0.02	20	0.3	0.6	15	0.6	1.1	6	3.7	6.2	5	6.1	10.3	5	7.3	13.6	5	10.1	19.3	5.4		1.66	32.1							
355C	3.3	3.3	45	4	A44	8.8	0.02	28	0.4	0.4	21	0.6	0.6	10	2.9	2.9	6	6.6	6.6	6	8.1	8.1	6	11.4	11.4	3.3		1.66	18.9							
356C		3.3	45	4	A44	8.8	0.02	28		0.4	21		0.6	10		2.9	6		6.6	6		8.1	6		11.4	3.3		1.66	18.9	Valley Chnl		327	0.37309	1560	1438	
357C	1.8	5.1	45	4	A44	8.8	0.02	24	0.2	0.6	18	0.4	1.0	7	2.2	5.0	5	4.2	10.2	5	5.1	12.5	5	7.0	17.6	5.1		1.66	29.3							
358BC	5.1	10.5	45	4	A44	8.8			0.6	1.2		1.0	2.1		5.0	11.1		10.2	20.5		12.5	26.1		17.6	37.0	10.5		1.66	61.3	Mtn Chnl		204	0.13725	1438	1410	
359B	1.4	11.9	45	4	A44	8.8	0.02	23	0.2	1.3	17	0.3	2.3	7	1.7	12.3	5	3.3	22.5	5	4.0	28.7	5	5.4	41.0	11.9		1.66	68.0							
360B	2.3	14.2	45	4	A44	8.8	0.02	28	0.2	1.6	21	0.4	2.7	9	2.2	14.5	6	4.6	27.1	5	6.5	34.2	5	8.9	48.7	14.2		1.66	80.8							
361B		14.2	45	4	A44	8.8	0.02	28		1.6	21		2.7	9		14.5	6		27.1	5		34.2	5		48.7	14.2		1.66	80.8	Mtn Chnl		374	0.09626	1414	1378	
362B	4.1	18.3	45	4	A44	8.8	0.02	28	0.4	2.0	22	0.7	3.4	10	3.6	16.5	7	7.3	31.4	6	10.0	40.3	6	14.1	59.1	18.3		1.66	98.1							
363C	3.1	3.1	45	4	A44	8.8	0.02	26	0.3	0.3	20	0.6	0.6	9	3.0	3.0	6	6.2	6.2	5	8.7	8.7	5	12.0	12.0	3.1		1.66	20.0							
364C		3.1	45	4	A44	8.8	0.02	26		0.3	20		0.6	9		3.0	6		6.2	5		8.7	5		12.0	3.1		1.66	20.0	Mtn Chnl		469	0.22175	1480	1376	
365C	2.5	5.6	45	4	A44	8.8	0.02	24	0.3	0.6	18	0.5	1.0	7	3.1	5.0	5	5.8	9.4	5	7.1	12.9	5	9.7	18.9	5.6		1.66	31.3							
366BC	5.6	23.9	45	4	A44	8.8			0.6	2.6		1.0	4.4		5.0	20.6		9.4	40.6		12.9	52.6		18.9	76.8	23.9		1.66	127.5	Valley Chnl		183	0.03279	1376	1370	
367B	0.8	24.7	45	4	A44	8.8	0.02	20	0.1	2.6	16	0.2	4.5	6	1.1	20.4	5	1.9	40.3	5	2.3	52.7	5	2.3	78.1	24.7		1.66	129.6							
368B		24.7	45	4	A44	8.8	0.02	20		2.6	16		4.5	6		20.4	5		40.3	5		52.7	5		78.1	24.7		1.66	129.6	PIPE	24	495	0.04646	1367	1344	48.8
369B	1.6	26.3	45	4	A44	8.8	0.02	27	0.2	2.8	21	0.3	4.8	9	1.5	21.1	6	3.2	40.5	5	4.5	53.1	5	6.2	81.1	26.3		1.66	134.7							
370B	3.4	29.7	45	4	A44	8.8	0.02	29	0.4	3.1	22	0.6	5.4	10	3.0	23.4	7	6.0	45.1	6	8.3	58.4	6	11.7	91.1	29.7		1.66	151.3							
371B		29.7	45	4	A44	8.8	0.02	29		3.1	22		5.4	10		23.4	7		45.1	6		58.4	6		91.1	29.7		1.66	151.3	PIPE	24	325	0.05231	1344	1327	51.7
372B	0.2	29.9	45	4	A44	8.8	0.5	9	0.2	3.2	6	0.3	5.4	5	0.5	23.2	5	0.6	44.6	5	0.8	57.8	5	0.9	90.3	29.7	0.2	1.66	149.4							

								2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone		Isohyetal (rainfall depth)	Imperviousness	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
373B	3.1	33	45	4	A44	8.8	0.02	27	0.3	3.5	20	0.6	5.9	9	3.0	24.9	6	6.2	47.7	5	8.7	61.7	5	12.0	98.8	32.8	0.2	1.66	163.6							
374B		33	45	4	A44	8.8	0.02	27		3.5	20		5.9	9		24.9	6		47.7	5		61.7	5		98.8	32.8	0.2	1.66	163.6	PIPE	24	430	0.04419	1327	1308	47.6
375B	0.6	33.6	45	4	A44	8.8	0.5	11	0.4	3.6	8	0.8	6.1	6	1.3	24.8	5	1.9	47.8	5	2.3	62.0	5	2.6	99.9	32.8	0.8	1.64	164.3							
376B	3.8	37.4	45	4	A44	8.8	0.02	26	0.4	4.0	19	0.7	6.7	8	4.1	26.3	6	7.6	50.7	5	10.7	66.9	5	14.8	110.3	36.6	0.8	1.65	181.6							
377B		37.4	45	4	A44	8.8	0.02	26		4.0	19		6.7	8		26.3	6		50.7	5		66.9	5		110.3	36.6	0.8	1.65	181.6	PIPE	24	42	0.66667	1308	1280	185
378B	1.5	38.9	45	4	A44	8.8	0.02	19	0.2	4.1	14	0.3	7.0	5	2.5	26.5	5	3.5	52.0	5	4.2	68.8	5	5.8	114.3	38.1	0.8	1.65	188.2							
379AB	38.9	846	45	4	A44	8.8			4.1	82.7		7.0	205.2		26.5	375.5		52.0	656.0		68.8	880.4		114.3	1469.7	706.1	139.9	1.55	2279.3	Valley Chnl		318	0.00314	1269	1268	
380A	0.6	846.6	45	4	A44	8.8	0.02	15	0.1	82.4	6	0.6	203.9	5	1.0	374.2	5	1.4	652.8	5	1.7	875.4	5	1.7	1459.9	706.7	139.9	1.55	2264.2							
381A	2.4	849	45	4	A44	8.8	0.02	23	0.3	82.4	18	0.5	204.0	7	2.9	374.3	5	5.6	653.0	5	6.8	875.6	5	9.3	1461.0	709.1	139.9	1.55	2266.3							
382A		849	45	4	A44	8.8	0.02	23		82.4	18		204.0	7		374.3	5		653.0	5		875.6	5		1461.0	709.1	139.9	1.55	2266.3	Valley Chnl		232	0.00431	1262	1261	
383A	3.1	852.1	45	4	A44	8.8	0.02	20	0.4	82.3	15	0.7	203.3	6	4.4	373.8	5	7.2	651.3	5	8.7	873.1	5	8.7	1455.8	712.2	139.9	1.55	2258.9	PIPE	BOX	233	0.04	1262	1254	1824
384A	2.5	854.6	45	4	A44	8.8	0.02	20	0.3	82.4	15	0.5	203.3	6	3.5	373.9	5	5.8	650.5	5	7.1	871.6	5	9.7	1452.3	714.7	139.9	1.55	2253.9	Valley Chnl		250	0.032	1262	1254	
385A		854.6	45	4	A44	8.8	0.02	20		82.3	15		203.1	6		373.3	5		650.0	5		870.0	5		1450.7	714.7	139.9	1.55	2251.4	Mtn Chnl		226	0.22124	1304	1254	
386A	4.1	858.7	45	4	A44	8.8	0.02	29	0.4	82.4	23	0.7	203.1	11	3.2	373.5	7	7.3	650.1	6	10.0	870.1	6	14.1	1450.1	718.8	139.9	1.55	2251.2							
387A	2.7	861.4	45	4	A44	8.8	0.02	29	0.3	82.4	22	0.5	203.2	10	2.3	373.7	7	4.8	650.3	6	6.6	870.4	6	9.3	1451.2	721.5	139.9	1.55	2253.4							
388A		861.4	45	4	A44	8.8	0.02	29		82.4	22		203.2	10		373.7	7		650.3	6		870.4	6		1451.2	721.5	139.9	1.55	2253.4	Mtn Chnl		127	0.04724	1254	1248	
389A	0.8	862.2	45	4	A44	8.8	0.02	20	0.1	82.4	15	0.2	203.2	6	1.1	373.6	5	1.9	649.5	5	2.3	869.8	5	3.1	1451.4	722.3	139.9	1.55	2253.9							
390B	5.5	5.5	45	4	A44	8.8	0.02	26	0.6	0.6	20	1.0	1.0	9	5.3	5.3	6	11.0	11.0	5	15.5	15.5	5	21.4	21.4	5.5		1.66	35.4							
391B		5.5	45	4	A44	8.8	0.02	26		0.6	20		1.0	9		5.3	6		11.0	5		15.5	5		21.4	5.5		1.66	35.4	Mtn Chnl		218	0.21101	1738	1692	
392B	3	8.5	28	4	A44	8.8	0.02	14	1.3	1.9	7	4.4	5.3	6	6.6	11.4	5	9.8	19.2	5	11.5	25.0	5	13.4	32.6	8.5		1.66	54.2							
393B	2.1	10.6	31	4	A44	8.8	0.02	27	0.2	2.1	7	3.1	8.4	6	4.6	15.9	5	6.8	25.9	5	7.9	32.9	5	9.3	41.9	10.6		1.66	69.6							
394B		10.6	31	4	A44	8.8	0.02	27		2.1	7		8.4	6		15.9	5		25.9	5		32.9	5		41.9	10.6		1.66	69.6	Mtn Chnl		409	0.14181	1692	1634	
395B	7.4	18	31	4	A44	8.8	0.02	29	0.8	2.8	8	10.0	17.4	6	16.1	28.1	5	23.8	43.3	5	27.9	53.8	5	32.7	67.4	18.0		1.66	111.9							
396B		18	31	4	A44	8.8	0.02	29		2.8	8		17.4	6		28.1	5		43.3	5		53.8	5		67.4	18.0		1.66	111.9	Mtn Chnl		427	0.1733	1634	1560	
397B	4.3	22.3	31	4	A44	8.8	0.02	29	0.4	3.2	8	5.8	22.2	6	9.4	34.3	5	13.8	51.9	5	16.2	64.0	5	19.0	80.3	22.3		1.66	133.3							
398C	3.6	3.6	31	4	A44	8.8	0.02	26	0.4	0.4	7	5.3	5.3	5	8.9	8.9	5	11.6	11.6	5	13.6	13.6	5	15.9	15.9	3.6		1.66	26.4							
399C		3.6	31	4	A44	8.8	0.02	26		0.4	7		5.3	5		8.9	5		11.6	5		13.6	5		15.9	3.6		1.66	26.4	Mtn Chnl		351	0.13675	1610	1562	
400C	2.5	6.1	31	4	A44	8.8	0.02	9	1.5	1.7	5	4.7	8.1	5	6.2	12.8	5	8.0	17.0	5	9.4	20.2	5	11.0	24.0	6.1		1.66	39.8							
401BC	6.1	28.4	31	4	A44	8.8			1.7	4.1		8.1	29.5		12.8	46.5		17.0	67.9		20.2	83.5		24.0	104.3	28.4		1.66	173.1	Mtn Chnl		700	0.15714	1562	1452	
402B	7.2	35.6	31	4	A44	8.8	0.02	27	0.8	4.5	7	10.6	33.8	6	15.7	53.7	5	23.1	77.8	5	27.1	95.7	5	31.8	121.3	35.6		1.66	201.4							
403B		35.6	31	4	A44	8.8	0.02	27		4.5	7		33.8	6		53.7	5		77.8	5		95.7	5		121.3	35.6		1.66	201.4	Mtn Chnl		663	0.04827	1452	1420	
404B	6.3	41.9	31	4	A44	8.8	0.02	28	0.7	4.9	8	8.5	31.5	6	13.7	50.3	5	20.2	74.9	5	23.7	94.2	5	27.8	124.2	41.9		1.66	206.1							
405C	3	3	31	4	A44	8.8	0.02	29	0.3	0.3	8	4.0	4.0	6	6.5	6.5	5	9.6	9.6	5	11.3	11.3	5	13.2	13.2	3.0		1.66	22.0							
406C		3	31	4	A44	8.8	0.02	29		0.3	8		4.0	6		6.5	5		9.6	5		11.3	5		13.2	3.0		1.66	22.0	Valley Chnl		462	0.08658	1700	1660	
407C	6.3	9.3	31	4	A44	8.8	0.02	29	0.7	1.0	8	8.5	12.1	6	13.7	19.4	5	20.2	27.7	5	23.7	32.7	5	27.8	38.6	9.3		1.66	64.1							
408C		9.3	31	4	A44	8.8	0.02	29		1.0	8		12.1	6		19.4	5		27.7	5		32.7	5		38.6	9.3		1.66	64.1	Valley Chnl		338	0.35503	1660	1540	
409C	6	15.3	31	4	A44	8.8	0.02	16	1.6	2.6	7	8.9	20.6	5	14.8	32.1	5	19.3	45.2	5	22.6	53.4	5	26.5	63.1	15.3		1.66	104.8							
410C		15.3	31	4	A44	8.8	0.02	16		2.6	7		20.6	5		32.1	5		45.2	5		53.4	5		63.1	15.3		1.66	104.8	Mtn Chnl		374	0.13369	1540	1490	
411C	6	21.3	31	4	A44	8.8	0.02	17	1.5	3.8	7	8.9	27.9	5	14.8	42.1	5	19.3	58.8	5	22.6	69.8	5	26.5	83.2	21.3		1.66	138.1							
412C		21.3	31	4	A44	8.8	0.02	17		3.8	7		27.9	5		42.1	5		58.8	5		69.8	5		83.2	21.3		1.66	138.1	Mtn Chnl		538	0.09665	1490	1438	
413C	4.8	26.1	31	4	A44	8.8	0.02	27	0.5	4.0	7	7.1	29.9	6	10.4	46.9	5	15.4	64.7	5	18.1	77.8	5	21.2	94.4	26.1		1.66	156.7							
414D	3.4	3.4	31	4	A44	8.8	0.02	12	1.4	1.4	6	5.6	5.6	5	8.4	8.4	5	10.9	10.9	5	12.8	12.8	5	15.0	15.0	3.4		1.66	24.9							
415CD	3.4	29.5	31	4	A44	8.8			1.4	4.6		5.6	32.4		8.4	51.4		10.9	72.3		12.8	86.9		15.0	105.3	29.5		1.66	174.8	Mtn Chnl		375	0.11733	1540	1496	
416C	9.1	38.6	31	4	A44	8.8	0.02	29	0.9	5.4	8	12.3	40.2	6	19.8	62.9	5	29.2	87.7	5	34.3	106.5	5	40.2	130.8	38.6		1.66	217.2							
417C		38.6	31	4	A44	8.8	0.02	29		5.4	8		40.2	6		62.9	5		87.7	5		106.5	5		130.8	38.6		1.66	217.2	Mtn Chnl		525	0.10667	1496	1440	
418C	5.2	43.8	31	4	A44	8.8	0.02	28	0.5	5.8	8	7.0	42.3	6	11.3	66.7	5	16.7	93.6	5	19.6	114.2	5	22.9	141.4	43.8		1.66	234.7							
419C		43.8	31	4	A44	8.8	0.02	28		5.8	8		42.3	6		66.7	5		93.6	5		114.2	5		141.4	43.8		1.66	234.7	Mtn Chnl		568	0.03521	1440	1420	
420C	5	48.8	31	4	A44	8.8	0.02	27	0.5	5.9	7	7.4	39.1	6	10.9	62.2	5	16.1	89.8	5	18.8	111.4	5	22.1	141.2	48.8		1.66	234.4							
421BC	48.8	90.7	31	4	A44	8.8			5.9	10.7		39.1	69.2		62.2	111.2		89.8	164.2		111.4	205.3		141.2	265.1	90.7		1.66	440.0	Mtn Chnl		710	0.05634	1420	1380	
422B	8.1	98.8	31	4	A44	8.8	0.02	28	0.9	11.0	8	10.9	66.9	6	17.6	108.5	5	26.0	161.3	5	30.5	203.8	5	35.7	265.9	98.8		1.66	441.4							
423B		98.8	31	4	A44	8.8	0.02	28		11.0	8		66.9	6		108.5	5		161.3	5		203.8	5		265.9	98.8		1.66	441.4	Mtn Chnl		402	0.12438	1380	1330	
424B	7.4	106.2	31	4	A44	8.8	0.02	28	0.8	11.4	8	10.0	66.7	6	16.1	108.1	5	23.8	161.3	5	27.9	203.7	5	32.7	268.5	106.2		1.66	445.6							
425C	2.9	2.9	31	4	A44	8.8	0.02	28	0.3	0.3	7	4.3	4.3	6	6.3	6.3	5	9.3	9.3	5	10.9	10.9	5	12.8	12.8	2.9		1.66	21.2							
426C		2.9	31	4	A44	8.8	0.02	28		0.3	7		4.3	6		6.3	5		9.3	5		10.9	5		12.8	2.9		1.66	21.2	Mtn Chnl		217	0.2765	1670	1610	
427C	2	4.9	31	4	A44	8.8	0.02	28	0.2	0.5	8	2.7	6.9	6	4.4	10.5	5	6.4	14.7	5	7.5	17.3	5	8.8	20.5	4.9		1.66	33.9							
428C	1.2	6.1	31	4	A44	8.8	0.02	11	0.6	1.1	6	2.0	8.8	5	3.0	13.0	5	3.9	18.5	5	4.5	21.8	5	5.3	25.8	6.1		1.66	42.7							
429C		6.1	31	4	A44	8.8	0.02	11		1.1	6		8.8	5		13.0	5		18.5	5		21.8	5		25.8	6.1		1.66	42.7	Mtn Chnl		449	0.06682	1610	1580	
430C	2.2	8.3	31	4	A44	8.8	0.02	11	1.0	1.5	6	3.6	9.1	5	5.4	14.0	5	7.1	20.4	5	8.3	24.7	5	9.7	30.0	8.3		1.66	49.8							
431C		8.3	31	4	A44	8.8	0.02	11		1.5	6		9.1	5		14.0	5		20.4	5		24.7	5		30.0	8.3		1.66	49.8	Valley Chnl		205	0.09756	1580	1560	
432C	0.4	8.7	31	4	A44	8.8	0.02	8	0.3	1.7	5	0.8	9.2	5	1.0	14.3	5	1.3	20.8	5	1.5	25.1	5	1.8	30.7	8.7		1.66	51.0							
433D	3.3	3.3	31	4	A44	8.8	0.02	28	0.4	0.4	8	4.4	4.4	6	7.2	7.2	5	10.6	10.6	5	12.4	12.4	5	14.6	14.6	3.3		1.66	24.2							
434D		3.3	31	4	A44	8.8	0.02	28		0.4	8		4.4	6		7.2	5		10.6	5		12.4	5		14.6	3.3		1.66	24.2	Mtn Chnl		271	0.1476	1600	1560	
435D	1.2	4.5	31	4	A44	8.8	0.02	10	0.6	0.9	5	2.3	5.8	5	3.0	9.1	5	3.9	13.0	5	4.5	15.3	5	5.3	18.2	4.5		1.66	30.1							

								2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone		Isohyetal (rainfall depth)	Imperviousness	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
436CD	4.5	13.2	31	4	A44	8.8			0.9	2.6		5.8	14.3		9.1	22.6		13.0	32.7		15.3	39.3		18.2	47.5	13.2		1.66	78.9	Valley Chnl		480	0.08333	1560	1520	
437C	2.9	16.1	31	4	A44	8.8	0.02	14	1.0	3.4	7	4.3	16.6	5	7.2	25.6	5	9.3	37.4	5	10.9	45.4	5	12.8	55.6	16.1		1.66	92.3							
438D	5.3	5.3	31	4	A44	8.8	0.02	29	0.6	0.6	8	7.1	7.1	6	11.5	11.5	5	17.0	17.0	5	20.0	20.0	5	23.4	23.4	5.3		1.66	38.8							
439D		5.3	31	4	A44	8.8	0.02	29		0.6	8		7.1	6		11.5	5		17.0	5		20.0	5		23.4	5.3		1.66	38.8	Mtn Chnl		408	0.19608	1600	1520	
440D	3	8.3	31	4	A44	8.8	0.02	28	0.3	0.9	7	4.4	11.1	6	6.5	16.7	5	9.6	23.6	5	11.3	27.9	5	13.2	33.1	8.3		1.66	54.9							
441CD	8.3	24.4	31	4	A44	8.8			0.9	4.2		11.1	27.1		16.7	41.9		23.6	59.4		27.9	71.2		33.1	86.5	24.4		1.66	143.5	Valley Chnl		671	0.07452	1520	1470	
442C	3	27.4	31	4	A44	8.8	0.02	28	0.3	4.4	8	4.0	29.2	6	6.5	44.4	5	9.6	63.1	5	11.3	75.9	5	13.2	93.2	27.4		1.66	154.7							
443C		27.4	31	4	A44	8.8	0.02	28		4.4	8		29.2	6		44.4	5		63.1	5		75.9	5		93.2	27.4		1.66	154.7	Mtn Chnl		494	0.26316	1470	1340	
444C	2	29.4	31	4	A44	8.8	0.02	10	1.1	4.4	5	3.8	28.6	5	4.9	45.0	5	6.4	64.6	5	7.5	78.7	5	8.8	97.1	29.4		1.66	161.2							
445BC	29.4	135.6	31	4	A44	8.8			4.4	13.8		28.6	81.1		45.0	132.2		64.6	202.4		78.7	257.9		97.1	341.9	135.6		1.66	567.6	Mtn Chnl		534	0.05618	1340	1310	
446B	5.6	141.2	31	4	A44	8.8	0.02	17	1.4	13.8	7	8.3	80.5	5	13.8	130.9	5	18.0	201.3	5	21.1	257.2	5	24.7	343.9	141.2		1.66	570.9							
447C	3.3	3.3	31	4	A44	8.8	0.02	29	0.3	0.3	8	4.4	4.4	6	7.2	7.2	5	10.6	10.6	5	12.4	12.4	5	14.6	14.6	3.3		1.66	24.2							
448C		3.3	31	4	A44	8.8	0.02	29		0.3	8		4.4	6		7.2	5		10.6	5		12.4	5		14.6	3.3		1.66	24.2	Mtn Chnl		380	0.23684	1610	1520	
449C	2.3	5.6	31	4	A44	8.8	0.02	16	0.6	0.9	7	3.4	7.5	5	5.7	11.2	5	7.4	15.9	5	8.7	18.8	5	10.2	22.3	5.6		1.66	37.0							
450C		5.6	31	4	A44	8.8	0.02	16		0.9	7		7.5	5		11.2	5		15.9	5		18.8	5		22.3	5.6		1.66	37.0	Mtn Chnl		317	0.23659	1520	1445	
451C	1	6.6	31	4	A44	8.8	0.02	9	0.6	1.3	5	1.9	8.1	5	2.5	12.7	5	3.2	17.8	5	3.8	21.1	5	4.4	25.4	6.6		1.66	42.1							
452D	7	7	31	4	A44	8.8	0.02	29	0.7	0.7	8	9.4	9.4	6	15.2	15.2	5	22.5	22.5	5	26.4	26.4	5	30.9	30.9	7.0		1.66	51.3							
453D		7	31	4	A44	8.8	0.02	29		0.7	8		9.4	6		15.2	5		22.5	5		26.4	5		30.9	7.0		1.66	51.3	Mtn Chnl		191	0.18325	1480	1445	
454D	0.7	7.7	31	4	A44	8.8	0.02	9	0.4	1.1	5	1.3	10.3	5	1.7	16.5	5	2.3	23.0	5	2.6	27.0	5	3.1	31.8	7.7		1.66	52.7							
455CD	7.7	14.3	31	4	A44	8.8			1.1	2.4		10.3	18.2		16.5	28.9		23.0	40.7		27.0	48.1		31.8	57.1	14.3		1.66	94.8	Valley Chnl		235	0.19149	1445	1400	
456C	1.1	15.4	31	4	A44	8.8	0.02	7	0.8	3.0	5	2.1	19.3	5	2.7	30.3	5	3.5	43.2	5	4.1	51.3	5	4.9	61.0	15.4		1.66	101.3							
457C		15.4	31	4	A44	8.8	0.02	7		3.0	5		19.3	5		30.3	5		43.2	5		51.3	5		61.0	15.4		1.66	101.3	Valley Chnl		330	0.07576	1440	1415	
458C	3.3	18.7	31	4	A44	8.8	0.02	28	0.4	3.3	8	4.4	23.2	6	7.2	35.8	5	10.6	49.4	5	12.4	58.8	5	14.6	70.8	18.7		1.66	117.5							
459D	3.2	3.2	31	4	A44	8.8	0.02	12	1.4	1.4	6	5.3	5.3	5	7.9	7.9	5	10.3	10.3	5	12.1	12.1	5	14.1	14.1	3.2		1.66	23.4							
460D		3.2	31	4	A44	8.8	0.02	12		1.4	6		5.3	5		7.9	5		10.3	5		12.1	5		14.1	3.2		1.66	23.4	Mtn Chnl		438	0.23973	1520	1415	
461D	2.1	5.3	31	4	A44	8.8	0.02	14	0.7	1.9	7	3.1	7.9	5	5.2	11.2	5	6.8	14.8	5	7.9	17.6	5	9.3	20.9	5.3		1.66	34.7							
462CD	5.3	24	31	4	A44	8.8			1.9	5.1		7.9	30.5		11.2	46.5		14.8	64.0		17.6	76.4		20.9	91.7	24.0		1.66	152.2	Mtn Chnl		340	0.07353	1415	1390	
463C	0.8	24.8	31	4	A44	8.8	0.02	11	0.4	5.0	5	1.5	30.1	5	2.0	46.0	5	2.6	63.6	5	3.0	75.7	5	3.5	91.7	24.8		1.66	152.2							
464D	4.5	4.5	31	4	A44	8.8	0.02	12	1.9	1.9	6	7.4	7.4	5	11.1	11.1	5	14.5	14.5	5	17.0	17.0	5	19.9	19.9	4.5		1.66	33.0							
465D		4.5	31	4	A44	8.8	0.02	12		1.9	6		7.4	5		11.1	5		14.5	5		17.0	5		19.9	4.5		1.66	33.0	Mtn Chnl		268	0.22388	1450	1390	
466D	1.5	6	31	4	A44	8.8	0.02	12	0.6	2.5	6	2.5	9.4	5	3.7	13.5	5	4.8	17.6	5	5.7	20.7	5	6.6	24.5	6.0		1.66	40.6							
467CD	6	30.8	31	4	A44	8.8			2.5	7.1		9.4	36.4		13.5	55.7		4.8	17.6		5.7	20.7		6.6	24.5	30.8		1.66	40.6	Mtn Chnl		267	0.29963	1390	1310	
468C	1	31.8	31	4	A44	8.8	0.02	12	0.4	7.3	6	1.7	37.1	5	2.5	56.8	5	3.2	79.1	5	3.8	94.9	5	4.4	115.3	31.8		1.66	191.4							
469BC	31.8	173	31	4	A44	8.8			7.3	17.2		37.1	96.9		56.8	157.0		79.1	252.3		94.9	322.4		115.3	430.2	173.0		1.66	714.2	Mtn Chnl		443	0.02257	1310	1300	
470B	4.5	177.5	31	4	A44	8.8	0.02	11	2.1	16.8	6	7.4	94.7	5	11.1	154.6	5	14.5	249.5	5	17.0	320.4	5	19.9	429.2	177.5		1.66	712.5							
471B		177.5	31	4	A44	8.8	0.02	11		16.8	6		94.7	5		154.6	5		249.5	5		320.4	5		429.2	177.5		1.66	712.5	Mtn Chnl		489	0.02863	1300	1286	
472B	3.2	180.7	31	4	A44	8.8	0.02	12	1.4	16.5	6	5.3	93.2	5	7.9	153.2	5	10.3	246.7	5	12.1	318.0	5	14.1	427.6	180.7		1.66	709.8							
473B		180.7	31	4	A44	8.8	0.02	12		16.5	6		93.2	5		153.2	5		246.7	5		318.0	5		427.6	180.7		1.66	709.8	Mtn Chnl		610	0.11803	1452	1380	
474C	3.9	3.9	31	4	A44	8.8	0.02	29	0.4	0.4	8	5.3	5.3	6	8.5	8.5	5	12.5	12.5	5	14.7	14.7	5	17.2	17.2	3.9		1.66	28.6							
475C	5.4	9.3	31	4	A44	8.8	0.02	27	0.6	1.0	7	8.0	13.2	6	11.7	20.2	5	17.4	29.9	5	20.4	35.0	5	23.8	41.0	9.3		1.66	68.1							
476C		9.3	31	4	A44	8.8	0.02	27		1.0	7		13.2	6		20.2	5		29.9	5		35.0	5		41.0	9.3		1.66	68.1	Mtn Chnl		382	0.10995	1380	1338	
477C	5.6	14.9	31	4	A44	8.8	0.02	12	2.4	3.1	6	9.2	20.1	5	13.8	29.6	5	18.0	42.2	5	21.1	49.9	5	24.7	59.3	14.9		1.66	98.4							
478C		14.9	31	4	A44	8.8	0.02	12		3.1	6		20.1	5		29.6	5		42.2	5		49.9	5		59.3	14.9		1.66	98.4	Mtn Chnl		342	0.04094	1338	1324	
479C	3.8	18.7	31	4	A44	8.8	0.02	12	1.6	4.0	6	6.3	21.4	5	9.4	32.6	5	12.2	47.2	5	14.3	56.7	5	16.8	68.5	18.7		1.66	113.7							
480C		18.7	31	4	A44	8.8	0.02	12		4.0	6		21.4	5		32.6	5		47.2	5		56.7	5		68.5	18.7		1.66	113.7	Mtn Chnl		522	0.0728	1324	1286	
481C	4.2	22.9	31	4	A44	8.8	0.02	14	1.4	4.2	7	6.2	21.0	5	10.4	32.3	5	13.5	49.1	5	15.8	59.8	5	18.5	74.1	22.9		1.66	122.9							
482BC	22.9	203.6	31	4	A44	8.8			4.2	18.6		21.0	102.2		32.3	167.3		49.1	270.2		59.8	348.0		74.1	469.1	203.6		1.66	778.6	Mtn Chnl		256	0.00391	1286	1285	
483B	3.2	206.8	31	4	A44	8.8	0.02	26	0.4	18.3	7	4.7	99.3	6	7.0	163.3	5	10.3	263.9	5	12.1	341.5	5	14.1	464.7	206.8		1.66	771.3	PIPE	60	100	0.06	1366	1360	638
484C	3.3	3.3	31	4	A44	8.8	0.02	16	0.9	0.9	7	4.9	4.9	5	8.2	8.2	5	10.6	10.6	5	12.4	12.4	5	14.6	14.6	3.3		1.66	24.2							
485BC	3.3	210.1	31	4	A44	8.8			0.9	18.4		4.9	99.5		8.2	163.5		10.6	264.2		12.4	341.9		14.6	466.0	210.1		1.66	773.5	Valley Chnl		470	0.17021	1360	1280	
486B	2.1	212.2	31	4	A44	8.8	0.02	12	0.9	18.5	6	3.5	99.4	5	5.2	163.3	5	6.8	263.8	5	7.9	341.4	5	9.3	466.3	212.2		1.66	774.1							
487B		212.2	31	4	A44	8.8	0.02	12		18.5	6		99.4	5		163.3	5		263.8	5		341.4	5		466.3	212.2		1.66	774.1	Mtn Chnl		360	0.04167	1280	1265	
488B	2.2	214.4	31	4	A44	8.8	0.02	9	1.3	18.5	5	4.2	99.1	5	5.4	162.9	5	7.1	262.2	5	8.3	339.7	5	9.7	465.0	214.4		1.66	771.9							
489B		214.4	31	4	A44	8.8	0.02	9		18.5	5		99.1	5		162.9	5		262.2	5		339.7	5		465.0	214.4		1.66	771.9	Mtn Chnl		354	0.01412	1265	1260	
490B	4	218.4	31	4	A44	8.8	0.02	29	0.4	18.4	8	5.4	98.3	6	8.7	161.5	5	12.9	259.9	5	15.1	337.2	5	17.7	462.2	218.4		1.66	767.3							
491C	2.3	2.3	31	4	A44	8.8	0.02	11	1.1	1.1	6	3.8	3.8	5	5.7	5.7	5	7.4	7.4	5	8.7	8.7	5	10.2	10.2	2.3		1.66	16.8							
492C		2.3	31	4	A44	8.8	0.02	11		1.1	6		3.8	5		5.7	5		7.4	5		8.7	5		10.2	2.3		1.66	16.8	Mtn Chnl		526	0.1711	1350	1260	
493C	2.3	4.6	31	4	A44	8.8	0.02	27	0.3	1.1	7	3.4	6.0	6	5.0	8.7	5	7.4	11.7	5	8.7	14.1	5	10.2	17.0	4.6		1.66	28.2							
494BC	4.6	223	31	4	A44	8.8			1.1	18.6		6.0	98.5		8.7	161.9		11.7	260.5		14.1	338.1		17.0	464.3	223.0		1.66	770.7	Mtn Chnl		122	0.08197	1260	1250	
495B	0.6	223.6	31	4	A44	8.8	0.02	11	0.3	18.6	6	1.0	98.5	5	1.5	161.8	5	1.9	260.5	5	2.3	337.2	5	2.7	464.3	223.6		1.66	770.7							
496AB	223.6	1085.8	31	4	A44	8.8			18.6	99.7		98.5	274.1		161.8	524.1		260.5	901.7		337.2	1201.1		464.3	1915.7	945.9	139.9	1.57	3017.1	Mtn Chnl		69	0.07246	1250	1245	
497A	0.3	1086.1	31	4	A44	8.8	0.02	9	0.2	99.7	5	0.6	274.0	5	0.7	524.1	5	1.0	901.6	5	1.1	1200.9	5	1.3	1915.3	946.2	139.9	1.57	3016.6							
498B	6.7	6.7	31	4	A44	8.8	0.02	27	0.7	0.7	7	9.9	9.9	6	14.6	14.6	5	21.5	21.5	5	25.3	25.3	5	29.6	29.6	6.7		1.66	49.1							

								2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone		Isohyetal (rainfall depth)	Imperviousness	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
499B		6.7	31	4	A44	8.8	0.02	27		0.7	7		9.9	6		14.6	5		21.5	5		25.3	5		29.6	6.7		1.66	49.1	Mtn Chnl		249	0.04016	1460	1450	
500B	4.9	11.6	31	4	A44	8.8	0.02	27	0.5	1.2	7	7.2	15.8	6	10.7	22.7	5	15.7	32.1	5	18.5	38.1	5	21.6	45.4	11.6		1.66	75.3							
501B		11.6	31	4	A44	8.8	0.02	27		1.2	7		15.8	6		22.7	5		32.1	5		38.1	5		45.4	11.6		1.66	75.3	Mtn Chnl		358	0.23743	1450	1365	
502B	4.3	15.9	31	4	A44	8.8	0.02	16	1.2	2.1	7	6.3	20.3	5	10.6	29.2	5	13.8	42.0	5	16.2	50.2	5	19.0	60.4	15.9		1.66	100.2							
503B		15.9	31	4	A44	8.8	0.02	16		2.1	7		20.3	5		29.2	5		42.0	5		50.2	5		60.4	15.9		1.66	100.2	Mtn Chnl		438	0.19406	1365	1280	
504B	2.3	18.2	31	4	A44	8.8	0.02	16	0.6	2.6	7	3.4	21.9	5	5.7	31.5	5	7.4	45.9	5	8.7	55.1	5	10.2	66.5	18.2		1.66	110.4							
505C	2.8	2.8	31	4	A44	8.8	0.02	27	0.3	0.3	7	4.1	4.1	6	6.1	6.1	5	9.0	9.0	5	10.6	10.6	5	12.4	12.4	2.8		1.66	20.5							
506C	1.7	4.5	31	4	A44	8.8	0.02	26	0.2	0.5	7	2.5	6.6	5	4.2	10.3	5	5.5	14.5	5	6.4	17.0	5	7.5	19.9	4.5		1.66	33.0							
507C		4.5	31	4	A44	8.8	0.02	26		0.5	7		6.6	5		10.3	5		14.5	5		17.0	5		19.9	4.5		1.66	33.0	Mtn Chnl		250	0.02	1285	1280	
508C	1.6	6.1	31	4	A44	8.8	0.02	14	0.6	0.8	7	2.4	7.1	5	4.0	10.5	5	5.1	15.1	5	6.0	18.2	5	7.1	22.1	6.1		1.66	36.7							
509BC	6.1	24.3	31	4	A44	8.8			0.8	3.4		7.1	29.0		10.5	42.0		15.1	61.0		18.2	73.3		22.1	88.6	24.3		1.66	147.1	Mtn Chnl		305	0.09836	1280	1250	
510B	1	25.3	31	4	A44	8.8	0.02	26	0.1	3.5	7	1.5	29.0	5	2.5	42.0	5	3.2	61.4	5	3.8	73.7	5	4.4	89.3	25.3		1.66	148.3							
511AB	25.3	1111.4	31	4	A44	8.8			3.5	100.5		29.0	275.2		42.0	526.5		61.4	906.0		73.7	1207.8		89.3	1932.0	971.5	139.9	1.58	3046.6	Mtn Chnl		585	0.02051	1250	1238	
512A	9.2	1120.6	31	4	A44	8.8	0.02	26	1.0	100.3	7	13.6	274.2	6	20.0	525.0	5	29.6	901.6	5	34.7	1201.6	5	40.6	1923.1	980.7	139.9	1.58	3033.8							
513B	3.7	3.7	31	4	A44	8.8	0.02	26	0.4	0.4	7	5.5	5.5	6	8.0	8.0	5	11.9	11.9	5	13.9	13.9	5	16.3	16.3	3.7		1.66	27.1							
514B		3.7	31	4	A44	8.8	0.02	26		0.4	7		5.5	6		8.0	5		11.9	5		13.9	5		16.3	3.7		1.66	27.1	Mtn Chnl		431	0.19722	1420	1335	
515B	3.3	7	31	4	A44	8.8	0.02	28	0.4	0.7	8	4.4	9.4	6	7.2	13.9	5	10.6	19.5	5	12.4	23.1	5	14.6	27.5	7.0		1.66	45.6							
516B		7	31	4	A44	8.8	0.02	28		0.7	8		9.4	6		13.9	5		19.5	5		23.1	5		27.5	7.0		1.66	45.6	Mtn Chnl		362	0.27624	1335	1235	
517B	1.9	8.9	31	4	A44	8.8	0.02	14	0.7	1.2	7	2.8	11.2	5	4.7	16.6	5	6.1	23.6	5	7.2	28.2	5	8.4	33.9	8.9		1.66	56.3							
518AB	8.9	1129.5	31	4	A44	8.8			1.2	100.5		11.2	274.6		16.6	525.6		23.6	902.5		28.2	1202.8		33.9	1926.6	989.6	139.9	1.58	3040.7	Mtn Chnl		527	0.02846	1235	1220	
519A	4.5	1134	45	4	A44	8.8	0.02	28	0.5	100.4	21	0.8	274.1	10	3.9	524.2	6	9.0	900.0	5	12.7	1197.1	5	17.5	1918.6	994.1	139.9	1.58	3028.7							
520B	2.2	2.2	45	4	A44	8.8	0.02	26	0.2	0.2	20	0.4	0.4	9	2.1	2.1	6	4.4	4.4	5	6.2	6.2	5	8.5	8.5	2.2		1.66	14.2							
521B		2.2	45	4	A44	8.8	0.02	26		0.2	20		0.4	9		2.1	6		4.4	5		6.2	5		8.5	2.2		1.66	14.2	Mtn Chnl		571	0.09632	1790	1735	
522B	3	5.2	45	4	A44	8.8	0.02	29	0.3	0.5	23	0.5	0.9	11	2.3	3.2	7	5.3	7.1	6	7.3	9.6	6	10.3	15.1	5.2		1.66	25.1							
523C	5.2	5.2	45	4	A44	8.8	0.02	27	0.6	0.6	21	0.9	0.9	9	5.0	5.0	6	10.4	10.4	5	14.7	14.7	5	20.2	20.2	5.2		1.66	33.5							
524C		5.2	45	4	A44	8.8	0.02	27		0.6	21		0.9	9		5.0	6		10.4	5		14.7	5		20.2	5.2		1.66	33.5	Valley Chnl		443	0.07901	1770	1735	
525C	4.4	9.6	45	4	A44	8.8	0.02	28	0.5	1.0	22	0.8	1.7	10	3.8	8.3	7	7.8	17.5	6	10.8	23.8	6	15.2	33.6	9.6		1.66	55.8							
526BC	9.6	14.8	45	4	A44	8.8			1.0	1.5		1.7	2.5		8.3	11.3		17.5	24.5		23.8	33.3		33.6	48.8	14.8		1.66	80.9	Mtn Chnl		476	0.06513	1735	1704	
527B	6.4	21.2	45	4	A44	8.8	0.02	29	0.7	2.1	22	1.1	3.5	11	4.9	13.8	7	11.3	28.8	6	15.7	39.4	6	22.1	62.1	21.2		1.66	103.0							
528B		21.2	45	4	A44	8.8	0.02	29		2.1	22		3.5	11		13.8	7		28.8	6		39.4	6		62.1	21.2		1.66	103.0	Mtn Chnl		275	0.10545	1704	1675	
529B	1.4	22.6	45	4	A44	8.8	0.02	23	0.2	2.2	17	0.3	3.7	7	1.7	13.6	5	3.3	28.7	5	4.0	39.9	5	5.4	64.1	22.6		1.66	106.4							
530C	5.5	5.5	45	4	A44	8.8	0.02	28	0.6	0.6	21	1.0	1.0	10	4.8	4.8	6	11.0	11.0	6	13.5	13.5	6	19.0	19.0	5.5		1.66	31.5							
531C		5.5	45	4	A44	8.8	0.02	28		0.6	21		1.0	10		4.8	6		11.0	6		13.5	6		19.0	5.5		1.66	31.5	Mtn Chnl		162	0.21605	1690	1655	
532C	0.6	6.1	45	4	A44	8.8	0.02	17	0.1	0.7	12	0.2	1.1	5	1.0	5.3	5	1.4	12.1	5	1.7	14.8	5	2.3	20.9	6.1		1.66	34.7							
533BC	6.1	28.7	45	4	A44	8.8			0.7	2.8		1.1	4.7		5.3	16.8		12.1	36.3		14.8	50.8		20.9	81.5	28.7		1.66	135.2	Valley Chnl		214	0.09346	1675	1655	
534B	5.2	33.9	45	4	A44	8.8	0.02	28	0.5	3.3	21	0.9	5.6	10	4.5	19.6	6	10.4	42.1	6	12.7	59.1	6	17.9	95.2	33.9		1.66	158.1							
535B		33.9	45	4	A44	8.8	0.02	28		3.3	21		5.6	10		19.6	6		42.1	6		59.1	6		95.2	33.9		1.66	158.1	Mtn Chnl		350	0.02857	1655	1645	
536B	4.9	38.8	45	4	A44	8.8	0.02	28	0.5	3.7	21	0.9	6.2	10	4.3	19.5	6	9.8	42.5	5	13.8	58.9	5	19.0	99.6	38.8		1.66	165.3							
537B		38.8	45	4	A44	8.8	0.02	28		3.7	21		6.2	10		19.5	6		42.5	5		58.9	5		99.6	38.8		1.66	165.3	Mtn Chnl		385	0.04935	1645	1626	
538B	3.7	42.5	45	4	A44	8.8	0.02	29	0.4	4.0	23	0.6	6.7	11	2.9	19.7	7	6.6	41.6	6	9.1	57.8	6	12.8	102.2	42.5		1.66	169.7							
539B		42.5	45	4	A44	8.8	0.02	29		4.0	23		6.7	11		19.7	7		41.6	6		57.8	6		102.2	42.5		1.66	169.7	Valley Chnl		256	0.02344	1626	1620	
540B	4.1	46.6	45	4	A44	8.8	0.02	20	0.5	4.1	15	0.9	6.9	6	5.8	19.9	5	9.6	41.8	5	11.6	57.9	5	15.9	104.1	46.6		1.66	172.8							
541B		46.6	45	4	A44	8.8	0.02	20		4.1	15		6.9	6		19.9	5		41.8	5		57.9	5		104.1	46.6		1.66	172.8	Mtn Chnl		580	0.10345	1620	1560	
542B	4.8	51.4	45	4	A44	8.8	0.02	26	0.5	4.3	20	0.9	7.1	8	5.2	19.9	6	9.6	41.3	5	13.5	57.3	5	18.6	105.6	51.4		1.66	175.3							
543B		51.4	45	4	A44	8.8	0.02	26		4.3	20		7.1	8		19.9	6		41.3	5		57.3	5		105.6	51.4		1.66	175.3	Mtn Chnl		248	0.12097	1560	1530	
544B	3.6	55	45	4	A44	8.8	0.02	24	0.4	4.5	18	0.7	7.4	7	4.4	20.0	5	8.4	41.5	5	10.2	57.2	5	14.0	107.2	55.0		1.66	177.9							
545B		55	45	4	A44	8.8	0.02	24		4.5	18		7.4	7		20.0	5		41.5	5		57.2	5		107.2	55.0		1.66	177.9	Mtn Chnl		154	0.05195	1530	1522	
546B	3.1	58.1	45	4	A44	8.8	0.02	24	0.4	4.7	18	0.6	7.6	8	3.3	20.1	6	6.2	41.6	5	8.7	57.4	5	12.0	108.2	58.1		1.66	179.6							
547B		58.1	45	4	A44	8.8	0.02	24		4.7	18		7.6	8		20.1	6		41.6	5		57.4	5		108.2	58.1		1.66	179.6	Mtn Chnl		464	0.12069	1522	1466	
548B	4.9	63	45	4	A44	8.8	0.02	23	0.6	4.9	18	1.0	7.9	7	6.0	20.5	5	11.4	41.4	5	13.8	57.0	5	19.0	109.9	63.0		1.66	182.5							
549B		63	45	4	A44	8.8	0.02	23		4.9	18		7.9	7		20.5	5		41.4	5		57.0	5		109.9	63.0		1.66	182.5	Mtn Chnl		425	0.08471	1466	1430	
550B	3.9	66.9	45	4	A44	8.8	0.02	24	0.4	5.0	19	0.7	8.2	8	4.2	20.8	5	9.1	41.2	5	11.0	56.8	5	15.1	111.1	66.9		1.66	184.4							
551B		66.9	45	4	A44	8.8	0.02	24		5.0	19		8.2	8		20.8	5		41.2	5		56.8	5		111.1	66.9		1.66	184.4	Mtn Chnl		385	0.22857	1430	1342	
552B	4.5	71.4	45	4	A44	8.8	0.02	26	0.5	5.3	19	0.9	8.7	8	4.8	21.9	6	9.0	41.3	5	12.7	56.9	5	17.5	113.0	71.4		1.66	187.5							
553B		71.4	45	4	A44	8.8	0.02	26		5.3	19		8.7	8		21.9	6		41.3	5		56.9	5		113.0	71.4		1.66	187.5	Mtn Chnl		292	0.07534	1342	1320	
554B	5.2	76.6	45	4	A44	8.8	0.02	26	0.6	5.6	20	1.0	9.3	9	5.0	24.1	6	10.4	41.4	5	14.7	56.9	5	20.2	120.0	76.6		1.66	199.1							
555B		76.6	45	4	A44	8.8	0.02	26		5.6	20		9.3	9		24.1	6		41.4	5		56.9	5		120.0	76.6		1.66	199.1	Mtn Chnl		307	0.01629	1320	1315	
556B	2.7	79.3	45	4	A44	8.8	0.02	24	0.3	5.7	18	0.5	9.4	8	2.9	23.0	6	5.4	40.7	5	7.6	55.8	5	10.5	120.2	79.3		1.66	199.4	PIPE	48	100	0.04	1626	1622	287
557C	4.6	4.6	45	4	A44	8.8	0.02	29	0.5	0.5	22	0.8	0.8	10	4.0	4.0	7	8.2	8.2	6	11.3	11.3	6	15.9	15.9	4.6		1.66	26.3							
558C		4.6	45	4	A44	8.8	0.02	29		0.5	22		0.8	10		4.0	7		8.2	6		11.3	6		15.9	4.6		1.66	26.3	Mtn Chnl		520	0.17692	1622	1530	
559C	3.3	7.9	45	4	A44	8.8	0.02	29	0.3	0.8	23	0.6	1.4	11	2.5	5.7	7	5.8	12.5	6	8.1	16.7	6	11.4	24.8	7.9		1.66	41.2							
560C		7.9	45	4	A44	8.8	0.02	29		0.8	23		1.4	11		5.7	7		12.5	6		16.7	6		24.8	7.9		1.66	41.2	Mtn Chnl		517	0.12573	1530	1465	
561C	3.6	11.5	45	4	A44	8.8	0.02	27	0.4	1.1	21	0.7	1.9	9	3.5	6.4	6	7.2	13.7	5	10.2	19.2	5	14.0	31.4	11.5		1.66	52.2							

Sequential Area for Lar04	Tributary Area (acres)	Cumulative area (acres)	Soil Type	DPA Zone	Isohyetal (rainfall depth)	Imperviousness	2 year			5 year			10 year			25 year			50 year			50 year Burned			50 Year Burned and Bulked				slopes						
							Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	Tc (minutes)	Tributary Q (cfs)	Conveyance Q (cfs)	cummulative burned and bulked acreage	cummulative burned only acreage	Weighted Bulking Factor	Conveyance Q (cfs)	Conveyance Type	Pipe Diameter (inches)	Length	Slope	Elevation in	Elevation out	Full Capacity (Pipes)
562C		11.5	45	4	A44	8.8	0.02	27		1.1	21		1.9	9		6.4	6		13.7	5		19.2	5		31.4	11.5		1.66	52.2	Mtn Chnl		404	0.11139	1465	1420	
563C	1.1	12.6	45	4	A44	8.8	0.02	26	0.1	1.2	20	0.2	2.0	8	1.2	6.2	6	2.2	13.6	5	3.1	19.1	5	4.3	32.6	12.6		1.66	54.0							
564D	4.2	4.2	45	4	A44	8.8	0.02	26	0.5	0.5	19	0.8	0.8	8	4.5	4.5	6	8.4	8.4	5	11.9	11.9	5	16.3	16.3	4.2		1.66	27.1							
565D		4.2	45	4	A44	8.8	0.02	26		0.5	19		0.8	8		4.5	6		8.4	5		11.9	5		16.3	4.2		1.66	27.1	Valley Chnl		183	0.09836	1672	1654	
566D	1.8	6	45	4	A44	8.8	0.02	23	0.2	0.7	17	0.4	1.2	7	2.2	6.6	5	4.2	11.8	5	5.1	15.9	5	7.0	22.2	6.0		1.66	36.9							
567D		6	45	4	A44	8.8	0.02	23		0.7	17		1.2	7		6.6	5		11.8	5		15.9	5		22.2	6.0		1.66	36.9	Valley Chnl		535	0.27664	1654	1506	
568D	2.6	8.6	45	4	A44	8.8	0.02	27	0.3	0.9	21	0.5	1.6	9	2.5	8.8	6	5.2	16.5	5	7.3	21.4	5	10.1	30.2	8.6		1.66	50.1							
569D		8.6	45	4	A44	8.8	0.02	27		0.9	21		1.6	9		8.8	6		16.5	5		21.4	5		30.2	8.6		1.66	50.1	Mtn Chnl		348	0.15517	1506	1452	
570D	2.6	11.2	45	4	A44	8.8	0.02	26	0.3	1.2	20	0.5	2.1	9	2.5	10.6	6	5.2	19.4	5	7.3	25.3	5	10.1	36.7	11.2		1.66	60.9							
571CD	11.2	23.8	45	4	A44	8.8			1.2	2.3		2.1	4.0		10.6	16.2		19.4	31.4		25.3	42.2		36.7	67.7	23.8		1.66	112.4	Mtn Chnl		343	0.09329	1452	1420	
572C	1.7	25.5	45	4	A44	8.8	0.02	26	0.2	2.5	19	0.3	4.2	8	1.8	16.0	6	3.4	31.7	5	4.8	42.5	5	6.6	69.7	25.5		1.66	115.7							
573C		25.5	45	4	A44	8.8	0.02	26		2.5	19		4.2	8		16.0	6		31.7	5		42.5	5		69.7	25.5		1.66	115.7	Mtn Chnl		124	0.00806	1420	1419	
574C	1.5	27	45	4	A44	8.8	0.02	27	0.2	2.6	20	0.3	4.4	9	1.4	15.6	6	3.0	30.6	5	4.2	41.5	5	5.8	69.9	27.0		1.66	116.0							
575C		27	45	4	A44	8.8	0.02	27		2.6	20		4.4	9		15.6	6		30.6	5		41.5	5		69.9	27.0		1.66	116.0	Mtn Chnl		240	0.2875	1419	1350	
576C	3.2	30.2	45	4	A44	8.8	0.02	29	0.3	2.9	23	0.6	4.8	11	2.5	16.0	7	5.7	30.8	6	7.8	42.4	6	11.0	74.4	30.2		1.66	123.5							
577C		30.2	45	4	A44	8.8	0.02	29		2.9	23		4.8	11		16.0	7		30.8	6		42.4	6		74.4	30.2		1.66	123.5	Mtn Chnl		250	0.12	1350	1320	
578C	3.5	33.7	45	4	A44	8.8	0.02	29	0.4	3.1	23	0.6	5.3	11	2.7	16.3	7	6.2	31.1	6	8.6	42.4	6	12.1	78.3	33.7		1.66	129.9							
579C	2.2	35.9	45	4	A44	8.8	0.02	26	0.2	3.3	20	0.4	5.5	9	2.1	16.5	6	4.4	31.4	5	6.2	42.8	5	8.5	81.3	35.9		1.66	134.9							
580C		35.9	45	4	A44	8.8	0.02	26		3.3	20		5.5	9		16.5	6		31.4	5		42.8	5		81.3	35.9		1.66	134.9	Mtn Chnl		286	0.03147	1319	1310	
581C	5.4	41.3	45	4	A44	8.8	0.02	29	0.6	3.7	22	1.0	6.1	10	4.7	16.6	7	9.6	31.5	6	13.2	43.0	6	18.6	86.2	41.3		1.66	143.0							
582BC	41.3	120.6	45	4	A44	8.8			3.7	9.3		6.1	15.4		16.6	39.0		31.5	69.6		43.0	95.0		86.2	206.0	120.6		1.66	341.9	Mtn Chnl		136	0.25735	1310	1275	
583B	6.3	126.9	45	4	A44	8.8	0.02	27	0.7	9.7	20	1.2	16.0	9	6.0	39.5	6	12.6	70.3	5	17.8	95.8	5	24.5	212.4	126.9		1.66	352.6							
584B		126.9	45	4	A44	8.8	0.02	27		9.7	20		16.0	9		39.5	6		70.3	5		95.8	5		212.4	126.9		1.66	352.6	Mtn Chnl		367	0.04087	1275	1260	
585B	4.2	131.1	45	4	A44	8.8	0.02	26	0.5	9.8	19	0.8	16.2	8	4.5	39.6	6	8.4	70.4	5	11.9	95.7	5	16.3	213.5	131.1		1.66	354.5							
586C	3.7	3.7	45	4	A44	8.8	0.02	24	0.4	0.4	19	0.7	0.7	8	4.0	4.0	6	7.4	7.4	5	10.4	10.4	5	14.4	14.4	3.7		1.66	23.8							
587C		3.7	45	4	A44	8.8	0.02	24		0.4	19		0.7	8		4.0	6		7.4	5		10.4	5		14.4	3.7		1.66	23.8	Mtn Chnl		323	0.04644	1340	1325	
588C	1.6	5.3	45	4	A44	8.8	0.02	27	0.2	0.6	20	0.3	0.9	9	1.5	4.5	6	3.2	8.0	5	4.5	10.9	5	6.2	16.6	5.3		1.66	27.6							
589C		5.3	45	4	A44	8.8	0.02	27		0.6	20		0.9	9		4.5	6		8.0	5		10.9	5		16.6	5.3		1.66	27.6	Mtn Chnl		458	0.12009	1325	1270	
590C	3.4	8.7	45	4	A44	8.8	0.02	23	0.4	0.9	17	0.7	1.5	7	4.2	5.3	5	7.9	9.7	5	9.6	13.3	5	13.2	23.1	8.7		1.66	38.3							
591D	1.7	1.7	45	4	A44	8.8	0.02	29	0.2	0.2	23	0.3	0.3	11	1.3	1.3	7	3.0	3.0	6	4.2	4.2	6	5.9	5.9	1.7		1.66	9.7							
592D		1.7	45	4	A44	8.8	0.02	29		0.2	23		0.3	11		1.3	7		3.0	6		4.2	6		5.9	1.7		1.66	9.7	Mtn Chnl		291	0.15464	1375	1330	
593D	0.7	2.4	45	4	A44	8.8	0.02	16	0.1	0.3	12	0.2	0.4	5	1.2	1.6	5	1.6	3.8	5	2.0	5.2	5	2.7	7.6	2.4		1.66	12.6							
594D	2.6	5	45	4	A44	8.8	0.02	27	0.3	0.5	20	0.5	0.9	9	2.5	4.1	6	5.2	8.9	5	7.3	12.0	5	10.1	17.3	5.0		1.66	28.7							
595D		5	45	4	A44	8.8	0.02	27		0.5	20		0.9	9		4.1	6		8.9	5		12.0	5		17.3	5.0		1.66	28.7	Mtn Chnl		441	0.24943	1330	1220	
596D	2	7	45	4	A44	8.8	0.02	24	0.2	0.7	18	0.4	1.3	7	2.4	5.8	5	4.7	11.1	5	5.6	14.9	5	7.8	22.4	7.0		1.66	37.2							
597CD	7	15.7	45	4	A44	8.8			0.7	1.6		1.3	2.7		5.8	11.1		11.1	20.0		14.9	28.1		22.4	44.9	15.7		1.66	74.6	Mtn Chnl		116	0.0431	1270	1265	
598C	0.3	16	45	4	A44	8.8	0.02	15	0.0	1.6	6	0.3	2.7	5	0.5	10.8	5	0.7	20.3	5	0.9	28.4	5	1.2	45.7	16.0		1.66	75.8							
599BC	16	147.1	45	4	A44	8.8			1.6	11.1		2.7	18.2		10.8	44.9		20.3	85.5		28.4	117.6		45.7	251.5	147.1		1.66	417.5	Mtn Chnl		563	0.08348	1265	1218	
600B	4.7	151.8	45	4	A44	8.8	0.02	26	0.5	11.2	20	0.9	18.5	8	5.1	45.2	6	9.4	84.9	5	13.3	116.4	5	18.2	252.5	151.8		1.66	419.2							
601AB	151.8	1285.8	45	4	A44	8.8			11.2	108.2		18.5	288.8		45.2	554.7		84.9	958.7		116.4	1277.0		252.5	2099.1	1145.9	139.9	1.59	3333.8							
602A		1285.8	45	4	A44	8.8		30		108.2	30		288.8	30		554.7	30		958.7	30		1277.0	30		2099.1	1145.9	139.9	1.59	3333.8							

LAR04 Output

Program Package Serial Number: 2195

06/26/13 FILE: ma050e INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	17.8	55.01	17.8	55.01	0	0.	.00000	.00	.00	0.	28	7	A44	.02
5	2A	.0	.00	17.8	55.01	1	506.	.11858	.00	.00	0.	28	7	A44	.02
5	3A	4.1	15.72	21.9	64.83	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	4B	9.7	37.20	9.7	37.20	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	5B	.0	.00	9.7	37.20	1	534.	.31835	.00	.00	0.	28	5	A44	.02
5	6B	1.9	7.29	11.6	40.61	0	0.	.00000	.00	.00	0.	28	5	A44	.02

CONFLUENCE Q'S

5 7A TA 1155 QA 64.83 QAB 102.53 QB 37.70 5 7B TB 1154 QB 40.61 QBA 104.35 QA 63.74

5 7AB TAB 1154 QAB 104.35 QA 63.74 QB 40.61

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	11.6	40.61	33.5	104.35	1	257.	.07782	.00	.00	0.	28	0	A44	.00
5	8A	3.1	11.89	36.6	111.32	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	9C	30.6	104.06	30.6	104.06	0	0.	.00000	.00	.00	0.	28	6	A44	.02
5	10C	.0	.00	30.6	104.06	2	266.	.47368	.00	.00	0.	28	6	A44	.02
5	11C	2.4	9.20	33.0	111.75	0	0.	.00000	.00	.00	0.	28	5	A44	.02

CONFLUENCE Q'S

5 12A TA 1155 QA 111.32 QAC 209.92 QC 98.60 5 12C TC 1154 QC 111.75 QCA 219.21 QA 107.46

5 12AC TAC 1154 QAC 219.21 QA 107.46 QC 111.75

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	12AC	33.0	111.75	69.6	219.21	1	405.	.03457	.00	.00	0.	28	0	A44	.00
5	13A	3.4	13.04	73.0	216.41	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	14D	9.9	37.97	9.9	37.97	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	15D	.0	.00	9.9	37.97	1	1124.	.18683	.00	.00	0.	28	5	A44	.02
5	16D	6.8	23.12	16.7	49.09	0	0.	.00000	.00	.00	0.	28	6	A44	.02
5	17D	8.6	32.98	25.3	76.17	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	18D	.0	.00	25.3	76.17	1	806.	.10918	.00	.00	0.	28	5	A44	.02
5	19D	7.8	29.91	33.1	88.55	0	0.	.00000	.00	.00	0.	28	5	A44	.02

CONFLUENCE Q'S

5 20A TA 1155 QA 216.41 QAD 304.96 QD 88.55 5 20D TD 1155 QD 88.55 QDA 304.96 QA 216.41

5 20AD TAD 1155 QAD 304.96 QA 216.41 QD 88.55

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	20AD	33.1	88.55	106.1	304.96	1	201.	.02985	.00	.00	0.	28	0	A44	.00
5	21A	.7	2.68	106.8	304.09	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	22E	9.7	37.20	9.7	37.20	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	23E	.0	.00	9.7	37.20	1	1051.	.15033	.00	.00	0.	28	5	A44	.02
5	24E	9.0	27.81	18.7	55.28	0	0.	.00000	.00	.00	0.	28	7	A44	.02

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06/26/13 FILE: ma050e INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

5 25A TA 1156 QA 304.09 QAE 357.27 QE 53.18 5 25E TE 1155 QE 55.28 QEA 342.86 QA 287.59

5 25AE TAE 1156 QAE 357.27 QA 304.09 QE 53.18

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	25AE	18.7	55.28	125.5	357.27	1	652.	.02454	.00	.00	0.	28	0	A44	.00

5	26A	16.7	51.61	142.2	360.50	0	0.	.00000	.00	.00	0.	28	7	A44	.02
5	27A	.0	.00	142.2	360.50	1	1018.	.04322	.00	.00	0.	28	7	A44	.02
5	28A	24.5	83.31	166.7	348.03	0	0.	.00000	.00	.00	0.	28	6	A44	.02
5	29B	12.5	47.94	12.5	47.94	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	30B	3.2	12.27	15.7	60.21	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	31B	.0	.00	15.7	60.21	1	673.	.17533	.00	.00	0.	28	5	A44	.02
5	32B	3.3	12.66	19.0	63.87	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	33B	.0	.00	19.0	63.87	1	790.	.11392	.00	.00	0.	28	5	A44	.02
5	34B	7.1	17.38	26.1	68.54	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	35C	4.3	16.49	4.3	16.49	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	36C	.0	.00	4.3	16.49	1	700.	.17143	.00	.00	0.	28	5	A44	.02
5	37C	2.4	5.87	6.7	18.51	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	38C	.0	.00	6.7	18.51	1	583.	.10292	.00	.00	0.	45	6	A44	.02
5	39C	2.8	6.85	9.5	19.28	0	0.	.00000	.00	.00	0.	45	6	A44	.02

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CONFLUENCE Q'S

5 40B TB 1156 QB 68.54 QBC 87.45 QC 18.91 5 40C TC 1157 QC 19.28 QCB 85.72 QB 66.43

5 40BC TBC 1156 QBC 87.45 QB 68.54 QC 18.91

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	40BC	9.5	19.28	35.6	87.45	1	128.	.03125	.00	.00	0.	45	0	A44	.00
5	41B	.3	.85	35.9	86.48	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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CONFLUENCE Q'S

5 42A TA 1161 QA 348.03 QAB 401.59 QB 53.56 5 42B TB 1157 QB 86.48 QBA 350.85 QA 264.36

5 42AB TAB 1160 QAB 406.41 QA 343.30 QB 63.11

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	42AB	35.9	86.48	202.6	406.41	1	814.	.33170	.00	.00	0.	45	0	A44	.00
5	43A	13.8	38.93	216.4	405.24	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	44A	.0	.00	216.4	405.24	1	624.	.02244	.00	.00	0.	45	5	A44	.02
5	45A	17.3	42.35	233.7	398.96	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	46A	.0	.00	233.7	398.96	4	141.	.02128	2.00	.00	0.	45	6	A44	.02
5	47A	3.0	8.52	236.7	399.21	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	48B	7.7	21.72	7.7	21.72	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	49B	.0	.00	7.7	21.72	2	256.	.39844	.00	.00	0.	45	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	50B	.4	1.13	8.1	21.76	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	51C	3.8	10.72	3.8	10.72	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	52C	.0	.00	3.8	10.72	1	433.	.16166	.00	.00	0.	45	5	A44	.02
5	53C	2.5	7.05	6.3	14.49	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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CONFLUENCE Q'S

5 54B TB 1153 QB 21.76 QBC 35.30 QC 13.54 5 54C TC 1154 QC 14.49 QCB 35.11 QB 20.62

5 54BC TBC 1153 QBC 35.30 QB 21.76 QC 13.54

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	54BC	6.3	14.49	14.4	35.30	1	740.	.25405	.00	.00	0.	45	0	A44	.00
5	55B	6.3	15.42	20.7	45.54	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	56C	4.9	13.82	4.9	13.82	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	57C	.0	.00	4.9	13.82	1	504.	.25794	.00	.00	0.	45	5	A44	.02
5	58C	5.9	14.44	10.8	26.15	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	59C	.0	.00	10.8	26.15	1	429.	.24242	.00	.00	0.	45	6	A44	.02
5	60C	4.1	11.57	14.9	32.31	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	61C	.0	.00	14.9	32.31	2	510.	.01569	.00	.00	0.	45	5	A44	.02
5	62C	2.4	6.77	17.3	30.10	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	63D	2.5	7.05	2.5	7.05	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	64D	.0	.00	2.5	7.05	2	397.	.31738	.00	.00	0.	45	5	A44	.02
5	65D	1.0	2.82	3.5	9.01	0	0.	.00000	.00	.00	0.	45	5	A44	.02

5	66D	3.1	7.59	6.6	16.60	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	67D	.0	.00	6.6	16.60	2	256.	.08594	.00	.00	0.	45	6	A44	.02
5	68D	.9	2.54	7.5	18.40	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 69C TC 1157 QC 30.10 QCD 40.44 QD 10.34 5 69D TD 1154 QD 18.40 QDC 38.51 QC 20.11 *

* 5 69CD TCD 1156 QCD 42.87 QC 28.85 QD 14.02 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	69CD	7.5	18.40	24.8	42.87	2	138.	.08696	.00	.00	0.	45	0	A44	.00
5	70C	.3	.85	25.1	43.17	0	0.	.00000	.00	.00	0.	45	5	A44	.02

****

* CONFLUENCE Q'S *

* 5 71B TB 1155 QB 45.54 QBC 87.27 QC 41.73 5 71C TC 1156 QC 43.17 QCB 85.23 QB 42.07 *

* 5 71BC TBC 1155 QBC 87.27 QB 45.54 QC 41.73 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	71BC	25.1	43.17	45.8	87.27	1	114.	.10526	.00	.00	0.	45	0	A44	.00
5	72B	.4	1.13	46.2	86.62	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	73E	4.0	11.28	4.0	11.28	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	74E	.0	.00	4.0	11.28	1	567.	.16226	.00	.00	0.	45	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	75E	5.3	14.95	9.3	20.29	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 76B TB 1156 QB 86.62 QBE 102.51 QE 15.89 5 76E TE 1153 QE 20.29 QEB 82.17 QB 61.87 *

* 5 76BE TBE 1155 QBE 105.16 QB 86.31 QE 18.85 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	76BE	9.3	20.29	55.5	105.16	1	282.	.18440	.00	.00	0.	45	0	A44	.00
5	77B	3.7	9.06	59.2	108.92	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	78C	4.0	11.28	4.0	11.28	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	79C	.0	.00	4.0	11.28	1	516.	.31008	.00	.00	0.	45	5	A44	.02
5	80C	8.2	23.13	12.2	30.82	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	81C	.0	.00	12.2	30.82	1	501.	.16766	.00	.00	0.	45	5	A44	.02
5	82C	7.7	21.72	19.9	44.30	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	83C	3.5	9.87	23.4	52.60	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	84C	.0	.00	23.4	52.60	1	614.	.25081	.00	.00	0.	45	5	A44	.02
5	85C	9.3	22.77	32.7	69.46	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	86C	.0	.00	32.7	69.46	1	755.	.10331	.00	.00	0.	45	6	A44	.02
5	87C	3.9	9.55	36.6	67.80	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	88D	4.6	12.98	4.6	12.98	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	89D	.0	.00	4.6	12.98	1	517.	.28627	.00	.00	0.	45	5	A44	.02
5	90D	2.7	7.62	7.3	17.45	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	91D	.0	.00	7.3	17.45	1	458.	.22926	.00	.00	0.	45	5	A44	.02
5	92D	2.8	7.90	10.1	21.45	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 93C TC 1157 QC 67.80 QCD 84.43 QD 16.63 5 93D TD 1155 QD 21.45 QDC 77.05 QC 55.60 *

* 5 93CD TCD 1156 QCD 85.20 QC 65.18 QD 20.01 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	93CD	10.1	21.45	46.7	85.20	1	225.	.22667	.00	.00	0.	45	0	A44	.00
5	94C	1.6	4.51	48.3	85.67	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 95B TB 1156 QB 108.92 QBC 192.71 QC 83.79 5 95C TC 1157 QC 85.67 QCB 187.31 QB 101.64 *

* 5 95BC TBC 1156 QBC 192.71 QB 108.92 QC 83.79 *

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 95BC	48.3	85.67	107.5	192.71	1	461.	.03000	.00	.00	0.	45	0	A44	.00
5 96B	6.5	18.34	114.0	186.10	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 97B	.0	.00	114.0	186.10	4	150.	.03000	1.50	.00	0.	45	5	A44	.02
5 98B	.6	1.70	114.6	186.00	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 99C	4.8	13.54	4.8	13.54	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 100C	.0	.00	4.8	13.54	1	557.	.18312	.00	.00	0.	45	5	A44	.02
5 101C	5.3	12.97	10.1	23.03	0	0.	.00000	.00	.00	0.	45	6	A44	.02

CONFLUENCE Q'S

5 102B TB 1158 QB 186.00 QBC 196.17 QC 10.17 5 102C TC 1154 QC 23.03 QCB 116.85 QB 93.81

5 102BC TBC 1158 QBC 196.17 QB 186.00 QC 10.17

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 102BC	10.1	23.03	124.7	196.17	4	255.	.03000	1.50	.00	0.	45	0	A44	.00
5 103B	3.1	8.80	127.8	196.75	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 104C	3.4	9.59	3.4	9.59	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 105C	.0	.00	3.4	9.59	2	517.	.35783	.00	.00	0.	45	5	A44	.02
5 106C	2.2	6.21	5.6	14.46	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 107D	2.9	8.18	2.9	8.18	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 108D	.0	.00	2.9	8.18	1	273.	.27106	.00	.00	0.	45	5	A44	.02
5 109D	1.5	4.23	4.4	11.04	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 110C TC 1153 QC 14.46 QCD 25.39 QD 10.93 5 110D TD 1154 QD 11.04 QDC 25.11 QC 14.07

5 110CD TCD 1153 QCD 25.39 QC 14.46 QD 10.93

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 110CD	4.4	11.04	10.0	25.39	1	325.	.16615	.00	.00	0.	45	0	A44	.00
5 111C	3.0	8.46	13.0	30.78	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 112C	.0	.00	13.0	30.78	4	138.	.06522	1.00	.00	0.	45	5	A44	.02
5 113C	2.3	6.49	15.3	36.06	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 114B TB 1158 QB 196.75 QBC 211.41 QC 14.65 5 114C TC 1154 QC 36.06 QCB 158.73 QB 122.66

5 114BC TBC 1157 QBC 217.55 QB 196.04 QC 21.51

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 114BC	15.3	36.06	143.1	217.55	4	540.	.04870	1.50	.00	0.	45	0	A44	.00
5 115B	12.0	29.60	155.1	229.66	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 116B	.0	.00	155.1	229.66	4	475.	.04147	1.50	.00	0.	45	6	A44	.03
5 117B	5.5	13.57	160.6	234.94	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 118A TA 1163 QA 399.21 QAB 516.69 QB 117.48 5 118B TB 1157 QB 234.94 QBA 539.39 QA 304.44

5 118AB TAB 1157 QAB 539.39 QA 304.44 QB 234.94

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 118AB	160.6	234.94	397.3	539.39	4	285.	.08702	2.00	.00	0.	45	0	A44	.00
5 119A	3.7	9.13	401.0	542.79	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 120B	4.0	11.28	4.0	11.28	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 121B	.0	.00	4.0	11.28	1	202.	.28713	.00	.00	0.	45	5	A44	.02
5 122B	2.6	7.33	6.6	17.35	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 123B	.0	.00	6.6	17.35	2	393.	.36132	.00	.00	0.	45	5	A44	.02
5 124B	2.4	6.77	9.0	22.49	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 125B	.0	.00	9.0	22.49	2	591.	.11168	.00	.00	0.	45	5	A44	.02
5 126B	1.1	2.71	10.1	23.86	0	0.	.00000	.00	.00	0.	45	6	A44	.03

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* CONFLUENCE Q'S *

* 5 127A TA 1157 QA 542.79 QAB 560.88 QB 18.09 5 127B TB 1155 QB 23.86 QBA 513.30 QA 489.44 *

* 5 127AB TAB 1157 QAB 560.88 QA 542.79 QB 18.09 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 127AB	10.1	23.86	411.1	560.88	4	293.	.01160	2.00	.00	0.	45	0	A44	.00
5 128A	1.1	3.12	412.2	561.26	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 129B	4.6	12.98	4.6	12.98	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 130B	.0	.00	4.6	12.98	2	514.	.16732	.00	.00	0.	45	5	A44	.02
5 131B	4.4	12.50	9.0	22.99	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 132B	.0	.00	9.0	22.99	2	500.	.04600	.00	.00	0.	45	5	A44	.03
5 133B	4.3	12.13	13.3	29.19	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 134A TA 1157 QA 561.26 QAB 581.96 QB 20.70 5 134B TB 1155 QB 29.19 QBA 543.07 QA 513.88 *

* 5 134AB TAB 1157 QAB 581.96 QA 561.26 QB 20.70 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 134AB	13.3	29.19	425.5	581.96	2	272.	.00735	.00	.00	0.	45	0	A44	.00
5 135A	1.9	5.40	427.4	577.42	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 136B	7.3	20.59	7.3	20.59	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 137B	.0	.00	7.3	20.59	1	496.	.20565	.00	.00	0.	45	5	A44	.02
5 138B	6.2	15.18	13.5	32.81	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 139B	.0	.00	13.5	32.81	1	464.	.09052	.00	.00	0.	45	6	A44	.02
5 140B	2.5	6.12	16.0	34.08	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 141B	.0	.00	16.0	34.08	1	216.	.12963	.00	.00	0.	45	6	A44	.02
5 142B	.9	2.54	16.9	33.73	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 143B	.0	.00	16.9	33.73	1	716.	.24581	.00	.00	0.	45	5	A44	.02
5 144B	7.0	17.13	23.9	36.26	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 145B	.0	.00	23.9	36.26	1	287.	.21603	.00	.00	0.	45	6	A44	.02
5 146B	2.7	7.62	26.6	36.27	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 147C	3.4	8.32	3.4	8.32	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 148C	.0	.00	3.4	8.32	1	438.	.20091	.00	.00	0.	45	6	A44	.02
5 149C	7.0	19.75	10.4	24.94	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 150C	.0	.00	10.4	24.94	1	504.	.22619	.00	.00	0.	45	5	A44	.02
5 151C	4.8	11.75	15.2	33.29	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 152C	.0	.00	15.2	33.29	1	238.	.26891	.00	.00	0.	45	6	A44	.02
5 153C	1.9	5.36	17.1	36.48	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 154B TB 1158 QB 36.27 QBC 57.99 QC 21.72 5 154C TC 1155 QC 36.48 QCB 68.83 QB 32.35 *

* 5 154BC TBC 1155 QBC 68.83 QB 32.35 QC 36.48 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 154BC	17.1	36.48	43.7	68.83	1	404.	.19307	.00	.00	0.	45	0	A44	.00
5 155B	2.3	6.49	46.0	70.79	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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          5  156B      .0       .00      46.0      70.79   1      438.    .11416       .00   .00         0.    45    5   A44    .02
          5  157B     6.8      16.65      52.8      76.24   0        0.    .00000       .00   .00         0.    45    6   A44    .02
          5  158B      .0       .00      52.8      76.24   2      431.    .03712       .00   .00         0.    45    6   A44    .02
          5  159B     4.8      13.54      57.6      76.39   0        0.    .00000       .00   .00         0.    45    5   A44    .02
          5  160D     3.8       9.30       3.8       9.30   0        0.    .00000       .00   .00         0.    45    6   A44    .02
          5  161D      .0       .00        3.8       9.30   1      353.    .25496       .00   .00         0.    45    6   A44    .02
          5  162D     1.4       3.95       5.2      11.85   0        0.    .00000       .00   .00         0.    45    5   A44    .02
          5  163D      .0       .00        5.2      11.85   1      455.    .32967       .00   .00         0.    45    5   A44    .02
          5  164D     3.5       9.87       8.7      17.89   0        0.    .00000       .00   .00         0.    45    5   A44    .02
          5  165D      .0       .00        8.7      17.89   1      207.    .16425       .00   .00         0.    45    5   A44    .02
          5  166D     1.9       5.36      10.6      21.23   0        0.    .00000       .00   .00         0.    45    5   A44    .02
          5  167E     6.6      16.16       6.6      16.16   0        0.    .00000       .00   .00         0.    45    6   A44    .02
          5  168E      .0       .00        6.6      16.16   1      539.    .24490       .00   .00         0.    45    6   A44    .02
          5  169E     3.8       9.30      10.4      23.05   0        0.    .00000       .00   .00         0.    45    6   A44    .02
     ********************************************************************************************************************************
     *                                                                                                                              *
     *                                                CONFLUENCE Q'S                                                                *
     *      5  170D  TD 1155 QD    21.23 QDE    44.21 QE    22.98       5  170E  TE 1154 QE    23.05 QED    44.11 QD    21.05    *
     *                                  5  170DE TDE 1155 QDE    44.21 QD    21.23 QE    22.98                                    *
     ********************************************************************************************************************************
                      SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
          LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
             5  170DE   10.4      23.05      21.0      44.21   2      307.    .01303       .00   .00         0.    45    0   A44    .00
             5  171D     4.5      11.02      25.5      49.22   0        0.    .00000       .00   .00         0.    45    6   A44    .02
     ********************************************************************************************************************************
     *                                                                                                                              *
     *                                                CONFLUENCE Q'S                                                                *
     *      5  172B  TB 1157 QB    76.39 QBD   122.49 QD    46.10       5  172D  TD 1156 QD    49.22 QDB   121.29 QB    72.07    *
     *                                  5  172BD TBD 1157 QBD   122.49 QB    76.39 QD    46.10                                    *
     ********************************************************************************************************************************
                      SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
          LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
             5  172BD   25.5      49.22      83.1     122.49   2      543.    .06262       .00   .00         0.    45    0   A44    .00
             5  173B     5.6      15.91      88.7     122.69   0        0.    .00000       .00   .00         0.    45    5   A44    .03
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                      SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
          LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     ********************************************************************************************************************************
     *                                                                                                                              *
     *                                                CONFLUENCE Q'S                                                                *
     *      5  174A  TA 1158 QA   577.42 QAB   698.87 QB   121.45       5  174B  TB 1157 QB   122.69 QBA   695.12 QA   572.43    *
     *                                  5  174AB TAB 1158 QAB   698.87 QA   577.42 QB   121.45                                    *
     ********************************************************************************************************************************
                      SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
          LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
             5  174AB   88.7     122.69     516.1     698.87   4      270.    .01296       2.50  .00         0.    45    0   A44    .00
             5  175A     7.0      17.13     523.1     702.22   0        0.    .00000       .00   .00         0.    45    6   A44    .02
             5  176B     5.9      16.99       5.9      16.99   0        0.    .00000       .00   .00         0.    45    5   A44    .05
             5  177B      .0       .00        5.9      16.99   2      420.    .06190       .00   .00         0.    45    5   A44    .05
             5  178B     3.4       8.39       9.3      23.42   0        0.    .00000       .00   .00         0.    45    6   A44    .03
     ********************************************************************************************************************************
     *                                                                                                                              *
     *                                                CONFLUENCE Q'S                                                                *
     *      5  179A  TA 1158 QA   702.22 QAB   710.77 QB     8.55       5  179B  TB 1154 QB    23.42 QBA   545.91 QA   522.49    *
     *                                  5  179AB TAB 1157 QAB   714.68 QA   701.41 QB    13.27                                    *
     ********************************************************************************************************************************
                      SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
          LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
             5  179AB    9.3      23.42     532.4     714.68   2      499.    .00200       .00   .00         0.    45    0   A44    .00
             5  180A     9.4      26.70     541.8     685.06   0        0.    .00000       .00   .00         0.    45    5   A44    .03
             5  181C     5.9      16.64       5.9      16.64   0        0.    .00000       .00   .00         0.    45    5   A44    .02
             5  182C      .0       .00        5.9      16.64   4      363.    .14325      1.50   .00         0.    45    5   A44    .02
             5  183C      .6      1.69        6.5      17.21   4      350.    .03401      1.50   .00         0.    45    5   A44    .02
     ********************************************************************************************************************************
     *                                                                                                                              *
     *                                                CONFLUENCE Q'S                                                                *
     *      5  184A  TA 1161 QA   685.06 QAC   686.30 QC     1.24       5  184C  TC 1154 QC    16.63 QCA   269.79 QA   253.16    *
     *                                  5  184AC TAC 1161 QAC   686.30 QA   685.06 QC     1.24                                    *
     ********************************************************************************************************************************
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 184AC	6.5	16.63	548.3	686.30	4	896.	.03069	5.50	.00	0.	45	0	A44	.00
5 185A	.8	2.27	549.1	684.26	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 186B	1.3	3.69	1.3	3.69	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 187B	.0	.00	1.3	3.69	2	302.	.20183	.00	.00	0.	45	5	A44	.03
5 188B	1.1	3.12	2.4	6.31	0	0.	.00000	.00	.00	0.	45	5	A44	.03

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* CONFLUENCE Q'S *

* 5 189A TA 1161 QA 684.26 QAB 684.65 QB .39 5 189B TB 1153 QB 6.31 QBA 192.16 QA 185.85 *

* 5 189AB TAB 1161 QAB 684.65 QA 684.26 QB .39 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 189AB	2.4	6.31	551.5	684.65	2	90.	.06667	.00	.00	0.	45	0	A44	.00
5 190A	.1	.28	551.6	682.96	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 191A	1.5	4.23	553.1	683.16	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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06/26/13 FILE: ma050e INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 9

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 192A	.0	.00	553.1	683.16	2	380.	.01316	.00	.00	0.	45	5	A44	.02
5 193A	1.8	4.44	554.9	680.59	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 194D	1.9	5.40	1.9	5.40	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 195D	.0	.00	1.9	5.40	2	254.	.12598	.00	.00	0.	45	5	A44	.03
5 196D	1.5	4.26	3.4	8.94	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 197D	.0	.00	3.4	8.94	2	375.	.00267	.00	.00	0.	45	5	A44	.03
5 198D	1.9	5.40	5.3	6.12	0	0.	.00000	.00	.00	0.	45	5	A44	.03

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* CONFLUENCE Q'S *

* 5 199A TA 1163 QA 680.59 QAD 684.96 QD 4.37 5 199D TD 1153 QD 6.12 QDA 169.83 QA 163.71 *

* 5 199AD TAD 1163 QAD 684.96 QA 680.59 QD 4.37 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 199AD	5.3	6.12	560.2	684.96	2	97.	.01031	.00	.00	0.	45	0	A44	.00
5 200A	1.3	3.69	561.5	684.62	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 201B	10.7	33.07	10.7	33.07	0	0.	.00000	.00	.00	0.	28	7	A44	.02
5 202B	.0	.00	10.7	33.07	2	555.	.45766	.00	.00	0.	28	7	A44	.02
5 203B	2.2	6.21	12.9	38.16	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 204C	4.5	12.69	4.5	12.69	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 205C	.0	.00	4.5	12.69	1	137.	.42336	.00	.00	0.	45	5	A44	.02
5 206C	.5	1.41	5.0	13.36	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 207D	2.3	6.49	2.3	6.49	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 208D	.0	.00	2.3	6.49	2	166.	.46988	.00	.00	0.	45	5	A44	.02
5 209D	.3	.85	2.6	7.06	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 210C TC 1153 QC 13.36 QCD 20.42 QD 7.06 5 210D TD 1153 QD 7.06 QDC 20.42 QC 13.36 *

* 5 210CD TCD 1153 QCD 20.42 QC 13.36 QD 7.06 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 210CD	2.6	7.06	7.6	20.42	2	301.	.34551	.00	.00	0.	45	0	A44	.00
5 211C	1.1	3.10	8.7	22.37	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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* CONFLUENCE Q'S *

* 5 212B TB 1154 QB 38.16 QBC 60.52 QC 22.37 5 212C TC 1154 QC 22.37 QCB 60.52 QB 38.16 *

* 5 212BC TBC 1154 QBC 60.52 QB 38.16 QC 22.37 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 212BC	8.7	22.37	21.6	60.52	1	135.	.13333	.00	.00	0.	45	0	A44	.00
5 213B	.3	.85	21.9	60.96	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 214D	.8	2.26	.8	2.26	0	0.	.00000	.00	.00	0.	45	5	A44	.02

5	215D	.0	.00	.8	2.26	2	448.	.34375	.00	.00	0.	45	5	A44	.02
5	216D	.7	1.97	1.5	3.83	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
5 217B TB 1154 QB	60.96 QBD	64.68 QD	3.72	5 217D TD 1153 QD	3.83 QDB	60.20 QB	56.37							
5 217BD TBD 1154 QBD	64.68 QB	60.96 QD	3.72											
5 217BD	1.5	3.83	23.4	64.68	1	130.	.09231	.00	.00	0.	45	0	A44	.00
5 218B	.3	.85	23.7	63.58	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 219E	11.2	38.09	11.2	38.09	0	0.	.00000	.00	.00	0.	28	6	A44	.02
5 220E	.0	.00	11.2	38.09	2	282.	.35816	.00	.00	0.	28	6	A44	.02
5 221E	9.1	30.95	20.3	68.87	0	0.	.00000	.00	.00	0.	28	6	A44	.02
5 222E	.0	.00	20.3	68.87	2	208.	.14904	.00	.00	0.	28	6	A44	.02
5 223E	3.0	8.46	23.3	75.79	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 224F	2.5	7.05	2.5	7.05	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 225F	.0	.00	2.5	7.05	2	378.	.40212	.00	.00	0.	45	5	A44	.02
5 226F	.8	2.26	3.3	8.59	0	0.	.00000	.00	.00	0.	45	5	A44	.02
CONFLUENCE Q'S														
5 227E TE 1154 QE	75.79 QEF	84.21 QF	8.42	5 227F TF 1153 QF	8.59 QFE	81.94 QE	73.35							
5 227EF TEF 1154 QEF	84.21 QE	75.79 QF	8.42											
5 227EF	3.3	8.59	26.6	84.21	1	115.	.06957	.00	.00	0.	45	0	A44	.00
5 228E	.3	.85	26.9	84.29	0	0.	.00000	.00	.00	0.	45	5	A44	.02
CONFLUENCE Q'S														
5 229B TB 1154 QB	63.58 QBE	147.87 QE	84.29	5 229E TE 1154 QE	84.29 QEB	147.87 QB	63.58							
5 229BE TBE 1154 QBE	147.87 QB	63.58 QE	84.29											
5 229BE	26.9	84.29	50.6	147.87	1	132.	.16667	.00	.00	0.	45	0	A44	.00
5 230B	.4	1.13	51.0	145.95	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 231C	1.3	3.67	1.3	3.67	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 232C	.0	.00	1.3	3.67	2	352.	.29545	.00	.00	0.	45	5	A44	.02
5 233C	.7	1.97	2.0	5.15	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 234D	1.2	3.38	1.2	3.38	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 235D	.0	.00	1.2	3.38	2	277.	.28881	.00	.00	0.	45	5	A44	.02
5 236D	.9	2.54	2.1	5.56	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
5 237C TC 1153 QC	5.15 QCD	10.72 QD	5.56	5 237D TD 1153 QD	5.56 QDC	10.72 QC	5.15							
5 237CD TCD 1153 QCD	10.72 QC	5.15 QD	5.56											
5 237CD	2.1	5.56	4.1	10.72	2	135.	.23704	.00	.00	0.	45	0	A44	.00
5 238C	.5	1.41	4.6	11.67	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  239B  TB 1154 QB    145.95 QBC    157.63 QC     11.67       5  239C  TC 1154 QC     11.67 QCB    157.63 QB    145.95   *
*                                    5  239BC TBC 1154 QBC    157.63 QB    145.95 QC     11.67                               *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV      CONV      CONV    CONV    CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE   IMPV
       5  239BC     4.6      11.67       55.6    157.63   1      395.    .09620       .00    .00         0.    45   0   A44    .00
       5  240B      6.2      17.49       61.8    164.80   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  241B       .0        .00       61.8    164.80   1      550.    .16364       .00    .00         0.    45   5   A44    .02
       5  242B      5.8      16.36       67.6    167.85   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  243C      5.2      14.67        5.2     14.67   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  244C       .0        .00        5.2     14.67   1      339.    .33628       .00    .00         0.    45   5   A44    .02
       5  245C      2.2       6.21        7.4     18.71   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  246D      1.7       4.80        1.7      4.80   0        0.    .00000       .00    .00         0.    45   5   A44    .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  247C  TC 1154 QC     18.71 QCD     22.73 QD      4.03       5  247D  TD 1153 QD      4.80 QDC     23.25 QC     18.46   *
*                                    5  247CD TCD 1153 QCD     23.25 QC     18.46 QD      4.80                               *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV      CONV      CONV    CONV    CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE   IMPV
       5  247CD     1.7       4.80        9.1     23.25   1       94.    .19149       .00    .00         0.    45   0   A44    .00
       5  248C       .2        .56        9.3     23.29   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  249E       .8       2.26         .8      2.26   0        0.    .00000       .00    .00         0.    45   5   A44    .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  250C  TC 1154 QC     23.29 QCE     25.18 QE      1.90       5  250E  TE 1153 QE      2.26 QEC     24.75 QC     22.49   *
*                                    5  250CE TCE 1154 QCE     25.18 QC     23.29 QE      1.90                               *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV      CONV      CONV    CONV    CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE   IMPV
       5  250CE     .8       2.26       10.1     25.18   1      252.    .41270       .00    .00         0.    45   0   A44    .00
       5  251C      .4       1.13       10.5     25.83   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  252F     1.8       5.08        1.8      5.08   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  253F      .0        .00        1.8      5.08   1      200.    .41000       .00    .00         0.    45   5   A44    .02
       5  254F     1.9       5.36        3.7      9.82   0        0.    .00000       .00    .00         0.    45   5   A44    .02

 Program Package Serial Number:  2195
06/26/13   FILE: ma050e   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    12
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                      PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV      CONV      CONV    CONV    CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE   IMPV
       5  255F      .0        .00        3.7      9.82   2      322.    .37888       .00    .00         0.    45   5   A44    .02
       5  256F     1.0       2.82        4.7     11.78   0        0.    .00000       .00    .00         0.    45   5   A44    .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  257C  TC 1154 QC     25.83 QCF     37.61 QF     11.78       5  257F  TF 1154 QF     11.78 QFC    37.61 QC     25.83   *
*                                    5  257CF TCF 1154 QCF     37.61 QC     25.83 QF     11.78                              *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV      CONV      CONV    CONV    CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE   IMPV
       5  257CF     4.7      11.78       15.2     37.61   1      269.    .28253       .00    .00         0.    45   0   A44    .00
       5  258C      2.0       5.64       17.2     40.38   0        0.    .00000       .00    .00         0.    45   5   A44    .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  259B  TB 1156 QB    167.85 QBC    202.98 QC     35.12       5  259C  TC 1154 QC     40.38 QCB    177.42 QB    137.04   *
*                                    5  259BC TBC 1156 QBC    202.98 QB    167.85 QC     35.12                              *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV      CONV      CONV    CONV    CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE   SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE   IMPV
       5  259BC    17.2      40.38       84.8    202.98   1      282.    .04965       .00    .00         0.    45   0   A44    .00
       5  260B      4.3      12.13       89.1    202.26   0        0.    .00000       .00    .00         0.    45   5   A44    .02
       5  261B       .0        .00       89.1    202.26   2      253.    .07905       .00    .00         0.    45   5   A44    .02
       5  262B      8.2      20.07       97.3    209.74   0        0.    .00000       .00    .00         0.    45   6   A44    .02
       5  263B       .0        .00       97.3    209.74   4      910.    .07692      2.00    .00         0.    45   6   A44    .02
       5  264B      5.9      14.55      103.2    215.87   0        0.    .00000       .00    .00         0.    45   6   A44    .03
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5	265B	.0	.00	103.2	215.87	2	617.	.05835	.00	.00	0.	45	6	A44	.03
5	266B	6.3	15.54	109.5	215.59	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5	267C	7.8	22.00	7.8	22.00	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	268C	.0	.00	7.8	22.00	1	445.	.17978	.00	.00	0.	45	5	A44	.02
5	269C	5.4	13.22	13.2	32.36	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	270C	.0	.00	13.2	32.36	1	665.	.24662	.00	.00	0.	45	6	A44	.02
5	271C	11.4	27.91	24.6	51.44	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	272C	.0	.00	24.6	51.44	1	292.	.07534	.00	.00	0.	45	6	A44	.02
5	273C	2.3	6.49	26.9	53.18	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	274C	.0	.00	26.9	53.18	2	188.	.07979	.00	.00	0.	45	5	A44	.02
5	275C	2.7	7.62	29.6	56.42	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	276D	4.5	11.10	4.5	11.10	0	0.	.00000	.00	.00	0.	45	6	A44	.03

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CONFLUENCE Q'S

5 277C TC 1156 QC 56.42 QCD 63.40 QD 6.98 5 277D TD 1153 QD 11.10 QDC 51.09 QC 39.99

5 277CD TCD 1155 QCD 63.89 QC 54.75 QD 9.14

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	277CD	4.5	11.10	34.1	63.89	2	270.	.02593	.00	.00	0.	45	0	A44	.00
5	278C	1.7	4.83	35.8	65.05	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	279C	.0	.00	35.8	65.05	2	455.	.08352	.00	.00	0.	45	5	A44	.03

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	280C	.9	2.54	36.7	64.47	4	713.	.10028	1.25	.00	0.	45	5	A44	.02
5	281C	3.4	8.39	40.1	67.44	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5	282D	1.9	5.36	1.9	5.36	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	283D	.0	.00	1.9	5.36	2	681.	.12335	.00	.00	0.	45	5	A44	.02
5	284D	1.9	4.69	3.8	8.83	0	0.	.00000	.00	.00	0.	45	6	A44	.03

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CONFLUENCE Q'S

5 285C TC 1156 QC 67.44 QCD 74.68 QD 7.25 5 285D TD 1154 QD 8.83 QDC 58.63 QC 49.80

5 285CD TCD 1156 QCD 74.68 QC 67.44 QD 7.25

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	285CD	3.8	8.83	43.9	74.68	2	200.	.04000	.00	.00	0.	45	0	A44	.00
5	286C	.4	1.14	44.3	72.87	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	287D	3.1	11.68	3.1	11.68	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	288D	.0	.00	3.1	11.68	1	608.	.23355	.00	.00	0.	31	5	A44	.02
5	289D	4.8	18.09	7.9	25.68	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	290D	.0	.00	7.9	25.68	2	530.	.08679	.00	.00	0.	31	5	A44	.02
5	291D	1.2	4.53	9.1	27.85	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5	292E	5.8	21.86	5.8	21.86	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	293E	.0	.00	5.8	21.86	4	514.	.07802	1.00	.00	0.	31	5	A44	.02
5	294E	2.3	8.69	8.1	29.29	0	0.	.00000	.00	.00	0.	31	5	A44	.03

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CONFLUENCE Q'S

5 295D TD 1155 QD 27.85 QDE 50.57 QE 22.72 5 295E TE 1153 QE 29.29 QED 53.79 QD 24.50

5 295DE TDE 1154 QDE 55.11 QD 27.39 QE 27.72

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	295DE	8.1	29.29	17.2	55.11	2	514.	.07802	.00	.00	0.	31	0	A44	.00
5	296D	.0	.00	17.2	53.55	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5	297E	3.5	13.19	3.5	13.19	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	298E	.0	.00	3.5	13.19	4	174.	.08046	1.00	.00	0.	31	5	A44	.02
5	299E	.8	3.02	4.3	15.89	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5	300F	.8	3.01	.8	3.01	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	301F	.0	.00	.8	3.01	4	264.	.04583	1.00	.00	0.	31	5	A44	.02
5	302F	.6	2.27	1.4	4.98	0	0.	.00000	.00	.00	0.	31	5	A44	.03

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CONFLUENCE Q'S

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*      5  303E  TE 1153 QE    15.89 QEF    20.88 QF     4.98       5  303F  TF 1153 QF     4.98 QFE    20.88 QE    15.89   *
*                                5  303EF TEF 1153 QEF    20.88 QE    15.89 QF     4.98                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  303EF     1.4       4.98       5.7     20.88   4     1220.   .06877     1.50   .00        0.   31   0   A44   .00
       5  304E      .1        .38        5.8     19.57   0        0.   .00000      .00   .00        0.   31   5   A44   .03
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                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  305D  TD 1155 QD    53.55 QDE    73.11 QE    19.57       5  305E  TE 1155 QE    19.57 QED    73.11 QD    53.55   *
*                                5  305DE TDE 1155 QDE    73.11 QD    53.55 QE    19.57                                 *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  305DE     5.8      19.57      23.0     73.11   2      470.   .05745       .00   .00        0.   31   0   A44   .00
       5  306D      2.9      10.96      25.9     76.90   0        0.   .00000       .00   .00        0.   31   5   A44   .03
       5  307D       .0        .00      25.9     76.90   2      140.   .06429       .00   .00        0.   31   5   A44   .03
       5  308D       .2        .76      26.1     76.98   0        0.   .00000       .00   .00        0.   31   5   A44   .03
       5  309E      2.8      10.55       2.8     10.55   0        0.   .00000       .00   .00        0.   31   5   A44   .02
       5  310E       .0        .00       2.8     10.55   2      480.   .07500       .00   .00        0.   31   5   A44   .02
       5  311E      3.3      12.47       6.1     20.46   0        0.   .00000       .00   .00        0.   31   5   A44   .03
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  312D  TD 1156 QD    76.98 QDE    92.13 QE    15.15       5  312E  TE 1153 QE    20.46 QED    72.59 QD    52.14   *
*                                5  312DE TDE 1156 QDE    92.13 QD    76.98 QE    15.15                                 *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  312DE     6.1      20.46      32.2     92.13   2      350.   .07429       .00   .00        0.   31   0   A44   .00
       5  313D      5.9      22.29      38.1    103.30   0        0.   .00000       .00   .00        0.   31   5   A44   .03
       5  314D       .0        .00      38.1    103.30   2      407.   .04914       .00   .00        0.   31   5   A44   .03
       5  315D      2.7       7.67      40.8    104.75   0        0.   .00000       .00   .00        0.   45   5   A44   .03
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  316C  TC 1157 QC    72.87 QCD   176.14 QD   103.26       5  316D  TD 1156 QD   104.75 QDC   175.56 QC    70.81   *
*                                5  316CD TCD 1157 QCD   176.14 QC    72.87 QD   103.26                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  316CD    40.8     104.75      85.1    176.14   4      819.   .03541      2.00   .00        0.   45   0   A44   .00
       5  317C      1.8       5.11      86.9    178.31   0        0.   .00000       .00   .00        0.   45   5   A44   .03
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  318B  TB 1157 QB   215.59 QBC   389.15 QC   173.56       5  318C  TC 1156 QC   178.31 QCB   377.68 QB   199.37   *
*                                5  318BC TBC 1157 QBC   389.15 QB   215.59 QC   173.56                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  318BC    86.9     178.31     196.4    389.15   2      362.   .03591       .00   .00        0.   45   0   A44   .00
       5  319B      3.4       9.66     199.8    388.70   0        0.   .00000       .00   .00        0.   45   5   A44   .03
       5  320C      2.5       9.44       2.5      9.44   0        0.   .00000       .00   .00        0.   31   5   A44   .03
       5  321C       .0        .00       2.5      9.44   2      495.   .06061       .00   .00        0.   31   5   A44   .03
       5  322C      6.1      17.33       8.6     24.03   0        0.   .00000       .00   .00        0.   45   5   A44   .03
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                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
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LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5 323C	.0	.00	8.6	24.03	2	390.	.06154	.00	.00	0.	45	5	A44	.03
5 324C	3.0	8.52	11.6	29.27	0	0.	.00000	.00	.00	0.	45	5	A44	.03

CONFLUENCE Q'S

5 325B TB 1158 QB 388.70 QBC 401.91 QC 13.20 5 325C TC 1154 QC 29.27 QCB 256.96 QB 227.69

5 325BC TBC 1158 QBC 401.91 QB 388.70 QC 13.20

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 325BC	11.6	29.27	211.4	401.91	4	360.	.03472	1.50	.00	0.	45	0	A44	.00
5 326B	4.5	12.78	215.9	403.84	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 327B	.0	.00	215.9	403.84	4	232.	.01815	2.00	.00	0.	45	5	A44	.03
5 328B	2.8	6.91	218.7	405.83	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 329A TA 1163 QA 684.62 QAB 916.64 QB 232.02 5 329B TB 1157 QB 405.83 QBA 742.38 QA 336.56

5 329AB TAB 1161 QAB 947.45 QA 637.85 QB 309.60

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 329AB	218.7	405.83	780.2	947.45	4	294.	.01837	2.50	.00	0.	45	0	A44	.00
5 330A	1.5	4.26	781.7	947.05	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 331A	.0	.00	781.7	947.05	2	227.	.00220	.00	.00	0.	45	5	A44	.03
5 332A	2.9	8.24	784.6	940.51	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 333A	.0	.00	784.6	940.51	4	233.	.03863	5.50	.00	0.	45	5	A44	.03
5 334A	.8	2.27	785.4	939.95	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 335A	4.1	11.57	789.5	940.45	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 336A	.0	.00	789.5	940.45	2	207.	.00483	.00	.00	0.	45	5	A44	.02
5 337A	1.3	3.67	790.8	935.25	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 338B	.3	1.03	.3	1.03	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5 339B	.0	.00	.3	1.03	1	280.	.07143	.00	.00	0.	45	5	A44	.34
5 340B	1.7	5.86	2.0	6.22	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5 341B	.0	.00	2.0	6.22	1	230.	.06522	.00	.00	0.	45	5	A44	.34
5 342B	1.9	6.54	3.9	10.83	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5 343B	.0	.00	3.9	10.83	1	180.	.06667	.00	.00	0.	45	5	A44	.34
5 344B	1.8	6.20	5.7	15.24	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5 345B	.0	.00	5.7	15.24	1	202.	.06931	.00	.00	0.	45	5	A44	.34
5 346B	2.4	8.27	8.1	20.53	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5 347B	.0	.00	8.1	20.53	2	356.	.02247	.00	.00	0.	45	5	A44	.34
5 348B	3.0	10.33	11.1	25.69	2	100.	.05000	.00	.00	0.	45	5	A44	.34

CONFLUENCE Q'S

5 349A TA 1163 QA 935.25 QAB 945.30 QB 10.04 5 349B TB 1156 QB 25.44 QBA 458.57 QA 433.12

5 349AB TAB 1163 QAB 945.30 QA 935.25 QB 10.04

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 349AB	11.1	25.44	801.9	945.30	2	50.	.00400	.00	.00	0.	45	0	A44	.00
5 350A	.1	.28	802.0	943.64	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 351B	2.7	7.62	2.7	7.62	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 352B	.0	.00	2.7	7.62	1	322.	.31056	.00	.00	0.	45	5	A44	.02
5 353B	2.6	7.33	5.3	13.36	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 354C	3.3	8.08	3.3	8.08	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 355C	.0	.00	3.3	8.08	2	327.	.37309	.00	.00	0.	45	6	A44	.02
5 356C	1.8	5.08	5.1	12.47	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 357B TB 1153 QB 13.36 QBC 25.84 QC 12.47 5 357C TC 1153 QC 12.47 QCB 25.84 QB 13.36

5 357BC TBC 1153 QBC 25.84 QB 13.36 QC 12.47

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 357BC	5.1	12.47	10.4	25.84	1	204.	.13725	.00	.00	0.	45	0	A44	.00
5 358B	1.4	3.95	11.8	28.46	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 359B	2.3	6.49	14.1	33.91	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 360B	.0	.00	14.1	33.91	1	374.	.09626	.00	.00	0.	45	5	A44	.02
5 361B	4.4	10.77	18.5	40.70	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 362C	3.1	8.74	3.1	8.74	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 363C	.0	.00	3.1	8.74	1	469.	.22175	.00	.00	0.	45	5	A44	.02
5 364C	2.5	7.05	5.6	12.94	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 365B TB 1155 QB 40.70 QBC 53.00 QC 12.30 5 365C TC 1154 QC 12.94 QCB 51.15 QB 38.21

5 365BC TBC 1155 QBC 53.00 QB 40.70 QC 12.30

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 365BC	5.6	12.94	24.1	53.00	4	75.	.08000	3.00	.00	0.	45	0	A44	.00
5 366B	2.4	6.86	26.5	57.37	0	0.	.00000	.00	.00	0.	45	5	A44	.04
5 367B	.0	.00	26.5	57.37	4	400.	.05750	3.00	.00	0.	45	5	A44	.04
5 368B	2.3	6.58	28.8	61.34	0	0.	.00000	.00	.00	0.	45	5	A44	.04
5 369B	.0	.00	28.8	61.34	1	60.	.01538	.00	.00	0.	45	5	A44	.04
5 370B	3.7	9.06	32.5	67.33	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 371B	.0	.00	32.5	67.33	4	304.	.04934	3.00	.00	0.	45	6	A44	.02
5 372B	3.8	13.09	36.3	74.89	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5 373B	.0	.00	36.3	74.89	4	538.	.03532	3.00	.00	0.	45	5	A44	.34
5 374B	5.0	17.22	41.3	82.80	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5 375B	.0	.00	41.3	82.80	4	342.	.08187	3.00	.00	0.	45	5	A44	.34
5 376B	1.6	4.61	42.9	84.83	0	0.	.00000	.00	.00	0.	45	5	A44	.05
5 377C	.7	2.63	.7	2.63	0	0.	.00000	3.00	.00	0.	45	5	A44	.50
5 378C	.0	.00	.7	2.63	2	185.	.03784	.00	.00	0.	45	5	A44	.50
5 379C	1.0	3.76	1.7	5.93	0	0.	.00000	.00	.00	0.	45	5	A44	.50

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

5 380B TB 1156 QB 84.83 QBC 88.92 QC 4.08 5 380C TC 1153 QC 5.93 QCB 68.71 QB 62.78

5 380BC TBC 1156 QBC 88.92 QB 84.83 QC 4.08

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 380BC	1.7	5.93	44.6	88.92	2	131.	.19084	3.00	.00	0.	45	0	A44	.00
5 381B	.1	.28	44.7	88.98	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 382A TA 1163 QA 943.64 QAB 969.83 QB 26.19 5 382B TB 1156 QB 88.98 QBA 528.99 QA 440.02

5 382AB TAB 1163 QAB 969.83 QA 943.64 QB 26.19

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 382AB	44.7	88.98	846.7	969.83	2	102.	.00980	.00	.00	0.	45	0	A44	.00
5 383A	.4	1.13	847.1	967.83	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 384A	2.5	7.05	849.6	968.13	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 385A	.0	.00	849.6	968.13	1	226.	.00442	.00	.00	0.	45	5	A44	.02
5 386A	3.1	8.74	852.7	962.89	4	200.	.03000	12.00	.00	0.	45	5	A44	.02
5 387A	2.5	7.05	855.2	962.68	4	240.	.04167	1.80	.00	0.	45	5	A44	.02
5 388A	.0	.00	855.2	962.57	1	221.	.03620	.00	.00	0.	45	5	A44	.02
5 389A	4.1	10.04	859.3	958.46	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 390A	2.7	6.61	862.0	958.76	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5 391A	.0	.00	862.0	958.76	1	116.	.05172	.00	.00	0.	45	6	A44	.02
5 392A	.8	2.26	862.8	958.82	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 393B	5.4	15.23	5.4	15.23	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5 394B	.0	.00	5.4	15.23	1	231.	.19913	.00	.00	0.	45	5	A44	.02

5	395B	3.0	11.51	8.4	24.57	0	0.	.00000	.00	.00	0.	28	5	A44	.02
5	396B	2.1	7.91	10.5	32.48	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	397B	.0	.00	10.5	32.48	1	409.	.14181	.00	.00	0.	31	5	A44	.02
5	398B	7.4	27.88	17.9	53.34	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	399B	.0	.00	17.9	53.34	1	427.	.17330	.00	.00	0.	31	5	A44	.02
5	400B	4.3	16.20	22.2	63.56	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	401C	3.6	13.57	3.6	13.57	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	402C	.0	.00	3.6	13.57	1	351.	.13675	.00	.00	0.	31	5	A44	.02
5	403C	2.5	9.42	6.1	20.17	0	0.	.00000	.00	.00	0.	31	5	A44	.02

CONFLUENCE Q'S

5 404B TB 1155 QB 63.56 QBC 82.46 QC 18.90 5 404C TC 1154 QC 20.17 QCB 83.03 QB 62.86

5 404BC TBC 1154 QBC 83.03 QB 62.86 QC 20.17

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 404BC	6.1	20.17	28.3	83.03	1	700.	.15714	.00	.00	0.	31	0	A44	.00

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 405B	7.2	27.13	35.5	95.19	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 406B	.0	.00	35.5	95.19	1	663.	.04827	.00	.00	0.	31	5	A44	.02
5 407B	6.3	23.74	41.8	93.81	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 408C	3.0	11.30	3.0	11.30	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 409C	.0	.00	3.0	11.30	2	462.	.08658	.00	.00	0.	31	5	A44	.02
5 410C	6.3	23.74	9.3	32.66	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 411C	.0	.00	9.3	32.66	2	338.	.35503	.00	.00	0.	31	5	A44	.02
5 412C	6.0	22.61	15.3	53.38	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 413C	.0	.00	15.3	53.38	1	374.	.13369	.00	.00	0.	31	5	A44	.02
5 414C	5.9	22.23	21.2	69.45	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 415C	.0	.00	21.2	69.45	1	538.	.09665	.00	.00	0.	31	5	A44	.02
5 416C	4.8	18.09	26.0	77.47	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 417D	3.4	12.81	3.4	12.81	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 418D	.0	.00	3.4	12.81	1	375.	.11733	.00	.00	0.	31	5	A44	.02
5 419D	9.1	34.29	12.5	43.38	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 420D	.0	.00	12.5	43.38	1	525.	.10667	.00	.00	0.	31	5	A44	.02
5 421D	5.2	19.59	17.7	54.08	0	0.	.00000	.00	.00	0.	31	5	A44	.02

CONFLUENCE Q'S

5 422C TC 1155 QC 77.47 QCD 131.55 QD 54.08 5 422D TD 1155 QD 54.08 QDC 131.55 QC 77.47

5 422CD TCD 1155 QCD 131.55 QC 77.47 QD 54.08

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 422CD	17.7	54.08	43.7	131.55	1	568.	.03521	.00	.00	0.	31	0	A44	.00
5 423C	5.0	18.84	48.7	129.07	0	0.	.00000	.00	.00	0.	31	5	A44	.02

CONFLUENCE Q'S

5 424B TB 1157 QB 93.81 QBC 222.88 QC 129.07 5 424C TC 1157 QC 129.07 QCB 222.88 QB 93.81

5 424BC TBC 1157 QBC 222.88 QB 93.81 QC 129.07

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 424BC	48.7	129.07	90.5	222.88	1	710.	.05634	.00	.00	0.	31	0	A44	.00
5 425B	8.1	30.52	98.6	219.78	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 426B	.0	.00	98.6	219.78	1	402.	.12438	.00	.00	0.	31	5	A44	.02
5 427B	7.4	27.88	106.0	219.81	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 428C	2.9	10.93	2.9	10.93	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 429C	.0	.00	2.9	10.93	1	217.	.27650	.00	.00	0.	31	5	A44	.02
5 430C	2.0	7.54	4.9	17.32	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 431C	1.2	4.52	6.1	21.84	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 432C	.0	.00	6.1	21.84	1	449.	.06682	.00	.00	0.	31	5	A44	.02
5 433C	2.2	8.29	8.3	24.65	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 434C	.0	.00	8.3	24.65	2	205.	.09756	.00	.00	0.	31	5	A44	.02

5	435C	.4	1.51	8.7	25.06	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	436D	3.3	12.43	3.3	12.43	0	0.	.00000	.00	.00	0.	31	5	A44	.02

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 437D	.0	.00	3.3	12.43	1	271.	.14760	.00	.00	0.	31	5	A44	.02
5 438D	1.2	4.52	4.5	15.33	0	0.	.00000	.00	.00	0.	31	5	A44	.02

CONFLUENCE Q'S

5 439C TC 1155 QC 25.06 QCD 39.26 QD 14.19 5 439D TD 1154 QD 15.33 QDC 38.76 QC 23.43

5 439CD TCD 1155 QCD 39.26 QC 25.06 QD 14.19

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 439CD	4.5	15.33	13.2	39.26	2	480.	.08333	.00	.00	0.	31	0	A44	.00
5 440C	2.9	10.93	16.1	45.36	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 441D	5.3	19.97	5.3	19.97	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 442D	.0	.00	5.3	19.97	1	408.	.19608	.00	.00	0.	31	5	A44	.02
5 443D	3.0	11.30	8.3	27.90	0	0.	.00000	.00	.00	0.	31	5	A44	.02

CONFLUENCE Q'S

5 444C TC 1155 QC 45.36 QCD 71.19 QD 25.83 5 444D TD 1154 QD 27.90 QDC 70.92 QC 43.02

5 444CD TCD 1155 QCD 71.19 QC 45.36 QD 25.83

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 444CD	8.3	27.90	24.4	71.19	2	671.	.07452	.00	.00	0.	31	0	A44	.00
5 445C	3.0	11.30	27.4	75.88	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 446C	.0	.00	27.4	75.88	1	494.	.26316	.00	.00	0.	31	5	A44	.02
5 447C	2.0	7.54	29.4	78.70	0	0.	.00000	.00	.00	0.	31	5	A44	.02

CONFLUENCE Q'S

5 448B TB 1160 QB 219.81 QBC 272.91 QC 53.10 5 448C TC 1156 QC 78.70 QCB 251.93 QB 173.23

5 448BC TBC 1159 QBC 279.31 QB 216.95 QC 62.36

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 448BC	29.4	78.70	135.4	279.31	1	534.	.05618	.00	.00	0.	31	0	A44	.00
5 449B	5.6	21.10	141.0	278.04	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 450C	3.3	12.43	3.3	12.43	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 451C	.0	.00	3.3	12.43	1	380.	.23684	.00	.00	0.	31	5	A44	.02
5 452C	2.3	8.67	5.6	18.79	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 453C	.0	.00	5.6	18.79	1	317.	.23659	.00	.00	0.	31	5	A44	.02
5 454C	1.0	3.77	6.6	21.12	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 455D	7.0	26.38	7.0	26.38	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 456D	.0	.00	7.0	26.38	1	191.	.18325	.00	.00	0.	31	5	A44	.02
5 457D	.7	2.64	7.7	26.99	0	0.	.00000	.00	.00	0.	31	5	A44	.02

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

5 458C TC 1154 QC 21.12 QCD 48.11 QD 26.99 5 458D TD 1154 QD 26.99 QDC 48.11 QC 21.12

5 458CD TCD 1154 QCD 48.11 QC 21.12 QD 26.99

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 458CD	7.7	26.99	14.3	48.11	2	235.	.19149	.00	.00	0.	31	0	A44	.00

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      5  459C      1.1       4.14       15.4      51.25   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  460C       .0        .00       15.4      51.25   2     330.    .07576       .00   .00         0.    31   5   A44    .02
      5  461C      3.3      12.43       18.7      58.81   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  462D      3.2      12.06        3.2      12.06   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  463D       .0        .00        3.2      12.06   1     438.    .23973       .00   .00         0.    31   5   A44    .02
      5  464D      2.1       7.91        5.3      17.57   0       0.    .00000       .00   .00         0.    31   5   A44    .02
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  465C  TC 1154 QC    58.81 QCD    76.38 QD    17.57       5  465D  TD 1154 QD    17.57 QDC    76.38 QC    58.81   *
*                                      5  465CD TCD 1154 QCD    76.38 QC    58.81 QD    17.57                                *
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                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE   IMPV
      5  465CD     5.3       17.57       24.0      76.38   1     340.    .07353       .00   .00         0.    31   0   A44    .00
      5  466C       .8        3.01       24.8      75.73   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  467D      4.5       16.96        4.5      16.96   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  468D       .0        .00        4.5      16.96   1     268.    .22388       .00   .00         0.    31   5   A44    .02
      5  469D      1.5       5.65        6.0      20.74   0       0.    .00000       .00   .00         0.    31   5   A44    .02
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  470C  TC 1155 QC    75.73 QCD    94.16 QD    18.43       5  470D  TD 1154 QD    20.74 QDC    89.40 QC    68.66   *
*                                      5  470CD TCD 1155 QCD    94.16 QC    75.73 QD    18.43                                *
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                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE   IMPV
      5  470CD     6.0       20.74       30.8      94.16   1     267.    .29963       .00   .00         0.    31   0   A44    .00
      5  471C      1.0        3.77       31.8      94.90   0       0.    .00000       .00   .00         0.    31   5   A44    .02
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  472B  TB 1160 QB   278.04 QBC   325.47 QC    47.42       5  472C  TC 1155 QC    94.90 QCB   304.34 QB   209.44   *
*                                      5  472BC TBC 1158 QBC   336.95 QB   263.28 QC    73.67                                *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE   IMPV
      5  472BC    31.8       94.90      172.8     336.95   1     443.    .02257       .00   .00         0.    31   0   A44    .00
      5  473B      4.5       16.96      177.3     335.75   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  474B       .0        .00       177.3     335.75   1     489.    .02863       .00   .00         0.    31   5   A44    .02
      5  475B      3.2       12.06      180.5     334.08   0       0.    .00000       .00   .00         0.    31   5   A44    .02
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    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE   IMPV
      5  476C      3.9       14.70       3.9      14.70   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  477C       .0        .00        3.9      14.70   1     610.    .11803       .00   .00         0.    31   5   A44    .02
      5  478C      5.4       20.35       9.3      28.28   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  479C       .0        .00        9.3      28.28   1     382.    .10995       .00   .00         0.    31   5   A44    .02
      5  480C      5.6       21.10       14.9     43.31   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  481C       .0        .00        14.9     43.31   1     342.    .04094       .00   .00         0.    31   5   A44    .02
      5  482C      3.8       14.32       18.7     49.96   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  483C       .0        .00        18.7     49.96   1     522.    .07280       .00   .00         0.    31   5   A44    .02
      5  484C      4.2       15.83       22.9     53.47   0       0.    .00000       .00   .00         0.    31   5   A44    .02
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  485B  TB 1161 QB   334.08 QBC   370.71 QC    36.63       5  485C  TC 1157 QC    53.47 QCB   305.59 QB   252.12   *
*                                      5  485BC TBC 1161 QBC   370.71 QB   334.08 QC    36.63                                *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV    CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN   PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE   IMPV
      5  485BC    22.9       53.47      203.4     370.71   1     256.    .00391       .00   .00         0.    31   0   A44    .00
      5  486B      3.2       12.06      206.6     365.25   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  487C      3.3       12.43        3.3      12.43   0       0.    .00000       .00   .00         0.    31   5   A44    .02
      5  488C       .0        .00        3.3      12.43   2     470.    .17021       .00   .00         0.    31   5   A44    .02
      5  489C      2.1       7.91        5.4      18.55   0       0.    .00000       .00   .00         0.    31   5   A44    .02
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
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*      5  490B  TB 1163 QB   365.25 QBC   366.47 QC     1.22       5  490C  TC 1153 QC    18.55 QCB   128.86 QB   110.31   *
*                                5  490BC TBC 1163 QBC   366.47 QB   365.25 QC     1.22                                  *
```

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 490BC	5.4	18.55	212.0	366.47	1	360.	.04167	.00	.00	0.	31	0	A44	.00
5 491B	2.2	8.29	214.2	364.86	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 492B	.0	.00	214.2	364.86	1	354.	.01412	.00	.00	0.	31	5	A44	.02
5 493B	4.0	15.07	218.2	361.85	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 494C	2.3	8.67	2.3	8.67	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 495C	.0	.00	2.3	8.67	1	526.	.17110	.00	.00	0.	31	5	A44	.02
5 496C	2.3	8.67	4.6	14.06	0	0.	.00000	.00	.00	0.	31	5	A44	.02

```
*                                                CONFLUENCE Q'S                                                            *
*      5  497B  TB 1166 QB   361.85 QBC   362.92 QC     1.07       5  497C  TC 1154 QC    14.06 QCB   113.81 QB    99.75   *
*                                5  497BC TBC 1166 QBC   362.92 QB   361.85 QC     1.07                                  *
```

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 497BC	4.6	14.06	222.8	362.92	1	122.	.08197	.00	.00	0.	31	0	A44	.00
5 498B	.6	2.26	223.4	362.59	0	0.	.00000	.00	.00	0.	31	5	A44	.02

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  Program Package Serial Number:  2195
06/26/13   FILE: ma050e   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    22
                                LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                      PROG F0601M

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    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

```
*                                                CONFLUENCE Q'S                                                            *
*      5  499A  TA 1166 QA   958.82 QAB  1321.41 QB   362.59       5  499B  TB 1166 QB   362.59 QBA  1321.41 QA   958.82   *
*                                5  499AB TAB 1166 QAB  1321.41 QA   958.82 QB   362.59                                  *
```

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 499AB	223.4	362.59	1086.2	1321.41	1	69.	.07246	.00	.00	0.	31	0	A44	.00
5 500A	.3	1.13	1086.5	1321.05	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 501B	6.7	25.25	6.7	25.25	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 502B	.0	.00	6.7	25.25	1	249.	.04016	.00	.00	0.	31	5	A44	.02
5 503B	4.8	18.09	11.5	37.75	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 504B	.0	.00	11.5	37.75	1	358.	.23743	.00	.00	0.	31	5	A44	.02
5 505B	4.3	16.20	15.8	49.86	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 506B	.0	.00	15.8	49.86	1	438.	.19406	.00	.00	0.	31	5	A44	.02
5 507B	2.3	8.67	18.1	54.70	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 508C	2.8	10.55	2.8	10.55	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 509C	1.7	6.41	4.5	16.96	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 510C	.0	.00	4.5	16.96	1	250.	.02000	.00	.00	0.	31	5	A44	.02
5 511C	1.6	6.03	6.1	18.20	0	0.	.00000	.00	.00	0.	31	5	A44	.02

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*                                                CONFLUENCE Q'S                                                            *
*      5  512B  TB 1155 QB    54.70 QBC    72.90 QC    18.20       5  512C  TC 1155 QC    18.20 QCB    72.90 QB    54.70   *
*                                5  512BC TBC 1155 QBC    72.90 QB    54.70 QC    18.20                                  *
```

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 512BC	6.1	18.20	24.2	72.90	1	305.	.09836	.00	.00	0.	31	0	A44	.00
5 513B	1.0	3.77	25.2	73.33	0	0.	.00000	.00	.00	0.	31	5	A44	.02

```
*                                                CONFLUENCE Q'S                                                            *
*      5  514A  TA 1166 QA  1321.05 QAB  1332.45 QB    11.40       5  514B  TB 1156 QB    73.33 QBA   534.12 QA   460.79   *
*                                5  514AB TAB 1166 QAB  1332.45 QA  1321.05 QB    11.40                                  *
```

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 514AB	25.2	73.33	1111.7	1332.45	1	585.	.02051	.00	.00	0.	31	0	A44	.00
5 515A	9.2	34.67	1120.9	1321.82	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 516B	3.7	13.94	3.7	13.94	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 517B	.0	.00	3.7	13.94	1	431.	.19722	.00	.00	0.	31	5	A44	.02

5	518B	3.3	12.43	7.0	23.08	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5	519B	.0	.00	7.0	23.08	1	362.	.27624	.00	.00	0.	31	5	A44	.02
5	520B	1.9	7.16	8.9	28.23	0	0.	.00000	.00	.00	0.	31	5	A44	.02

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Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
						CONFLUENCE Q'S								
5	521A	TA 1167 QA	1321.82 QAB	1323.55 QB	1.73									
					5	521AB TAB 1167 QAB	1323.55 QA	1321.82 QB	1.73					
5	521AB	8.9	28.23	1129.8	1323.55	1	527.	.02846	.00	.00	0.	31	0	A44	.00
5	522A	4.5	12.69	1134.3	1317.11	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	523B	2.2	6.21	2.2	6.21	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	524B	.0	.00	2.2	6.21	1	571.	.09632	.00	.00	0.	45	5	A44	.02
5	525B	3.0	7.34	5.2	9.57	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	526C	5.2	14.67	5.2	14.67	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	527C	.0	.00	5.2	14.67	2	443.	.07901	.00	.00	0.	45	5	A44	.02
5	528C	4.4	10.77	9.6	23.77	0	0.	.00000	.00	.00	0.	45	6	A44	.02
						CONFLUENCE Q'S								
5	529B	TB 1154 QB	9.57 QBC	33.33 QC	23.77									
					5	529BC TBC 1154 QBC	33.33 QB	9.57 QC	23.77					
5	529BC	9.6	23.77	14.8	33.33	1	476.	.06513	.00	.00	0.	45	0	A44	.00
5	530B	6.4	15.67	21.2	39.35	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	531B	.0	.00	21.2	39.35	1	275.	.10545	.00	.00	0.	45	6	A44	.02
5	532B	1.4	3.95	22.6	39.92	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	533C	5.5	13.46	5.5	13.46	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	534C	.0	.00	5.5	13.46	1	162.	.21605	.00	.00	0.	45	6	A44	.02
5	535C	.6	1.69	6.1	14.80	0	0.	.00000	.00	.00	0.	45	5	A44	.02
						CONFLUENCE Q'S								
5	536B	TB 1156 QB	39.92 QBC	50.80 QC	10.88									
					5	536BC TBC 1156 QBC	50.80 QB	39.92 QC	10.88					
5	536BC	6.1	14.80	28.7	50.80	2	214.	.09346	.00	.00	0.	45	0	A44	.00
5	537B	5.2	12.73	33.9	59.05	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	538B	.0	.00	33.9	59.05	1	350.	.02857	.00	.00	0.	45	6	A44	.02
5	539B	4.9	13.82	38.8	58.90	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	540B	.0	.00	38.8	58.90	1	385.	.04935	.00	.00	0.	45	5	A44	.02
5	541B	3.7	9.06	42.5	57.77	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	542B	.0	.00	42.5	57.77	2	256.	.02344	.00	.00	0.	45	6	A44	.02
5	543B	4.1	11.57	46.6	57.86	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	544B	.0	.00	46.6	57.86	1	580.	.10345	.00	.00	0.	45	5	A44	.02
5	545B	4.8	13.54	51.4	57.26	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	546B	.0	.00	51.4	57.26	1	248.	.12097	.00	.00	0.	45	5	A44	.02
5	547B	3.6	10.15	55.0	57.19	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	548B	.0	.00	55.0	57.19	1	154.	.05195	.00	.00	0.	45	5	A44	.02

5	549B	3.1	8.74	58.1	57.35	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	550B	.0	.00	58.1	57.35	1	464.	.12069	.00	.00	0.	45	5	A44	.02
5	551B	4.9	13.82	63.0	56.99	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	552B	.0	.00	63.0	56.99	1	425.	.08471	.00	.00	0.	45	5	A44	.02
5	553B	3.9	11.00	66.9	56.82	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	554B	.0	.00	66.9	56.82	1	385.	.22857	.00	.00	0.	45	5	A44	.02
5	555B	4.5	12.69	71.4	56.86	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	556B	.0	.00	71.4	56.86	1	292.	.07534	.00	.00	0.	45	5	A44	.02
5	557B	5.2	14.67	76.6	56.88	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	558B	.0	.00	76.6	56.88	1	307.	.01629	.00	.00	0.	45	5	A44	.02
5	559B	2.7	7.62	79.3	55.80	4	200.	.10000	2.40	.00	0.	45	5	A44	.02
5	560C	4.6	11.26	4.6	11.26	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	561C	.0	.00	4.6	11.26	1	520.	.17692	.00	.00	0.	45	6	A44	.02
5	562C	3.3	8.08	7.9	16.69	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	563C	.0	.00	7.9	16.69	1	517.	.12573	.00	.00	0.	45	6	A44	.02
5	564C	3.6	10.15	11.5	19.15	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	565C	.0	.00	11.5	19.15	1	404.	.11139	.00	.00	0.	45	5	A44	.02
5	566C	1.1	3.10	12.6	19.05	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	567D	4.2	11.85	4.2	11.85	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	568D	.0	.00	4.2	11.85	2	183.	.09836	.00	.00	0.	45	5	A44	.02
5	569D	1.8	5.08	6.0	15.90	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	570D	.0	.00	6.0	15.90	2	535.	.27664	.00	.00	0.	45	5	A44	.02
5	571D	2.6	7.33	8.6	21.35	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	572D	.0	.00	8.6	21.35	1	348.	.15517	.00	.00	0.	45	5	A44	.02
5	573D	2.6	7.33	11.2	25.29	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	574D	.0	.00	11.2	25.29	1	343.	.09329	.00	.00	0.	45	5	A44	.02
5	575D	1.7	4.80	12.9	26.32	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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CONFLUENCE Q'S

5 576C TC 1157 QC 19.05 QCD 43.68 QD 24.63 5 576D TD 1156 QD 26.32 QDC 44.73 QC 18.41

5 576CD TCD 1156 QCD 44.73 QC 18.41 QD 26.32

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	576CD	12.9	26.32	25.5	44.73	1	124.	.00806	.00	.00	0.	45	0	A44	.00
5	577C	1.5	4.23	27.0	43.52	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	578C	.0	.00	27.0	43.52	1	240.	.28750	.00	.00	0.	45	5	A44	.02
5	579C	3.2	7.83	30.2	44.80	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	580C	.0	.00	30.2	44.80	1	250.	.12000	.00	.00	0.	45	6	A44	.02
5	581C	3.5	8.57	33.7	45.24	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	582C	2.2	6.21	35.9	45.66	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	583C	.0	.00	35.9	45.66	1	286.	.03147	.00	.00	0.	45	5	A44	.02
5	584C	5.4	13.22	41.3	45.83	4	200.	.12500	3.60	.00	0.	45	6	A44	.02

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Program Package Serial Number: 2195

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

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CONFLUENCE Q'S

5 585B TB 1171 QB 55.80 QBC 71.24 QC 15.44 5 585C TC 1160 QC 45.73 QCB 97.88 QB 52.15

5 585BC TBC 1160 QBC 97.88 QB 52.15 QC 45.73

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	585BC	41.3	45.73	120.6	97.88	1	136.	.25735	.00	.00	0.	45	0	A44	.00
5	586B	6.3	17.77	126.9	98.67	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	587B	.0	.00	126.9	98.67	1	367.	.04087	.00	.00	0.	45	5	A44	.02
5	588B	4.2	11.85	131.1	98.50	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	589C	3.7	10.44	3.7	10.44	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	590C	.0	.00	3.7	10.44	1	323.	.04644	.00	.00	0.	45	5	A44	.02
5	591C	1.6	4.51	5.3	10.94	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	592C	.0	.00	5.3	10.94	1	458.	.12009	.00	.00	0.	45	5	A44	.02
5	593C	3.4	9.59	8.7	13.29	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	594D	1.7	4.16	1.7	4.16	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	595D	.0	.00	1.7	4.16	1	291.	.15464	.00	.00	0.	45	6	A44	.02

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          5  596D       .7       1.97       2.4       5.21   0       0.    .00000       .00   .00         0.    45   5   A44    .02
          5  597D      2.6       7.33       5.0      12.00   0       0.    .00000       .00   .00         0.    45   5   A44    .02
          5  598D       .0        .00       5.0      12.00   1     441.    .24943       .00   .00         0.    45   5   A44    .02
          5  599D      2.0       5.64       7.0      14.93   0       0.    .00000       .00   .00         0.    45   5   A44    .02
        ********************************************************************************************************************************
        *                                                    CONFLUENCE Q'S                                                              *
        *      5  600C  TC 1155 QC    13.29 QCD    28.13 QD    14.83       5  600D  TD 1154 QD    14.93 QDC    27.81 QC    12.89    *
        *                                5  600CD TCD 1155 QCD    28.13 QC    13.29 QD    14.83                                      *
        ********************************************************************************************************************************
                        SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
            LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
               5  600CD    7.0      14.93       15.7     28.13   1      116.    .04310       .00   .00         0.    45   0   A44    .00
               5  601C       .3        .85       16.0     28.38   0       0.    .00000       .00   .00         0.    45   5   A44    .02
        ********************************************************************************************************************************
        *                                                    CONFLUENCE Q'S                                                              *
        *      5  602B  TB 1161 QB    98.50 QBC   111.03 QC    12.54       5  602C  TC 1155 QC    28.38 QCB   106.99 QB    78.62    *
        *                                5  602BC TBC 1157 QBC   117.02 QB    91.56 QC    25.46                                      *
        ********************************************************************************************************************************
                        SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
            LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
               5  602BC   16.0      28.38      147.1    117.02   1      563.    .08348       .00   .00         0.    45   0   A44    .00
               5  603B     4.7      13.26      151.8    116.38   0       0.    .00000       .00   .00         0.    45   5   A44    .02
        ********************************************************************************************************************************
        *                                                    CONFLUENCE Q'S                                                              *
        *      5  604A  TA 1169 QA  1317.11 QAB  1402.75 QB    85.64       5  604B  TB 1159 QB   116.38 QBA   646.05 QA   529.68    *
        *                                5  604AB TAB 1168 QAB  1403.63 QA  1313.84 QB    89.80                                      *
        ********************************************************************************************************************************
                        SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
            LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
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        Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
        MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                        SUBAREA   SUBAREA      TOTAL   TOTAL  CONV   CONV      CONV      CONV   CONV   CONTROL SOIL       RAIN  PCT
            LOCATION    AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
               5  604AB  151.8     116.38     1286.1   1403.63   0       0.    .00000       .00   .00         0.    45   0   A44    .00
               5  605A      .0        .00     1286.1   1403.63   0       0.    .00000       .00   .00         0.    45  30   A44    .00
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Program Package Serial Number: 2195

06/26/13 FILE: maB50e INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
5	1A	17.8	65.05	17.8	65.05	0	0.	.00000	.00	.00	0.	228	7	A44	.02
5	2A	.0	.00	17.8	65.05	1	506.	.11858	.00	.00	0.	228	7	A44	.02
5	3A	4.1	18.24	21.9	77.23	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	4B	9.7	43.16	9.7	43.16	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	5B	.0	.00	9.7	43.16	1	534.	.31835	.00	.00	0.	228	5	A44	.02
5	6B	1.9	8.45	11.6	47.61	0	0.	.00000	.00	.00	0.	228	5	A44	.02

CONFLUENCE Q'S

5 7A TA 1155 QA 77.23 QAB 121.38 QB 44.15

5 7B TB 1154 QB 47.61 QBA 124.06 QA 76.45

5 7AB TAB 1154 QAB 124.06 QA 76.45 QB 47.61

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	11.6	47.61	33.5	124.06	1	257.	.07782	.00	.00	0.	228	0	A44	.00
5	8A	3.1	13.79	36.6	132.39	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	9C	30.6	121.96	30.6	121.96	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5	10C	.0	.00	30.6	121.96	2	266.	.47368	.00	.00	0.	228	6	A44	.02
5	11C	2.4	10.68	33.0	131.02	0	0.	.00000	.00	.00	0.	228	5	A44	.02

CONFLUENCE Q'S

5 12A TA 1155 QA 132.39 QAC 249.21 QC 116.81

5 12C TC 1154 QC 131.02 QCA 260.59 QA 129.57

5 12AC TAC 1154 QAC 260.59 QA 129.57 QC 131.02

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	12AC	33.0	131.02	69.6	260.59	1	405.	.03457	.00	.00	0.	228	0	A44	.00
5	13A	3.4	15.13	73.0	260.60	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	14D	9.9	44.05	9.9	44.05	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	15D	.0	.00	9.9	44.05	1	1124.	.18683	.00	.00	0.	228	5	A44	.02
5	16D	6.8	27.10	16.7	59.32	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5	17D	8.6	38.26	25.3	91.59	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	18D	.0	.00	25.3	91.59	1	806.	.10918	.00	.00	0.	228	5	A44	.02
5	19D	7.8	34.70	33.1	109.13	0	0.	.00000	.00	.00	0.	228	5	A44	.02

CONFLUENCE Q'S

5 20A TA 1155 QA 260.60 QAD 369.73 QD 109.13

5 20D TD 1155 QD 109.13 QDA 369.73 QA 260.60

5 20AD TAD 1155 QAD 369.73 QA 260.60 QD 109.13

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	20AD	33.1	109.13	106.1	369.73	1	201.	.02985	.00	.00	0.	228	0	A44	.00
5	21A	.7	3.11	106.8	368.10	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	22E	9.7	43.16	9.7	43.16	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	23E	.0	.00	9.7	43.16	1	1051.	.15033	.00	.00	0.	228	5	A44	.02
5	24E	9.0	32.89	18.7	66.72	0	0.	.00000	.00	.00	0.	228	7	A44	.02

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Program Package Serial Number: 2195

06/26/13 FILE: maB50e INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

5 25A TA 1156 QA 368.10 QAE 431.96 QE 63.86

5 25E TE 1155 QE 66.72 QEA 421.39 QA 354.67

* 5 25AE TAE 1156 QAE 431.96 QA 368.10 QE 63.86 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	25AE	18.7	66.72	125.5	431.96	1	652.	.02454	.00	.00	0.	228	0	A44	.00
5	26A	16.7	61.03	142.2	446.16	0	0.	.00000	.00	.00	0.	228	7	A44	.02
5	27A	.0	.00	142.2	446.16	1	1018.	.04322	.00	.00	0.	228	7	A44	.02
5	28A	24.5	97.65	166.7	443.36	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5	29B	12.5	55.62	12.5	55.62	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	30B	3.2	14.24	15.7	69.85	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	31B	.0	.00	15.7	69.85	1	673.	.17533	.00	.00	0.	228	5	A44	.02
5	32B	3.3	14.68	19.0	75.55	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	33B	.0	.00	19.0	75.55	1	790.	.11392	.00	.00	0.	228	5	A44	.02
5	34B	7.1	24.46	26.1	87.04	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	35C	4.3	19.13	4.3	19.13	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	36C	.0	.00	4.3	19.13	1	700.	.17143	.00	.00	0.	228	5	A44	.02
5	37C	2.4	8.27	6.7	23.52	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	38C	.0	.00	6.7	23.52	1	583.	.10292	.00	.00	0.	245	6	A44	.02
5	39C	2.8	9.65	9.5	27.04	0	0.	.00000	.00	.00	0.	245	6	A44	.02

* CONFLUENCE Q'S *

* 5 40B TB 1156 QB 87.04 QBC 114.08 QC 27.04 5 40C TC 1156 QC 27.04 QCB 114.08 QB 87.04 *

* 5 40BC TBC 1156 QBC 114.08 QB 87.04 QC 27.04 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	40BC	9.5	27.04	35.6	114.08	1	128.	.03125	.00	.00	0.	245	0	A44	.00
5	41B	.3	1.16	35.9	112.52	0	0.	.00000	.00	.00	0.	245	5	A44	.02

* CONFLUENCE Q'S *

* 5 42A TA 1160 QA 443.36 QAB 522.62 QB 79.26 5 42B TB 1157 QB 112.52 QBA 485.59 QA 373.07 *

* 5 42AB TAB 1160 QAB 522.62 QA 443.36 QB 79.26 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	42AB	35.9	112.52	202.6	522.62	1	814.	.33170	.00	.00	0.	245	0	A44	.00
5	43A	13.8	53.56	216.4	529.19	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	44A	.0	.00	216.4	529.19	1	624.	.02244	.00	.00	0.	245	5	A44	.02
5	45A	17.3	59.61	233.7	531.30	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	46A	.0	.00	233.7	531.30	4	141.	.02128	2.00	.00	0.	245	6	A44	.02
5	47A	3.0	8.52	236.7	531.63	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	48B	7.7	29.89	7.7	29.89	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	49B	.0	.00	7.7	29.89	2	256.	.39844	.00	.00	0.	245	5	A44	.02

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Program Package Serial Number: 2195

06/26/13 FILE: maB50e INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	50B	.4	1.55	8.1	30.28	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	51C	3.8	14.75	3.8	14.75	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	52C	.0	.00	3.8	14.75	1	433.	.16166	.00	.00	0.	245	5	A44	.02
5	53C	2.5	9.70	6.3	21.18	0	0.	.00000	.00	.00	0.	245	5	A44	.02

* CONFLUENCE Q'S *

* 5 54B TB 1153 QB 30.28 QBC 50.69 QC 20.41 5 54C TC 1154 QC 21.18 QCB 49.92 QB 28.74 *

* 5 54BC TBC 1153 QBC 50.69 QB 30.28 QC 20.41 *

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	54BC	6.3	21.18	14.4	50.69	1	740.	.25405	.00	.00	0.	245	0	A44	.00
5	55B	6.3	21.71	20.7	66.90	0	0.	.00000	.00	.00	0.	245	6	A44	.02

5	56C	4.9	19.02	4.9	19.02	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	57C	.0	.00	4.9	19.02	1	504.	.25794	.00	.00	0.	245	5	A44	.02
5	58C	5.9	20.33	10.8	37.31	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	59C	.0	.00	10.8	37.31	1	429.	.24242	.00	.00	0.	245	6	A44	.02
5	60C	4.1	15.91	14.9	47.57	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	61C	.0	.00	14.9	47.57	2	510.	.01569	.00	.00	0.	245	5	A44	.02
5	62C	2.4	9.32	17.3	48.22	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	63D	2.5	9.70	2.5	9.70	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	64D	.0	.00	2.5	9.70	2	397.	.31738	.00	.00	0.	245	5	A44	.02
5	65D	1.0	3.88	3.5	12.67	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	66D	3.1	10.68	6.6	23.35	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	67D	.0	.00	6.6	23.35	2	256.	.08594	.00	.00	0.	245	6	A44	.02
5	68D	.9	3.49	7.5	26.06	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 69C TC 1156 QC 48.22 QCD 68.62 QD 20.40 5 69D TD 1154 QD 26.06 QDC 65.60 QC 39.54
5 69CD TCD 1155 QCD 69.48 QC 45.19 QD 24.29

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	69CD	7.5	26.06	24.8	69.48	2	138.	.08696	.00	.00	0.	245	0	A44	.00
5	70C	.3	1.16	25.1	69.63	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 71B TB 1155 QB 66.90 QBC 136.28 QC 69.38 5 71C TC 1156 QC 69.63 QCB 130.79 QB 61.16
5 71BC TBC 1155 QBC 136.28 QB 66.90 QC 69.38

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	71BC	25.1	69.63	45.8	136.28	1	114.	.10526	.00	.00	0.	245	0	A44	.00
5	72B	.4	1.55	46.2	136.36	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	73E	4.0	15.53	4.0	15.53	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	74E	.0	.00	4.0	15.53	1	567.	.16226	.00	.00	0.	245	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	75E	5.3	20.57	9.3	30.45	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 76B TB 1155 QB 136.36 QBE 164.50 QE 28.14 5 76E TE 1153 QE 30.45 QEB 140.40 QB 109.94
5 76BE TBE 1155 QBE 164.50 QB 136.36 QE 28.14

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	76BE	9.3	30.45	55.5	164.50	1	282.	.18440	.00	.00	0.	245	0	A44	.00
5	77B	3.7	12.75	59.2	172.43	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	78C	4.0	15.53	4.0	15.53	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	79C	.0	.00	4.0	15.53	1	516.	.31008	.00	.00	0.	245	5	A44	.02
5	80C	8.2	31.83	12.2	43.86	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	81C	.0	.00	12.2	43.86	1	501.	.16766	.00	.00	0.	245	5	A44	.02
5	82C	7.7	29.89	19.9	65.46	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	83C	3.5	13.59	23.4	77.20	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	84C	.0	.00	23.4	77.20	1	614.	.25081	.00	.00	0.	245	5	A44	.02
5	85C	9.3	32.05	32.7	103.89	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	86C	.0	.00	32.7	103.89	1	755.	.10331	.00	.00	0.	245	6	A44	.02
5	87C	3.9	13.44	36.6	107.46	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	88D	4.6	17.85	4.6	17.85	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	89D	.0	.00	4.6	17.85	1	517.	.28627	.00	.00	0.	245	5	A44	.02
5	90D	2.7	10.48	7.3	25.06	0	0.	.00000	.00	.00	0.	245	5	A44	.02

5	91D	.0	.00	7.3	25.06	1	458.	.22926	.00	.00	0.	245	5	A44	.02
5	92D	2.8	10.87	10.1	31.88	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 93C TC 1156 QC 107.46 QCD 136.77 QD 29.31 | 5 93D TD 1155 QD 31.88 QDC 131.82 QC 99.94

5 93CD TCD 1156 QCD 136.77 QC 107.46 QD 29.31

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 93CD	10.1	31.88	46.7	136.77	1	225.	.22667	.00	.00	0.	245	0	A44	.00
5 94C	1.6	4.51	48.3	137.30	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 95B TB 1155 QB 172.43 QBC 301.79 QC 129.36 | 5 95C TC 1156 QC 137.30 QCB 307.03 QB 169.72

5 95BC TBC 1156 QBC 307.03 QB 169.72 QC 137.30

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 95BC	48.3	137.30	107.5	307.03	1	461.	.03000	.00	.00	0.	45	0	A44	.00
5 96B	6.5	25.23	114.0	306.54	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 97B	.0	.00	114.0	306.54	4	150.	.03000	1.50	.00	0.	245	5	A44	.02
5 98B	.6	1.70	114.6	306.76	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 99C	4.8	18.63	4.8	18.63	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 100C	.0	.00	4.8	18.63	1	557.	.18312	.00	.00	0.	245	5	A44	.02
5 101C	5.3	18.26	10.1	33.89	0	0.	.00000	.00	.00	0.	245	6	A44	.02

CONFLUENCE Q'S

5 102B TB 1157 QB 306.76 QBC 329.55 QC 22.79 | 5 102C TC 1154 QC 33.89 QCB 252.28 QB 218.39

5 102BC TBC 1157 QBC 329.55 QB 306.76 QC 22.79

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 102BC	10.1	33.89	124.7	329.55	4	255.	.03000	1.50	.00	0.	245	0	A44	.00
5 103B	3.1	8.80	127.8	331.50	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 104C	3.4	13.20	3.4	13.20	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 105C	.0	.00	3.4	13.20	2	517.	.35783	.00	.00	0.	245	5	A44	.02
5 106C	2.2	8.54	5.6	20.33	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 107D	2.9	11.26	2.9	11.26	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 108D	.0	.00	2.9	11.26	1	273.	.27106	.00	.00	0.	245	5	A44	.02
5 109D	1.5	5.82	4.4	15.56	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 110C TC 1153 QC 20.33 QCD 35.89 QD 15.56 | 5 110D TD 1153 QD 15.56 QDC 35.89 QC 20.33

5 110CD TCD 1153 QCD 35.89 QC 20.33 QD 15.56

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 110CD	4.4	15.56	10.0	35.89	1	325.	.16615	.00	.00	0.	245	0	A44	.00
5 111C	3.0	11.64	13.0	44.43	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 112C	.0	.00	13.0	44.43	4	138.	.06522	1.00	.00	0.	245	5	A44	.02
5 113C	2.3	8.93	15.3	52.04	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 114B TB 1157 QB 331.50 QBC 364.19 QC 32.69 | 5 114C TC 1154 QC 52.04 QCB 310.45 QB 258.41

5 114BC TBC 1156 QBC 366.50 QB 324.75 QC 41.74

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 114BC	15.3	52.04	143.1	366.50	4	540.	.04870	1.50	.00	0.	245	0	A44	.00
5 115B	12.0	29.60	155.1	384.24	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 116B	.0	.00	155.1	384.24	4	475.	.04147	1.50	.00	0.	45	6	A44	.03
5 117B	5.5	13.57	160.6	392.21	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 118A TA 1162 QA 531.63 QAB 737.11 QB 205.48 — 5 118B TB 1156 QB 392.21 QBA 827.07 QA 434.85

5 118AB TAB 1157 QAB 838.29 QA 455.18 QB 383.11

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 118AB	160.6	392.21	397.3	838.29	4	285.	.08702	2.00	.00	0.	45	0	A44	.00
5 119A	3.7	9.13	401.0	842.01	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 120B	4.0	15.53	4.0	15.53	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 121B	.0	.00	4.0	15.53	1	202.	.28713	.00	.00	0.	245	5	A44	.02
5 122B	2.6	10.09	6.6	24.30	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 123B	.0	.00	6.6	24.30	2	393.	.36132	.00	.00	0.	245	5	A44	.02
5 124B	2.4	9.32	9.0	31.86	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 125B	.0	.00	9.0	31.86	2	591.	.11168	.00	.00	0.	245	5	A44	.02
5 126B	1.1	2.71	10.1	33.01	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 127A TA 1157 QA 842.01 QAB 867.20 QB 25.19 — 5 127B TB 1155 QB 33.01 QBA 827.05 QA 794.04

5 127AB TAB 1157 QAB 867.20 QA 842.01 QB 25.19

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 127AB	10.1	33.01	411.1	867.20	4	293.	.01160	2.00	.00	0.	45	0	A44	.00
5 128A	1.1	3.12	412.2	867.87	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 129B	4.6	17.85	4.6	17.85	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 130B	.0	.00	4.6	17.85	2	514.	.16732	.00	.00	0.	245	5	A44	.02
5 131B	4.4	12.50	9.0	27.76	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 132B	.0	.00	9.0	27.76	2	500.	.04600	.00	.00	0.	45	5	A44	.03
5 133B	4.3	16.69	13.3	38.26	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 134A TA 1157 QA 867.87 QAB 895.46 QB 27.59 — 5 134B TB 1154 QB 38.26 QBA 804.55 QA 766.29

5 134AB TAB 1156 QAB 896.91 QA 862.96 QB 33.95

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 134AB	13.3	38.26	425.5	896.91	2	272.	.00735	.00	.00	0.	245	0	A44	.00
5 135A	1.9	5.40	427.4	894.80	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 136B	7.3	28.33	7.3	28.33	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 137B	.0	.00	7.3	28.33	1	496.	.20565	.00	.00	0.	245	5	A44	.02
5 138B	6.2	21.36	13.5	46.82	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 139B	.0	.00	13.5	46.82	1	464.	.09052	.00	.00	0.	245	6	A44	.02
5 140B	2.5	8.61	16.0	50.23	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 141B	.0	.00	16.0	50.23	1	216.	.12963	.00	.00	0.	245	6	A44	.02
5 142B	.9	3.49	16.9	51.78	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 143B	.0	.00	16.9	51.78	1	716.	.24581	.00	.00	0.	245	5	A44	.02
5 144B	7.0	24.12	23.9	61.86	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 145B	.0	.00	23.9	61.86	1	287.	.21603	.00	.00	0.	245	6	A44	.02
5 146B	2.7	10.48	26.6	65.10	0	0.	.00000	.00	.00	0.	245	5	A44	.02

5	147C	3.4	11.72	3.4	11.72	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	148C	.0	.00	3.4	11.72	1	438.	.20091	.00	.00	0.	245	6	A44	.02
5	149C	7.0	27.17	10.4	35.95	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 150C	.0	.00	10.4	35.95	1	504.	.22619	.00	.00	0.	245	5	A44	.02
5 151C	4.8	16.54	15.2	49.45	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 152C	.0	.00	15.2	49.45	1	238.	.26891	.00	.00	0.	245	6	A44	.02
5 153C	1.9	7.37	17.1	53.50	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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* CONFLUENCE Q'S *

* 5 154B TB 1157 QB 65.10 QBC 107.05 QC 41.95 5 154C TC 1155 QC 53.50 QCB 115.69 QB 62.19 *

* 5 154BC TBC 1155 QBC 115.69 QB 62.19 QC 53.50 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 154BC	17.1	53.50	43.7	115.69	1	404.	.19307	.00	.00	0.	245	0	A44	.00
5 155B	2.3	8.93	46.0	119.51	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 156B	.0	.00	46.0	119.51	1	438.	.11416	.00	.00	0.	245	5	A44	.02
5 157B	6.8	23.43	52.8	131.70	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 158B	.0	.00	52.8	131.70	2	431.	.03712	.00	.00	0.	245	6	A44	.02
5 159B	4.8	18.63	57.6	136.52	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 160D	3.8	13.09	3.8	13.09	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 161D	.0	.00	3.8	13.09	1	353.	.25496	.00	.00	0.	245	6	A44	.02
5 162D	1.4	5.43	5.2	17.11	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 163D	.0	.00	5.2	17.11	1	455.	.32967	.00	.00	0.	245	5	A44	.02
5 164D	3.5	13.59	8.7	27.03	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 165D	.0	.00	8.7	27.03	1	207.	.16425	.00	.00	0.	245	5	A44	.02
5 166D	1.9	7.37	10.6	32.56	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 167E	6.6	22.74	6.6	22.74	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 168E	.0	.00	6.6	22.74	1	539.	.24490	.00	.00	0.	245	6	A44	.02
5 169E	3.8	13.09	10.4	33.74	0	0.	.00000	.00	.00	0.	245	6	A44	.02

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* CONFLUENCE Q'S *

* 5 170D TD 1154 QD 32.56 QDE 66.31 QE 33.74 5 170E TE 1154 QE 33.74 QED 66.31 QD 32.56 *

* 5 170DE TDE 1154 QDE 66.31 QD 32.56 QE 33.74 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 170DE	10.4	33.74	21.0	66.31	2	307.	.01303	.00	.00	0.	245	0	A44	.00
5 171D	4.5	15.51	25.5	75.24	0	0.	.00000	.00	.00	0.	245	6	A44	.02

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* CONFLUENCE Q'S *

* 5 172B TB 1157 QB 136.52 QBD 205.46 QD 68.94 5 172D TD 1155 QD 75.24 QDB 200.92 QB 125.68 *

* 5 172BD TBD 1156 QBD 209.32 QB 134.55 QD 74.77 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 172BD	25.5	75.24	83.1	209.32	2	543.	.06262	.00	.00	0.	245	0	A44	.00
5 173B	5.6	15.91	88.7	210.81	0	0.	.00000	.00	.00	0.	45	5	A44	.03

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
*					CONFLUENCE Q'S									*
* 5 174A	TA 1157 QA	894.80	QAB 1105.61	QB 210.81		5 174B	TB 1157 QB	210.81	QBA 1105.61	QA 894.80				*
*			5 174AB	TAB 1157	QAB 1105.61	QA 894.80	QB 210.81							*
5 174AB	88.7	210.81	516.1	1105.61	4	270.	.01296	2.50	.00	0.	45	0	A44	.00
5 175A	7.0	24.12	523.1	1117.70	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 176B	5.9	16.99	5.9	16.99	0	0.	.00000	.00	.00	0.	45	5	A44	.05
5 177B	.0	.00	5.9	16.99	2	420.	.06190	.00	.00	0.	45	5	A44	.05
5 178B	3.4	8.39	9.3	23.42	0	0.	.00000	.00	.00	0.	45	6	A44	.03
*					CONFLUENCE Q'S									*
* 5 179A	TA 1157 QA	1117.70	QAB 1130.97	QB 13.27		5 179B	TB 1154 QB	23.42	QBA 947.24	QA 923.82				*
*			5 179AB	TAB 1157	QAB 1130.97	QA 1117.70	QB 13.27							*
5 179AB	9.3	23.42	532.4	1130.97	2	499.	.00200	.00	.00	0.	45	0	A44	.00
5 180A	9.4	26.70	541.8	1091.40	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 181C	5.9	22.90	5.9	22.90	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 182C	.0	.00	5.9	22.90	4	363.	.14325	1.50	.00	0.	245	5	A44	.02
5 183C	.6	2.33	6.5	23.98	4	350.	.03401	1.50	.00	0.	245	5	A44	.02
*					CONFLUENCE Q'S									*
* 5 184A	TA 1160 QA	1091.40	QAC 1096.18	QC 4.78		5 184C	TC 1154 QC	23.53	QCA 636.17	QA 612.63				*
*			5 184AC	TAC 1159	QAC 1097.83	QA 1091.15	QC 6.68							*
5 184AC	6.5	23.53	548.3	1097.83	4	896.	.03069	5.50	.00	0.	45	0	A44	.00
5 185A	.8	2.27	549.1	1096.84	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 186B	1.3	3.69	1.3	3.69	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 187B	.0	.00	1.3	3.69	2	302.	.20183	.00	.00	0.	45	5	A44	.03
5 188B	1.1	3.12	2.4	6.31	0	0.	.00000	.00	.00	0.	45	5	A44	.03
*					CONFLUENCE Q'S									*
* 5 189A	TA 1160 QA	1096.84	QAB 1097.30	QB .46		5 189B	TB 1153 QB	6.31	QBA 484.24	QA 477.93				*
*			5 189AB	TAB 1160	QAB 1097.30	QA 1096.84	QB .46							*
5 189AB	2.4	6.31	551.5	1097.30	2	90.	.06667	.00	.00	0.	45	0	A44	.00
5 190A	.1	.28	551.6	1088.15	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 191A	1.5	5.82	553.1	1089.00	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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Program Package Serial Number: 2195

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5 192A	.0	.00	553.1	1089.00	2	380.	.01316	.00	.00	0.	245	5	A44	.02
5 193A	1.8	4.44	554.9	1088.33	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 194D	1.9	5.40	1.9	5.40	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 195D	.0	.00	1.9	5.40	2	254.	.12598	.00	.00	0.	45	5	A44	.03
5 196D	1.5	4.26	3.4	8.94	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 197D	.0	.00	3.4	8.94	2	375.	.00267	.00	.00	0.	45	5	A44	.03
5 198D	1.9	5.40	5.3	6.12	0	0.	.00000	.00	.00	0.	45	5	A44	.03
*					CONFLUENCE Q'S									*

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*      5  199A  TA 1161 QA  1088.33 QAD  1093.65 QD     5.32       5  199D  TD 1153 QD     6.12 QDA   442.70 QA   436.58   *
*                                5  199AD TAD 1161 QAD  1093.65 QA  1088.33 QD     5.32                                  *
```

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 199AD	5.3	6.12	560.2	1093.65	2	97.	.01031	.00	.00	0.	45	0	A44	.00
5 200A	1.3	3.69	561.5	1092.51	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 201B	10.7	39.10	10.7	39.10	0	0.	.00000	.00	.00	0.	228	7	A44	.02
5 202B	.0	.00	10.7	39.10	2	555.	.45766	.00	.00	0.	228	7	A44	.02
5 203B	2.2	8.54	12.9	46.40	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 204C	4.5	17.47	4.5	17.47	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 205C	.0	.00	4.5	17.47	1	137.	.42336	.00	.00	0.	245	5	A44	.02
5 206C	.5	1.94	5.0	18.63	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 207D	2.3	8.93	2.3	8.93	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 208D	.0	.00	2.3	8.93	2	166.	.46988	.00	.00	0.	245	5	A44	.02
5 209D	.3	1.16	2.6	9.80	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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*                                                CONFLUENCE Q'S                                                             *
*      5  210C  TC 1153 QC    18.63 QCD    28.42 QD     9.80       5  210D  TD 1153 QD     9.80 QDC    28.42 QC    18.63   *
*                                5  210CD TCD 1153 QCD    28.42 QC    18.63 QD     9.80                                  *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 210CD	2.6	9.80	7.6	28.42	2	301.	.34551	.00	.00	0.	245	0	A44	.00
5 211C	1.1	4.27	8.7	31.36	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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*                                                CONFLUENCE Q'S                                                             *
*      5  212B  TB 1154 QB    46.40 QBC    77.75 QC    31.36       5  212C  TC 1154 QC    31.36 QCB    77.75 QB    46.40   *
*                                5  212BC TBC 1154 QBC    77.75 QB    46.40 QC    31.36                                 *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 212BC	8.7	31.36	21.6	77.75	1	135.	.13333	.00	.00	0.	245	0	A44	.00
5 213B	.3	1.16	21.9	78.56	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 214D	.8	3.11	.8	3.11	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 215D	.0	.00	.8	3.11	2	448.	.34375	.00	.00	0.	245	5	A44	.02
5 216D	.7	2.72	1.5	5.39	0	0.	.00000	.00	.00	0.	245	5	A44	.02

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

```
*                                                CONFLUENCE Q'S                                                             *
*      5  217B  TB 1154 QB    78.56 QBD    83.79 QD     5.23       5  217D  TD 1153 QD     5.39 QDB    79.47 QB    74.07   *
*                                5  217BD TBD 1154 QBD    83.79 QB    78.56 QD     5.23                                  *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 217BD	1.5	5.39	23.4	83.79	1	130.	.09231	.00	.00	0.	245	0	A44	.00
5 218B	.3	1.16	23.7	83.31	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 219E	11.2	44.64	11.2	44.64	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5 220E	.0	.00	11.2	44.64	2	282.	.35816	.00	.00	0.	228	6	A44	.02
5 221E	9.1	36.27	20.3	80.73	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5 222E	.0	.00	20.3	80.73	2	208.	.14904	.00	.00	0.	228	6	A44	.02
5 223E	3.0	11.64	23.3	90.61	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 224F	2.5	9.70	2.5	9.70	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 225F	.0	.00	2.5	9.70	2	378.	.40212	.00	.00	0.	245	5	A44	.02
5 226F	.8	3.11	3.3	12.04	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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*                                                CONFLUENCE Q'S                                                             *
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*      5  227E  TE 1154 QE    90.61 QEF   102.37 QF    11.76       5  227F  TF 1153 QF    12.04 QFE   100.39 QE    88.35   *
*                                5  227EF TEF 1154 QEF   102.37 QE    90.61 QF    11.76                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  227EF     3.3      12.04       26.6    102.37   1      115.   .06957      .00    .00       0.  245   0   A44   .00
       5  228E      .3        1.16       26.9    103.01   0        0.   .00000      .00    .00       0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  229B  TB 1154 QB    83.31 QBE   186.32 QE   103.01       5  229E  TE 1154 QE   103.01 QEB   186.32 QB    83.31   *
*                                5  229BE TBE 1154 QBE   186.32 QB    83.31 QE   103.01                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  229BE    26.9     103.01       50.6    186.32   1      132.   .16667      .00    .00       0.  245   0   A44   .00
       5  230B      .4        1.55       51.0    185.12   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  231C     1.3        5.05        1.3      5.05   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  232C      .0         .00        1.3      5.05   2      352.   .29545      .00    .00       0.  245   5   A44   .02
       5  233C      .7        2.72        2.0      7.24   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  234D     1.2        4.66        1.2      4.66   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  235D      .0         .00        1.2      4.66   2      277.   .28881      .00    .00       0.  245   5   A44   .02
       5  236D      .9        3.49        2.1      7.76   0        0.   .00000      .00    .00       0.  245   5   A44   .02

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  Program Package Serial Number:  2195
 06/26/13   FILE: maB50e   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    11
                                    LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                        PROG F0601M

     Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
     MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  237C  TC 1153 QC     7.24 QCD    15.01 QD     7.76       5  237D  TD 1153 QD     7.76 QDC    15.01 QC     7.24   *
*                                5  237CD TCD 1153 QCD    15.01 QC     7.24 QD     7.76                                   *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  237CD     2.1        7.76        4.1     15.01   2      135.   .23704      .00    .00       0.  245   0   A44   .00
       5  238C      .5        1.94        4.6     16.43   0        0.   .00000      .00    .00       0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  239B  TB 1154 QB   185.12 QBC   201.53 QC    16.40       5  239C  TC 1153 QC    16.43 QCB   184.45 QB   168.02   *
*                                5  239BC TBC 1154 QBC   201.53 QB   185.12 QC    16.40                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  239BC     4.6       16.43       55.6    201.53   1      395.   .09620      .00    .00       0.  245   0   A44   .00
       5  240B      6.2       24.06       61.8    214.28   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  241B      .0         .00        61.8    214.28   1      550.   .16364      .00    .00       0.  245   5   A44   .02
       5  242B      5.8       22.51       67.6    221.83   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  243C      5.2       20.18        5.2     20.18   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  244C      .0         .00        5.2     20.18   1      339.   .33628      .00    .00       0.  245   5   A44   .02
       5  245C     2.2        8.54        7.4     26.26   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  246D     1.7        6.60        1.7      6.60   0        0.   .00000      .00    .00       0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  247C  TC 1154 QC    26.26 QCD    31.96 QD     5.70       5  247D  TD 1153 QD     6.60 QDC    32.84 QC    26.24   *
*                                5  247CD TCD 1153 QCD    32.84 QC    26.24 QD     6.60                                   *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  247CD     1.7        6.60        9.1     32.84   1       94.   .19149      .00    .00       0.  245   0   A44   .00
       5  248C      .2         .78        9.3     32.85   0        0.   .00000      .00    .00       0.  245   5   A44   .02
       5  249E      .8        3.11         .8      3.11   0        0.   .00000      .00    .00       0.  245   5   A44   .02
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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  250C  TC 1154 QC    32.85 QCE    35.53 QE     2.68       5  250E  TE 1153 QE     3.11 QEC    35.37 QC    32.27   *
*                                 5  250CE TCE 1154 QCE    35.53 QC    32.85 QE     2.68                                  *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  250CE      .8       3.11       10.1     35.53   1      252.    .41270      .00   .00        0.   245   0   A44   .00
       5  251C       .4       1.55       10.5     36.83   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  252F      1.8       6.99        1.8      6.99   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  253F       .0        .00        1.8      6.99   1      200.    .41000      .00   .00        0.   245   5   A44   .02
       5  254F      1.9       7.37        3.7     13.72   0        0.    .00000      .00   .00        0.   245   5   A44   .02

 Program Package Serial Number:  2195
06/26/13   FILE: maB50e   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    12
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                      PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  255F       .0        .00        3.7     13.72   2      322.    .37888      .00   .00        0.   245   5   A44   .02
       5  256F      1.0       3.88        4.7     16.68   0        0.    .00000      .00   .00        0.   245   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  257C  TC 1154 QC    36.83 QCF    53.47 QF    16.64       5  257F  TF 1153 QF    16.68 QFC    50.87 QC    34.19   *
*                                 5  257CF TCF 1154 QCF    53.47 QC    36.83 QF    16.64                                 *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  257CF      4.7      16.68       15.2     53.47   1      269.    .28253      .00   .00        0.   245   0   A44   .00
       5  258C       2.0       7.76       17.2     58.66   0        0.    .00000      .00   .00        0.   245   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  259B  TB 1156 QB   221.83 QBC   271.88 QC    50.04       5  259C  TC 1154 QC    58.66 QCB   256.13 QB   197.47   *
*                                 5  259BC TBC 1155 QBC   274.97 QB   217.95 QC    57.02                                 *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  259BC     17.2      58.66       84.8    274.97   1      282.    .04965      .00   .00        0.   245   0   A44   .00
       5  260B       4.3      16.69       89.1    280.74   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  261B        .0        .00       89.1    280.74   2      253.    .07905      .00   .00        0.   245   5   A44   .02
       5  262B       8.2      28.26       97.3    297.41   0        0.    .00000      .00   .00        0.   245   6   A44   .02
       5  263B        .0        .00       97.3    297.41   4      910.    .07692     2.00   .00        0.   245   6   A44   .02
       5  264B       5.9      14.55      103.2    304.43   0        0.    .00000      .00   .00        0.    45   6   A44   .03
       5  265B        .0        .00      103.2    304.43   2      617.    .05835      .00   .00        0.    45   6   A44   .03
       5  266B       6.3      15.54      109.5    306.36   0        0.    .00000      .00   .00        0.    45   6   A44   .03
       5  267C       7.8      30.28        7.8     30.28   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  268C        .0        .00        7.8     30.28   1      445.    .17978      .00   .00        0.   245   5   A44   .02
       5  269C       5.4      18.61       13.2     46.05   0        0.    .00000      .00   .00        0.   245   6   A44   .02
       5  270C        .0        .00       13.2     46.05   1      665.    .24662      .00   .00        0.   245   6   A44   .02
       5  271C      11.4      39.28       24.6     77.22   0        0.    .00000      .00   .00        0.   245   6   A44   .02
       5  272C        .0        .00       24.6     77.22   1      292.    .07534      .00   .00        0.   245   6   A44   .02
       5  273C       2.3       8.93       26.9     81.38   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  274C        .0        .00       26.9     81.38   2      188.    .07979      .00   .00        0.   245   5   A44   .02
       5  275C       2.7      10.48       29.6     86.99   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  276D       4.5      11.10        4.5     11.10   0        0.    .00000      .00   .00        0.    45   6   A44   .03
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  277C  TC 1155 QC    86.99 QCD    96.12 QD     9.14       5  277D  TD 1153 QD    11.10 QDC    82.30 QC    71.20   *
*                                 5  277CD TCD 1155 QCD    96.12 QC    86.99 QD     9.14                                  *
*****************************************************************************************************************************

                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  277CD      4.5      11.10       34.1     96.12   2      270.    .02593      .00   .00        0.    45   0   A44   .00
```

5	278C	1.7	4.83	35.8	96.83	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	279C	.0	.00	35.8	96.83	2	455.	.08352	.00	.00	0.	45	5	A44	.03

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
5 280C	.9	3.49	36.7	96.70	4	713.	.10028	1.25	.00	0.	245	5	A44	.02
5 281C	3.4	8.39	40.1	100.75	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 282D	1.9	7.37	1.9	7.37	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 283D	.0	.00	1.9	7.37	2	681.	.12335	.00	.00	0.	245	5	A44	.02
5 284D	1.9	4.69	3.8	10.87	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 285C TC 1156 QC 100.75 QCD 109.78 QD 9.03 5 285D TD 1154 QD 10.87 QDC 94.52 QC 83.65
5 285CD TCD 1156 QCD 109.78 QC 100.75 QD 9.03

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 285CD	3.8	10.87	43.9	109.78	2	200.	.04000	.00	.00	0.	45	0	A44	.00
5 286C	.4	1.14	44.3	108.67	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 287D	3.1	13.68	3.1	13.68	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 288D	.0	.00	3.1	13.68	1	608.	.23355	.00	.00	0.	231	5	A44	.02
5 289D	4.8	21.18	7.9	30.74	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 290D	.0	.00	7.9	30.74	2	530.	.08679	.00	.00	0.	231	5	A44	.02
5 291D	1.2	4.53	9.1	32.83	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 292E	5.8	25.59	5.8	25.59	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 293E	.0	.00	5.8	25.59	4	514.	.07802	1.00	.00	0.	231	5	A44	.02
5 294E	2.3	8.69	8.1	33.41	0	0.	.00000	.00	.00	0.	31	5	A44	.03

CONFLUENCE Q'S

5 295D TD 1155 QD 32.83 QDE 58.93 QE 26.10 5 295E TE 1153 QE 33.41 QED 62.82 QD 29.41
5 295DE TDE 1154 QDE 63.35 QD 32.51 QE 30.84

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 295DE	8.1	33.41	17.2	63.35	2	514.	.07802	.00	.00	0.	31	0	A44	.00
5 296D	.0	.00	17.2	62.04	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 297E	3.5	15.44	3.5	15.44	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 298E	.0	.00	3.5	15.44	4	174.	.08046	1.00	.00	0.	231	5	A44	.02
5 299E	.8	3.02	4.3	18.08	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 300F	.8	3.53	.8	3.53	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 301F	.0	.00	.8	3.53	4	264.	.04583	1.00	.00	0.	231	5	A44	.02
5 302F	.6	2.27	1.4	5.48	0	0.	.00000	.00	.00	0.	31	5	A44	.03

CONFLUENCE Q'S

5 303E TE 1153 QE 18.08 QEF 23.56 QF 5.48 5 303F TF 1153 QF 5.48 QFE 23.56 QE 18.08
5 303EF TEF 1153 QEF 23.56 QE 18.08 QF 5.48

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 303EF	1.4	5.48	5.7	23.56	4	1220.	.06877	1.50	.00	0.	31	0	A44	.00
5 304E	.1	.38	5.8	22.27	0	0.	.00000	.00	.00	0.	31	5	A44	.03

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV

LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
CONFLUENCE Q'S														
5 305D TD 1155 QD	62.04 QDE	84.31 QE	22.27	5 305E TE 1155 QE	22.27 QED	84.31 QD	62.04							
5 305DE TDE 1155 QDE	84.31 QD	62.04 QE	22.27											
5 305DE	5.8	22.27	23.0	84.31	2	470.	.05745	.00	.00	0.	31	0	A44	.00
5 306D	2.9	10.96	25.9	88.05	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 307D	.0	.00	25.9	88.05	2	140.	.06429	.00	.00	0.	31	5	A44	.03
5 308D	.2	.76	26.1	88.27	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 309E	2.8	10.55	2.8	10.55	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 310E	.0	.00	2.8	10.55	2	480.	.07500	.00	.00	0.	31	5	A44	.02
5 311E	3.3	12.47	6.1	20.46	0	0.	.00000	.00	.00	0.	31	5	A44	.03
CONFLUENCE Q'S														
5 312D TD 1156 QD	88.27 QDE	103.43 QE	15.15	5 312E TE 1153 QE	20.46 QED	83.78 QD	63.32							
5 312DE TDE 1156 QDE	103.43 QD	88.27 QE	15.15											
5 312DE	6.1	20.46	32.2	103.43	2	350.	.07429	.00	.00	0.	31	0	A44	.00
5 313D	5.9	22.29	38.1	115.07	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 314D	.0	.00	38.1	115.07	2	407.	.04914	.00	.00	0.	31	5	A44	.03
5 315D	2.7	7.67	40.8	116.89	0	0.	.00000	.00	.00	0.	45	5	A44	.03
CONFLUENCE Q'S														
5 316C TC 1157 QC	108.67 QCD	223.45 QD	114.78	5 316D TD 1156 QD	116.89 QDC	225.46 QC	108.57							
5 316CD TCD 1156 QCD	225.46 QC	108.57 QD	116.89											
5 316CD	40.8	116.89	85.1	225.46	4	819.	.03541	2.00	.00	0.	45	0	A44	.00
5 317C	1.8	5.11	86.9	226.17	0	0.	.00000	.00	.00	0.	45	5	A44	.03
CONFLUENCE Q'S														
5 318B TB 1157 QB	306.36 QBC	530.76 QC	224.41	5 318C TC 1156 QC	226.17 QCB	525.04 QB	298.86							
5 318BC TBC 1157 QBC	530.76 QB	306.36 QC	224.41											
5 318BC	86.9	226.17	196.4	530.76	2	362.	.03591	.00	.00	0.	45	0	A44	.00
5 319B	3.4	9.66	199.8	529.59	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 320C	2.5	9.44	2.5	9.44	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 321C	.0	.00	2.5	9.44	2	495.	.06061	.00	.00	0.	31	5	A44	.03
5 322C	6.1	17.33	8.6	24.03	0	0.	.00000	.00	.00	0.	45	5	A44	.03

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5 323C	.0	.00	8.6	24.03	2	390.	.06154	.00	.00	0.	45	5	A44	.03
5 324C	3.0	8.52	11.6	29.27	0	0.	.00000	.00	.00	0.	45	5	A44	.03
CONFLUENCE Q'S														
5 325B TB 1157 QB	529.59 QBC	548.27 QC	18.68	5 325C TC 1154 QC	29.27 QCB	411.58 QB	382.31							
5 325BC TBC 1157 QBC	548.27 QB	529.59 QC	18.68											

LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV

5	325BC	11.6	29.27	211.4	548.27	4	360.	.03472	1.50	.00	0.	45	0	A44	.00
5	326B	4.5	12.78	215.9	551.01	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	327B	.0	.00	215.9	551.01	4	232.	.01815	2.00	.00	0.	45	5	A44	.03
5	328B	2.8	6.91	218.7	553.62	0	0.	.00000	.00	.00	0.	45	6	A44	.03

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* CONFLUENCE Q'S *

* 5 329A TA 1161 QA 1092.51 QAB 1481.81 QB 389.30 5 329B TB 1157 QB 553.62 QBA 1363.97 QA 810.35 *

* 5 329AB TAB 1159 QAB 1528.30 QA 1031.75 QB 496.55 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	329AB	218.7	553.62	780.2	1528.30	4	294.	.01837	2.50	.00	0.	45	0	A44	.00
5	330A	1.5	4.26	781.7	1527.76	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	331A	.0	.00	781.7	1527.76	2	227.	.00220	.00	.00	0.	45	5	A44	.03
5	332A	2.9	8.24	784.6	1515.56	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	333A	.0	.00	784.6	1515.56	4	233.	.03863	5.50	.00	0.	45	5	A44	.03
5	334A	.8	2.27	785.4	1514.59	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	335A	4.1	15.91	789.5	1516.74	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	336A	.0	.00	789.5	1516.74	2	207.	.00483	.00	.00	0.	245	5	A44	.02
5	337A	1.3	5.05	790.8	1512.35	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	338B	.3	1.03	.3	1.03	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5	339B	.0	.00	.3	1.03	1	280.	.07143	.00	.00	0.	45	5	A44	.34
5	340B	1.7	5.86	2.0	6.22	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5	341B	.0	.00	2.0	6.22	1	230.	.06522	.00	.00	0.	45	5	A44	.34
5	342B	1.9	6.54	3.9	10.83	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5	343B	.0	.00	3.9	10.83	1	180.	.06667	.00	.00	0.	45	5	A44	.34
5	344B	1.8	6.20	5.7	15.24	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5	345B	.0	.00	5.7	15.24	1	202.	.06931	.00	.00	0.	45	5	A44	.34
5	346B	2.4	8.27	8.1	20.53	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5	347B	.0	.00	8.1	20.53	2	356.	.02247	.00	.00	0.	45	5	A44	.34
5	348B	3.0	10.33	11.1	25.69	2	100.	.05000	.00	.00	0.	45	5	A44	.34

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* CONFLUENCE Q'S *

* 5 349A TA 1161 QA 1512.35 QAB 1525.95 QB 13.60 5 349B TB 1156 QB 25.44 QBA 971.71 QA 946.27 *

* 5 349AB TAB 1161 QAB 1525.95 QA 1512.35 QB 13.60 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	349AB	11.1	25.44	801.9	1525.95	2	50.	.00400	.00	.00	0.	45	0	A44	.00
5	350A	.1	.39	802.0	1522.93	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	351B	2.7	10.48	2.7	10.48	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	352B	.0	.00	2.7	10.48	1	322.	.31056	.00	.00	0.	45	5	A44	.02
5	353B	2.6	10.09	5.3	18.96	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	354C	3.3	11.37	3.3	11.37	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	355C	.0	.00	3.3	11.37	2	327.	.37309	.00	.00	0.	45	6	A44	.02
5	356C	1.8	6.99	5.1	17.64	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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* CONFLUENCE Q'S *

* 5 357B TB 1153 QB 18.96 QBC 36.60 QC 17.64 5 357C TC 1153 QC 17.64 QCB 36.60 QB 18.96 *

* 5 357BC TBC 1153 QBC 36.60 QB 18.96 QC 17.64 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	357BC	5.1	17.64	10.4	36.60	1	204.	.13725	.00	.00	0.	245	0	A44	.00
5	358B	1.4	5.43	11.8	40.61	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	359B	2.3	8.93	14.1	48.33	0	0.	.00000	.00	.00	0.	245	5	A44	.02

5	360B	.0	.00	14.1	48.33	1	374.	.09626	.00	.00	0.	45	5	A44	.02
5	361B	4.4	15.16	18.5	59.63	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	362C	3.1	12.03	3.1	12.03	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	363C	.0	.00	3.1	12.03	1	469.	.22175	.00	.00	0.	45	5	A44	.02
5	364C	2.5	9.70	5.6	18.85	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 365B TB 1155 QB 59.63 QBC 77.35 QC 17.72 5 365C TC 1154 QC 18.85 QCB 77.25 QB 58.40

5 365BC TBC 1155 QBC 77.35 QB 59.63 QC 17.72

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	365BC	5.6	18.85	24.1	77.35	4	75.	.08000	3.00	.00	0.	245	0	A44	.00
5	366B	2.4	6.86	26.5	82.68	0	0.	.00000	.00	.00	0.	45	5	A44	.04
5	367B	.0	.00	26.5	82.68	4	400.	.05750	3.00	.00	0.	45	5	A44	.04
5	368B	2.3	6.58	28.8	86.38	0	0.	.00000	.00	.00	0.	45	5	A44	.04
5	369B	.0	.00	28.8	86.38	1	60.	.01538	.00	.00	0.	45	5	A44	.04
5	370B	3.7	9.06	32.5	93.36	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	371B	.0	.00	32.5	93.36	4	304.	.04934	3.00	.00	0.	45	6	A44	.02
5	372B	3.8	13.09	36.3	101.53	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5	373B	.0	.00	36.3	101.53	4	538.	.03532	3.00	.00	0.	45	5	A44	.34
5	374B	5.0	17.22	41.3	109.30	0	0.	.00000	.00	.00	0.	45	5	A44	.34
5	375B	.0	.00	41.3	109.30	4	342.	.08187	3.00	.00	0.	45	5	A44	.34
5	376B	1.6	4.61	42.9	111.01	0	0.	.00000	.00	.00	0.	45	5	A44	.05
5	377C	.7	2.63	.7	2.63	0	0.	.00000	3.00	.00	0.	45	5	A44	.50
5	378C	.0	.00	.7	2.63	2	185.	.03784	.00	.00	0.	45	5	A44	.50
5	379C	1.0	3.76	1.7	5.93	0	0.	.00000	.00	.00	0.	45	5	A44	.50

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

5 380B TB 1156 QB 111.01 QBC 115.10 QC 4.08 5 380C TC 1153 QC 5.93 QCB 93.26 QB 87.34

5 380BC TBC 1155 QBC 115.11 QB 110.09 QC 5.02

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	380BC	1.7	5.93	44.6	115.11	2	131.	.19084	3.00	.00	0.	45	0	A44	.00
5	381B	.1	.28	44.7	115.23	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 382A TA 1161 QA 1522.93 QAB 1576.19 QB 53.26 5 382B TB 1156 QB 115.23 QBA 1062.38 QA 947.15

5 382AB TAB 1161 QAB 1576.19 QA 1522.93 QB 53.26

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	382AB	44.7	115.23	846.7	1576.19	2	102.	.00980	.00	.00	0.	45	0	A44	.00
5	383A	.4	1.13	847.1	1572.66	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	384A	2.5	7.05	849.6	1573.00	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	385A	.0	.00	849.6	1573.00	1	226.	.00442	.00	.00	0.	45	5	A44	.02
5	386A	3.1	8.74	852.7	1558.07	4	200.	.03000	12.00	.00	0.	45	5	A44	.02
5	387A	2.5	7.05	855.2	1558.21	4	240.	.04167	1.80	.00	0.	45	5	A44	.02
5	388A	.0	.00	855.2	1558.16	1	221.	.03620	.00	.00	0.	45	5	A44	.02
5	389A	4.1	10.04	859.3	1556.29	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	390A	2.7	6.61	862.0	1556.63	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	391A	.0	.00	862.0	1556.63	1	116.	.05172	.00	.00	0.	45	6	A44	.02
5	392A	.8	2.26	862.8	1553.35	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	393B	5.4	20.96	5.4	20.96	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	394B	.0	.00	5.4	20.96	1	231.	.19913	.00	.00	0.	245	5	A44	.02

5	395B	3.0	13.35	8.4	32.07	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	396B	2.1	9.27	10.5	41.34	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	397B	.0	.00	10.5	41.34	1	409.	.14181	.00	.00	0.	231	5	A44	.02
5	398B	7.4	32.65	17.9	66.87	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	399B	.0	.00	17.9	66.87	1	427.	.17330	.00	.00	0.	231	5	A44	.02
5	400B	4.3	18.97	22.2	79.73	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	401C	3.6	15.88	3.6	15.88	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	402C	.0	.00	3.6	15.88	1	351.	.13675	.00	.00	0.	231	5	A44	.02
5	403C	2.5	11.03	6.1	24.00	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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CONFLUENCE Q'S

5 404B TB 1154 QB 79.73 QBC 103.74 QC 24.00 — 5 404C TC 1154 QC 24.00 QCB 103.74 QB 79.73

5 404BC TBC 1154 QBC 103.74 QB 79.73 QC 24.00

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 404BC	6.1	24.00	28.3	103.74	1	700.	.15714	.00	.00	0.	231	0	A44	.00

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 405B	7.2	31.77	35.5	120.80	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 406B	.0	.00	35.5	120.80	1	663.	.04827	.00	.00	0.	231	5	A44	.02
5 407B	6.3	27.80	41.8	123.65	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 408C	3.0	13.24	3.0	13.24	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 409C	.0	.00	3.0	13.24	2	462.	.08658	.00	.00	0.	231	5	A44	.02
5 410C	6.3	27.80	9.3	38.59	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 411C	.0	.00	9.3	38.59	2	338.	.35503	.00	.00	0.	231	5	A44	.02
5 412C	6.0	26.47	15.3	63.12	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 413C	.0	.00	15.3	63.12	1	374.	.13369	.00	.00	0.	231	5	A44	.02
5 414C	5.9	26.03	21.2	82.81	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 415C	.0	.00	21.2	82.81	1	538.	.09665	.00	.00	0.	231	5	A44	.02
5 416C	4.8	21.18	26.0	93.95	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 417D	3.4	15.00	3.4	15.00	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 418D	.0	.00	3.4	15.00	1	375.	.11733	.00	.00	0.	231	5	A44	.02
5 419D	9.1	40.15	12.5	51.41	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 420D	.0	.00	12.5	51.41	1	525.	.10667	.00	.00	0.	231	5	A44	.02
5 421D	5.2	22.94	17.7	65.08	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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CONFLUENCE Q'S

5 422C TC 1155 QC 93.95 QCD 158.84 QD 64.88 — 5 422D TD 1154 QD 65.08 QDC 153.95 QC 88.86

5 422CD TCD 1155 QCD 158.84 QC 93.95 QD 64.88

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 422CD	17.7	65.08	43.7	158.84	1	568.	.03521	.00	.00	0.	231	0	A44	.00
5 423C	5.0	22.06	48.7	159.57	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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CONFLUENCE Q'S

5 424B TB 1157 QB 123.65 QBC 283.21 QC 159.57 — 5 424C TC 1157 QC 159.57 QCB 283.21 QB 123.65

5 424BC TBC 1157 QBC 283.21 QB 123.65 QC 159.57

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 424BC	48.7	159.57	90.5	283.21	1	710.	.05634	.00	.00	0.	231	0	A44	.00
5 425B	8.1	35.74	98.6	281.47	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 426B	.0	.00	98.6	281.47	1	402.	.12438	.00	.00	0.	231	5	A44	.02
5 427B	7.4	32.65	106.0	285.79	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 428C	2.9	12.80	2.9	12.80	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 429C	.0	.00	2.9	12.80	1	217.	.27650	.00	.00	0.	231	5	A44	.02

5	430C	2.0	8.82	4.9	20.45	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	431C	1.2	5.29	6.1	25.75	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	432C	.0	.00	6.1	25.75	1	449.	.06682	.00	.00	0.	231	5	A44	.02
5	433C	2.2	9.71	8.3	30.00	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	434C	.0	.00	8.3	30.00	2	205.	.09756	.00	.00	0.	231	5	A44	.02
5	435C	.4	1.76	8.7	30.73	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	436D	3.3	14.56	3.3	14.56	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 437D	.0	.00	3.3	14.56	1	271.	.14760	.00	.00	0.	231	5	A44	.02
5 438D	1.2	5.29	4.5	18.15	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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* CONFLUENCE Q'S *

* 5 439C TC 1155 QC 30.73 QCD 47.52 QD 16.79 5 439D TD 1154 QD 18.15 QDC 47.30 QC 29.14 *

* 5 439CD TCD 1155 QCD 47.52 QC 30.73 QD 16.79 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 439CD	4.5	18.15	13.2	47.52	2	480.	.08333	.00	.00	0.	231	0	A44	.00
5 440C	2.9	12.80	16.1	55.58	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 441D	5.3	23.39	5.3	23.39	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 442D	.0	.00	5.3	23.39	1	408.	.19608	.00	.00	0.	231	5	A44	.02
5 443D	3.0	13.24	8.3	33.10	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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* CONFLUENCE Q'S *

* 5 444C TC 1155 QC 55.58 QCD 86.22 QD 30.63 5 444D TD 1154 QD 33.10 QDC 86.47 QC 53.36 *

* 5 444CD TCD 1154 QCD 86.47 QC 53.36 QD 33.10 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 444CD	8.3	33.10	24.4	86.47	2	671.	.07452	.00	.00	0.	231	0	A44	.00
5 445C	3.0	13.24	27.4	93.22	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 446C	.0	.00	27.4	93.22	1	494.	.26316	.00	.00	0.	231	5	A44	.02
5 447C	2.0	8.82	29.4	97.11	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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* CONFLUENCE Q'S *

* 5 448B TB 1159 QB 285.79 QBC 361.31 QC 75.52 5 448C TC 1156 QC 97.11 QCB 341.06 QB 243.95 *

* 5 448BC TBC 1158 QBC 363.80 QB 277.94 QC 85.86 *

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 448BC	29.4	97.11	135.4	363.80	1	534.	.05618	.00	.00	0.	231	0	A44	.00
5 449B	5.6	24.71	141.0	364.88	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 450C	3.3	14.56	3.3	14.56	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 451C	.0	.00	3.3	14.56	1	380.	.23684	.00	.00	0.	231	5	A44	.02
5 452C	2.3	10.15	5.6	22.29	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 453C	.0	.00	5.6	22.29	1	317.	.23659	.00	.00	0.	231	5	A44	.02
5 454C	1.0	4.41	6.6	25.36	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 455D	7.0	30.89	7.0	30.89	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 456D	.0	.00	7.0	30.89	1	191.	.18325	.00	.00	0.	231	5	A44	.02
5 457D	.7	3.09	7.7	31.76	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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				CONFLUENCE Q'S										
5 458C TC 1154 QC	25.36 QCD	57.11 QD	31.76	5 458D TD 1154 QD	31.76 QDC	57.11 QC	25.36							
5 458CD TCD 1154 QCD	57.11 QC	25.36 QD	31.76											
5 458CD	7.7	31.76	14.3	57.11	2	235.	.19149	.00	.00	0.	231	0	A44	.00
5 459C	1.1	4.85	15.4	61.04	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 460C	.0	.00	15.4	61.04	2	330.	.07576	.00	.00	0.	231	5	A44	.02
5 461C	3.3	14.56	18.7	70.80	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 462D	3.2	14.12	3.2	14.12	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 463D	.0	.00	3.2	14.12	1	438.	.23973	.00	.00	0.	231	5	A44	.02
5 464D	2.1	9.27	5.3	20.90	0	0.	.00000	.00	.00	0.	231	5	A44	.02
				CONFLUENCE Q'S										
5 465C TC 1154 QC	70.80 QCD	91.70 QD	20.90	5 465D TD 1154 QD	20.90 QDC	91.70 QC	70.80							
5 465CD TCD 1154 QCD	91.70 QC	70.80 QD	20.90											
5 465CD	5.3	20.90	24.0	91.70	1	340.	.07353	.00	.00	0.	231	0	A44	.00
5 466C	.8	3.53	24.8	91.68	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 467D	4.5	19.86	4.5	19.86	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 468D	.0	.00	4.5	19.86	1	268.	.22388	.00	.00	0.	231	5	A44	.02
5 469D	1.5	6.62	6.0	24.48	0	0.	.00000	.00	.00	0.	231	5	A44	.02
				CONFLUENCE Q'S										
5 470C TC 1155 QC	91.68 QCD	113.51 QD	21.83	5 470D TD 1154 QD	24.48 QDC	109.45 QC	84.98							
5 470CD TCD 1155 QCD	113.51 QC	91.68 QD	21.83											
5 470CD	6.0	24.48	30.8	113.51	1	267.	.29963	.00	.00	0.	231	0	A44	.00
5 471C	1.0	4.41	31.8	115.28	0	0.	.00000	.00	.00	0.	231	5	A44	.02
				CONFLUENCE Q'S										
5 472B TB 1159 QB	364.88 QBC	437.07 QC	72.20	5 472C TC 1155 QC	115.28 QCB	411.27 QB	295.99							
5 472BC TBC 1157 QBC	445.73 QB	342.71 QC	103.01											
5 472BC	31.8	115.28	172.8	445.73	1	443.	.02257	.00	.00	0.	231	0	A44	.00
5 473B	4.5	19.86	177.3	446.27	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 474B	.0	.00	177.3	446.27	1	489.	.02863	.00	.00	0.	231	5	A44	.02
5 475B	3.2	14.12	180.5	443.81	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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5 476C	3.9	17.21	3.9	17.21	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 477C	.0	.00	3.9	17.21	1	610.	.11803	.00	.00	0.	31	5	A44	.02
5 478C	5.4	23.83	9.3	34.19	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 479C	.0	.00	9.3	34.19	1	382.	.10995	.00	.00	0.	231	5	A44	.02
5 480C	5.6	24.71	14.9	52.70	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 481C	.0	.00	14.9	52.70	1	342.	.04094	.00	.00	0.	231	5	A44	.02
5 482C	3.8	16.77	18.7	61.78	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 483C	.0	.00	18.7	61.78	1	522.	.07280	.00	.00	0.	231	5	A44	.02

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     5  484C     4.2      18.53      22.9     67.69  0        0.  .00000        .00   .00       0.  231   5   A44   .02
********************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                  *
*     5  485B  TB 1161 QB   443.81 QBC   488.93 QC     45.12       5  485C  TC 1156 QC    67.69 QCB   398.37 QB   330.68  *
*                                 5  485BC TBC 1160 QBC   494.50 QB   442.83 QC    51.67                              *
********************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV     CONV     CONV   CONV     CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z       Q(CFS) NAME  TC  ZONE  IMPV
     5  485BC   22.9      67.69      203.4    494.50  1      256.   .00391        .00   .00       0.  231   0   A44   .00
     5  486B     3.2      14.12      206.6    489.40  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  487C     3.3      14.56        3.3     14.56  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  488C      .0        .00        3.3     14.56  2      470.   .17021        .00   .00       0.  231   5   A44   .02
     5  489C     2.1       9.27        5.4     21.97  0        0.   .00000        .00   .00       0.  231   5   A44   .02
********************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                  *
*     5  490B  TB 1162 QB   489.40 QBC   492.53 QC      3.12       5  490C  TC 1153 QC    21.97 QCB   236.14 QB   214.16  *
*                                 5  490BC TBC 1162 QBC   492.53 QB   489.40 QC     3.12                              *
********************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV     CONV     CONV   CONV     CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z       Q(CFS) NAME  TC  ZONE  IMPV
     5  490BC    5.4      21.97      212.0    492.53  1      360.   .04167        .00   .00       0.  231   0   A44   .00
     5  491B     2.2       9.71      214.2    491.01  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  492B      .0        .00      214.2    491.01  1      354.   .01412        .00   .00       0.  231   5   A44   .02
     5  493B     4.0      17.65      218.2    487.57  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  494C     2.3      10.15        2.3     10.15  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  495C      .0        .00        2.3     10.15  1      526.   .17110        .00   .00       0.  231   5   A44   .02
     5  496C     2.3      10.15        4.6     17.00  0        0.   .00000        .00   .00       0.  231   5   A44   .02
********************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                  *
*     5  497B  TB 1165 QB   487.57 QBC   489.86 QC      2.29       5  497C  TC 1154 QC    17.00 QCB   228.74 QB   211.74  *
*                                 5  497BC TBC 1165 QBC   489.86 QB   487.57 QC     2.29                              *
********************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV     CONV     CONV   CONV     CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z       Q(CFS) NAME  TC  ZONE  IMPV
     5  497BC    4.6      17.00      222.8    489.86  1      122.   .08197        .00   .00       0.  231   0   A44   .00
     5  498B      .6       2.65      223.4    490.00  0        0.   .00000        .00   .00       0.  231   5   A44   .02
```

Program Package Serial Number: 2195
06/26/13 FILE: maB50e INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 22
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

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                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV     CONV     CONV   CONV     CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z       Q(CFS) NAME  TC  ZONE  IMPV
********************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                  *
*     5  499A  TA 1163 QA  1553.35 QAB  2026.60 QB    473.24       5  499B  TB 1165 QB   490.00 QBA  1997.44 QA  1507.44  *
*                                 5  499AB TAB 1164 QAB  2033.90 QA  1546.51 QB   487.39                              *
********************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV    CONV     CONV     CONV   CONV     CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z       Q(CFS) NAME  TC  ZONE  IMPV
     5  499AB  223.4     490.00     1086.2   2033.90  1       69.   .07246        .00   .00       0.  231   0   A44   .00
     5  500A      .3       1.32     1086.5   2033.71  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  501B     6.7      29.56        6.7     29.56  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  502B      .0        .00        6.7     29.56  1      249.   .04016        .00   .00       0.  231   5   A44   .02
     5  503B     4.8      21.18       11.5     44.99  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  504B      .0        .00       11.5     44.99  1      358.   .23743        .00   .00       0.  231   5   A44   .02
     5  505B     4.3      18.97       15.8     59.93  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  506B      .0        .00       15.8     59.93  1      438.   .19406        .00   .00       0.  231   5   A44   .02
     5  507B     2.3      10.15       18.1     66.07  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  508C     2.8      12.35        2.8     12.35  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  509C     1.7       7.50        4.5     19.86  0        0.   .00000        .00   .00       0.  231   5   A44   .02
     5  510C      .0        .00        4.5     19.86  1      250.   .02000        .00   .00       0.  231   5   A44   .02
     5  511C     1.6       7.06        6.1     22.11  0        0.   .00000        .00   .00       0.  231   5   A44   .02
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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  512B  TB 1155 QB    66.07 QBC    88.18 QC    22.11       5  512C  TC 1155 QC    22.11 QCB    88.18 QB    66.07   *
*                                  5  512BC TBC 1155 QBC    88.18 QB    66.07 QC    22.11                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  512BC    6.1      22.11      24.2     88.18   1      305.   .09836      .00   .00        0.  231   0   A44   .00
       5  513B     1.0       4.41      25.2     88.93   0        0.   .00000      .00   .00        0.  231   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  514A  TA 1164 QA  2033.71 QAB  2056.70 QB    22.99       5  514B  TB 1156 QB    88.93 QBA  1121.75 QA  1032.81   *
*                                  5  514AB TAB 1164 QAB  2056.70 QA  2033.71 QB    22.99                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  514AB   25.2      88.93    1111.7   2056.70   1      585.   .02051      .00   .00        0.  231   0   A44   .00
       5  515A     9.2      40.59    1120.9   2047.79   0        0.   .00000      .00   .00        0.  231   5   A44   .02
       5  516B     3.7      16.33       3.7     16.33   0        0.   .00000      .00   .00        0.  231   5   A44   .02
       5  517B      .0        .00       3.7     16.33   1      431.   .19722      .00   .00        0.  231   5   A44   .02
       5  518B     3.3      14.56       7.0     27.46   0        0.   .00000      .00   .00        0.  231   5   A44   .02
       5  519B      .0        .00       7.0     27.46   1      362.   .27624      .00   .00        0.  231   5   A44   .02
       5  520B     1.9       8.38       8.9     33.91   0        0.   .00000      .00   .00        0.  231   5   A44   .02

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 Program Package Serial Number:  2195
06/26/13   FILE: maB50e   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    23
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                    PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  521A  TA 1165 QA  2047.79 QAB  2052.20 QB     4.40       5  521B  TB 1154 QB    33.91 QBA   833.84 QA   799.93   *
*                                  5  521AB TAB 1165 QAB  2052.20 QA  2047.79 QB     4.40                                   *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  521AB    8.9      33.91    1129.8   2052.20   1      527.   .02846      .00   .00        0.  231   0   A44   .00
       5  522A     4.5      17.47    1134.3   2042.67   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  523B     2.2       8.54       2.2      8.54   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  524B      .0        .00       2.2      8.54   1      571.   .09632      .00   .00        0.  245   5   A44   .02
       5  525B     3.0      10.34       5.2     15.14   0        0.   .00000      .00   .00        0.  245   6   A44   .02
       5  526C     5.2      20.18       5.2     20.18   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  527C      .0        .00       5.2     20.18   2      443.   .07901      .00   .00        0.  245   5   A44   .02
       5  528C     4.4      15.16       9.6     33.61   0        0.   .00000      .00   .00        0.  245   6   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  529B  TB 1154 QB    15.14 QBC    48.75 QC    33.61       5  529C  TC 1154 QC    33.61 QCB    48.75 QB    15.14   *
*                                  5  529BC TBC 1154 QBC    48.75 QB    15.14 QC    33.61                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  529BC    9.6      33.61      14.8     48.75   1      476.   .06513      .00   .00        0.  245   0   A44   .00
       5  530B     6.4      22.05      21.2     62.05   0        0.   .00000      .00   .00        0.  245   6   A44   .02
       5  531B      .0        .00      21.2     62.05   1      275.   .10545      .00   .00        0.  245   6   A44   .02
       5  532B     1.4       5.43      22.6     64.11   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  533C     5.5      18.95       5.5     18.95   0        0.   .00000      .00   .00        0.  245   6   A44   .02
       5  534C      .0        .00       5.5     18.95   1      162.   .21605      .00   .00        0.  245   6   A44   .02
       5  535C      .6       2.33       6.1     20.92   0        0.   .00000      .00   .00        0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  536B  TB 1156 QB    64.11 QBC    80.15 QC    16.04       5  536C  TC 1154 QC    20.92 QCB    76.98 QB    56.06   *
*                                  5  536BC TBC 1155 QBC    81.45 QB    62.21 QC    19.24                                  *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 536BC	6.1	20.92	28.7	81.45	2	214.	.09346	.00	.00	0.	245	0	A44	.00
5 537B	5.2	17.92	33.9	95.24	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 538B	.0	.00	33.9	95.24	1	350.	.02857	.00	.00	0.	245	6	A44	.02
5 539B	4.9	19.02	38.8	99.58	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 540B	.0	.00	38.8	99.58	1	385.	.04935	.00	.00	0.	245	5	A44	.02
5 541B	3.7	12.75	42.5	102.23	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 542B	.0	.00	42.5	102.23	2	256.	.02344	.00	.00	0.	245	6	A44	.02
5 543B	4.1	15.91	46.6	104.10	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 544B	.0	.00	46.6	104.10	1	580.	.10345	.00	.00	0.	245	5	A44	.02
5 545B	4.8	18.63	51.4	105.58	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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Program Package Serial Number: 2195

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 546B	.0	.00	51.4	105.58	1	248.	.12097	.00	.00	0.	245	5	A44	.02
5 547B	3.6	13.97	55.0	107.16	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 548B	.0	.00	55.0	107.16	1	154.	.05195	.00	.00	0.	245	5	A44	.02
5 549B	3.1	12.03	58.1	108.17	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 550B	.0	.00	58.1	108.17	1	464.	.12069	.00	.00	0.	245	5	A44	.02
5 551B	4.9	19.02	63.0	109.93	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 552B	.0	.00	63.0	109.93	1	425.	.08471	.00	.00	0.	245	5	A44	.02
5 553B	3.9	15.14	66.9	111.08	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 554B	.0	.00	66.9	111.08	1	385.	.22857	.00	.00	0.	245	5	A44	.02
5 555B	4.5	17.47	71.4	112.96	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 556B	.0	.00	71.4	112.96	1	292.	.07534	.00	.00	0.	245	5	A44	.02
5 557B	5.2	20.18	76.6	119.95	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 558B	.0	.00	76.6	119.95	1	307.	.01629	.00	.00	0.	245	5	A44	.02
5 559B	2.7	10.48	79.3	120.15	4	200.	.10000	2.40	.00	0.	245	5	A44	.02
5 560C	4.6	15.85	4.6	15.85	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 561C	.0	.00	4.6	15.85	1	520.	.17692	.00	.00	0.	245	6	A44	.02
5 562C	3.3	11.37	7.9	24.84	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 563C	.0	.00	7.9	24.84	1	517.	.12573	.00	.00	0.	245	6	A44	.02
5 564C	3.6	13.97	11.5	31.44	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 565C	.0	.00	11.5	31.44	1	404.	.11139	.00	.00	0.	245	5	A44	.02
5 566C	1.1	4.27	12.6	32.56	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 567D	4.2	16.30	4.2	16.30	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 568D	.0	.00	4.2	16.30	2	183.	.09836	.00	.00	0.	245	5	A44	.02
5 569D	1.8	6.99	6.0	22.20	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 570D	.0	.00	6.0	22.20	2	535.	.27664	.00	.00	0.	245	5	A44	.02
5 571D	2.6	10.09	8.6	30.17	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 572D	.0	.00	8.6	30.17	1	348.	.15517	.00	.00	0.	245	5	A44	.02
5 573D	2.6	10.09	11.2	36.71	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 574D	.0	.00	11.2	36.71	1	343.	.09329	.00	.00	0.	245	5	A44	.02
5 575D	1.7	6.60	12.9	39.40	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 576C TC 1156 QC 32.56 QCD 71.86 QD 39.31 5 576D TD 1155 QD 39.40 QDC 70.63 QC 31.23
5 576CD TCD 1156 QCD 71.86 QC 32.56 QD 39.31

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 576CD	12.9	39.40	25.5	71.86	1	124.	.00806	.00	.00	0.	245	0	A44	.00
5 577C	1.5	5.82	27.0	72.35	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 578C	.0	.00	27.0	72.35	1	240.	.28750	.00	.00	0.	245	5	A44	.02
5 579C	3.2	11.03	30.2	77.28	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 580C	.0	.00	30.2	77.28	1	250.	.12000	.00	.00	0.	245	6	A44	.02
5 581C	3.5	12.06	33.7	81.65	0	0.	.00000	.00	.00	0.	245	6	A44	.02

5	582C	2.2	8.54	35.9	84.66	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	583C	.0	.00	35.9	84.66	1	286.	.03147	.00	.00	0.	245	5	A44	.02
5	584C	5.4	18.61	41.3	89.80	4	200.	.12500	3.60	.00	0.	245	6	A44	.02

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
5 585B TB 1158 QB 119.94 QBC 209.46 QC 89.52					5 585C TC 1158 QC 89.52 QCB 209.46 QB 119.94									
5 585BC TBC 1158 QBC 209.46 QB 119.94 QC 89.52														
5	585BC	41.3	89.52	120.6	209.46	1	136.	.25735	.00	.00	0.	245	0	A44	.00
5	586B	6.3	24.45	126.9	214.49	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	587B	.0	.00	126.9	214.49	1	367.	.04087	.00	.00	0.	245	5	A44	.02
5	588B	4.2	16.30	131.1	216.04	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	589C	3.7	14.36	3.7	14.36	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	590C	.0	.00	3.7	14.36	1	323.	.04644	.00	.00	0.	245	5	A44	.02
5	591C	1.6	6.21	5.3	16.64	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	592C	.0	.00	5.3	16.64	1	458.	.12009	.00	.00	0.	245	5	A44	.02
5	593C	3.4	13.20	8.7	23.06	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	594D	1.7	5.86	1.7	5.86	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	595D	.0	.00	1.7	5.86	1	291.	.15464	.00	.00	0.	245	6	A44	.02
5	596D	.7	2.72	2.4	7.60	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	597D	2.6	10.09	5.0	17.28	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	598D	.0	.00	5.0	17.28	1	441.	.24943	.00	.00	0.	245	5	A44	.02
5	599D	2.0	7.76	7.0	22.39	0	0.	.00000	.00	.00	0.	245	5	A44	.02
CONFLUENCE Q'S														
5 600C TC 1155 QC 23.06 QCD 44.83 QD 21.77					5 600D TD 1154 QD 22.39 QDC 44.93 QC 22.55									
5 600CD TCD 1154 QCD 44.93 QC 22.55 QD 22.39														
5	600CD	7.0	22.39	15.7	44.93	1	116.	.04310	.00	.00	0.	245	0	A44	.00
5	601C	.3	1.16	16.0	45.68	0	0.	.00000	.00	.00	0.	245	5	A44	.02
CONFLUENCE Q'S														
5 602B TB 1159 QB 216.04 QBC 244.77 QC 28.73					5 602C TC 1155 QC 45.68 QCB 234.58 QB 188.91									
5 602BC TBC 1157 QBC 251.70 QB 211.46 QC 40.24														
5	602BC	16.0	45.68	147.1	251.70	1	563.	.08348	.00	.00	0.	245	0	A44	.00
5	603B	4.7	18.24	151.8	252.40	0	0.	.00000	.00	.00	0.	245	5	A44	.02
CONFLUENCE Q'S														
5 604A TA 1166 QA 2042.67 QAB 2237.58 QB 194.92					5 604B TB 1158 QB 252.40 QBA 1334.85 QA 1082.45									
5 604AB TAB 1166 QAB 2237.58 QA 2042.67 QB 194.92														

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 604AB	151.8	252.40	1286.1	2237.58	0	0.	.00000	.00	.00	0.	245	0	A44	.00
5 605A	.0	.00	1286.1	2237.58	0	0.	.00000	.00	.00	0.	245	30	A44	.00

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06/26/13 FILE: maB50p INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
5	1A	17.8	65.05	17.8	65.05	0	0.	.00000	.00	.00	0.	228	7	A44	.02
5	2A	.0	.00	17.8	65.05	1	506.	.11858	.00	.00	0.	228	7	A44	.02
5	3A	4.1	18.24	21.9	77.23	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	4B	9.7	43.16	9.7	43.16	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	5B	.0	.00	9.7	43.16	1	534.	.31835	.00	.00	0.	228	5	A44	.02
5	6B	1.9	8.45	11.6	47.61	0	0.	.00000	.00	.00	0.	228	5	A44	.02

CONFLUENCE Q'S

5 7A TA 1155 QA 77.23 QAB 121.38 QB 44.15 5 7B TB 1154 QB 47.61 QBA 124.06 QA 76.45

5 7AB TAB 1154 QAB 124.06 QA 76.45 QB 47.61

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	11.6	47.61	33.5	124.06	1	257.	.07782	.00	.00	0.	228	0	A44	.00
5	8A	3.1	13.79	36.6	132.39	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	9C	30.6	121.96	30.6	121.96	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5	10C	.0	.00	30.6	121.96	2	266.	.47368	.00	.00	0.	228	6	A44	.02
5	11C	2.4	10.68	33.0	131.02	0	0.	.00000	.00	.00	0.	228	5	A44	.02

CONFLUENCE Q'S

5 12A TA 1155 QA 132.39 QAC 249.21 QC 116.81 5 12C TC 1154 QC 131.02 QCA 260.59 QA 129.57

5 12AC TAC 1154 QAC 260.59 QA 129.57 QC 131.02

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	12AC	33.0	131.02	69.6	260.59	1	405.	.03457	.00	.00	0.	228	0	A44	.00
5	13A	3.4	15.13	73.0	260.60	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	14D	9.9	44.05	9.9	44.05	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	15D	.0	.00	9.9	44.05	1	1124.	.18683	.00	.00	0.	228	5	A44	.02
5	16D	6.8	27.10	16.7	59.32	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5	17D	8.6	38.26	25.3	91.59	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	18D	.0	.00	25.3	91.59	1	806.	.10918	.00	.00	0.	228	5	A44	.02
5	19D	7.8	34.70	33.1	109.13	0	0.	.00000	.00	.00	0.	228	5	A44	.02

CONFLUENCE Q'S

5 20A TA 1155 QA 260.60 QAD 369.73 QD 109.13 5 20D TD 1155 QD 109.13 QDA 369.73 QA 260.60

5 20AD TAD 1155 QAD 369.73 QA 260.60 QD 109.13

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	20AD	33.1	109.13	106.1	369.73	1	201.	.02985	.00	.00	0.	228	0	A44	.00
5	21A	.7	3.11	106.8	368.10	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	22E	9.7	43.16	9.7	43.16	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	23E	.0	.00	9.7	43.16	1	1051.	.15033	.00	.00	0.	228	5	A44	.02
5	24E	9.0	32.89	18.7	66.72	0	0.	.00000	.00	.00	0.	228	7	A44	.02

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06/26/13 FILE: maB50p INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

5 25A TA 1156 QA 368.10 QAE 431.96 QE 63.86 5 25E TE 1155 QE 66.72 QEA 421.39 QA 354.67

* 5 25AE TAE 1156 QAE 431.96 QA 368.10 QE 63.86 *

LOCATION		SUBAREA AREA(AC)	SUBAREA Q(CFS)	TOTAL AREA(AC)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	25AE	18.7	66.72	125.5	431.96	1	652.	.02454	.00	.00	0.	228	0	A44	.00
5	26A	16.7	61.03	142.2	446.16	0	0.	.00000	.00	.00	0.	228	7	A44	.02
5	27A	.0	.00	142.2	446.16	1	1018.	.04322	.00	.00	0.	228	7	A44	.02
5	28A	24.5	97.65	166.7	443.36	0	0.	.00000	.00	.00	0.	228	6	A44	.02
5	29B	12.5	55.62	12.5	55.62	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	30B	3.2	14.24	15.7	69.85	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	31B	.0	.00	15.7	69.85	1	673.	.17533	.00	.00	0.	228	5	A44	.02
5	32B	3.3	14.68	19.0	75.55	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	33B	.0	.00	19.0	75.55	1	790.	.11392	.00	.00	0.	228	5	A44	.02
5	34B	7.1	24.46	26.1	87.04	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	35C	4.3	19.13	4.3	19.13	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	36C	.0	.00	4.3	19.13	1	700.	.17143	.00	.00	0.	228	5	A44	.02
5	37C	2.4	8.27	6.7	23.52	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	38C	.0	.00	6.7	23.52	1	583.	.10292	.00	.00	0.	245	6	A44	.02
5	39C	2.8	9.65	9.5	27.04	0	0.	.00000	.00	.00	0.	245	6	A44	.02

CONFLUENCE Q'S

* 5 40B TB 1156 QB 87.04 QBC 114.08 QC 27.04 5 40C TC 1156 QC 27.04 QCB 114.08 QB 87.04 *

* 5 40BC TBC 1156 QBC 114.08 QB 87.04 QC 27.04 *

LOCATION		SUBAREA AREA(AC)	SUBAREA Q(CFS)	TOTAL AREA(AC)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	40BC	9.5	27.04	35.6	114.08	1	128.	.03125	.00	.00	0.	245	0	A44	.00
5	41B	.3	1.16	35.9	112.52	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

* 5 42A TA 1160 QA 443.36 QAB 522.62 QB 79.26 5 42B TB 1157 QB 112.52 QBA 485.59 QA 373.07 *

* 5 42AB TAB 1160 QAB 522.62 QA 443.36 QB 79.26 *

LOCATION		SUBAREA AREA(AC)	SUBAREA Q(CFS)	TOTAL AREA(AC)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	42AB	35.9	112.52	202.6	522.62	1	814.	.33170	.00	.00	0.	245	0	A44	.00
5	43A	13.8	53.56	216.4	529.19	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	44A	.0	.00	216.4	529.19	1	624.	.02244	.00	.00	0.	245	5	A44	.02
5	45A	17.3	59.61	233.7	531.30	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	46A	.0	.00	233.7	531.30	4	141.	.02128	2.00	.00	0.	245	6	A44	.02
5	47A	3.0	8.52	236.7	531.63	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	48B	7.7	29.89	7.7	29.89	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	49B	.0	.00	7.7	29.89	2	256.	.39844	.00	.00	0.	245	5	A44	.02

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06/26/13 FILE: maB50p INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 3

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(AC)	SUBAREA Q(CFS)	TOTAL AREA(AC)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	50B	.4	1.55	8.1	30.28	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	51C	3.8	14.75	3.8	14.75	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	52C	.0	.00	3.8	14.75	1	433.	.16166	.00	.00	0.	245	5	A44	.02
5	53C	2.5	9.70	6.3	21.18	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

* 5 54B TB 1153 QB 30.28 QBC 50.69 QC 20.41 5 54C TC 1154 QC 21.18 QCB 49.92 QB 28.74 *

* 5 54BC TBC 1153 QBC 50.69 QB 30.28 QC 20.41 *

LOCATION		SUBAREA AREA(AC)	SUBAREA Q(CFS)	TOTAL AREA(AC)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	54BC	6.3	21.18	14.4	50.69	1	740.	.25405	.00	.00	0.	245	0	A44	.00
5	55B	6.3	21.71	20.7	66.90	0	0.	.00000	.00	.00	0.	245	6	A44	.02

5	56C	4.9	19.02	4.9	19.02	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	57C	.0	.00	4.9	19.02	1	504.	.25794	.00	.00	0.	245	5	A44	.02
5	58C	5.9	20.33	10.8	37.31	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	59C	.0	.00	10.8	37.31	1	429.	.24242	.00	.00	0.	245	6	A44	.02
5	60C	4.1	15.91	14.9	47.57	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	61C	.0	.00	14.9	47.57	2	510.	.01569	.00	.00	0.	245	5	A44	.02
5	62C	2.4	9.32	17.3	48.22	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	63D	2.5	9.70	2.5	9.70	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	64D	.0	.00	2.5	9.70	2	397.	.31738	.00	.00	0.	245	5	A44	.02
5	65D	1.0	3.88	3.5	12.67	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	66D	3.1	10.68	6.6	23.35	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	67D	.0	.00	6.6	23.35	2	256.	.08594	.00	.00	0.	245	6	A44	.02
5	68D	.9	3.49	7.5	26.06	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 69C TC 1156 QC 48.22 QCD 68.62 QD 20.40 5 69D TD 1154 QD 26.06 QDC 65.60 QC 39.54
5 69CD TCD 1155 QCD 69.48 QC 45.19 QD 24.29

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	69CD	7.5	26.06	24.8	69.48	2	138.	.08696	.00	.00	0.	245	0	A44	.00
5	70C	.3	1.16	25.1	69.63	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 71B TB 1155 QB 66.90 QBC 136.28 QC 69.38 5 71C TC 1156 QC 69.63 QCB 130.79 QB 61.16
5 71BC TBC 1155 QBC 136.28 QB 66.90 QC 69.38

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	71BC	25.1	69.63	45.8	136.28	1	114.	.10526	.00	.00	0.	245	0	A44	.00
5	72B	.4	1.55	46.2	136.36	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	73E	4.0	15.53	4.0	15.53	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	74E	.0	.00	4.0	15.53	1	567.	.16226	.00	.00	0.	245	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	75E	5.3	20.57	9.3	30.45	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 76B TB 1155 QB 136.36 QBE 164.50 QE 28.14 5 76E TE 1153 QE 30.45 QEB 140.40 QB 109.94
5 76BE TBE 1155 QBE 164.50 QB 136.36 QE 28.14

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	76BE	9.3	30.45	55.5	164.50	1	282.	.18440	.00	.00	0.	245	0	A44	.00
5	77B	3.7	12.75	59.2	172.43	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	78C	4.0	15.53	4.0	15.53	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	79C	.0	.00	4.0	15.53	1	516.	.31008	.00	.00	0.	245	5	A44	.02
5	80C	8.2	31.83	12.2	43.86	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	81C	.0	.00	12.2	43.86	1	501.	.16766	.00	.00	0.	245	5	A44	.02
5	82C	7.7	29.89	19.9	65.46	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	83C	3.5	13.59	23.4	77.20	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	84C	.0	.00	23.4	77.20	1	614.	.25081	.00	.00	0.	245	5	A44	.02
5	85C	9.3	32.05	32.7	103.89	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	86C	.0	.00	32.7	103.89	1	755.	.10331	.00	.00	0.	245	6	A44	.02
5	87C	3.9	13.44	36.6	107.46	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	88D	4.6	17.85	4.6	17.85	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	89D	.0	.00	4.6	17.85	1	517.	.28627	.00	.00	0.	245	5	A44	.02
5	90D	2.7	10.48	7.3	25.06	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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      5   91D      .0       .00       7.3      25.06   1     458.    .22926      .00   .00        0.  245   5   A44    .02
      5   92D     2.8     10.87      10.1      31.88   0       0.    .00000      .00   .00        0.  245   5   A44    .02
*****************************************************************************************************************************
*                                                CONFLUENCE Q'S                                                             *
*      5   93C  TC 1156 QC   107.46 QCD   136.77 QD    29.31       5   93D  TD 1155 QD    31.88 QDC   131.82 QC    99.94   *
*                                  5   93CD TCD 1156 QCD   136.77 QC   107.46 QD    29.31                                 *
*****************************************************************************************************************************

                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5   93CD   10.1     31.88      46.7    136.77   1     225.    .22667      .00   .00        0.  245   0   A44    .00
       5   94C     1.6      4.51      48.3    137.30   0       0.    .00000      .00   .00        0.   45   5   A44    .02
*****************************************************************************************************************************
*                                                CONFLUENCE Q'S                                                             *
*      5   95B  TB 1155 QB   172.43 QBC   301.79 QC    129.36       5   95C  TC 1156 QC   137.30 QCB   307.03 QB   169.72   *
*                                  5   95BC TBC 1156 QBC   307.03 QB   169.72 QC   137.30                                 *
*****************************************************************************************************************************

                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5   95BC   48.3    137.30     107.5    307.03   1     461.    .03000      .00   .00        0.   45   0   A44    .00
       5   96B     6.5     25.23     114.0    306.54   0       0.    .00000      .00   .00        0.  245   5   A44    .02
       5   97B      .0       .00     114.0    306.54   4     150.    .03000     1.50   .00        0.  245   5   A44    .02
       5   98B      .6      1.70     114.6    306.76   0       0.    .00000      .00   .00        0.   45   5   A44    .03
       5   99C     4.8     18.63       4.8     18.63   0       0.    .00000      .00   .00        0.  245   5   A44    .02

♀
 Program Package Serial Number:  2195
06/26/13   FILE: maB50p   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE      5
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                        PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  100C     .0       .00       4.8     18.63   1     557.    .18312      .00   .00        0.  245   5   A44    .02
       5  101C    5.3     18.26      10.1     33.89   0       0.    .00000      .00   .00        0.  245   6   A44    .02
*****************************************************************************************************************************
*                                                CONFLUENCE Q'S                                                             *
*      5  102B  TB 1157 QB   306.76 QBC   329.55 QC    22.79       5  102C  TC 1154 QC    33.89 QCB   252.28 QB   218.39   *
*                                  5  102BC TBC 1157 QBC   329.55 QB   306.76 QC    22.79                                 *
*****************************************************************************************************************************

                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  102BC  10.1     33.89     124.7    329.55   4     255.    .03000     1.50   .00        0.  245   0   A44    .00
       5  103B    3.1      8.80     127.8    331.50   0       0.    .00000      .00   .00        0.   45   5   A44    .03
       5  104C    3.4     13.20       3.4     13.20   0       0.    .00000      .00   .00        0.  245   5   A44    .02
       5  105C     .0       .00       3.4     13.20   2     517.    .35783      .00   .00        0.  245   5   A44    .02
       5  106C    2.2      8.54       5.6     20.33   0       0.    .00000      .00   .00        0.  245   5   A44    .02
       5  107D    2.9     11.26       2.9     11.26   0       0.    .00000      .00   .00        0.  245   5   A44    .02
       5  108D     .0       .00       2.9     11.26   1     273.    .27106      .00   .00        0.  245   5   A44    .02
       5  109D    1.5      5.82       4.4     15.56   0       0.    .00000      .00   .00        0.  245   5   A44    .02
*****************************************************************************************************************************
*                                                CONFLUENCE Q'S                                                             *
*      5  110C  TC 1153 QC    20.33 QCD    35.89 QD    15.56       5  110D  TD 1153 QD    15.56 QDC    35.89 QC    20.33   *
*                                  5  110CD TCD 1153 QCD    35.89 QC    20.33 QD    15.56                                 *
*****************************************************************************************************************************

                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  110CD   4.4     15.56      10.0     35.89   1     325.    .16615      .00   .00        0.  245   0   A44    .00
       5  111C    3.0     11.64      13.0     44.43   0       0.    .00000      .00   .00        0.  245   5   A44    .02
       5  112C     .0       .00      13.0     44.43   4     138.    .06522     1.00   .00        0.  245   5   A44    .02
       5  113C    2.3      8.93      15.3     52.04   0       0.    .00000      .00   .00        0.  245   5   A44    .02
*****************************************************************************************************************************
*                                                CONFLUENCE Q'S                                                             *
*      5  114B  TB 1157 QB   331.50 QBC   364.19 QC    32.69       5  114C  TC 1154 QC    52.04 QCB   310.45 QB   258.41   *
*                                  5  114BC TBC 1156 QBC   366.50 QB   324.75 QC    41.74                                 *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	114BC	15.3	52.04	143.1	366.50	4	540.	.04870	1.50	.00	0.	245	0	A44	.00
5	115B	12.0	29.60	155.1	384.24	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5	116B	.0	.00	155.1	384.24	4	475.	.04147	1.50	.00	0.	45	6	A44	.03
5	117B	5.5	13.57	160.6	392.21	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 118A TA 1162 QA 531.63 QAB 737.11 QB 205.48 — 5 118B TB 1156 QB 392.21 QBA 827.07 QA 434.85

5 118AB TAB 1157 QAB 838.29 QA 455.18 QB 383.11

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

Program Package Serial Number: 2195

06/26/13 FILE: maB50p INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 6

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	118AB	160.6	392.21	397.3	838.29	4	285.	.08702	2.00	.00	0.	45	0	A44	.00
5	119A	3.7	9.13	401.0	842.01	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5	120B	4.0	15.53	4.0	15.53	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	121B	.0	.00	4.0	15.53	1	202.	.28713	.00	.00	0.	245	5	A44	.02
5	122B	2.6	10.09	6.6	24.30	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	123B	.0	.00	6.6	24.30	2	393.	.36132	.00	.00	0.	245	5	A44	.02
5	124B	2.4	9.32	9.0	31.86	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	125B	.0	.00	9.0	31.86	2	591.	.11168	.00	.00	0.	245	5	A44	.02
5	126B	1.1	2.71	10.1	33.01	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 127A TA 1157 QA 842.01 QAB 867.20 QB 25.19 — 5 127B TB 1155 QB 33.01 QBA 827.05 QA 794.04

5 127AB TAB 1157 QAB 867.20 QA 842.01 QB 25.19

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	127AB	10.1	33.01	411.1	867.20	4	293.	.01160	2.00	.00	0.	45	0	A44	.00
5	128A	1.1	3.12	412.2	867.87	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	129B	4.6	17.85	4.6	17.85	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	130B	.0	.00	4.6	17.85	2	514.	.16732	.00	.00	0.	245	5	A44	.02
5	131B	4.4	12.50	9.0	27.76	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	132B	.0	.00	9.0	27.76	2	500.	.04600	.00	.00	0.	45	5	A44	.03
5	133B	4.3	16.69	13.3	38.26	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 134A TA 1157 QA 867.87 QAB 895.46 QB 27.59 — 5 134B TB 1154 QB 38.26 QBA 804.55 QA 766.29

5 134AB TAB 1156 QAB 896.91 QA 862.96 QB 33.95

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	134AB	13.3	38.26	425.5	896.91	2	272.	.00735	.00	.00	0.	245	0	A44	.00
5	135A	1.9	5.40	427.4	894.80	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	136B	7.3	28.33	7.3	28.33	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	137B	.0	.00	7.3	28.33	1	496.	.20565	.00	.00	0.	245	5	A44	.02
5	138B	6.2	21.36	13.5	46.82	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	139B	.0	.00	13.5	46.82	1	464.	.09052	.00	.00	0.	245	6	A44	.02
5	140B	2.5	8.61	16.0	50.23	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	141B	.0	.00	16.0	50.23	1	216.	.12963	.00	.00	0.	245	6	A44	.02
5	142B	.9	3.49	16.9	51.78	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	143B	.0	.00	16.9	51.78	1	716.	.24581	.00	.00	0.	245	5	A44	.02
5	144B	7.0	24.12	23.9	61.86	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	145B	.0	.00	23.9	61.86	1	287.	.21603	.00	.00	0.	245	6	A44	.02
5	146B	2.7	10.48	26.6	65.10	0	0.	.00000	.00	.00	0.	245	5	A44	.02

5	147C	3.4	11.72	3.4	11.72	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	148C	.0	.00	3.4	11.72	1	438.	.20091	.00	.00	0.	245	6	A44	.02
5	149C	7.0	27.17	10.4	35.95	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

		SUBAREA	SUBAREA	TOTAL	TOTAL	CONV	CONV	CONV	CONV	CONV	CONTROL	SOIL		RAIN	PCT
LOCATION		AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5	150C	.0	.00	10.4	35.95	1	504.	.22619	.00	.00	0.	245	5	A44	.02
5	151C	4.8	16.54	15.2	49.45	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	152C	.0	.00	15.2	49.45	1	238.	.26891	.00	.00	0.	245	6	A44	.02
5	153C	1.9	7.37	17.1	53.50	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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* CONFLUENCE Q'S *

* 5 154B TB 1157 QB 65.10 QBC 107.05 QC 41.95 5 154C TC 1155 QC 53.50 QCB 115.69 QB 62.19 *

* 5 154BC TBC 1155 QBC 115.69 QB 62.19 QC 53.50 *

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		SUBAREA	SUBAREA	TOTAL	TOTAL	CONV	CONV	CONV	CONV	CONV	CONTROL	SOIL		RAIN	PCT
LOCATION		AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5	154BC	17.1	53.50	43.7	115.69	1	404.	.19307	.00	.00	0.	245	0	A44	.00
5	155B	2.3	8.93	46.0	119.51	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	156B	.0	.00	46.0	119.51	1	438.	.11416	.00	.00	0.	245	5	A44	.02
5	157B	6.8	23.43	52.8	131.70	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	158B	.0	.00	52.8	131.70	2	431.	.03712	.00	.00	0.	245	6	A44	.02
5	159B	4.8	18.63	57.6	136.52	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	160D	3.8	13.09	3.8	13.09	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	161D	.0	.00	3.8	13.09	1	353.	.25496	.00	.00	0.	245	6	A44	.02
5	162D	1.4	5.43	5.2	17.11	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	163D	.0	.00	5.2	17.11	1	455.	.32967	.00	.00	0.	245	5	A44	.02
5	164D	3.5	13.59	8.7	27.03	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	165D	.0	.00	8.7	27.03	1	207.	.16425	.00	.00	0.	245	5	A44	.02
5	166D	1.9	7.37	10.6	32.56	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	167E	6.6	22.74	6.6	22.74	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	168E	.0	.00	6.6	22.74	1	539.	.24490	.00	.00	0.	245	6	A44	.02
5	169E	3.8	13.09	10.4	33.74	0	0.	.00000	.00	.00	0.	245	6	A44	.02

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* CONFLUENCE Q'S *

* 5 170D TD 1154 QD 32.56 QDE 66.31 QE 33.74 5 170E TE 1154 QE 33.74 QED 66.31 QD 32.56 *

* 5 170DE TDE 1154 QDE 66.31 QD 32.56 QE 33.74 *

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		SUBAREA	SUBAREA	TOTAL	TOTAL	CONV	CONV	CONV	CONV	CONV	CONTROL	SOIL		RAIN	PCT
LOCATION		AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5	170DE	10.4	33.74	21.0	66.31	2	307.	.01303	.00	.00	0.	245	0	A44	.00
5	171D	4.5	15.51	25.5	75.24	0	0.	.00000	.00	.00	0.	245	6	A44	.02

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* CONFLUENCE Q'S *

* 5 172B TB 1157 QB 136.52 QBD 205.46 QD 68.94 5 172D TD 1155 QD 75.24 QDB 200.92 QB 125.68 *

* 5 172BD TBD 1156 QBD 209.32 QB 134.55 QD 74.77 *

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		SUBAREA	SUBAREA	TOTAL	TOTAL	CONV	CONV	CONV	CONV	CONV	CONTROL	SOIL		RAIN	PCT
LOCATION		AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5	172BD	25.5	75.24	83.1	209.32	2	543.	.06262	.00	.00	0.	245	0	A44	.00
5	173B	5.6	15.91	88.7	210.81	0	0.	.00000	.00	.00	0.	45	5	A44	.03

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

		SUBAREA	SUBAREA	TOTAL	TOTAL	CONV	CONV	CONV	CONV	CONV	CONTROL	SOIL		RAIN	PCT
LOCATION		AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV

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    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)    Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  174A  TA 1157 QA   894.80 QAB  1105.61 QB   210.81       5  174B  TB 1157 QB   210.81 QBA  1105.61 QA   894.80   *
*                                  5  174AB TAB 1157 QAB  1105.61 QA   894.80 QB   210.81                                  *
*****************************************************************************************************************************

                 SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)    Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  174AB   88.7     210.81     516.1   1105.61   4     270.   .01296     2.50   .00        0.   45   0   A44   .00
       5  175A     7.0      24.12     523.1   1117.70   0       0.   .00000      .00   .00        0.  245   6   A44   .02
       5  176B     4.2      12.09       4.2     12.09   0       0.   .00000      .00   .00        0.   45   5   A44   .05
       5  177B      .0        .00       4.2     12.09   2     420.   .06190      .00   .00        0.   45   5   A44   .05
       5  178B     3.4       8.39       7.6     18.90   0       0.   .00000      .00   .00        0.   45   6   A44   .03
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  179A  TA 1157 QA  1117.70 QAB  1128.46 QB    10.77       5  179B  TB 1154 QB    18.90 QBA   942.72 QA   923.82   *
*                                  5  179AB TAB 1157 QAB  1128.46 QA  1117.70 QB    10.77                                  *
*****************************************************************************************************************************

                 SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)    Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  179AB    7.6      18.90     530.7   1128.46   2     499.   .00200      .00   .00        0.   45   0   A44   .00
       5  180A     9.4      26.70     540.1   1089.31   0       0.   .00000      .00   .00        0.   45   5   A44   .03
       5  181C     5.9      22.90       5.9     22.90   0       0.   .00000      .00   .00        0.  245   5   A44   .02
       5  182C      .0        .00       5.9     22.90   4     363.   .14325     1.50   .00        0.  245   5   A44   .02
       5  183C      .6       2.33       6.5     23.98   4     350.   .03401     1.50   .00        0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  184A  TA 1160 QA  1089.31 QAC  1094.09 QC     4.78       5  184C  TC 1154 QC    23.53 QCA   633.46 QA   609.93   *
*                                  5  184AC TAC 1159 QAC  1094.90 QA  1088.22 QC     6.68                                  *
*****************************************************************************************************************************

                 SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)    Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  184AC    6.5      23.53     546.6   1094.90   4     896.   .03069     5.50   .00        0.   45   0   A44   .00
       5  185A      .8       2.27     547.4   1094.48   0       0.   .00000      .00   .00        0.   45   5   A44   .03
       5  186B     1.0       2.84       1.0      2.84   0       0.   .00000      .00   .00        0.   45   5   A44   .03
       5  187B      .0        .00       1.0      2.84   2     302.   .20183      .00   .00        0.   45   5   A44   .03
       5  188B     1.1       3.12       2.1      5.55   0       0.   .00000      .00   .00        0.   45   5   A44   .03
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*      5  189A  TA 1160 QA  1094.48 QAB  1094.88 QB      .40       5  189B  TB 1153 QB     5.55 QBA   482.35 QA   476.80   *
*                                  5  189AB TAB 1160 QAB  1094.88 QA  1094.48 QB      .40                                  *
*****************************************************************************************************************************

                 SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)    Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  189AB    2.1       5.55     549.5   1094.88   2      90.   .06667      .00   .00        0.   45   0   A44   .00
       5  190A      .1        .28     549.6   1085.98   0       0.   .00000      .00   .00        0.   45   5   A44   .03
       5  191A     1.5       5.82     551.1   1086.76   0       0.   .00000      .00   .00        0.  245   5   A44   .02

♀
  Program Package Serial Number:  2195
06/26/13   FILE: maB50p   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     9
                                LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                          PROG F0601M

     Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
     MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                        STORM DAY 4
                 SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)    Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  192A      .0        .00     551.1   1086.76   2     380.   .01316      .00   .00        0.  245   5   A44   .02
       5  193A     1.8       4.44     552.9   1086.15   0       0.   .00000      .00   .00        0.   45   6   A44   .03
       5  194D      .3        .85        .3       .85   0       0.   .00000      .00   .00        0.   45   5   A44   .03
       5  195D      .0        .00        .3       .85   2     254.   .12598      .00   .00        0.   45   5   A44   .03
       5  196D     1.3       3.69       1.6      4.37   0       0.   .00000      .00   .00        0.   45   5   A44   .03
       5  197D      .0        .00       1.6      4.37   2     375.   .00267      .00   .00        0.   45   5   A44   .03
       5  198D     1.9       5.40       3.5      5.66   0       0.   .00000      .00   .00        0.   45   5   A44   .03
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
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*      5  199A  TA 1161 QA  1086.15 QAD  1088.67 QD     2.52       5  199D  TD 1153 QD     5.66 QDA   440.81 QA   435.15   *
*                                5  199AD TAD 1161 QAD  1088.67 QA  1086.15 QD     2.52                                  *
*********************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  199AD    3.5       5.66     556.4   1088.67   2      97.    .01031      .00    .00        0.   45   0   A44   .00
       5  200A      .9       2.56     557.3   1087.28   0       0.    .00000      .00    .00        0.   45   5   A44   .03
       5  201B    10.7      39.10      10.7     39.10   0       0.    .00000      .00    .00        0.  228   7   A44   .02
       5  202B      .0        .00      10.7     39.10   2     555.    .45766      .00    .00        0.  228   7   A44   .02
       5  203B     2.2       8.54      12.9     46.40   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  204C     4.5      17.47       4.5     17.47   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  205C      .0        .00       4.5     17.47   1     137.    .42336      .00    .00        0.  245   5   A44   .02
       5  206C      .5       1.94       5.0     18.63   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  207D     2.3       8.93       2.3      8.93   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  208D      .0        .00       2.3      8.93   2     166.    .46988      .00    .00        0.  245   5   A44   .02
       5  209D      .3       1.16       2.6      9.80   0       0.    .00000      .00    .00        0.  245   5   A44   .02
*********************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                             *
*      5  210C  TC 1153 QC    18.63 QCD    28.42 QD     9.80       5  210D  TD 1153 QD     9.80 QDC    28.42 QC    18.63    *
*                                5  210CD TCD 1153 QCD    28.42 QC    18.63 QD     9.80                                  *
*********************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  210CD    2.6       9.80       7.6     28.42   2     301.    .34551      .00    .00        0.  245   0   A44   .00
       5  211C     1.1       4.27       8.7     31.36   0       0.    .00000      .00    .00        0.  245   5   A44   .02
*********************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                             *
*      5  212B  TB 1154 QB    46.40 QBC    77.75 QC    31.36       5  212C  TC 1154 QC    31.36 QCB    77.75 QB    46.40    *
*                                5  212BC TBC 1154 QBC    77.75 QB    46.40 QC    31.36                                 *
*********************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  212BC    8.7      31.36      21.6     77.75   1     135.    .13333      .00    .00        0.  245   0   A44   .00
       5  213B      .3       1.16      21.9     78.56   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  214D      .8       3.11        .8      3.11   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  215D      .0        .00        .8      3.11   2     448.    .34375      .00    .00        0.  245   5   A44   .02
       5  216D      .7       2.72       1.5      5.39   0       0.    .00000      .00    .00        0.  245   5   A44   .02
♀
 Program Package Serial Number:  2195
06/26/13   FILE: maB50p   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    10
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                          PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*********************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                             *
*      5  217B  TB 1154 QB    78.56 QBD    83.79 QD     5.23       5  217D  TD 1153 QD     5.39 QDB    79.47 QB    74.07    *
*                                5  217BD TBD 1154 QBD    83.79 QB    78.56 QD     5.23                                  *
*********************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  217BD    1.5       5.39      23.4     83.79   1     130.    .09231      .00    .00        0.  245   0   A44   .00
       5  218B      .3       1.16      23.7     83.31   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  219E    11.2      44.64      11.2     44.64   0       0.    .00000      .00    .00        0.  228   6   A44   .02
       5  220E      .0        .00      11.2     44.64   2     282.    .35816      .00    .00        0.  228   6   A44   .02
       5  221E     9.1      36.27      20.3     80.73   0       0.    .00000      .00    .00        0.  228   6   A44   .02
       5  222E      .0        .00      20.3     80.73   2     208.    .14904      .00    .00        0.  228   6   A44   .02
       5  223E     3.0      11.64      23.3     90.61   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  224F     2.5       9.70       2.5      9.70   0       0.    .00000      .00    .00        0.  245   5   A44   .02
       5  225F      .0        .00       2.5      9.70   2     378.    .40212      .00    .00        0.  245   5   A44   .02
       5  226F      .8       3.11       3.3     12.04   0       0.    .00000      .00    .00        0.  245   5   A44   .02
*********************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                             *
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*      5  227E  TE 1154 QE    90.61 QEF   102.37 QF    11.76       5  227F  TF 1153 QF    12.04 QFE   100.39 QE    88.35   *
*                                5  227EF TEF 1154 QEF   102.37 QE    90.61 QF    11.76                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  227EF     3.3      12.04       26.6    102.37   1      115.   .06957      .00    .00        0.  245   0   A44   .00
       5  228E      .3        1.16       26.9    103.01   0        0.   .00000      .00    .00        0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  229B  TB 1154 QB    83.31 QBE   186.32 QE   103.01       5  229E  TE 1154 QE   103.01 QEB   186.32 QB    83.31   *
*                                5  229BE TBE 1154 QBE   186.32 QB    83.31 QE   103.01                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  229BE    26.9     103.01       50.6    186.32   1      132.   .16667      .00    .00        0.  245   0   A44   .00
       5  230B      .4        1.55       51.0    185.12   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  231C     1.3        5.05        1.3      5.05   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  232C      .0         .00        1.3      5.05   2      352.   .29545      .00    .00        0.  245   5   A44   .02
       5  233C      .7        2.72        2.0      7.24   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  234D     1.2        4.66        1.2      4.66   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  235D      .0         .00        1.2      4.66   2      277.   .28881      .00    .00        0.  245   5   A44   .02
       5  236D      .9        3.49        2.1      7.76   0        0.   .00000      .00    .00        0.  245   5   A44   .02
♀
 Program Package Serial Number:  2195
06/26/13   FILE: maB50p   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    11
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                      PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  237C  TC 1153 QC     7.24 QCD    15.01 QD     7.76       5  237D  TD 1153 QD     7.76 QDC    15.01 QC     7.24   *
*                                5  237CD TCD 1153 QCD    15.01 QC     7.24 QD     7.76                                   *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  237CD     2.1        7.76        4.1     15.01   2      135.   .23704      .00    .00        0.  245   0   A44   .00
       5  238C      .5        1.94        4.6     16.43   0        0.   .00000      .00    .00        0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  239B  TB 1154 QB   185.12 QBC   201.53 QC    16.40       5  239C  TC 1153 QC    16.43 QCB   184.45 QB   168.02   *
*                                5  239BC TBC 1154 QBC   201.53 QB   185.12 QC    16.40                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  239BC     4.6       16.43       55.6    201.53   1      395.   .09620      .00    .00        0.  245   0   A44   .00
       5  240B      6.2       24.06       61.8    214.28   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  241B      .0         .00        61.8    214.28   1      550.   .16364      .00    .00        0.  245   5   A44   .02
       5  242B      5.8       22.51       67.6    221.83   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  243C      5.2       20.18        5.2     20.18   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  244C      .0         .00        5.2     20.18   1      339.   .33628      .00    .00        0.  245   5   A44   .02
       5  245C     2.2        8.54        7.4     26.26   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  246D     1.7        6.60        1.7      6.60   0        0.   .00000      .00    .00        0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                      CONFLUENCE Q'S                                                         *
*      5  247C  TC 1154 QC    26.26 QCD    31.96 QD     5.70       5  247D  TD 1153 QD     6.60 QDC    32.84 QC    26.24   *
*                                5  247CD TCD 1153 QCD    32.84 QC    26.24 QD     6.60                                   *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  247CD     1.7        6.60        9.1     32.84   1       94.   .19149      .00    .00        0.  245   0   A44   .00
       5  248C      .2         .78        9.3     32.85   0        0.   .00000      .00    .00        0.  245   5   A44   .02
       5  249E      .8        3.11         .8      3.11   0        0.   .00000      .00    .00        0.  245   5   A44   .02
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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  250C  TC 1154 QC    32.85 QCE    35.53 QE     2.68       5  250E  TE 1153 QE     3.11 QEC    35.37 QC    32.27   *
*                                 5  250CE TCE 1154 QCE    35.53 QC    32.85 QE     2.68                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  250CE      .8       3.11       10.1     35.53   1      252.    .41270      .00   .00        0.   245   0   A44   .00
       5  251C       .4       1.55       10.5     36.83   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  252F      1.8       6.99        1.8      6.99   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  253F       .0        .00        1.8      6.99   1      200.    .41000      .00   .00        0.   245   5   A44   .02
       5  254F      1.9       7.37        3.7     13.72   0        0.    .00000      .00   .00        0.   245   5   A44   .02

 Program Package Serial Number:  2195
06/26/13   FILE: maB50p   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    12
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                      PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  255F       .0        .00        3.7     13.72   2      322.    .37888      .00   .00        0.   245   5   A44   .02
       5  256F      1.0       3.88        4.7     16.68   0        0.    .00000      .00   .00        0.   245   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  257C  TC 1154 QC    36.83 QCF    53.47 QF    16.64       5  257F  TF 1153 QF    16.68 QFC    50.87 QC    34.19   *
*                                 5  257CF TCF 1154 QCF    53.47 QC    36.83 QF    16.64                                 *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  257CF      4.7      16.68       15.2     53.47   1      269.    .28253      .00   .00        0.   245   0   A44   .00
       5  258C       2.0       7.76       17.2     58.66   0        0.    .00000      .00   .00        0.   245   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  259B  TB 1156 QB   221.83 QBC   271.88 QC    50.04       5  259C  TC 1154 QC    58.66 QCB   256.13 QB   197.47   *
*                                 5  259BC TBC 1155 QBC   274.97 QB   217.95 QC    57.02                                 *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  259BC     17.2      58.66       84.8    274.97   1      282.    .04965      .00   .00        0.   245   0   A44   .00
       5  260B       4.3      16.69       89.1    280.74   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  261B        .0        .00       89.1    280.74   2      253.    .07905      .00   .00        0.   245   5   A44   .02
       5  262B       8.2      28.26       97.3    297.41   0        0.    .00000      .00   .00        0.   245   6   A44   .02
       5  263B        .0        .00       97.3    297.41   4      910.    .07692     2.00   .00        0.   245   6   A44   .02
       5  264B       5.9      14.55      103.2    304.43   0        0.    .00000      .00   .00        0.    45   6   A44   .03
       5  265B        .0        .00      103.2    304.43   2      617.    .05835      .00   .00        0.    45   6   A44   .03
       5  266B       6.3      15.54      109.5    306.36   0        0.    .00000      .00   .00        0.    45   6   A44   .03
       5  267C       7.8      30.28        7.8     30.28   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  268C        .0        .00        7.8     30.28   1      445.    .17978      .00   .00        0.   245   5   A44   .02
       5  269C       5.4      18.61       13.2     46.05   0        0.    .00000      .00   .00        0.   245   6   A44   .02
       5  270C        .0        .00       13.2     46.05   1      665.    .24662      .00   .00        0.   245   6   A44   .02
       5  271C      11.4      39.28       24.6     77.22   0        0.    .00000      .00   .00        0.   245   6   A44   .02
       5  272C        .0        .00       24.6     77.22   1      292.    .07534      .00   .00        0.   245   6   A44   .02
       5  273C       2.3       8.93       26.9     81.38   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  274C        .0        .00       26.9     81.38   2      188.    .07979      .00   .00        0.   245   5   A44   .02
       5  275C       2.7      10.48       29.6     86.99   0        0.    .00000      .00   .00        0.   245   5   A44   .02
       5  276D       4.5      11.10        4.5     11.10   0        0.    .00000      .00   .00        0.    45   6   A44   .03
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  277C  TC 1155 QC    86.99 QCD    96.12 QD     9.14       5  277D  TD 1153 QD    11.10 QDC    82.30 QC    71.20   *
*                                 5  277CD TCD 1155 QCD    96.12 QC    86.99 QD     9.14                                  *
*****************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV      CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  277CD      4.5      11.10       34.1     96.12   2      270.    .02593      .00   .00        0.    45   0   A44   .00
```

5	278C	1.7	4.83	35.8	96.83	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	279C	.0	.00	35.8	96.83	2	455.	.08352	.00	.00	0.	45	5	A44	.03

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
5 280C	.9	3.49	36.7	96.70	4	713.	.10028	1.25	.00	0.	245	5	A44	.02
5 281C	3.4	8.39	40.1	100.75	0	0.	.00000	.00	.00	0.	45	6	A44	.03
5 282D	1.9	7.37	1.9	7.37	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 283D	.0	.00	1.9	7.37	2	681.	.12335	.00	.00	0.	245	5	A44	.02
5 284D	1.9	4.69	3.8	10.87	0	0.	.00000	.00	.00	0.	45	6	A44	.03

CONFLUENCE Q'S

5 285C TC 1156 QC 100.75 QCD 109.78 QD 9.03 5 285D TD 1154 QD 10.87 QDC 94.52 QC 83.65
5 285CD TCD 1156 QCD 109.78 QC 100.75 QD 9.03

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 285CD	3.8	10.87	43.9	109.78	2	200.	.04000	.00	.00	0.	45	0	A44	.00
5 286C	.4	1.14	44.3	108.67	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 287D	3.1	13.68	3.1	13.68	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 288D	.0	.00	3.1	13.68	1	608.	.23355	.00	.00	0.	231	5	A44	.02
5 289D	4.8	21.18	7.9	30.74	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 290D	.0	.00	7.9	30.74	2	530.	.08679	.00	.00	0.	231	5	A44	.02
5 291D	1.2	4.53	9.1	32.83	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 292E	5.8	25.59	5.8	25.59	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 293E	.0	.00	5.8	25.59	4	514.	.07802	1.00	.00	0.	231	5	A44	.02
5 294E	2.3	8.69	8.1	33.41	0	0.	.00000	.00	.00	0.	31	5	A44	.03

CONFLUENCE Q'S

5 295D TD 1155 QD 32.83 QDE 58.93 QE 26.10 5 295E TE 1153 QE 33.41 QED 62.82 QD 29.41
5 295DE TDE 1154 QDE 63.35 QD 32.51 QE 30.84

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 295DE	8.1	33.41	17.2	63.35	2	514.	.07802	.00	.00	0.	31	0	A44	.00
5 296D	.0	.00	17.2	62.04	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 297E	3.5	15.44	3.5	15.44	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 298E	.0	.00	3.5	15.44	4	174.	.08046	1.00	.00	0.	231	5	A44	.02
5 299E	.8	3.02	4.3	18.08	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 300F	.8	3.53	.8	3.53	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 301F	.0	.00	.8	3.53	4	264.	.04583	1.00	.00	0.	231	5	A44	.02
5 302F	.6	2.27	1.4	5.48	0	0.	.00000	.00	.00	0.	31	5	A44	.03

CONFLUENCE Q'S

5 303E TE 1153 QE 18.08 QEF 23.56 QF 5.48 5 303F TF 1153 QF 5.48 QFE 23.56 QE 18.08
5 303EF TEF 1153 QEF 23.56 QE 18.08 QF 5.48

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 303EF	1.4	5.48	5.7	23.56	4	1220.	.06877	1.50	.00	0.	31	0	A44	.00
5 304E	.1	.38	5.8	22.27	0	0.	.00000	.00	.00	0.	31	5	A44	.03

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV

LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
CONFLUENCE Q'S														
5 305D TD 1155 QD	62.04 QDE		84.31 QE		22.27		5 305E TE 1155 QE		22.27 QED		84.31 QD		62.04	
5 305DE TDE 1155 QDE	84.31 QD		62.04 QE		22.27									
5 305DE	5.8	22.27	23.0	84.31	2	470.	.05745	.00	.00	0.	31	0	A44	.00
5 306D	2.9	10.96	25.9	88.05	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 307D	.0	.00	25.9	88.05	2	140.	.06429	.00	.00	0.	31	5	A44	.03
5 308D	.2	.76	26.1	88.27	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 309E	2.8	10.55	2.8	10.55	0	0.	.00000	.00	.00	0.	31	5	A44	.02
5 310E	.0	.00	2.8	10.55	2	480.	.07500	.00	.00	0.	31	5	A44	.02
5 311E	3.3	12.47	6.1	20.46	0	0.	.00000	.00	.00	0.	31	5	A44	.03
CONFLUENCE Q'S														
5 312D TD 1156 QD	88.27 QDE		103.43 QE		15.15		5 312E TE 1153 QE		20.46 QED		83.78 QD		63.32	
5 312DE TDE 1156 QDE	103.43 QD		88.27 QE		15.15									
5 312DE	6.1	20.46	32.2	103.43	2	350.	.07429	.00	.00	0.	31	0	A44	.00
5 313D	5.9	22.29	38.1	115.07	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 314D	.0	.00	38.1	115.07	2	407.	.04914	.00	.00	0.	31	5	A44	.03
5 315D	2.7	7.67	40.8	116.89	0	0.	.00000	.00	.00	0.	45	5	A44	.03
CONFLUENCE Q'S														
5 316C TC 1157 QC	108.67 QCD		223.45 QD		114.78		5 316D TD 1156 QD		116.89 QDC		225.46 QC		108.57	
5 316CD TCD 1156 QCD	225.46 QC		108.57 QD		116.89									
5 316CD	40.8	116.89	85.1	225.46	4	819.	.03541	2.00	.00	0.	45	0	A44	.00
5 317C	1.8	5.11	86.9	226.17	0	0.	.00000	.00	.00	0.	45	5	A44	.03
CONFLUENCE Q'S														
5 318B TB 1157 QB	306.36 QBC		530.76 QC		224.41		5 318C TC 1156 QC		226.17 QCB		525.04 QB		298.86	
5 318BC TBC 1157 QBC	530.76 QB		306.36 QC		224.41									
5 318BC	86.9	226.17	196.4	530.76	2	362.	.03591	.00	.00	0.	45	0	A44	.00
5 319B	3.4	9.66	199.8	529.59	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5 320C	2.5	9.44	2.5	9.44	0	0.	.00000	.00	.00	0.	31	5	A44	.03
5 321C	.0	.00	2.5	9.44	2	495.	.06061	.00	.00	0.	31	5	A44	.03
5 322C	6.1	17.33	8.6	24.03	0	0.	.00000	.00	.00	0.	45	5	A44	.03

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	AREA(Ac)	Q(CFS)	AREA(Ac)	Q(CFS)	TYPE	LNGTH(Ft)	SLOPE	SIZE(Ft)	Z	Q(CFS)	NAME	TC	ZONE	IMPV
5 323C	.0	.00	8.6	24.03	2	390.	.06154	.00	.00	0.	45	5	A44	.03
5 324C	3.0	8.52	11.6	29.27	0	0.	.00000	.00	.00	0.	45	5	A44	.03
CONFLUENCE Q'S														
5 325B TB 1157 QB	529.59 QBC		548.27 QC		18.68		5 325C TC 1154 QC		29.27 QCB		411.58 QB		382.31	
5 325BC TBC 1157 QBC	548.27 QB		529.59 QC		18.68									

5	325BC	11.6	29.27	211.4	548.27	4	360.	.03472	1.50	.00	0.	45	0	A44	.00
5	326B	4.5	12.78	215.9	551.01	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	327B	.0	.00	215.9	551.01	4	232.	.01815	2.00	.00	0.	45	5	A44	.03
5	328B	2.8	6.91	218.7	553.62	0	0.	.00000	.00	.00	0.	45	6	A44	.03

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* CONFLUENCE Q'S *

* 5 329A TA 1161 QA 1087.28 QAB 1476.59 QB 389.30 5 329B TB 1157 QB 553.62 QBA 1356.18 QA 802.56 *

* 5 329AB TAB 1159 QAB 1520.92 QA 1024.37 QB 496.55 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	329AB	218.7	553.62	776.0	1520.92	4	294.	.01837	2.50	.00	0.	45	0	A44	.00
5	330A	1.2	3.41	777.2	1520.30	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	331A	.0	.00	777.2	1520.30	2	227.	.00220	.00	.00	0.	45	5	A44	.03
5	332A	2.8	7.95	780.0	1508.22	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	333A	.0	.00	780.0	1508.22	4	233.	.03863	5.50	.00	0.	45	5	A44	.03
5	334A	.8	2.27	780.8	1508.19	0	0.	.00000	.00	.00	0.	45	5	A44	.03
5	335A	4.1	15.91	784.9	1510.33	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	336A	.0	.00	784.9	1510.33	2	207.	.00483	.00	.00	0.	245	5	A44	.02
5	337A	1.6	6.21	786.5	1505.38	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	338B	5.4	13.22	5.4	13.22	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	339B	.0	.00	5.4	13.22	2	280.	.07143	.00	.00	0.	45	6	A44	.02
5	340B	2.1	5.14	7.5	17.89	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	341B	.0	.00	7.5	17.89	2	230.	.06522	.00	.00	0.	45	6	A44	.02
5	342B	2.4	6.77	9.9	22.30	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	343B	.0	.00	9.9	22.30	2	180.	.06667	.00	.00	0.	45	5	A44	.02
5	344B	2.4	6.77	12.3	27.15	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	345B	.0	.00	12.3	27.15	2	202.	.06931	.00	.00	0.	45	5	A44	.02
5	346B	3.1	7.59	15.4	33.46	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	347B	.0	.00	15.4	33.46	2	356.	.02247	.00	.00	0.	45	6	A44	.02
5	348B	4.1	10.04	19.5	38.16	4	350.	.02857	3.60	.00	0.	45	6	A44	.02

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* CONFLUENCE Q'S *

* 5 349A TA 1161 QA 1505.38 QAB 1522.57 QB 17.19 5 349B TB 1156 QB 37.77 QBA 979.46 QA 941.68 *

* 5 349AB TAB 1161 QAB 1522.57 QA 1505.38 QB 17.19 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

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Program Package Serial Number: 2195

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	349AB	19.5	37.77	806.0	1522.57	2	50.	.00400	.00	.00	0.	45	0	A44	.00
5	350A	.1	.39	806.1	1519.75	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	351B	2.7	10.48	2.7	10.48	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	352B	.0	.00	2.7	10.48	1	322.	.31056	.00	.00	0.	45	5	A44	.02
5	353B	2.6	10.09	5.3	18.96	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	354C	3.3	12.81	3.3	12.81	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	355C	.0	.00	3.3	12.81	2	327.	.37309	.00	.00	0.	45	5	A44	.02
5	356C	1.8	6.99	5.1	18.96	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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* CONFLUENCE Q'S *

* 5 357B TB 1153 QB 18.96 QBC 37.92 QC 18.96 5 357C TC 1153 QC 18.96 QCB 37.92 QB 18.96 *

* 5 357BC TBC 1153 QBC 37.92 QB 18.96 QC 18.96 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	357BC	5.1	18.96	10.4	37.92	1	204.	.13725	.00	.00	0.	245	0	A44	.00
5	358B	1.4	5.43	11.8	41.60	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	359B	2.3	8.93	14.1	49.32	0	0.	.00000	.00	.00	0.	245	5	A44	.02

5	360B	.0	.00	14.1	49.32	1	374.	.09626	.00	.00	0.	45	5	A44	.02
5	361B	4.2	14.47	18.3	59.99	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	362C	3.1	12.03	3.1	12.03	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	363C	.0	.00	3.1	12.03	1	469.	.22175	.00	.00	0.	45	5	A44	.02
5	364C	2.5	9.70	5.6	18.85	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 365B TB 1155 QB 59.99 QBC 77.72 QC 17.72 5 365C TC 1154 QC 18.85 QCB 77.61 QB 58.76

5 365BC TBC 1155 QBC 77.72 QB 59.99 QC 17.72

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	365BC	5.6	18.85	23.9	77.72	4	75.	.08000	3.00	.00	0.	245	0	A44	.00
5	366B	.9	2.54	24.8	79.38	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	367B	.0	.00	24.8	79.38	4	400.	.05750	3.00	.00	0.	45	5	A44	.02
5	368B	1.6	4.51	26.4	82.33	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	369B	.0	.00	26.4	82.33	1	60.	.01538	.00	.00	0.	45	5	A44	.02
5	370B	3.6	8.81	30.0	88.43	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	371B	.0	.00	30.0	88.43	4	304.	.04934	3.00	.00	0.	45	6	A44	.02
5	372B	3.3	9.31	33.3	93.05	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	373B	.0	.00	33.3	93.05	4	538.	.03532	3.00	.00	0.	45	5	A44	.02
5	374B	4.0	9.79	37.3	97.81	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	375B	.0	.00	37.3	97.81	4	342.	.08187	3.00	.00	0.	45	6	A44	.02
5	376B	1.6	4.61	38.9	99.59	0	0.	.00000	.00	.00	0.	45	5	A44	.05
5	377C	.7	1.97	.7	1.97	0	0.	.00000	3.00	.00	0.	45	5	A44	.02
5	378C	.0	.00	.7	1.97	2	185.	.03784	.00	.00	0.	45	5	A44	.02
5	379C	.9	2.54	1.6	4.05	0	0.	.00000	.00	.00	0.	45	5	A44	.02

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MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	380B	1.6	4.05	40.5	102.17	2	131.	.19084	3.00	.00	0.	45	0	A44	.00
5	381B	.1	.28	40.6	102.14	0	0.	.00000	.00	.00	0.	45	5	A44	.02

CONFLUENCE Q'S

5 382A TA 1161 QA 1519.75 QAB 1568.00 QB 48.24 5 382B TB 1156 QB 102.14 QBA 1056.89 QA 954.75

5 382AB TAB 1161 QAB 1568.00 QA 1519.75 QB 48.24

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	382AB	40.6	102.14	846.7	1568.00	2	102.	.00980	.00	.00	0.	45	0	A44	.00
5	383A	.4	1.13	847.1	1564.68	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	384A	2.5	7.05	849.6	1565.02	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	385A	.0	.00	849.6	1565.02	1	226.	.00442	.00	.00	0.	45	5	A44	.02
5	386A	3.1	8.74	852.7	1549.83	4	200.	.03000	12.00	.00	0.	45	5	A44	.02
5	387A	2.5	7.05	855.2	1550.01	4	240.	.04167	1.80	.00	0.	45	5	A44	.02
5	388A	.0	.00	855.2	1549.96	1	221.	.03620	.00	.00	0.	45	5	A44	.02
5	389A	4.1	10.04	859.3	1548.31	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	390A	2.7	6.61	862.0	1548.64	0	0.	.00000	.00	.00	0.	45	6	A44	.02
5	391A	.0	.00	862.0	1548.64	1	116.	.05172	.00	.00	0.	45	6	A44	.02
5	392A	.8	2.26	862.8	1545.51	0	0.	.00000	.00	.00	0.	45	5	A44	.02
5	393B	5.4	20.96	5.4	20.96	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	394B	.0	.00	5.4	20.96	1	231.	.19913	.00	.00	0.	245	5	A44	.02

5	395B	3.0	13.35	8.4	32.07	0	0.	.00000	.00	.00	0.	228	5	A44	.02
5	396B	2.1	9.27	10.5	41.34	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	397B	.0	.00	10.5	41.34	1	409.	.14181	.00	.00	0.	231	5	A44	.02
5	398B	7.4	32.65	17.9	66.87	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	399B	.0	.00	17.9	66.87	1	427.	.17330	.00	.00	0.	231	5	A44	.02
5	400B	4.3	18.97	22.2	79.73	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	401C	3.6	15.88	3.6	15.88	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	402C	.0	.00	3.6	15.88	1	351.	.13675	.00	.00	0.	231	5	A44	.02
5	403C	2.5	11.03	6.1	24.00	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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CONFLUENCE Q'S

5 404B TB 1154 QB 79.73 QBC 103.74 QC 24.00 — 5 404C TC 1154 QC 24.00 QCB 103.74 QB 79.73

5 404BC TBC 1154 QBC 103.74 QB 79.73 QC 24.00

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 404BC	6.1	24.00	28.3	103.74	1	700.	.15714	.00	.00	0.	231	0	A44	.00

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 405B	7.2	31.77	35.5	120.80	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 406B	.0	.00	35.5	120.80	1	663.	.04827	.00	.00	0.	231	5	A44	.02
5 407B	6.3	27.80	41.8	123.65	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 408C	3.0	13.24	3.0	13.24	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 409C	.0	.00	3.0	13.24	2	462.	.08658	.00	.00	0.	231	5	A44	.02
5 410C	6.3	27.80	9.3	38.59	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 411C	.0	.00	9.3	38.59	2	338.	.35503	.00	.00	0.	231	5	A44	.02
5 412C	6.0	26.47	15.3	63.12	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 413C	.0	.00	15.3	63.12	1	374.	.13369	.00	.00	0.	231	5	A44	.02
5 414C	5.9	26.03	21.2	82.81	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 415C	.0	.00	21.2	82.81	1	538.	.09665	.00	.00	0.	231	5	A44	.02
5 416C	4.8	21.18	26.0	93.95	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 417D	3.4	15.00	3.4	15.00	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 418D	.0	.00	3.4	15.00	1	375.	.11733	.00	.00	0.	231	5	A44	.02
5 419D	9.1	40.15	12.5	51.41	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 420D	.0	.00	12.5	51.41	1	525.	.10667	.00	.00	0.	231	5	A44	.02
5 421D	5.2	22.94	17.7	65.08	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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CONFLUENCE Q'S

5 422C TC 1155 QC 93.95 QCD 158.84 QD 64.88 — 5 422D TD 1154 QD 65.08 QDC 153.95 QC 88.86

5 422CD TCD 1155 QCD 158.84 QC 93.95 QD 64.88

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 422CD	17.7	65.08	43.7	158.84	1	568.	.03521	.00	.00	0.	231	0	A44	.00
5 423C	5.0	22.06	48.7	159.57	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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CONFLUENCE Q'S

5 424B TB 1157 QB 123.65 QBC 283.21 QC 159.57 — 5 424C TC 1157 QC 159.57 QCB 283.21 QB 123.65

5 424BC TBC 1157 QBC 283.21 QB 123.65 QC 159.57

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 424BC	48.7	159.57	90.5	283.21	1	710.	.05634	.00	.00	0.	231	0	A44	.00
5 425B	8.1	35.74	98.6	281.47	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 426B	.0	.00	98.6	281.47	1	402.	.12438	.00	.00	0.	231	5	A44	.02
5 427B	7.4	32.65	106.0	285.79	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 428C	2.9	12.80	2.9	12.80	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 429C	.0	.00	2.9	12.80	1	217.	.27650	.00	.00	0.	231	5	A44	.02

5	430C	2.0	8.82	4.9	20.45	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	431C	1.2	5.29	6.1	25.75	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	432C	.0	.00	6.1	25.75	1	449.	.06682	.00	.00	0.	231	5	A44	.02
5	433C	2.2	9.71	8.3	30.00	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	434C	.0	.00	8.3	30.00	2	205.	.09756	.00	.00	0.	231	5	A44	.02
5	435C	.4	1.76	8.7	30.73	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	436D	3.3	14.56	3.3	14.56	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	437D	.0	.00	3.3	14.56	1	271.	.14760	.00	.00	0.	231	5	A44	.02
5	438D	1.2	5.29	4.5	18.15	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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* CONFLUENCE Q'S *

* 5 439C TC 1155 QC 30.73 QCD 47.52 QD 16.79 5 439D TD 1154 QD 18.15 QDC 47.30 QC 29.14 *

* 5 439CD TCD 1155 QCD 47.52 QC 30.73 QD 16.79 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	439CD	4.5	18.15	13.2	47.52	2	480.	.08333	.00	.00	0.	231	0	A44	.00
5	440C	2.9	12.80	16.1	55.58	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	441D	5.3	23.39	5.3	23.39	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	442D	.0	.00	5.3	23.39	1	408.	.19608	.00	.00	0.	231	5	A44	.02
5	443D	3.0	13.24	8.3	33.10	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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* CONFLUENCE Q'S *

* 5 444C TC 1155 QC 55.58 QCD 86.22 QD 30.63 5 444D TD 1154 QD 33.10 QDC 86.47 QC 53.36 *

* 5 444CD TCD 1154 QCD 86.47 QC 53.36 QD 33.10 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	444CD	8.3	33.10	24.4	86.47	2	671.	.07452	.00	.00	0.	231	0	A44	.00
5	445C	3.0	13.24	27.4	93.22	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	446C	.0	.00	27.4	93.22	1	494.	.26316	.00	.00	0.	231	5	A44	.02
5	447C	2.0	8.82	29.4	97.11	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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* CONFLUENCE Q'S *

* 5 448B TB 1159 QB 285.79 QBC 361.31 QC 75.52 5 448C TC 1156 QC 97.11 QCB 341.06 QB 243.95 *

* 5 448BC TBC 1158 QBC 363.80 QB 277.94 QC 85.86 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	448BC	29.4	97.11	135.4	363.80	1	534.	.05618	.00	.00	0.	231	0	A44	.00
5	449B	5.6	24.71	141.0	364.88	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	450C	3.3	14.56	3.3	14.56	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	451C	.0	.00	3.3	14.56	1	380.	.23684	.00	.00	0.	231	5	A44	.02
5	452C	2.3	10.15	5.6	22.29	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	453C	.0	.00	5.6	22.29	1	317.	.23659	.00	.00	0.	231	5	A44	.02
5	454C	1.0	4.41	6.6	25.36	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	455D	7.0	30.89	7.0	30.89	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5	456D	.0	.00	7.0	30.89	1	191.	.18325	.00	.00	0.	231	5	A44	.02
5	457D	.7	3.09	7.7	31.76	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
5 458C TC 1154 QC	25.36 QCD	57.11 QD	31.76	5 458D TD 1154 QD	31.76 QDC	57.11 QC	25.36							
5 458CD TCD 1154 QCD	57.11 QC	25.36 QD	31.76											
5 458CD	7.7	31.76	14.3	57.11	2	235.	.19149	.00	.00	0.	231	0	A44	.00
5 459C	1.1	4.85	15.4	61.04	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 460C	.0	.00	15.4	61.04	2	330.	.07576	.00	.00	0.	231	5	A44	.02
5 461C	3.3	14.56	18.7	70.80	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 462D	3.2	14.12	3.2	14.12	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 463D	.0	.00	3.2	14.12	1	438.	.23973	.00	.00	0.	231	5	A44	.02
5 464D	2.1	9.27	5.3	20.90	0	0.	.00000	.00	.00	0.	231	5	A44	.02
CONFLUENCE Q'S														
5 465C TC 1154 QC	70.80 QCD	91.70 QD	20.90	5 465D TD 1154 QD	20.90 QDC	91.70 QC	70.80							
5 465CD TCD 1154 QCD	91.70 QC	70.80 QD	20.90											
5 465CD	5.3	20.90	24.0	91.70	1	340.	.07353	.00	.00	0.	231	0	A44	.00
5 466C	.8	3.53	24.8	91.68	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 467D	4.5	19.86	4.5	19.86	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 468D	.0	.00	4.5	19.86	1	268.	.22388	.00	.00	0.	231	5	A44	.02
5 469D	1.5	6.62	6.0	24.48	0	0.	.00000	.00	.00	0.	231	5	A44	.02
CONFLUENCE Q'S														
5 470C TC 1155 QC	91.68 QCD	113.51 QD	21.83	5 470D TD 1154 QD	24.48 QDC	109.45 QC	84.98							
5 470CD TCD 1155 QCD	113.51 QC	91.68 QD	21.83											
5 470CD	6.0	24.48	30.8	113.51	1	267.	.29963	.00	.00	0.	231	0	A44	.00
5 471C	1.0	4.41	31.8	115.28	0	0.	.00000	.00	.00	0.	231	5	A44	.02
CONFLUENCE Q'S														
5 472B TB 1159 QB	364.88 QBC	437.07 QC	72.20	5 472C TC 1155 QC	115.28 QCB	411.27 QB	295.99							
5 472BC TBC 1157 QBC	445.73 QB	342.71 QC	103.01											
5 472BC	31.8	115.28	172.8	445.73	1	443.	.02257	.00	.00	0.	231	0	A44	.00
5 473B	4.5	19.86	177.3	446.27	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 474B	.0	.00	177.3	446.27	1	489.	.02863	.00	.00	0.	231	5	A44	.02
5 475B	3.2	14.12	180.5	443.81	0	0.	.00000	.00	.00	0.	231	5	A44	.02

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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 476C	3.9	17.21	3.9	17.21	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 477C	.0	.00	3.9	17.21	1	610.	.11803	.00	.00	0.	31	5	A44	.02
5 478C	5.4	23.83	9.3	34.19	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 479C	.0	.00	9.3	34.19	1	382.	.10995	.00	.00	0.	231	5	A44	.02
5 480C	5.6	24.71	14.9	52.70	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 481C	.0	.00	14.9	52.70	1	342.	.04094	.00	.00	0.	231	5	A44	.02
5 482C	3.8	16.77	18.7	61.78	0	0.	.00000	.00	.00	0.	231	5	A44	.02
5 483C	.0	.00	18.7	61.78	1	522.	.07280	.00	.00	0.	231	5	A44	.02

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      5  484C     4.2      18.53      22.9     67.69   0       0.   .00000      .00   .00        0.  231   5   A44    .02
*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  485B  TB 1161 QB   443.81 QBC   488.93 QC    45.12       5  485C  TC 1156 QC    67.69 QCB   398.37 QB   330.68    *
*                                 5  485BC TBC 1160 QBC   494.50 QB   442.83 QC    51.67                                   *
*******************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  485BC   22.9      67.69      203.4    494.50   1     256.   .00391      .00   .00        0.  231   0   A44    .00
       5  486B     3.2      14.12      206.6    489.40   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  487C     3.3      14.56        3.3     14.56   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  488C      .0        .00        3.3     14.56   2     470.   .17021      .00   .00        0.  231   5   A44    .02
       5  489C     2.1       9.27        5.4     21.97   0       0.   .00000      .00   .00        0.  231   5   A44    .02
*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  490B  TB 1162 QB   489.40 QBC   492.53 QC     3.12       5  490C  TC 1153 QC    21.97 QCB   236.14 QB   214.16    *
*                                 5  490BC TBC 1162 QBC   492.53 QB   489.40 QC     3.12                                    *
*******************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  490BC    5.4      21.97      212.0    492.53   1     360.   .04167      .00   .00        0.  231   0   A44    .00
       5  491B     2.2       9.71      214.2    491.01   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  492B      .0        .00      214.2    491.01   1     354.   .01412      .00   .00        0.  231   5   A44    .02
       5  493B     4.0      17.65      218.2    487.57   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  494C     2.3      10.15        2.3     10.15   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  495C      .0        .00        2.3     10.15   1     526.   .17110      .00   .00        0.  231   5   A44    .02
       5  496C     2.3      10.15        4.6     17.00   0       0.   .00000      .00   .00        0.  231   5   A44    .02
*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  497B  TB 1165 QB   487.57 QBC   489.86 QC     2.29       5  497C  TC 1154 QC    17.00 QCB   228.74 QB   211.74    *
*                                 5  497BC TBC 1165 QBC   489.86 QB   487.57 QC     2.29                                    *
*******************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  497BC    4.6      17.00      222.8    489.86   1     122.   .08197      .00   .00        0.  231   0   A44    .00
       5  498B      .6       2.65      223.4    490.00   0       0.   .00000      .00   .00        0.  231   5   A44    .02
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    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                          STORM DAY 4
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      5  499A  TA 1163 QA  1545.51 QAB  2018.75 QB   473.24       5  499B  TB 1165 QB   490.00 QBA  1989.27 QA  1499.27    *
*                                 5  499AB TAB 1164 QAB  2025.69 QA  1538.30 QB   487.39                                   *
*******************************************************************************************************************************
                  SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV    CONV   CONTROL SOIL       RAIN  PCT
    LOCATION      AREA(Ac)  Q(CFS)     AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  499AB  223.4     490.00     1086.2   2025.69   1      69.   .07246      .00   .00        0.  231   0   A44    .00
       5  500A      .3       1.32     1086.5   2025.51   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  501B     6.7      29.56        6.7     29.56   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  502B      .0        .00        6.7     29.56   1     249.   .04016      .00   .00        0.  231   5   A44    .02
       5  503B     4.8      21.18       11.5     44.99   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  504B      .0        .00       11.5     44.99   1     358.   .23743      .00   .00        0.  231   5   A44    .02
       5  505B     4.3      18.97       15.8     59.93   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  506B      .0        .00       15.8     59.93   1     438.   .19406      .00   .00        0.  231   5   A44    .02
       5  507B     2.3      10.15       18.1     66.07   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  508C     2.8      12.35        2.8     12.35   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  509C     1.7       7.50        4.5     19.86   0       0.   .00000      .00   .00        0.  231   5   A44    .02
       5  510C      .0        .00        4.5     19.86   1     250.   .02000      .00   .00        0.  231   5   A44    .02
       5  511C     1.6       7.06        6.1     22.11   0       0.   .00000      .00   .00        0.  231   5   A44    .02
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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  512B  TB 1155 QB    66.07 QBC    88.18 QC    22.11       5  512C  TC 1155 QC    22.11 QCB    88.18 QB    66.07   *
*                                  5  512BC TBC 1155 QBC    88.18 QB    66.07 QC    22.11                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  512BC    6.1      22.11      24.2     88.18   1      305.   .09836      .00   .00        0.  231   0   A44   .00
       5  513B     1.0       4.41      25.2     88.93   0        0.   .00000      .00   .00        0.  231   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  514A  TA 1164 QA  2025.51 QAB  2048.50 QB    22.99       5  514B  TB 1156 QB    88.93 QBA  1102.98 QA  1014.05   *
*                                  5  514AB TAB 1164 QAB  2048.50 QA  2025.51 QB    22.99                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  514AB   25.2      88.93    1111.7   2048.50   1      585.   .02051      .00   .00        0.  231   0   A44   .00
       5  515A     9.2      40.59    1120.9   2039.81   0        0.   .00000      .00   .00        0.  231   5   A44   .02
       5  516B     3.7      16.33       3.7     16.33   0        0.   .00000      .00   .00        0.  231   5   A44   .02
       5  517B      .0        .00       3.7     16.33   1      431.   .19722      .00   .00        0.  231   5   A44   .02
       5  518B     3.3      14.56       7.0     27.46   0        0.   .00000      .00   .00        0.  231   5   A44   .02
       5  519B      .0        .00       7.0     27.46   1      362.   .27624      .00   .00        0.  231   5   A44   .02
       5  520B     1.9       8.38       8.9     33.91   0        0.   .00000      .00   .00        0.  231   5   A44   .02

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 Program Package Serial Number:  2195
06/26/13   FILE: maB50p   INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE    23
                                  LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                    PROG F0601M

    Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\lasoilx.dat
    MALIBU INSTITUTE   MALIBU CALIFORNIA 1-20-13 per                                                        STORM DAY 4
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  521A  TA 1165 QA  2039.81 QAB  2044.21 QB     4.40       5  521B  TB 1154 QB    33.91 QBA   818.26 QA   784.35   *
*                                  5  521AB TAB 1165 QAB  2044.21 QA  2039.81 QB     4.40                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  521AB    8.9      33.91    1129.8   2044.21   1      527.   .02846      .00   .00        0.  231   0   A44   .00
       5  522A     4.5      17.47    1134.3   2034.77   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  523B     2.2       8.54       2.2      8.54   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  524B      .0        .00       2.2      8.54   1      571.   .09632      .00   .00        0.  245   5   A44   .02
       5  525B     3.0      10.34       5.2     15.14   0        0.   .00000      .00   .00        0.  245   6   A44   .02
       5  526C     5.2      20.18       5.2     20.18   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  527C      .0        .00       5.2     20.18   2      443.   .07901      .00   .00        0.  245   5   A44   .02
       5  528C     4.4      15.16       9.6     33.61   0        0.   .00000      .00   .00        0.  245   6   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  529B  TB 1154 QB    15.14 QBC    48.75 QC    33.61       5  529C  TC 1154 QC    33.61 QCB    48.75 QB    15.14   *
*                                  5  529BC TBC 1154 QBC    48.75 QB    15.14 QC    33.61                                  *
*****************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL   TOTAL  CONV   CONV      CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       5  529BC    9.6      33.61      14.8     48.75   1      476.   .06513      .00   .00        0.  245   0   A44   .00
       5  530B     6.4      22.05      21.2     62.05   0        0.   .00000      .00   .00        0.  245   6   A44   .02
       5  531B      .0        .00      21.2     62.05   1      275.   .10545      .00   .00        0.  245   6   A44   .02
       5  532B     1.4       5.43      22.6     64.11   0        0.   .00000      .00   .00        0.  245   5   A44   .02
       5  533C     5.5      18.95       5.5     18.95   0        0.   .00000      .00   .00        0.  245   6   A44   .02
       5  534C      .0        .00       5.5     18.95   1      162.   .21605      .00   .00        0.  245   6   A44   .02
       5  535C      .6       2.33       6.1     20.92   0        0.   .00000      .00   .00        0.  245   5   A44   .02
*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*      5  536B  TB 1156 QB    64.11 QBC    80.15 QC    16.04       5  536C  TC 1154 QC    20.92 QCB    76.98 QB    56.06   *
*                                  5  536BC TBC 1155 QBC    81.45 QB    62.21 QC    19.24                                  *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 536BC	6.1	20.92	28.7	81.45	2	214.	.09346	.00	.00	0.	245	0	A44	.00
5 537B	5.2	17.92	33.9	95.24	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 538B	.0	.00	33.9	95.24	1	350.	.02857	.00	.00	0.	245	6	A44	.02
5 539B	4.9	19.02	38.8	99.58	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 540B	.0	.00	38.8	99.58	1	385.	.04935	.00	.00	0.	245	5	A44	.02
5 541B	3.7	12.75	42.5	102.23	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 542B	.0	.00	42.5	102.23	2	256.	.02344	.00	.00	0.	245	6	A44	.02
5 543B	4.1	15.91	46.6	104.10	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 544B	.0	.00	46.6	104.10	1	580.	.10345	.00	.00	0.	245	5	A44	.02
5 545B	4.8	18.63	51.4	105.58	0	0.	.00000	.00	.00	0.	245	5	A44	.02

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Program Package Serial Number: 2195

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 546B	.0	.00	51.4	105.58	1	248.	.12097	.00	.00	0.	245	5	A44	.02
5 547B	3.6	13.97	55.0	107.16	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 548B	.0	.00	55.0	107.16	1	154.	.05195	.00	.00	0.	245	5	A44	.02
5 549B	3.1	12.03	58.1	108.17	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 550B	.0	.00	58.1	108.17	1	464.	.12069	.00	.00	0.	245	5	A44	.02
5 551B	4.9	19.02	63.0	109.93	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 552B	.0	.00	63.0	109.93	1	425.	.08471	.00	.00	0.	245	5	A44	.02
5 553B	3.9	15.14	66.9	111.08	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 554B	.0	.00	66.9	111.08	1	385.	.22857	.00	.00	0.	245	5	A44	.02
5 555B	4.5	17.47	71.4	112.96	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 556B	.0	.00	71.4	112.96	1	292.	.07534	.00	.00	0.	245	5	A44	.02
5 557B	5.2	20.18	76.6	119.95	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 558B	.0	.00	76.6	119.95	1	307.	.01629	.00	.00	0.	245	5	A44	.02
5 559B	2.7	10.48	79.3	120.15	4	200.	.10000	2.40	.00	0.	245	5	A44	.02
5 560C	4.6	15.85	4.6	15.85	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 561C	.0	.00	4.6	15.85	1	520.	.17692	.00	.00	0.	245	6	A44	.02
5 562C	3.3	11.37	7.9	24.84	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 563C	.0	.00	7.9	24.84	1	517.	.12573	.00	.00	0.	245	6	A44	.02
5 564C	3.6	13.97	11.5	31.44	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 565C	.0	.00	11.5	31.44	1	404.	.11139	.00	.00	0.	245	5	A44	.02
5 566C	1.1	4.27	12.6	32.56	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 567D	4.2	16.30	4.2	16.30	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 568D	.0	.00	4.2	16.30	2	183.	.09836	.00	.00	0.	245	5	A44	.02
5 569D	1.8	6.99	6.0	22.20	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 570D	.0	.00	6.0	22.20	2	535.	.27664	.00	.00	0.	245	5	A44	.02
5 571D	2.6	10.09	8.6	30.17	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 572D	.0	.00	8.6	30.17	1	348.	.15517	.00	.00	0.	245	5	A44	.02
5 573D	2.6	10.09	11.2	36.71	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 574D	.0	.00	11.2	36.71	1	343.	.09329	.00	.00	0.	245	5	A44	.02
5 575D	1.7	6.60	12.9	39.40	0	0.	.00000	.00	.00	0.	245	5	A44	.02

CONFLUENCE Q'S

5 576C TC 1156 QC 32.56 QCD 71.86 QD 39.31 5 576D TD 1155 QD 39.40 QDC 70.63 QC 31.23
5 576CD TCD 1156 QCD 71.86 QC 32.56 QD 39.31

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 576CD	12.9	39.40	25.5	71.86	1	124.	.00806	.00	.00	0.	245	0	A44	.00
5 577C	1.5	5.82	27.0	72.35	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5 578C	.0	.00	27.0	72.35	1	240.	.28750	.00	.00	0.	245	5	A44	.02
5 579C	3.2	11.03	30.2	77.28	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5 580C	.0	.00	30.2	77.28	1	250.	.12000	.00	.00	0.	245	6	A44	.02
5 581C	3.5	12.06	33.7	81.65	0	0.	.00000	.00	.00	0.	245	6	A44	.02

5	582C	2.2	8.54	35.9	84.66	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	583C	.0	.00	35.9	84.66	1	286.	.03147	.00	.00	0.	245	5	A44	.02
5	584C	5.4	18.61	41.3	89.80	4	200.	.12500	3.60	.00	0.	245	6	A44	.02

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
5 585B TB 1158 QB 119.94 QBC 209.46 QC 89.52						5 585C TC 1158 QC 89.52 QCB 209.46 QB 119.94								
5 585BC TBC 1158 QBC 209.46 QB 119.94 QC 89.52														
5	585BC	41.3	89.52	120.6	209.46	1	136.	.25735	.00	.00	0.	245	0	A44	.00
5	586B	6.3	24.45	126.9	214.49	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	587B	.0	.00	126.9	214.49	1	367.	.04087	.00	.00	0.	245	5	A44	.02
5	588B	4.2	16.30	131.1	216.04	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	589C	3.7	14.36	3.7	14.36	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	590C	.0	.00	3.7	14.36	1	323.	.04644	.00	.00	0.	245	5	A44	.02
5	591C	1.6	6.21	5.3	16.64	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	592C	.0	.00	5.3	16.64	1	458.	.12009	.00	.00	0.	245	5	A44	.02
5	593C	3.4	13.20	8.7	23.06	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	594D	1.7	5.86	1.7	5.86	0	0.	.00000	.00	.00	0.	245	6	A44	.02
5	595D	.0	.00	1.7	5.86	1	291.	.15464	.00	.00	0.	245	6	A44	.02
5	596D	.7	2.72	2.4	7.60	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	597D	2.6	10.09	5.0	17.28	0	0.	.00000	.00	.00	0.	245	5	A44	.02
5	598D	.0	.00	5.0	17.28	1	441.	.24943	.00	.00	0.	245	5	A44	.02
5	599D	2.0	7.76	7.0	22.39	0	0.	.00000	.00	.00	0.	245	5	A44	.02
CONFLUENCE Q'S														
5 600C TC 1155 QC 23.06 QCD 44.83 QD 21.77						5 600D TD 1154 QD 22.39 QDC 44.93 QC 22.55								
5 600CD TCD 1154 QCD 44.93 QC 22.55 QD 22.39														
5	600CD	7.0	22.39	15.7	44.93	1	116.	.04310	.00	.00	0.	245	0	A44	.00
5	601C	.3	1.16	16.0	45.68	0	0.	.00000	.00	.00	0.	245	5	A44	.02
CONFLUENCE Q'S														
5 602B TB 1159 QB 216.04 QBC 244.77 QC 28.73						5 602C TC 1155 QC 45.68 QCB 234.58 QB 188.91								
5 602BC TBC 1157 QBC 251.70 QB 211.46 QC 40.24														
5	602BC	16.0	45.68	147.1	251.70	1	563.	.08348	.00	.00	0.	245	0	A44	.00
5	603B	4.7	18.24	151.8	252.40	0	0.	.00000	.00	.00	0.	245	5	A44	.02
CONFLUENCE Q'S														
5 604A TA 1166 QA 2034.77 QAB 2229.69 QB 194.92						5 604B TB 1158 QB 252.40 QBA 1314.91 QA 1062.51								
5 604AB TAB 1166 QAB 2229.69 QA 2034.77 QB 194.92														

MALIBU INSTITUTE MALIBU CALIFORNIA 1-20-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 604AB	151.8	252.40	1286.1	2229.69	0	0.	.00000	.00	.00	0.	245	0	A44	.00
5 605A	.0	.00	1286.1	2229.69	0	0.	.00000	.00	.00	0.	245	30	A44	.00

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Program Package Serial Number: 2195

Site Proposed LAR04 Output

Program Package Serial Number: 2195
07/01/13 FILE: ms050p INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 6-28-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 701A	1.1	3.70	1.1	3.70	4	20.	.05000	1.50	.00	0.	45	5	A44	.30
5 702A	.6	1.94	1.7	5.60	4	20.	.05000	1.50	.00	0.	45	5	A44	.23
5 703A	.0	.00	1.7	5.56	4	145.	.20690	2.00	.00	0.	45	5	A44	.23
5 704A	.6	2.09	2.3	7.51	4	20.	.05000	2.00	.00	0.	45	5	A44	.36
5 705A	.0	.00	2.3	7.46	4	302.	.03311	2.00	.00	0.	45	5	A44	.36
5 706B	1.6	5.20	1.6	5.20	0	0.	.00000	.00	.00	0.	45	5	A44	.24
5 707B	.8	2.88	2.4	8.08	0	0.	.00000	.00	.00	0.	45	5	A44	.42
5 708B	.0	.00	2.4	8.08	4	230.	.07391	2.00	.00	0.	45	5	A44	.42
5 709B	.3	.93	2.7	8.54	0	0.	.00000	.00	.00	0.	45	5	A44	.16

CONFLUENCE Q'S
5 710A TA 1154 QA 7.17 QAB 15.44 QB 8.26 5 710B TB 1153 QB 8.54 QBA 15.17 QA 6.63
5 710AB TAB 1154 QAB 15.44 QA 7.17 QB 8.26

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 710AB	2.7	8.54	5.0	15.44	4	233.	.04292	2.00	.00	0.	45	0	A44	.00
5 711A	.6	1.91	5.6	17.00	0	0.	.00000	.00	.00	0.	45	5	A44	.21
5 712A	.6	1.89	6.2	18.62	4	110.	.09091	1.50	.00	0.	45	5	A44	.19
5 713A	.0	.00	6.2	18.56	4	232.	.07759	2.00	.00	0.	45	5	A44	.19
5 714A	.3	.95	6.5	19.08	0	0.	.00000	.00	.00	0.	45	5	A44	.19
5 715A	.7	2.30	7.2	21.05	4	110.	.09091	1.50	.00	0.	45	5	A44	.26
5 716A	.0	.00	7.2	20.95	4	465.	.04516	2.00	.00	0.	45	5	A44	.26
5 717A	.7	1.72	7.9	22.16	0	0.	.00000	.00	.00	0.	45	7	A44	.17
5 718A	.9	3.01	8.8	24.25	4	100.	.03000	1.50	.00	0.	45	5	A44	.29
5 719A	.0	.00	8.8	23.88	4	40.	.07500	2.00	.00	0.	45	5	A44	.29
5 720A	.8	2.26	9.6	25.77	0	0.	.00000	.00	.00	0.	45	6	A44	.22
5 721C	.7	2.34	.7	2.34	0	0.	.00000	1.50	.00	0.	45	5	A44	.29
5 722C	.0	.00	.7	2.34	4	350.	.08286	1.50	.00	0.	45	5	A44	.29
5 723C	1.9	4.64	2.6	6.81	0	0.	.00000	.00	.00	0.	45	7	A44	.16

CONFLUENCE Q'S
5 724A TA 1155 QA 25.77 QAC 32.24 QC 6.47 5 724C TC 1154 QC 6.81 QCA 32.33 QA 25.52
5 724AC TAC 1154 QAC 32.33 QA 25.52 QC 6.81

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 724AC	2.6	6.81	12.2	32.33	4	40.	.05000	2.00	.00	0.	45	0	A44	.00
5 725A	.4	1.59	12.6	33.53	4	20.	.10000	2.00	.00	0.	45	5	A44	.61
5 726D	.6	2.05	.6	2.05	0	0.	.00000	.00	.00	0.	45	5	A44	.33
5 727D	.0	.00	.6	2.05	4	363.	.05510	2.00	.00	0.	45	5	A44	.33
5 728D	1.0	3.60	1.6	5.34	4	120.	.01667	1.50	.00	0.	45	5	A44	.42
5 729D	.4	1.35	2.0	6.36	4	20.	.05000	1.50	.00	0.	45	5	A44	.30
5 730D	.0	.00	2.0	6.34	4	246.	.04065	2.00	.00	0.	45	5	A44	.30
5 731D	.4	1.46	2.4	7.55	4	20.	.05000	1.50	.00	0.	45	5	A44	.44
5 732D	.9	3.14	3.3	10.25	4	120.	.01667	1.50	.00	0.	45	5	A44	.36

Program Package Serial Number: 2195
07/01/13 FILE: ms050p INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\lasoilx.dat
MALIBU INSTITUTE MALIBU CALIFORNIA 6-28-13 per STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 733D	.0	.00	3.3	10.25	4	260.	.03846	2.00	.00	0.	45	5	A44	.36
5 734D	.4	1.49	3.7	11.18	4	20.	.10000	1.50	.00	0.	45	5	A44	.49

5	735D	.8	2.90	4.5	13.67	4	110.	.01818	1.50	.00	0.	45	5	A44	.43
5	736D	2.3	8.33	6.8	20.69	4	370.	.04054	2.00	.00	0.	45	5	A44	.43
5	737D	.0	.00	6.8	20.38	4	120.	.03333	2.00	.00	0.	45	5	A44	.47

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CONFLUENCE Q'S

5 738A TA 1154 QA 33.46 QAD 53.43 QD 19.97 5 738D TD 1155 QD 20.17 QDA 53.59 QA 33.42

5 738AD TAD 1155 QAD 53.59 QA 33.42 QD 20.17

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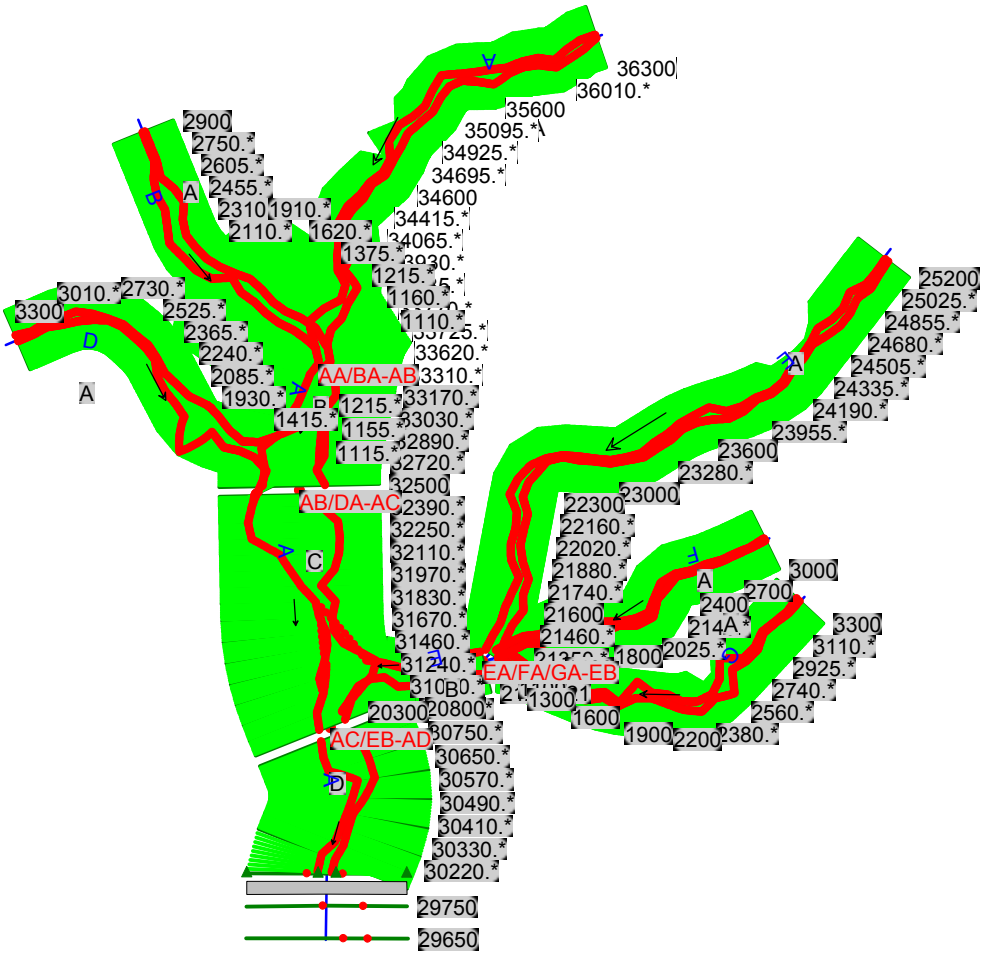
LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5 738AD	6.8	20.17	19.4	53.59	4	338.	.01183	3.00	.00	0.	45	0	A44	.00
5 739A	.0	.00	19.4	52.64	0	0.	.00000	.00	.00	0.	45	30	A44	.30

Appendix C Surface Flow Analysis

- HecRAS pdf's
- HecRAS program files



1 in Horiz. = 1200 ft 1 in Vert. = 600 ft

HEC-RAS Plan: Plan 01 Profile: 50yr B&B

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
G	A	3300	50yr B&B	51.00	1601.62	1602.87	1603.42	1604.74	0.200076	10.97	4.65	6.75	2.33
G	A	3200	50yr B&B	51.00	1579.57	1580.52	1581.01	1582.27	0.225952	10.64	4.79	8.31	2.47
G	A	3100	50yr B&B	51.00	1539.23	1540.12	1540.78	1543.02	0.397735	13.65	3.74	6.74	3.23
G	A	3000	50yr B&B	51.00	1501.68	1502.37	1502.89	1504.60	0.381569	11.97	4.26	9.33	3.12
G	A	2900	50yr B&B	51.00	1464.83	1465.24	1465.53	1466.38	0.375559	8.55	5.97	21.70	2.87
G	A	2800	50yr B&B	51.00	1444.00	1444.36	1444.61	1445.23	0.212585	7.49	6.81	19.54	2.24
G	A	2700	50yr B&B	51.00	1433.08	1433.57	1433.70	1433.99	0.109274	5.16	9.88	30.32	1.59
G	A	2600	50yr B&B	51.00	1429.21	1429.78	1429.84	1430.01	0.042658	3.87	13.18	56.56	1.41
G	A	2500	50yr B&B	51.00	1420.18	1420.64	1420.82	1421.23	0.075512	6.17	8.29	28.00	1.97
G	A	2400	50yr B&B	51.00	1411.46	1411.81	1411.95	1412.28	0.089576	5.52	9.24	40.62	2.04
G	A	2300	50yr B&B	51.00	1404.07	1404.42	1404.54	1404.82	0.071698	5.06	10.08	42.76	1.84
G	A	2200	50yr B&B	51.00	1397.36	1397.80	1397.94	1398.25	0.065323	5.37	9.49	34.32	1.80
G	A	2100	50yr B&B	51.00	1390.72	1391.35	1391.51	1391.86	0.062610	5.75	8.88	28.65	1.80
G	A	2000	50yr B&B	128.40	1383.72	1385.24	1385.24	1385.59	0.015082	4.80	26.77	37.95	1.01
G	A	1900	50yr B&B	128.40	1374.00	1375.12	1375.68	1377.04	0.075558	11.11	11.55	15.42	2.26
G	A	1800	50yr B&B	128.40	1365.99	1366.78	1367.35	1368.42	0.085565	10.26	12.51	20.87	2.34
G	A	1700	50yr B&B	128.40	1359.93	1360.67	1360.97	1361.64	0.066517	7.91	16.23	33.27	2.00
G	A	1600	50yr B&B	128.40	1352.07	1352.76	1353.03	1353.67	0.083598	7.66	16.77	42.88	2.16
G	A	1500	50yr B&B	128.40	1345.90	1346.58	1346.88	1347.53	0.063147	7.79	16.49	33.05	1.94
G	A	1400	50yr B&B	128.40	1340.00	1340.97	1341.29	1341.99	0.054385	8.08	15.88	27.03	1.86
G	A	1300	50yr B&B	128.40	1333.71	1334.31	1334.46	1334.81	0.066758	5.65	22.72	77.37	1.84
G	A	1200	50yr B&B	128.40	1327.03	1327.90	1328.14	1328.67	0.056760	7.07	18.16	39.08	1.83
G	A	1100	50yr B&B	128.40	1321.22	1321.84	1322.06	1322.54	0.060865	6.72	19.30	50.24	1.85
F	A	3000	50yr B&B	76.40	1588.93	1589.93	1590.46	1591.83	0.220166	11.04	6.92	11.29	2.48
F	A	2900	50yr B&B	76.40	1559.79	1560.89	1561.64	1563.76	0.286239	14.14	5.65	7.46	2.89
F	A	2800	50yr B&B	76.40	1530.64	1531.80	1532.43	1534.38	0.296677	12.90	5.92	9.37	2.86
F	A	2700	50yr B&B	76.40	1489.87	1490.74	1491.49	1494.07	0.411115	14.65	5.21	8.81	3.35
F	A	2600	50yr B&B	76.40	1460.08	1461.01	1461.60	1463.37	0.300116	12.34	6.19	10.80	2.87
F	A	2500	50yr B&B	76.40	1433.92	1434.95	1435.60	1437.43	0.256359	12.63	6.05	8.88	2.70
F	A	2400	50yr B&B	76.40	1419.04	1420.07	1420.48	1421.42	0.152349	9.30	8.22	13.20	2.08
F	A	2300	50yr B&B	76.40	1406.53	1407.20	1407.40	1407.84	0.132453	6.41	11.91	30.48	1.81
F	A	2200	50yr B&B	76.40	1395.41	1396.30	1396.58	1397.20	0.100103	7.60	10.05	16.04	1.69
F	A	2100	50yr B&B	76.40	1384.00	1384.42	1384.60	1385.01	0.119741	6.16	12.40	31.17	1.72
F	A	2000	50yr B&B	76.40	1379.68	1380.45	1380.48	1380.74	0.044273	4.28	17.85	36.89	1.08
F	A	1900	50yr B&B	76.40	1374.99	1375.64	1375.71	1375.99	0.047214	4.90	16.78	36.18	1.15
F	A	1800	50yr B&B	76.40	1370.26	1370.86	1370.97	1371.24	0.045076	4.95	15.44	47.81	1.53
F	A	1700	50yr B&B	318.50	1365.76	1366.91	1366.91	1367.36	0.013509	5.39	59.61	68.23	1.00
F	A	1600	50yr B&B	318.50	1360.10	1360.98	1361.27	1361.91	0.066447	8.45	44.95	87.14	2.03
F	A	1500	50yr B&B	318.50	1352.07	1352.91	1353.19	1353.87	0.075846	7.87	41.09	99.03	2.09
F	A	1400	50yr B&B	318.50	1343.57	1344.53	1344.89	1345.77	0.080188	9.23	38.36	80.69	2.22
F	A	1300	50yr B&B	318.50	1334.03	1334.79	1335.27	1336.53	0.092616	10.67	31.33	61.85	2.44
F	A	1200	50yr B&B	318.50	1325.99	1326.98	1327.43	1328.54	0.079410	10.03	31.91	57.21	2.26
F	A	1100	50yr B&B	318.50	1320.91	1321.83	1322.20	1322.98	0.052951	8.62	38.43	70.05	1.87
E	A	25200	50yr B&B	139.10	1993.57	1995.22	1995.64	1996.55	0.100166	9.26	15.03	17.62	1.77
E	A	25100	50yr B&B	139.10	1957.82	1959.01	1959.66	1961.81	0.356617	13.43	10.37	18.48	3.14
E	A	25000	50yr B&B	139.10	1939.89	1940.86	1941.49	1943.06	0.184672	11.91	11.68	14.82	2.36
E	A	24900	50yr B&B	139.10	1929.05	1929.91	1930.13	1930.66	0.123731	6.94	20.03	43.29	1.80
E	A	24800	50yr B&B	139.10	1919.56	1920.60	1920.90	1921.58	0.088252	7.93	17.54	23.95	1.63
E	A	24700	50yr B&B	139.10	1910.35	1912.04	1912.45	1913.31	0.084527	9.03	15.40	16.50	1.65
E	A	24600	50yr B&B	139.10	1909.01	1910.07	1910.10	1910.37	0.045337	4.33	32.13	66.43	1.10
E	A	24500	50yr B&B	139.10	1879.95	1882.03	1882.97	1885.28	0.176668	14.48	9.70	8.66	2.34
E	A	24400	50yr B&B	139.10	1821.15	1822.75	1824.11	1830.31	0.590184	22.06	6.31	7.01	4.10
E	A	24300	50yr B&B	139.10	1766.63	1767.57	1768.56	1772.89	0.564964	18.50	7.52	11.38	4.01
E	A	24200	50yr B&B	139.10	1711.92	1713.23	1714.39	1719.24	0.525345	19.67	7.07	9.16	3.91
E	A	24100	50yr B&B	139.10	1669.16	1670.12	1671.02	1674.34	0.482130	17.52	8.55	13.21	3.72
E	A	24000	50yr B&B	139.10	1621.86	1623.22	1624.38	1629.01	0.465136	19.31	7.20	8.53	3.70
E	A	23900	50yr B&B	139.10	1606.40	1607.53	1607.92	1608.81	0.163407	9.07	15.34	27.31	2.13
E	A	23800	50yr B&B	334.50	1587.44	1588.69	1589.02	1589.77	0.070368	8.41	41.26	50.56	1.53
E	A	23700	50yr B&B	334.50	1574.77	1576.42	1576.79	1577.63	0.121413	8.85	37.80	55.86	1.90
E	A	23600	50yr B&B	334.50	1558.96	1560.45	1561.11	1562.72	0.148697	12.09	27.68	29.68	2.21
E	A	23500	50yr B&B	334.50	1546.54	1548.67	1549.42	1551.07	0.111585	12.41	26.95	22.08	1.98
E	A	23400	50yr B&B	334.50	1537.08	1538.70	1539.24	1540.44	0.104507	10.59	31.59	31.72	1.87
E	A	23300	50yr B&B	334.50	1532.23	1535.11	1535.33	1536.23	0.038853	8.50	39.36	25.69	1.21
E	A	23200	50yr B&B	334.50	1517.60	1519.83	1520.75	1522.90	0.145920	14.07	23.77	19.59	2.25
E	A	23100	50yr B&B	334.50	1503.82	1506.23	1507.25	1509.59	0.128484	14.73	22.72	15.39	2.14
E	A	23000	50yr B&B	334.50	1488.29	1490.57	1491.63	1494.23	0.157788	15.33	21.81	16.56	2.35
E	A	22900	50yr B&B	334.50	1474.71	1477.13	1478.15	1480.52	0.133863	14.77	22.65	15.95	2.18
E	A	22800	50yr B&B	456.50	1462.30	1465.34	1466.05	1467.68	0.068116	12.30	37.13	20.75	1.62
E	A	22700	50yr B&B	456.50	1434.21	1436.65	1438.33	1444.05	0.246038	22.07	21.81	17.45	3.04
E	A	22600	50yr B&B	456.50	1408.39	1411.02	1412.63	1417.77	0.256956	20.86	21.89	14.72	3.01
E	A	22500	50yr B&B	456.50	1398.00	1399.10	1399.69	1401.05	0.117895	11.19	40.78	41.29	1.98
E	A	22400	50yr B&B	456.50	1394.00	1395.40	1395.56	1396.19	0.043132	7.16	63.72	59.53	1.22
E	A	22300	50yr B&B	493.70	1391.28	1393.37	1393.37	1394.01	0.027536	6.42	76.94	60.51	1.00
E	A	22200	50yr B&B	493.70	1386.00	1388.19	1388.53	1389.50	0.046860	9.19	53.74	36.49	1.33
E	A	22100	50yr B&B	493.70	1380.27	1381.86	1382.24	1383.17	0.068933	9.19	53.71	49.01	1.55
E	A	22000	50yr B&B	493.70	1373.97	1375.82	1376.18	1377.07	0.060824	8.97	55.03	47.39	1.47
E	A	21900	50yr B&B	493.70	1369.20	1370.88	1371.08	1371.72	0.051145	7.37	67.01	68.92	1.31
E	A	21800	50yr B&B	493.70	1363.96	1365.97	1366.17	1366.87	0.048544	7.62	64.78	60.28	1.30
E	A	21700	50yr B&B	493.70	1355.08	1356.15	1356.51	1357.33	0.097895	8.76	58.66	106.58	1.75
E	A	21600	50yr B&B	493.70	1344.84	1346.08	1346.47	1347.56	0.083422	9.79	51.58	101.81	2.29
E	A	21500	50yr B&B	493.70	1334.53	1335.47	1335.97	1337.32	0.098777	10.96	46.68	92.38	2.51

HEC-RAS Plan: Plan 01 Profile: 50yr B&B (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E	A	21400	50yr B&B	493.70	1326.22	1327.09	1327.56	1328.68	0.085414	10.13	48.83	85.60	2.33
E	A	21300	50yr B&B	493.70	1320.00	1320.93	1321.30	1322.19	0.061242	9.04	54.61	86.15	2.00
E	B	21223.21	50yr B&B	805.90	1317.95	1319.01	1319.79	1322.02	0.106582	13.92	57.90	72.42	2.74
E	B	21100	50yr B&B	805.90	1314.12	1316.15	1316.55	1317.49	0.025439	9.27	86.91	68.18	1.45
E	B	21000	50yr B&B	805.90	1311.96	1313.89	1314.27	1315.21	0.021364	9.21	87.50	60.74	1.35
E	B	20900	50yr B&B	805.90	1309.15	1310.75	1311.16	1312.02	0.036953	9.04	90.10	103.99	1.66
E	B	20800	50yr B&B	805.90	1303.98	1305.69	1306.23	1307.33	0.040672	10.31	80.87	91.35	1.77
E	B	20700	50yr B&B	805.90	1299.23	1302.11		1302.23	0.001044	2.81	302.43	150.37	0.32
E	B	20600	50yr B&B	805.90	1295.93	1302.15		1302.17	0.000070	1.36	727.34	163.09	0.10
E	B	20500	50yr B&B	805.90	1293.93	1302.16		1302.16	0.000011	0.64	1787.02	331.54	0.04
E	B	20400	50yr B&B	805.90	1290.00	1302.16		1302.16	0.000001	0.21	4058.92	636.44	0.01
E	B	20300	50yr B&B	805.90	1289.98	1302.16		1302.16	0.000001	0.28	3560.01	503.63	0.02
E	B	20200	50yr B&B	805.90	1289.94	1302.16		1302.16	0.000005	0.47	2095.43	350.33	0.03
E	B	20100	50yr B&B	805.90	1289.56	1302.16	1292.39	1302.16	0.000005	0.49	1976.44	299.95	0.03
D	A	3300	50yr B&B	102.70	1588.89	1590.11	1590.72	1592.42	0.250250	12.20	8.42	13.03	2.67
D	A	3200	50yr B&B	102.70	1549.95	1551.15	1552.07	1555.22	0.374790	16.17	6.35	8.44	3.29
D	A	3100	50yr B&B	102.70	1519.72	1520.46	1521.05	1522.86	0.312526	12.43	8.26	14.69	2.92
D	A	3000	50yr B&B	102.70	1508.16	1509.59	1509.98	1510.84	0.113092	8.97	11.45	15.36	1.83
D	A	2900	50yr B&B	102.70	1488.89	1489.85	1490.21	1491.16	0.202504	9.18	11.18	22.93	2.32
D	A	2800	50yr B&B	102.70	1479.22	1480.18	1480.43	1481.02	0.107456	7.35	13.97	24.84	1.73
D	A	2700	50yr B&B	102.70	1461.86	1463.65	1464.30	1465.81	0.143646	11.79	8.71	8.64	2.07
D	A	2600	50yr B&B	102.70	1429.48	1430.70	1431.51	1434.09	0.330293	14.78	6.95	9.71	3.08
D	A	2500	50yr B&B	198.40	1404.19	1405.99	1406.67	1408.35	0.141374	12.33	16.09	15.82	2.15
D	A	2400	50yr B&B	198.40	1378.99	1380.13	1380.82	1382.90	0.262206	13.36	14.85	20.98	2.80
D	A	2300	50yr B&B	198.40	1370.00	1372.30	1372.86	1374.12	0.074513	10.82	18.33	12.90	1.60
D	A	2200	50yr B&B	198.40	1369.27	1370.49	1370.49	1370.89	0.031626	5.09	39.17	51.11	1.00
D	A	2100	50yr B&B	198.40	1363.91	1364.86	1364.96	1365.31	0.055155	5.43	36.50	62.18	1.25
D	A	2000	50yr B&B	198.40	1359.04	1360.09	1360.13	1360.40	0.052138	4.47	44.72	105.43	1.17
D	A	1900	50yr B&B	198.40	1352.96	1355.56		1355.56	0.000137	0.61	330.37	184.37	0.08
D	A	1800	50yr B&B	347.50	1350.00	1355.56		1355.56	0.000008	0.24	1424.72	338.13	0.02
D	A	1700	50yr B&B	347.50	1354.01	1355.11	1355.11	1355.44	0.033275	4.60	77.73	125.77	0.99
D	A	1600	50yr B&B	347.50	1346.58	1347.48	1347.63	1348.05	0.072732	6.11	56.88	100.09	1.43
D	A	1500	50yr B&B	347.50	1343.21	1344.20	1344.40	1344.90	0.027102	6.89	55.41	86.12	1.38
D	A	1400	50yr B&B	347.50	1334.33	1335.34	1335.66	1336.48	0.088981	8.61	41.42	96.50	2.27
D	A	1300	50yr B&B	347.50	1320.46	1332.65		1332.66	0.000001	0.18	1944.32	249.92	0.01
D	A	1200	50yr B&B	347.50	1314.00	1332.65		1332.65	0.000000	0.05	6476.37	691.39	0.00
D	A	1100	50yr B&B	347.50	1315.99	1332.65		1332.66	0.000000	0.07	5337.78	432.40	0.00
B	A	2900	50yr B&B	509.70	1453.87	1456.95	1458.54	1462.40	0.150295	18.73	27.21	13.50	2.33
B	A	2800	50yr B&B	509.70	1439.99	1442.69	1444.17	1447.94	0.142532	18.47	28.33	17.39	2.37
B	A	2700	50yr B&B	509.70	1417.94	1421.06	1422.92	1428.04	0.205988	21.20	24.04	12.47	2.69
B	A	2600	50yr B&B	509.70	1404.00	1405.07	1405.83	1407.74	0.158000	13.10	38.91	38.27	2.29
B	A	2500	50yr B&B	509.70	1403.62	1405.20	1405.20	1405.66	0.031091	5.39	94.52	105.85	1.01
B	A	2400	50yr B&B	509.70	1398.97	1400.63	1400.74	1401.23	0.042120	6.21	82.06	93.41	1.17
B	A	2300	50yr B&B	509.70	1395.82	1397.57	1397.49	1398.16	0.022668	6.14	83.00	60.19	0.92
B	A	2200	50yr B&B	602.10	1393.88	1395.45		1395.85	0.018776	5.04	119.37	101.28	0.82
B	A	2100	50yr B&B	602.10	1391.72	1393.24	1393.24	1393.87	0.027703	6.34	94.99	76.49	1.00
B	A	2000	50yr B&B	602.10	1387.78	1389.62	1389.70	1390.38	0.032620	7.00	86.03	67.50	1.09
B	A	1900	50yr B&B	602.10	1383.73	1385.27	1385.43	1386.08	0.042249	7.25	83.00	75.00	1.22
B	A	1800	50yr B&B	602.10	1379.13	1380.53	1380.85	1381.63	0.078978	9.94	79.34	110.37	1.66
B	A	1700	50yr B&B	602.10	1373.89	1375.77	1376.22	1377.26	0.056769	9.79	61.50	44.00	1.46
B	A	1600	50yr B&B	602.10	1365.86	1367.12	1367.50	1368.39	0.096667	9.07	66.42	79.96	1.75
B	A	1500	50yr B&B	602.10	1360.01	1361.10	1361.52	1362.49	0.052441	9.51	65.11	92.42	1.91
B	A	1400	50yr B&B	602.10	1354.67	1356.00	1356.40	1357.35	0.050541	9.32	64.66	86.11	1.88
B	A	1300	50yr B&B	602.10	1350.83	1352.07	1352.40	1353.17	0.039158	8.42	73.27	113.50	1.66
B	A	1200	50yr B&B	602.10	1346.74	1347.94	1348.27	1349.04	0.040747	8.44	72.08	99.28	1.69
B	A	1100	50yr B&B	602.10	1341.64	1343.01	1343.52	1344.66	0.042249	10.30	58.46	57.30	1.80
A	A	36300	50yr B&B	717.10	1699.97	1702.50	1703.86	1707.02	0.120141	17.11	42.75	26.56	2.20
A	A	36200	50yr B&B	717.10	1695.99	1700.43	1700.56	1701.57	0.029429	8.54	83.92	43.96	1.09
A	A	36100	50yr B&B	717.10	1693.83	1697.60	1697.69	1698.56	0.028362	7.87	91.16	53.36	1.06
A	A	36000	50yr B&B	717.10	1689.97	1693.49	1693.84	1694.83	0.040547	9.39	79.27	53.75	1.27
A	A	35900	50yr B&B	717.10	1685.94	1689.56	1689.91	1691.20	0.035534	10.30	69.62	31.52	1.22
A	A	35800	50yr B&B	717.10	1681.99	1686.53	1686.81	1688.01	0.033970	9.76	73.52	35.57	1.18
A	A	35700	50yr B&B	717.10	1679.92	1683.83	1683.88	1684.97	0.024500	8.58	84.12	41.98	1.02
A	A	35600	50yr B&B	717.10	1675.98	1679.57	1679.87	1680.71	0.037254	8.53	84.03	53.34	1.20
A	A	35500	50yr B&B	740.60	1673.81	1676.91	1676.91	1677.76	0.024850	7.40	101.05	63.82	1.00
A	A	35400	50yr B&B	740.60	1669.74	1673.17	1673.34	1674.37	0.030403	8.80	84.27	45.73	1.12
A	A	35300	50yr B&B	740.60	1665.93	1669.06	1669.37	1670.36	0.037606	9.12	81.21	47.02	1.22
A	A	35200	50yr B&B	740.60	1663.23	1667.11	1667.21	1667.96	0.028723	7.53	102.84	72.75	1.05
A	A	35100	50yr B&B	740.60	1658.00	1661.44	1661.90	1662.96	0.053205	9.90	74.79	49.90	1.43
A	A	35000	50yr B&B	740.60	1651.06	1653.16	1653.73	1655.02	0.080893	10.93	67.74	53.75	1.72
A	A	34900	50yr B&B	740.60	1643.89	1645.94	1646.37	1647.38	0.072225	9.63	76.88	67.82	1.59
A	A	34800	50yr B&B	867.50	1637.17	1639.65	1639.68	1640.45	0.027929	7.17	121.09	82.23	1.04
A	A	34700	50yr B&B	867.50	1620.56	1624.52	1625.80	1628.71	0.074219	16.45	53.10	21.20	1.78
A	A	34600	50yr B&B	867.50	1573.14	1575.15	1577.25	1587.39	0.496911	28.21	31.39	25.40	4.27
A	A	34500	50yr B&B	867.50	1480.66	1482.38	1485.23	1503.87	0.874846	37.24	23.47	18.31	5.63
A	A	34400	50yr B&B	867.50	1438.22	1439.97	1441.76	1449.30	0.446198	24.50	35.40	29.93	3.97
A	A	34300	50yr B&B	867.50	1404.53	1406.18	1407.65	1413.07	0.345865	21.07	41.30	37.99	3.48
A	A	34200	50yr B&B	867.50	1387.89	1390.69	1392.21	1396.03	0.145961	18.55	46.78	24.56	2.37
A	A	34100	50yr B&B	867.50	1382.72	1384.97	1385.59	1387.05	0.065695	11.58	74.89	46.31	1.61
A	A	34000	50yr B&B	867.50	1372.63	1374.47	1375.02	1376.30	0.105773	10.85	79.98	78.51	1.89
A	A	33900	50yr B&B	867.50	1363.86	1367.29	1368.04	1369.52	0.047415	11.98	72.42	32.71	1.42

HEC-RAS Plan: Plan 01 Profile: 50yr B&B (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	A	33800	50yr B&B	867.50	1357.91	1363.59		1363.67	0.000615	2.31	375.68	78.07	0.18
A	A	33700	50yr B&B	867.50	1359.50	1362.24	1362.24	1363.29	0.023054	8.24	106.14	53.27	0.99
A	A	33600	50yr B&B	867.50	1354.01	1355.34	1355.60	1356.28	0.063966	7.79	112.04	130.00	1.45
A	A	33500	50yr B&B	1357.90	1347.73	1350.10	1350.10	1350.80	0.026413	6.68	203.41	149.82	1.00
A	A	33400	50yr B&B	1357.90	1342.30	1344.91	1345.22	1346.33	0.040349	9.54	142.32	82.60	1.28
A	A	33300	50yr B&B	1357.90	1337.91	1340.16	1340.81	1342.35	0.034805	11.88	114.65	82.14	1.73
A	A	33272.54	50yr B&B	1357.90	1336.57	1339.02	1339.83	1341.48	0.029108	12.96	120.62	88.07	1.65
A	B	33272.54	50yr B&B	1399.20	1336.57	1339.11	1339.87	1341.45	0.026112	12.66	128.68	90.92	1.58
A	B	33200	50yr B&B	1399.20	1324.96	1332.64		1332.70	0.000181	1.88	785.16	204.04	0.15
A	B	33100	50yr B&B	1399.20	1323.57	1332.66		1332.68	0.000045	1.11	1281.25	229.12	0.08
A	B	33000	50yr B&B	1399.20	1323.74	1332.64		1332.67	0.000062	1.30	1077.57	182.36	0.09
A	B	32900	50yr B&B	1399.20	1323.87	1332.65		1332.66	0.000028	0.91	1540.14	240.55	0.06
A	B	32800	50yr B&B	1399.20	1322.47	1332.65		1332.66	0.000010	0.62	2257.33	299.29	0.04
A	B	32700	50yr B&B	1399.20	1320.59	1332.65		1332.66	0.000003	0.38	3681.89	404.39	0.02
A	B	32600	50yr B&B	1399.20	1316.34	1332.65		1332.66	0.000002	0.34	4120.25	337.63	0.02
A	B	32500	50yr B&B	1399.20	1314.36	1332.65		1332.65	0.000001	0.26	5404.09	397.78	0.01
A	C	32470.54	50yr B&B	1805.50	1313.97	1332.65		1332.65	0.000001	0.27	6616.16	471.14	0.01
A	C	32400	50yr B&B	1805.50	1313.99	1332.65		1332.65	0.000001	0.28	6436.66	438.95	0.01
A	C	32300	50yr B&B	1805.50	1313.88	1332.65		1332.65	0.000001	0.22	8290.29	573.25	0.01
A	C	32200	50yr B&B	1805.50	1313.78	1332.65		1332.65	0.000001	0.23	7895.06	591.77	0.01
A	C	32100	50yr B&B	1805.50	1313.64	1332.65		1332.65	0.000001	0.32	5624.63	404.93	0.01
A	C	32000	50yr B&B	1805.50	1312.03	1332.65		1332.65	0.000002	0.45	4048.92	282.49	0.02
A	C	31900	50yr B&B	1805.50	1329.50	1331.77	1331.77	1332.55	0.010272	7.37	284.89	204.03	0.97
A	C	31800	50yr B&B	1805.50	1300.05	1305.63	1302.97	1305.80	0.000626	3.30	568.99	154.71	0.28
A	C	31700	50yr B&B	1805.50	1299.13	1305.32		1305.67	0.001696	5.04	458.16	189.69	0.45
A	C	31600	50yr B&B	1805.50	1297.18	1303.46	1303.46	1305.24	0.009443	10.70	168.80	49.31	1.01
A	C	31500	50yr B&B	1805.50	1291.96	1302.14		1302.18	0.000071	1.73	1537.80	394.05	0.10
A	C	31400	50yr B&B	1805.50	1290.00	1302.16		1302.17	0.000015	0.80	2679.11	420.39	0.05
A	C	31300	50yr B&B	1805.50	1289.99	1302.16		1302.16	0.000005	0.49	3950.09	488.10	0.03
A	C	31200	50yr B&B	1805.50	1289.96	1302.16		1302.16	0.000004	0.49	4274.07	535.33	0.03
A	C	31100	50yr B&B	1805.50	1289.61	1302.15		1302.16	0.000012	0.76	2882.12	578.71	0.04
A	C	31000	50yr B&B	1805.50	1285.98	1302.15	1288.71	1302.16	0.000010	0.82	2472.37	280.40	0.04
A	D	30900	50yr B&B	2352.80	1285.96	1302.14		1302.16	0.000016	1.13	2538.97	291.62	0.05
A	D	30800	50yr B&B	2352.80	1285.91	1302.15		1302.16	0.000005	0.65	3798.17	324.45	0.03
A	D	30700	50yr B&B	2352.80	1285.78	1302.15		1302.16	0.000008	0.73	3384.19	361.33	0.04
A	D	30600	50yr B&B	2352.80	1293.57	1302.11		1302.15	0.000082	1.79	2065.27	410.06	0.11
A	D	30500	50yr B&B	2377.70	1291.68	1302.12		1302.14	0.000049	1.59	2570.45	398.53	0.09
A	D	30400	50yr B&B	2377.70	1267.96	1302.12		1302.13	0.000017	1.04	5106.27	428.45	0.03
A	D	30300	50yr B&B	2377.70	1261.21	1302.12		1302.13	0.000012	0.88	5772.96	509.12	0.03
A	D	30200	50yr B&B	2377.70	1260.00	1302.12		1302.13	0.000010	0.80	5106.87	336.24	0.02
A	D	30100	50yr B&B	2377.70	1260.00	1302.12		1302.13	0.000005	0.58	5575.93	226.60	0.02
A	D	30000	50yr B&B	2377.70	1265.00	1302.12	1269.83	1302.13	0.000006	0.64	3708.98	249.68	0.02
A	D	29990		Culvert									
A	D	29750	50yr B&B	2377.70	1256.00	1264.87	1264.87	1267.70	0.038852	13.49	176.30	31.61	1.01
A	D	29650	50yr B&B	2377.70	1255.53	1258.76	1259.70	1261.99	0.090238	14.42	164.90	59.61	1.53

HEC-RAS Plan: Plan 01 Profile: 50yr B&B

River	Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
				(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
A	D	30000	50yr B&B	1302.13	1302.12	0.01				2377.70		249.68
A	D	29990		Culvert								
A	D	29750	50yr B&B	1267.70	1264.87	2.82	3.76	0.32		2377.70		31.61
A	D	29650	50yr B&B	1261.99	1258.76	3.23	5.67	0.04		2377.70		59.61

HEC-RAS Plan: Plan 01 Profile: 50yr B&B

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
G	A	3300	50yr B&B	51.00	1601.62	1602.87	1603.42	1604.74	0.200076	10.97	4.65	6.75	2.33
G	A	3200	50yr B&B	51.00	1579.57	1580.52	1581.01	1582.27	0.225952	10.64	4.79	8.31	2.47
G	A	3100	50yr B&B	51.00	1539.23	1540.12	1540.78	1543.02	0.397735	13.65	3.74	6.74	3.23
G	A	3000	50yr B&B	51.00	1501.68	1502.37	1502.89	1504.60	0.381569	11.97	4.26	9.33	3.12
G	A	2900	50yr B&B	51.00	1464.83	1465.24	1465.53	1466.38	0.375559	8.55	5.97	21.70	2.87
G	A	2800	50yr B&B	51.00	1444.00	1444.36	1444.61	1445.23	0.212585	7.49	6.81	19.54	2.24
G	A	2700	50yr B&B	51.00	1433.08	1433.57	1433.70	1433.99	0.109274	5.16	9.88	30.32	1.59
G	A	2600	50yr B&B	51.00	1429.21	1429.78	1429.84	1430.01	0.042658	3.87	13.18	56.56	1.41
G	A	2500	50yr B&B	51.00	1420.18	1420.64	1420.82	1421.23	0.075512	6.17	8.29	28.00	1.97
G	A	2400	50yr B&B	51.00	1411.46	1411.81	1411.95	1412.28	0.089576	5.52	9.24	40.62	2.04
G	A	2300	50yr B&B	51.00	1404.07	1404.42	1404.54	1404.82	0.071698	5.06	10.08	42.76	1.84
G	A	2200	50yr B&B	51.00	1397.36	1397.80	1397.94	1398.25	0.065323	5.37	9.49	34.32	1.80
G	A	2100	50yr B&B	51.00	1390.72	1391.35	1391.51	1391.86	0.062610	5.75	8.88	28.65	1.80
G	A	2000	50yr B&B	128.40	1383.72	1385.24	1385.24	1385.59	0.015082	4.80	26.77	37.95	1.01
G	A	1900	50yr B&B	128.40	1374.00	1375.12	1375.68	1377.04	0.075558	11.11	11.55	15.42	2.26
G	A	1800	50yr B&B	128.40	1365.99	1366.78	1367.35	1368.42	0.085565	10.26	12.51	20.87	2.34
G	A	1700	50yr B&B	128.40	1359.93	1360.67	1360.97	1361.64	0.066517	7.91	16.23	33.27	2.00
G	A	1600	50yr B&B	128.40	1352.07	1352.76	1353.03	1353.67	0.083598	7.66	16.77	42.88	2.16
G	A	1500	50yr B&B	128.40	1345.90	1346.58	1346.88	1347.53	0.063147	7.79	16.49	33.05	1.94
G	A	1400	50yr B&B	128.40	1340.00	1340.97	1341.29	1341.99	0.054385	8.08	15.88	27.03	1.86
G	A	1300	50yr B&B	128.40	1333.71	1334.31	1334.46	1334.81	0.066758	5.65	22.72	77.37	1.84
G	A	1200	50yr B&B	128.40	1327.03	1327.90	1328.14	1328.67	0.056760	7.07	18.16	39.08	1.83
G	A	1100	50yr B&B	128.40	1321.22	1321.84	1322.06	1322.54	0.060865	6.72	19.30	50.24	1.85
F	A	3000	50yr B&B	76.40	1588.93	1589.93	1590.46	1591.83	0.220166	11.04	6.92	11.29	2.48
F	A	2900	50yr B&B	76.40	1559.79	1560.89	1561.64	1563.76	0.286239	14.14	5.65	7.46	2.89
F	A	2800	50yr B&B	76.40	1530.64	1531.80	1532.43	1534.38	0.296677	12.90	5.92	9.37	2.86
F	A	2700	50yr B&B	76.40	1489.87	1490.74	1491.49	1494.07	0.411115	14.65	5.21	8.81	3.35
F	A	2600	50yr B&B	76.40	1460.08	1461.01	1461.60	1463.37	0.300116	12.34	6.19	10.80	2.87
F	A	2500	50yr B&B	76.40	1433.92	1434.95	1435.60	1437.43	0.256359	12.63	6.05	8.88	2.70
F	A	2400	50yr B&B	76.40	1419.04	1420.07	1420.48	1421.42	0.152349	9.30	8.22	13.20	2.08
F	A	2300	50yr B&B	76.40	1406.53	1407.20	1407.40	1407.84	0.132453	6.41	11.91	30.48	1.81
F	A	2200	50yr B&B	76.40	1395.41	1396.30	1396.58	1397.20	0.100103	7.60	10.05	16.04	1.69
F	A	2100	50yr B&B	76.40	1384.00	1384.42	1384.60	1385.01	0.119741	6.16	12.40	31.17	1.72
F	A	2000	50yr B&B	76.40	1379.68	1380.45	1380.48	1380.74	0.044273	4.28	17.85	36.89	1.08
F	A	1900	50yr B&B	76.40	1374.99	1375.64	1375.71	1375.99	0.047214	4.90	16.78	36.18	1.15
F	A	1800	50yr B&B	76.40	1370.26	1370.86	1370.97	1371.24	0.045076	4.95	15.44	47.81	1.53
F	A	1700	50yr B&B	318.50	1365.76	1366.91	1366.91	1367.36	0.013509	5.39	59.61	68.23	1.00
F	A	1600	50yr B&B	318.50	1360.10	1360.98	1361.27	1361.91	0.066447	8.45	44.95	87.14	2.03
F	A	1500	50yr B&B	318.50	1352.07	1352.91	1353.19	1353.87	0.075846	7.87	41.09	99.03	2.09
F	A	1400	50yr B&B	318.50	1343.57	1344.53	1344.89	1345.77	0.080188	9.23	38.36	80.69	2.22
F	A	1300	50yr B&B	318.50	1334.03	1334.79	1335.27	1336.53	0.092616	10.67	31.33	61.85	2.44
F	A	1200	50yr B&B	318.50	1325.99	1326.98	1327.43	1328.54	0.079410	10.03	31.91	57.21	2.26
F	A	1100	50yr B&B	318.50	1320.91	1321.83	1322.20	1322.98	0.052951	8.62	38.43	70.05	1.87
E	A	25200	50yr B&B	139.10	1993.57	1995.22	1995.64	1996.55	0.100166	9.26	15.03	17.62	1.77
E	A	25100	50yr B&B	139.10	1957.82	1959.01	1959.66	1961.81	0.356617	13.43	10.37	18.48	3.14
E	A	25000	50yr B&B	139.10	1939.89	1940.86	1941.49	1943.06	0.184672	11.91	11.68	14.82	2.36
E	A	24900	50yr B&B	139.10	1929.05	1929.91	1930.13	1930.66	0.123731	6.94	20.03	43.29	1.80
E	A	24800	50yr B&B	139.10	1919.56	1920.60	1920.90	1921.58	0.088252	7.93	17.54	23.95	1.63
E	A	24700	50yr B&B	139.10	1910.35	1912.04	1912.45	1913.31	0.084527	9.03	15.40	16.50	1.65
E	A	24600	50yr B&B	139.10	1909.01	1910.07	1910.10	1910.37	0.045337	4.33	32.13	66.43	1.10
E	A	24500	50yr B&B	139.10	1879.95	1882.03	1882.97	1885.28	0.176668	14.48	9.70	8.66	2.34
E	A	24400	50yr B&B	139.10	1821.15	1822.75	1824.11	1830.31	0.590184	22.06	6.31	7.01	4.10
E	A	24300	50yr B&B	139.10	1766.63	1767.57	1768.56	1772.89	0.564964	18.50	7.52	11.38	4.01
E	A	24200	50yr B&B	139.10	1711.92	1713.23	1714.39	1719.24	0.525345	19.67	7.07	9.16	3.91
E	A	24100	50yr B&B	139.10	1669.16	1670.12	1671.02	1674.34	0.482130	17.52	8.55	13.21	3.72
E	A	24000	50yr B&B	139.10	1621.86	1623.22	1624.38	1629.01	0.465136	19.31	7.20	8.53	3.70
E	A	23900	50yr B&B	139.10	1606.40	1607.53	1607.92	1608.81	0.163407	9.07	15.34	27.31	2.13
E	A	23800	50yr B&B	334.50	1587.44	1588.69	1589.02	1589.77	0.070368	8.41	41.26	50.56	1.53
E	A	23700	50yr B&B	334.50	1574.77	1576.42	1576.79	1577.63	0.121413	8.85	37.80	55.86	1.90
E	A	23600	50yr B&B	334.50	1558.96	1560.45	1561.11	1562.72	0.148697	12.09	27.68	29.68	2.21
E	A	23500	50yr B&B	334.50	1546.54	1548.67	1549.42	1551.07	0.111585	12.41	26.95	22.08	1.98
E	A	23400	50yr B&B	334.50	1537.08	1538.70	1539.24	1540.44	0.104507	10.59	31.59	31.72	1.87
E	A	23300	50yr B&B	334.50	1532.23	1535.11	1535.33	1536.23	0.038853	8.50	39.36	25.69	1.21
E	A	23200	50yr B&B	334.50	1517.60	1519.83	1520.75	1522.90	0.145920	14.07	23.77	19.59	2.25
E	A	23100	50yr B&B	334.50	1503.82	1506.23	1507.25	1509.59	0.128484	14.73	22.72	15.39	2.14
E	A	23000	50yr B&B	334.50	1488.29	1490.57	1491.63	1494.23	0.157788	15.33	21.81	16.56	2.35
E	A	22900	50yr B&B	334.50	1474.71	1477.13	1478.15	1480.52	0.133863	14.77	22.65	15.95	2.18
E	A	22800	50yr B&B	456.50	1462.30	1465.34	1466.05	1467.68	0.068116	12.30	37.13	20.75	1.62
E	A	22700	50yr B&B	456.50	1434.21	1436.65	1438.33	1444.05	0.246038	22.07	21.81	17.45	3.04
E	A	22600	50yr B&B	456.50	1408.39	1411.02	1412.63	1417.77	0.256956	20.86	21.89	14.72	3.01
E	A	22500	50yr B&B	456.50	1398.00	1399.10	1399.69	1401.05	0.117895	11.19	40.78	41.29	1.98
E	A	22400	50yr B&B	456.50	1394.00	1395.40	1395.56	1396.19	0.043132	7.16	63.72	59.53	1.22
E	A	22300	50yr B&B	493.70	1391.28	1393.37	1393.37	1394.01	0.027536	6.42	76.94	60.51	1.00
E	A	22200	50yr B&B	493.70	1386.00	1388.19	1388.53	1389.50	0.046860	9.19	53.74	36.49	1.33
E	A	22100	50yr B&B	493.70	1380.27	1381.86	1382.24	1383.17	0.068933	9.19	53.71	49.01	1.55
E	A	22000	50yr B&B	493.70	1373.97	1375.82	1376.18	1377.07	0.060824	8.97	55.03	47.39	1.47
E	A	21900	50yr B&B	493.70	1369.20	1370.88	1371.08	1371.72	0.051145	7.37	67.01	68.92	1.31
E	A	21800	50yr B&B	493.70	1363.96	1365.97	1366.17	1366.87	0.048544	7.62	64.78	60.28	1.30
E	A	21700	50yr B&B	493.70	1355.08	1356.15	1356.51	1357.33	0.097895	8.76	58.66	106.58	1.75
E	A	21600	50yr B&B	493.70	1344.84	1346.08	1346.47	1347.56	0.083422	9.79	51.58	101.81	2.29
E	A	21500	50yr B&B	493.70	1334.53	1335.47	1335.97	1337.32	0.098777	10.96	46.68	92.38	2.51

HEC-RAS Plan: Plan 01 Profile: 50yr B&B (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
E	A	21400	50yr B&B	493.70	1326.22	1327.09	1327.56	1328.68	0.085414	10.13	48.83	85.60	2.33
E	A	21300	50yr B&B	493.70	1320.00	1320.93	1321.30	1322.19	0.061242	9.04	54.61	86.15	2.00
E	B	21223.21	50yr B&B	805.90	1317.95	1319.01	1319.79	1322.02	0.106582	13.92	57.90	72.42	2.74
E	B	21100	50yr B&B	805.90	1314.12	1316.15	1316.55	1317.49	0.025439	9.27	86.91	68.18	1.45
E	B	21000	50yr B&B	805.90	1311.96	1313.89	1314.27	1315.21	0.021364	9.21	87.50	60.74	1.35
E	B	20900	50yr B&B	805.90	1309.15	1310.75	1311.16	1312.02	0.036953	9.04	90.10	103.99	1.66
E	B	20800	50yr B&B	805.90	1303.98	1305.69	1306.23	1307.33	0.040672	10.31	80.87	91.35	1.77
E	B	20700	50yr B&B	805.90	1299.23	1301.83	1300.89	1301.99	0.001628	3.22	260.75	144.86	0.40
E	B	20600	50yr B&B	805.90	1295.93	1301.88		1301.91	0.000083	1.43	684.20	159.19	0.11
E	B	20500	50yr B&B	805.90	1293.93	1301.89		1301.90	0.000013	0.67	1698.87	328.94	0.04
E	B	20400	50yr B&B	805.90	1290.00	1301.89		1301.90	0.000001	0.22	3891.94	611.32	0.01
E	B	20300	50yr B&B	805.90	1289.98	1301.89		1301.90	0.000002	0.28	3426.56	496.94	0.02
E	B	20200	50yr B&B	805.90	1289.94	1301.89		1301.89	0.000005	0.49	2002.58	344.88	0.03
E	B	20100	50yr B&B	805.90	1289.56	1301.89	1292.39	1301.89	0.000005	0.51	1896.99	294.44	0.03
D	A	3300	50yr B&B	102.70	1588.89	1590.11	1590.72	1592.42	0.250250	12.20	8.42	13.03	2.67
D	A	3200	50yr B&B	102.70	1549.95	1551.15	1552.07	1555.22	0.374790	16.17	6.35	8.44	3.29
D	A	3100	50yr B&B	102.70	1519.72	1520.46	1521.05	1522.86	0.312526	12.43	8.26	14.69	2.92
D	A	3000	50yr B&B	102.70	1508.16	1509.59	1509.98	1510.84	0.113092	8.97	11.45	15.36	1.83
D	A	2900	50yr B&B	102.70	1488.89	1489.85	1490.21	1491.16	0.202504	9.18	11.18	22.93	2.32
D	A	2800	50yr B&B	102.70	1479.22	1480.18	1480.43	1481.02	0.107456	7.35	13.97	24.84	1.73
D	A	2700	50yr B&B	102.70	1461.86	1463.65	1464.30	1465.81	0.143646	11.79	8.71	8.64	2.07
D	A	2600	50yr B&B	102.70	1429.48	1430.70	1431.51	1434.09	0.330293	14.78	6.95	9.71	3.08
D	A	2500	50yr B&B	198.40	1404.19	1405.99	1406.67	1408.35	0.141374	12.33	16.09	15.82	2.15
D	A	2400	50yr B&B	198.40	1378.99	1380.13	1380.82	1382.90	0.262206	13.36	14.85	20.98	2.80
D	A	2300	50yr B&B	198.40	1370.00	1372.30	1372.86	1374.12	0.074513	10.82	18.33	12.90	1.60
D	A	2200	50yr B&B	198.40	1369.27	1370.49	1370.49	1370.89	0.031626	5.09	39.17	51.11	1.00
D	A	2100	50yr B&B	198.40	1363.91	1364.86	1364.96	1365.31	0.055155	5.43	36.50	62.18	1.25
D	A	2000	50yr B&B	198.40	1359.04	1360.09	1360.13	1360.40	0.052138	4.47	44.72	105.43	1.17
D	A	1900	50yr B&B	198.40	1352.96	1355.56		1355.56	0.000137	0.61	330.37	184.37	0.08
D	A	1800	50yr B&B	347.50	1350.00	1355.56		1355.56	0.000008	0.24	1424.72	338.13	0.02
D	A	1700	50yr B&B	347.50	1354.01	1355.11	1355.11	1355.44	0.033275	4.60	77.73	125.77	0.99
D	A	1600	50yr B&B	347.50	1346.58	1347.48	1347.63	1348.05	0.072732	6.11	56.88	100.09	1.43
D	A	1500	50yr B&B	347.50	1343.21	1344.20	1344.40	1344.90	0.027102	6.89	55.41	86.12	1.38
D	A	1400	50yr B&B	347.50	1334.33	1335.34	1335.66	1336.48	0.088981	8.61	41.42	96.50	2.27
D	A	1300	50yr B&B	347.50	1320.46	1332.65		1332.65	0.000001	0.18	1943.87	249.90	0.01
D	A	1200	50yr B&B	347.50	1314.00	1332.65		1332.65	0.000000	0.05	6475.11	691.37	0.00
D	A	1100	50yr B&B	347.50	1315.99	1332.65		1332.65	0.000000	0.07	5336.99	432.38	0.00
B	A	2900	50yr B&B	509.70	1453.87	1456.95	1458.54	1462.40	0.150295	18.73	27.21	13.50	2.33
B	A	2800	50yr B&B	509.70	1439.99	1442.69	1444.17	1447.94	0.142532	18.47	28.33	17.39	2.37
B	A	2700	50yr B&B	509.70	1417.94	1421.06	1422.92	1428.04	0.205988	21.20	24.04	12.47	2.69
B	A	2600	50yr B&B	509.70	1404.00	1405.07	1405.83	1407.74	0.158000	13.10	38.91	38.27	2.29
B	A	2500	50yr B&B	509.70	1403.62	1405.20	1405.20	1405.66	0.031091	5.39	94.52	105.85	1.01
B	A	2400	50yr B&B	509.70	1398.97	1400.63	1400.74	1401.23	0.042120	6.21	82.06	93.41	1.17
B	A	2300	50yr B&B	509.70	1395.82	1397.57	1397.49	1398.16	0.022668	6.14	83.00	60.19	0.92
B	A	2200	50yr B&B	602.10	1393.88	1395.45		1395.85	0.018776	5.04	119.37	101.28	0.82
B	A	2100	50yr B&B	602.10	1391.72	1393.24	1393.24	1393.87	0.027703	6.34	94.99	76.49	1.00
B	A	2000	50yr B&B	602.10	1387.78	1389.62	1389.70	1390.38	0.032620	7.00	86.03	67.50	1.09
B	A	1900	50yr B&B	602.10	1383.73	1385.27	1385.43	1386.08	0.042249	7.25	83.00	75.00	1.22
B	A	1800	50yr B&B	602.10	1379.13	1380.53	1380.85	1381.63	0.078978	9.94	79.34	110.37	1.66
B	A	1700	50yr B&B	602.10	1373.89	1375.77	1376.22	1377.26	0.056769	9.79	61.50	44.00	1.46
B	A	1600	50yr B&B	602.10	1365.86	1367.12	1367.50	1368.39	0.096667	9.07	66.42	79.96	1.75
B	A	1500	50yr B&B	602.10	1360.01	1361.10	1361.52	1362.49	0.052441	9.51	65.11	92.42	1.91
B	A	1400	50yr B&B	602.10	1354.67	1356.00	1356.40	1357.35	0.050541	9.32	64.66	86.11	1.88
B	A	1300	50yr B&B	602.10	1350.83	1352.07	1352.40	1353.17	0.039158	8.42	73.27	113.50	1.66
B	A	1200	50yr B&B	602.10	1346.74	1347.94	1348.27	1349.04	0.040747	8.44	72.08	99.28	1.69
B	A	1100	50yr B&B	602.10	1341.64	1343.01	1343.52	1344.66	0.042249	10.30	58.46	57.30	1.80
A	A	36300	50yr B&B	717.10	1699.97	1702.50	1703.86	1707.02	0.120141	17.11	42.75	26.56	2.20
A	A	36200	50yr B&B	717.10	1695.99	1700.43	1700.56	1701.57	0.029429	8.54	83.92	43.96	1.09
A	A	36100	50yr B&B	717.10	1693.83	1697.60	1697.69	1698.56	0.028362	7.87	91.16	53.36	1.06
A	A	36000	50yr B&B	717.10	1689.97	1693.49	1693.84	1694.83	0.040547	9.39	79.27	53.75	1.27
A	A	35900	50yr B&B	717.10	1685.94	1689.56	1689.91	1691.20	0.035534	10.30	69.62	31.52	1.22
A	A	35800	50yr B&B	717.10	1681.99	1686.53	1686.81	1688.01	0.033970	9.76	73.52	35.57	1.18
A	A	35700	50yr B&B	717.10	1679.92	1683.83	1683.88	1684.97	0.024500	8.58	84.12	41.98	1.02
A	A	35600	50yr B&B	717.10	1675.98	1679.57	1679.87	1680.71	0.037254	8.53	84.03	53.34	1.20
A	A	35500	50yr B&B	740.60	1673.81	1676.91	1676.91	1677.76	0.024850	7.40	101.05	63.82	1.00
A	A	35400	50yr B&B	740.60	1669.74	1673.17	1673.34	1674.37	0.030403	8.80	84.27	45.73	1.12
A	A	35300	50yr B&B	740.60	1665.93	1669.06	1669.37	1670.36	0.037606	9.12	81.21	47.02	1.22
A	A	35200	50yr B&B	740.60	1663.23	1667.11	1667.21	1667.96	0.028723	7.53	102.84	72.75	1.05
A	A	35100	50yr B&B	740.60	1658.00	1661.44	1661.90	1662.96	0.053205	9.90	74.79	49.90	1.43
A	A	35000	50yr B&B	740.60	1651.06	1653.16	1653.73	1655.02	0.080893	10.93	67.74	53.75	1.72
A	A	34900	50yr B&B	740.60	1643.89	1645.94	1646.37	1647.38	0.072225	9.63	76.88	67.82	1.59
A	A	34800	50yr B&B	867.50	1637.17	1639.65	1639.68	1640.45	0.027929	7.17	121.09	82.23	1.04
A	A	34700	50yr B&B	867.50	1620.56	1624.52	1625.80	1628.71	0.074219	16.45	53.10	21.20	1.78
A	A	34600	50yr B&B	867.50	1573.14	1575.15	1577.25	1587.39	0.496911	28.21	31.39	25.40	4.27
A	A	34500	50yr B&B	867.50	1480.66	1482.38	1485.23	1503.87	0.874846	37.24	23.47	18.31	5.63
A	A	34400	50yr B&B	867.50	1438.22	1439.97	1441.76	1449.30	0.446198	24.50	35.40	29.93	3.97
A	A	34300	50yr B&B	867.50	1404.53	1406.18	1407.65	1413.07	0.345865	21.07	41.30	37.99	3.48
A	A	34200	50yr B&B	867.50	1387.89	1390.69	1392.21	1396.03	0.145961	18.55	46.78	24.56	2.37
A	A	34100	50yr B&B	867.50	1382.72	1384.97	1385.59	1387.05	0.065695	11.58	74.89	46.31	1.61
A	A	34000	50yr B&B	867.50	1372.63	1374.47	1375.02	1376.30	0.105773	10.85	79.98	78.51	1.89
A	A	33900	50yr B&B	867.50	1363.86	1367.29	1368.04	1369.52	0.047415	11.98	72.42	32.71	1.42

HEC-RAS Plan: Plan 01 Profile: 50yr B&B (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
A	A	33800	50yr B&B	867.50	1357.91	1363.59		1363.67	0.000615	2.31	375.68	78.07	0.18
A	A	33700	50yr B&B	867.50	1359.50	1362.24	1362.24	1363.29	0.023054	8.24	106.14	53.27	0.99
A	A	33600	50yr B&B	867.50	1354.01	1355.34	1355.60	1356.28	0.063966	7.79	112.04	130.00	1.45
A	A	33500	50yr B&B	1357.90	1347.73	1350.10	1350.10	1350.80	0.026413	6.68	203.41	149.82	1.00
A	A	33400	50yr B&B	1357.90	1342.30	1344.91	1345.22	1346.33	0.040349	9.54	142.32	82.60	1.28
A	A	33300	50yr B&B	1357.90	1337.91	1340.16	1340.81	1342.35	0.034805	11.88	114.65	82.14	1.73
A	A	33272.54	50yr B&B	1357.90	1336.57	1339.02	1339.83	1341.48	0.029108	12.96	120.62	88.07	1.65
A	B	33272.54	50yr B&B	1399.20	1336.57	1339.11	1339.87	1341.45	0.026112	12.66	128.68	90.92	1.58
A	B	33200	50yr B&B	1399.20	1324.96	1332.64		1332.69	0.000181	1.88	784.79	204.01	0.15
A	B	33100	50yr B&B	1399.20	1323.57	1332.66		1332.67	0.000045	1.11	1280.83	229.10	0.08
A	B	33000	50yr B&B	1399.20	1323.74	1332.64		1332.67	0.000062	1.30	1077.23	182.35	0.09
A	B	32900	50yr B&B	1399.20	1323.87	1332.65		1332.66	0.000028	0.91	1539.70	240.54	0.06
A	B	32800	50yr B&B	1399.20	1322.47	1332.65		1332.66	0.000010	0.62	2256.78	299.27	0.04
A	B	32700	50yr B&B	1399.20	1320.59	1332.65		1332.65	0.000003	0.38	3681.15	404.37	0.02
A	B	32600	50yr B&B	1399.20	1316.34	1332.65		1332.65	0.000002	0.34	4119.63	337.61	0.02
A	B	32500	50yr B&B	1399.20	1314.36	1332.65		1332.65	0.000001	0.26	5403.36	397.77	0.01
A	C	32470.54	50yr B&B	1803.60	1313.97	1332.65		1332.65	0.000001	0.27	6615.29	471.13	0.01
A	C	32400	50yr B&B	1803.60	1313.99	1332.65		1332.65	0.000001	0.28	6435.86	438.93	0.01
A	C	32300	50yr B&B	1803.60	1313.88	1332.65		1332.65	0.000001	0.22	8289.24	573.24	0.01
A	C	32200	50yr B&B	1803.60	1313.78	1332.65		1332.65	0.000001	0.23	7893.97	591.72	0.01
A	C	32100	50yr B&B	1803.60	1313.64	1332.65		1332.65	0.000001	0.32	5623.88	404.91	0.01
A	C	32000	50yr B&B	1803.60	1312.03	1332.65		1332.65	0.000002	0.45	4048.44	282.46	0.02
A	C	31900	50yr B&B	1803.60	1329.50	1331.77	1331.77	1332.55	0.010258	7.36	284.82	204.00	0.97
A	C	31800	50yr B&B	1803.60	1300.05	1305.63	1302.96	1305.80	0.000626	3.30	568.48	154.65	0.28
A	C	31700	50yr B&B	1803.60	1299.13	1305.32		1305.67	0.001699	5.04	457.45	189.64	0.45
A	C	31600	50yr B&B	1803.60	1297.18	1303.46	1303.46	1305.23	0.009444	10.70	168.67	49.28	1.01
A	C	31500	50yr B&B	1803.60	1291.96	1301.87		1301.91	0.000080	1.80	1434.42	366.53	0.11
A	C	31400	50yr B&B	1803.60	1290.00	1301.89		1301.90	0.000017	0.83	2567.50	414.49	0.05
A	C	31300	50yr B&B	1803.60	1289.99	1301.89		1301.90	0.000005	0.51	3820.25	484.32	0.03
A	C	31200	50yr B&B	1803.60	1289.96	1301.89		1301.90	0.000005	0.50	4131.36	532.74	0.03
A	C	31100	50yr B&B	1803.60	1289.61	1301.89		1301.90	0.000013	0.79	2730.15	557.97	0.05
A	C	31000	50yr B&B	1803.60	1285.98	1301.88	1288.70	1301.89	0.000011	0.84	2397.85	276.47	0.04
A	D	30900	50yr B&B	2340.60	1285.96	1301.87		1301.89	0.000017	1.15	2461.37	288.01	0.06
A	D	30800	50yr B&B	2340.60	1285.91	1301.88		1301.89	0.000005	0.66	3711.73	321.29	0.03
A	D	30700	50yr B&B	2340.60	1285.78	1301.88		1301.89	0.000009	0.75	3287.93	355.73	0.04
A	D	30600	50yr B&B	2340.60	1293.57	1301.84		1301.88	0.000094	1.87	1954.23	406.50	0.12
A	D	30500	50yr B&B	2367.20	1291.68	1301.85		1301.87	0.000049	1.55	2464.00	390.56	0.09
A	D	30400	50yr B&B	2367.20	1267.96	1301.85		1301.86	0.000018	1.05	4991.43	419.30	0.03
A	D	30300	50yr B&B	2367.20	1261.21	1301.85		1301.86	0.000012	0.89	5638.52	486.18	0.03
A	D	30200	50yr B&B	2367.20	1260.00	1301.85		1301.86	0.000010	0.81	5016.09	334.75	0.02
A	D	30100	50yr B&B	2367.20	1260.00	1301.85		1301.86	0.000005	0.58	5514.84	225.53	0.02
A	D	30000	50yr B&B	2367.20	1265.00	1301.85	1269.82	1301.86	0.000007	0.64	3678.71	248.64	0.02
A	D	29990		Culvert									
A	D	29750	50yr B&B	2367.20	1256.00	1264.87	1264.87	1267.67	0.038660	13.45	176.03	31.57	1.00
A	D	29650	50yr B&B	2367.20	1255.53	1258.75	1259.69	1261.98	0.090458	14.41	164.29	59.57	1.53

HEC-RAS Plan: Plan 01 Profile: 50yr B&B

River	Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
				(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
A	D	30000	50yr B&B	1301.86	1301.85	0.01				2367.20		248.64
A	D	29990		Culvert								
A	D	29750	50yr B&B	1267.67	1264.87	2.81	3.75	0.31		2367.20		31.57
A	D	29650	50yr B&B	1261.98	1258.75	3.22	5.65	0.04		2367.20		59.57

Appendix D LID calculations (including Detention)

LID spreadsheet with calculations and summary

LID devices by area, imperviousness, storage volumes									
Area (overall)				**1**	**2**	**3**	**4**	**5**	**Totals**
ΣA	acres			4.49	9.74	2.52	0.58	2.13	19.5
ΣA	square feet			195600	424300	109800	25300	92800	847800
Area for LID calc not including green roofs	acres			4.39	7.14	1.52	0.47	1.72	
Impervious[7]	%			0.81	0.37	0.29	0.76	0.65	
Soil Type				45	45	45	45	45	
Flowpath length (feet)	*feet*			1275	1855	995	280	595	
Flowpath slope	*%*			0.06	0.06	0.05	0.05	0.04	
Elevation upper	*feet*			1410	1400	1356	1335	1322	
Elevation Lower	*feet*			1328	1296	1305	1322	1300	
Qpm[1]	*CFS*			0.67	0.77	0.17	0.08	0.26	1.95
Qpm[1]	*gpm*			302	344	74.4	36.8	118	875
85th percentile storm volume[2]				1.15	1.15	1.15	1.15	1.15	
Developed Storage Volume [1]	*cubic feet*			**13646**	**11831**	**2073**	**1386**	**4418**	**33354**
Undeveloped Storage Volume [1]	*cubic feet*			2072	3109	646	214	784	6825
BMP devices (proposed site)								see note[4]	
Pervious Pavement A[3]	*square feet*		*0.95*	157745	84010	13930	13117	5390	274192
Volume of storage	*cubic feet*			**31549**	**16802**	**2786**	**2623.4**	**1078**	54838.4
Green Roof[5]	*square feet*			4355	113220	43500	4685	17954	183714
Bioretention[6]	*length*			1000	4000	870	0		5870
area at 4 foot width	*square feet*	*4*	*0.10*	4000	16000	3480	0	0	23480
Volume of Storage	*cubic feet*			**3200**	**12800**	**2784**	**0**	**0**	18784
Infiltration Retention Storage [9]									
Volume of Storage	*cubic feet*							**4500**	4500
Other areas (proposed site)									
Impervious Pavement	*square feet*		*0.95*	2150	14400	500	2910	42845	62805
Landscape areas	*square feet*		*0.10*	27350	196670	48390	4588	26611	303609
Potential Volume Mitigated	*cubic feet*			**34749**	**29602**	**5570**	**2623**	**4500**	**77044.4**
				see note[8]	see note[8]	see note[8]	see note[8]		
Volume Mitigated	*cubic feet*			**13646**	**11831**	**2073**	**1386**	**4418**	**33354**
percent mitigated				**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

[1] *from LID calculator*

[2] *interpolated from map at http://dpw.lacouty.gov/wrd/hydrologygis/*

[3] *Pervious Pavement A is designed with a reservoir layer of 6". Assumes a 30% void ratio. With a 0.4 in/hr perc rate and a 2 time safety factor, these areas will empty in 9 hours. (6in*0.30 *12"/ (0.4in/hr /2)*

[4] *BMP's highlighted by shading are not included as working toward mitigation, due to the BMP's location.*

[5] *Green Roofs are assumed to produce no runoff under an 85th percentile storm, so the area under green roofs has been removed from developed and undeveloped areas for determination of infiltration requirements.*

[6] *Bioretention Swales are designed with a 2 foot reservoir layer. Assumes a 30% void ratio. With a 0.4 in/hr perc rate and a 2 time safety factor, these areas will empty in 1.5 days. (2 feet*0.30*12"/(0.4in/2)/hr/24hr/day)*

[7] *Impervious rate for storage development is determined by considering paved (including pervious paved surfaces) to be at a rate of 95%, and landscape to be at a rate of 10% imperviousness The higher impervious number was used for pervious concrete so as to better estimate the storage requirements.*

[8] *Potential Volume Mitigation exceeds Volume developed..*

[9] *Infiltration rate for overall site is 0.4 in/hr. The 4500 cubic feet of retention storage will be accommodated in the lower 1.5 feet of the detention basin. This basin with a 0.4 in/hr perc rate and a 2 time safety factor, it will empty in less than 4 days. (1.5 feet*12"/(0.4in/hr/2)/24hr/day)*

Appendix E Debris Analysis and Basins

Debris Calculation Spreadsheet

Debris Production																Basin Volume															Storm Frequency and Rate							Outflow Device
Basin Number	Tributary (T) or Cummulative (C) area			Total Tributary Acres	Tributary Square Miles	Undeveloped Acres	Undeveloped Square Miles	Developed Acres	Debris Production Factor (Cubic Yards per square mile)	Debris Production Factor (Cubic Yards per Acre)	Debris Production Factor (Cubic Yards per square mile)	Undeveloped Debris Production Factor (Cubic Yards per Acre)	Debris Production Rate (cy)	DDE factor	**Design Debris Event (DDE) rate (cy)**	Basin drawing sheet no	Level Capacity	(1) Spillway elevation	(2) Natural Ground below spillway	(3) Spillway Height	(4) delta EL	(5) Upstream Cone EL	(6) Horizontal to upstream cone el	(7) Natural Slope	(8) Debris Cone Slope (MAX 5%)	Cone Volume (to a maximum of level capacity)	Total Basin Volume including Cone (MAX 5000)	Capacity meets DDE	Hydrologic area		2	5	10	25	50	50 burned	50 burned and bulked	Outflow Device Type
2*	C	6	6	83.1	0.130	83.1	0.130	0	67840	106	67840	106	8809	0.2	**1762**	18	10750	1357.5	1350	7.5	15	1365	430	3.5%	1.7%	10750	5000	YES	172BD	172	7.8	13.1	44.4	91.0	122.5	209.3	347.5	10' wier
3*	T	5	4	2.3	0.004	2.1	0.003	0.2	72320	113	72320	113	237	0.2	**47**	18	260	1402	1400	2	4	1404	90	4.4%	2.2%	75	335	YES	113C	113	0.2	0.4	2.0	4.6	6.5	8.9	14.8	8' wier
4*	C	6	6	114.0	0.178	112.2	0.175	1.8	58880	92	58880	92	10322	0.2	**2064**	18	190	1408	1404	4	8	1412	105	7.6%	3.8%	190	380	no	97B	97	11.3	18.9	69.2	137.1	186.1	306.5	508.9	8' wier
5*	C	6	6	24.8	0.039	24.1	0.038	0.7	72320	113	72320	113	2723	0.2	**545**	18	2860	1562	1554	8	16	1570	390	4.1%	2.1%	2293	5000	YES	69CD	69	2.5	4.2	15.0	30.7	42.9	69.5	115.3	Dirt wier
6*	C	6	6	10.1	0.016	10.0	0.016	0.1	72320	113	72320	113	1130	0.2	**226**	18	60	1402.4	1400	2.4	4.8	1404	40	10.0%	5.0%	22	82	no	101C	101	1.1	1.8	9.2	18.2	23.0	33.9	56.3	8' wier
7	T	5	4	2.8	0.004	1.4	0.002	1.4	72320	113	72320	113	158	0.2	**32**	19	56	1413	1412.3	0.7	1.4	1413.7	45	3.1%	1.6%	10	66	YES	309E	309	1.1	4.1	6.9	9.0	10.6	10.6	17.5	6.5' wier
8	T	5	4	0.8	0.001	0.8	0.001	0	72320	113	72320	113	90	0.2	**18**	19	25	1418	1417	1	2	1419	47	4.3%	2.1%	6	31	YES	300F	300	0.6	1.5	2.0	2.6	3.0	3.5	5.9	6.5' wier
9	T	5	4	3.5	0.005	3.5	0.005	0	72320	113	72320	113	396	0.2	**79**	19	36	1421	1419	2	4	1423	70	5.7%	2.9%	18	54	no	297E	297	0.4	5.2	7.6	11.2	13.2	15.4	25.6	6.5' wier
*10**																*19*	*290*	*1354.2*	*1350*	*4.2*	*8.4*	*1358.4*	*81*	*10.4%*	*5.2%*	*225*	*515*											25' wier
*11**																*19*	*940*	*1359.75*	*1356*	*3.75*	*7.5*	*1363.5*	*206*	*3.6%*	*1.8%*	*622*	*1562*											25' wier
sum 10,11	C	6	6	233.7	0.365	233.7	0.365	0	48000	75	48000	75	17528	0.2	**3506**		1230									847	2077	no	46A	46	45.0	139.0	214.0	316.3	399.0	531.3	882.0	
12	C	6	6	5.8	0.009	5.8	0.009	0	72320	113	72320	113	655	0.2	**131**	19	65	1448	1446	2	4	1450	67	6.0%	3.0%	29	94	no	292E	292	1.3	8.6	14.3	18.6	21.9	25.6	42.5	6' wier
13	C	6	6	7.9	0.012	7.9	0.012	0	72320	113	72320	113	893	0.2	**179**	20	30	1445.7	1444	1.7	3.4	1447.4	42	8.1%	4.0%	13	43	no	290D	290	1.9	11.4	15.9	21.6	25.7	30.7	51.0	5' wier
14	C	6	6	26.9	0.042	26.9	0.042	0	72320	113	72320	113	3040	0.2	**608**	20	165	1387.9	1384	3.9	7.8	1391.8	100	7.8%	3.9%	127	292	no	274C	274	2.7	4.6	17.7	38.5	53.2	81.4	135.1	5' wier
15																*20*	*475*	*1392.2*	*1388*	*4.2*	*8.4*	*1396.4*	*165*	*5.1%*	*2.5%*	*381*	*856*											20' wier
16																*20*	*485*	*1398*	*1394*	*4*	*8*	*1402*	*170*	*4.7%*	*2.4%*	*485*	*970*											None
17																*20*	*270*	*1401.8*	*1398*	*3.8*	*7.6*	*1405.6*	*150*	*5.1%*	*2.5%*	*252*	*522*											None
sum 15,16,17	C	6	6	97.3	0.152	97.3	0.152	0	62080	97	62080	97	9438	0.2	**1888**		1230									1118	2348	YES	263B	263	14.9	42.4	98.6	162.3	209.7	297.4	493.7	
18*	C	6	6	411.1	0.642	403.0	0.630	8.1	40960	64	41600	65	25800	0.2	**5160**	21	340	1324.8	1320.6	4.2	8.4	1329	135	6.2%	3.1%	340	680	no	127AB	127	60.8	167.1	274.1	419.4	560.9	867.2	1399.2	Dirt wier
19*	C	6	6	13.3	0.021	11.8	0.018	1.5	72320	113	72320	113	1333	0.2	**267**	21	125	1327	1326	1	2	1328	72	2.8%	1.4%	41	166	no	133B	133	1.4	2.4	11.5	22.1	29.2	38.3	55.2	Dirt wier
20*	T	5	4	7.0	0.011	7.0	0.011	0	72320	113	72320	113	791	0.2	**158**	21	100	1319	1318	1	2	1320	67	3.0%	1.5%	50	150	no	175A	175	0.7	1.3	6.1	14.0	17.1	24.1	40.0	Dirt wier
21*	T	5	4	9.4	0.015	9.4	0.015	0	72320	113	72320	113	1062	0.2	**212**	21	40	1320	1319	1	2	1321	35	5.7%	2.9%	19	59	no	180A	180	1.1	1.8	9.2	19.0	26.7	26.7	26.7	Dirt wier
Feature 2	C	6	6	546.6	0.854	540.7	0.845	5.9	39680	62	39680	62	33523	0.2	**6705**	21	50000	1300	1290	10	20	1310	2000	1.0%	0.5%	50000	5000	YES	184AC	184	67.9	177.5	305.6	508.7	684.6	1094.9	1737.3	Dirt wier
			4																																			
Site Basin	C	6	6	23.9	0.037	23.9	0.037	0	72320	113	72320	113	2701	0.2	**540**	20	282	1387.9	1384	3.9	7.8	1391.8	100	7.8%	3.9%	279	561	YES	365BC	365	2.6	4.4	20.8	40.6	53.5	77.7	129.0	5' wier

*Basins noted with an asterisk are tributary to Feature 2, the large lake at the center of the site.

SUBTOTAL DDE **24126**

SUBTOTAL UNCOLLECTED DDE **1709**

SUBTOTAL DDE COLLECTED **22417**

Debris Development Areas Uncollected

366	T	5	4	0.9	0.001	0.9	0.001	0	72320	113	72320	113	102	0.2	**20**													no	366B	366	0.1	0.2	1.3	2.1	2.5	2.5	4.2	
368	T	5	4	1.6	0.003	1.6	0.003	0	72320	113	72320	113	181	0.2	**36**													no	368B	368	0.2	0.3	1.5	3.2	4.5	4.5	7.5	
370	T	5	4	3.6	0.006	3.6	0.006	0	72320	113	72320	113	407	0.2	**81**													no	370B	370	0.4	0.6	3.1	6.4	8.8	8.8	14.6	
372	T	5	4	3.3	0.005	3.3	0.005	0	72320	113	72320	113	373	0.2	**75**													no	372B	372	0.4	0.7	4.0	7.7	9.3	9.3	15.5	
374	T	5	4	4.0	0.006	4.0	0.006	0	72320	113	72320	113	452	0.2	**90**													no	374B	374	0.4	0.7	3.5	7.1	9.8	9.8	16.3	
376	T	5	4	1.6	0.003	1.6	0.003	0	72320	113	72320	113	181	0.2	**36**													no	376B	376	0.3	0.5	2.8	3.8	4.6	4.6	4.6	
387B	T	5	4	2.5	0.004	2.5	0.004	0	72320	113	72320	113	283	0.2	**57**													no	387B	387	0.3	0.5	3.5	5.8	7.1	7.1	11.7	

UNCOLLECTED SITE DDE	**396**
TOTAL DDE (SUBTOTAL&SITE)	**24521**
UNCOLLECTED DDE (SUBTOTAL&SITE)	**2105**
PERCENTAGE DDE UNCOLLECTED	**9%**

Appendix F Infiltration Results

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA. 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite A, Buena Park, CA. 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA. 92223 (951) 845-7743 Fax (951) 845-8863
800 E. Florida Avenue, Hemet, CA. 92543 (951) 766-8777 Fax (951) 766-8778

July 5, 2013

Project No. 444-12027
13-07-059

Malibu Associates, LLC
2400 Wyandotte Street
Suite B-102
Mountain View, CA 94043-2373

Project: The Malibu Institute
Malibu Golf Club Renovations
901 Encinal Canyon Road
Malibu Area
Los Angeles County, California

Subject: Infiltration Testing

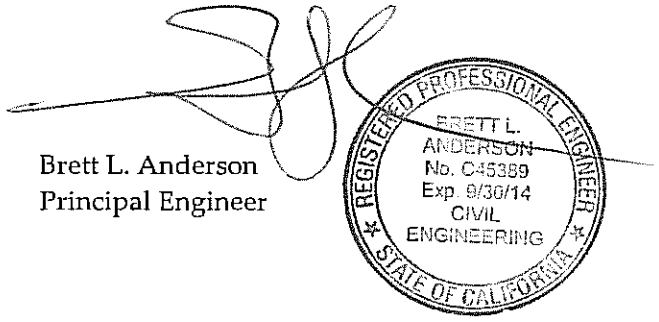
Ref: Geotechnical Investigation report prepared by Sladden Engineering dated July 16, 2012; Project No. 444-12027, Report No. 12-07-050.

As requested, we have performed infiltration testing on the subject site to evaluate the infiltration potential of the near surface soil to assist in storm water retention system design and to address Los Angeles County Hydrology Study review comments. The preliminary plans indicate that on-site storm water retention will be required for the subject project. It is our understanding that shallow retention basins are proposed for on-site storm water retention. The infiltration rates determined should be useful in the preliminary assessment of on-site storm water retention needs.

Infiltration testing was performed on June 19, 2013 utilizing double ring infiltrometers. Testing was performed in general accordance with the Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer (ASTM D-3385). Testing was performed in the approximate locations and bottom elevations of the proposed primary retention basins. The approximate locations of the tests are indicated on the attached Test Hole Location Plan. Testing indicated an infiltration rates of approximately 0.7 and 0.4 inches per hour (in/hour) for test holes 1 and 2, respectively. The rates determined represent ultimate rates and an appropriate safety factor should be incorporated into system design to account for long-term saturation and the potential "silting" of the sub-surface soil.

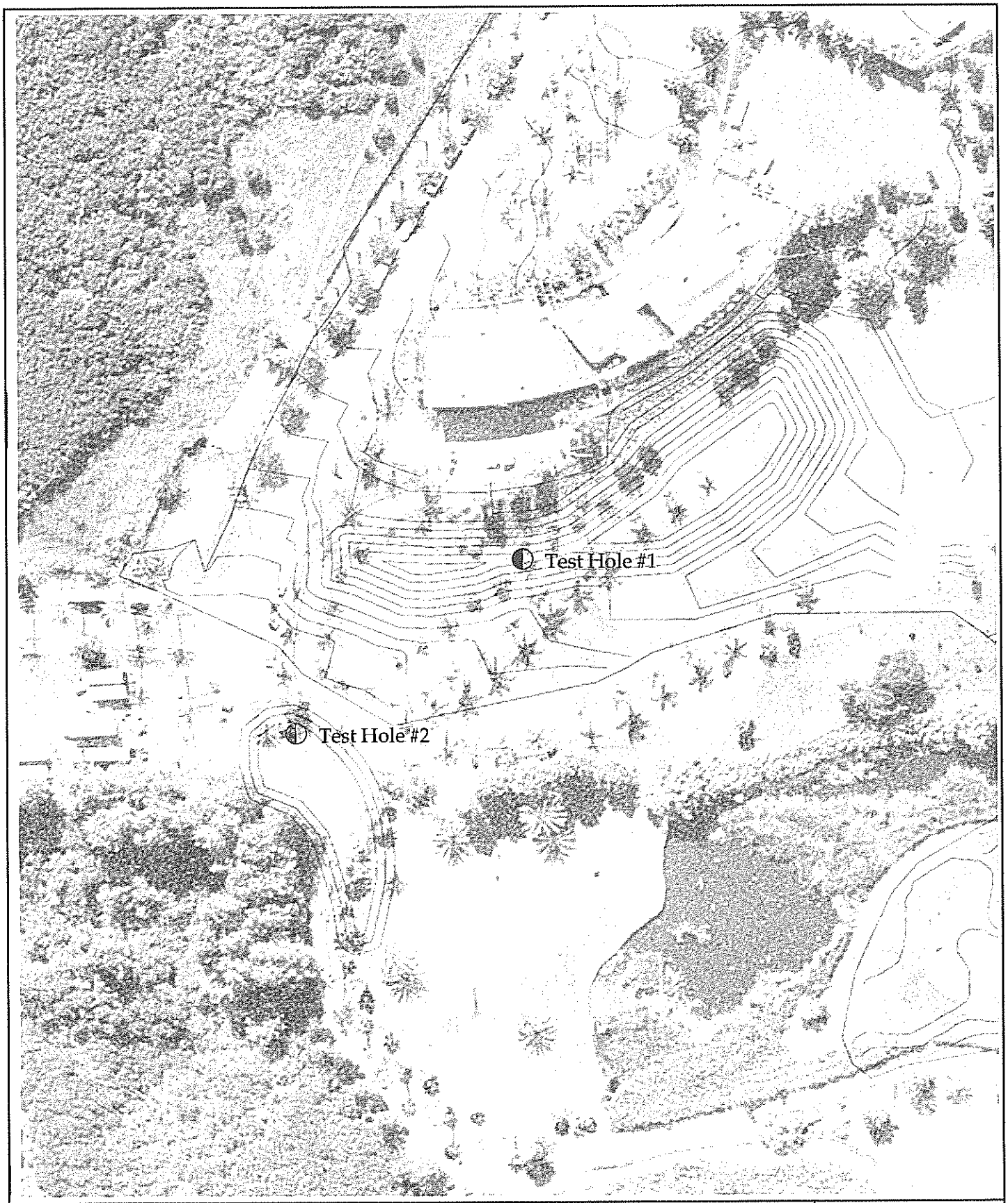
If you have any questions regarding this memo, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING



Brett L. Anderson
Principal Engineer

Copies: 2/ Addressee
2/RCE Consulting



Sladden Engineering

TEST HOLE LOCATION PLAN

FIGURE 1

Project Number:	444-12027
Report Number:	13-07-059
Date:	July 5, 2013

DOUBLE RING PERCOLATION RATE CALCULATIONS

Job No. 444-12027

Test Hole 1

INNER RING

Interval Number	Initial Water(cm)	Final Water(cm)	Con. Factor (cm to in)	Water (in)	Area Mar. (in2)	Volume (in3)	Area IR (in2)	Time (min)	Time (hr)	Vir (in/hr)
1	49.4	22.4	0.39	10.6	8.9	95.1	113.1	30	0.50	1.7
2	41.0	24.5	0.39	6.5	8.9	58.1	113.1	30	0.50	1.0
3	51.6	37.5	0.39	5.6	8.9	49.6	113.1	30	0.50	0.9
4	37.5	24.3	0.39	5.2	8.9	46.5	113.1	30	0.50	0.8
5	24.3	13.6	0.39	4.2	8.9	37.7	113.1	30	0.50	0.7
6	50.4	40.5	0.39	3.9	8.9	34.9	113.1	30	0.50	0.6
7	40.5	30.0	0.39	4.1	8.9	37.0	113.1	30	0.50	0.7
8	30.0	19.5	0.39	4.1	8.9	37.0	113.1	30	0.50	0.7
9	47.5	37.1	0.39	4.1	8.9	36.4	113.1	30	0.50	0.6
10	37.1	26.0	0.39	4.4	8.9	38.9	113.1	30	0.50	0.7
11	41.0	30.5	0.39	4.1	8.9	36.8	113.1	30	0.50	0.7
12	30.5	19.5	0.39	4.3	8.9	38.5	113.1	30	0.50	0.7
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

AVERAGE RATE* = 0.7 (in/hr)

DOUBLE RING PERCOLATION RATE CALCULATIONS

Job No. 444-12027

Test Hole 2

AVERAGE RATE* = 0.4 (in/hr)

INNER RING

Interval Number	Initial Water(cm)	Final Water(cm)	Con. Factor (cm to in)	Water (in)	Area Mar. (in2)	Volume (in3)	Area IR (in2)	Time (min)	Time (hr)	Vir (in/hr)
1	42.2	32.2	0.39	3.9	8.9	35.2	113.1	30	0.50	0.6
2	32.2	26.3	0.39	2.3	8.9	20.8	113.1	30	0.50	0.4
3	26.3	19.1	0.39	2.8	8.9	25.3	113.1	30	0.50	0.4
4	49.0	42.5	0.39	2.6	8.9	22.9	113.1	30	0.50	0.4
5	42.5	36.5	0.39	2.4	8.9	21.1	113.1	30	0.50	0.4
6	36.5	30.0	0.39	2.6	8.9	22.9	113.1	30	0.50	0.4
7	30.0	24.5	0.39	2.2	8.9	19.4	113.1	30	0.50	0.3
8	24.5	19.1	0.39	2.1	8.9	19.0	113.1	30	0.50	0.3
9	19.1	12.5	0.39	2.6	8.9	23.1	113.1	30	0.50	0.4
10	45.0	38.5	0.39	2.6	8.9	22.8	113.1	30	0.50	0.4
11	38.5	31.5	0.39	2.8	8.9	24.5	113.1	30	0.50	0.4
12	31.5	25.1	0.39	2.5	8.9	22.4	113.1	30	0.50	0.4
13										
14										
15										
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30										

Appendix G Detention Basin Analysis (Development Site Area)

- Site hydrographs
- Site Detention Calculations

Proposed Site Hydrographs

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1997-2004 Version 6.4

Study Date : 02/20/13 Input hydrograph file name : ms002p.HYD
Output hydrograph file name: msdet002.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.140	1.800	0.139	0.141
1.920	0.300	1.900	0.299	0.301
2.000	0.320	2.200	0.318	0.322

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 1 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.01 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.1	0.1	0.2	0.2	Depth (Ft.)
0	0.0	0.0	0.000	O	|	|	|	|	0.0
100	0.0	0.0	0.000	O	|	|	|	|	0.0
200	0.0	0.0	0.000	O	|	|	|	|	0.0
300	0.0	0.0	0.000	O	|	|	|	|	0.0
400	0.0	0.0	0.000	O	|	|	|	|	0.0
500	0.0	0.0	0.000	O	|	|	|	|	0.0
600	0.0	0.0	0.000	O	|	|	|	|	0.0
700	0.0	0.0	0.000	O	|	|	|	|	0.0
800	0.0	0.0	0.000	O	|	|	|	|	0.0
900	0.0	0.0	0.000	O	|	|	|	|	0.0
1000	0.0	0.0	0.000	O	|	|	|	|	0.0
1050	0.0	0.0	0.000	O	|	|	|	|	0.0
1100	0.0	0.0	0.000	O	|	|	|	|	0.0
1110	0.0	0.0	0.000	O	|	|	|	|	0.0
1120	0.0	0.0	0.000	O	|	|	|	|	0.0
1130	0.0	0.0	0.000	O	|	|	|	|	0.0
1131	0.0	0.0	0.000	O	|	|	|	|	0.0
1132	0.0	0.0	0.000	O	|	|	|	|	0.0
1133	0.0	0.0	0.000	O	|	|	|	|	0.0
1134	0.0	0.0	0.000	O	|	|	|	|	0.0
1135	0.0	0.0	0.000	O	|	|	|	|	0.0
1136	0.0	0.0	0.000	O	|	|	|	|	0.0
1137	0.0	0.0	0.000	O	|	|	|	|	0.0
1138	0.0	0.0	0.000	O	|	|	|	|	0.0
1139	0.0	0.0	0.000	O	|	|	|	|	0.0
1140	0.0	0.0	0.000	O	|	|	|	|	0.0

1141	0.0	0.0	0.000	o	|	|	|	0.0
1142	0.0	0.0	0.000	o	|	|	|	0.0
1143	0.0	0.0	0.000	o	|	|	|	0.0
1144	0.0	0.0	0.000	o	|	|	|	0.0
1145	0.0	0.0	0.000	o	|	|	|	0.0
1146	0.0	0.0	0.000	o	|	|	|	0.0
1147	0.0	0.0	0.000	o	|	|	|	0.0
1148	0.0	0.0	0.000	o	|	|	|	0.0
1149	0.0	0.0	0.000	o	|	|	|	0.0
1150	0.2	0.0	0.000	o	|	|	I	0.0
1151	0.2	0.0	0.001	|o	|	|	I	0.0
1152	0.2	0.0	0.001	|o	|	|	I	0.0
1153	0.2	0.0	0.001	| o	|	|	I	0.0
1154	0.2	0.0	0.001	| o	|	|	I	0.0
1155	0.2	0.0	0.002	| o	|	|	I	0.0
1156	0.2	0.0	0.002	| o	|	|	I	0.0
1157	0.2	0.0	0.002	| o	|	|	I	0.0
1158	0.2	0.0	0.002	| o	|	|	I	0.0
1159	0.2	0.0	0.003	| o	|	|	I	0.0
1160	0.2	0.0	0.003	| o	|	|	I	0.0
1161	0.2	0.0	0.003	| o	|	|	I	0.0
1162	0.2	0.0	0.003	| o	|	|	I	0.0
1163	0.2	0.0	0.003	| o|	|	|	I	0.0
1164	0.2	0.0	0.004	| o|	|	|	I	0.0
1165	0.2	0.0	0.004	| o|	|	|	I	0.0
1166	0.2	0.1	0.004	| o	|	|	I	0.0
1167	0.2	0.1	0.004	| o	|	|	I	0.0
1168	0.2	0.1	0.004	| |o	|	|	I	0.0
1169	0.1	0.1	0.005	| |o	I	|	|	0.0
1170	0.0	0.1	0.004	I |o	|	|	|	0.0
1171	0.0	0.1	0.004	I o	|	|	|	0.0
1172	0.0	0.1	0.004	I o	|	|	|	0.0
1173	0.0	0.1	0.004	I o	|	|	|	0.0
1174	0.0	0.1	0.004	I o	|	|	|	0.0
1175	0.0	0.1	0.004	I o	|	|	|	0.0
1176	0.0	0.1	0.004	I o	|	|	|	0.0
1177	0.0	0.1	0.004	I o	|	|	|	0.0
1178	0.0	0.0	0.004	I o|	|	|	|	0.0
1179	0.0	0.0	0.004	I o|	|	|	|	0.0
1180	0.0	0.0	0.004	I o|	|	|	|	0.0
1181	0.0	0.0	0.004	I o|	|	|	|	0.0
1182	0.0	0.0	0.004	I o|	|	|	|	0.0
1183	0.0	0.0	0.004	I o|	|	|	|	0.0
1184	0.0	0.0	0.003	I o|	|	|	|	0.0
1185	0.0	0.0	0.003	I o |	|	|	|	0.0
1186	0.0	0.0	0.003	I o |	|	|	|	0.0
1187	0.0	0.0	0.003	I o |	|	|	|	0.0
1188	0.0	0.0	0.003	I o |	|	|	|	0.0
1189	0.0	0.0	0.003	I o |	|	|	|	0.0
1190	0.0	0.0	0.003	I o |	|	|	|	0.0
1191	0.0	0.0	0.003	I o |	|	|	|	0.0
1192	0.0	0.0	0.003	I o |	|	|	|	0.0
1193	0.0	0.0	0.003	I o |	|	|	|	0.0
1194	0.0	0.0	0.003	I o |	|	|	|	0.0
1195	0.0	0.0	0.003	I o |	|	|	|	0.0
1196	0.0	0.0	0.003	I o |	|	|	|	0.0
1197	0.0	0.0	0.003	I o |	|	|	|	0.0
1198	0.0	0.0	0.003	I o |	|	|	|	0.0
1199	0.0	0.0	0.003	I o |	|	|	|	0.0
1200	0.0	0.0	0.003	I o |	|	|	|	0.0
1201	0.0	0.0	0.003	I o |	|	|	|	0.0
1202	0.0	0.0	0.003	I o |	|	|	|	0.0
1203	0.0	0.0	0.002	I o |	|	|	|	0.0

1204	0.0	0.0	0.002	I O				0.0
1205	0.0	0.0	0.002	I O				0.0
1206	0.0	0.0	0.002	I O				0.0
1207	0.0	0.0	0.002	I O				0.0
1208	0.0	0.0	0.002	I O				0.0
1209	0.0	0.0	0.002	I O				0.0
1210	0.0	0.0	0.002	I O				0.0
1211	0.0	0.0	0.002	I O				0.0
1212	0.0	0.0	0.002	I O				0.0
1213	0.0	0.0	0.002	I O				0.0
1214	0.0	0.0	0.002	I O				0.0
1215	0.0	0.0	0.002	I O				0.0
1216	0.0	0.0	0.002	I O				0.0
1217	0.0	0.0	0.002	I O				0.0
1218	0.0	0.0	0.002	I O				0.0
1219	0.0	0.0	0.002	I O				0.0
1220	0.0	0.0	0.002	I O				0.0
1221	0.0	0.0	0.002	I O				0.0
1222	0.0	0.0	0.002	I O				0.0
1223	0.0	0.0	0.002	I O				0.0
1224	0.0	0.0	0.002	I O				0.0
1225	0.0	0.0	0.002	I O				0.0
1226	0.0	0.0	0.002	I O				0.0
1227	0.0	0.0	0.002	I O				0.0
1228	0.0	0.0	0.002	I O				0.0
1229	0.0	0.0	0.002	I O				0.0
1230	0.0	0.0	0.002	I O				0.0
1231	0.0	0.0	0.002	I O				0.0
1232	0.0	0.0	0.001	I O				0.0
1233	0.0	0.0	0.001	I O				0.0
1234	0.0	0.0	0.001	I O				0.0
1235	0.0	0.0	0.001	I O				0.0
1236	0.0	0.0	0.001	I O				0.0
1237	0.0	0.0	0.001	I O				0.0
1238	0.0	0.0	0.001	I O				0.0
1239	0.0	0.0	0.001	I O				0.0
1240	0.0	0.0	0.001	I O				0.0
1241	0.0	0.0	0.001	I O				0.0
1242	0.0	0.0	0.001	I O				0.0
1243	0.0	0.0	0.001	I O				0.0
1244	0.0	0.0	0.001	I O				0.0
1245	0.0	0.0	0.001	I O				0.0
1246	0.0	0.0	0.001	I O				0.0
1247	0.0	0.0	0.001	I O				0.0
1248	0.0	0.0	0.001	I O				0.0
1249	0.0	0.0	0.001	I O				0.0
1250	0.0	0.0	0.001	I O				0.0
1251	0.0	0.0	0.001	I O				0.0
1252	0.0	0.0	0.001	I O				0.0
1253	0.0	0.0	0.001	I O				0.0
1254	0.0	0.0	0.001	I O				0.0
1255	0.0	0.0	0.001	I O				0.0
1256	0.0	0.0	0.001	IO				0.0
1257	0.0	0.0	0.001	IO				0.0
1258	0.0	0.0	0.001	IO				0.0
1259	0.0	0.0	0.001	IO				0.0
1260	0.0	0.0	0.001	IO				0.0
1261	0.0	0.0	0.001	IO				0.0
1262	0.0	0.0	0.001	IO				0.0
1263	0.0	0.0	0.001	IO				0.0
1264	0.0	0.0	0.001	IO				0.0
1265	0.0	0.0	0.001	IO				0.0
1266	0.0	0.0	0.001	IO				0.0

1267	0.0	0.0	0.001	IO	|	|	|	0.0
1268	0.0	0.0	0.001	IO	|	|	|	0.0
1269	0.0	0.0	0.001	IO	|	|	|	0.0
1270	0.0	0.0	0.001	IO	|	|	|	0.0
1271	0.0	0.0	0.001	IO	|	|	|	0.0
1272	0.0	0.0	0.001	IO	|	|	|	0.0
1273	0.0	0.0	0.001	IO	|	|	|	0.0
1274	0.0	0.0	0.001	IO	|	|	|	0.0
1275	0.0	0.0	0.001	IO	|	|	|	0.0
1276	0.0	0.0	0.001	IO	|	|	|	0.0
1277	0.0	0.0	0.001	IO	|	|	|	0.0
1278	0.0	0.0	0.001	IO	|	|	|	0.0
1279	0.0	0.0	0.001	IO	|	|	|	0.0
1280	0.0	0.0	0.001	IO	|	|	|	0.0
1281	0.0	0.0	0.001	IO	|	|	|	0.0
1282	0.0	0.0	0.001	IO	|	|	|	0.0
1283	0.0	0.0	0.001	IO	|	|	|	0.0
1284	0.0	0.0	0.001	IO	|	|	|	0.0
1285	0.0	0.0	0.001	IO	|	|	|	0.0
1286	0.0	0.0	0.001	IO	|	|	|	0.0
1287	0.0	0.0	0.001	IO	|	|	|	0.0
1288	0.0	0.0	0.001	IO	|	|	|	0.0
1289	0.0	0.0	0.001	IO	|	|	|	0.0
1290	0.0	0.0	0.001	IO	|	|	|	0.0
1291	0.0	0.0	0.001	IO	|	|	|	0.0
1292	0.0	0.0	0.001	IO	|	|	|	0.0
1293	0.0	0.0	0.001	IO	|	|	|	0.0
1294	0.0	0.0	0.000	IO	|	|	|	0.0
1295	0.0	0.0	0.000	O	|	|	|	0.0
1296	0.0	0.0	0.000	O	|	|	|	0.0
1297	0.0	0.0	0.000	O	|	|	|	0.0
1298	0.0	0.0	0.000	O	|	|	|	0.0
1299	0.0	0.0	0.000	O	|	|	|	0.0
1300	0.0	0.0	0.000	O	|	|	|	0.0
1310	0.0	0.0	0.000	O	|	|	|	0.0
1320	0.0	0.0	0.000	O	|	|	|	0.0
1330	0.0	0.0	0.000	O	|	|	|	0.0
1340	0.0	0.0	0.000	O	|	|	|	0.0
1350	0.0	0.0	0.000	O	|	|	|	0.0
1360	0.0	0.0	0.000	O	|	|	|	0.0
1370	0.0	0.0	0.000	O	|	|	|	0.0
1380	0.0	0.0	0.000	O	|	|	|	0.0
1390	0.0	0.0	0.000	O	|	|	|	0.0
1400	0.0	0.0	0.000	O	|	|	|	0.0
1420	0.0	0.0	0.000	O	|	|	|	0.0
1440	0.0	0.0	0.000	O	|	|	|	0.0
1460	0.0	0.0	0.000	O	|	|	|	0.0
1500	0.0	0.0	0.000	O	|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 0.06(CFS)
Peak flow time = 1169 Min., time interval # = 55
Maximum depth in basin = 0.03(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 2 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.19 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

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msdet002

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	Depth .0 0.8 1.7 2.5 3.4 (Ft.)
0	0.0	0.0	0.000	0.0
100	0.0	0.0	0.000	0.0
200	0.0	0.0	0.000	0.0
300	0.0	0.0	0.000	0.0
400	0.0	0.0	0.000	0.0
500	0.0	0.0	0.000	0.0
600	0.0	0.0	0.000	0.0
700	0.0	0.0	0.000	0.0
800	0.0	0.0	0.000	0.0
900	0.0	0.0	0.000	0.0
1000	0.0	0.0	0.000	0.0
1050	0.0	0.0	0.000	0.0
1100	0.2	0.1	0.005	0.0
1110	0.2	0.1	0.007	0.0
1120	0.3	0.1	0.009	0.1
1130	0.3	0.1	0.011	0.1
1131	0.3	0.1	0.012	0.1
1132	0.3	0.2	0.012	0.1
1133	0.3	0.2	0.012	0.1
1134	0.4	0.2	0.012	0.1
1135	0.4	0.2	0.013	0.1
1136	0.4	0.2	0.013	0.1
1137	0.4	0.2	0.013	0.1
1138	0.5	0.2	0.014	0.1
1139	0.6	0.2	0.014	0.1
1140	0.6	0.2	0.015	0.1
1141	0.7	0.2	0.016	0.1
1142	0.7	0.2	0.016	0.1
1143	0.8	0.2	0.017	0.1
1144	0.9	0.2	0.018	0.1
1145	1.0	0.2	0.019	0.1
1146	1.1	0.3	0.020	0.1
1147	1.2	0.3	0.022	0.2
1148	1.3	0.3	0.023	0.2
1149	1.4	0.3	0.024	0.2
1150	1.6	0.3	0.026	0.2
1151	1.8	0.4	0.028	0.2
1152	2.1	0.4	0.031	0.2
1153	2.4	0.4	0.033	0.2
1154	2.6	0.5	0.036	0.3
1155	2.8	0.5	0.039	0.3
1156	3.0	0.6	0.043	0.3
1157	3.2	0.6	0.046	0.3
1158	3.3	0.6	0.050	0.4
1159	3.4	0.7	0.054	0.4
1160	3.4	0.7	0.058	0.4
1161	3.3	0.8	0.061	0.4
1162	3.1	0.8	0.064	0.5
1163	2.9	0.9	0.067	0.5
1164	2.7	0.9	0.070	0.5
1165	2.5	0.9	0.072	0.5
1166	2.2	0.9	0.074	0.5
1167	2.0	1.0	0.075	0.5
1168	1.8	1.0	0.076	0.5
1169	1.7	1.0	0.077	0.6
1170	1.6	1.0	0.078	0.6
1171	1.5	1.0	0.079	0.6
1172	1.4	1.0	0.079	0.6
1173	1.3	1.0	0.080	0.6
1174	1.2	1.0	0.080	0.6
1175	1.2	1.0	0.080	0.6

1176	1.1	1.0	0.080	|	|OI	|	|	0.6
1177	1.1	1.0	0.080	|	|OI	|	|	0.6
1178	1.1	1.0	0.080	|	|OI	|	|	0.6
1179	1.0	1.0	0.080	|	|O	|	|	0.6
1180	1.0	1.0	0.080	|	|O	|	|	0.6
1181	1.0	1.0	0.080	|	|O	|	|	0.6
1182	1.0	1.0	0.080	|	|O	|	|	0.6
1183	0.9	1.0	0.080	|	IO	|	|	0.6
1184	0.9	1.0	0.080	|	IO	|	|	0.6
1185	0.8	1.0	0.079	|	I|O	|	|	0.6
1186	0.8	1.0	0.079	|	I|O	|	|	0.6
1187	0.8	1.0	0.079	|	I|O	|	|	0.6
1188	0.8	1.0	0.079	|	I|O	|	|	0.6
1189	0.7	1.0	0.078	|	I |O	|	|	0.6
1190	0.7	1.0	0.078	|	I |O	|	|	0.6
1191	0.7	1.0	0.077	|	I |O	|	|	0.6
1192	0.7	1.0	0.077	|	I |O	|	|	0.5
1193	0.7	1.0	0.077	|	I |O	|	|	0.5
1194	0.7	1.0	0.076	|	I |O	|	|	0.5
1195	0.7	1.0	0.076	|	I |O	|	|	0.5
1196	0.6	1.0	0.075	|	I |O	|	|	0.5
1197	0.6	1.0	0.075	|	I |O	|	|	0.5
1198	0.6	1.0	0.074	|	I O	|	|	0.5
1199	0.6	0.9	0.074	|	I O	|	|	0.5
1200	0.6	0.9	0.073	|	I O	|	|	0.5
1201	0.6	0.9	0.073	|	I O	|	|	0.5
1202	0.6	0.9	0.072	|	I O	|	|	0.5
1203	0.6	0.9	0.072	|	I O	|	|	0.5
1204	0.6	0.9	0.071	|	I O	|	|	0.5
1205	0.6	0.9	0.071	|	I O	|	|	0.5
1206	0.6	0.9	0.071	|	I O	|	|	0.5
1207	0.6	0.9	0.070	|	I O	|	|	0.5
1208	0.6	0.9	0.070	|	I O	|	|	0.5
1209	0.6	0.9	0.069	|	I O	|	|	0.5
1210	0.6	0.9	0.069	|	I O	|	|	0.5
1211	0.6	0.9	0.069	|	I O	|	|	0.5
1212	0.6	0.9	0.068	|	I O	|	|	0.5
1213	0.6	0.9	0.068	|	I O	|	|	0.5
1214	0.5	0.9	0.067	|	I O	|	|	0.5
1215	0.5	0.9	0.067	|	I O	|	|	0.5
1216	0.5	0.9	0.066	|	I O	|	|	0.5
1217	0.5	0.8	0.066	|	I O|	|	|	0.5
1218	0.5	0.8	0.065	|	I O|	|	|	0.5
1219	0.5	0.8	0.065	|	I O|	|	|	0.5
1220	0.5	0.8	0.064	|	I O|	|	|	0.5
1221	0.5	0.8	0.064	|	I O|	|	|	0.5
1222	0.5	0.8	0.064	|	I O|	|	|	0.5
1223	0.5	0.8	0.063	|	I O|	|	|	0.5
1224	0.5	0.8	0.063	|	I O|	|	|	0.4
1225	0.5	0.8	0.062	|	I O|	|	|	0.4
1226	0.5	0.8	0.062	|	I O|	|	|	0.4
1227	0.5	0.8	0.061	|	I O|	|	|	0.4
1228	0.5	0.8	0.061	|	I O|	|	|	0.4
1229	0.5	0.8	0.061	|	I O|	|	|	0.4
1230	0.5	0.8	0.060	|	I O|	|	|	0.4
1231	0.5	0.8	0.060	|	I O|	|	|	0.4
1232	0.5	0.8	0.060	|	I O|	|	|	0.4
1233	0.5	0.8	0.059	|	I O|	|	|	0.4
1234	0.4	0.8	0.059	|	I O|	|	|	0.4
1235	0.4	0.7	0.058	|	I O|	|	|	0.4
1236	0.4	0.7	0.058	|	I O |	|	|	0.4
1237	0.4	0.7	0.057	|	I O |	|	|	0.4
1238	0.4	0.7	0.057	|	I O |	|	|	0.4

1239	0.4	0.7	0.056	| I O |	|	|	|	0.4
1240	0.4	0.7	0.056	| I O |	|	|	|	0.4
1241	0.4	0.7	0.055	| I O |	|	|	|	0.4
1242	0.4	0.7	0.055	| I O |	|	|	|	0.4
1243	0.4	0.7	0.055	| I O |	|	|	|	0.4
1244	0.4	0.7	0.054	| I O |	|	|	|	0.4
1245	0.4	0.7	0.054	| I O |	|	|	|	0.4
1246	0.4	0.7	0.053	| I O |	|	|	|	0.4
1247	0.4	0.7	0.053	| I O |	|	|	|	0.4
1248	0.4	0.7	0.053	| I O |	|	|	|	0.4
1249	0.4	0.7	0.052	| I O |	|	|	|	0.4
1250	0.4	0.7	0.052	| I O |	|	|	|	0.4
1251	0.4	0.7	0.052	| I O |	|	|	|	0.4
1252	0.4	0.7	0.051	| I O |	|	|	|	0.4
1253	0.3	0.7	0.051	| I O |	|	|	|	0.4
1254	0.3	0.6	0.050	| I O |	|	|	|	0.4
1255	0.3	0.6	0.050	| I O |	|	|	|	0.4
1256	0.3	0.6	0.049	| I O |	|	|	|	0.4
1257	0.3	0.6	0.049	| I O |	|	|	|	0.3
1258	0.3	0.6	0.048	| I O |	|	|	|	0.3
1259	0.3	0.6	0.048	| I O |	|	|	|	0.3
1260	0.3	0.6	0.047	| I O |	|	|	|	0.3
1261	0.3	0.6	0.047	| I O |	|	|	|	0.3
1262	0.3	0.6	0.047	| I O |	|	|	|	0.3
1263	0.3	0.6	0.046	| I O |	|	|	|	0.3
1264	0.3	0.6	0.046	| I O |	|	|	|	0.3
1265	0.3	0.6	0.045	| I O |	|	|	|	0.3
1266	0.3	0.6	0.045	| I O |	|	|	|	0.3
1267	0.3	0.6	0.045	| I O |	|	|	|	0.3
1268	0.3	0.6	0.044	| I O |	|	|	|	0.3
1269	0.3	0.6	0.044	| I O |	|	|	|	0.3
1270	0.3	0.6	0.044	| I O |	|	|	|	0.3
1271	0.3	0.6	0.043	| I O |	|	|	|	0.3
1272	0.2	0.5	0.043	|I O |	|	|	|	0.3
1273	0.2	0.5	0.042	|I O |	|	|	|	0.3
1274	0.1	0.5	0.042	I O |	|	|	|	0.3
1275	0.1	0.5	0.041	I O |	|	|	|	0.3
1276	0.1	0.5	0.040	I O |	|	|	|	0.3
1277	0.0	0.5	0.040	I O |	|	|	|	0.3
1278	0.1	0.5	0.039	I O |	|	|	|	0.3
1279	0.0	0.5	0.039	I O |	|	|	|	0.3
1280	0.0	0.5	0.038	I O |	|	|	|	0.3
1281	0.0	0.5	0.037	I O |	|	|	|	0.3
1282	0.0	0.5	0.037	I O |	|	|	|	0.3
1283	0.0	0.5	0.036	I O |	|	|	|	0.3
1284	0.0	0.5	0.035	I O |	|	|	|	0.3
1285	0.0	0.4	0.035	I O |	|	|	|	0.2
1286	0.0	0.4	0.034	I O |	|	|	|	0.2
1287	0.0	0.4	0.033	I O |	|	|	|	0.2
1288	0.0	0.4	0.033	I O |	|	|	|	0.2
1289	0.0	0.4	0.032	I O |	|	|	|	0.2
1290	0.0	0.4	0.032	I O |	|	|	|	0.2
1291	0.0	0.4	0.031	I O |	|	|	|	0.2
1292	0.0	0.4	0.031	I O |	|	|	|	0.2
1293	0.0	0.4	0.030	I O |	|	|	|	0.2
1294	0.0	0.4	0.030	I O |	|	|	|	0.2
1295	0.0	0.4	0.029	I O |	|	|	|	0.2
1296	0.0	0.4	0.028	I O |	|	|	|	0.2
1297	0.0	0.4	0.028	I O |	|	|	|	0.2
1298	0.0	0.4	0.028	I O |	|	|	|	0.2
1299	0.0	0.3	0.027	I O |	|	|	|	0.2
1300	0.0	0.3	0.027	I O |	|	|	|	0.2
1310	0.0	0.3	0.022	I O |	|	|	|	0.2

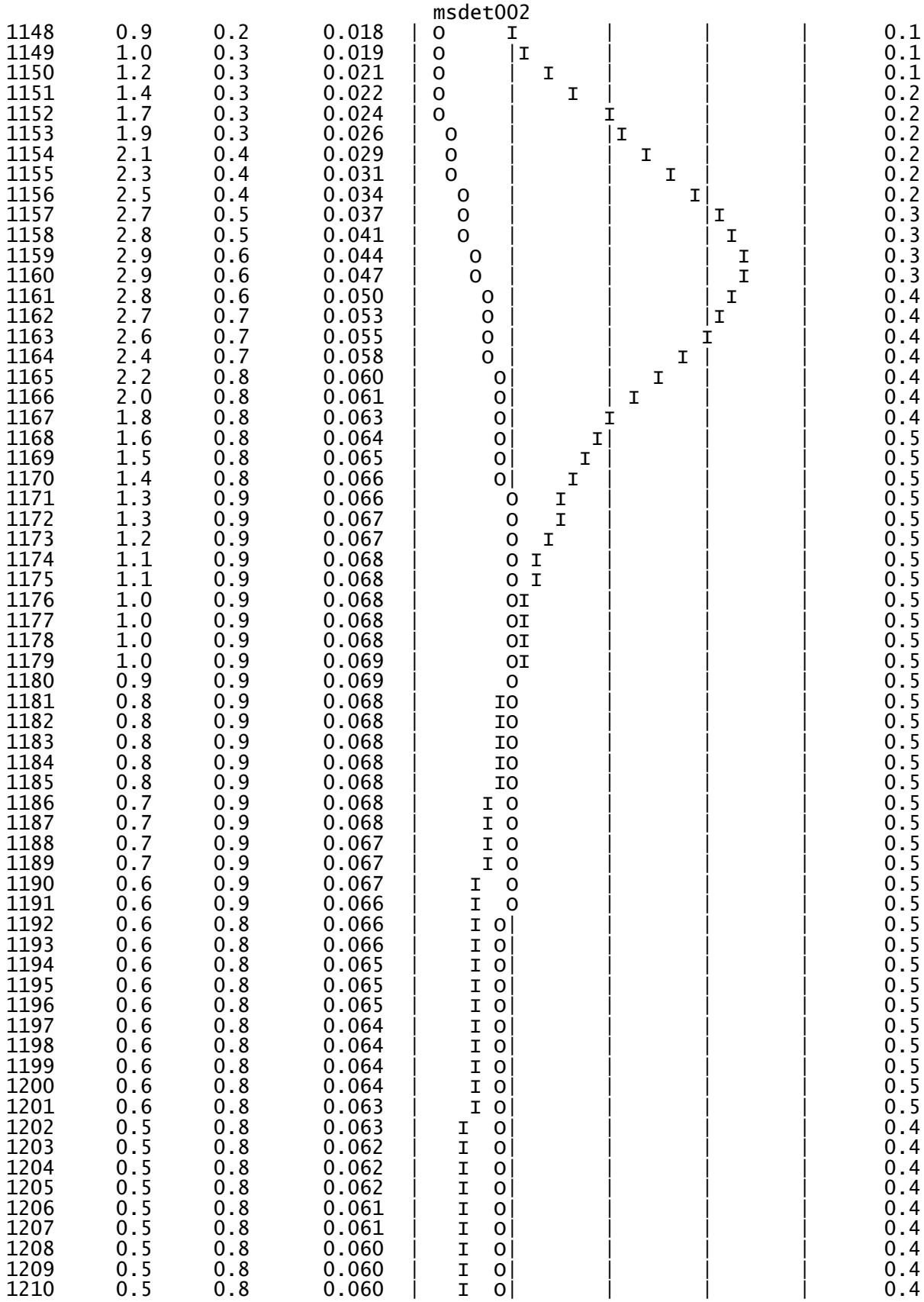
1320	0.0	0.2	0.019	I O	|	|	|	0.1
1330	0.0	0.2	0.016	IO	|	|	|	0.1
1340	0.0	0.2	0.013	IO	|	|	|	0.1
1350	0.0	0.1	0.011	IO	|	|	|	0.1
1360	0.0	0.1	0.009	IO	|	|	|	0.1
1370	0.0	0.1	0.008	O	|	|	|	0.1
1380	0.0	0.1	0.006	O	|	|	|	0.0
1390	0.0	0.1	0.005	O	|	|	|	0.0
1400	0.0	0.1	0.005	O	|	|	|	0.0
1420	0.0	0.0	0.003	O	|	|	|	0.0
1440	0.0	0.0	0.002	O	|	|	|	0.0
1460	0.0	0.0	0.002	O	|	|	|	0.0
1500	0.0	0.0	0.001	O	|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 1.03(CFS)
Peak flow time = 1178 Min., time interval # = 64
Maximum depth in basin = 0.57(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 3 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.17 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.8	1.7	2.5	3.4 (Ft.)	Depth
0	0.0	0.0	0.001	O	|	|	|	|	0.0
100	0.0	0.0	0.000	O	|	|	|	|	0.0
200	0.0	0.0	0.000	O	|	|	|	|	0.0
300	0.0	0.0	0.000	O	|	|	|	|	0.0
400	0.0	0.0	0.000	O	|	|	|	|	0.0
500	0.0	0.0	0.000	O	|	|	|	|	0.0
600	0.0	0.0	0.000	O	|	|	|	|	0.0
700	0.0	0.0	0.000	O	|	|	|	|	0.0
800	0.0	0.0	0.000	O	|	|	|	|	0.0
900	0.0	0.0	0.000	O	|	|	|	|	0.0
1000	0.0	0.0	0.000	O	|	|	|	|	0.0
1050	0.0	0.0	0.000	O	|	|	|	|	0.0
1100	0.2	0.1	0.005	OI	|	|	|	|	0.0
1110	0.2	0.1	0.007	OI	|	|	|	|	0.0
1120	0.3	0.1	0.009	|OI	|	|	|	|	0.1
1130	0.3	0.1	0.011	|OI	|	|	|	|	0.1
1131	0.3	0.1	0.012	|OI	|	|	|	|	0.1
1132	0.3	0.2	0.012	|OI	|	|	|	|	0.1
1133	0.3	0.2	0.012	|OI	|	|	|	|	0.1
1134	0.3	0.2	0.012	|OI	|	|	|	|	0.1
1135	0.3	0.2	0.012	|OI	|	|	|	|	0.1
1136	0.3	0.2	0.013	|OI	|	|	|	|	0.1
1137	0.3	0.2	0.013	|OI	|	|	|	|	0.1
1138	0.3	0.2	0.013	|OI	|	|	|	|	0.1
1139	0.3	0.2	0.013	|OI	|	|	|	|	0.1
1140	0.4	0.2	0.013	|O I	|	|	|	|	0.1
1141	0.4	0.2	0.014	|O I	|	|	|	|	0.1
1142	0.5	0.2	0.014	|O I	|	|	|	|	0.1
1143	0.6	0.2	0.015	|O I	|	|	|	|	0.1
1144	0.6	0.2	0.015	|O I	|	|	|	|	0.1
1145	0.7	0.2	0.016	|O I	|	|	|	|	0.1
1146	0.7	0.2	0.017	| O I	|	|	|	|	0.1
1147	0.8	0.2	0.018	| O I	|	|	|	|	0.1



1148	0.9	0.2	0.018	O	I			0.1
1149	1.0	0.3	0.019	O	I			0.1
1150	1.2	0.3	0.021	O	I			0.1
1151	1.4	0.3	0.022	O	I			0.2
1152	1.7	0.3	0.024	O	I			0.2
1153	1.9	0.3	0.026	O	I			0.2
1154	2.1	0.4	0.029	O	I			0.2
1155	2.3	0.4	0.031	O	I			0.2
1156	2.5	0.4	0.034	O	I			0.2
1157	2.7	0.5	0.037	O	I			0.3
1158	2.8	0.5	0.041	O	I			0.3
1159	2.9	0.6	0.044	O	I			0.3
1160	2.9	0.6	0.047	O	I			0.3
1161	2.8	0.6	0.050	O	I			0.4
1162	2.7	0.7	0.053	O	I			0.4
1163	2.6	0.7	0.055	O	I			0.4
1164	2.4	0.7	0.058	O	I			0.4
1165	2.2	0.8	0.060	O	I			0.4
1166	2.0	0.8	0.061	O	I			0.4
1167	1.8	0.8	0.063	O	I			0.4
1168	1.6	0.8	0.064	O	I			0.5
1169	1.5	0.8	0.065	O	I			0.5
1170	1.4	0.8	0.066	O	I			0.5
1171	1.3	0.9	0.066	O	I			0.5
1172	1.3	0.9	0.067	O	I			0.5
1173	1.2	0.9	0.067	O	I			0.5
1174	1.1	0.9	0.068	O	I			0.5
1175	1.1	0.9	0.068	O	I			0.5
1176	1.0	0.9	0.068	O	I			0.5
1177	1.0	0.9	0.068	O	I			0.5
1178	1.0	0.9	0.068	O	I			0.5
1179	1.0	0.9	0.069	O	I			0.5
1180	0.9	0.9	0.069	O				0.5
1181	0.8	0.9	0.068	I	O			0.5
1182	0.8	0.9	0.068	I	O			0.5
1183	0.8	0.9	0.068	I	O			0.5
1184	0.8	0.9	0.068	I	O			0.5
1185	0.8	0.9	0.068	I	O			0.5
1186	0.7	0.9	0.068	I	O			0.5
1187	0.7	0.9	0.068	I	O			0.5
1188	0.7	0.9	0.067	I	O			0.5
1189	0.7	0.9	0.067	I	O			0.5
1190	0.6	0.9	0.067	I	O			0.5
1191	0.6	0.9	0.066	I	O			0.5
1192	0.6	0.8	0.066	I	O			0.5
1193	0.6	0.8	0.066	I	O			0.5
1194	0.6	0.8	0.065	I	O			0.5
1195	0.6	0.8	0.065	I	O			0.5
1196	0.6	0.8	0.065	I	O			0.5
1197	0.6	0.8	0.064	I	O			0.5
1198	0.6	0.8	0.064	I	O			0.5
1199	0.6	0.8	0.064	I	O			0.5
1200	0.6	0.8	0.064	I	O			0.5
1201	0.6	0.8	0.063	I	O			0.5
1202	0.5	0.8	0.063	I	O			0.4
1203	0.5	0.8	0.062	I	O			0.4
1204	0.5	0.8	0.062	I	O			0.4
1205	0.5	0.8	0.062	I	O			0.4
1206	0.5	0.8	0.061	I	O			0.4
1207	0.5	0.8	0.061	I	O			0.4
1208	0.5	0.8	0.060	I	O			0.4
1209	0.5	0.8	0.060	I	O			0.4
1210	0.5	0.8	0.060	I	O			0.4

1211	0.5	0.8	0.059	| I O|	|	|	|	0.4
1212	0.5	0.8	0.059	| I O|	|	|	|	0.4
1213	0.5	0.8	0.059	| I O|	|	|	|	0.4
1214	0.5	0.7	0.058	| I O|	|	|	|	0.4
1215	0.5	0.7	0.058	| I O|	|	|	|	0.4
1216	0.5	0.7	0.058	| I O |	|	|	|	0.4
1217	0.5	0.7	0.057	| I O |	|	|	|	0.4
1218	0.4	0.7	0.057	| I O |	|	|	|	0.4
1219	0.4	0.7	0.056	| I O |	|	|	|	0.4
1220	0.4	0.7	0.056	| I O |	|	|	|	0.4
1221	0.4	0.7	0.055	| I O |	|	|	|	0.4
1222	0.4	0.7	0.055	| I O |	|	|	|	0.4
1223	0.4	0.7	0.055	| I O |	|	|	|	0.4
1224	0.4	0.7	0.054	| I O |	|	|	|	0.4
1225	0.4	0.7	0.054	| I O |	|	|	|	0.4
1226	0.4	0.7	0.053	| I O |	|	|	|	0.4
1227	0.4	0.7	0.053	| I O |	|	|	|	0.4
1228	0.4	0.7	0.053	| I O |	|	|	|	0.4
1229	0.4	0.7	0.052	| I O |	|	|	|	0.4
1230	0.4	0.7	0.052	| I O |	|	|	|	0.4
1231	0.4	0.7	0.051	| I O |	|	|	|	0.4
1232	0.4	0.7	0.051	| I O |	|	|	|	0.4
1233	0.4	0.7	0.051	| I O |	|	|	|	0.4
1234	0.4	0.6	0.050	| I O |	|	|	|	0.4
1235	0.4	0.6	0.050	| I O |	|	|	|	0.4
1236	0.4	0.6	0.050	| I O |	|	|	|	0.4
1237	0.4	0.6	0.049	| I O |	|	|	|	0.4
1238	0.4	0.6	0.049	| I O |	|	|	|	0.4
1239	0.4	0.6	0.049	| I O |	|	|	|	0.3
1240	0.4	0.6	0.048	| I O |	|	|	|	0.3
1241	0.3	0.6	0.048	| I O |	|	|	|	0.3
1242	0.3	0.6	0.048	| I O |	|	|	|	0.3
1243	0.3	0.6	0.047	| I O |	|	|	|	0.3
1244	0.3	0.6	0.047	| I O |	|	|	|	0.3
1245	0.3	0.6	0.046	| I O |	|	|	|	0.3
1246	0.3	0.6	0.046	| I O |	|	|	|	0.3
1247	0.3	0.6	0.046	| I O |	|	|	|	0.3
1248	0.3	0.6	0.045	| I O |	|	|	|	0.3
1249	0.3	0.6	0.045	| I O |	|	|	|	0.3
1250	0.3	0.6	0.044	| I O |	|	|	|	0.3
1251	0.3	0.6	0.044	| I O |	|	|	|	0.3
1252	0.3	0.6	0.044	| I O |	|	|	|	0.3
1253	0.3	0.6	0.043	| I O |	|	|	|	0.3
1254	0.3	0.6	0.043	| I O |	|	|	|	0.3
1255	0.3	0.5	0.043	| I O |	|	|	|	0.3
1256	0.3	0.5	0.042	| I O |	|	|	|	0.3
1257	0.3	0.5	0.042	| I O |	|	|	|	0.3
1258	0.3	0.5	0.042	| I O |	|	|	|	0.3
1259	0.3	0.5	0.041	| I O |	|	|	|	0.3
1260	0.3	0.5	0.041	| I O |	|	|	|	0.3
1261	0.2	0.5	0.041	|I O |	|	|	|	0.3
1262	0.1	0.5	0.040	I O |	|	|	|	0.3
1263	0.2	0.5	0.040	|I O |	|	|	|	0.3
1264	0.1	0.5	0.039	I O |	|	|	|	0.3
1265	0.2	0.5	0.039	|I O |	|	|	|	0.3
1266	0.1	0.5	0.038	I O |	|	|	|	0.3
1267	0.2	0.5	0.038	|I O |	|	|	|	0.3
1268	0.1	0.5	0.037	I O |	|	|	|	0.3
1269	0.1	0.5	0.037	I O |	|	|	|	0.3
1270	0.1	0.5	0.036	I O |	|	|	|	0.3
1271	0.1	0.5	0.036	I O |	|	|	|	0.3
1272	0.1	0.5	0.035	I O |	|	|	|	0.3
1273	0.1	0.4	0.035	I O |	|	|	|	0.2

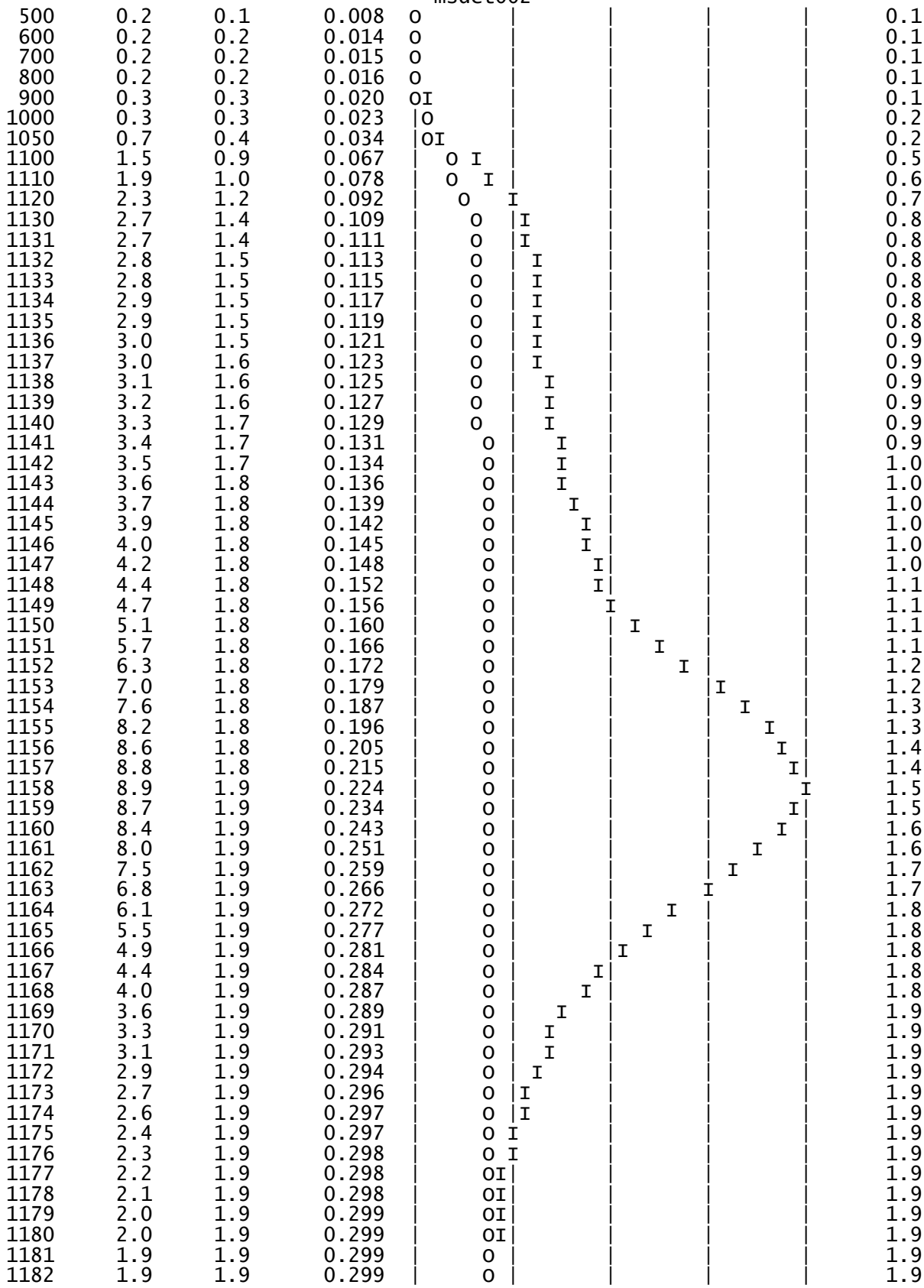
1274	0.1	0.4	0.034	I	O	|	|	|	0.2
1275	0.1	0.4	0.034	I	O	|	|	|	0.2
1276	0.1	0.4	0.033	I	O	|	|	|	0.2
1277	0.1	0.4	0.033	I	O	|	|	|	0.2
1278	0.1	0.4	0.032	I	O	|	|	|	0.2
1279	0.1	0.4	0.032	I	O	|	|	|	0.2
1280	0.1	0.4	0.031	I	O	|	|	|	0.2
1281	0.1	0.4	0.031	I	O	|	|	|	0.2
1282	0.1	0.4	0.031	I	O	|	|	|	0.2
1283	0.1	0.4	0.030	I	O	|	|	|	0.2
1284	0.0	0.4	0.030	I	O	|	|	|	0.2
1285	0.0	0.4	0.029	I	O	|	|	|	0.2
1286	0.0	0.4	0.029	I	O	|	|	|	0.2
1287	0.0	0.4	0.028	I	O	|	|	|	0.2
1288	0.0	0.4	0.028	I	O	|	|	|	0.2
1289	0.0	0.3	0.027	I	O	|	|	|	0.2
1290	0.0	0.3	0.027	I	O	|	|	|	0.2
1291	0.0	0.3	0.026	I	O	|	|	|	0.2
1292	0.0	0.3	0.026	I	O	|	|	|	0.2
1293	0.0	0.3	0.025	I	O	|	|	|	0.2
1294	0.0	0.3	0.025	I	O	|	|	|	0.2
1295	0.0	0.3	0.024	I	O	|	|	|	0.2
1296	0.0	0.3	0.024	I	O	|	|	|	0.2
1297	0.0	0.3	0.024	I	O	|	|	|	0.2
1298	0.0	0.3	0.023	I	O	|	|	|	0.2
1299	0.0	0.3	0.023	I	O	|	|	|	0.2
1300	0.0	0.3	0.022	I	O	|	|	|	0.2
1310	0.0	0.2	0.019	I	O	|	|	|	0.1
1320	0.0	0.2	0.016	I	O	|	|	|	0.1
1330	0.0	0.2	0.013	I	O	|	|	|	0.1
1340	0.0	0.1	0.011	I	O	|	|	|	0.1
1350	0.0	0.1	0.009	I	O	|	|	|	0.1
1360	0.0	0.1	0.008	O		|	|	|	0.1
1370	0.0	0.1	0.006	O		|	|	|	0.0
1380	0.0	0.1	0.005	O		|	|	|	0.0
1390	0.0	0.1	0.005	O		|	|	|	0.0
1400	0.0	0.0	0.004	O		|	|	|	0.0
1420	0.0	0.0	0.003	O		|	|	|	0.0
1440	0.0	0.0	0.002	O		|	|	|	0.0
1460	0.0	0.0	0.001	O		|	|	|	0.0
1500	0.1	0.0	0.003	O		|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 0.88(CFS)
Peak flow time = 1180 Min., time interval # = 66
Maximum depth in basin = 0.49(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 4 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.86 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	2.2	4.5	6.7	8.9	Depth (Ft.)
0	0.0	0.0	0.003	O	|	|	|	|	0.0
100	0.0	0.0	0.000	O	|	|	|	|	0.0
200	0.0	0.0	0.000	O	|	|	|	|	0.0
300	0.0	0.0	0.000	O	|	|	|	|	0.0
400	0.0	0.0	0.000	O	|	|	|	|	0.0



500	0.2	0.1	0.008	O	0.1
600	0.2	0.2	0.014	O	0.1
700	0.2	0.2	0.015	O	0.1
800	0.2	0.2	0.016	O	0.1
900	0.3	0.3	0.020	OI	0.1
1000	0.3	0.3	0.023	|O	0.2
1050	0.7	0.4	0.034	|OI	0.2
1100	1.5	0.9	0.067	| O I |	0.5
1110	1.9	1.0	0.078	| O I |	0.6
1120	2.3	1.2	0.092	| O I |	0.7
1130	2.7	1.4	0.109	| O |I |	0.8
1131	2.7	1.4	0.111	| O |I |	0.8
1132	2.8	1.5	0.113	| O | I |	0.8
1133	2.8	1.5	0.115	| O | I |	0.8
1134	2.9	1.5	0.117	| O | I |	0.8
1135	2.9	1.5	0.119	| O | I |	0.8
1136	3.0	1.5	0.121	| O | I |	0.9
1137	3.0	1.6	0.123	| O | I |	0.9
1138	3.1	1.6	0.125	| O | I |	0.9
1139	3.2	1.6	0.127	| O | I |	0.9
1140	3.3	1.7	0.129	| O | I |	0.9
1141	3.4	1.7	0.131	| O | I |	0.9
1142	3.5	1.7	0.134	| O | I |	1.0
1143	3.6	1.8	0.136	| O | I |	1.0
1144	3.7	1.8	0.139	| O | I |	1.0
1145	3.9	1.8	0.142	| O | I |	1.0
1146	4.0	1.8	0.145	| O | I |	1.0
1147	4.2	1.8	0.148	| O | I |	1.0
1148	4.4	1.8	0.152	| O | I |	1.1
1149	4.7	1.8	0.156	| O | I |	1.1
1150	5.1	1.8	0.160	| O | I |	1.1
1151	5.7	1.8	0.166	| O | I |	1.1
1152	6.3	1.8	0.172	| O | I |	1.2
1153	7.0	1.8	0.179	| O | I |	1.2
1154	7.6	1.8	0.187	| O | I |	1.3
1155	8.2	1.8	0.196	| O | I |	1.3
1156	8.6	1.8	0.205	| O | I |	1.4
1157	8.8	1.8	0.215	| O | I |	1.4
1158	8.9	1.9	0.224	| O | I |	1.5
1159	8.7	1.9	0.234	| O | I |	1.5
1160	8.4	1.9	0.243	| O | I |	1.6
1161	8.0	1.9	0.251	| O | I |	1.6
1162	7.5	1.9	0.259	| O | I |	1.7
1163	6.8	1.9	0.266	| O | I |	1.7
1164	6.1	1.9	0.272	| O | I |	1.8
1165	5.5	1.9	0.277	| O | I |	1.8
1166	4.9	1.9	0.281	| O | I |	1.8
1167	4.4	1.9	0.284	| O | I |	1.8
1168	4.0	1.9	0.287	| O | I |	1.8
1169	3.6	1.9	0.289	| O | I |	1.9
1170	3.3	1.9	0.291	| O | I |	1.9
1171	3.1	1.9	0.293	| O | I |	1.9
1172	2.9	1.9	0.294	| O | I |	1.9
1173	2.7	1.9	0.296	| O |I |	1.9
1174	2.6	1.9	0.297	| O |I |	1.9
1175	2.4	1.9	0.297	| O I |	1.9
1176	2.3	1.9	0.298	| O I |	1.9
1177	2.2	1.9	0.298	| OI |	1.9
1178	2.1	1.9	0.298	| OI |	1.9
1179	2.0	1.9	0.299	| OI |	1.9
1180	2.0	1.9	0.299	| OI |	1.9
1181	1.9	1.9	0.299	| O |	1.9
1182	1.9	1.9	0.299	| O |	1.9

1183	1.9	1.9	0.299		O			1.9
1184	1.8	1.9	0.299		O			1.9
1185	1.8	1.9	0.298		O			1.9
1186	1.8	1.9	0.298		O			1.9
1187	1.7	1.9	0.298		O			1.9
1188	1.7	1.9	0.298		O			1.9
1189	1.6	1.9	0.297		IO			1.9
1190	1.5	1.9	0.297		IO			1.9
1191	1.5	1.9	0.296		IO			1.9
1192	1.5	1.9	0.296		IO			1.9
1193	1.5	1.9	0.295		IO			1.9
1194	1.4	1.9	0.295		IO			1.9
1195	1.4	1.9	0.294		IO			1.9
1196	1.4	1.9	0.293		IO			1.9
1197	1.4	1.9	0.292		IO			1.9
1198	1.3	1.9	0.292		I O			1.9
1199	1.3	1.9	0.291		I O			1.9
1200	1.3	1.9	0.290		I O			1.9
1201	1.2	1.9	0.289		I O			1.9
1202	1.2	1.9	0.288		I O			1.9
1203	1.2	1.9	0.287		I O			1.8
1204	1.2	1.9	0.286		I O			1.8
1205	1.2	1.9	0.285		I O			1.8
1206	1.1	1.9	0.284		I O			1.8
1207	1.1	1.9	0.283		I O			1.8
1208	1.1	1.9	0.282		I O			1.8
1209	1.1	1.9	0.281		I O			1.8
1210	1.1	1.9	0.280		I O			1.8
1211	1.1	1.9	0.279		I O			1.8
1212	1.1	1.9	0.278		I O			1.8
1213	1.1	1.9	0.277		I O			1.8
1214	1.1	1.9	0.275		I O			1.8
1215	1.1	1.9	0.274		I O			1.8
1216	1.1	1.9	0.273		I O			1.8
1217	1.0	1.9	0.272		I O			1.8
1218	1.0	1.9	0.271		I O			1.8
1219	1.0	1.9	0.270		I O			1.7
1220	1.0	1.9	0.268		I O			1.7
1221	1.0	1.9	0.267		I O			1.7
1222	1.0	1.9	0.266		I O			1.7
1223	0.9	1.9	0.265		I O			1.7
1224	0.9	1.9	0.263		I O			1.7
1225	0.9	1.9	0.262		I O			1.7
1226	0.9	1.9	0.261		I O			1.7
1227	0.9	1.9	0.259		I O			1.7
1228	0.9	1.9	0.258		I O			1.7
1229	0.9	1.9	0.257		I O			1.7
1230	0.9	1.9	0.255		I O			1.7
1231	0.9	1.9	0.254		I O			1.7
1232	0.9	1.9	0.253		I O			1.6
1233	0.9	1.9	0.251		I O			1.6
1234	0.9	1.9	0.250		I O			1.6
1235	0.8	1.9	0.248	I	O			1.6
1236	0.8	1.9	0.247	I	O			1.6
1237	0.8	1.9	0.246	I	O			1.6
1238	0.8	1.9	0.244	I	O			1.6
1239	0.8	1.9	0.243	I	O			1.6
1240	0.8	1.9	0.241	I	O			1.6
1241	0.8	1.9	0.240	I	O			1.6
1242	0.8	1.9	0.238	I	O			1.6
1243	0.8	1.9	0.237	I	O			1.6
1244	0.8	1.9	0.235	I	O			1.5
1245	0.8	1.9	0.234	I	O			1.5

1246	0.7	1.9	0.232	| I O |	|	|	|	1.5
1247	0.7	1.9	0.231	| I O |	|	|	|	1.5
1248	0.7	1.9	0.229	| I O |	|	|	|	1.5
1249	0.7	1.9	0.227	| I O |	|	|	|	1.5
1250	0.7	1.9	0.226	| I O |	|	|	|	1.5
1251	0.7	1.9	0.224	| I O |	|	|	|	1.5
1252	0.6	1.9	0.223	| I O |	|	|	|	1.5
1253	0.6	1.9	0.221	| I O |	|	|	|	1.5
1254	0.6	1.8	0.219	| I O |	|	|	|	1.5
1255	0.6	1.8	0.217	| I O |	|	|	|	1.4
1256	0.6	1.8	0.216	| I O |	|	|	|	1.4
1257	0.6	1.8	0.214	| I O |	|	|	|	1.4
1258	0.6	1.8	0.212	| I O |	|	|	|	1.4
1259	0.6	1.8	0.211	| I O |	|	|	|	1.4
1260	0.5	1.8	0.209	|I O |	|	|	|	1.4
1261	0.5	1.8	0.207	|I O |	|	|	|	1.4
1262	0.5	1.8	0.205	|I O |	|	|	|	1.4
1263	0.5	1.8	0.203	|I O |	|	|	|	1.4
1264	0.5	1.8	0.201	|I O |	|	|	|	1.4
1265	0.5	1.8	0.199	|I O |	|	|	|	1.3
1266	0.5	1.8	0.198	|I O |	|	|	|	1.3
1267	0.5	1.8	0.196	|I O |	|	|	|	1.3
1268	0.5	1.8	0.194	|I O |	|	|	|	1.3
1269	0.5	1.8	0.192	|I O |	|	|	|	1.3
1270	0.5	1.8	0.190	|I O |	|	|	|	1.3
1271	0.5	1.8	0.188	|I O |	|	|	|	1.3
1272	0.5	1.8	0.187	|I O |	|	|	|	1.3
1273	0.5	1.8	0.185	|I O |	|	|	|	1.3
1274	0.5	1.8	0.183	|I O |	|	|	|	1.2
1275	0.4	1.8	0.181	|I O |	|	|	|	1.2
1276	0.4	1.8	0.179	|I O |	|	|	|	1.2
1277	0.4	1.8	0.177	|I O |	|	|	|	1.2
1278	0.4	1.8	0.175	|I O |	|	|	|	1.2
1279	0.4	1.8	0.173	|I O |	|	|	|	1.2
1280	0.4	1.8	0.171	|I O |	|	|	|	1.2
1281	0.4	1.8	0.169	|I O |	|	|	|	1.2
1282	0.4	1.8	0.167	|I O |	|	|	|	1.2
1283	0.4	1.8	0.165	|I O |	|	|	|	1.1
1284	0.3	1.8	0.163	|I O |	|	|	|	1.1
1285	0.2	1.8	0.161	I O |	|	|	|	1.1
1286	0.3	1.8	0.159	|I O |	|	|	|	1.1
1287	0.2	1.8	0.157	I O |	|	|	|	1.1
1288	0.2	1.8	0.154	I O |	|	|	|	1.1
1289	0.2	1.8	0.152	I O |	|	|	|	1.1
1290	0.2	1.8	0.150	I O |	|	|	|	1.1
1291	0.2	1.8	0.148	I O |	|	|	|	1.0
1292	0.2	1.8	0.146	I O |	|	|	|	1.0
1293	0.2	1.8	0.143	I O |	|	|	|	1.0
1294	0.2	1.8	0.141	I O |	|	|	|	1.0
1295	0.2	1.8	0.139	I O |	|	|	|	1.0
1296	0.2	1.8	0.137	I O |	|	|	|	1.0
1297	0.2	1.7	0.135	I O |	|	|	|	1.0
1298	0.2	1.7	0.133	I O |	|	|	|	0.9
1299	0.2	1.7	0.131	I O |	|	|	|	0.9
1300	0.2	1.7	0.129	I O |	|	|	|	0.9
1310	0.2	1.4	0.110	I O |	|	|	|	0.8
1320	0.2	1.2	0.095	I O |	|	|	|	0.7
1330	0.2	1.1	0.082	I O |	|	|	|	0.6
1340	0.2	0.9	0.071	I O |	|	|	|	0.5
1350	0.2	0.8	0.062	I O |	|	|	|	0.4
1360	0.2	0.7	0.055	I O |	|	|	|	0.4
1370	0.2	0.6	0.048	I O |	|	|	|	0.3
1380	0.2	0.6	0.043	IO |	|	|	|	0.3

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1390	0.2	0.5	0.039	IO	|	|	|	0.3
1400	0.0	0.4	0.033	IO	|	|	|	0.2
1420	0.2	0.3	0.026	IO	|	|	|	0.2
1440	0.2	0.3	0.023	IO	|	|	|	0.2
1460	0.1	0.2	0.019	O	|	|	|	0.1
1500	0.0	0.1	0.011	O	|	|	|	0.1

Remaining water in basin = 0.01 (Ac.Ft)
Peak flow out of basin = 1.90(CFS)
Peak flow time = 1183 Min., time interval # = 69
Maximum depth in basin = 1.91(Ft.)

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Study Date : 02/20/13 Input hydrograph file name : ms005p.HYD
Output hydrograph file name: msdet005.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.140	1.800	0.139	0.141
1.920	0.300	1.900	0.299	0.301
2.000	0.320	2.100	0.319	0.321
3.000	0.550	3.300	0.548	0.552
3.500	0.680	4.000	0.677	0.683

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 1 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.05 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	0.3	0.5	0.8	1.0	Depth (Ft.)
0	0.0	0.0	0.000	O	|	|	|	|	0.0
100	0.0	0.0	0.000	O	|	|	|	|	0.0
200	0.0	0.0	0.000	O	|	|	|	|	0.0
300	0.0	0.0	0.000	O	|	|	|	|	0.0
400	0.0	0.0	0.000	O	|	|	|	|	0.0
500	0.0	0.0	0.000	O	|	|	|	|	0.0
600	0.0	0.0	0.000	O	|	|	|	|	0.0
700	0.0	0.0	0.000	O	|	|	|	|	0.0
800	0.0	0.0	0.000	O	|	|	|	|	0.0
900	0.0	0.0	0.000	O	|	|	|	|	0.0
1000	0.0	0.0	0.000	O	|	|	|	|	0.0
1050	0.0	0.0	0.000	O	|	|	|	|	0.0
1100	0.0	0.0	0.000	O	|	|	|	|	0.0
1110	0.0	0.0	0.000	O	|	|	|	|	0.0
1120	0.0	0.0	0.000	O	|	|	|	|	0.0
1130	0.0	0.0	0.000	O	|	|	|	|	0.0
1131	0.0	0.0	0.000	O	|	|	|	|	0.0
1132	0.0	0.0	0.000	O	|	|	|	|	0.0
1133	0.0	0.0	0.000	O	|	|	|	|	0.0
1134	0.0	0.0	0.000	O	|	|	|	|	0.0
1135	0.0	0.0	0.000	O	|	|	|	|	0.0
1136	0.0	0.0	0.000	O	|	|	|	|	0.0
1137	0.0	0.0	0.000	O	|	|	|	|	0.0
1138	0.0	0.0	0.000	O	|	|	|	|	0.0

1139	0.0	0.0	0.000	O | | | | 0.0
1140	0.0	0.0	0.000	O | | | | 0.0
1141	0.0	0.0	0.000	O | | | | 0.0
1142	0.2	0.0	0.000	O I | | | | 0.0
1143	0.2	0.0	0.001	O I | | | | 0.0
1144	0.2	0.0	0.001	O I | | | | 0.0
1145	0.2	0.0	0.001	O I | | | | 0.0
1146	0.2	0.0	0.001	O I | | | | 0.0
1147	0.2	0.0	0.002	O I | | | | 0.0
1148	0.2	0.0	0.002	O I | | | | 0.0
1149	0.2	0.0	0.002	O I | | | | 0.0
1150	0.3	0.0	0.002	O | I | | | 0.0
1151	0.3	0.0	0.003	|O | I | | | 0.0
1152	0.5	0.0	0.003	|O | | I | | 0.0
1153	0.7	0.1	0.004	|O | | | I | 0.0
1154	0.8	0.1	0.005	| O | | | I | 0.0
1155	0.9	0.1	0.006	| O | | | | I | 0.0
1156	0.9	0.1	0.008	| O | | | | I | 0.1
1157	1.0	0.1	0.009	| O | | | | | I 0.1
1158	1.0	0.1	0.010	| O | | | | | I 0.1
1159	1.0	0.1	0.011	| O | | | | | I 0.1
1160	1.0	0.2	0.012	| O | | | | | I 0.1
1161	0.9	0.2	0.013	| O | | | | I | 0.1
1162	0.9	0.2	0.014	| O | | | | I | 0.1
1163	0.9	0.2	0.015	| O | | | | I | 0.1
1164	0.8	0.2	0.016	| O | | | I | | 0.1
1165	0.7	0.2	0.017	| O | | | I | | 0.1
1166	0.7	0.2	0.018	| O| | | I | | 0.1
1167	0.6	0.2	0.018	| O| | I | | | 0.1
1168	0.6	0.2	0.019	| O| | I | | | 0.1
1169	0.6	0.2	0.019	| O| | I | | | 0.1
1170	0.5	0.2	0.019	| O| | I | | | 0.1
1171	0.5	0.3	0.020	| O | I | | | 0.1
1172	0.5	0.3	0.020	| O | I | | | 0.1
1173	0.5	0.3	0.020	| O | I | | | 0.1
1174	0.5	0.3	0.021	| O | I | | | 0.1
1175	0.4	0.3	0.021	| O I | | | | 0.1
1176	0.4	0.3	0.021	| O I | | | | 0.2
1177	0.4	0.3	0.021	| O I | | | | 0.2
1178	0.4	0.3	0.021	| O I | | | | 0.2
1179	0.4	0.3	0.022	| O I | | | | 0.2
1180	0.4	0.3	0.022	| O I | | | | 0.2
1181	0.4	0.3	0.022	| |O I | | | | 0.2
1182	0.4	0.3	0.022	| |O I | | | | 0.2
1183	0.4	0.3	0.022	| |O I | | | | 0.2
1184	0.4	0.3	0.022	| |O I | | | | 0.2
1185	0.3	0.3	0.022	| |O | | | | 0.2
1186	0.3	0.3	0.022	| |O | | | | 0.2
1187	0.3	0.3	0.022	| |O | | | | 0.2
1188	0.3	0.3	0.022	| |O | | | | 0.2
1189	0.3	0.3	0.022	| |O | | | | 0.2
1190	0.3	0.3	0.022	| |O | | | | 0.2
1191	0.3	0.3	0.023	| |O | | | | 0.2
1192	0.3	0.3	0.023	| |O | | | | 0.2
1193	0.3	0.3	0.023	| |O | | | | 0.2
1194	0.3	0.3	0.023	| |O | | | | 0.2
1195	0.3	0.3	0.023	| |O | | | | 0.2
1196	0.3	0.3	0.023	| |O | | | | 0.2
1197	0.3	0.3	0.023	| |O | | | | 0.2
1198	0.3	0.3	0.023	| |O | | | | 0.2
1199	0.3	0.3	0.023	| |O | | | | 0.2
1200	0.3	0.3	0.023	| |O | | | | 0.2
1201	0.3	0.3	0.023	| |O | | | | 0.2

1202	0.3	0.3	0.023	|	|O	|	|	0.2
1203	0.3	0.3	0.023	|	|O	|	|	0.2
1204	0.3	0.3	0.023	|	|O	|	|	0.2
1205	0.3	0.3	0.023	|	|O	|	|	0.2
1206	0.3	0.3	0.023	|	|O	|	|	0.2
1207	0.2	0.3	0.023	|	I |O	|	|	0.2
1208	0.2	0.3	0.022	|	I |O	|	|	0.2
1209	0.1	0.3	0.022	| I	|O	|	|	0.2
1210	0.2	0.3	0.022	|	I |O	|	|	0.2
1211	0.1	0.3	0.022	| I	O	|	|	0.2
1212	0.1	0.3	0.022	| I	O	|	|	0.2
1213	0.1	0.3	0.021	| I	O	|	|	0.2
1214	0.1	0.3	0.021	| I	O	|	|	0.2
1215	0.1	0.3	0.021	| I	O	|	|	0.1
1216	0.1	0.3	0.021	| I	O	|	|	0.1
1217	0.1	0.3	0.020	| I	O	|	|	0.1
1218	0.1	0.3	0.020	| I	O	|	|	0.1
1219	0.1	0.3	0.020	| I	O	|	|	0.1
1220	0.1	0.3	0.020	| I	O	|	|	0.1
1221	0.1	0.3	0.020	| I	O	|	|	0.1
1222	0.1	0.2	0.019	| I	O|	|	|	0.1
1223	0.1	0.2	0.019	| I	O|	|	|	0.1
1224	0.1	0.2	0.019	| I	O|	|	|	0.1
1225	0.1	0.2	0.019	| I	O|	|	|	0.1
1226	0.1	0.2	0.019	| I	O|	|	|	0.1
1227	0.1	0.2	0.018	| I	O|	|	|	0.1
1228	0.1	0.2	0.018	| I	O|	|	|	0.1
1229	0.1	0.2	0.018	| I	O|	|	|	0.1
1230	0.1	0.2	0.018	| I	O|	|	|	0.1
1231	0.1	0.2	0.018	| I	O|	|	|	0.1
1232	0.1	0.2	0.017	| I	O|	|	|	0.1
1233	0.1	0.2	0.017	| I	O|	|	|	0.1
1234	0.1	0.2	0.017	| I	O|	|	|	0.1
1235	0.1	0.2	0.017	| I	O |	|	|	0.1
1236	0.1	0.2	0.017	| I	O |	|	|	0.1
1237	0.1	0.2	0.017	| I	O |	|	|	0.1
1238	0.1	0.2	0.016	| I	O |	|	|	0.1
1239	0.1	0.2	0.016	| I	O |	|	|	0.1
1240	0.1	0.2	0.016	| I	O |	|	|	0.1
1241	0.1	0.2	0.016	| I	O |	|	|	0.1
1242	0.1	0.2	0.016	| I	O |	|	|	0.1
1243	0.1	0.2	0.016	| I	O |	|	|	0.1
1244	0.1	0.2	0.016	| I	O |	|	|	0.1
1245	0.1	0.2	0.015	| I	O |	|	|	0.1
1246	0.1	0.2	0.015	| I	O |	|	|	0.1
1247	0.1	0.2	0.015	| I	O |	|	|	0.1
1248	0.1	0.2	0.015	| I	O |	|	|	0.1
1249	0.1	0.2	0.015	| I	O |	|	|	0.1
1250	0.1	0.2	0.015	| I	O |	|	|	0.1
1251	0.1	0.2	0.015	| I	O |	|	|	0.1
1252	0.1	0.2	0.015	| I	O |	|	|	0.1
1253	0.0	0.2	0.014	I	O |	|	|	0.1
1254	0.0	0.2	0.014	I	O |	|	|	0.1
1255	0.0	0.2	0.014	I	O |	|	|	0.1
1256	0.0	0.2	0.014	I	O |	|	|	0.1
1257	0.0	0.2	0.013	I	O |	|	|	0.1
1258	0.0	0.2	0.013	I	O |	|	|	0.1
1259	0.0	0.2	0.013	I	O |	|	|	0.1
1260	0.0	0.2	0.013	I	O |	|	|	0.1
1261	0.0	0.2	0.012	I	O |	|	|	0.1
1262	0.0	0.2	0.012	I	O |	|	|	0.1
1263	0.0	0.2	0.012	I	O |	|	|	0.1
1264	0.0	0.2	0.012	I	O |	|	|	0.1

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1265	0.0	0.1	0.012	I O	|	|	|	0.1
1266	0.0	0.1	0.011	I O	|	|	|	0.1
1267	0.0	0.1	0.011	I O	|	|	|	0.1
1268	0.0	0.1	0.011	I O	|	|	|	0.1
1269	0.0	0.1	0.011	I O	|	|	|	0.1
1270	0.0	0.1	0.011	I O	|	|	|	0.1
1271	0.0	0.1	0.010	I O	|	|	|	0.1
1272	0.0	0.1	0.010	I O	|	|	|	0.1
1273	0.0	0.1	0.010	I O	|	|	|	0.1
1274	0.0	0.1	0.010	I O	|	|	|	0.1
1275	0.0	0.1	0.010	I O	|	|	|	0.1
1276	0.0	0.1	0.010	I O	|	|	|	0.1
1277	0.0	0.1	0.009	I O	|	|	|	0.1
1278	0.0	0.1	0.009	I O	|	|	|	0.1
1279	0.0	0.1	0.009	I O	|	|	|	0.1
1280	0.0	0.1	0.009	I O	|	|	|	0.1
1281	0.0	0.1	0.009	I O	|	|	|	0.1
1282	0.0	0.1	0.009	I O	|	|	|	0.1
1283	0.0	0.1	0.008	I O	|	|	|	0.1
1284	0.0	0.1	0.008	I O	|	|	|	0.1
1285	0.0	0.1	0.008	I O	|	|	|	0.1
1286	0.0	0.1	0.008	I O	|	|	|	0.1
1287	0.0	0.1	0.008	I O	|	|	|	0.1
1288	0.0	0.1	0.008	I O	|	|	|	0.1
1289	0.0	0.1	0.008	I O	|	|	|	0.1
1290	0.0	0.1	0.007	I O	|	|	|	0.1
1291	0.0	0.1	0.007	I O	|	|	|	0.1
1292	0.0	0.1	0.007	I O	|	|	|	0.1
1293	0.0	0.1	0.007	I O	|	|	|	0.1
1294	0.0	0.1	0.007	I O	|	|	|	0.0
1295	0.0	0.1	0.007	I O	|	|	|	0.0
1296	0.0	0.1	0.007	I O	|	|	|	0.0
1297	0.0	0.1	0.007	I O	|	|	|	0.0
1298	0.0	0.1	0.006	I O	|	|	|	0.0
1299	0.0	0.1	0.006	I O	|	|	|	0.0
1300	0.0	0.1	0.006	I O	|	|	|	0.0
1310	0.0	0.1	0.005	I O	|	|	|	0.0
1320	0.0	0.1	0.004	IO	|	|	|	0.0
1330	0.0	0.0	0.004	IO	|	|	|	0.0
1340	0.0	0.0	0.003	IO	|	|	|	0.0
1350	0.0	0.0	0.003	IO	|	|	|	0.0
1360	0.0	0.0	0.002	O	|	|	|	0.0
1370	0.0	0.0	0.002	O	|	|	|	0.0
1380	0.0	0.0	0.002	O	|	|	|	0.0
1390	0.0	0.0	0.001	O	|	|	|	0.0
1400	0.0	0.0	0.001	O	|	|	|	0.0
1420	0.0	0.0	0.001	O	|	|	|	0.0
1440	0.0	0.0	0.001	O	|	|	|	0.0
1460	0.0	0.0	0.000	O	|	|	|	0.0
1500	0.0	0.0	0.000	O	|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 0.29(CFS)
Peak flow time = 1206 Min., time interval # = 92
Maximum depth in basin = 0.16(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 2 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.39 Ac. Ft.

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msdet005

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 1.5 3.0 4.4 5.9	Depth (Ft.)
0	0.0	0.0	0.000	O	0.0
100	0.0	0.0	0.000	O	0.0
200	0.0	0.0	0.000	O	0.0
300	0.0	0.0	0.000	O	0.0
400	0.0	0.0	0.000	O	0.0
500	0.0	0.0	0.000	O	0.0
600	0.0	0.0	0.000	O	0.0
700	0.0	0.0	0.000	O	0.0
800	0.0	0.0	0.000	O	0.0
900	0.0	0.0	0.000	O	0.0
1000	0.2	0.1	0.008	OI	0.1
1050	0.3	0.2	0.015	|O	0.1
1100	0.3	0.3	0.020	|O	0.1
1110	0.6	0.3	0.023	|O I	0.2
1120	0.8	0.4	0.028	|O I	0.2
1130	1.2	0.5	0.036	| O I	0.3
1131	1.2	0.5	0.037	| O I	0.3
1132	1.3	0.5	0.039	| O I	0.3
1133	1.4	0.5	0.040	| O I	0.3
1134	1.4	0.5	0.041	| O I	0.3
1135	1.5	0.5	0.042	| O I	0.3
1136	1.6	0.6	0.044	| O I	0.3
1137	1.7	0.6	0.045	| O |I	0.3
1138	1.7	0.6	0.047	| O |I	0.3
1139	1.8	0.6	0.048	| O |I	0.3
1140	1.9	0.6	0.050	| O | I	0.4
1141	2.0	0.7	0.052	| O | I	0.4
1142	2.0	0.7	0.054	| O | I	0.4
1143	2.1	0.7	0.056	| O | I	0.4
1144	2.2	0.7	0.058	| O | I	0.4
1145	2.4	0.8	0.060	| O | I	0.4
1146	2.5	0.8	0.062	| O | I	0.4
1147	2.6	0.8	0.065	| O | I	0.5
1148	2.7	0.9	0.067	| O | I	0.5
1149	2.9	0.9	0.070	| O | I	0.5
1150	3.2	0.9	0.073	| O | I	0.5
1151	3.6	1.0	0.077	| O | I	0.5
1152	4.1	1.0	0.081	| O | I	0.6
1153	4.7	1.1	0.086	| O | I	0.6
1154	5.2	1.2	0.092	| O | I	0.7
1155	5.6	1.3	0.098	| O | I	0.7
1156	5.9	1.3	0.104	| O | I	0.7
1157	5.9	1.4	0.110	| O | I	0.8
1158	5.8	1.5	0.116	| O | I	0.8
1159	5.4	1.6	0.122	| O | I	0.9
1160	4.9	1.6	0.126	| O | I	0.9
1161	4.4	1.7	0.130	| O | I	0.9
1162	3.9	1.7	0.133	| O | I	1.0
1163	3.4	1.7	0.135	| O | I	1.0
1164	3.1	1.8	0.137	| O | I	1.0
1165	2.7	1.8	0.139	| O | I	1.0
1166	2.5	1.8	0.140	| O | I	1.0
1167	2.3	1.8	0.140	| O | I	1.0
1168	2.1	1.8	0.141	| O | I	1.0
1169	1.9	1.8	0.141	| O | I	1.0
1170	1.8	1.8	0.141	| O | I	1.0
1171	1.6	1.8	0.140	| O | I	1.0
1172	1.6	1.8	0.140	| O | I	1.0
1173	1.5	1.8	0.140	| O | I	1.0

1174	1.5	1.8	0.139		IO			1.0
1175	1.4	1.8	0.139		I|O			1.0
1176	1.4	1.8	0.138		I|O			1.0
1177	1.3	1.8	0.138		I|O			1.0
1178	1.3	1.8	0.137		I|O			1.0
1179	1.3	1.8	0.136		I|O			1.0
1180	1.3	1.7	0.136		I|O			1.0
1181	1.2	1.7	0.135		I |O			1.0
1182	1.2	1.7	0.134		I |O			1.0
1183	1.2	1.7	0.134		I |O			1.0
1184	1.2	1.7	0.133		I |O			0.9
1185	1.2	1.7	0.132		I |O			0.9
1186	1.1	1.7	0.131		I |O			0.9
1187	1.1	1.7	0.131		I |O			0.9
1188	1.1	1.7	0.130		I |O			0.9
1189	1.0	1.7	0.129		I O			0.9
1190	1.0	1.6	0.128		I O			0.9
1191	1.0	1.6	0.127		I O			0.9
1192	1.0	1.6	0.126		I O			0.9
1193	1.0	1.6	0.125		I O			0.9
1194	1.0	1.6	0.125		I O			0.9
1195	0.9	1.6	0.124		I O			0.9
1196	0.9	1.6	0.123		I O			0.9
1197	0.9	1.6	0.122		I O			0.9
1198	0.9	1.6	0.121		I O			0.9
1199	0.9	1.5	0.120		I O			0.9
1200	0.9	1.5	0.119		I O			0.9
1201	0.9	1.5	0.118		I O			0.8
1202	0.9	1.5	0.117		I O			0.8
1203	0.9	1.5	0.116		I O			0.8
1204	0.9	1.5	0.116		I O			0.8
1205	0.9	1.5	0.115		I O			0.8
1206	0.8	1.5	0.114		I O|			0.8
1207	0.8	1.5	0.113		I O|			0.8
1208	0.8	1.4	0.112		I O|			0.8
1209	0.8	1.4	0.111		I O|			0.8
1210	0.8	1.4	0.110		I O|			0.8
1211	0.8	1.4	0.110		I O|			0.8
1212	0.8	1.4	0.109		I O|			0.8
1213	0.8	1.4	0.108		I O|			0.8
1214	0.8	1.4	0.107		I O|			0.8
1215	0.8	1.4	0.106		I O|			0.8
1216	0.8	1.4	0.106		I O|			0.8
1217	0.8	1.3	0.105		I O|			0.7
1218	0.8	1.3	0.104		I O|			0.7
1219	0.7	1.3	0.103		I O|			0.7
1220	0.7	1.3	0.102		I O|			0.7
1221	0.7	1.3	0.101		I O|			0.7
1222	0.7	1.3	0.101		I O|			0.7
1223	0.7	1.3	0.100		I O |			0.7
1224	0.7	1.3	0.099		I O |			0.7
1225	0.7	1.3	0.098		I O |			0.7
1226	0.7	1.3	0.097		I O |			0.7
1227	0.7	1.2	0.097		I O |			0.7
1228	0.7	1.2	0.096		I O |			0.7
1229	0.7	1.2	0.095		I O |			0.7
1230	0.7	1.2	0.095		I O |			0.7
1231	0.7	1.2	0.094		I O |			0.7
1232	0.7	1.2	0.093		I O |			0.7
1233	0.7	1.2	0.092		I O |			0.7
1234	0.7	1.2	0.092		I O |			0.7
1235	0.6	1.2	0.091		I O |			0.7
1236	0.6	1.2	0.090		I O |			0.6

1237	0.6	1.2	0.089	| I O |	|	|	|	0.6
1238	0.6	1.1	0.089	| I O |	|	|	|	0.6
1239	0.6	1.1	0.088	| I O |	|	|	|	0.6
1240	0.6	1.1	0.087	| I O |	|	|	|	0.6
1241	0.6	1.1	0.087	| I O |	|	|	|	0.6
1242	0.6	1.1	0.086	| I O |	|	|	|	0.6
1243	0.6	1.1	0.085	| I O |	|	|	|	0.6
1244	0.6	1.1	0.084	| I O |	|	|	|	0.6
1245	0.6	1.1	0.084	| I O |	|	|	|	0.6
1246	0.5	1.1	0.083	| I O |	|	|	|	0.6
1247	0.5	1.1	0.082	| I O |	|	|	|	0.6
1248	0.5	1.0	0.081	| I O |	|	|	|	0.6
1249	0.5	1.0	0.081	| I O |	|	|	|	0.6
1250	0.5	1.0	0.080	| I O |	|	|	|	0.6
1251	0.5	1.0	0.079	| I O |	|	|	|	0.6
1252	0.5	1.0	0.079	| I O |	|	|	|	0.6
1253	0.5	1.0	0.078	| I O |	|	|	|	0.6
1254	0.5	1.0	0.077	| I O |	|	|	|	0.6
1255	0.5	1.0	0.077	| I O |	|	|	|	0.5
1256	0.5	1.0	0.076	| I O |	|	|	|	0.5
1257	0.5	1.0	0.075	| I O |	|	|	|	0.5
1258	0.5	1.0	0.075	| I O |	|	|	|	0.5
1259	0.5	1.0	0.074	| I O |	|	|	|	0.5
1260	0.5	0.9	0.073	| I O |	|	|	|	0.5
1261	0.5	0.9	0.073	| I O |	|	|	|	0.5
1262	0.5	0.9	0.072	| I O |	|	|	|	0.5
1263	0.5	0.9	0.072	| I O |	|	|	|	0.5
1264	0.5	0.9	0.071	| I O |	|	|	|	0.5
1265	0.5	0.9	0.070	| I O |	|	|	|	0.5
1266	0.5	0.9	0.070	| I O |	|	|	|	0.5
1267	0.4	0.9	0.069	| I O |	|	|	|	0.5
1268	0.3	0.9	0.068	|I O |	|	|	|	0.5
1269	0.4	0.9	0.068	| I O |	|	|	|	0.5
1270	0.3	0.9	0.067	|I O |	|	|	|	0.5
1271	0.3	0.9	0.066	|I O |	|	|	|	0.5
1272	0.3	0.8	0.065	|I O |	|	|	|	0.5
1273	0.2	0.8	0.065	|I O |	|	|	|	0.5
1274	0.3	0.8	0.064	|I O |	|	|	|	0.5
1275	0.2	0.8	0.063	|I O |	|	|	|	0.4
1276	0.2	0.8	0.062	|I O |	|	|	|	0.4
1277	0.1	0.8	0.061	I O |	|	|	|	0.4
1278	0.1	0.8	0.060	I O |	|	|	|	0.4
1279	0.1	0.8	0.059	I O |	|	|	|	0.4
1280	0.1	0.8	0.058	I O |	|	|	|	0.4
1281	0.1	0.7	0.058	I O |	|	|	|	0.4
1282	0.1	0.7	0.057	I O |	|	|	|	0.4
1283	0.1	0.7	0.056	I O |	|	|	|	0.4
1284	0.1	0.7	0.055	I O |	|	|	|	0.4
1285	0.1	0.7	0.054	I O |	|	|	|	0.4
1286	0.1	0.7	0.053	I O |	|	|	|	0.4
1287	0.1	0.7	0.053	I O |	|	|	|	0.4
1288	0.1	0.7	0.052	I O |	|	|	|	0.4
1289	0.1	0.7	0.051	I O |	|	|	|	0.4
1290	0.1	0.6	0.050	I O |	|	|	|	0.4
1291	0.1	0.6	0.049	I O |	|	|	|	0.4
1292	0.1	0.6	0.049	I O |	|	|	|	0.3
1293	0.1	0.6	0.048	I O |	|	|	|	0.3
1294	0.1	0.6	0.047	I O |	|	|	|	0.3
1295	0.1	0.6	0.047	I O |	|	|	|	0.3
1296	0.1	0.6	0.046	I O |	|	|	|	0.3
1297	0.1	0.6	0.045	I O |	|	|	|	0.3
1298	0.1	0.6	0.045	I O |	|	|	|	0.3
1299	0.1	0.6	0.044	I O |	|	|	|	0.3

1300	0.1	0.6	0.043	I O	|	|	|	0.3
1310	0.1	0.5	0.038	I O	|	|	|	0.3
1320	0.1	0.4	0.033	I O	|	|	|	0.2
1330	0.1	0.4	0.029	IO	|	|	|	0.2
1340	0.1	0.3	0.025	IO	|	|	|	0.2
1350	0.1	0.3	0.022	IO	|	|	|	0.2
1360	0.1	0.3	0.020	IO	|	|	|	0.1
1370	0.1	0.2	0.018	IO	|	|	|	0.1
1380	0.1	0.2	0.016	IO	|	|	|	0.1
1390	0.1	0.2	0.015	IO	|	|	|	0.1
1400	0.1	0.2	0.014	O	|	|	|	0.1
1420	0.1	0.2	0.012	O	|	|	|	0.1
1440	0.1	0.1	0.011	O	|	|	|	0.1
1460	0.1	0.1	0.010	O	|	|	|	0.1
1500	0.2	0.1	0.011	OI	|	|	|	0.1

Remaining water in basin = 0.01 (Ac.Ft)
Peak flow out of basin = 1.80(CFS)
Peak flow time = 1169 Min., time interval # = 55
Maximum depth in basin = 1.00(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 3 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.29 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	1.5	3.0	4.4	5.9	Depth (Ft.)
0	0.0	0.1	0.011	O	|	|	|	|	0.1
100	0.0	0.0	0.002	O	|	|	|	|	0.0
200	0.0	0.0	0.000	O	|	|	|	|	0.0
300	0.0	0.0	0.000	O	|	|	|	|	0.0
400	0.0	0.0	0.000	O	|	|	|	|	0.0
500	0.0	0.0	0.000	O	|	|	|	|	0.0
600	0.0	0.0	0.000	O	|	|	|	|	0.0
700	0.0	0.0	0.000	O	|	|	|	|	0.0
800	0.0	0.0	0.000	O	|	|	|	|	0.0
900	0.0	0.0	0.000	O	|	|	|	|	0.0
1000	0.2	0.1	0.008	OI	|	|	|	|	0.1
1050	0.2	0.2	0.013	OI	|	|	|	|	0.1
1100	0.3	0.2	0.017	|O	|	|	|	|	0.1
1110	0.3	0.2	0.018	|O	|	|	|	|	0.1
1120	0.6	0.3	0.021	|O I	|	|	|	|	0.2
1130	1.0	0.4	0.028	|O I	|	|	|	|	0.2
1131	1.0	0.4	0.029	| O I	|	|	|	|	0.2
1132	1.1	0.4	0.030	| O I	|	|	|	|	0.2
1133	1.1	0.4	0.031	| O I	|	|	|	|	0.2
1134	1.2	0.4	0.032	| O I	|	|	|	|	0.2
1135	1.2	0.4	0.033	| O I	|	|	|	|	0.2
1136	1.3	0.4	0.034	| O I|	|	|	|	|	0.2
1137	1.3	0.5	0.035	| O I|	|	|	|	|	0.3
1138	1.3	0.5	0.037	| O I|	|	|	|	|	0.3
1139	1.4	0.5	0.038	| O I|	|	|	|	|	0.3
1140	1.4	0.5	0.039	| O I|	|	|	|	|	0.3
1141	1.5	0.5	0.040	| O I	|	|	|	|	0.3
1142	1.5	0.5	0.042	| O I	|	|	|	|	0.3
1143	1.6	0.6	0.043	| O I	|	|	|	|	0.3
1144	1.8	0.6	0.045	| O |I	|	|	|	|	0.3
1145	1.9	0.6	0.047	| O | I	|	|	|	|	0.3

1146	2.0	0.6	0.049	O	I			0.3
1147	2.1	0.7	0.051	O	I			0.4
1148	2.3	0.7	0.053	O	I			0.4
1149	2.5	0.7	0.055	O	I			0.4
1150	2.8	0.7	0.058	O	I			0.4
1151	3.1	0.8	0.061	O	I			0.4
1152	3.5	0.8	0.065	O	I			0.5
1153	3.9	0.9	0.069	O	I			0.5
1154	4.4	1.0	0.074	O	I			0.5
1155	4.8	1.0	0.079	O	I			0.6
1156	5.0	1.1	0.085	O	I			0.6
1157	5.1	1.2	0.090	O	I			0.6
1158	5.0	1.2	0.096	O	I			0.7
1159	4.7	1.3	0.100	O	I			0.7
1160	4.4	1.3	0.105	O	I			0.7
1161	4.0	1.4	0.108	O	I			0.8
1162	3.5	1.4	0.111	O	I			0.8
1163	3.1	1.5	0.113	O	I			0.8
1164	2.7	1.5	0.115	O	I			0.8
1165	2.5	1.5	0.116	O	I			0.8
1166	2.2	1.5	0.117	O	I			0.8
1167	2.0	1.5	0.118	O	I			0.8
1168	1.9	1.5	0.119	O	I			0.8
1169	1.7	1.5	0.119	O	I			0.8
1170	1.6	1.5	0.119	O				0.8
1171	1.5	1.5	0.119	O				0.8
1172	1.4	1.5	0.119	I	O			0.8
1173	1.4	1.5	0.119	I	O			0.8
1174	1.3	1.5	0.118	I	O			0.8
1175	1.3	1.5	0.118	I	O			0.8
1176	1.3	1.5	0.118	I	O			0.8
1177	1.2	1.5	0.117	I	O			0.8
1178	1.2	1.5	0.117	I	O			0.8
1179	1.2	1.5	0.116	I	O			0.8
1180	1.2	1.5	0.116	I	O			0.8
1181	1.1	1.5	0.115	I	O			0.8
1182	1.0	1.5	0.115	I	O			0.8
1183	1.0	1.5	0.114	I	O			0.8
1184	1.0	1.5	0.113	I	O			0.8
1185	0.9	1.4	0.113	I	O			0.8
1186	0.9	1.4	0.112	I	O			0.8
1187	0.9	1.4	0.111	I	O			0.8
1188	0.9	1.4	0.110	I	O			0.8
1189	0.8	1.4	0.110	I	O			0.8
1190	0.8	1.4	0.109	I	O			0.8
1191	0.8	1.4	0.108	I	O			0.8
1192	0.8	1.4	0.107	I	O			0.8
1193	0.8	1.4	0.106	I	O			0.8
1194	0.8	1.4	0.106	I	O			0.8
1195	0.8	1.3	0.105	I	O			0.7
1196	0.8	1.3	0.104	I	O			0.7
1197	0.7	1.3	0.103	I	O			0.7
1198	0.7	1.3	0.102	I	O			0.7
1199	0.7	1.3	0.102	I	O			0.7
1200	0.7	1.3	0.101	I	O			0.7
1201	0.7	1.3	0.100	I	O			0.7
1202	0.7	1.3	0.099	I	O			0.7
1203	0.7	1.3	0.098	I	O			0.7
1204	0.7	1.3	0.098	I	O			0.7
1205	0.7	1.2	0.097	I	O			0.7
1206	0.7	1.2	0.096	I	O			0.7
1207	0.7	1.2	0.095	I	O			0.7
1208	0.7	1.2	0.095	I	O			0.7

1209	0.7	1.2	0.094	| I O |				0.7
1210	0.7	1.2	0.093	| I O |				0.7
1211	0.6	1.2	0.092	| I O |				0.7
1212	0.6	1.2	0.092	| I O |				0.7
1213	0.6	1.2	0.091	| I O |				0.6
1214	0.6	1.2	0.090	| I O |				0.6
1215	0.6	1.1	0.089	| I O |				0.6
1216	0.6	1.1	0.089	| I O |				0.6
1217	0.6	1.1	0.088	| I O |				0.6
1218	0.6	1.1	0.087	| I O |				0.6
1219	0.5	1.1	0.086	| I O |				0.6
1220	0.5	1.1	0.085	| I O |				0.6
1221	0.5	1.1	0.085	| I O |				0.6
1222	0.5	1.1	0.084	| I O |				0.6
1223	0.5	1.1	0.083	| I O |				0.6
1224	0.5	1.1	0.082	| I O |				0.6
1225	0.5	1.0	0.081	| I O |				0.6
1226	0.5	1.0	0.081	| I O |				0.6
1227	0.5	1.0	0.080	| I O |				0.6
1228	0.5	1.0	0.079	| I O |				0.6
1229	0.5	1.0	0.079	| I O |				0.6
1230	0.5	1.0	0.078	| I O |				0.6
1231	0.5	1.0	0.077	| I O |				0.6
1232	0.5	1.0	0.076	| I O |				0.5
1233	0.5	1.0	0.076	| I O |				0.5
1234	0.5	1.0	0.075	| I O |				0.5
1235	0.4	1.0	0.074	| I O |				0.5
1236	0.4	0.9	0.074	| I O |				0.5
1237	0.4	0.9	0.073	| I O |				0.5
1238	0.4	0.9	0.072	| I O |				0.5
1239	0.4	0.9	0.071	| I O |				0.5
1240	0.4	0.9	0.071	| I O |				0.5
1241	0.4	0.9	0.070	| I O |				0.5
1242	0.4	0.9	0.069	| I O |				0.5
1243	0.4	0.9	0.069	| I O |				0.5
1244	0.4	0.9	0.068	| I O |				0.5
1245	0.4	0.9	0.067	| I O |				0.5
1246	0.4	0.9	0.067	| I O |				0.5
1247	0.4	0.9	0.066	| I O |				0.5
1248	0.4	0.8	0.065	| I O |				0.5
1249	0.4	0.8	0.065	| I O |				0.5
1250	0.4	0.8	0.064	| I O |				0.5
1251	0.4	0.8	0.064	| I O |				0.5
1252	0.4	0.8	0.063	| I O |				0.5
1253	0.4	0.8	0.063	| I O |				0.4
1254	0.3	0.8	0.062	|I O |				0.4
1255	0.3	0.8	0.061	|I O |				0.4
1256	0.3	0.8	0.061	|I O |				0.4
1257	0.3	0.8	0.060	|I O |				0.4
1258	0.3	0.8	0.059	|I O |				0.4
1259	0.2	0.8	0.058	|I O |				0.4
1260	0.2	0.7	0.058	|I O |				0.4
1261	0.2	0.7	0.057	|I O |				0.4
1262	0.2	0.7	0.056	|I O |				0.4
1263	0.2	0.7	0.056	|I O |				0.4
1264	0.2	0.7	0.055	|I O |				0.4
1265	0.2	0.7	0.054	|I O |				0.4
1266	0.2	0.7	0.053	|I O |				0.4
1267	0.2	0.7	0.053	|I O |				0.4
1268	0.2	0.7	0.052	|I O |				0.4
1269	0.2	0.7	0.052	|I O |				0.4
1270	0.2	0.7	0.051	|I O |				0.4
1271	0.2	0.6	0.050	|I O |				0.4

1272	0.1	0.6	0.050	I	O	|	|	|	0.4
1273	0.1	0.6	0.049	I	O	|	|	|	0.3
1274	0.1	0.6	0.048	I	O	|	|	|	0.3
1275	0.1	0.6	0.047	I	O	|	|	|	0.3
1276	0.0	0.6	0.047	I	O	|	|	|	0.3
1277	0.0	0.6	0.046	I	O	|	|	|	0.3
1278	0.0	0.6	0.045	I	O	|	|	|	0.3
1279	0.0	0.6	0.044	I	O	|	|	|	0.3
1280	0.0	0.6	0.043	I	O	|	|	|	0.3
1281	0.0	0.5	0.043	I	O	|	|	|	0.3
1282	0.0	0.5	0.042	I	O	|	|	|	0.3
1283	0.0	0.5	0.041	I	O	|	|	|	0.3
1284	0.0	0.5	0.040	I	O	|	|	|	0.3
1285	0.0	0.5	0.040	I	O	|	|	|	0.3
1286	0.0	0.5	0.039	I	O	|	|	|	0.3
1287	0.0	0.5	0.038	I	O	|	|	|	0.3
1288	0.0	0.5	0.038	I	O	|	|	|	0.3
1289	0.0	0.5	0.037	I	O	|	|	|	0.3
1290	0.0	0.5	0.036	I	O	|	|	|	0.3
1291	0.0	0.5	0.036	I	O	|	|	|	0.3
1292	0.0	0.5	0.035	I	O	|	|	|	0.3
1293	0.0	0.4	0.034	I	O	|	|	|	0.2
1294	0.0	0.4	0.034	I	O	|	|	|	0.2
1295	0.0	0.4	0.033	I	O	|	|	|	0.2
1296	0.0	0.4	0.033	I	O	|	|	|	0.2
1297	0.0	0.4	0.032	I	O	|	|	|	0.2
1298	0.0	0.4	0.032	I	O	|	|	|	0.2
1299	0.0	0.4	0.031	I	O	|	|	|	0.2
1300	0.0	0.4	0.030	I	O	|	|	|	0.2
1310	0.0	0.3	0.025	I	O	|	|	|	0.2
1320	0.0	0.3	0.021	I	O	|	|	|	0.2
1330	0.0	0.2	0.018	I	O	|	|	|	0.1
1340	0.0	0.2	0.015	I	O	|	|	|	0.1
1350	0.0	0.2	0.013	O		|	|	|	0.1
1360	0.0	0.1	0.011	O		|	|	|	0.1
1370	0.0	0.1	0.009	O		|	|	|	0.1
1380	0.0	0.1	0.007	O		|	|	|	0.1
1390	0.0	0.1	0.006	O		|	|	|	0.0
1400	0.0	0.1	0.005	O		|	|	|	0.0
1420	0.0	0.0	0.004	O		|	|	|	0.0
1440	0.0	0.0	0.003	O		|	|	|	0.0
1460	0.0	0.0	0.002	O		|	|	|	0.0
1500	0.1	0.0	0.003	O		|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 1.53(CFS)
Peak flow time = 1170 Min., time interval # = 56
Maximum depth in basin = 0.85(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 4 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 1.68 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	4.9	9.8	14.6	19.5	Depth (Ft.)
0	0.0	0.0	0.003	O	|	|	|	|	0.0
100	0.2	0.1	0.009	O	|	|	|	|	0.1
200	0.2	0.2	0.014	O	|	|	|	|	0.1

300	0.3	0.3	0.020	O	|	|	|	|	0.1
400	0.3	0.3	0.023	O	|	|	|	|	0.2
500	0.3	0.3	0.023	O	|	|	|	|	0.2
600	0.3	0.3	0.023	O	|	|	|	|	0.2
700	0.3	0.3	0.023	O	|	|	|	|	0.2
800	0.4	0.4	0.027	O	|	|	|	|	0.2
900	0.7	0.6	0.043	OI	|	|	|	|	0.3
1000	1.3	1.0	0.077	|OI	|	|	|	|	0.6
1050	1.9	1.4	0.107	| OI	|	|	|	|	0.8
1100	2.6	1.8	0.151	| O I	|	|	|	|	1.1
1110	3.1	1.8	0.165	| O I	|	|	|	|	1.1
1120	3.7	1.8	0.187	| O I	|	|	|	|	1.3
1130	4.3	1.8	0.218	| O I|	|	|	|	|	1.4
1131	4.3	1.9	0.221	| O I|	|	|	|	|	1.5
1132	4.4	1.9	0.224	| O I|	|	|	|	|	1.5
1133	4.5	1.9	0.228	| O I|	|	|	|	|	1.5
1134	4.6	1.9	0.232	| O I|	|	|	|	|	1.5
1135	4.7	1.9	0.236	| O I|	|	|	|	|	1.6
1136	4.8	1.9	0.240	| O I|	|	|	|	|	1.6
1137	4.9	1.9	0.244	| O I	|	|	|	|	1.6
1138	5.0	1.9	0.248	| O I	|	|	|	|	1.6
1139	5.2	1.9	0.253	| O I	|	|	|	|	1.6
1140	5.3	1.9	0.258	| O I	|	|	|	|	1.7
1141	5.5	1.9	0.263	| O |I	|	|	|	|	1.7
1142	5.7	1.9	0.268	| O |I	|	|	|	|	1.7
1143	5.8	1.9	0.273	| O |I	|	|	|	|	1.8
1144	6.0	1.9	0.279	| O |I	|	|	|	|	1.8
1145	6.3	1.9	0.285	| O | I	|	|	|	|	1.8
1146	6.6	1.9	0.292	| O | I	|	|	|	|	1.9
1147	6.9	1.9	0.298	| O | I	|	|	|	|	1.9
1148	7.2	2.0	0.306	| O | I	|	|	|	|	1.9
1149	7.8	2.0	0.314	| O | I	|	|	|	|	2.0
1150	8.7	2.1	0.323	| O | I	|	|	|	|	2.0
1151	9.9	2.2	0.334	| O | I	|	|	|	|	2.1
1152	11.8	2.2	0.347	| O | I	|	|	|	|	2.1
1153	14.4	2.3	0.363	| O | I	|	|	|	|	2.2
1154	16.9	2.4	0.383	| O | I	|	|	|	|	2.3
1155	18.7	2.5	0.406	| O | I	|	|	|	|	2.4
1156	19.5	2.7	0.429	| O | I	|	|	|	|	2.5
1157	18.7	2.8	0.451	| O | I	|	|	|	|	2.6
1158	16.9	2.9	0.470	| O | I	|	|	|	|	2.7
1159	14.6	3.0	0.486	| O | I	|	|	|	|	2.7
1160	12.5	3.0	0.500	| O | I	|	|	|	|	2.8
1161	10.5	3.1	0.510	| O | I	|	|	|	|	2.8
1162	8.9	3.1	0.518	| O | I	|	|	|	|	2.9
1163	7.7	3.2	0.524	| O | I	|	|	|	|	2.9
1164	6.7	3.2	0.529	| O | I	|	|	|	|	2.9
1165	6.0	3.2	0.533	| O |I	|	|	|	|	2.9
1166	5.4	3.2	0.536	| O I	|	|	|	|	2.9
1167	5.0	3.2	0.538	| O I	|	|	|	|	2.9
1168	4.6	3.2	0.540	| O I|	|	|	|	|	3.0
1169	4.2	3.3	0.541	| OI |	|	|	|	|	3.0
1170	3.9	3.3	0.542	| OI |	|	|	|	|	3.0
1171	3.7	3.3	0.543	| OI |	|	|	|	|	3.0
1172	3.5	3.3	0.543	| O |	|	|	|	|	3.0
1173	3.4	3.3	0.543	| O |	|	|	|	|	3.0
1174	3.2	3.3	0.543	| O |	|	|	|	|	3.0
1175	3.1	3.3	0.543	| O |	|	|	|	|	3.0
1176	3.0	3.3	0.543	| IO |	|	|	|	|	3.0
1177	3.0	3.3	0.542	| IO |	|	|	|	|	3.0
1178	2.9	3.3	0.542	| IO |	|	|	|	|	3.0
1179	2.8	3.3	0.541	| IO |	|	|	|	|	3.0
1180	2.7	3.3	0.540	| IO |	|	|	|	|	3.0

1181	2.7	3.2	0.540		IO			3.0
1182	2.6	3.2	0.539		IO			3.0
1183	2.6	3.2	0.538		IO			2.9
1184	2.5	3.2	0.537		IO			2.9
1185	2.5	3.2	0.536		IO			2.9
1186	2.4	3.2	0.535		I O			2.9
1187	2.4	3.2	0.534		I O			2.9
1188	2.4	3.2	0.533		I O			2.9
1189	2.3	3.2	0.531		I O			2.9
1190	2.3	3.2	0.530		I O			2.9
1191	2.3	3.2	0.529		I O			2.9
1192	2.2	3.2	0.527		I O			2.9
1193	2.2	3.2	0.526		I O			2.9
1194	2.1	3.2	0.525		I O			2.9
1195	2.0	3.2	0.523		I O			2.9
1196	2.0	3.2	0.521		I O			2.9
1197	2.0	3.1	0.520		I O			2.9
1198	2.0	3.1	0.518		I O			2.9
1199	1.9	3.1	0.517		I O			2.9
1200	1.9	3.1	0.515		I O			2.8
1201	1.9	3.1	0.513		I O			2.8
1202	1.9	3.1	0.512		I O			2.8
1203	1.9	3.1	0.510		I O			2.8
1204	1.8	3.1	0.508		I O			2.8
1205	1.8	3.1	0.506		I O			2.8
1206	1.8	3.1	0.505		I O			2.8
1207	1.8	3.1	0.503		I O			2.8
1208	1.8	3.0	0.501		I O			2.8
1209	1.8	3.0	0.499		I O			2.8
1210	1.8	3.0	0.498		I O			2.8
1211	1.7	3.0	0.496		I O			2.8
1212	1.7	3.0	0.494		I O			2.8
1213	1.7	3.0	0.492		I O			2.7
1214	1.6	3.0	0.490		I O			2.7
1215	1.6	3.0	0.489		I O			2.7
1216	1.5	3.0	0.487		I O			2.7
1217	1.5	3.0	0.484		I O			2.7
1218	1.4	2.9	0.482		I O			2.7
1219	1.4	2.9	0.480		I O			2.7
1220	1.4	2.9	0.478		I O			2.7
1221	1.4	2.9	0.476		I O			2.7
1222	1.4	2.9	0.474		I O			2.7
1223	1.3	2.9	0.472		I O			2.7
1224	1.3	2.9	0.470		I O			2.7
1225	1.3	2.9	0.467		I O			2.6
1226	1.3	2.9	0.465		I O			2.6
1227	1.3	2.8	0.463		I O			2.6
1228	1.3	2.8	0.461		I O			2.6
1229	1.3	2.8	0.459		I O			2.6
1230	1.3	2.8	0.457		I O			2.6
1231	1.2	2.8	0.455		I O			2.6
1232	1.2	2.8	0.452		I O			2.6
1233	1.2	2.8	0.450		I O			2.6
1234	1.2	2.8	0.448		I O			2.6
1235	1.2	2.8	0.446		I O			2.5
1236	1.2	2.7	0.444		I O			2.5
1237	1.2	2.7	0.442		I O			2.5
1238	1.2	2.7	0.440		I O			2.5
1239	1.1	2.7	0.437		I O			2.5
1240	1.1	2.7	0.435		I O			2.5
1241	1.0	2.7	0.433		I O			2.5
1242	1.0	2.7	0.430		I O			2.5
1243	1.0	2.7	0.428		I O			2.5

1244	1.0	2.7	0.426	|I O |				2.5
1245	0.9	2.6	0.423	|I O |				2.4
1246	0.9	2.6	0.421	|I O |				2.4
1247	0.9	2.6	0.419	|I O |				2.4
1248	0.9	2.6	0.416	|I O |				2.4
1249	0.9	2.6	0.414	|I O |				2.4
1250	0.9	2.6	0.412	|I O |				2.4
1251	0.9	2.6	0.409	|I O |				2.4
1252	0.9	2.6	0.407	|I O |				2.4
1253	0.8	2.5	0.405	|I O |				2.4
1254	0.8	2.5	0.402	|I O |				2.4
1255	0.8	2.5	0.400	|I O |				2.3
1256	0.8	2.5	0.398	|I O |				2.3
1257	0.8	2.5	0.395	|I O |				2.3
1258	0.8	2.5	0.393	|I O |				2.3
1259	0.8	2.5	0.391	|I O |				2.3
1260	0.8	2.5	0.388	|I O |				2.3
1261	0.8	2.4	0.386	|I O |				2.3
1262	0.8	2.4	0.384	|I O |				2.3
1263	0.8	2.4	0.382	|I O |				2.3
1264	0.8	2.4	0.379	|I O |				2.3
1265	0.8	2.4	0.377	|I O |				2.2
1266	0.7	2.4	0.375	|I O |				2.2
1267	0.7	2.4	0.372	|I O |				2.2
1268	0.7	2.4	0.370	|I O |				2.2
1269	0.7	2.3	0.368	|I O |				2.2
1270	0.7	2.3	0.366	|I O |				2.2
1271	0.6	2.3	0.363	I O |				2.2
1272	0.6	2.3	0.361	I O |				2.2
1273	0.6	2.3	0.358	I O |				2.2
1274	0.6	2.3	0.356	I O |				2.2
1275	0.6	2.3	0.354	I O |				2.1
1276	0.6	2.3	0.352	I O |				2.1
1277	0.6	2.3	0.349	I O |				2.1
1278	0.6	2.2	0.347	I O |				2.1
1279	0.6	2.2	0.345	I O |				2.1
1280	0.6	2.2	0.342	I O |				2.1
1281	0.6	2.2	0.340	I O |				2.1
1282	0.6	2.2	0.338	I O |				2.1
1283	0.6	2.2	0.336	I O |				2.1
1284	0.6	2.2	0.334	I O |				2.1
1285	0.6	2.2	0.332	I O |				2.1
1286	0.5	2.1	0.329	I O |				2.0
1287	0.5	2.1	0.327	I O |				2.0
1288	0.5	2.1	0.325	I O |				2.0
1289	0.5	2.1	0.323	I O |				2.0
1290	0.5	2.1	0.320	I O |				2.0
1291	0.5	2.1	0.318	I O |				2.0
1292	0.5	2.1	0.316	I O |				2.0
1293	0.5	2.0	0.314	I O |				2.0
1294	0.5	2.0	0.312	I O |				2.0
1295	0.5	2.0	0.310	I O |				2.0
1296	0.5	2.0	0.308	I O |				2.0
1297	0.5	2.0	0.306	I O |				1.9
1298	0.5	1.9	0.304	I O |				1.9
1299	0.5	1.9	0.302	I O |				1.9
1300	0.5	1.9	0.300	I O |				1.9
1310	0.4	1.9	0.280	I O |				1.8
1320	0.3	1.9	0.259	I O |				1.7
1330	0.4	1.9	0.238	I O |				1.6
1340	0.3	1.8	0.217	I O |				1.4
1350	0.3	1.8	0.196	I O |				1.3
1360	0.3	1.8	0.175	I O |				1.2

msdet005

1370	0.3	1.8	0.154	I O	|	|	|	1.1
1380	0.3	1.7	0.133	I O	|	|	|	1.0
1390	0.2	1.5	0.115	I O	|	|	|	0.8
1400	0.2	1.3	0.099	I O	|	|	|	0.7
1420	0.2	0.9	0.074	IO	|	|	|	0.5
1440	0.2	0.7	0.056	IO	|	|	|	0.4
1460	0.2	0.6	0.044	O	|	|	|	0.3
1500	0.2	0.4	0.029	O	|	|	|	0.2

Remaining water in basin = 0.03 (Ac.Ft)
Peak flow out of basin = 3.27(CFS)
Peak flow time = 1173 Min., time interval # = 59
Maximum depth in basin = 2.97(Ft.)

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Study Date : 02/20/13 Input hydrograph file name : ms010p.HYD
Output hydrograph file name: msdet010.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.140	1.800	0.139	0.141
1.920	0.300	1.900	0.299	0.301
2.000	0.320	2.100	0.319	0.321
3.000	0.550	3.300	0.548	0.552
3.470	0.680	13.200	0.671	0.689
4.000	0.830	15.000	0.820	0.840

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 1 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.06 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 0.3 0.7 1.0 1.4	Depth (Ft.)
0	0.0	0.0	0.000	O | | | |	0.0
100	0.0	0.0	0.000	O | | | |	0.0
200	0.0	0.0	0.000	O | | | |	0.0
300	0.0	0.0	0.000	O | | | |	0.0
400	0.0	0.0	0.000	O | | | |	0.0
500	0.0	0.0	0.000	O | | | |	0.0
600	0.0	0.0	0.000	O | | | |	0.0
700	0.0	0.0	0.000	O | | | |	0.0
800	0.0	0.0	0.000	O | | | |	0.0
900	0.0	0.0	0.000	O | | | |	0.0
1000	0.0	0.0	0.000	O | | | |	0.0
1050	0.0	0.0	0.000	O | | | |	0.0
1100	0.0	0.0	0.000	O | | | |	0.0
1110	0.0	0.0	0.000	O | | | |	0.0
1120	0.0	0.0	0.000	O | | | |	0.0
1130	0.0	0.0	0.000	O | | | |	0.0
1131	0.0	0.0	0.000	O | | | |	0.0
1132	0.0	0.0	0.000	O | | | |	0.0
1133	0.0	0.0	0.000	O | | | |	0.0
1134	0.0	0.0	0.000	O | | | |	0.0
1135	0.2	0.0	0.000	O I | | | |	0.0
1136	0.2	0.0	0.001	O I | | | |	0.0
1137	0.2	0.0	0.001	O I | | | |	0.0

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1138    0.2     0.0     0.001  O   I   |       |       |       |       0.0
1139    0.2     0.0     0.001  O   I   |       |       |       |       0.0
1140    0.2     0.0     0.002  O   I   |       |       |       |       0.0
1141    0.2     0.0     0.002  O   I   |       |       |       |       0.0
1142    0.2     0.0     0.002  O   I   |       |       |       |       0.0
1143    0.2     0.0     0.002  O   I   |       |       |       |       0.0
1144    0.2     0.0     0.003  O   I   |       |       |       |       0.0
1145    0.2     0.0     0.003  O   I   |       |       |       |       0.0
1146    0.3     0.0     0.003  O     I |       |       |       |       0.0
1147    0.3     0.0     0.003  |O    I |       |       |       |       0.0
1148    0.3     0.0     0.004  |O    I |       |       |       |       0.0
1149    0.3     0.1     0.004  |O    I |       |       |       |       0.0
1150    0.5     0.1     0.005  |O      |  I    |       |       |       0.0
1151    0.7     0.1     0.006  |O      |       I       |       |       0.0
1152    0.8     0.1     0.007  |O      |       | I     |       |       0.0
1153    1.0     0.1     0.008  | O     |       |     I |       |       0.1
1154    1.1     0.1     0.009  | O     |       |       |I      |       0.1
1155    1.2     0.1     0.011  |  O    |       |       |  I    |       0.1
1156    1.3     0.2     0.012  |  O    |       |       |    I  |       0.1
1157    1.4     0.2     0.014  |   O   |       |       |      I|       0.1
1158    1.4     0.2     0.016  |   O   |       |       |       I       0.1
1159    1.4     0.2     0.017  |    O  |       |       |       I       0.1
1160    1.3     0.2     0.019  |    O  |       |       |    I  |       0.1
1161    1.2     0.3     0.020  |    O  |       |       |  I    |       0.1
1162    1.1     0.3     0.021  |     O |       |       |I      |       0.2
1163    1.1     0.3     0.022  |     O |       |       |I      |       0.2
1164    1.0     0.3     0.023  |     O |       |     I |       |       0.2
1165    0.9     0.3     0.024  |      O|       |   I   |       |       0.2
1166    0.8     0.3     0.025  |      O|       | I     |       |       0.2
1167    0.8     0.3     0.025  |      O|       | I     |       |       0.2
1168    0.7     0.3     0.026  |      O|       I       |       |       0.2
1169    0.7     0.3     0.026  |      O|       I       |       |       0.2
1170    0.7     0.3     0.027  |      O|       I       |       |       0.2
1171    0.6     0.4     0.027  |       O    I  |       |       |       0.2
1172    0.6     0.4     0.028  |       O    I  |       |       |       0.2
1173    0.6     0.4     0.028  |       O    I  |       |       |       0.2
1174    0.6     0.4     0.028  |       O    I  |       |       |       0.2
1175    0.6     0.4     0.029  |       O    I  |       |       |       0.2
1176    0.6     0.4     0.029  |       O    I  |       |       |       0.2
1177    0.5     0.4     0.029  |       O  I    |       |       |       0.2
1178    0.5     0.4     0.029  |       O  I    |       |       |       0.2
1179    0.5     0.4     0.029  |       O  I    |       |       |       0.2
1180    0.5     0.4     0.030  |       O  I    |       |       |       0.2
1181    0.5     0.4     0.030  |       O  I    |       |       |       0.2
1182    0.4     0.4     0.030  |       OI      |       |       |       0.2
1183    0.4     0.4     0.030  |       OI      |       |       |       0.2
1184    0.4     0.4     0.030  |       OI      |       |       |       0.2
1185    0.4     0.4     0.030  |       OI      |       |       |       0.2
1186    0.4     0.4     0.030  |       OI      |       |       |       0.2
1187    0.4     0.4     0.030  |       OI      |       |       |       0.2
1188    0.4     0.4     0.030  |       OI      |       |       |       0.2
1189    0.4     0.4     0.030  |       OI      |       |       |       0.2
1190    0.3     0.4     0.030  |      I O      |       |       |       0.2
1191    0.3     0.4     0.030  |      I O      |       |       |       0.2
1192    0.3     0.4     0.030  |      I O      |       |       |       0.2
1193    0.3     0.4     0.030  |      I O      |       |       |       0.2
1194    0.3     0.4     0.029  |      I O      |       |       |       0.2
1195    0.3     0.4     0.029  |      I O      |       |       |       0.2
1196    0.3     0.4     0.029  |      I O      |       |       |       0.2
1197    0.3     0.4     0.029  |      I O      |       |       |       0.2
1198    0.3     0.4     0.029  |      I O      |       |       |       0.2
1199    0.3     0.4     0.029  |      I O      |       |       |       0.2
1200    0.3     0.4     0.029  |      I O      |       |       |       0.2
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1201	0.3	0.4	0.029		I O			0.2
1202	0.3	0.4	0.029		I O			0.2
1203	0.3	0.4	0.029		I O			0.2
1204	0.3	0.4	0.028		I O			0.2
1205	0.3	0.4	0.028		I O			0.2
1206	0.3	0.4	0.028		I O			0.2
1207	0.3	0.4	0.028		I O			0.2
1208	0.3	0.4	0.028		I O			0.2
1209	0.3	0.4	0.028		I O			0.2
1210	0.3	0.4	0.028		I O			0.2
1211	0.2	0.4	0.028		I O			0.2
1212	0.1	0.4	0.027	I	O			0.2
1213	0.2	0.3	0.027		I O			0.2
1214	0.1	0.3	0.027	I	O			0.2
1215	0.2	0.3	0.027		I O			0.2
1216	0.1	0.3	0.026	I	O			0.2
1217	0.2	0.3	0.026		I O			0.2
1218	0.1	0.3	0.026	I	O			0.2
1219	0.2	0.3	0.026		I O			0.2
1220	0.1	0.3	0.025	I	O			0.2
1221	0.2	0.3	0.025		I O			0.2
1222	0.1	0.3	0.025	I	O			0.2
1223	0.1	0.3	0.024	I	O			0.2
1224	0.1	0.3	0.024	I	O			0.2
1225	0.1	0.3	0.024	I	O			0.2
1226	0.1	0.3	0.024	I	O			0.2
1227	0.1	0.3	0.023	I	O			0.2
1228	0.1	0.3	0.023	I	O			0.2
1229	0.1	0.3	0.023	I	O			0.2
1230	0.1	0.3	0.023	I	O			0.2
1231	0.1	0.3	0.022	I	O			0.2
1232	0.1	0.3	0.022	I	O			0.2
1233	0.1	0.3	0.022	I	O			0.2
1234	0.1	0.3	0.022	I	O			0.2
1235	0.1	0.3	0.021	I	O			0.2
1236	0.1	0.3	0.021	I	O			0.2
1237	0.1	0.3	0.021	I	O			0.1
1238	0.1	0.3	0.021	I	O			0.1
1239	0.1	0.3	0.020	I	O			0.1
1240	0.1	0.3	0.020	I	O			0.1
1241	0.1	0.3	0.020	I	O			0.1
1242	0.1	0.3	0.020	I	O			0.1
1243	0.1	0.3	0.020	I	O			0.1
1244	0.1	0.2	0.019	I	O			0.1
1245	0.1	0.2	0.019	I	O			0.1
1246	0.1	0.2	0.019	I	O			0.1
1247	0.1	0.2	0.019	I	O			0.1
1248	0.1	0.2	0.019	I	O			0.1
1249	0.1	0.2	0.018	I	O			0.1
1250	0.1	0.2	0.018	I	O			0.1
1251	0.1	0.2	0.018	I	O			0.1
1252	0.1	0.2	0.018	I	O			0.1
1253	0.1	0.2	0.018	I	O			0.1
1254	0.1	0.2	0.017	I	O			0.1
1255	0.1	0.2	0.017	I	O			0.1
1256	0.1	0.2	0.017	I	O			0.1
1257	0.1	0.2	0.017	I	O			0.1
1258	0.1	0.2	0.017	I	O			0.1
1259	0.1	0.2	0.017	I	O			0.1
1260	0.1	0.2	0.016	I	O			0.1
1261	0.1	0.2	0.016	I	O			0.1
1262	0.1	0.2	0.016	I	O			0.1
1263	0.1	0.2	0.016	I	O			0.1

1264	0.0	0.2	0.016	I O	|	|	|	0.1
1265	0.0	0.2	0.015	I O	|	|	|	0.1
1266	0.0	0.2	0.015	I O	|	|	|	0.1
1267	0.0	0.2	0.015	I O	|	|	|	0.1
1268	0.0	0.2	0.015	I O	|	|	|	0.1
1269	0.0	0.2	0.014	I O	|	|	|	0.1
1270	0.0	0.2	0.014	I O	|	|	|	0.1
1271	0.0	0.2	0.014	I O	|	|	|	0.1
1272	0.0	0.2	0.014	I O	|	|	|	0.1
1273	0.0	0.2	0.013	I O	|	|	|	0.1
1274	0.0	0.2	0.013	I O	|	|	|	0.1
1275	0.0	0.2	0.013	I O	|	|	|	0.1
1276	0.0	0.2	0.013	I O	|	|	|	0.1
1277	0.0	0.2	0.012	I O	|	|	|	0.1
1278	0.0	0.2	0.012	I O	|	|	|	0.1
1279	0.0	0.2	0.012	I O	|	|	|	0.1
1280	0.0	0.2	0.012	I O	|	|	|	0.1
1281	0.0	0.1	0.012	I O	|	|	|	0.1
1282	0.0	0.1	0.011	I O	|	|	|	0.1
1283	0.0	0.1	0.011	I O	|	|	|	0.1
1284	0.0	0.1	0.011	I O	|	|	|	0.1
1285	0.0	0.1	0.011	I O	|	|	|	0.1
1286	0.0	0.1	0.011	I O	|	|	|	0.1
1287	0.0	0.1	0.010	I O	|	|	|	0.1
1288	0.0	0.1	0.010	I O	|	|	|	0.1
1289	0.0	0.1	0.010	I O	|	|	|	0.1
1290	0.0	0.1	0.010	I O	|	|	|	0.1
1291	0.0	0.1	0.010	I O	|	|	|	0.1
1292	0.0	0.1	0.010	I O	|	|	|	0.1
1293	0.0	0.1	0.009	I O	|	|	|	0.1
1294	0.0	0.1	0.009	I O	|	|	|	0.1
1295	0.0	0.1	0.009	I O	|	|	|	0.1
1296	0.0	0.1	0.009	I O	|	|	|	0.1
1297	0.0	0.1	0.009	I O	|	|	|	0.1
1298	0.0	0.1	0.009	I O	|	|	|	0.1
1299	0.0	0.1	0.008	I O	|	|	|	0.1
1300	0.0	0.1	0.008	I O	|	|	|	0.1
1310	0.0	0.1	0.007	I O	|	|	|	0.0
1320	0.0	0.1	0.006	IO	|	|	|	0.0
1330	0.0	0.1	0.005	IO	|	|	|	0.0
1340	0.0	0.1	0.004	IO	|	|	|	0.0
1350	0.0	0.0	0.003	IO	|	|	|	0.0
1360	0.0	0.0	0.003	O	|	|	|	0.0
1370	0.0	0.0	0.002	O	|	|	|	0.0
1380	0.0	0.0	0.002	O	|	|	|	0.0
1390	0.0	0.0	0.002	O	|	|	|	0.0
1400	0.0	0.0	0.001	O	|	|	|	0.0
1420	0.0	0.0	0.001	O	|	|	|	0.0
1440	0.0	0.0	0.001	O	|	|	|	0.0
1460	0.0	0.0	0.000	O	|	|	|	0.0
1500	0.0	0.0	0.000	O	|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 0.39(CFS)
Peak flow time = 1189 Min., time interval # = 75
Maximum depth in basin = 0.21(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 2 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.53 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 1.9 3.9 5.8 7.7	Depth (Ft.)
0	0.0	0.0	0.000	O | | | |	0.0
100	0.0	0.0	0.000	O | | | |	0.0
200	0.0	0.0	0.000	O | | | |	0.0
300	0.0	0.0	0.000	O | | | |	0.0
400	0.0	0.0	0.000	O | | | |	0.0
500	0.0	0.0	0.000	O | | | |	0.0
600	0.0	0.0	0.000	O | | | |	0.0
700	0.0	0.0	0.000	O | | | |	0.0
800	0.2	0.1	0.008	O | | | |	0.1
900	0.2	0.2	0.014	O | | | |	0.1
1000	0.2	0.2	0.015	O | | | |	0.1
1050	0.3	0.2	0.018	OI | | | |	0.1
1100	0.7	0.4	0.032	|OI | | | |	0.2
1110	1.0	0.5	0.038	| O I | | | |	0.3
1120	1.5	0.6	0.048	| O I | | | |	0.3
1130	1.8	0.8	0.061	| O I| | | |	0.4
1131	1.9	0.8	0.063	| O I| | | |	0.4
1132	1.9	0.8	0.064	| O I| | | |	0.5
1133	2.0	0.8	0.066	| O I | | |	0.5
1134	2.1	0.9	0.067	| O I | | |	0.5
1135	2.1	0.9	0.069	| O I | | |	0.5
1136	2.2	0.9	0.071	| O |I | | |	0.5
1137	2.2	0.9	0.073	| O |I | | |	0.5
1138	2.3	1.0	0.074	| O |I | | |	0.5
1139	2.4	1.0	0.076	| O |I | | |	0.5
1140	2.5	1.0	0.079	| O | I | | |	0.6
1141	2.6	1.0	0.081	| O | I | | |	0.6
1142	2.7	1.1	0.083	| O | I | | |	0.6
1143	2.8	1.1	0.085	| O | I | | |	0.6
1144	2.9	1.1	0.088	| O | I | | |	0.6
1145	3.0	1.2	0.090	| O | I | | |	0.6
1146	3.1	1.2	0.093	| O | I | | |	0.7
1147	3.3	1.2	0.096	| O | I | | |	0.7
1148	3.5	1.3	0.099	| O | I | | |	0.7
1149	3.8	1.3	0.102	| O | I| | |	0.7
1150	4.3	1.4	0.106	| O | |I | |	0.8
1151	4.9	1.4	0.111	| O | | I | |	0.8
1152	5.6	1.5	0.117	| O | | I| |	0.8
1153	6.4	1.6	0.124	| O | | | I |	0.9
1154	7.0	1.7	0.131	| O| | | I |	0.9
1155	7.5	1.8	0.139	| O| | | I|	1.0
1156	7.7	1.8	0.147	| O| | | I|	1.0
1157	7.5	1.8	0.155	| O| | | I|	1.1
1158	7.0	1.8	0.162	| O| | | I |	1.1
1159	6.3	1.8	0.168	| O| | | I |	1.2
1160	5.5	1.8	0.173	| O| | I | |	1.2
1161	4.8	1.8	0.177	| O| | I | |	1.2
1162	4.2	1.8	0.181	| O| |I | |	1.2
1163	3.7	1.8	0.183	| O| I| | |	1.2
1164	3.2	1.8	0.185	| O| I | | |	1.3
1165	2.8	1.8	0.187	| O| I | | |	1.3
1166	2.6	1.8	0.188	| O| I | | |	1.3
1167	2.4	1.8	0.188	| O|I | | |	1.3
1168	2.2	1.8	0.189	| O|I | | |	1.3
1169	2.1	1.8	0.189	| OI | | |	1.3
1170	1.9	1.8	0.189	| O| | | |	1.3
1171	1.9	1.8	0.189	| O| | | |	1.3
1172	1.8	1.8	0.189	| O| | | |	1.3

1173	1.7	1.8	0.189		O			1.3
1174	1.7	1.8	0.189		O			1.3
1175	1.6	1.8	0.189		IO			1.3
1176	1.6	1.8	0.188		IO			1.3
1177	1.5	1.8	0.188		IO			1.3
1178	1.5	1.8	0.188		IO			1.3
1179	1.5	1.8	0.187		IO			1.3
1180	1.4	1.8	0.186		I O			1.3
1181	1.4	1.8	0.186		I O			1.3
1182	1.4	1.8	0.185		I O			1.3
1183	1.4	1.8	0.185		I O			1.3
1184	1.4	1.8	0.184		I O			1.3
1185	1.3	1.8	0.183		I O			1.2
1186	1.3	1.8	0.183		I O			1.2
1187	1.3	1.8	0.182		I O			1.2
1188	1.3	1.8	0.181		I O			1.2
1189	1.2	1.8	0.180		I O			1.2
1190	1.2	1.8	0.180		I O			1.2
1191	1.2	1.8	0.179		I O			1.2
1192	1.1	1.8	0.178		I O			1.2
1193	1.1	1.8	0.177		I O			1.2
1194	1.1	1.8	0.176		I O			1.2
1195	1.1	1.8	0.175		I O			1.2
1196	1.1	1.8	0.174		I O			1.2
1197	1.0	1.8	0.173		I O			1.2
1198	1.0	1.8	0.171		I O			1.2
1199	1.0	1.8	0.170		I O			1.2
1200	1.0	1.8	0.169		I O			1.2
1201	1.0	1.8	0.168		I O			1.2
1202	1.0	1.8	0.167		I O			1.2
1203	1.0	1.8	0.166		I O			1.1
1204	1.0	1.8	0.165		I O			1.1
1205	1.0	1.8	0.164		I O			1.1
1206	1.0	1.8	0.162		I O			1.1
1207	1.0	1.8	0.161		I O			1.1
1208	1.0	1.8	0.160		I O			1.1
1209	0.9	1.8	0.159		I O			1.1
1210	0.9	1.8	0.158		I O			1.1
1211	0.9	1.8	0.156		I O			1.1
1212	0.9	1.8	0.155		I O			1.1
1213	0.9	1.8	0.154		I O			1.1
1214	0.9	1.8	0.153		I O			1.1
1215	0.9	1.8	0.151		I O			1.1
1216	0.9	1.8	0.150		I O			1.1
1217	0.9	1.8	0.149		I O			1.1
1218	0.8	1.8	0.148		I O			1.0
1219	0.8	1.8	0.146		I O			1.0
1220	0.8	1.8	0.145		I O			1.0
1221	0.8	1.8	0.143		I O			1.0
1222	0.8	1.8	0.142		I O			1.0
1223	0.8	1.8	0.141		I O			1.0
1224	0.8	1.8	0.139		I O			1.0
1225	0.8	1.8	0.138		I O			1.0
1226	0.8	1.8	0.137		I O			1.0
1227	0.8	1.7	0.135		I O			1.0
1228	0.8	1.7	0.134		I O			1.0
1229	0.8	1.7	0.133		I O			0.9
1230	0.7	1.7	0.131		I O			0.9
1231	0.7	1.7	0.130		I O			0.9
1232	0.7	1.7	0.129		I O			0.9
1233	0.7	1.6	0.127		I O			0.9
1234	0.7	1.6	0.126		I O			0.9
1235	0.7	1.6	0.125		I O			0.9

1236	0.7	1.6	0.124	I O				0.9
1237	0.7	1.6	0.122	I O				0.9
1238	0.7	1.6	0.121	I O				0.9
1239	0.6	1.5	0.120	I O				0.9
1240	0.6	1.5	0.119	I O				0.8
1241	0.6	1.5	0.117	I O				0.8
1242	0.6	1.5	0.116	I O				0.8
1243	0.6	1.5	0.115	I O				0.8
1244	0.6	1.5	0.114	I O				0.8
1245	0.6	1.4	0.112	I O				0.8
1246	0.6	1.4	0.111	I O				0.8
1247	0.6	1.4	0.110	I O				0.8
1248	0.6	1.4	0.109	I O				0.8
1249	0.5	1.4	0.108	I O				0.8
1250	0.5	1.4	0.107	I O				0.8
1251	0.5	1.4	0.105	I O				0.8
1252	0.5	1.3	0.104	I O				0.7
1253	0.5	1.3	0.103	I O				0.7
1254	0.5	1.3	0.102	I O				0.7
1255	0.5	1.3	0.101	I O				0.7
1256	0.5	1.3	0.100	I O				0.7
1257	0.5	1.3	0.099	I O				0.7
1258	0.5	1.3	0.098	I O				0.7
1259	0.5	1.2	0.097	I O				0.7
1260	0.5	1.2	0.096	I O				0.7
1261	0.5	1.2	0.095	I O				0.7
1262	0.5	1.2	0.094	I O				0.7
1263	0.5	1.2	0.093	I O				0.7
1264	0.5	1.2	0.092	I O				0.7
1265	0.4	1.2	0.091	I O				0.6
1266	0.4	1.2	0.090	I O				0.6
1267	0.4	1.1	0.089	I O				0.6
1268	0.4	1.1	0.088	I O				0.6
1269	0.4	1.1	0.087	I O				0.6
1270	0.3	1.1	0.086	I O				0.6
1271	0.3	1.1	0.084	I O				0.6
1272	0.2	1.1	0.083	I O				0.6
1273	0.2	1.1	0.082	I O				0.6
1274	0.2	1.0	0.081	I O				0.6
1275	0.1	1.0	0.080	I O				0.6
1276	0.2	1.0	0.078	I O				0.6
1277	0.1	1.0	0.077	I O				0.6
1278	0.2	1.0	0.076	I O				0.5
1279	0.1	1.0	0.075	I O				0.5
1280	0.2	0.9	0.074	I O				0.5
1281	0.1	0.9	0.073	I O				0.5
1282	0.2	0.9	0.072	I O				0.5
1283	0.1	0.9	0.071	I O				0.5
1284	0.2	0.9	0.070	I O				0.5
1285	0.1	0.9	0.069	I O				0.5
1286	0.2	0.9	0.068	I O				0.5
1287	0.1	0.9	0.067	I O				0.5
1288	0.2	0.8	0.066	I O				0.5
1289	0.1	0.8	0.065	I O				0.5
1290	0.2	0.8	0.064	I O				0.5
1291	0.1	0.8	0.063	I O				0.4
1292	0.2	0.8	0.062	I O				0.4
1293	0.1	0.8	0.061	I O				0.4
1294	0.2	0.8	0.060	I O				0.4
1295	0.1	0.8	0.059	I O				0.4
1296	0.1	0.8	0.058	I O				0.4
1297	0.1	0.7	0.058	I O				0.4
1298	0.1	0.7	0.057	I O				0.4

1299	0.1	0.7	0.056	I O	|	|	|	0.4
1300	0.1	0.7	0.055	I O	|	|	|	0.4
1310	0.1	0.6	0.047	I O	|	|	|	0.3
1320	0.1	0.5	0.041	I O	|	|	|	0.3
1330	0.1	0.5	0.036	IO	|	|	|	0.3
1340	0.1	0.4	0.031	IO	|	|	|	0.2
1350	0.1	0.4	0.027	IO	|	|	|	0.2
1360	0.1	0.3	0.024	IO	|	|	|	0.2
1370	0.1	0.3	0.021	IO	|	|	|	0.2
1380	0.1	0.2	0.019	IO	|	|	|	0.1
1390	0.1	0.2	0.017	O	|	|	|	0.1
1400	0.1	0.2	0.016	O	|	|	|	0.1
1420	0.1	0.2	0.013	O	|	|	|	0.1
1440	0.1	0.2	0.012	O	|	|	|	0.1
1460	0.0	0.1	0.009	O	|	|	|	0.1
1500	0.1	0.1	0.007	O	|	|	|	0.0

Remaining water in basin = 0.01 (Ac.Ft)
Peak flow out of basin = 1.83(CFS)
Peak flow time = 1171 Min., time interval # = 57
Maximum depth in basin = 1.28(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 3 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.39 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	1.9	3.9	5.8	7.7	Depth (Ft.)
0	0.0	0.1	0.007	O	|	|	|	|	0.0
100	0.0	0.0	0.001	O	|	|	|	|	0.0
200	0.0	0.0	0.000	O	|	|	|	|	0.0
300	0.0	0.0	0.000	O	|	|	|	|	0.0
400	0.0	0.0	0.000	O	|	|	|	|	0.0
500	0.0	0.0	0.000	O	|	|	|	|	0.0
600	0.0	0.0	0.000	O	|	|	|	|	0.0
700	0.0	0.0	0.000	O	|	|	|	|	0.0
800	0.0	0.0	0.000	O	|	|	|	|	0.0
900	0.2	0.1	0.008	O	|	|	|	|	0.1
1000	0.2	0.2	0.014	O	|	|	|	|	0.1
1050	0.3	0.2	0.018	OI	|	|	|	|	0.1
1100	0.3	0.3	0.021	|O	|	|	|	|	0.2
1110	0.7	0.3	0.024	|OI	|	|	|	|	0.2
1120	1.1	0.4	0.032	|O I	|	|	|	|	0.2
1130	1.5	0.6	0.044	| O I	|	|	|	|	0.3
1131	1.5	0.6	0.045	| O I	|	|	|	|	0.3
1132	1.6	0.6	0.046	| O I	|	|	|	|	0.3
1133	1.6	0.6	0.048	| O I	|	|	|	|	0.3
1134	1.6	0.6	0.049	| O I	|	|	|	|	0.3
1135	1.7	0.6	0.050	| O I|	|	|	|	|	0.4
1136	1.8	0.7	0.052	| O I|	|	|	|	|	0.4
1137	1.9	0.7	0.054	| O I|	|	|	|	|	0.4
1138	2.0	0.7	0.055	| O I	|	|	|	|	0.4
1139	2.0	0.7	0.057	| O I	|	|	|	|	0.4
1140	2.1	0.8	0.059	| O I	|	|	|	|	0.4
1141	2.2	0.8	0.061	| O |I	|	|	|	|	0.4
1142	2.3	0.8	0.063	| O |I	|	|	|	|	0.5
1143	2.3	0.8	0.065	| O |I	|	|	|	|	0.5
1144	2.5	0.9	0.067	| O | I	|	|	|	|	0.5

1145	2.6	0.9	0.070	O	I			0.5
1146	2.7	0.9	0.072	O	I			0.5
1147	2.9	1.0	0.075	O	I			0.5
1148	3.0	1.0	0.078	O	I			0.6
1149	3.2	1.0	0.081	O	I			0.6
1150	3.6	1.1	0.084	O	I			0.6
1151	4.2	1.1	0.088	O	I			0.6
1152	4.8	1.2	0.093	O	I			0.7
1153	5.5	1.3	0.099	O	I			0.7
1154	6.1	1.4	0.106	O	I			0.8
1155	6.5	1.5	0.113	O	I			0.8
1156	6.6	1.5	0.120	O	I			0.9
1157	6.5	1.6	0.127	O	I			0.9
1158	6.1	1.7	0.133	O	I			0.9
1159	5.5	1.8	0.138	O	I			1.0
1160	4.9	1.8	0.142	O	I			1.0
1161	4.3	1.8	0.146	O	I			1.0
1162	3.7	1.8	0.148	O	I			1.0
1163	3.3	1.8	0.150	O	I			1.1
1164	2.9	1.8	0.152	O	I			1.1
1165	2.6	1.8	0.153	O	I			1.1
1166	2.3	1.8	0.154	O	I			1.1
1167	2.1	1.8	0.154	OI				1.1
1168	2.0	1.8	0.154	OI				1.1
1169	1.8	1.8	0.154	O				1.1
1170	1.7	1.8	0.154	O				1.1
1171	1.7	1.8	0.154	O				1.1
1172	1.6	1.8	0.154	IO				1.1
1173	1.5	1.8	0.153	IO				1.1
1174	1.5	1.8	0.153	IO				1.1
1175	1.5	1.8	0.152	IO				1.1
1176	1.4	1.8	0.152	I O				1.1
1177	1.4	1.8	0.151	I O				1.1
1178	1.4	1.8	0.151	I O				1.1
1179	1.3	1.8	0.150	I O				1.1
1180	1.3	1.8	0.149	I O				1.1
1181	1.3	1.8	0.149	I O				1.1
1182	1.2	1.8	0.148	I O				1.0
1183	1.1	1.8	0.147	I O				1.0
1184	1.1	1.8	0.146	I O				1.0
1185	1.1	1.8	0.145	I O				1.0
1186	1.1	1.8	0.144	I O				1.0
1187	1.0	1.8	0.143	I O				1.0
1188	1.0	1.8	0.142	I O				1.0
1189	1.0	1.8	0.141	I O				1.0
1190	0.9	1.8	0.139	I O				1.0
1191	0.9	1.8	0.138	I O				1.0
1192	0.9	1.8	0.137	I O				1.0
1193	0.9	1.7	0.136	I O				1.0
1194	0.9	1.7	0.135	I O				1.0
1195	0.9	1.7	0.134	I O				1.0
1196	0.9	1.7	0.132	I O				0.9
1197	0.9	1.7	0.131	I O				0.9
1198	0.8	1.7	0.130	I O				0.9
1199	0.8	1.7	0.129	I O				0.9
1200	0.8	1.6	0.128	I O				0.9
1201	0.8	1.6	0.127	I O				0.9
1202	0.8	1.6	0.125	I O				0.9
1203	0.8	1.6	0.124	I O				0.9
1204	0.8	1.6	0.123	I O				0.9
1205	0.8	1.6	0.122	I O				0.9
1206	0.8	1.6	0.121	I O				0.9
1207	0.8	1.5	0.120	I O				0.9

1208	0.7	1.5	0.119	| I O |				0.8
1209	0.7	1.5	0.118	| I O |				0.8
1210	0.7	1.5	0.117	| I O |				0.8
1211	0.7	1.5	0.116	| I O |				0.8
1212	0.7	1.5	0.115	| I O |				0.8
1213	0.7	1.5	0.114	| I O |				0.8
1214	0.7	1.4	0.112	| I O |				0.8
1215	0.7	1.4	0.111	| I O |				0.8
1216	0.7	1.4	0.110	| I O |				0.8
1217	0.7	1.4	0.109	| I O |				0.8
1218	0.7	1.4	0.109	| I O |				0.8
1219	0.7	1.4	0.108	| I O |				0.8
1220	0.7	1.4	0.107	| I O |				0.8
1221	0.6	1.4	0.106	| I O |				0.8
1222	0.6	1.3	0.105	| I O |				0.7
1223	0.6	1.3	0.104	| I O |				0.7
1224	0.6	1.3	0.103	| I O |				0.7
1225	0.6	1.3	0.102	| I O |				0.7
1226	0.6	1.3	0.101	| I O |				0.7
1227	0.6	1.3	0.100	| I O |				0.7
1228	0.6	1.3	0.099	| I O |				0.7
1229	0.6	1.3	0.098	| I O |				0.7
1230	0.6	1.2	0.097	| I O |				0.7
1231	0.6	1.2	0.096	| I O |				0.7
1232	0.5	1.2	0.095	| I O |				0.7
1233	0.5	1.2	0.094	| I O |				0.7
1234	0.5	1.2	0.093	| I O |				0.7
1235	0.5	1.2	0.092	| I O |				0.7
1236	0.5	1.2	0.091	| I O |				0.7
1237	0.5	1.2	0.090	| I O |				0.6
1238	0.5	1.1	0.089	| I O |				0.6
1239	0.5	1.1	0.088	| I O |				0.6
1240	0.5	1.1	0.088	| I O |				0.6
1241	0.5	1.1	0.087	| I O |				0.6
1242	0.5	1.1	0.086	| I O |				0.6
1243	0.5	1.1	0.085	| I O |				0.6
1244	0.4	1.1	0.084	|I O |				0.6
1245	0.4	1.1	0.083	|I O |				0.6
1246	0.4	1.1	0.082	|I O |				0.6
1247	0.4	1.0	0.081	|I O |				0.6
1248	0.4	1.0	0.080	|I O |				0.6
1249	0.4	1.0	0.080	|I O |				0.6
1250	0.4	1.0	0.079	|I O |				0.6
1251	0.4	1.0	0.078	|I O |				0.6
1252	0.4	1.0	0.077	|I O |				0.6
1253	0.4	1.0	0.076	|I O |				0.5
1254	0.4	1.0	0.076	|I O |				0.5
1255	0.4	1.0	0.075	|I O |				0.5
1256	0.4	1.0	0.074	|I O |				0.5
1257	0.4	0.9	0.073	|I O |				0.5
1258	0.4	0.9	0.072	|I O |				0.5
1259	0.4	0.9	0.072	|I O |				0.5
1260	0.4	0.9	0.071	|I O |				0.5
1261	0.4	0.9	0.070	|I O |				0.5
1262	0.3	0.9	0.070	|I O |				0.5
1263	0.2	0.9	0.069	I O |				0.5
1264	0.3	0.9	0.068	|I O |				0.5
1265	0.2	0.9	0.067	I O |				0.5
1266	0.1	0.8	0.066	I O |				0.5
1267	0.2	0.8	0.065	I O |				0.5
1268	0.0	0.8	0.064	I O |				0.5
1269	0.1	0.8	0.063	I O |				0.4
1270	0.0	0.8	0.062	I O |				0.4

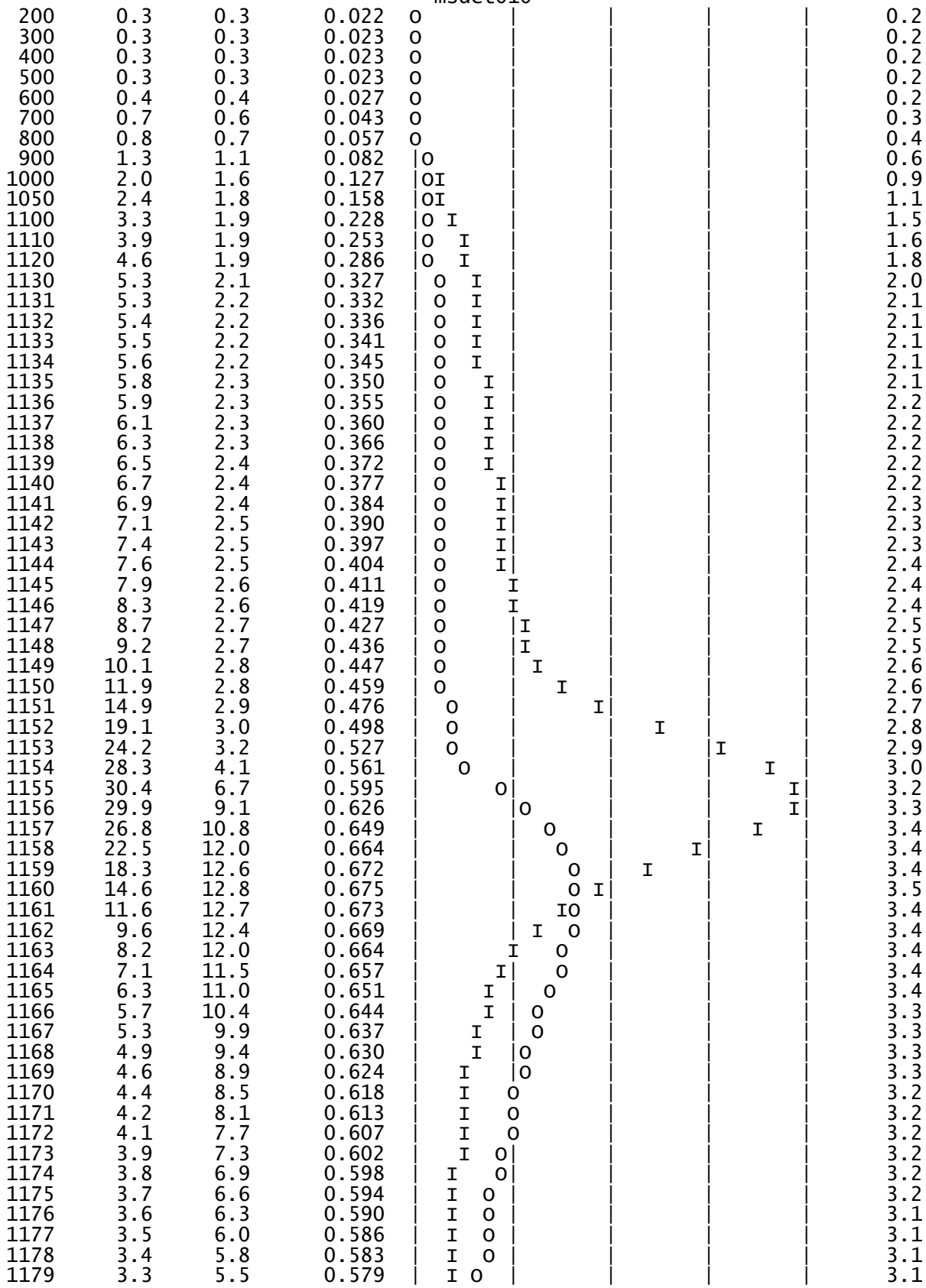
1271	0.0	0.8	0.061	I	O	|	|	|	0.4
1272	0.0	0.8	0.060	I	O	|	|	|	0.4
1273	0.0	0.8	0.059	I	O	|	|	|	0.4
1274	0.0	0.7	0.057	I	O	|	|	|	0.4
1275	0.0	0.7	0.056	I	O	|	|	|	0.4
1276	0.0	0.7	0.055	I	O	|	|	|	0.4
1277	0.0	0.7	0.055	I	O	|	|	|	0.4
1278	0.0	0.7	0.054	I	O	|	|	|	0.4
1279	0.0	0.7	0.053	I	O	|	|	|	0.4
1280	0.0	0.7	0.052	I	O	|	|	|	0.4
1281	0.0	0.7	0.051	I	O	|	|	|	0.4
1282	0.0	0.6	0.050	I	O	|	|	|	0.4
1283	0.0	0.6	0.049	I	O	|	|	|	0.4
1284	0.0	0.6	0.048	I	O	|	|	|	0.3
1285	0.0	0.6	0.047	I	O	|	|	|	0.3
1286	0.0	0.6	0.046	I	O	|	|	|	0.3
1287	0.0	0.6	0.046	I	O	|	|	|	0.3
1288	0.0	0.6	0.045	I	O	|	|	|	0.3
1289	0.0	0.6	0.044	I	O	|	|	|	0.3
1290	0.0	0.6	0.043	I	O	|	|	|	0.3
1291	0.0	0.5	0.043	I	O	|	|	|	0.3
1292	0.0	0.5	0.042	I	O	|	|	|	0.3
1293	0.0	0.5	0.041	I	O	|	|	|	0.3
1294	0.0	0.5	0.040	I	O	|	|	|	0.3
1295	0.0	0.5	0.040	I	O	|	|	|	0.3
1296	0.0	0.5	0.039	I	O	|	|	|	0.3
1297	0.0	0.5	0.038	I	O	|	|	|	0.3
1298	0.0	0.5	0.038	I	O	|	|	|	0.3
1299	0.0	0.5	0.037	I	O	|	|	|	0.3
1300	0.0	0.5	0.036	I	O	|	|	|	0.3
1310	0.0	0.4	0.030	I	O	|	|	|	0.2
1320	0.0	0.3	0.025	I	O	|	|	|	0.2
1330	0.0	0.3	0.021	I	O	|	|	|	0.2
1340	0.0	0.2	0.018		O	|	|	|	0.1
1350	0.0	0.2	0.015		O	|	|	|	0.1
1360	0.0	0.2	0.013		O	|	|	|	0.1
1370	0.0	0.1	0.011		O	|	|	|	0.1
1380	0.0	0.1	0.009		O	|	|	|	0.1
1390	0.0	0.1	0.007		O	|	|	|	0.1
1400	0.0	0.1	0.006		O	|	|	|	0.0
1420	0.0	0.1	0.004		O	|	|	|	0.0
1440	0.0	0.0	0.003		O	|	|	|	0.0
1460	0.0	0.0	0.002		O	|	|	|	0.0
1500	0.0	0.0	0.001		O	|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 1.81(CFS)
Peak flow time = 1168 Min., time interval # = 54
Maximum depth in basin = 1.08(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 4 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 2.36 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	7.6	15.2	22.8	30.4	Depth (Ft.)
0	0.0	0.0	0.001	O	|	|	|	|	0.0
100	0.3	0.2	0.013	O	|	|	|	|	0.1



200	0.3	0.3	0.022	O					0.2
300	0.3	0.3	0.023	O					0.2
400	0.3	0.3	0.023	O					0.2
500	0.3	0.3	0.023	O					0.2
600	0.4	0.4	0.027	O					0.2
700	0.7	0.6	0.043	O					0.3
800	0.8	0.7	0.057	O					0.4
900	1.3	1.1	0.082	O					0.6
1000	2.0	1.6	0.127	OI					0.9
1050	2.4	1.8	0.158	OI					1.1
1100	3.3	1.9	0.228	O I					1.5
1110	3.9	1.9	0.253	O I					1.6
1120	4.6	1.9	0.286	O I					1.8
1130	5.3	2.1	0.327	O I					2.0
1131	5.3	2.2	0.332	O I					2.1
1132	5.4	2.2	0.336	O I					2.1
1133	5.5	2.2	0.341	O I					2.1
1134	5.6	2.2	0.345	O I					2.1
1135	5.8	2.3	0.350	O I					2.1
1136	5.9	2.3	0.355	O I					2.2
1137	6.1	2.3	0.360	O I					2.2
1138	6.3	2.3	0.366	O I					2.2
1139	6.5	2.4	0.372	O I					2.2
1140	6.7	2.4	0.377	O I					2.2
1141	6.9	2.4	0.384	O I					2.3
1142	7.1	2.5	0.390	O I					2.3
1143	7.4	2.5	0.397	O I					2.3
1144	7.6	2.5	0.404	O I					2.4
1145	7.9	2.6	0.411	O I					2.4
1146	8.3	2.6	0.419	O I					2.4
1147	8.7	2.7	0.427	O I					2.5
1148	9.2	2.7	0.436	O I					2.5
1149	10.1	2.8	0.447	O I					2.6
1150	11.9	2.8	0.459	O I					2.6
1151	14.9	2.9	0.476	O	I				2.7
1152	19.1	3.0	0.498	O	I				2.8
1153	24.2	3.2	0.527	O	I				2.9
1154	28.3	4.1	0.561	O	I				3.0
1155	30.4	6.7	0.595	O	I				3.2
1156	29.9	9.1	0.626	O	I				3.3
1157	26.8	10.8	0.649	O	I				3.4
1158	22.5	12.0	0.664	O	I				3.4
1159	18.3	12.6	0.672	O	I				3.4
1160	14.6	12.8	0.675	O	I				3.5
1161	11.6	12.7	0.673	O	I				3.4
1162	9.6	12.4	0.669	O	I				3.4
1163	8.2	12.0	0.664	O	I				3.4
1164	7.1	11.5	0.657	O	I				3.4
1165	6.3	11.0	0.651	O	I				3.4
1166	5.7	10.4	0.644	O	I				3.3
1167	5.3	9.9	0.637	O	I				3.3
1168	4.9	9.4	0.630	O	I				3.3
1169	4.6	8.9	0.624	O	I				3.3
1170	4.4	8.5	0.618	O	I				3.2
1171	4.2	8.1	0.613	O	I				3.2
1172	4.1	7.7	0.607	O	I				3.2
1173	3.9	7.3	0.602	O	I				3.2
1174	3.8	6.9	0.598	O	I				3.2
1175	3.7	6.6	0.594	O	I				3.2
1176	3.6	6.3	0.590	O	I				3.1
1177	3.5	6.0	0.586	O	I				3.1
1178	3.4	5.8	0.583	O	I				3.1
1179	3.3	5.5	0.579	O	I				3.1

1180	3.2	5.3	0.576	I O				3.1
1181	3.2	5.1	0.573	I O				3.1
1182	3.1	4.9	0.571	I O				3.1
1183	3.1	4.7	0.569	IO				3.1
1184	3.0	4.5	0.566	IO				3.1
1185	2.9	4.4	0.564	IO				3.1
1186	2.9	4.2	0.562	IO				3.0
1187	2.8	4.1	0.560	I O				3.0
1188	2.8	4.0	0.559	I O				3.0
1189	2.8	3.8	0.557	I O				3.0
1190	2.7	3.7	0.556	IO				3.0
1191	2.7	3.6	0.554	IO				3.0
1192	2.6	3.5	0.553	IO				3.0
1193	2.6	3.4	0.552	IO				3.0
1194	2.6	3.3	0.551	IO				3.0
1195	2.5	3.3	0.550	IO				3.0
1196	2.5	3.3	0.548	IO				3.0
1197	2.5	3.3	0.547	IO				3.0
1198	2.4	3.3	0.546	IO				3.0
1199	2.4	3.3	0.545	IO				3.0
1200	2.4	3.3	0.544	IO				3.0
1201	2.4	3.3	0.543	IO				3.0
1202	2.3	3.3	0.541	IO				3.0
1203	2.2	3.2	0.540	IO				3.0
1204	2.2	3.2	0.538	IO				2.9
1205	2.2	3.2	0.537	IO				2.9
1206	2.2	3.2	0.535	IO				2.9
1207	2.1	3.2	0.534	IO				2.9
1208	2.1	3.2	0.532	IO				2.9
1209	2.1	3.2	0.531	IO				2.9
1210	2.1	3.2	0.529	IO				2.9
1211	2.1	3.2	0.528	IO				2.9
1212	2.1	3.2	0.526	IO				2.9
1213	2.0	3.2	0.525	IO				2.9
1214	2.0	3.2	0.523	IO				2.9
1215	2.0	3.2	0.522	IO				2.9
1216	2.0	3.1	0.520	IO				2.9
1217	2.0	3.1	0.518	IO				2.9
1218	2.0	3.1	0.517	IO				2.9
1219	1.9	3.1	0.515	I O				2.8
1220	1.9	3.1	0.514	I O				2.8
1221	1.9	3.1	0.512	I O				2.8
1222	1.9	3.1	0.510	I O				2.8
1223	1.9	3.1	0.509	I O				2.8
1224	1.8	3.1	0.507	I O				2.8
1225	1.8	3.1	0.505	I O				2.8
1226	1.8	3.1	0.503	I O				2.8
1227	1.8	3.0	0.502	I O				2.8
1228	1.7	3.0	0.500	I O				2.8
1229	1.7	3.0	0.498	I O				2.8
1230	1.7	3.0	0.496	I O				2.8
1231	1.7	3.0	0.494	I O				2.8
1232	1.7	3.0	0.492	I O				2.7
1233	1.7	3.0	0.491	I O				2.7
1234	1.7	3.0	0.489	I O				2.7
1235	1.6	3.0	0.487	I O				2.7
1236	1.6	3.0	0.485	I O				2.7
1237	1.6	3.0	0.483	I O				2.7
1238	1.5	2.9	0.481	I O				2.7
1239	1.5	2.9	0.479	I O				2.7
1240	1.5	2.9	0.477	I O				2.7
1241	1.5	2.9	0.475	I O				2.7
1242	1.5	2.9	0.473	I O				2.7

1243	1.5	2.9	0.472	|I O	|	|	|	2.7
1244	1.4	2.9	0.469	|I O	|	|	|	2.6
1245	1.4	2.9	0.467	|I O	|	|	|	2.6
1246	1.4	2.9	0.465	|I O	|	|	|	2.6
1247	1.4	2.8	0.463	|IO	|	|	|	2.6
1248	1.4	2.8	0.461	|IO	|	|	|	2.6
1249	1.4	2.8	0.459	|IO	|	|	|	2.6
1250	1.4	2.8	0.458	|IO	|	|	|	2.6
1251	1.3	2.8	0.455	|IO	|	|	|	2.6
1252	1.3	2.8	0.453	|IO	|	|	|	2.6
1253	1.3	2.8	0.451	|IO	|	|	|	2.6
1254	1.3	2.8	0.449	|IO	|	|	|	2.6
1255	1.3	2.8	0.447	|IO	|	|	|	2.6
1256	1.3	2.8	0.445	|IO	|	|	|	2.5
1257	1.3	2.7	0.443	|IO	|	|	|	2.5
1258	1.3	2.7	0.441	|IO	|	|	|	2.5
1259	1.3	2.7	0.439	|IO	|	|	|	2.5
1260	1.3	2.7	0.437	|IO	|	|	|	2.5
1261	1.3	2.7	0.435	|IO	|	|	|	2.5
1262	1.3	2.7	0.433	|IO	|	|	|	2.5
1263	1.2	2.7	0.431	|IO	|	|	|	2.5
1264	1.2	2.7	0.429	|IO	|	|	|	2.5
1265	1.2	2.7	0.427	|IO	|	|	|	2.5
1266	1.2	2.6	0.425	|IO	|	|	|	2.5
1267	1.2	2.6	0.423	|IO	|	|	|	2.4
1268	1.1	2.6	0.421	|IO	|	|	|	2.4
1269	1.1	2.6	0.419	|IO	|	|	|	2.4
1270	1.1	2.6	0.417	|IO	|	|	|	2.4
1271	1.1	2.6	0.415	|IO	|	|	|	2.4
1272	1.1	2.6	0.413	|IO	|	|	|	2.4
1273	1.1	2.6	0.411	|IO	|	|	|	2.4
1274	1.1	2.6	0.409	|IO	|	|	|	2.4
1275	1.1	2.6	0.407	|IO	|	|	|	2.4
1276	1.1	2.5	0.405	|IO	|	|	|	2.4
1277	1.0	2.5	0.403	|IO	|	|	|	2.4
1278	1.0	2.5	0.401	|IO	|	|	|	2.4
1279	1.0	2.5	0.399	|IO	|	|	|	2.3
1280	1.0	2.5	0.397	|IO	|	|	|	2.3
1281	1.0	2.5	0.394	|IO	|	|	|	2.3
1282	1.0	2.5	0.392	|IO	|	|	|	2.3
1283	0.9	2.5	0.390	I O	|	|	|	2.3
1284	0.9	2.5	0.388	I O	|	|	|	2.3
1285	0.9	2.4	0.386	I O	|	|	|	2.3
1286	0.9	2.4	0.384	I O	|	|	|	2.3
1287	0.9	2.4	0.382	I O	|	|	|	2.3
1288	0.9	2.4	0.380	I O	|	|	|	2.3
1289	0.9	2.4	0.378	I O	|	|	|	2.3
1290	0.8	2.4	0.375	I O	|	|	|	2.2
1291	0.8	2.4	0.373	I O	|	|	|	2.2
1292	0.8	2.4	0.371	I O	|	|	|	2.2
1293	0.8	2.4	0.369	I O	|	|	|	2.2
1294	0.8	2.3	0.367	I O	|	|	|	2.2
1295	0.8	2.3	0.365	I O	|	|	|	2.2
1296	0.8	2.3	0.363	I O	|	|	|	2.2
1297	0.8	2.3	0.360	I O	|	|	|	2.2
1298	0.8	2.3	0.358	I O	|	|	|	2.2
1299	0.8	2.3	0.356	I O	|	|	|	2.2
1300	0.8	2.3	0.354	I O	|	|	|	2.1
1310	0.7	2.2	0.334	I O	|	|	|	2.1
1320	0.6	2.0	0.314	I O	|	|	|	2.0
1330	0.6	1.9	0.295	IO	|	|	|	1.9
1340	0.5	1.9	0.277	IO	|	|	|	1.8
1350	0.5	1.9	0.258	IO	|	|	|	1.7

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1360	0.5	1.9	0.239	IO	|	|	|	1.6
1370	0.4	1.8	0.219	IO	|	|	|	1.5
1380	0.5	1.8	0.200	IO	|	|	|	1.3
1390	0.4	1.8	0.181	IO	|	|	|	1.2
1400	0.3	1.8	0.161	IO	|	|	|	1.1
1420	0.4	1.6	0.122	IO	|	|	|	0.9
1440	0.3	1.2	0.094	IO	|	|	|	0.7
1460	0.3	0.9	0.073	O	|	|	|	0.5
1500	0.3	0.6	0.047	O	|	|	|	0.3

Remaining water in basin = 0.05 (Ac.Ft)
Peak flow out of basin = 12.81(CFS)
Peak flow time = 1160 Min., time interval # = 46
Maximum depth in basin = 3.45(Ft.)

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Study Date : 02/20/13 Input hydrograph file name : ms025p.HYD
Output hydrograph file name: msdet025.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

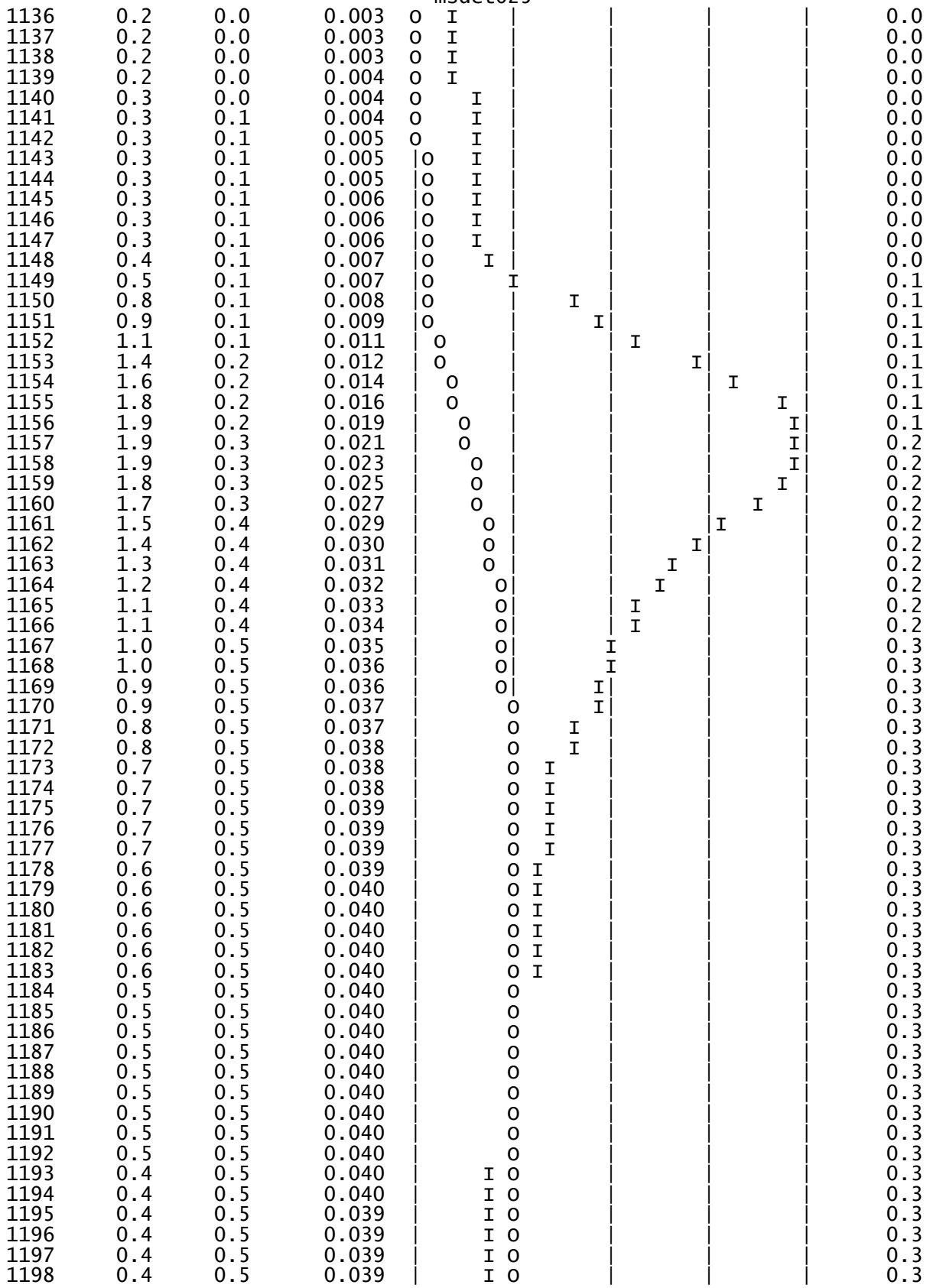
Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.140	1.800	0.139	0.141
1.920	0.300	1.900	0.299	0.301
2.000	0.320	2.100	0.319	0.321
3.000	0.550	3.300	0.548	0.552
3.470	0.680	13.200	0.671	0.689
3.600	0.710	17.000	0.698	0.722
3.900	0.800	26.900	0.781	0.819
4.000	0.830	30.000	0.809	0.851

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 1 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.10 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 0.5 0.9 1.4 1.9	Depth (Ft.)
0	0.0	0.0	0.000	O | | | |	0.0
100	0.0	0.0	0.000	O | | | |	0.0
200	0.0	0.0	0.000	O | | | |	0.0
300	0.0	0.0	0.000	O | | | |	0.0
400	0.0	0.0	0.000	O | | | |	0.0
500	0.0	0.0	0.000	O | | | |	0.0
600	0.0	0.0	0.000	O | | | |	0.0
700	0.0	0.0	0.000	O | | | |	0.0
800	0.0	0.0	0.000	O | | | |	0.0
900	0.0	0.0	0.000	O | | | |	0.0
1000	0.0	0.0	0.000	O | | | |	0.0
1050	0.0	0.0	0.000	O | | | |	0.0
1100	0.0	0.0	0.000	O | | | |	0.0
1110	0.0	0.0	0.000	O | | | |	0.0
1120	0.0	0.0	0.000	O | | | |	0.0
1130	0.2	0.0	0.001	O I | | | |	0.0
1131	0.2	0.0	0.002	O I | | | |	0.0
1132	0.2	0.0	0.002	O I | | | |	0.0
1133	0.2	0.0	0.002	O I | | | |	0.0
1134	0.2	0.0	0.002	O I | | | |	0.0
1135	0.2	0.0	0.003	O I | | | |	0.0



1136	0.2	0.0	0.003	O I	0.0
1137	0.2	0.0	0.003	O I	0.0
1138	0.2	0.0	0.003	O I	0.0
1139	0.2	0.0	0.004	O I	0.0
1140	0.3	0.0	0.004	O I	0.0
1141	0.3	0.1	0.004	O I	0.0
1142	0.3	0.1	0.005	O I	0.0
1143	0.3	0.1	0.005	O I	0.0
1144	0.3	0.1	0.005	O I	0.0
1145	0.3	0.1	0.006	O I	0.0
1146	0.3	0.1	0.006	O I	0.0
1147	0.3	0.1	0.006	O I	0.0
1148	0.4	0.1	0.007	O I	0.0
1149	0.5	0.1	0.007	O I	0.1
1150	0.8	0.1	0.008	O I	0.1
1151	0.9	0.1	0.009	O I	0.1
1152	1.1	0.1	0.011	O I	0.1
1153	1.4	0.2	0.012	O I	0.1
1154	1.6	0.2	0.014	O I	0.1
1155	1.8	0.2	0.016	O I	0.1
1156	1.9	0.2	0.019	O I	0.1
1157	1.9	0.3	0.021	O I	0.2
1158	1.9	0.3	0.023	O I	0.2
1159	1.8	0.3	0.025	O I	0.2
1160	1.7	0.3	0.027	O I	0.2
1161	1.5	0.4	0.029	O I	0.2
1162	1.4	0.4	0.030	O I	0.2
1163	1.3	0.4	0.031	O I	0.2
1164	1.2	0.4	0.032	O I	0.2
1165	1.1	0.4	0.033	O I	0.2
1166	1.1	0.4	0.034	O I	0.2
1167	1.0	0.5	0.035	O I	0.3
1168	1.0	0.5	0.036	O I	0.3
1169	0.9	0.5	0.036	O I	0.3
1170	0.9	0.5	0.037	O I	0.3
1171	0.8	0.5	0.037	O I	0.3
1172	0.8	0.5	0.038	O I	0.3
1173	0.7	0.5	0.038	O I	0.3
1174	0.7	0.5	0.038	O I	0.3
1175	0.7	0.5	0.039	O I	0.3
1176	0.7	0.5	0.039	O I	0.3
1177	0.7	0.5	0.039	O I	0.3
1178	0.6	0.5	0.039	O I	0.3
1179	0.6	0.5	0.040	O I	0.3
1180	0.6	0.5	0.040	O I	0.3
1181	0.6	0.5	0.040	O I	0.3
1182	0.6	0.5	0.040	O I	0.3
1183	0.6	0.5	0.040	O I	0.3
1184	0.5	0.5	0.040	O	0.3
1185	0.5	0.5	0.040	O	0.3
1186	0.5	0.5	0.040	O	0.3
1187	0.5	0.5	0.040	O	0.3
1188	0.5	0.5	0.040	O	0.3
1189	0.5	0.5	0.040	O	0.3
1190	0.5	0.5	0.040	O	0.3
1191	0.5	0.5	0.040	O	0.3
1192	0.5	0.5	0.040	O	0.3
1193	0.4	0.5	0.040	O I	0.3
1194	0.4	0.5	0.040	O I	0.3
1195	0.4	0.5	0.039	O I	0.3
1196	0.4	0.5	0.039	O I	0.3
1197	0.4	0.5	0.039	O I	0.3
1198	0.4	0.5	0.039	O I	0.3

1199	0.4	0.5	0.039	| I O	|	|	|	0.3
1200	0.4	0.5	0.039	| I O	|	|	|	0.3
1201	0.4	0.5	0.039	| I O	|	|	|	0.3
1202	0.4	0.5	0.038	| I O	|	|	|	0.3
1203	0.4	0.5	0.038	| I O	|	|	|	0.3
1204	0.4	0.5	0.038	| I O	|	|	|	0.3
1205	0.4	0.5	0.038	| I O	|	|	|	0.3
1206	0.4	0.5	0.038	| I O	|	|	|	0.3
1207	0.4	0.5	0.038	| I O	|	|	|	0.3
1208	0.4	0.5	0.038	| I O	|	|	|	0.3
1209	0.4	0.5	0.038	| I O	|	|	|	0.3
1210	0.4	0.5	0.037	| I O	|	|	|	0.3
1211	0.4	0.5	0.037	| I O	|	|	|	0.3
1212	0.4	0.5	0.037	| I O	|	|	|	0.3
1213	0.3	0.5	0.037	| I O	|	|	|	0.3
1214	0.3	0.5	0.037	| I O|	|	|	|	0.3
1215	0.3	0.5	0.037	| I O|	|	|	|	0.3
1216	0.3	0.5	0.036	| I O|	|	|	|	0.3
1217	0.3	0.5	0.036	| I O|	|	|	|	0.3
1218	0.3	0.5	0.036	| I O|	|	|	|	0.3
1219	0.3	0.5	0.036	| I O|	|	|	|	0.3
1220	0.3	0.5	0.035	| I O|	|	|	|	0.3
1221	0.3	0.5	0.035	| I O|	|	|	|	0.3
1222	0.3	0.4	0.035	| I O|	|	|	|	0.2
1223	0.3	0.4	0.035	| I O|	|	|	|	0.2
1224	0.3	0.4	0.035	| I O|	|	|	|	0.2
1225	0.3	0.4	0.034	| I O|	|	|	|	0.2
1226	0.3	0.4	0.034	| I O|	|	|	|	0.2
1227	0.3	0.4	0.034	| I O|	|	|	|	0.2
1228	0.3	0.4	0.034	| I O|	|	|	|	0.2
1229	0.3	0.4	0.034	| I O|	|	|	|	0.2
1230	0.3	0.4	0.033	| I O|	|	|	|	0.2
1231	0.3	0.4	0.033	| I O|	|	|	|	0.2
1232	0.3	0.4	0.033	| I O|	|	|	|	0.2
1233	0.3	0.4	0.033	| I O|	|	|	|	0.2
1234	0.3	0.4	0.033	| I O|	|	|	|	0.2
1235	0.3	0.4	0.033	| I O|	|	|	|	0.2
1236	0.3	0.4	0.032	| I O|	|	|	|	0.2
1237	0.3	0.4	0.032	| IO |	|	|	|	0.2
1238	0.3	0.4	0.032	| IO |	|	|	|	0.2
1239	0.3	0.4	0.032	| IO |	|	|	|	0.2
1240	0.3	0.4	0.032	| IO |	|	|	|	0.2
1241	0.3	0.4	0.032	| IO |	|	|	|	0.2
1242	0.3	0.4	0.032	| IO |	|	|	|	0.2
1243	0.2	0.4	0.031	| I O |	|	|	|	0.2
1244	0.2	0.4	0.031	| I O |	|	|	|	0.2
1245	0.1	0.4	0.031	|I O |	|	|	|	0.2
1246	0.1	0.4	0.030	|I O |	|	|	|	0.2
1247	0.1	0.4	0.030	|I O |	|	|	|	0.2
1248	0.1	0.4	0.029	|I O |	|	|	|	0.2
1249	0.1	0.4	0.029	|I O |	|	|	|	0.2
1250	0.1	0.4	0.029	|I O |	|	|	|	0.2
1251	0.1	0.4	0.028	|I O |	|	|	|	0.2
1252	0.1	0.4	0.028	|I O |	|	|	|	0.2
1253	0.1	0.4	0.028	|I O |	|	|	|	0.2
1254	0.1	0.3	0.027	|I O |	|	|	|	0.2
1255	0.1	0.3	0.027	|I O |	|	|	|	0.2
1256	0.1	0.3	0.027	|I O |	|	|	|	0.2
1257	0.1	0.3	0.026	|I O |	|	|	|	0.2
1258	0.1	0.3	0.026	|I O |	|	|	|	0.2
1259	0.1	0.3	0.026	|I O |	|	|	|	0.2
1260	0.1	0.3	0.025	|I O |	|	|	|	0.2
1261	0.1	0.3	0.025	|I O |	|	|	|	0.2

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1262	0.1	0.3	0.025	|I O |	|	|	|	0.2
1263	0.1	0.3	0.024	|I O |	|	|	|	0.2
1264	0.1	0.3	0.024	|I O |	|	|	|	0.2
1265	0.1	0.3	0.024	|I O |	|	|	|	0.2
1266	0.1	0.3	0.023	|I O |	|	|	|	0.2
1267	0.1	0.3	0.023	|I O |	|	|	|	0.2
1268	0.1	0.3	0.023	|I O |	|	|	|	0.2
1269	0.1	0.3	0.023	|I O |	|	|	|	0.2
1270	0.1	0.3	0.022	|I O |	|	|	|	0.2
1271	0.1	0.3	0.022	|I O |	|	|	|	0.2
1272	0.1	0.3	0.022	|I O |	|	|	|	0.2
1273	0.0	0.3	0.022	I O |	|	|	|	0.2
1274	0.0	0.3	0.021	I O |	|	|	|	0.2
1275	0.0	0.3	0.021	I O |	|	|	|	0.1
1276	0.0	0.3	0.020	I O |	|	|	|	0.1
1277	0.0	0.3	0.020	I O |	|	|	|	0.1
1278	0.0	0.3	0.020	I O |	|	|	|	0.1
1279	0.0	0.2	0.019	I O |	|	|	|	0.1
1280	0.0	0.2	0.019	I O |	|	|	|	0.1
1281	0.0	0.2	0.019	I O |	|	|	|	0.1
1282	0.0	0.2	0.018	I O |	|	|	|	0.1
1283	0.0	0.2	0.018	I O |	|	|	|	0.1
1284	0.0	0.2	0.018	I O |	|	|	|	0.1
1285	0.0	0.2	0.017	I O |	|	|	|	0.1
1286	0.0	0.2	0.017	I O |	|	|	|	0.1
1287	0.0	0.2	0.017	I O |	|	|	|	0.1
1288	0.0	0.2	0.016	I O |	|	|	|	0.1
1289	0.0	0.2	0.016	I O |	|	|	|	0.1
1290	0.0	0.2	0.016	I O |	|	|	|	0.1
1291	0.0	0.2	0.016	I O |	|	|	|	0.1
1292	0.0	0.2	0.015	I O |	|	|	|	0.1
1293	0.0	0.2	0.015	I O |	|	|	|	0.1
1294	0.0	0.2	0.015	I O |	|	|	|	0.1
1295	0.0	0.2	0.015	I O |	|	|	|	0.1
1296	0.0	0.2	0.014	I O |	|	|	|	0.1
1297	0.0	0.2	0.014	I O |	|	|	|	0.1
1298	0.0	0.2	0.014	I O |	|	|	|	0.1
1299	0.0	0.2	0.014	I O |	|	|	|	0.1
1300	0.0	0.2	0.013	I O |	|	|	|	0.1
1310	0.1	0.2	0.012	|IO |	|	|	|	0.1
1320	0.1	0.1	0.011	|IO |	|	|	|	0.1
1330	0.0	0.1	0.010	I O |	|	|	|	0.1
1340	0.1	0.1	0.009	|O |	|	|	|	0.1
1350	0.1	0.1	0.009	|O |	|	|	|	0.1
1360	0.1	0.1	0.009	|O |	|	|	|	0.1
1370	0.1	0.1	0.009	|O |	|	|	|	0.1
1380	0.0	0.1	0.008	IO |	|	|	|	0.1
1390	0.0	0.1	0.006	IO |	|	|	|	0.0
1400	0.0	0.1	0.005	IO |	|	|	|	0.0
1420	0.0	0.0	0.004	O |	|	|	|	0.0
1440	0.0	0.0	0.003	O |	|	|	|	0.0
1460	0.0	0.0	0.002	O |	|	|	|	0.0
1500	0.0	0.0	0.001	O |	|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 0.51(CFS)
Peak flow time = 1183 Min., time interval # = 69
Maximum depth in basin = 0.29(Ft.)

Total flood hydrograph volume this storm day = 0.75 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.4 4.8 7.2 9.6	Depth (Ft.)
0	0.0	0.0	0.001	O	0.0
100	0.0	0.0	0.000	O	0.0
200	0.0	0.0	0.000	O	0.0
300	0.0	0.0	0.000	O	0.0
400	0.0	0.0	0.000	O	0.0
500	0.0	0.0	0.000	O	0.0
600	0.2	0.1	0.008	O	0.1
700	0.2	0.2	0.014	O	0.1
800	0.2	0.2	0.015	O	0.1
900	0.3	0.3	0.020	OI	0.1
1000	0.3	0.3	0.023	OI	0.2
1050	0.4	0.3	0.026	|O	0.2
1100	1.2	0.6	0.050	O I	0.4
1110	1.6	0.8	0.060	O I	0.4
1120	2.1	1.0	0.074	O I	0.5
1130	2.4	1.2	0.091	O I	0.6
1131	2.4	1.2	0.092	O I	0.7
1132	2.5	1.2	0.094	O I	0.7
1133	2.6	1.2	0.096	O I	0.7
1134	2.7	1.3	0.098	O |I	0.7
1135	2.7	1.3	0.100	O |I	0.7
1136	2.8	1.3	0.102	O |I	0.7
1137	2.9	1.3	0.104	O |I	0.7
1138	3.0	1.4	0.107	O | I	0.8
1139	3.0	1.4	0.109	O | I	0.8
1140	3.1	1.4	0.111	O | I	0.8
1141	3.2	1.5	0.113	O | I	0.8
1142	3.4	1.5	0.116	O | I	0.8
1143	3.5	1.5	0.119	O | I	0.8
1144	3.7	1.6	0.122	O | I	0.9
1145	3.8	1.6	0.125	O | I	0.9
1146	4.1	1.6	0.128	O | I	0.9
1147	4.3	1.7	0.132	O | I	0.9
1148	4.5	1.7	0.136	O | I	1.0
1149	4.9	1.8	0.140	O | I	1.0
1150	5.6	1.8	0.145	O | I	1.0
1151	6.4	1.8	0.152	O | I	1.1
1152	7.3	1.8	0.159	O | I	1.1
1153	8.4	1.8	0.168	O | I	1.2
1154	9.2	1.8	0.178	O | I	1.2
1155	9.6	1.8	0.189	O | I	1.3
1156	9.6	1.8	0.200	O | I	1.3
1157	9.1	1.8	0.210	O | I	1.4
1158	8.2	1.8	0.219	O | I	1.5
1159	7.2	1.9	0.226	O | I	1.5
1160	6.2	1.9	0.232	O | I	1.5
1161	5.4	1.9	0.237	O | I	1.6
1162	4.7	1.9	0.241	O | I	1.6
1163	4.1	1.9	0.244	O | I	1.6
1164	3.7	1.9	0.246	O | I	1.6
1165	3.3	1.9	0.248	O | I	1.6
1166	3.0	1.9	0.250	O | I	1.6
1167	2.8	1.9	0.251	O | I	1.6
1168	2.6	1.9	0.252	O I |	1.6
1169	2.4	1.9	0.253	O I |	1.6
1170	2.3	1.9	0.253	OI |	1.7

1171	2.2	1.9	0.254		OI|			1.7
1172	2.1	1.9	0.254		OI|			1.7
1173	2.0	1.9	0.254		O				1.7
1174	2.0	1.9	0.255		O				1.7
1175	1.9	1.9	0.255		O				1.7
1176	1.9	1.9	0.255		O				1.7
1177	1.8	1.9	0.255		O				1.7
1178	1.8	1.9	0.254		O				1.7
1179	1.7	1.9	0.254		IO				1.7
1180	1.7	1.9	0.254		IO				1.7
1181	1.7	1.9	0.254		IO				1.7
1182	1.6	1.9	0.253		IO				1.7
1183	1.6	1.9	0.253		IO				1.6
1184	1.6	1.9	0.253		IO				1.6
1185	1.5	1.9	0.252		IO				1.6
1186	1.5	1.9	0.252		IO				1.6
1187	1.5	1.9	0.251		IO				1.6
1188	1.5	1.9	0.251		IO				1.6
1189	1.5	1.9	0.250		IO				1.6
1190	1.4	1.9	0.249		I O				1.6
1191	1.4	1.9	0.249		I O				1.6
1192	1.4	1.9	0.248		I O				1.6
1193	1.3	1.9	0.247		I O				1.6
1194	1.3	1.9	0.247		I O				1.6
1195	1.3	1.9	0.246		I O				1.6
1196	1.2	1.9	0.245		I O				1.6
1197	1.2	1.9	0.244		I O				1.6
1198	1.2	1.9	0.243		I O				1.6
1199	1.2	1.9	0.242		I O				1.6
1200	1.2	1.9	0.241		I O				1.6
1201	1.2	1.9	0.240		I O				1.6
1202	1.2	1.9	0.239		I O				1.6
1203	1.2	1.9	0.238		I O				1.6
1204	1.1	1.9	0.237		I O				1.6
1205	1.1	1.9	0.236		I O				1.6
1206	1.1	1.9	0.235		I O				1.5
1207	1.1	1.9	0.234		I O				1.5
1208	1.1	1.9	0.233		I O				1.5
1209	1.1	1.9	0.232		I O				1.5
1210	1.1	1.9	0.231		I O				1.5
1211	1.1	1.9	0.230		I O				1.5
1212	1.1	1.9	0.229		I O				1.5
1213	1.0	1.9	0.228		I O				1.5
1214	1.0	1.9	0.227		I O				1.5
1215	1.0	1.9	0.226		I O				1.5
1216	1.0	1.9	0.224		I O				1.5
1217	1.0	1.9	0.223		I O				1.5
1218	1.0	1.9	0.222		I O				1.5
1219	1.0	1.9	0.221		I O				1.5
1220	1.0	1.8	0.220		I O				1.5
1221	0.9	1.8	0.218		I O				1.5
1222	0.9	1.8	0.217		I O				1.4
1223	0.9	1.8	0.216		I O				1.4
1224	0.9	1.8	0.214		I O				1.4
1225	0.9	1.8	0.213		I O				1.4
1226	0.9	1.8	0.212		I O				1.4
1227	0.9	1.8	0.211		I O				1.4
1228	0.8	1.8	0.209	I	O				1.4
1229	0.8	1.8	0.208	I	O				1.4
1230	0.8	1.8	0.206	I	O				1.4
1231	0.8	1.8	0.205	I	O				1.4
1232	0.8	1.8	0.203	I	O				1.4
1233	0.8	1.8	0.202	I	O				1.4

1234	0.8	1.8	0.201	I O				1.3
1235	0.8	1.8	0.199	I O				1.3
1236	0.7	1.8	0.198	I O				1.3
1237	0.7	1.8	0.196	I O				1.3
1238	0.7	1.8	0.194	I O				1.3
1239	0.7	1.8	0.193	I O				1.3
1240	0.7	1.8	0.191	I O				1.3
1241	0.7	1.8	0.190	I O				1.3
1242	0.7	1.8	0.188	I O				1.3
1243	0.7	1.8	0.187	I O				1.3
1244	0.7	1.8	0.185	I O				1.3
1245	0.7	1.8	0.184	I O				1.3
1246	0.6	1.8	0.182	I O				1.2
1247	0.6	1.8	0.180	I O				1.2
1248	0.6	1.8	0.178	I O				1.2
1249	0.6	1.8	0.177	I O				1.2
1250	0.6	1.8	0.175	I O				1.2
1251	0.6	1.8	0.173	I O				1.2
1252	0.6	1.8	0.172	I O				1.2
1253	0.6	1.8	0.170	I O				1.2
1254	0.6	1.8	0.168	I O				1.2
1255	0.6	1.8	0.167	I O				1.2
1256	0.6	1.8	0.165	I O				1.1
1257	0.6	1.8	0.163	I O				1.1
1258	0.6	1.8	0.162	I O				1.1
1259	0.6	1.8	0.160	I O				1.1
1260	0.6	1.8	0.158	I O				1.1
1261	0.5	1.8	0.157	I O				1.1
1262	0.4	1.8	0.155	I O				1.1
1263	0.5	1.8	0.153	I O				1.1
1264	0.4	1.8	0.151	I O				1.1
1265	0.3	1.8	0.149	I O				1.1
1266	0.3	1.8	0.147	I O				1.0
1267	0.3	1.8	0.145	I O				1.0
1268	0.3	1.8	0.143	I O				1.0
1269	0.3	1.8	0.140	I O				1.0
1270	0.3	1.8	0.138	I O				1.0
1271	0.3	1.8	0.136	I O				1.0
1272	0.3	1.7	0.134	I O				1.0
1273	0.3	1.7	0.132	I O				0.9
1274	0.3	1.7	0.131	I O				0.9
1275	0.3	1.7	0.129	I O				0.9
1276	0.3	1.6	0.127	I O				0.9
1277	0.3	1.6	0.125	I O				0.9
1278	0.3	1.6	0.123	I O				0.9
1279	0.3	1.6	0.121	I O				0.9
1280	0.3	1.5	0.120	I O				0.9
1281	0.3	1.5	0.118	I O				0.8
1282	0.3	1.5	0.116	I O				0.8
1283	0.3	1.5	0.115	I O				0.8
1284	0.3	1.5	0.113	I O				0.8
1285	0.3	1.4	0.112	I O				0.8
1286	0.3	1.4	0.110	I O				0.8
1287	0.3	1.4	0.109	I O				0.8
1288	0.3	1.4	0.107	I O				0.8
1289	0.3	1.4	0.106	I O				0.8
1290	0.3	1.3	0.104	I O				0.7
1291	0.3	1.3	0.103	I O				0.7
1292	0.3	1.3	0.101	I O				0.7
1293	0.3	1.3	0.100	I O				0.7
1294	0.3	1.3	0.099	I O				0.7
1295	0.3	1.3	0.097	I O				0.7
1296	0.3	1.2	0.096	I O				0.7

1297	0.3	1.2	0.095	I O				0.7
1298	0.3	1.2	0.093	I O				0.7
1299	0.3	1.2	0.092	I O				0.7
1300	0.3	1.2	0.091	I O				0.6
1310	0.3	1.0	0.080	I O				0.6
1320	0.3	0.9	0.071	I O				0.5
1330	0.3	0.8	0.063	IO				0.5
1340	0.3	0.7	0.057	IO				0.4
1350	0.3	0.7	0.051	IO				0.4
1360	0.3	0.6	0.047	IO				0.3
1370	0.2	0.5	0.042	IO				0.3
1380	0.1	0.5	0.037	IO				0.3
1390	0.1	0.4	0.032	IO				0.2
1400	0.1	0.4	0.028	IO				0.2
1420	0.1	0.3	0.022	O				0.2
1440	0.1	0.2	0.018	O				0.1
1460	0.1	0.2	0.015	O				0.1
1500	0.0	0.1	0.009	O				0.1

Remaining water in basin = 0.01 (Ac.Ft)
Peak flow out of basin = 1.87(CFS)
Peak flow time = 1176 Min., time interval # = 62
Maximum depth in basin = 1.66(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 3 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.58 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.4 4.8 7.2 9.6	Depth (Ft.)
0	0.0	0.1	0.009	O	0.1
100	0.0	0.0	0.002	O	0.0
200	0.0	0.0	0.000	O	0.0
300	0.0	0.0	0.000	O	0.0
400	0.0	0.0	0.000	O	0.0
500	0.0	0.0	0.000	O	0.0
600	0.0	0.0	0.000	O	0.0
700	0.0	0.0	0.000	O	0.0
800	0.2	0.1	0.008	O	0.1
900	0.2	0.2	0.014	O	0.1
1000	0.3	0.3	0.020	OI	0.1
1050	0.3	0.3	0.022	OI	0.2
1100	0.7	0.4	0.033	OI	0.2
1110	1.2	0.5	0.040	O I	0.3
1120	1.8	0.7	0.053	O I	0.4
1130	2.1	0.9	0.069	O I	0.5
1131	2.1	0.9	0.071	O I	0.5
1132	2.2	0.9	0.073	O I	0.5
1133	2.2	1.0	0.075	O I	0.5
1134	2.2	1.0	0.076	O I	0.5
1135	2.3	1.0	0.078	O I	0.6
1136	2.4	1.0	0.080	O I	0.6
1137	2.4	1.1	0.082	O I	0.6
1138	2.6	1.1	0.084	O I	0.6
1139	2.7	1.1	0.086	O I	0.6
1140	2.7	1.1	0.088	O I	0.6
1141	2.8	1.2	0.091	O I	0.6
1142	2.9	1.2	0.093	O I	0.7

1143	3.0	1.2	0.095		O	I			0.7
1144	3.1	1.3	0.098		O	I			0.7
1145	3.3	1.3	0.101		O	I			0.7
1146	3.4	1.3	0.104		O	I			0.7
1147	3.6	1.4	0.107		O	I			0.8
1148	3.9	1.4	0.110		O	I			0.8
1149	4.3	1.5	0.114		O	I			0.8
1150	4.9	1.5	0.119		O	I			0.8
1151	5.5	1.6	0.124		O	I			0.9
1152	6.3	1.7	0.131		O	I			0.9
1153	7.2	1.8	0.138		O	I			1.0
1154	8.0	1.8	0.147		O	I			1.0
1155	8.3	1.8	0.156		O	I			1.1
1156	8.3	1.8	0.165		O	I			1.1
1157	7.9	1.8	0.173		O	I			1.2
1158	7.2	1.8	0.180		O	I			1.2
1159	6.4	1.8	0.187		O	I			1.3
1160	5.5	1.8	0.192		O	I			1.3
1161	4.8	1.8	0.196		O	I			1.3
1162	4.2	1.8	0.199		O	I			1.3
1163	3.7	1.8	0.202		O	I			1.4
1164	3.3	1.8	0.204		O	I			1.4
1165	3.0	1.8	0.205		O	I			1.4
1166	2.7	1.8	0.206		O	I			1.4
1167	2.5	1.8	0.207		O	I			1.4
1168	2.3	1.8	0.208		OI				1.4
1169	2.2	1.8	0.209		OI				1.4
1170	2.0	1.8	0.209		O				1.4
1171	2.0	1.8	0.209		O				1.4
1172	1.9	1.8	0.209		O				1.4
1173	1.8	1.8	0.209		O				1.4
1174	1.8	1.8	0.209		O				1.4
1175	1.7	1.8	0.209		IO				1.4
1176	1.7	1.8	0.209		IO				1.4
1177	1.6	1.8	0.208		IO				1.4
1178	1.6	1.8	0.208		IO				1.4
1179	1.6	1.8	0.207		IO				1.4
1180	1.5	1.8	0.207		IO				1.4
1181	1.5	1.8	0.207		IO				1.4
1182	1.5	1.8	0.206		IO				1.4
1183	1.4	1.8	0.205		I O				1.4
1184	1.4	1.8	0.205		I O				1.4
1185	1.4	1.8	0.204		I O				1.4
1186	1.4	1.8	0.204		I O				1.4
1187	1.4	1.8	0.203		I O				1.4
1188	1.3	1.8	0.202		I O				1.4
1189	1.3	1.8	0.202		I O				1.4
1190	1.3	1.8	0.201		I O				1.3
1191	1.2	1.8	0.200		I O				1.3
1192	1.2	1.8	0.199		I O				1.3
1193	1.2	1.8	0.198		I O				1.3
1194	1.1	1.8	0.197		I O				1.3
1195	1.1	1.8	0.196		I O				1.3
1196	1.1	1.8	0.195		I O				1.3
1197	1.1	1.8	0.194		I O				1.3
1198	1.1	1.8	0.193		I O				1.3
1199	1.1	1.8	0.192		I O				1.3
1200	1.1	1.8	0.191		I O				1.3
1201	1.1	1.8	0.190		I O				1.3
1202	1.1	1.8	0.189		I O				1.3
1203	1.0	1.8	0.188		I O				1.3
1204	1.0	1.8	0.187		I O				1.3
1205	1.0	1.8	0.186		I O				1.3

1206	1.0	1.8	0.185	| I O |	|	|	|	1.3
1207	1.0	1.8	0.183	| I O |	|	|	|	1.2
1208	1.0	1.8	0.182	| I O |	|	|	|	1.2
1209	1.0	1.8	0.181	| I O |	|	|	|	1.2
1210	1.0	1.8	0.180	| I O |	|	|	|	1.2
1211	1.0	1.8	0.179	| I O |	|	|	|	1.2
1212	1.0	1.8	0.178	| I O |	|	|	|	1.2
1213	0.9	1.8	0.176	| I O |	|	|	|	1.2
1214	0.9	1.8	0.175	| I O |	|	|	|	1.2
1215	0.9	1.8	0.174	| I O |	|	|	|	1.2
1216	0.9	1.8	0.173	| I O |	|	|	|	1.2
1217	0.9	1.8	0.171	| I O |	|	|	|	1.2
1218	0.9	1.8	0.170	| I O |	|	|	|	1.2
1219	0.9	1.8	0.169	| I O |	|	|	|	1.2
1220	0.9	1.8	0.168	| I O |	|	|	|	1.2
1221	0.9	1.8	0.166	| I O |	|	|	|	1.2
1222	0.8	1.8	0.165	| I O |	|	|	|	1.1
1223	0.8	1.8	0.164	| I O |	|	|	|	1.1
1224	0.8	1.8	0.162	| I O |	|	|	|	1.1
1225	0.8	1.8	0.161	| I O |	|	|	|	1.1
1226	0.8	1.8	0.159	| I O |	|	|	|	1.1
1227	0.8	1.8	0.158	| I O |	|	|	|	1.1
1228	0.8	1.8	0.157	| I O |	|	|	|	1.1
1229	0.8	1.8	0.155	| I O |	|	|	|	1.1
1230	0.8	1.8	0.154	| I O |	|	|	|	1.1
1231	0.8	1.8	0.152	| I O |	|	|	|	1.1
1232	0.8	1.8	0.151	| I O |	|	|	|	1.1
1233	0.8	1.8	0.150	| I O |	|	|	|	1.1
1234	0.7	1.8	0.148	| I O |	|	|	|	1.0
1235	0.7	1.8	0.147	| I O |	|	|	|	1.0
1236	0.7	1.8	0.145	| I O |	|	|	|	1.0
1237	0.7	1.8	0.144	| I O |	|	|	|	1.0
1238	0.7	1.8	0.142	| I O |	|	|	|	1.0
1239	0.7	1.8	0.140	| I O |	|	|	|	1.0
1240	0.7	1.8	0.139	| I O |	|	|	|	1.0
1241	0.7	1.8	0.137	| I O |	|	|	|	1.0
1242	0.7	1.7	0.136	| I O |	|	|	|	1.0
1243	0.7	1.7	0.135	| I O |	|	|	|	1.0
1244	0.6	1.7	0.133	| I O |	|	|	|	1.0
1245	0.6	1.7	0.132	| I O |	|	|	|	0.9
1246	0.6	1.7	0.130	| I O |	|	|	|	0.9
1247	0.6	1.7	0.129	| I O |	|	|	|	0.9
1248	0.6	1.6	0.127	| I O |	|	|	|	0.9
1249	0.6	1.6	0.126	| I O |	|	|	|	0.9
1250	0.6	1.6	0.124	| I O |	|	|	|	0.9
1251	0.6	1.6	0.123	| I O |	|	|	|	0.9
1252	0.6	1.6	0.122	| I O |	|	|	|	0.9
1253	0.5	1.5	0.120	|I O |	|	|	|	0.9
1254	0.5	1.5	0.119	|I O |	|	|	|	0.8
1255	0.5	1.5	0.117	|I O |	|	|	|	0.8
1256	0.5	1.5	0.116	|I O |	|	|	|	0.8
1257	0.5	1.5	0.115	|I O |	|	|	|	0.8
1258	0.5	1.5	0.113	|I O |	|	|	|	0.8
1259	0.5	1.4	0.112	|I O |	|	|	|	0.8
1260	0.5	1.4	0.111	|I O |	|	|	|	0.8
1261	0.5	1.4	0.109	|I O |	|	|	|	0.8
1262	0.5	1.4	0.108	|I O |	|	|	|	0.8
1263	0.5	1.4	0.107	|I O |	|	|	|	0.8
1264	0.5	1.4	0.106	|I O |	|	|	|	0.8
1265	0.4	1.3	0.104	|I O |	|	|	|	0.7
1266	0.4	1.3	0.103	|I O |	|	|	|	0.7
1267	0.4	1.3	0.102	|I O |	|	|	|	0.7
1268	0.4	1.3	0.101	|I O |	|	|	|	0.7

1269	0.4	1.3	0.099	|I O |	|	|	|	0.7
1270	0.4	1.3	0.098	|I O |	|	|	|	0.7
1271	0.4	1.2	0.097	|I O |	|	|	|	0.7
1272	0.4	1.2	0.096	|I O |	|	|	|	0.7
1273	0.3	1.2	0.095	|I O |	|	|	|	0.7
1274	0.4	1.2	0.094	|I O |	|	|	|	0.7
1275	0.3	1.2	0.092	|I O |	|	|	|	0.7
1276	0.3	1.2	0.091	|I O |	|	|	|	0.7
1277	0.3	1.2	0.090	|I O |	|	|	|	0.6
1278	0.2	1.1	0.089	I O |	|	|	|	0.6
1279	0.3	1.1	0.087	|I O |	|	|	|	0.6
1280	0.2	1.1	0.086	I O |	|	|	|	0.6
1281	0.2	1.1	0.085	I O |	|	|	|	0.6
1282	0.1	1.1	0.084	I O |	|	|	|	0.6
1283	0.2	1.1	0.082	I O |	|	|	|	0.6
1284	0.1	1.0	0.081	I O |	|	|	|	0.6
1285	0.2	1.0	0.080	I O |	|	|	|	0.6
1286	0.1	1.0	0.079	I O |	|	|	|	0.6
1287	0.2	1.0	0.078	I O |	|	|	|	0.6
1288	0.1	1.0	0.076	I O |	|	|	|	0.5
1289	0.2	1.0	0.075	I O |	|	|	|	0.5
1290	0.1	1.0	0.074	I O |	|	|	|	0.5
1291	0.2	0.9	0.073	I O |	|	|	|	0.5
1292	0.2	0.9	0.072	I O |	|	|	|	0.5
1293	0.2	0.9	0.071	I O |	|	|	|	0.5
1294	0.2	0.9	0.070	I O |	|	|	|	0.5
1295	0.2	0.9	0.069	I O |	|	|	|	0.5
1296	0.1	0.9	0.068	I O |	|	|	|	0.5
1297	0.2	0.9	0.067	I O |	|	|	|	0.5
1298	0.2	0.9	0.066	I O |	|	|	|	0.5
1299	0.2	0.8	0.065	I O |	|	|	|	0.5
1300	0.2	0.8	0.064	I O |	|	|	|	0.5
1310	0.2	0.7	0.057	I O |	|	|	|	0.4
1320	0.1	0.6	0.049	I O |	|	|	|	0.4
1330	0.1	0.5	0.042	IO |	|	|	|	0.3
1340	0.1	0.5	0.037	IO |	|	|	|	0.3
1350	0.1	0.4	0.032	IO |	|	|	|	0.2
1360	0.1	0.4	0.028	IO |	|	|	|	0.2
1370	0.1	0.3	0.025	IO |	|	|	|	0.2
1380	0.1	0.3	0.022	O |	|	|	|	0.2
1390	0.1	0.3	0.020	O |	|	|	|	0.1
1400	0.1	0.2	0.018	O |	|	|	|	0.1
1420	0.1	0.2	0.015	O |	|	|	|	0.1
1440	0.1	0.2	0.013	O |	|	|	|	0.1
1460	0.1	0.1	0.011	O |	|	|	|	0.1
1500	0.0	0.1	0.007	O |	|	|	|	0.1

Remaining water in basin = 0.01 (Ac.Ft)
Peak flow out of basin = 1.84(CFS)
Peak flow time = 1172 Min., time interval # = 58
Maximum depth in basin = 1.40(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 4 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 3.47 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	10.7	21.4	32.2	42.9	Depth (Ft.)

```
   0     0.0     0.1      0.007  O       |       |       |       |       0.1
 100     0.3     0.2      0.014  O       |       |       |       |       0.1
 200     0.4     0.3      0.026  O       |       |       |       |       0.2
 300     0.4     0.4      0.030  O       |       |       |       |       0.2
 400     0.7     0.6      0.043  O       |       |       |       |       0.3
 500     0.8     0.7      0.057  O       |       |       |       |       0.4
 600     1.2     1.0      0.078  O       |       |       |       |       0.6
 700     1.3     1.2      0.095  O       |       |       |       |       0.7
 800     1.6     1.4      0.113  |O      |       |       |       |       0.8
 900     2.1     1.8      0.143  |O      |       |       |       |       1.0
1000     2.4     1.8      0.203  |O      |       |       |       |       1.4
1050     3.2     1.9      0.269  |OI     |       |       |       |       1.7
1100     4.1     2.4      0.377  |O I    |       |       |       |       2.2
1110     4.9     2.5      0.405  |O I    |       |       |       |       2.4
1120     5.6     2.7      0.442  | O I   |       |       |       |       2.5
1130     6.5     3.0      0.486  | O I   |       |       |       |       2.7
1131     6.6     3.0      0.491  | O I   |       |       |       |       2.7
1132     6.7     3.0      0.497  | O I   |       |       |       |       2.8
1133     6.9     3.0      0.502  | O  I  |       |       |       |       2.8
1134     7.0     3.1      0.507  | O  I  |       |       |       |       2.8
1135     7.2     3.1      0.513  | O  I  |       |       |       |       2.8
1136     7.4     3.1      0.519  | O  I  |       |       |       |       2.9
1137     7.6     3.2      0.525  | O  I  |       |       |       |       2.9
1138     7.8     3.2      0.531  | O  I  |       |       |       |       2.9
1139     8.1     3.2      0.538  | O   I |       |       |       |       2.9
1140     8.3     3.3      0.545  | O   I |       |       |       |       3.0
1141     8.6     3.5      0.552  | O   I |       |       |       |       3.0
1142     8.9     4.0      0.559  | O   I |       |       |       |       3.0
1143     9.2     4.5      0.566  |  O  I |       |       |       |       3.1
1144     9.5     5.0      0.573  |  O   I|       |       |       |       3.1
1145     9.9     5.5      0.579  |   O  I|       |       |       |       3.1
1146    10.4     6.0      0.585  |   O  I|       |       |       |       3.1
1147    11.0     6.5      0.592  |   O   I       |       |       |       3.2
1148    11.5     7.0      0.598  |    O  I       |       |       |       3.2
1149    13.9     7.7      0.608  |    O  | I     |       |       |       3.2
1150    18.0     8.7      0.621  |     O |    I  |       |       |       3.3
1151    23.1    10.1      0.640  |       O|       |I      |       |       3.3
1152    29.4    12.1      0.665  |        O       |    I  |       |       3.4
1153    36.6    15.3      0.697  |        |  O    |       |  I    |       3.5
1154    41.7    19.2      0.730  |        |    O  |       |      I|       3.7
1155    42.9    22.6      0.761  |        |       O       |       I       3.8
1156    40.7    25.1      0.784  |        |       | O     |     I |       3.8
1157    35.4    26.6      0.797  |        |       |  O    | I     |       3.9
1158    28.4    26.8      0.799  |        |       |   OI  |       |       3.9
1159    21.9    26.1      0.793  |        |       I  O    |       |       3.9
1160    16.9    24.8      0.781  |        |   I   | O     |       |       3.8
1161    13.4    23.2      0.767  |        |I      |O      |       |       3.8
1162    11.1    21.5      0.751  |        I       O      |       |       3.7
1163     9.4    19.8      0.736  |       I|     O |       |       |       3.7
1164     8.2    18.2      0.721  |      I |    O  |       |       |       3.6
1165     7.4    16.6      0.707  |     I  |   O   |       |       |       3.6
1166     6.8    15.0      0.694  |     I  |  O    |       |       |       3.5
1167     6.3    13.6      0.683  |    I   | O     |       |       |       3.5
1168     5.9    12.7      0.673  |    I   |O      |       |       |       3.4
1169     5.6    12.0      0.664  |    I   O       |       |       |       3.4
1170     5.3    11.3      0.655  |   I    O       |       |       |       3.4
1171     5.1    10.7      0.647  |   I   O|       |       |       |       3.4
1172     4.9    10.1      0.640  |   I   O|       |       |       |       3.3
1173     4.7     9.6      0.633  |   I   O|       |       |       |       3.3
1174     4.6     9.1      0.626  |   I  O |       |       |       |       3.3
1175     4.4     8.6      0.620  |   I  O |       |       |       |       3.3
1176     4.3     8.2      0.614  |   I  O |       |       |       |       3.2
1177     4.2     7.8      0.609  |   I O  |       |       |       |       3.2
```

1178	4.1	7.4	0.604	I O				3.2
1179	4.0	7.1	0.600	I O				3.2
1180	3.9	6.8	0.596	I O				3.2
1181	3.9	6.5	0.592	I O				3.2
1182	3.8	6.2	0.588	I O				3.1
1183	3.7	6.0	0.585	I O				3.1
1184	3.6	5.7	0.582	I O				3.1
1185	3.6	5.5	0.579	I O				3.1
1186	3.5	5.3	0.576	IO				3.1
1187	3.4	5.1	0.574	IO				3.1
1188	3.4	5.0	0.572	IO				3.1
1189	3.3	4.8	0.570	IO				3.1
1190	3.3	4.6	0.568	IO				3.1
1191	3.2	4.5	0.566	IO				3.1
1192	3.2	4.4	0.564	IO				3.1
1193	3.1	4.2	0.562	IO				3.0
1194	3.1	4.1	0.561	IO				3.0
1195	3.1	4.0	0.560	IO				3.0
1196	3.0	3.9	0.558	O				3.0
1197	3.0	3.8	0.557	O				3.0
1198	3.0	3.7	0.556	O				3.0
1199	2.9	3.7	0.555	O				3.0
1200	2.9	3.6	0.554	O				3.0
1201	2.9	3.5	0.553	O				3.0
1202	2.8	3.4	0.552	O				3.0
1203	2.8	3.4	0.551	O				3.0
1204	2.8	3.3	0.550	O				3.0
1205	2.8	3.3	0.550	O				3.0
1206	2.7	3.3	0.549	O				3.0
1207	2.7	3.3	0.548	O				3.0
1208	2.7	3.3	0.547	O				3.0
1209	2.7	3.3	0.546	O				3.0
1210	2.6	3.3	0.545	IO				3.0
1211	2.6	3.3	0.545	IO				3.0
1212	2.6	3.3	0.544	IO				3.0
1213	2.6	3.3	0.543	IO				3.0
1214	2.5	3.3	0.542	IO				3.0
1215	2.4	3.3	0.540	IO				3.0
1216	2.4	3.2	0.539	IO				3.0
1217	2.4	3.2	0.538	IO				2.9
1218	2.4	3.2	0.537	IO				2.9
1219	2.4	3.2	0.536	IO				2.9
1220	2.3	3.2	0.535	IO				2.9
1221	2.3	3.2	0.533	IO				2.9
1222	2.3	3.2	0.532	IO				2.9
1223	2.3	3.2	0.531	IO				2.9
1224	2.3	3.2	0.530	IO				2.9
1225	2.2	3.2	0.528	IO				2.9
1226	2.2	3.2	0.527	IO				2.9
1227	2.2	3.2	0.526	IO				2.9
1228	2.2	3.2	0.524	IO				2.9
1229	2.2	3.2	0.523	IO				2.9
1230	2.2	3.2	0.522	IO				2.9
1231	2.2	3.1	0.520	IO				2.9
1232	2.2	3.1	0.519	IO				2.9
1233	2.2	3.1	0.518	IO				2.9
1234	2.1	3.1	0.516	IO				2.9
1235	2.1	3.1	0.515	IO				2.8
1236	2.1	3.1	0.513	IO				2.8
1237	2.1	3.1	0.512	IO				2.8
1238	2.1	3.1	0.511	IO				2.8
1239	2.1	3.1	0.509	IO				2.8
1240	2.1	3.1	0.508	IO				2.8

1241	2.0	3.1	0.506	|IO	|	|	|	2.8
1242	2.0	3.1	0.505	|IO	|	|	|	2.8
1243	2.0	3.1	0.504	|IO	|	|	|	2.8
1244	2.0	3.0	0.502	|IO	|	|	|	2.8
1245	2.0	3.0	0.501	|IO	|	|	|	2.8
1246	2.0	3.0	0.499	|IO	|	|	|	2.8
1247	1.9	3.0	0.498	|IO	|	|	|	2.8
1248	1.9	3.0	0.496	|IO	|	|	|	2.8
1249	1.9	3.0	0.495	|IO	|	|	|	2.8
1250	1.9	3.0	0.493	|IO	|	|	|	2.8
1251	1.8	3.0	0.491	|IO	|	|	|	2.7
1252	1.8	3.0	0.490	|IO	|	|	|	2.7
1253	1.8	3.0	0.488	|IO	|	|	|	2.7
1254	1.8	3.0	0.487	|IO	|	|	|	2.7
1255	1.8	3.0	0.485	|IO	|	|	|	2.7
1256	1.8	3.0	0.483	|IO	|	|	|	2.7
1257	1.8	2.9	0.482	|IO	|	|	|	2.7
1258	1.8	2.9	0.480	|IO	|	|	|	2.7
1259	1.8	2.9	0.479	|IO	|	|	|	2.7
1260	1.8	2.9	0.477	|IO	|	|	|	2.7
1261	1.8	2.9	0.476	|IO	|	|	|	2.7
1262	1.8	2.9	0.474	|IO	|	|	|	2.7
1263	1.7	2.9	0.472	|IO	|	|	|	2.7
1264	1.7	2.9	0.471	|IO	|	|	|	2.7
1265	1.7	2.9	0.469	|IO	|	|	|	2.6
1266	1.7	2.9	0.467	|IO	|	|	|	2.6
1267	1.7	2.9	0.466	|IO	|	|	|	2.6
1268	1.7	2.9	0.464	|IO	|	|	|	2.6
1269	1.7	2.8	0.463	|IO	|	|	|	2.6
1270	1.7	2.8	0.461	|IO	|	|	|	2.6
1271	1.6	2.8	0.459	|IO	|	|	|	2.6
1272	1.6	2.8	0.458	|IO	|	|	|	2.6
1273	1.6	2.8	0.456	|IO	|	|	|	2.6
1274	1.6	2.8	0.454	|IO	|	|	|	2.6
1275	1.6	2.8	0.453	|IO	|	|	|	2.6
1276	1.5	2.8	0.451	|IO	|	|	|	2.6
1277	1.5	2.8	0.449	|IO	|	|	|	2.6
1278	1.5	2.8	0.447	|IO	|	|	|	2.6
1279	1.5	2.8	0.446	|IO	|	|	|	2.5
1280	1.5	2.7	0.444	|IO	|	|	|	2.5
1281	1.5	2.7	0.442	|IO	|	|	|	2.5
1282	1.5	2.7	0.441	|IO	|	|	|	2.5
1283	1.5	2.7	0.439	|IO	|	|	|	2.5
1284	1.5	2.7	0.437	|IO	|	|	|	2.5
1285	1.5	2.7	0.436	|IO	|	|	|	2.5
1286	1.5	2.7	0.434	|IO	|	|	|	2.5
1287	1.4	2.7	0.432	|IO	|	|	|	2.5
1288	1.4	2.7	0.430	|O	|	|	|	2.5
1289	1.4	2.7	0.429	|O	|	|	|	2.5
1290	1.4	2.7	0.427	|O	|	|	|	2.5
1291	1.4	2.6	0.425	|O	|	|	|	2.5
1292	1.4	2.6	0.423	|O	|	|	|	2.4
1293	1.4	2.6	0.422	|O	|	|	|	2.4
1294	1.4	2.6	0.420	|O	|	|	|	2.4
1295	1.4	2.6	0.418	|O	|	|	|	2.4
1296	1.3	2.6	0.417	IO	|	|	|	2.4
1297	1.3	2.6	0.415	IO	|	|	|	2.4
1298	1.3	2.6	0.413	IO	|	|	|	2.4
1299	1.3	2.6	0.411	IO	|	|	|	2.4
1300	1.3	2.6	0.409	IO	|	|	|	2.4
1310	1.3	2.5	0.393	IO	|	|	|	2.3
1320	1.2	2.4	0.376	IO	|	|	|	2.2
1330	1.1	2.3	0.360	IO	|	|	|	2.2

1340	1.1	2.2	0.344	IO	|	|	|	2.1
1350	1.0	2.1	0.328	IO	|	|	|	2.0
1360	1.0	2.0	0.313	IO	|	|	|	2.0
1370	0.9	1.9	0.299	IO	|	|	|	1.9
1380	0.9	1.9	0.285	IO	|	|	|	1.8
1390	0.8	1.9	0.271	IO	|	|	|	1.8
1400	0.7	1.9	0.255	IO	|	|	|	1.7
1420	0.6	1.9	0.222	IO	|	|	|	1.5
1440	0.6	1.8	0.188	IO	|	|	|	1.3
1460	0.3	1.8	0.150	IO	|	|	|	1.1
1500	0.3	1.1	0.085	O	|	|	|	0.6

Remaining water in basin = 0.09 (Ac.Ft)
Peak flow out of basin = 26.83(CFS)
Peak flow time = 1158 Min., time interval # = 44
Maximum depth in basin = 3.90(Ft.)

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Study Date : 02/20/13 Input hydrograph file name : ms050p.HYD
Output hydrograph file name: msdet050.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	0.140	1.800	0.139	0.141
1.920	0.300	1.900	0.299	0.301
2.000	0.320	2.100	0.319	0.321
3.000	0.550	3.300	0.548	0.552
3.470	0.680	13.200	0.671	0.689
3.600	0.710	17.000	0.698	0.722
3.900	0.800	26.900	0.781	0.819
4.000	0.830	28.000	0.811	0.849
4.100	0.860	35.700	0.835	0.885
4.300	0.930	40.000	0.902	0.958

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 1 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.12 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 0.6 1.1 1.7 2.2	Depth (Ft.)
0	0.0	0.0	0.000	O | | | |	0.0
100	0.0	0.0	0.000	O | | | |	0.0
200	0.0	0.0	0.000	O | | | |	0.0
300	0.0	0.0	0.000	O | | | |	0.0
400	0.0	0.0	0.000	O | | | |	0.0
500	0.0	0.0	0.000	O | | | |	0.0
600	0.0	0.0	0.000	O | | | |	0.0
700	0.0	0.0	0.000	O | | | |	0.0
800	0.0	0.0	0.000	O | | | |	0.0
900	0.0	0.0	0.000	O | | | |	0.0
1000	0.0	0.0	0.000	O | | | |	0.0
1050	0.0	0.0	0.000	O | | | |	0.0
1100	0.0	0.0	0.000	O | | | |	0.0
1110	0.0	0.0	0.000	O | | | |	0.0
1120	0.2	0.0	0.001	O I | | | |	0.0
1130	0.2	0.0	0.004	O I | | | |	0.0
1131	0.2	0.1	0.004	O I | | | |	0.0
1132	0.2	0.1	0.004	O I | | | |	0.0
1133	0.2	0.1	0.004	O I | | | |	0.0

1134	0.2	0.1	0.005	O I	|	|	|	|	0.0
1135	0.3	0.1	0.005	O I	|	|	|	|	0.0
1136	0.3	0.1	0.005	O I	|	|	|	|	0.0
1137	0.3	0.1	0.006	|O I	|	|	|	|	0.0
1138	0.3	0.1	0.006	|O I	|	|	|	|	0.0
1139	0.3	0.1	0.006	|O I	|	|	|	|	0.0
1140	0.3	0.1	0.006	|O I	|	|	|	|	0.0
1141	0.3	0.1	0.007	|O I	|	|	|	|	0.0
1142	0.3	0.1	0.007	|O I	|	|	|	|	0.1
1143	0.3	0.1	0.007	|O I	|	|	|	|	0.1
1144	0.3	0.1	0.008	|O I	|	|	|	|	0.1
1145	0.4	0.1	0.008	|O I	|	|	|	|	0.1
1146	0.4	0.1	0.008	|O I	|	|	|	|	0.1
1147	0.5	0.1	0.009	|O I|	|	|	|	|	0.1
1148	0.6	0.1	0.010	|O I	|	|	|	|	0.1
1149	0.7	0.1	0.010	|O | I	|	|	|	|	0.1
1150	0.9	0.1	0.011	| O | I	|	|	|	|	0.1
1151	1.1	0.2	0.013	| O | I	|	|	|	|	0.1
1152	1.5	0.2	0.015	| O | I	|	|	|	|	0.1
1153	1.7	0.2	0.017	| O | I	|	|	|	|	0.1
1154	2.0	0.2	0.019	| O | I	|	|	|	|	0.1
1155	2.2	0.3	0.022	| O | I	|	|	|	|	0.2
1156	2.2	0.3	0.024	| O | I	|	|	|	|	0.2
1157	2.2	0.3	0.027	| O | I	|	|	|	|	0.2
1158	2.1	0.4	0.029	| O | I	|	|	|	|	0.2
1159	2.0	0.4	0.032	| O | I	|	|	|	|	0.2
1160	1.9	0.4	0.034	| O | I	|	|	|	|	0.2
1161	1.8	0.5	0.035	| O | I	|	|	|	|	0.3
1162	1.6	0.5	0.037	| O | I	|	|	|	|	0.3
1163	1.5	0.5	0.038	| O| I	|	|	|	|	0.3
1164	1.4	0.5	0.040	| O| I	|	|	|	|	0.3
1165	1.3	0.5	0.041	| O| I	|	|	|	|	0.3
1166	1.2	0.5	0.042	| O| I	|	|	|	|	0.3
1167	1.1	0.5	0.042	| O| I	|	|	|	|	0.3
1168	1.0	0.6	0.043	| O I	|	|	|	|	0.3
1169	1.0	0.6	0.044	| O I	|	|	|	|	0.3
1170	0.9	0.6	0.044	| O I	|	|	|	|	0.3
1171	0.9	0.6	0.045	| O I	|	|	|	|	0.3
1172	0.9	0.6	0.045	| O I	|	|	|	|	0.3
1173	0.9	0.6	0.045	| O I	|	|	|	|	0.3
1174	0.8	0.6	0.046	| O I	|	|	|	|	0.3
1175	0.8	0.6	0.046	| O I	|	|	|	|	0.3
1176	0.8	0.6	0.046	| O I	|	|	|	|	0.3
1177	0.7	0.6	0.046	| O I	|	|	|	|	0.3
1178	0.7	0.6	0.047	| O I	|	|	|	|	0.3
1179	0.7	0.6	0.047	| O I	|	|	|	|	0.3
1180	0.7	0.6	0.047	| O I	|	|	|	|	0.3
1181	0.7	0.6	0.047	| O I	|	|	|	|	0.3
1182	0.6	0.6	0.047	| O	|	|	|	|	0.3
1183	0.6	0.6	0.047	| O	|	|	|	|	0.3
1184	0.6	0.6	0.047	| O	|	|	|	|	0.3
1185	0.6	0.6	0.047	| O	|	|	|	|	0.3
1186	0.5	0.6	0.047	| IO	|	|	|	|	0.3
1187	0.5	0.6	0.047	| IO	|	|	|	|	0.3
1188	0.5	0.6	0.047	| IO	|	|	|	|	0.3
1189	0.5	0.6	0.046	| IO	|	|	|	|	0.3
1190	0.5	0.6	0.046	| IO	|	|	|	|	0.3
1191	0.5	0.6	0.046	| IO	|	|	|	|	0.3
1192	0.5	0.6	0.046	| IO	|	|	|	|	0.3
1193	0.5	0.6	0.046	| IO	|	|	|	|	0.3
1194	0.5	0.6	0.046	| IO	|	|	|	|	0.3
1195	0.5	0.6	0.046	| IO	|	|	|	|	0.3
1196	0.5	0.6	0.046	| IO	|	|	|	|	0.3

1197	0.5	0.6	0.045	| IO |				0.3
1198	0.5	0.6	0.045	| IO |				0.3
1199	0.5	0.6	0.045	| IO |				0.3
1200	0.5	0.6	0.045	| IO |				0.3
1201	0.5	0.6	0.045	| IO |				0.3
1202	0.4	0.6	0.045	| I O |				0.3
1203	0.4	0.6	0.045	| I O |				0.3
1204	0.4	0.6	0.044	| I O |				0.3
1205	0.4	0.6	0.044	| I O |				0.3
1206	0.4	0.6	0.044	| I O |				0.3
1207	0.4	0.6	0.044	| I O |				0.3
1208	0.4	0.6	0.043	| I O |				0.3
1209	0.4	0.6	0.043	| I O |				0.3
1210	0.4	0.6	0.043	| I O |				0.3
1211	0.4	0.5	0.043	| I O|				0.3
1212	0.4	0.5	0.043	| I O|				0.3
1213	0.4	0.5	0.042	| I O|				0.3
1214	0.4	0.5	0.042	| I O|				0.3
1215	0.4	0.5	0.042	| I O|				0.3
1216	0.4	0.5	0.042	| I O|				0.3
1217	0.4	0.5	0.042	| I O|				0.3
1218	0.4	0.5	0.041	| I O|				0.3
1219	0.4	0.5	0.041	| I O|				0.3
1220	0.4	0.5	0.041	| I O|				0.3
1221	0.4	0.5	0.041	| I O|				0.3
1222	0.4	0.5	0.041	| I O|				0.3
1223	0.3	0.5	0.040	| I O|				0.3
1224	0.3	0.5	0.040	| I O|				0.3
1225	0.3	0.5	0.040	| I O|				0.3
1226	0.3	0.5	0.039	| I O|				0.3
1227	0.3	0.5	0.039	| I O|				0.3
1228	0.3	0.5	0.039	| I O|				0.3
1229	0.3	0.5	0.039	| I O|				0.3
1230	0.3	0.5	0.038	| I O|				0.3
1231	0.3	0.5	0.038	| I O|				0.3
1232	0.3	0.5	0.038	| I O|				0.3
1233	0.3	0.5	0.038	| I O|				0.3
1234	0.3	0.5	0.037	| I O |				0.3
1235	0.3	0.5	0.037	| I O |				0.3
1236	0.3	0.5	0.037	| I O |				0.3
1237	0.3	0.5	0.037	| I O |				0.3
1238	0.3	0.5	0.036	| I O |				0.3
1239	0.3	0.5	0.036	| I O |				0.3
1240	0.3	0.5	0.036	| I O |				0.3
1241	0.3	0.5	0.036	| I O |				0.3
1242	0.3	0.5	0.036	| I O |				0.3
1243	0.3	0.5	0.035	| I O |				0.3
1244	0.3	0.5	0.035	| I O |				0.3
1245	0.3	0.4	0.035	| I O |				0.2
1246	0.3	0.4	0.035	| I O |				0.2
1247	0.3	0.4	0.034	| I O |				0.2
1248	0.3	0.4	0.034	| I O |				0.2
1249	0.3	0.4	0.034	| I O |				0.2
1250	0.3	0.4	0.034	| I O |				0.2
1251	0.2	0.4	0.034	| I O |				0.2
1252	0.2	0.4	0.033	| I O |				0.2
1253	0.2	0.4	0.033	| I O |				0.2
1254	0.2	0.4	0.033	| I O |				0.2
1255	0.1	0.4	0.032	|I O |				0.2
1256	0.1	0.4	0.032	|I O |				0.2
1257	0.1	0.4	0.031	|I O |				0.2
1258	0.1	0.4	0.031	|I O |				0.2
1259	0.1	0.4	0.031	|I O |				0.2

1260	0.1	0.4	0.030	|I O |	|	|	|	0.2
1261	0.1	0.4	0.030	|I O |	|	|	|	0.2
1262	0.1	0.4	0.029	|I O |	|	|	|	0.2
1263	0.1	0.4	0.029	|I O |	|	|	|	0.2
1264	0.0	0.4	0.028	I O |	|	|	|	0.2
1265	0.1	0.4	0.028	|I O |	|	|	|	0.2
1266	0.1	0.4	0.028	|I O |	|	|	|	0.2
1267	0.0	0.4	0.027	I O |	|	|	|	0.2
1268	0.0	0.3	0.027	I O |	|	|	|	0.2
1269	0.0	0.3	0.026	I O |	|	|	|	0.2
1270	0.0	0.3	0.026	I O |	|	|	|	0.2
1271	0.0	0.3	0.025	I O |	|	|	|	0.2
1272	0.0	0.3	0.025	I O |	|	|	|	0.2
1273	0.0	0.3	0.025	I O |	|	|	|	0.2
1274	0.0	0.3	0.024	I O |	|	|	|	0.2
1275	0.0	0.3	0.024	I O |	|	|	|	0.2
1276	0.0	0.3	0.023	I O |	|	|	|	0.2
1277	0.0	0.3	0.023	I O |	|	|	|	0.2
1278	0.0	0.3	0.022	I O |	|	|	|	0.2
1279	0.0	0.3	0.022	I O |	|	|	|	0.2
1280	0.0	0.3	0.022	I O |	|	|	|	0.2
1281	0.0	0.3	0.021	I O |	|	|	|	0.2
1282	0.0	0.3	0.021	I O |	|	|	|	0.1
1283	0.0	0.3	0.021	I O |	|	|	|	0.1
1284	0.0	0.3	0.020	I O |	|	|	|	0.1
1285	0.0	0.3	0.020	I O |	|	|	|	0.1
1286	0.0	0.3	0.019	I O |	|	|	|	0.1
1287	0.0	0.2	0.019	I O |	|	|	|	0.1
1288	0.0	0.2	0.019	I O |	|	|	|	0.1
1289	0.0	0.2	0.018	I O |	|	|	|	0.1
1290	0.0	0.2	0.018	I O |	|	|	|	0.1
1291	0.0	0.2	0.018	I O |	|	|	|	0.1
1292	0.0	0.2	0.018	I O |	|	|	|	0.1
1293	0.0	0.2	0.017	I O |	|	|	|	0.1
1294	0.0	0.2	0.017	I O |	|	|	|	0.1
1295	0.0	0.2	0.017	I O |	|	|	|	0.1
1296	0.0	0.2	0.016	I O |	|	|	|	0.1
1297	0.0	0.2	0.016	I O |	|	|	|	0.1
1298	0.0	0.2	0.016	I O |	|	|	|	0.1
1299	0.0	0.2	0.015	I O |	|	|	|	0.1
1300	0.0	0.2	0.015	I O |	|	|	|	0.1
1310	0.0	0.2	0.013	I O |	|	|	|	0.1
1320	0.0	0.1	0.011	IO |	|	|	|	0.1
1330	0.0	0.1	0.009	IO |	|	|	|	0.1
1340	0.0	0.1	0.007	IO |	|	|	|	0.1
1350	0.0	0.1	0.006	IO |	|	|	|	0.0
1360	0.0	0.1	0.005	O |	|	|	|	0.0
1370	0.0	0.1	0.004	O |	|	|	|	0.0
1380	0.0	0.0	0.004	O |	|	|	|	0.0
1390	0.0	0.0	0.003	O |	|	|	|	0.0
1400	0.0	0.0	0.003	O |	|	|	|	0.0
1420	0.0	0.0	0.002	O |	|	|	|	0.0
1440	0.0	0.0	0.001	O |	|	|	|	0.0
1460	0.0	0.0	0.001	O |	|	|	|	0.0
1500	0.2	0.1	0.005	O I |	|	|	|	0.0

Remaining water in basin = 0.00 (Ac.Ft)
Peak flow out of basin = 0.60(CFS)
Peak flow time = 1181 Min., time interval # = 67
Maximum depth in basin = 0.34(Ft.)

msdet050
Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 2 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.92 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.8 5.6 8.4 11.2	Depth (Ft.)
0	0.0	0.1	0.005	O	0.0
100	0.0	0.0	0.001	O	0.0
200	0.0	0.0	0.000	O	0.0
300	0.0	0.0	0.000	O	0.0
400	0.2	0.1	0.008	O	0.1
500	0.2	0.2	0.014	O	0.1
600	0.2	0.2	0.015	O	0.1
700	0.2	0.2	0.016	O	0.1
800	0.3	0.3	0.020	O	0.1
900	0.3	0.3	0.023	O	0.2
1000	0.3	0.3	0.023	O	0.2
1050	0.8	0.5	0.037	OI	0.3
1100	1.6	0.9	0.073	O I	0.5
1110	2.0	1.1	0.084	O I	0.6
1120	2.4	1.3	0.099	O I	0.7
1130	2.9	1.5	0.116	O I	0.8
1131	2.9	1.5	0.118	O I	0.8
1132	3.0	1.5	0.120	O I	0.9
1133	3.0	1.6	0.122	O I	0.9
1134	3.1	1.6	0.124	O I	0.9
1135	3.2	1.6	0.127	O I	0.9
1136	3.3	1.7	0.129	O I	0.9
1137	3.4	1.7	0.131	O I	0.9
1138	3.5	1.7	0.134	O I	1.0
1139	3.6	1.8	0.136	O I	1.0
1140	3.7	1.8	0.139	O I	1.0
1141	3.8	1.8	0.142	O I	1.0
1142	4.0	1.8	0.145	O I	1.0
1143	4.1	1.8	0.148	O I	1.0
1144	4.3	1.8	0.151	O I	1.1
1145	4.5	1.8	0.155	O I	1.1
1146	4.7	1.8	0.159	O I	1.1
1147	4.9	1.8	0.163	O I	1.1
1148	5.2	1.8	0.168	O I	1.2
1149	5.7	1.8	0.173	O I	1.2
1150	6.5	1.8	0.180	O I	1.2
1151	7.5	1.8	0.188	O I	1.3
1152	8.6	1.8	0.197	O I	1.3
1153	10.0	1.8	0.208	O I	1.4
1154	10.9	1.9	0.221	O I	1.5
1155	11.2	1.9	0.234	O I	1.5
1156	11.0	1.9	0.246	O I	1.6
1157	10.3	1.9	0.258	O I	1.7
1158	9.2	1.9	0.268	O I	1.7
1159	7.9	1.9	0.276	O I	1.8
1160	6.9	1.9	0.283	O I	1.8
1161	5.9	1.9	0.289	O I	1.9
1162	5.2	1.9	0.293	O I	1.9
1163	4.5	1.9	0.297	O I	1.9
1164	4.1	1.9	0.300	O I	1.9
1165	3.7	1.9	0.302	O I	1.9
1166	3.3	1.9	0.304	O I	1.9
1167	3.1	2.0	0.306	O I	1.9
1168	2.9	2.0	0.307	O I	1.9

1169	2.7	2.0	0.308		O I			2.0
1170	2.6	2.0	0.309		O I			2.0
1171	2.5	2.0	0.309		O I			2.0
1172	2.4	2.0	0.310		OI			2.0
1173	2.3	2.0	0.310		OI			2.0
1174	2.2	2.0	0.311		OI			2.0
1175	2.1	2.0	0.311		OI			2.0
1176	2.1	2.0	0.311		OI			2.0
1177	2.0	2.0	0.311		O			2.0
1178	2.0	2.0	0.311		O			2.0
1179	1.9	2.0	0.311		O			2.0
1180	1.9	2.0	0.311		O			2.0
1181	1.9	2.0	0.310		O			2.0
1182	1.8	2.0	0.310		O			2.0
1183	1.8	2.0	0.310		O			2.0
1184	1.8	2.0	0.310		O			2.0
1185	1.6	2.0	0.309		IO			2.0
1186	1.6	2.0	0.309		IO			2.0
1187	1.6	2.0	0.308		IO			2.0
1188	1.5	2.0	0.307		IO			1.9
1189	1.5	2.0	0.307		IO			1.9
1190	1.5	2.0	0.306		IO			1.9
1191	1.5	2.0	0.305		IO			1.9
1192	1.5	1.9	0.305		IO			1.9
1193	1.4	1.9	0.304		IO			1.9
1194	1.4	1.9	0.303		IO			1.9
1195	1.4	1.9	0.303		IO			1.9
1196	1.3	1.9	0.302		I O			1.9
1197	1.3	1.9	0.301		I O			1.9
1198	1.3	1.9	0.300		I O			1.9
1199	1.3	1.9	0.299		I O			1.9
1200	1.2	1.9	0.298		I O			1.9
1201	1.2	1.9	0.297		I O			1.9
1202	1.2	1.9	0.296		I O			1.9
1203	1.2	1.9	0.295		I O			1.9
1204	1.2	1.9	0.294		I O			1.9
1205	1.2	1.9	0.293		I O			1.9
1206	1.1	1.9	0.292		I O			1.9
1207	1.1	1.9	0.291		I O			1.9
1208	1.1	1.9	0.290		I O			1.9
1209	1.1	1.9	0.289		I O			1.9
1210	1.1	1.9	0.288		I O			1.9
1211	1.1	1.9	0.287		I O			1.8
1212	1.1	1.9	0.286		I O			1.8
1213	1.1	1.9	0.285		I O			1.8
1214	1.1	1.9	0.284		I O			1.8
1215	1.1	1.9	0.283		I O			1.8
1216	1.0	1.9	0.281		I O			1.8
1217	1.0	1.9	0.280		I O			1.8
1218	1.0	1.9	0.279		I O			1.8
1219	1.0	1.9	0.278		I O			1.8
1220	1.0	1.9	0.276		I O			1.8
1221	0.9	1.9	0.275		I O			1.8
1222	0.9	1.9	0.274		I O			1.8
1223	0.9	1.9	0.272		I O			1.8
1224	0.9	1.9	0.271		I O			1.8
1225	0.9	1.9	0.270		I O			1.7
1226	0.9	1.9	0.268		I O			1.7
1227	0.9	1.9	0.267		I O			1.7
1228	0.8	1.9	0.266		I O			1.7
1229	0.8	1.9	0.264		I O			1.7
1230	0.8	1.9	0.263		I O			1.7
1231	0.8	1.9	0.261		I O			1.7

1232	0.8	1.9	0.260	| I O |	|	|	|	1.7
1233	0.8	1.9	0.258	| I O |	|	|	|	1.7
1234	0.8	1.9	0.257	| I O |	|	|	|	1.7
1235	0.8	1.9	0.255	| I O |	|	|	|	1.7
1236	0.8	1.9	0.254	| I O |	|	|	|	1.7
1237	0.7	1.9	0.252	| I O |	|	|	|	1.6
1238	0.7	1.9	0.250	| I O |	|	|	|	1.6
1239	0.7	1.9	0.249	| I O |	|	|	|	1.6
1240	0.7	1.9	0.247	| I O |	|	|	|	1.6
1241	0.7	1.9	0.246	| I O |	|	|	|	1.6
1242	0.7	1.9	0.244	| I O |	|	|	|	1.6
1243	0.7	1.9	0.242	| I O |	|	|	|	1.6
1244	0.7	1.9	0.241	| I O |	|	|	|	1.6
1245	0.7	1.9	0.239	| I O |	|	|	|	1.6
1246	0.6	1.9	0.237	|I O |	|	|	|	1.6
1247	0.6	1.9	0.236	|I O |	|	|	|	1.6
1248	0.6	1.9	0.234	|I O |	|	|	|	1.5
1249	0.6	1.9	0.232	|I O |	|	|	|	1.5
1250	0.6	1.9	0.231	|I O |	|	|	|	1.5
1251	0.6	1.9	0.229	|I O |	|	|	|	1.5
1252	0.6	1.9	0.227	|I O |	|	|	|	1.5
1253	0.5	1.9	0.225	|I O |	|	|	|	1.5
1254	0.5	1.9	0.223	|I O |	|	|	|	1.5
1255	0.5	1.9	0.221	|I O |	|	|	|	1.5
1256	0.5	1.8	0.220	|I O |	|	|	|	1.5
1257	0.5	1.8	0.218	|I O |	|	|	|	1.4
1258	0.5	1.8	0.216	|I O |	|	|	|	1.4
1259	0.5	1.8	0.214	|I O |	|	|	|	1.4
1260	0.5	1.8	0.212	|I O |	|	|	|	1.4
1261	0.5	1.8	0.210	|I O |	|	|	|	1.4
1262	0.5	1.8	0.208	|I O |	|	|	|	1.4
1263	0.4	1.8	0.207	|I O |	|	|	|	1.4
1264	0.4	1.8	0.205	|I O |	|	|	|	1.4
1265	0.4	1.8	0.203	|I O |	|	|	|	1.4
1266	0.4	1.8	0.201	|I O |	|	|	|	1.3
1267	0.4	1.8	0.199	|I O |	|	|	|	1.3
1268	0.4	1.8	0.197	|I O |	|	|	|	1.3
1269	0.4	1.8	0.195	|I O |	|	|	|	1.3
1270	0.4	1.8	0.193	|I O |	|	|	|	1.3
1271	0.4	1.8	0.191	|I O |	|	|	|	1.3
1272	0.4	1.8	0.189	|I O |	|	|	|	1.3
1273	0.4	1.8	0.187	|I O |	|	|	|	1.3
1274	0.4	1.8	0.185	|I O |	|	|	|	1.3
1275	0.4	1.8	0.183	|I O |	|	|	|	1.2
1276	0.4	1.8	0.181	|I O |	|	|	|	1.2
1277	0.4	1.8	0.179	|I O |	|	|	|	1.2
1278	0.3	1.8	0.177	I O |	|	|	|	1.2
1279	0.2	1.8	0.175	I O |	|	|	|	1.2
1280	0.3	1.8	0.172	I O |	|	|	|	1.2
1281	0.3	1.8	0.170	I O |	|	|	|	1.2
1282	0.2	1.8	0.168	I O |	|	|	|	1.2
1283	0.2	1.8	0.166	I O |	|	|	|	1.1
1284	0.2	1.8	0.164	I O |	|	|	|	1.1
1285	0.2	1.8	0.161	I O |	|	|	|	1.1
1286	0.2	1.8	0.159	I O |	|	|	|	1.1
1287	0.2	1.8	0.157	I O |	|	|	|	1.1
1288	0.2	1.8	0.155	I O |	|	|	|	1.1
1289	0.2	1.8	0.153	I O |	|	|	|	1.1
1290	0.2	1.8	0.150	I O |	|	|	|	1.1
1291	0.2	1.8	0.148	I O |	|	|	|	1.0
1292	0.2	1.8	0.146	I O |	|	|	|	1.0
1293	0.2	1.8	0.144	I O |	|	|	|	1.0
1294	0.2	1.8	0.142	I O |	|	|	|	1.0

1295	0.2	1.8	0.139	I O	|	|	|	1.0
1296	0.2	1.8	0.137	I O	|	|	|	1.0
1297	0.2	1.7	0.135	I O	|	|	|	1.0
1298	0.2	1.7	0.133	I O	|	|	|	0.9
1299	0.2	1.7	0.131	I O	|	|	|	0.9
1300	0.2	1.7	0.129	I O	|	|	|	0.9
1310	0.2	1.4	0.110	I O	|	|	|	0.8
1320	0.2	1.2	0.095	I O	|	|	|	0.7
1330	0.2	1.1	0.082	I O	|	|	|	0.6
1340	0.2	0.9	0.071	I O	|	|	|	0.5
1350	0.2	0.8	0.062	I O	|	|	|	0.4
1360	0.2	0.7	0.055	I O	|	|	|	0.4
1370	0.2	0.6	0.048	IO	|	|	|	0.3
1380	0.2	0.6	0.043	IO	|	|	|	0.3
1390	0.2	0.5	0.039	IO	|	|	|	0.3
1400	0.2	0.4	0.035	IO	|	|	|	0.2
1420	0.2	0.4	0.029	IO	|	|	|	0.2
1440	0.0	0.3	0.022	O	|	|	|	0.2
1460	0.1	0.2	0.017	O	|	|	|	0.1
1500	0.0	0.1	0.010	O	|	|	|	0.1

Remaining water in basin = 0.01 (Ac.Ft)
Peak flow out of basin = 2.01(CFS)
Peak flow time = 1176 Min., time interval # = 62
Maximum depth in basin = 1.96(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 3 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 0.75 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 2.8 5.6 8.4 11.2	Depth (Ft.)
0	0.0	0.1	0.010	O | | | |	0.1
100	0.0	0.0	0.002	O | | | |	0.0
200	0.0	0.0	0.000	O | | | |	0.0
300	0.0	0.0	0.000	O | | | |	0.0
400	0.0	0.0	0.000	O | | | |	0.0
500	0.0	0.0	0.000	O | | | |	0.0
600	0.2	0.1	0.008	O | | | |	0.1
700	0.2	0.2	0.014	O | | | |	0.1
800	0.2	0.2	0.015	O | | | |	0.1
900	0.3	0.3	0.020	O | | | |	0.1
1000	0.3	0.3	0.023	O | | | |	0.2
1050	0.4	0.3	0.026	OI | | | |	0.2
1100	1.2	0.6	0.050	|O I | | | |	0.4
1110	1.6	0.8	0.060	| O I | | | |	0.4
1120	2.0	0.9	0.073	| O I | | | |	0.5
1130	2.4	1.2	0.090	| O I | | | |	0.6
1131	2.4	1.2	0.091	| O I | | | |	0.7
1132	2.5	1.2	0.093	| O I| | | |	0.7
1133	2.6	1.2	0.095	| O I| | | |	0.7
1134	2.7	1.2	0.097	| O I| | | |	0.7
1135	2.7	1.3	0.099	| O I| | | |	0.7
1136	2.8	1.3	0.101	| O I | | |	0.7
1137	2.9	1.3	0.103	| O I | | |	0.7
1138	3.0	1.4	0.106	| O I | | |	0.8
1139	3.0	1.4	0.108	| O I | | |	0.8
1140	3.1	1.4	0.110	| O I | | |	0.8

1141	3.2	1.4	0.113	O	I				0.8
1142	3.4	1.5	0.115	O	I				0.8
1143	3.5	1.5	0.118	O	I				0.8
1144	3.7	1.6	0.121	O	I				0.9
1145	3.9	1.6	0.124	O	I				0.9
1146	4.1	1.6	0.128	O	I				0.9
1147	4.3	1.7	0.131	O	I				0.9
1148	4.5	1.7	0.135	O	I				1.0
1149	5.0	1.8	0.140	O	I				1.0
1150	5.7	1.8	0.145	O	I				1.0
1151	6.5	1.8	0.151	O	I				1.1
1152	7.5	1.8	0.159	O	I				1.1
1153	8.6	1.8	0.169	O	I				1.2
1154	9.3	1.8	0.179	O	I				1.2
1155	9.6	1.8	0.190	O	I				1.3
1156	9.4	1.8	0.200	O	I				1.3
1157	8.8	1.8	0.210	O	I				1.4
1158	7.9	1.8	0.218	O	I				1.4
1159	7.0	1.9	0.225	O	I				1.5
1160	6.1	1.9	0.231	O	I				1.5
1161	5.3	1.9	0.236	O	I				1.5
1162	4.6	1.9	0.239	O	I				1.6
1163	4.1	1.9	0.242	O	I				1.6
1164	3.6	1.9	0.245	O	I				1.6
1165	3.3	1.9	0.247	O	I				1.6
1166	3.0	1.9	0.248	O	I				1.6
1167	2.8	1.9	0.250	O	I				1.6
1168	2.6	1.9	0.251	O	I				1.6
1169	2.4	1.9	0.251	O	I				1.6
1170	2.3	1.9	0.252	O	I				1.6
1171	2.2	1.9	0.252	O	I				1.6
1172	2.1	1.9	0.253	O	I				1.6
1173	2.0	1.9	0.253	O					1.6
1174	1.9	1.9	0.253	O					1.6
1175	1.9	1.9	0.253	O					1.6
1176	1.8	1.9	0.253	O					1.6
1177	1.8	1.9	0.253	O					1.6
1178	1.8	1.9	0.253	O					1.6
1179	1.7	1.9	0.252	O	I				1.6
1180	1.7	1.9	0.252	O	I				1.6
1181	1.7	1.9	0.252	O	I				1.6
1182	1.6	1.9	0.252	O	I				1.6
1183	1.6	1.9	0.251	O	I				1.6
1184	1.6	1.9	0.251	O	I				1.6
1185	1.5	1.9	0.250	O	I				1.6
1186	1.5	1.9	0.250	O	I				1.6
1187	1.5	1.9	0.249	O	I				1.6
1188	1.5	1.9	0.249	O	I				1.6
1189	1.5	1.9	0.248	O	I				1.6
1190	1.4	1.9	0.248	O	I				1.6
1191	1.4	1.9	0.247	O	I				1.6
1192	1.4	1.9	0.246	O	I				1.6
1193	1.3	1.9	0.246	O	I				1.6
1194	1.3	1.9	0.245	O	I				1.6
1195	1.3	1.9	0.244	O	I				1.6
1196	1.2	1.9	0.243	O	I				1.6
1197	1.2	1.9	0.242	O	I				1.6
1198	1.2	1.9	0.241	O	I				1.6
1199	1.2	1.9	0.240	O	I				1.6
1200	1.2	1.9	0.240	O	I				1.6
1201	1.2	1.9	0.239	O	I				1.6
1202	1.2	1.9	0.238	O	I				1.6
1203	1.2	1.9	0.237	O	I				1.6

1204	1.1	1.9	0.236	| I O |	|	|	|	1.6
1205	1.1	1.9	0.235	| I O |	|	|	|	1.5
1206	1.1	1.9	0.234	| I O |	|	|	|	1.5
1207	1.1	1.9	0.233	| I O |	|	|	|	1.5
1208	1.1	1.9	0.232	| I O |	|	|	|	1.5
1209	1.1	1.9	0.231	| I O |	|	|	|	1.5
1210	1.1	1.9	0.229	| I O |	|	|	|	1.5
1211	1.1	1.9	0.228	| I O |	|	|	|	1.5
1212	1.0	1.9	0.227	| I O |	|	|	|	1.5
1213	1.0	1.9	0.226	| I O |	|	|	|	1.5
1214	1.0	1.9	0.225	| I O |	|	|	|	1.5
1215	1.0	1.9	0.224	| I O |	|	|	|	1.5
1216	1.0	1.9	0.223	| I O |	|	|	|	1.5
1217	1.0	1.9	0.221	| I O |	|	|	|	1.5
1218	1.0	1.9	0.220	| I O |	|	|	|	1.5
1219	1.0	1.8	0.219	| I O |	|	|	|	1.5
1220	0.9	1.8	0.218	| I O |	|	|	|	1.4
1221	0.9	1.8	0.216	| I O |	|	|	|	1.4
1222	0.9	1.8	0.215	| I O |	|	|	|	1.4
1223	0.9	1.8	0.214	| I O |	|	|	|	1.4
1224	0.9	1.8	0.213	| I O |	|	|	|	1.4
1225	0.9	1.8	0.211	| I O |	|	|	|	1.4
1226	0.9	1.8	0.210	| I O |	|	|	|	1.4
1227	0.9	1.8	0.209	| I O |	|	|	|	1.4
1228	0.8	1.8	0.207	| I O |	|	|	|	1.4
1229	0.8	1.8	0.206	| I O |	|	|	|	1.4
1230	0.8	1.8	0.204	| I O |	|	|	|	1.4
1231	0.8	1.8	0.203	| I O |	|	|	|	1.4
1232	0.8	1.8	0.201	| I O |	|	|	|	1.4
1233	0.8	1.8	0.200	| I O |	|	|	|	1.3
1234	0.8	1.8	0.199	| I O |	|	|	|	1.3
1235	0.8	1.8	0.197	| I O |	|	|	|	1.3
1236	0.7	1.8	0.196	| I O |	|	|	|	1.3
1237	0.7	1.8	0.194	| I O |	|	|	|	1.3
1238	0.7	1.8	0.192	| I O |	|	|	|	1.3
1239	0.7	1.8	0.191	| I O |	|	|	|	1.3
1240	0.7	1.8	0.189	| I O |	|	|	|	1.3
1241	0.7	1.8	0.188	| I O |	|	|	|	1.3
1242	0.7	1.8	0.186	| I O |	|	|	|	1.3
1243	0.7	1.8	0.185	| I O |	|	|	|	1.3
1244	0.7	1.8	0.183	| I O |	|	|	|	1.2
1245	0.7	1.8	0.182	| I O |	|	|	|	1.2
1246	0.6	1.8	0.180	|I O |	|	|	|	1.2
1247	0.6	1.8	0.178	|I O |	|	|	|	1.2
1248	0.6	1.8	0.177	|I O |	|	|	|	1.2
1249	0.6	1.8	0.175	|I O |	|	|	|	1.2
1250	0.6	1.8	0.173	|I O |	|	|	|	1.2
1251	0.6	1.8	0.171	|I O |	|	|	|	1.2
1252	0.6	1.8	0.170	|I O |	|	|	|	1.2
1253	0.6	1.8	0.168	|I O |	|	|	|	1.2
1254	0.6	1.8	0.166	|I O |	|	|	|	1.2
1255	0.6	1.8	0.165	|I O |	|	|	|	1.1
1256	0.6	1.8	0.163	|I O |	|	|	|	1.1
1257	0.6	1.8	0.161	|I O |	|	|	|	1.1
1258	0.6	1.8	0.160	|I O |	|	|	|	1.1
1259	0.6	1.8	0.158	|I O |	|	|	|	1.1
1260	0.6	1.8	0.156	|I O |	|	|	|	1.1
1261	0.5	1.8	0.155	|I O |	|	|	|	1.1
1262	0.4	1.8	0.153	|I O |	|	|	|	1.1
1263	0.5	1.8	0.151	|I O |	|	|	|	1.1
1264	0.4	1.8	0.149	|I O |	|	|	|	1.1
1265	0.3	1.8	0.147	I O |	|	|	|	1.0
1266	0.3	1.8	0.145	I O |	|	|	|	1.0

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1267	0.3	1.8	0.143	I O	|	|	|	1.0
1268	0.3	1.8	0.141	I O	|	|	|	1.0
1269	0.3	1.8	0.139	I O	|	|	|	1.0
1270	0.3	1.8	0.137	I O	|	|	|	1.0
1271	0.3	1.7	0.135	I O	|	|	|	1.0
1272	0.3	1.7	0.133	I O	|	|	|	0.9
1273	0.3	1.7	0.131	I O	|	|	|	0.9
1274	0.3	1.7	0.129	I O	|	|	|	0.9
1275	0.3	1.6	0.127	I O	|	|	|	0.9
1276	0.3	1.6	0.125	I O	|	|	|	0.9
1277	0.3	1.6	0.123	I O	|	|	|	0.9
1278	0.3	1.6	0.122	I O	|	|	|	0.9
1279	0.3	1.5	0.120	I O	|	|	|	0.9
1280	0.3	1.5	0.118	I O	|	|	|	0.8
1281	0.3	1.5	0.117	I O	|	|	|	0.8
1282	0.3	1.5	0.115	I O	|	|	|	0.8
1283	0.3	1.5	0.113	I O	|	|	|	0.8
1284	0.3	1.4	0.112	I O	|	|	|	0.8
1285	0.3	1.4	0.110	I O	|	|	|	0.8
1286	0.3	1.4	0.109	I O	|	|	|	0.8
1287	0.3	1.4	0.107	I O	|	|	|	0.8
1288	0.3	1.4	0.106	I O	|	|	|	0.8
1289	0.3	1.3	0.104	I O	|	|	|	0.7
1290	0.3	1.3	0.103	I O	|	|	|	0.7
1291	0.3	1.3	0.101	I O	|	|	|	0.7
1292	0.3	1.3	0.100	I O	|	|	|	0.7
1293	0.3	1.3	0.099	I O	|	|	|	0.7
1294	0.3	1.3	0.097	I O	|	|	|	0.7
1295	0.3	1.2	0.096	I O	|	|	|	0.7
1296	0.3	1.2	0.095	I O	|	|	|	0.7
1297	0.3	1.2	0.094	I O	|	|	|	0.7
1298	0.3	1.2	0.092	I O	|	|	|	0.7
1299	0.3	1.2	0.091	I O	|	|	|	0.7
1300	0.3	1.2	0.090	I O	|	|	|	0.6
1310	0.3	1.0	0.079	I O	|	|	|	0.6
1320	0.3	0.9	0.070	I O	|	|	|	0.5
1330	0.3	0.8	0.062	I O	|	|	|	0.4
1340	0.3	0.7	0.056	I O	|	|	|	0.4
1350	0.3	0.7	0.051	IO	|	|	|	0.4
1360	0.2	0.6	0.046	IO	|	|	|	0.3
1370	0.2	0.5	0.041	IO	|	|	|	0.3
1380	0.1	0.5	0.036	IO	|	|	|	0.3
1390	0.1	0.4	0.031	IO	|	|	|	0.2
1400	0.1	0.4	0.028	IO	|	|	|	0.2
1420	0.1	0.3	0.022	O	|	|	|	0.2
1440	0.1	0.2	0.018	O	|	|	|	0.1
1460	0.1	0.2	0.015	O	|	|	|	0.1
1500	0.0	0.1	0.009	O	|	|	|	0.1

Remaining water in basin = 0.01 (Ac.Ft)
Peak flow out of basin = 1.87(CFS)
Peak flow time = 1175 Min., time interval # = 61
Maximum depth in basin = 1.65(Ft.)

Hydrograph Detention Basin Routing
Hydrograph at 5 439 A Storm Day: 4 Drainage Area = 19.10
Total flood hydrograph volume this storm day = 4.37 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

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msdet050

Time (Min)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0 12.9 25.8 38.6 51.5	Depth (Ft.)
0	0.0	0.1	0.009	O	0.1
100	0.7	0.4	0.031	O	0.2
200	0.7	0.6	0.050	O	0.4
300	0.8	0.7	0.058	O	0.4
400	1.2	1.0	0.078	O	0.6
500	1.3	1.2	0.095	O	0.7
600	1.4	1.3	0.104	O	0.7
700	1.8	1.6	0.125	OI	0.9
800	2.0	1.8	0.147	|O	1.0
900	2.3	1.8	0.193	|O	1.3
1000	2.9	1.9	0.295	|O	1.9
1050	3.6	2.4	0.372	|OI	2.2
1100	4.7	2.9	0.477	|OI	2.7
1110	5.6	3.1	0.508	|O I	2.8
1120	6.4	3.3	0.547	| OI	3.0
1130	7.4	5.6	0.581	| OI	3.1
1131	7.5	5.8	0.583	| OI	3.1
1132	7.7	6.0	0.586	| OI	3.1
1133	7.8	6.2	0.588	| OI	3.1
1134	8.0	6.4	0.590	| OI	3.1
1135	8.2	6.6	0.593	| OI	3.2
1136	8.4	6.7	0.595	| OI	3.2
1137	8.7	6.9	0.598	| OI	3.2
1138	9.0	7.1	0.600	| OI	3.2
1139	9.3	7.4	0.603	| OI	3.2
1140	9.5	7.6	0.606	| OI	3.2
1141	9.8	7.8	0.609	| O I	3.2
1142	10.2	8.0	0.612	| O I	3.2
1143	10.6	8.3	0.616	| OI	3.2
1144	10.9	8.5	0.619	| OI	3.2
1145	11.4	8.8	0.623	| O I|	3.3
1146	12.1	9.2	0.627	| O I|	3.3
1147	12.9	9.5	0.632	| O I	3.3
1148	14.1	10.0	0.638	| O I	3.3
1149	17.8	10.8	0.648	| O | I	3.4
1150	23.2	12.0	0.664	| O| I	3.4
1151	29.6	14.1	0.687	| O | I	3.5
1152	37.4	17.7	0.717	| | O | I|	3.6
1153	46.0	21.7	0.753	| | O | I	3.7
1154	51.1	25.9	0.791	| | O I|	3.9
1155	51.5	27.8	0.824	| | |O I|	4.0
1156	47.9	32.8	0.849	| | | O | I |	4.1
1157	41.1	35.3	0.858	| | | O |I |	4.1
1158	32.6	34.5	0.855	| | | IO |	4.1
1159	24.6	31.5	0.844	| | I| O |	4.0
1160	19.2	28.0	0.829	| | I |O |	4.0
1161	15.2	27.3	0.812	| |I O |	3.9
1162	12.5	26.1	0.792	| I| O |	3.9
1163	10.6	23.9	0.773	| I | O |	3.8
1164	9.2	21.8	0.754	| I | O |	3.7
1165	8.2	19.9	0.736	| I | O |	3.7
1166	7.6	18.2	0.721	| I | O |	3.6
1167	7.0	16.5	0.706	| I | O |	3.6
1168	6.6	14.9	0.694	| I |O |	3.5
1169	6.3	13.6	0.683	| I O |	3.5
1170	6.0	12.7	0.673	| I O|	3.4
1171	5.7	12.0	0.664	| I O|	3.4
1172	5.5	11.3	0.655	| I O|	3.4
1173	5.3	10.7	0.648	| I O |	3.4
1174	5.2	10.2	0.640	| I O |	3.3
1175	5.0	9.7	0.634	| I O |	3.3

1176	4.9	9.2	0.627	I O				3.3
1177	4.8	8.7	0.622	I O				3.3
1178	4.7	8.3	0.616	I O				3.2
1179	4.6	8.0	0.611	I O				3.2
1180	4.5	7.6	0.607	I O				3.2
1181	4.4	7.3	0.603	I O				3.2
1182	4.3	7.0	0.599	I O				3.2
1183	4.2	6.7	0.595	I O				3.2
1184	4.1	6.5	0.592	I O				3.2
1185	4.0	6.2	0.588	IO				3.1
1186	4.0	6.0	0.585	IO				3.1
1187	3.9	5.8	0.583	IO				3.1
1188	3.8	5.6	0.580	IO				3.1
1189	3.8	5.4	0.578	IO				3.1
1190	3.7	5.2	0.575	IO				3.1
1191	3.7	5.1	0.573	IO				3.1
1192	3.6	4.9	0.572	IO				3.1
1193	3.6	4.8	0.570	O				3.1
1194	3.5	4.7	0.568	O				3.1
1195	3.5	4.6	0.567	O				3.1
1196	3.4	4.4	0.565	O				3.1
1197	3.4	4.3	0.564	O				3.0
1198	3.4	4.2	0.562	O				3.0
1199	3.3	4.2	0.561	O				3.0
1200	3.3	4.1	0.560	O				3.0
1201	3.2	4.0	0.559	IO				3.0
1202	3.2	3.9	0.558	IO				3.0
1203	3.2	3.8	0.557	IO				3.0
1204	3.1	3.8	0.556	IO				3.0
1205	3.1	3.7	0.555	IO				3.0
1206	3.1	3.6	0.554	IO				3.0
1207	3.1	3.6	0.554	IO				3.0
1208	3.0	3.5	0.553	IO				3.0
1209	3.0	3.5	0.552	IO				3.0
1210	3.0	3.4	0.552	IO				3.0
1211	3.0	3.4	0.551	IO				3.0
1212	2.9	3.3	0.550	IO				3.0
1213	2.9	3.3	0.550	IO				3.0
1214	2.9	3.3	0.549	IO				3.0
1215	2.8	3.3	0.549	IO				3.0
1216	2.8	3.3	0.548	IO				3.0
1217	2.8	3.3	0.547	IO				3.0
1218	2.8	3.3	0.547	IO				3.0
1219	2.8	3.3	0.546	IO				3.0
1220	2.7	3.3	0.545	IO				3.0
1221	2.7	3.3	0.544	IO				3.0
1222	2.7	3.3	0.544	IO				3.0
1223	2.7	3.3	0.543	IO				3.0
1224	2.7	3.3	0.542	IO				3.0
1225	2.6	3.3	0.541	IO				3.0
1226	2.6	3.2	0.540	IO				3.0
1227	2.5	3.2	0.539	IO				3.0
1228	2.5	3.2	0.538	IO				2.9
1229	2.5	3.2	0.537	IO				2.9
1230	2.5	3.2	0.536	IO				2.9
1231	2.5	3.2	0.535	IO				2.9
1232	2.4	3.2	0.534	O				2.9
1233	2.4	3.2	0.533	O				2.9
1234	2.4	3.2	0.532	O				2.9
1235	2.3	3.2	0.531	O				2.9
1236	2.3	3.2	0.529	O				2.9
1237	2.3	3.2	0.528	O				2.9
1238	2.3	3.2	0.527	O				2.9

1239	2.2	3.2	0.526	O				2.9
1240	2.2	3.2	0.524	O				2.9
1241	2.2	3.2	0.523	O				2.9
1242	2.2	3.2	0.522	O				2.9
1243	2.2	3.1	0.520	O				2.9
1244	2.2	3.1	0.519	O				2.9
1245	2.2	3.1	0.518	O				2.9
1246	2.1	3.1	0.516	O				2.9
1247	2.1	3.1	0.515	O				2.8
1248	2.1	3.1	0.513	O				2.8
1249	2.1	3.1	0.512	O				2.8
1250	2.1	3.1	0.511	O				2.8
1251	2.1	3.1	0.509	O				2.8
1252	2.1	3.1	0.508	O				2.8
1253	2.1	3.1	0.507	O				2.8
1254	2.1	3.1	0.505	O				2.8
1255	2.1	3.1	0.504	O				2.8
1256	2.1	3.1	0.503	O				2.8
1257	2.0	3.0	0.501	O				2.8
1258	2.0	3.0	0.500	O				2.8
1259	2.0	3.0	0.498	O				2.8
1260	2.0	3.0	0.497	O				2.8
1261	2.0	3.0	0.496	O				2.8
1262	2.0	3.0	0.494	O				2.8
1263	2.0	3.0	0.493	O				2.8
1264	2.0	3.0	0.491	O				2.7
1265	2.0	3.0	0.490	O				2.7
1266	2.0	3.0	0.489	O				2.7
1267	1.9	3.0	0.487	O				2.7
1268	1.9	3.0	0.486	O				2.7
1269	1.9	3.0	0.484	O				2.7
1270	1.9	2.9	0.483	O				2.7
1271	1.9	2.9	0.481	O				2.7
1272	1.9	2.9	0.480	O				2.7
1273	1.9	2.9	0.479	O				2.7
1274	1.9	2.9	0.477	O				2.7
1275	1.9	2.9	0.476	O				2.7
1276	1.9	2.9	0.474	O				2.7
1277	1.9	2.9	0.473	O				2.7
1278	1.9	2.9	0.472	O				2.7
1279	1.8	2.9	0.470	O				2.7
1280	1.8	2.9	0.469	O				2.6
1281	1.8	2.9	0.467	O				2.6
1282	1.8	2.9	0.466	O				2.6
1283	1.8	2.9	0.464	O				2.6
1284	1.8	2.8	0.463	O				2.6
1285	1.8	2.8	0.461	O				2.6
1286	1.8	2.8	0.460	O				2.6
1287	1.8	2.8	0.458	O				2.6
1288	1.8	2.8	0.457	O				2.6
1289	1.8	2.8	0.456	O				2.6
1290	1.8	2.8	0.454	O				2.6
1291	1.8	2.8	0.453	O				2.6
1292	1.8	2.8	0.452	O				2.6
1293	1.8	2.8	0.450	O				2.6
1294	1.7	2.8	0.449	O				2.6
1295	1.7	2.8	0.447	O				2.6
1296	1.7	2.8	0.446	O				2.5
1297	1.7	2.7	0.444	O				2.5
1298	1.7	2.7	0.443	O				2.5
1299	1.7	2.7	0.441	O				2.5
1300	1.7	2.7	0.440	O				2.5
1310	1.6	2.7	0.426	IO				2.5

1320	1.5	2.6	0.411	IO	|	|	|	2.4
1330	1.5	2.5	0.397	IO	|	|	|	2.3
1340	1.4	2.4	0.383	IO	|	|	|	2.3
1350	1.4	2.4	0.369	IO	|	|	|	2.2
1360	1.3	2.3	0.356	IO	|	|	|	2.2
1370	1.2	2.2	0.342	IO	|	|	|	2.1
1380	1.2	2.1	0.328	IO	|	|	|	2.0
1390	1.1	2.1	0.315	IO	|	|	|	2.0
1400	1.1	1.9	0.303	IO	|	|	|	1.9
1420	1.0	1.9	0.279	IO	|	|	|	1.8
1440	0.9	1.9	0.254	IO	|	|	|	1.7
1460	0.7	1.9	0.224	IO	|	|	|	1.5
1500	0.7	1.8	0.161	IO	|	|	|	1.1

Remaining water in basin = 0.16 (Ac.Ft)
Peak flow out of basin = 35.30(CFS)
Peak flow time = 1157 Min., time interval # = 43
Maximum depth in basin = 4.09(Ft.)

Site Detention Calculations and Summary Information

The Malibu Institute

Detention Outflow Control
Final Detention Site and Parking.xls

Basin A Site Detention Calculations

Storm Frequency	storm frequency	2	5	10	25	50
Outflow rate	cfs, maximum allowable	***2***	***3.3***	***13.5***	***28.4***	***38.2***
water surface for Q	feet, elevation	1.92	2.96	3.43	3.85	4.04
Sum Q thru orifices	cfs, calculated	**2.00**	**3.30**	**13.50**	**28.40**	**38.20**
Q o2	Q=CA*(2*g*h)^.5	2.00	2.49	2.68	2.84	2.91
Q o5	"	0.00	0.81	0.98	1.10	1.16
Q o10	"	0.00	0.00	9.85	13.80	15.28
Q o25	"	0.00	0.00	0.00	10.67	12.90
Q o50	"	0.00	0.00	0.00	0.00	5.96

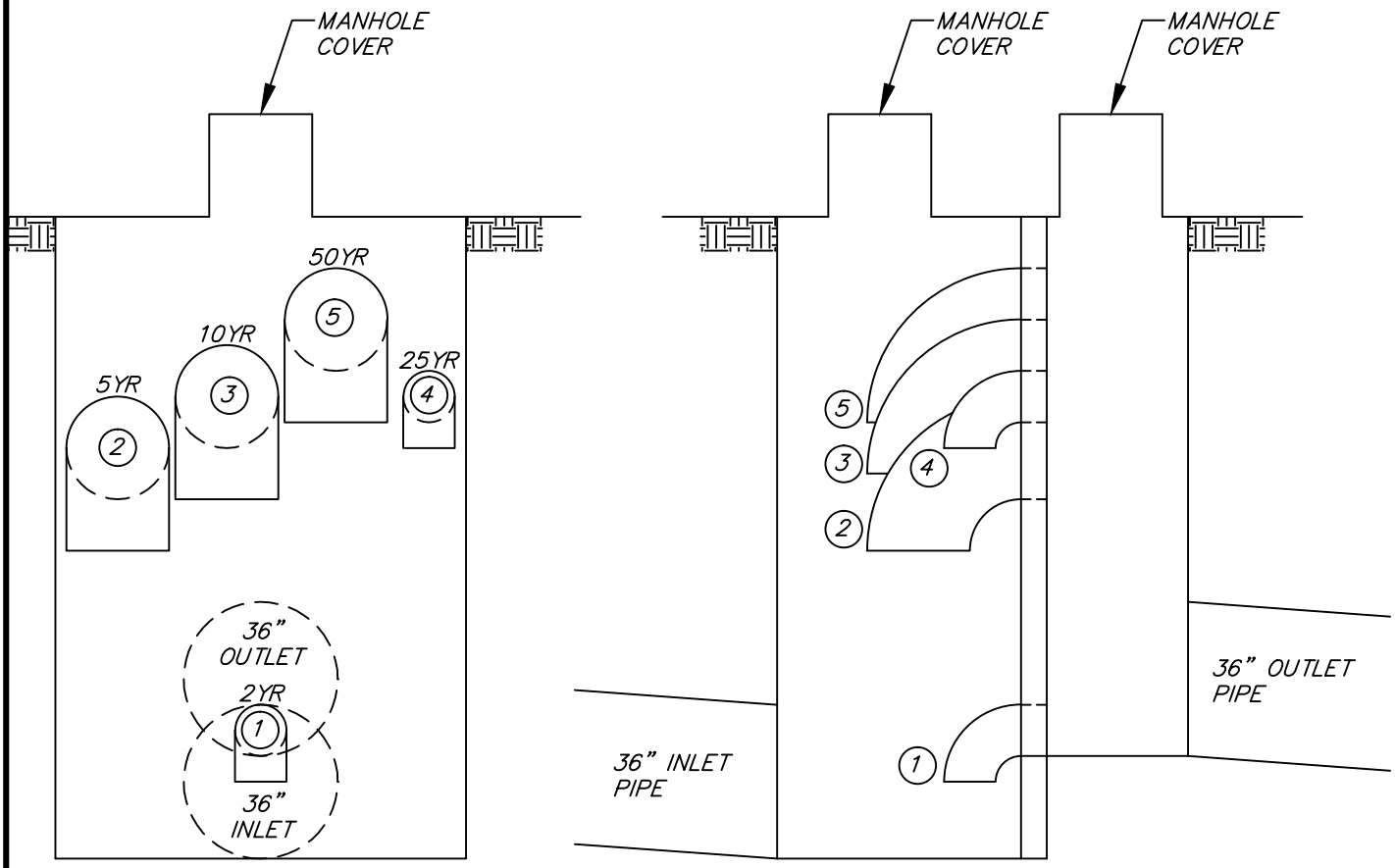
Orifice number	Orifice diameter	Orifice elevation	Coefficient-(plate)	square feet
1	7.42	0.000	0.6	0.30
2	5.50	1.920	0.6	0.16
3	23.87	3.000	0.6	3.11
4	25.08	3.433	0.6	3.43
5	22.72	3.850	0.6	2.82

retard entry and output data	storm frequency	*2*	*5*	*10*	*25*	*50*
	max Q into Control	9.1	20.1	31.8	44.5	53.6
	Proposed Hydrograph	ms002p.hyd	ms005p.hyd	ms010p.hyd	ms025p.hyd	ms050p.hyd
	Retard Output	m002site.OUT	m005site.OUT	m010site.OUT	m025site.OUT	m050site.OUT
	depth from retard program	**1.9**	**2.9**	**3.4**	**3.9**	**4.0**
	max volume (acre feet)	**0.298**	**0.539**	**0.665**	**0.786**	**0.845**
	max rate out of basin	**2.0**	**3.3**	**13.5**	**28.4**	**38.2**

Basin Storage capacity				acre-feet storage					
				1.92	**2.962**	**3.43**	**3.85**	**4.04**	depth (feet)
	Depth feet	Storage acre/ft	Rate	**0.301**	**0.539**	**0.665**	**0.786**	**0.845**	storage (acre-feet)
				2	3.3	13.5	28.4	38.2	flow rate (cfs)
	0	**0**	**0.00**	0.00					
	1	0.14	1.80	0.14					
	1.92	0.30	2.00	0.30	0.30				
	2	**0.32**	**2.10**		0.32				
	2.96	0.54	3.30		0.54	0.54			
	3.43	0.665	13.50			0.66	0.66		
	3.6	0.71	17.00				0.71		
	3.85	0.786	28.40				0.79	0.79	
	4	**0.83**	**28.50**					0.83	
	4.04	0.845	38.20					0.84	
	5	1.17	40.00						
	6	**1.55**							
	7	2.00							
	7.5	2.25							
	8	**2.52**							

Time to empty	Volume	cf	13114	10365	5480	5265	2568		
	Average flow rate	cf	1.00	2.65	8.4	20.95	33.3		
	step time	sec	13114	3911	652	251	77		
		hrs	3.6	1.1	0.2	0.1	0.0	**total hours**	**5.0**

Example Outlet Structure



	Site outlet control			Parking outlet control		
	Pipe	orifice	elevation	Pipe	orifice	elevation
5	24	22.72	3.85	12	11.43	3.5205
4	27	25.08	3.433	12	10.00	3.354
3	24	23.87	3	9	8.00	2.92
2	6	5.50	1.92	3	2.30	1.55
1	9	7.42	0	3	1.75	0

CONTROLLED
OUTLET STRUCTURE N.T.S. EXHIBIT G.2

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Appendix H Photos

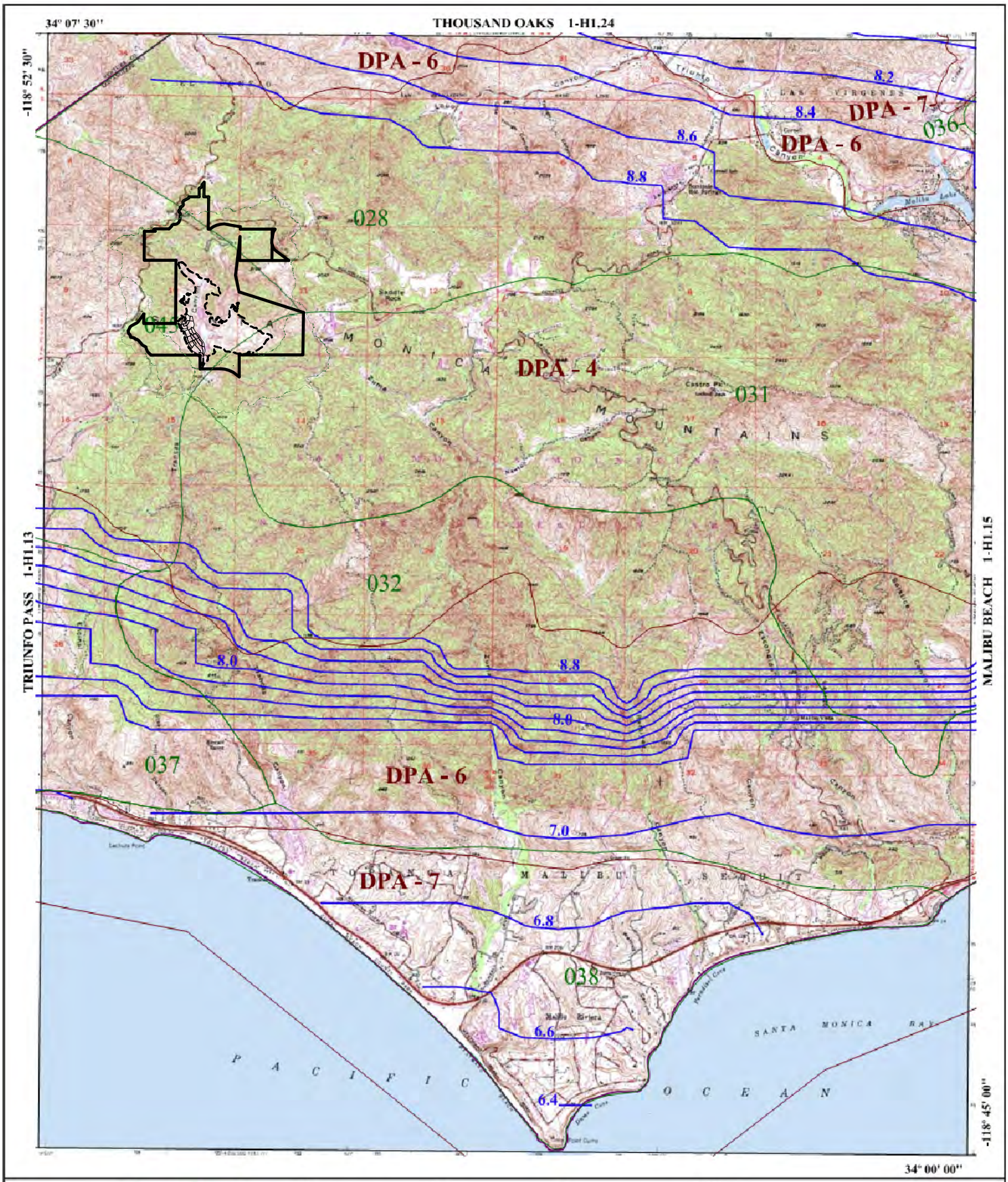
- Photo Reference spreadsheet
- Photos

Appendix I Los Angeles County Reference

- Los Angeles County Low Impact Development Manuel – BMP Reference Sheet
- 1-H1.14 - Point 50-year 24-hour Isohyet with site, soils and debris potential area
- Runoff Coefficient Curve – Soil type 028
- Runoff Coefficient Curve – Soil type 031
- Runoff Coefficient Curve – Soil type 045
- Debris Production Rates – B-1
- Peak Bulking Factors – B-4
- Cu values

County of Los Angeles Low Impact Development Manuel - Reference Sheet

BMP	***Reference Page***
Bioretention	24
Green Roofs	35
Infiltration Basin	41
Porous Pavement	53
Vegetated Buffers	60
Vegetated Swale	63

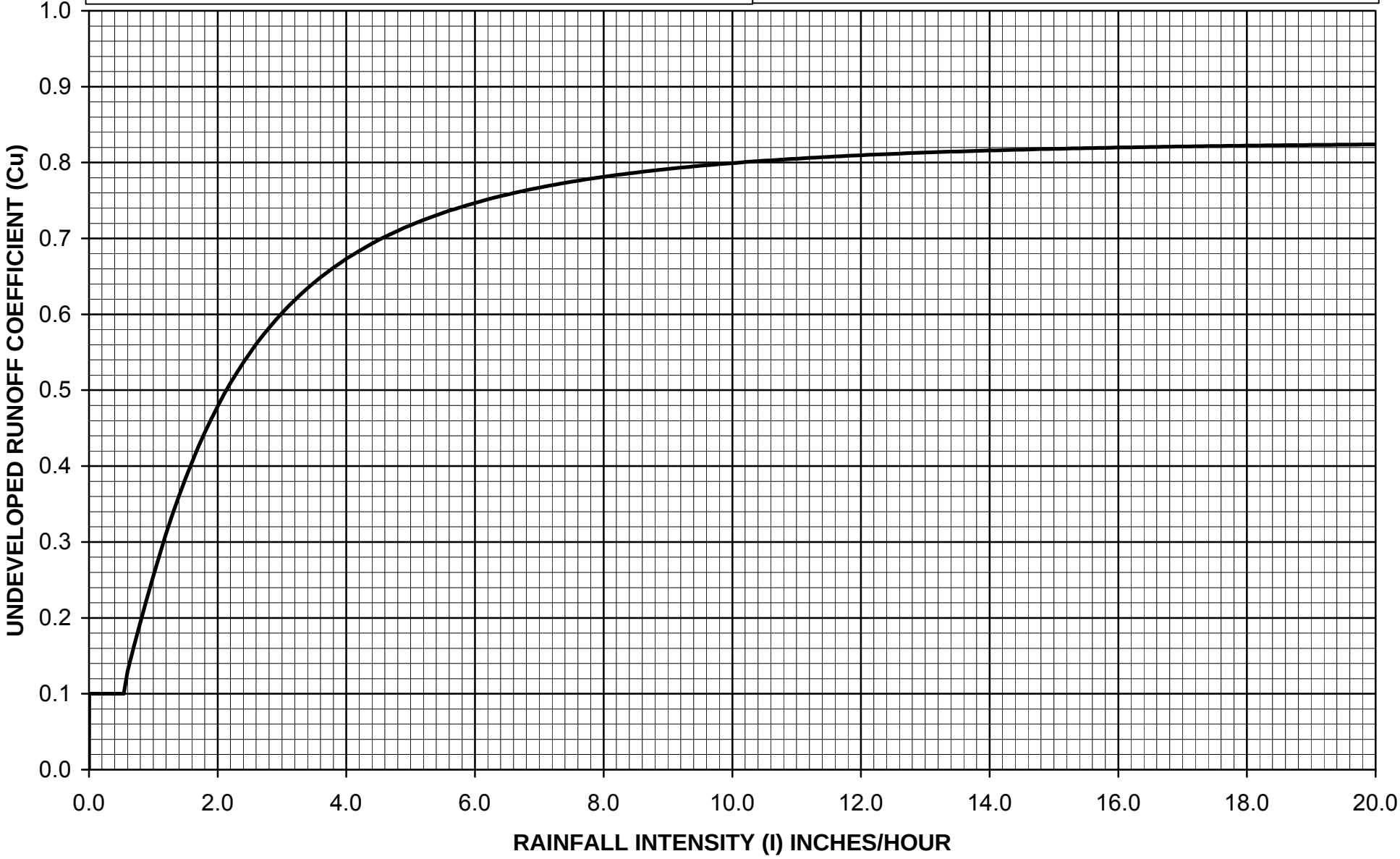

34° 07' 30"
THOUSAND OAKS 1-H1.24
-118° 52' 30"
DPA - 6
8.2
8.4
DPA - 7
036
8.6
DPA - 6
8.8
028
045
M O N I C A
DPA - 4
031
M O U N T A I N S
TRIUNFO PASS 1-H1.13
MALIBU BEACH 1-H1.15
032
8.0
8.8
8.0
037
DPA - 6
7.0
DPA - 7
M A L I B U S E M B L I T
6.8
038
6.6
6.4
P A C I F I C O C E A N
SANTA MONICA BAY
-118° 45' 00"
34° 00' 00"
N
W
E
S
016
SOIL CLASSIFICATION AREA
7.2
INCHES OF RAINFALL
DPA - 6
DEBRIS POTENTIAL AREA
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
POINT DUME
50-YEAR 24-HOUR ISOHYET
1-H1.14
LOS ANGELES COUNTY
PUBLIC WORKS
Public Service That Works

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 028

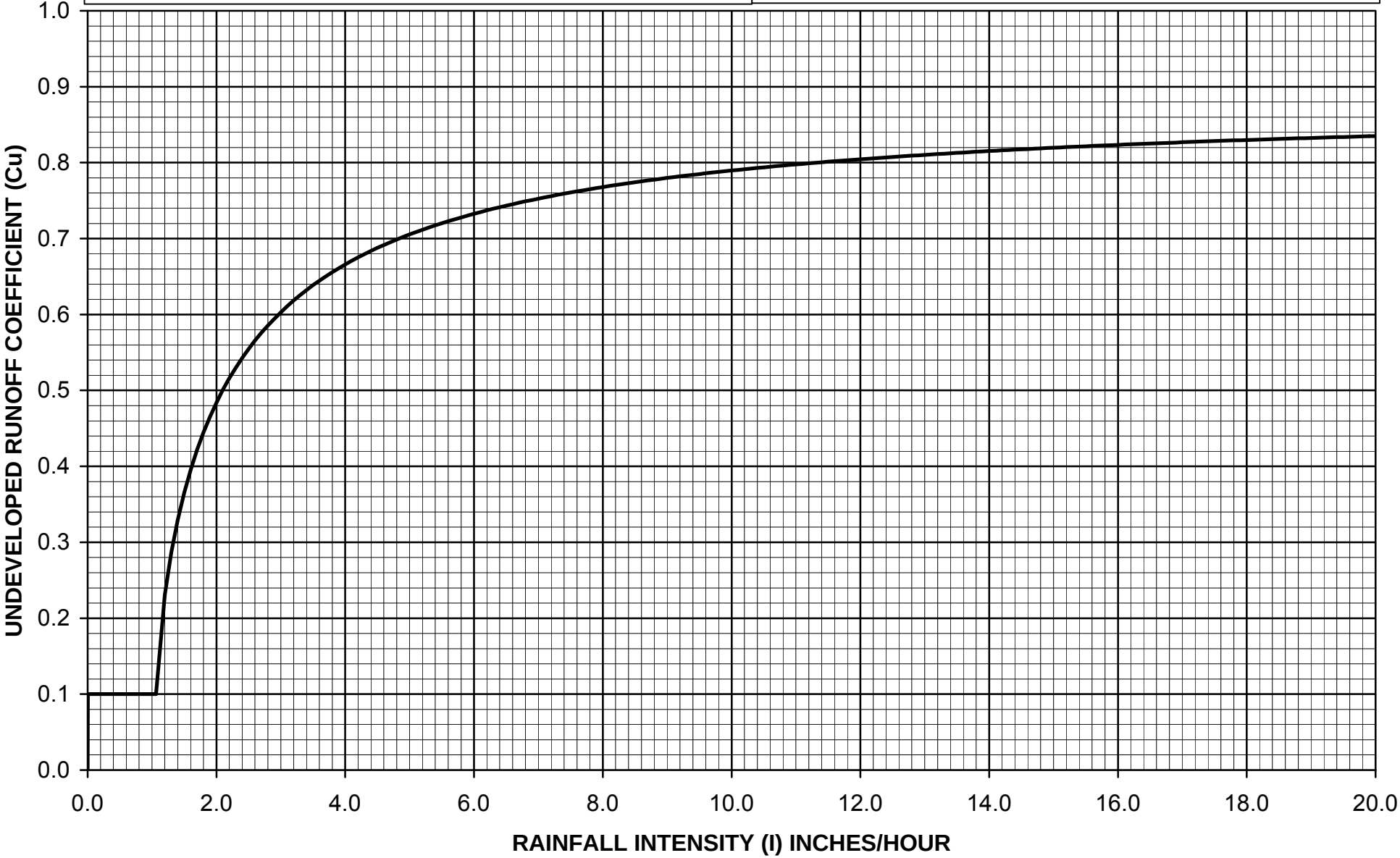


$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 031

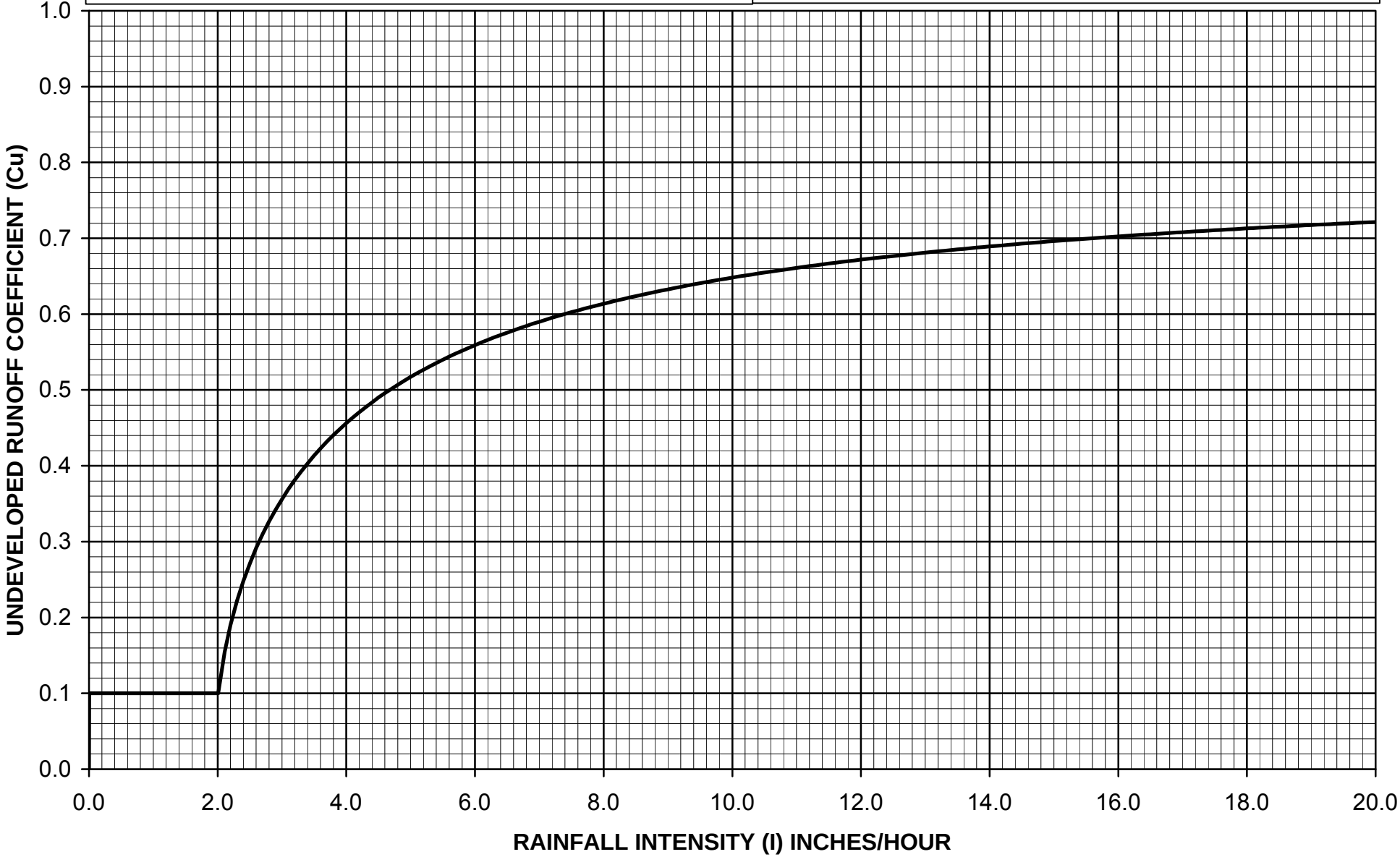


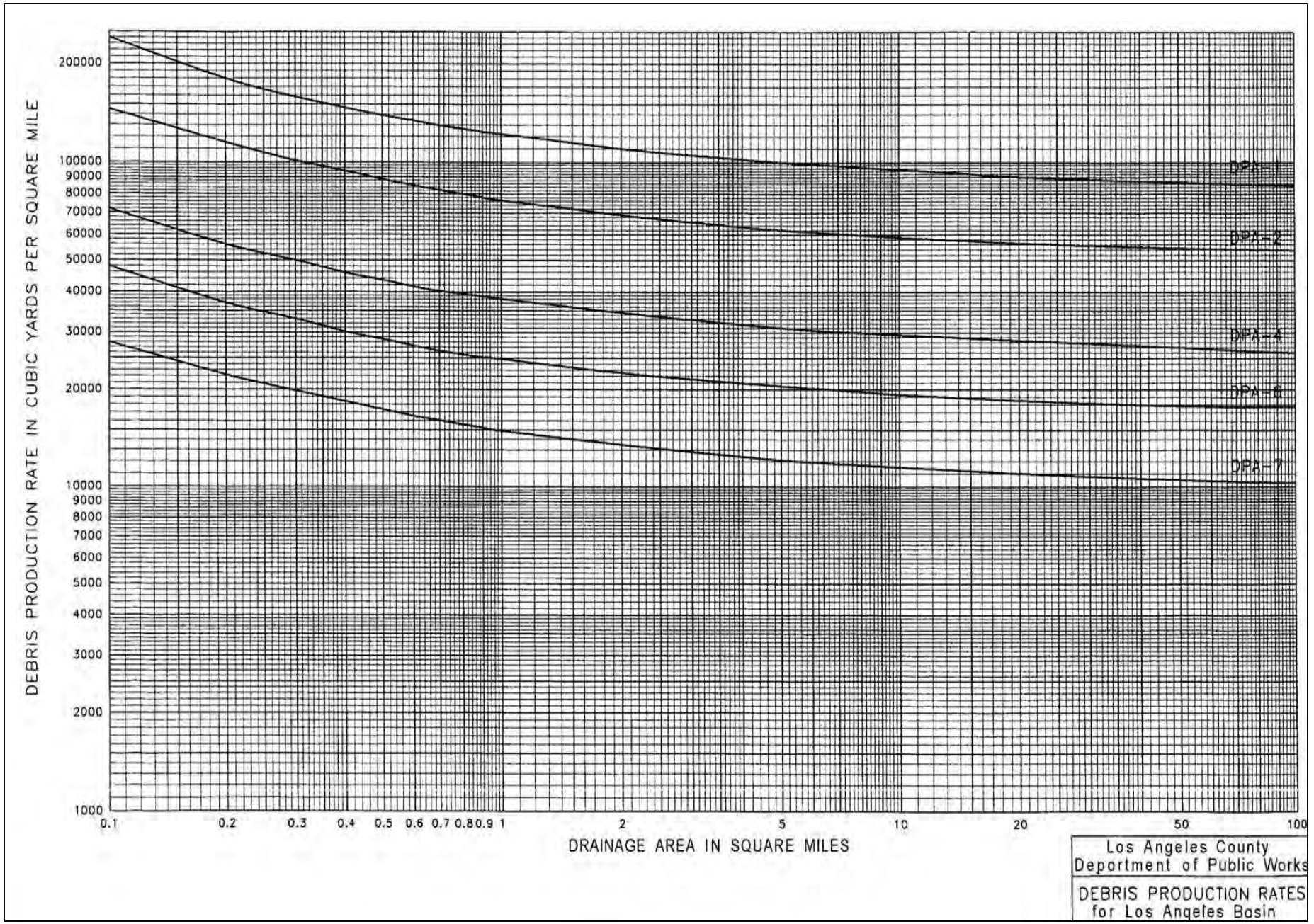
$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 045

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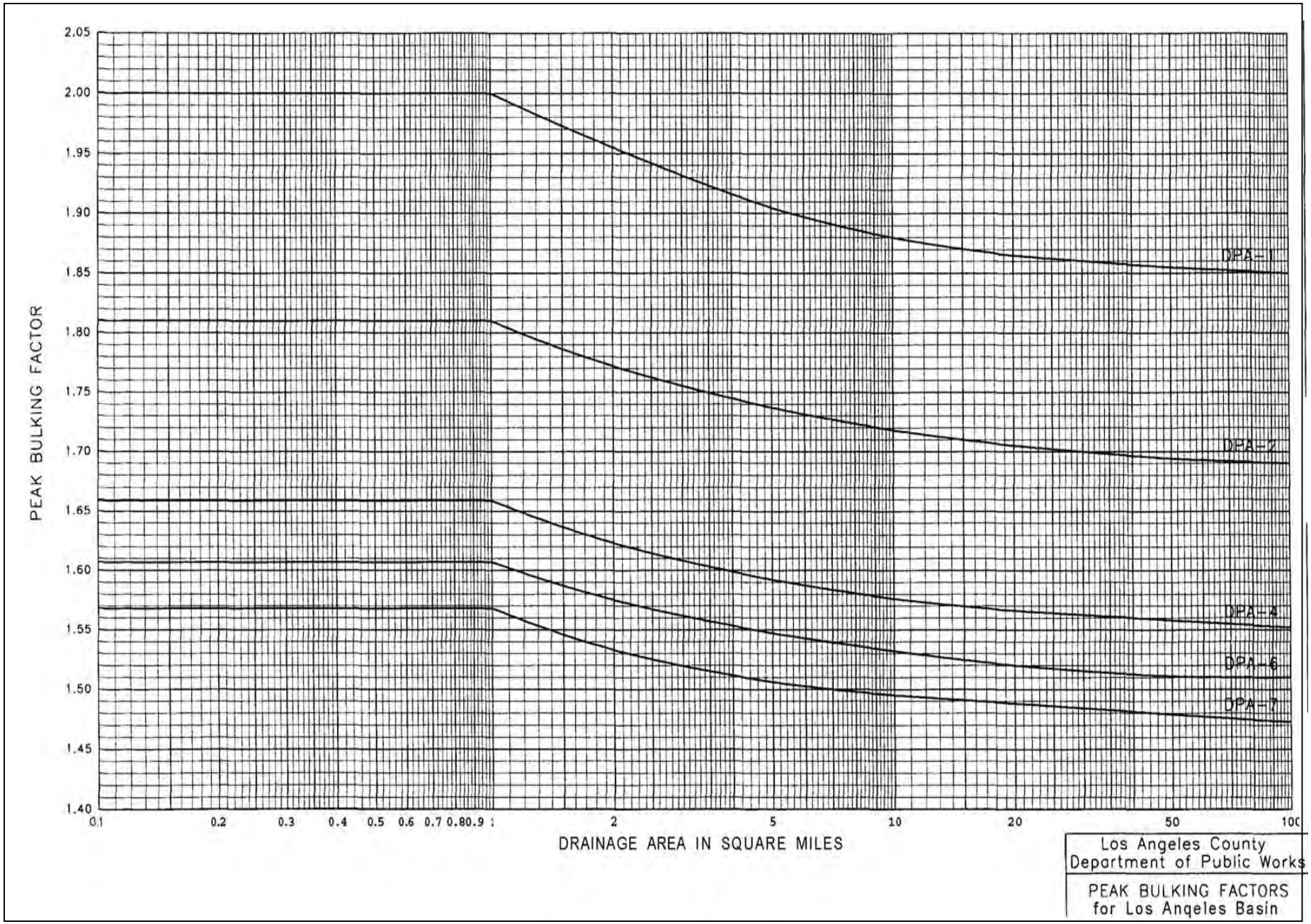
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
DPA-2
DPA-4
DPA-6
DPA-7
Los Angeles County
Department of Public Works
DEBRIS PRODUCTION RATES
for Los Angeles Basin


PEAK BULKING FACTOR
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
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0.1
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0.3
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20
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100
DRAINAGE AREA IN SQUARE MILES
DPA-1
DPA-2
DPA-4
DPA-6
DPA-7
Los Angeles County
Department of Public Works
PEAK BULKING FACTORS
for Los Angeles Basin

APPENDIX D

Proportion Impervious Data

Proportion Impervious Data

Code	Land Use Description	% Impervious
1111	High-Density Single Family Residential	42
1112	Low-Density Single Family Residential	21
1121	Mixed Multi-Family Residential	74
1122	Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	55
1123	Low-Rise Apartments, Condominiums, and Townhouses	86
1124	Medium-Rise Apartments and Condominiums	86
1125	High-Rise Apartments and Condominiums	90
1131	Trailer Parks and Mobile Home Courts, High-Density	91
1132	Mobile Home Courts and Subdivisions, Low-Density	42
1140	Mixed Residential	59
1151	Rural Residential, High-Density	15
1152	Rural Residential, Low-Density	10
1211	Low- and Medium-Rise Major Office Use	91
1212	High-Rise Major Office Use	91
1213	Skyscrapers	91
1221	Regional Shopping Center	95
1222	Retail Centers (Non-Strip With Contiguous Interconnected Off-Street	96
1223	Modern Strip Development	96
1224	Older Strip Development	97
1231	Commercial Storage	90
1232	Commercial Recreation	90
1233	Hotels and Motels	96
1234	Attended Pay Public Parking Facilities	91
1241	Government Offices	91
1242	Police and Sheriff Stations	91
1243	Fire Stations	91
1244	Major Medical Health Care Facilities	74
1245	Religious Facilities	82
1246	Other Public Facilities	91
1247	Non-Attended Public Parking Facilities	91
1251	Correctional Facilities	91
1252	Special Care Facilities	74
1253	Other Special Use Facilities	86
1261	Pre-Schools/Day Care Centers	68
1262	Elementary Schools	82
1263	Junior or Intermediate High Schools	82
1264	Senior High Schools	82
1265	Colleges and Universities	47
1266	Trade Schools and Professional Training Facilities	91
1271	Base (Built-up Area)	65
1271.01	Base High-Density Single Family Residential	42
1271.02	Base Duplexes, Triplexes and 2-or 3-Unit Condominiums and T	55

Code	Land Use Description	% Impervious
1271.03	Base Government Offices	91
1271.04	Base Fire Stations	91
1271.05	Base Non-Attended Public Parking Facilities	91
1271.06	Base Air Field	45
1271.07	Base Petroleum Refining and Processing	91
1271.08	Base Mineral Extraction - Oil and Gas	10
1271.09	Base Harbor Facilities	91
1271.10	Base Navigation Aids	47
1271.11	Base Developed Local Parks and Recreation	10
1271.12	Base Vacant Undifferentiated	1
1272	Vacant Area	2
1273	Air Field	45
1274	Former Base (Built-up Area)	65
1275	Former Base Vacant Area	2
1276	Former Base Air Field	91
1311	Manufacturing, Assembly, and Industrial Services	91
1312	Motion Picture and Television Studio Lots	82
1313	Packing Houses and Grain Elevators	96
1314	Research and Development	91
1321	Manufacturing	91
1322	Petroleum Refining and Processing	91
1323	Open Storage	66
1324	Major Metal Processing	91
1325	Chemical Processing	91
1331	Mineral Extraction - Other Than Oil and Gas	10
1332	Mineral Extraction - Oil and Gas	10
1340	Wholesaling and Warehousing	91
1411	Airports	91
1411.01	Airstrip	10
1412	Railroads	15
1412.01	Railroads-Attended Pay Public Parking Facilities	91
1412.02	Railroads-Non-Attended Public Parking Facilities	91
1412.03	Railroads-Manufacturing, Assembly, and Industrial Services	91
1412.04	Railroads-Petroleum Refining and Processing	91
1412.05	Railroads-Open Storage	66
1412.06	Railroads-Truck Terminals	91
1413	Freeways and Major Roads	91
1414	Park-and-Ride Lots	91
1415	Bus Terminals and Yards	91
1416	Truck Terminals	91
1417	Harbor Facilities	91
1418	Navigation Aids	47
1420	Communication Facilities	82
1420.01	Communication Facilities-Antenna	2

Code	Land Use Description	% Impervious
1431	Electrical Power Facilities	47
1431.01	Electrical Power Facilities-Powerlines (Urban)	2
1431.02	Electrical Power Facilities-Powerlines (Rural)	1
1432	Solid Waste Disposal Facilities	15
1433	Liquid Waste Disposal Facilities	96
1434	Water Storage Facilities	91
1435	Natural Gas and Petroleum Facilities	91
1435.01	Natural Gas and Petroleum Facilities-Manufacturing, Assembly, and In	91
1435.02	Natural Gas and Petroleum Facilities-Petroleum Refining and Processing	91
1435.03	Natural Gas and Petroleum Facilities-Mineral Extraction – Oil and Gas	10
1435.04	Natural Gas and Petroleum Facilities-Vacant Undifferentiated	1
1436	Water Transfer Facilities	96
1437	Improved Flood Waterways and Structures	100
1440	Maintenance Yards	91
1450	Mixed Transportation	90
1460	Mixed Transportation and Utility	91
1460.01	Mixed Utility and Transportation-Improved Flood Waterways and Structures	100
1460.02	Mixed Utility and Transportation-Railroads	15
1460.03	Mixed Utility and Transportation-Freeways and Major Roads	91
1500	Mixed Commercial and Industrial	91
1600	Mixed Urban	89
1700	Under Construction (Use appropriate value)	91
1810	Golf Courses	3
1821	Developed Local Parks and Recreation	10
1822	Undeveloped Local Parks and Recreation	2
1831	Developed Regional Parks and Recreation	2
1832	Undeveloped Regional Parks and Recreation	1
1840	Cemeteries	10
1850	Wildlife Preserves and Sanctuaries	2
1850.01	Wildlife-Commercial Recreation	90
1850.02	Wildlife-Other Special Use Facilities	86
1850.03	Wildlife-Developed Local Parks and Recreation	10
1860	Specimen Gardens and Arboreta	15
1870	Beach Parks	10
1880	Other Open Space and Recreation	10
2110	Irrigated Cropland and Improved Pasture Land	2
2120	Non-Irrigated Cropland and Improved Pasture Land	2
2200	Orchards and Vineyards	2
2300	Nurseries	15
2400	Dairy, Intensive Livestock, and Associated Facilities	42
2500	Poultry Operations	62
2600	Other Agriculture	42
2700	Horse Ranches	42

Code	Land Use Description	% Impervious
3100	Vacant Undifferentiated	1
3200	Abandoned Orchards and Vineyards	2
3300	Vacant With Limited Improvements (Use appropriate value)	42
3400	Beaches (Vacant)	1
4100	Water, Undifferentiated	100
4200	Harbor Water Facilities	100
4300	Marina Water Facilities	100
4400	Water Within a Military Installation	100

Table 3-1 Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
A. *Natural Streams*			
1. **Main Channels**			
a. Clean, straight, full, no rifts or deep pools	0.025	0.030	0.033
b. Same as above, but more stones and weeds	0.030	0.035	0.040
c. Clean, winding, some pools and shoals	0.033	0.040	0.045
d. Same as above, but some weeds and stones	0.035	0.045	0.050
e. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. Same as "d" but more stones	0.045	0.050	0.060
g. Sluggish reaches, weedy. deep pools	0.050	0.070	0.080
h. Very weedy reaches, deep pools, or floodways with heavy stands of timber and brush	0.070	0.100	0.150
2. **Flood Plains**			
a. Pasture no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
2. Same as above, but heavy sprouts	0.050	0.060	0.080
3. Heavy stand of timber, few down trees, little undergrowth, flow below branches	0.080	0.100	0.120
4. Same as above, but with flow into branches	0.100	0.120	0.160
5. Dense willows, summer, straight	0.110	0.150	0.200
3. **Mountain Streams, no vegetation in channel, banks usually steep, with trees and brush on banks submerged**			
a. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. Bottom: cobbles with large boulders	0.040	0.050	0.070

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
B. *Lined or Built-Up Channels*			
1. **Concrete**			
a. Trowel finish	0.011	0.013	0.015
b. Float Finish	0.013	0.015	0.016
c. Finished, with gravel bottom	0.015	0.017	0.020
d. Unfinished	0.014	0.017	0.020
e. Gunite, good section	0.016	0.019	0.023
f. Gunite, wavy section	0.018	0.022	0.025
g. On good excavated rock	0.017	0.020	
h. On irregular excavated rock	0.022	0.027	
2. **Concrete bottom float finished with sides of:**			
a. Dressed stone in mortar	0.015	0.017	0.020
b. Random stone in mortar	0.017	0.020	0.024
c. Cement rubble masonry, plastered	0.016	0.020	0.024
d. Cement rubble masonry	0.020	0.025	0.030
e. Dry rubble on riprap	0.020	0.030	0.035
3. **Gravel bottom with sides of:**			
a. Formed concrete	0.017	0.020	0.025
b. Random stone in mortar	0.020	0.023	0.026
c. Dry rubble or riprap	0.023	0.033	0.036
4. **Brick**			
a. Glazed	0.011	0.013	0.015
b. In cement mortar	0.012	0.015	0.018
5. **Metal**			
a. Smooth steel surfaces	0.011	0.012	0.014
b. Corrugated metal	0.021	0.025	0.030
6. **Asphalt**			
a. Smooth	0.013	0.013	
b. Rough	0.016	0.016	
7. **Vegetal lining**	0.030		0.500

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
C. *Excavated or Dredged Channels*			
1. **Earth, straight and uniform**			
a. Clean, recently completed	0.016	0.018	0.020
b. Clean, after weathering	0.018	0.022	0.025
c. Gravel, uniform section, clean	0.022	0.025	0.030
d. With short grass, few weeds	0.022	0.027	0.033
2. **Earth, winding and sluggish**			
a. No vegetation	0.023	0.025	0.030
b. Grass, some weeds	0.025	0.030	0.033
c. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
d. Earth bottom and rubble side	0.028	0.030	0.035
e. Stony bottom and weedy banks	0.025	0.035	0.040
f. Cobble bottom and clean sides	0.030	0.040	0.050
3. **Dragline-excavated or dredged**			
a. No vegetation	0.025	0.028	0.033
b. Light brush on banks	0.035	0.050	0.060
4. **Rock cuts**			
a. Smooth and uniform	0.025	0.035	0.040
b. Jagged and irregular	0.035	0.040	0.050
5. **Channels not maintained, weeds and brush**			
a. Clean bottom, brush on sides	0.040	0.050	0.080
b. Same as above, highest stage of flow	0.045	0.070	0.110
c. Dense weeds, high as flow depth	0.050	0.080	0.120
d. Dense brush, high stage	0.080	0.100	0.140

Other sources that include pictures of selected streams as a guide to n value determination are available (Fasken, 1963; Barnes, 1967; and Hicks and Mason, 1991). In general, these references provide color photos with tables of calibrated n values for a range of flows.

Although there are many factors that affect the selection of the n value for the channel, some of the most important factors are the type and size of materials that compose the bed and banks of a channel, and the shape of the channel. Cowan (1956) developed a procedure for estimating the effects of these factors to determine the value of Manning's n of a channel. In Cowan's procedure, the value of n is computed by the following equation:

Appendix G.4

Preliminary Water System Design Report, AECOM, March 29, 2013

Preliminary Water System Design Report for Malibu Institute Development (Vesting Tentative Tract Map No. 71735)

Las Virgenes Municipal Water District

Project Manager John Zhao, PE

AECOM Technical Services, Inc.

Project Manager Ryan Gallagher, PE

Project Engineer Fernando Baez, EIT

60274327

March 29, 2013

Las Virgenes Municipal Water District
Water System Design Report
for
Malibu Institute Development
(Vesting Tentative Tract Map No. 71735)
County of Los Angeles, California

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Plates

Las Virgenes Municipal Water District
Preliminary Water System Design Report
for
Malibu Institute Development
(Vesting Tentative Tract Map No. 71735)
County of Los Angeles, California

Section 1 – Introduction

The Malibu Institute is proposing to make improvements to the Malibu Golf Club through the Malibu Institute Development (Project). The Malibu Golf Club is located on the northwest end of the Malibu Coastal Zone, northwest of Malibu, in unincorporated Los Angeles County as shown on **Plate 1**. The Project proposes to add several new buildings including guest bungalows, a clubhouse, a maintenance building, and the reconstruction of the golf course with a water-wise turf.

The purpose of this Water System Design Report is to investigate the feasibility of providing potable water service and recycled water service to the Project and to develop criteria for the facilities required to provide adequate service. All sewage generated by the Project will be treated and disposed of on-site by a private wastewater treatment system. Potable water demand for the Project is based on the "Potable Water System Master Plan for the Las Virgenes Municipal Water District," by AECOM (formerly known as Boyle Engineering), (Ref. 1). Recycled water demand for landscape irrigation within the proposed development is based on the "Recycled Water System Master Plan 2007" by AECOM (formerly known as Boyle Engineering), (Ref. 2). Fire protection requirements are based on Los Angeles County Fire Department Regulation No. 8 (Ref. 3).

The owner of the Malibu Golf Club is Malibu Associates, LLC, 901 Encinal Canyon Road, Malibu, CA 90265.

The developer's engineer is RCE Consultants, Inc., 23332 Mill Creek Drive, Suite 205, Laguna Hills, CA 92653, (949) 453-0111.

Section 2 – Proposed Project

The Project involves the construction of the Malibu Institute Development at the site of the existing Malibu Golf Club. The Malibu Golf Club is located at 901 Encinal Canyon Road, Malibu, CA 90265 as shown in **Plate 1**. The Project includes the demolition of the existing Malibu Golf Club and construction of several new buildings, including guest bungalows, a clubhouse, maintenance building, conference rooms, a large lecture hall with classrooms, and a number of additional buildings totaling more than 224,000 Square Feet (SF) of new space. The existing golf course will be re-graded and water efficient turf will be installed, but the overall design with respect to size of the course will be maintained. The water system, within the new development, will require new pipelines and improvements to an existing pressure reducing station. The existing pressure reducing station does not conflict with the developer's plans and is not anticipated to be relocated.

The existing golf course and future Malibu Institute Development are located on parcels zoned for R-R-1 (Resort and Recreation) and A-1-1 (Light Agriculture) use. The Los Angeles County-Malibu Coastal Land Use Plan designates the land use for the property as Rural Land, with a maximum density of one (1) dwelling unit per two (2) acres (Plate 4 of Ref. 2).

The sizes of the guest bungalows range from approximately 2,600 SF to 5,300 SF and the largest of the new buildings, the Malibu Institute, will be approximately 48,000 SF, as shown in the preliminary architectural drawings and developer's e-mail, provided in **Appendix A**.

Per the property owners' site plan, ground levels within the Project range from approximately 1,310 feet in elevation at the entrance to the Malibu Golf Club, near Encinal Canyon Road, to 1,440 feet in elevation at the northwest end of the golf course. Building pad elevations range from 1,304 feet to 1,402 feet.

Section 3 – Potable Water Demand

Domestic Use

The existing Malibu Country Club is serviced by Las Virgenes Municipal Water District's (District) Seminole System pressure zone (2,153-foot gradient) through a pressure reducing station located on the most northwest corner of the golf course as shown on **Plate 1.** Land to the south of the Project site has been classified as open space/park land and is not anticipated to be developed. Land immediately to the west and east of the Project has been classified as Mountain Lands and Public Use per Plate 4 of the *Potable Water Master Plan Update 2007* (*Ref. 1*). These surrounding properties may be more efficiently served by the existing Seminole System. The proposed water system to serve the Project is not planned to serve future developments in the surrounding area.

Estimates for the potable water demand are based on the average daily demand criteria presented in Table 5-16 of the *Potable Water Master Plan Update 2007* (*Ref. 1*). Projected demands for irrigation provided by the developer were considered in the irrigation subsection below. The average demand presented in Table 5-16 for Mountain Land use within the County of Los Angeles includes an average of 550 gallons per day per person (gpd/person) and 2.95 persons per residence. The average daily demand for land designated, as "Mountain Land M-2" is believed to be highly conservative for the Project. Forty guest bungalows are proposed as part of the Project and will serve as overnight accommodations for guests of the Project. A more appropriate demand for this type of development including accommodations and community buildings, not accounting for the golf course, is a demand of 250 gpd per person in residential application as noted in Table 5-16 of the Master Plan. A demand of 250 gpd per person was assumed for this study. Maximum-day demand (MDD) and peak-hour demand (PHD) are based on peaking factors of 2.1 X ADD and 2.5 X MDD, respectively, from Table 5-10 of the *Potable Water Master Plan Update 2007 (Ref. 1)*.

20X2020 Water Conservation Plan

In 2008, Governor Schwarzenegger introduced a seven-part comprehensive plan to improve the Sacramento-San Joaquin Delta. Water conservation was included in that comprehensive plan and the 20x2020 Water Conservation Plan (20x2020 Plan) was developed to set forth a statewide road map to

maximize the state's urban water efficiency and conservation opportunities between 2009 and 2020, and beyond. The 20x2020 Plan is designed to achieve a 20 percent per capita reduction in urban water demand by the year 2020. These activities include improving an understanding of the variation in water use across California, promoting legislative initiatives that incentivize water agencies to promote water conservation, and creating evaluation and enforcement mechanisms to assure regional and statewide goals are met.

Fire Flow

The developer conducted preliminary investigations with the Los Angeles County Fire Department (LACFD) and coordinated with the Project architect to estimate the fire flow demands. Based on that coordination effort, the LACFD has required a fire flow of 2,000 gpm for two (2) hous. **Appendix D** contains the e-mail correspondence between the property owners and the LACFD noting this fire flow requirement.

Prior to adoption of the water system design report (WSDR) by the District Board, the property owners shall submit a plan approved by the LACFD showing the required fire flow and hydrant locations. If the required fire flow is higher than 2,000 gpm, an amendment to this Water System Design Report will be required.

Irrigation

The existing Malibu Country Club currently uses potable water for irrigation of the golf course. Section 7 of this report notes that, at this time, recycled water will not be a feasible option for irrigation of the golf course. This study presumes that potable water will be used for irrigation of the golf course. Using billing records (see **Appendix B**), provided by the District, from the Malibu Country Club from 2009 through 2012, the maximum day demand was recorded during the month of August in 2009 with a volume of 386,000 gallons per day. Projected irrigation demands (see **Appendix C**) provided by the developer were slightly lower at 360,000 gallons per day. For purposes of this analysis, the higher demand was used as the maximum day demand.

The existing golf course includes a lake that provides for water storage. The new development will keep the existing lake and will store water available to fire fighting helicopters. Direct drafting by fire trucks is not planned.

It is reasonable to assume that the daily demand will be replenished during a six (6) hour window during low demands at night. Pumping 386,000 gallons over a six (6) hour period equates to a flow of 1,071 gpm and is not anticipated to impact MDD demands during the day. **Table 1** summarizes the anticipated demands.

Table 1
Estimated Potable Water Demand for Proposed Project

Land Use	No. of Units	Demand Criteria	Estimated Water Demand (gpm)		
			Avg. Day Demand	Max. Day Demand	Peak Hour Demand
Mountain Land M-2	40	2,000 gpd per unit [1]	55.6	116.7[2]	291.7[3]
Fire Flow Demand	-	-	2,000[4]		
Golf Course Irrigation	-	-	1,071[5]		

[1] *Based on assuming 8 people per unit @ 250 gpd per person.*
[2] *Domestic MDD Peaking Factor of 2.1.*
[3] *Domestic PHD Peaking Factor of 2.5.*
[4] *Based on information coordinated by the Developer and LACFD. See Appendix D.*
[5] *Based on billing records from 2009 to 2012 showing a maximum day of 386,000 gallons of water per day.*

Section 4 - Existing Potable Water System

The existing potable water system near the Project site is shown on **Plate 1**. The Project will be supplied with potable water from the District's nominal 2,153 foot gradient system, also known as the Seminole System. The Seminole System is the District's highest lift zone and is located in the southwest corner of its service area. This system also delivers water to the Latigo and Three Springs Systems through pressure reducing stations. The Seminole System is supplied from the Backbone System through the Seminole Pump Station. The Seminole Pump Station is located on Mulholland Highway, west of Malibu Lake and has a capacity of 2,400 gpm with four 300 HP pumps (3 duty, 1 standby).

There are two reservoirs in the Seminole System; Seminole No. 1 which has a capacity of 0.5 million gallons (MG) and Seminole No. 2 with a capacity of 1.5 MG. **Table 2** below summarizes the components of the Seminole System based on Table 7-1 of the District's *Potable Water Master Plan Update 2007 (Ref. 1)*.

Table 2
Seminole System

Description	Capacity
Hydraulic Gradient	2,153 feet
Seminole Pump Station	2,400 gpm
Seminole No. 1 Tank	0.5 MG
Seminole No. 2 Tank	1.5 MG
Fire Flow	2,500 gpm
Required Fire Storage	300,000 gallons
Source	Backbone System (1,235 feet)
Sub-Systems	Latigo Three Springs

A portion of the existing system runs through the Malibu Golf Club on the northwest side of the property and includes a 10-inch diameter pipeline that is buried 60-feet below grade. During the re-grading of the golf course, the developer is expected to work with the District to replace the deep portion of pipeline with a pipeline installed at a normal depth. Plate PW-101 of the District's Standard

Plans and Specifications for Construction of Water Mains and Facilities provides details on depth of cover (36-inches for 12-inch or smaller pipe diameter). Financial responsibility for the replacement of the portion of 10-inch main will be addressed during the design phase of the proposed development.

The Malibu Golf Club is served potable water through an existing 6-inch meter with an 8-inch pressure reducing valve (PRV). The meter and PRV are contained within an 8' x 3' valve vault located in the northwest corner of the Malibu Golf Club. A standard 8-inch Cla-Val PRV (Model 90-01) has a maximum continuous flow capacity of 3,100 gpm and a maximum intermittent flow capacity of 3,900 gpm (per manufacturer's catalog information). The PRV serving the Malibu Golf Club has a hydrostatic inlet gradient of 2,153-feet and a discharge gradient of approximately 1,615-feet. The existing 6-inch meter serving the property is only capable of providing a maximum flow of 1,000 gpm, per District provided information. In order to provide a fire flow greater than 1,000 gpm, a detector check valve with its own PRV will need to be installed parallel to the existing meter and PRV. Plate PW-109 of the District's standards provides details for the installation of a detector check.

Section 5 - Proposed Potable Water System

Using the District's hydraulic model from the 2007 Master Plan Update, the system was modeled during a Max Day Demand (MDD) with a fire flow (FF) demand of 2,000 gpm at the Project site. The results of the analysis show that a fire flow of 2,000 gpm can be delivered without negatively impacting the Seminole System. Based on Table 7-1 of the *Potable Water Master Plan Update 2007 (Ref. 1)*, the Seminole System has sufficient storage for a 2 hour fire flow demand of 2,000 gpm. If a Fire Flow larger than 2,000 gpm is required by LACFD, this report will need to be updated and improvements to the District's system may be required. **Table 3** summarizes the results of the analysis.

Table 3
Seminole System Pressures with Fire Flow Demands at Malibu Institute Development

	MDD and No FF	MDD + 2,000 GPM FF
ID[(a)]	Pressure (psi)	Pressure (psi)
1941	123.6	38.6
1949	173.7	54.7
1940	117.4	39.7
1943	127.9	42.9
4408[(b)]	106.9	105.5

(a) See **Plate 1** for location of nodes.
(b) Location of Malibu Institute Development/Malibu Country Club demand.

As previously noted, a new detector check valve is required for flows greater than 1,000 gpm (the flow limit of the existing meter). Plate PW-109 of the District's standards provides details for the installation of such device.

Pipeline Access and Easements

The existing pressure reducing station and the District mainline located within the Project property are anticipated to stay within existing District easements. Improvements, if any, to District owned facilities will remain within existing easements or new easements shall be dedicated to the District prior to the water system being approved. Regular access is required for meter reading, maintenance, and repairs.

Section 6 - Recycled Water

Historical data provided by the developer (**Appendix C**) shows that approximately 193 acre-feet per year of water is used for golf course irrigation.

Economic Feasibility

The nearest recycled water pipelines are located approximately five miles north of the Project site as shown on **Plate 3**.

Various studies investigating the feasibility to deliver recycled water to the Malibu Golf Club have been completed including the *Malibu Golf Course Recycled Water Service Study* (*Ref. 4*) and the *Recycled Water Master Plan Update 2007* (*Ref. 2*). In 2004, the project to deliver recycled water to the Malibu Golf Club, named the Decker Canyon Project, was designed, permitted, and advertised for bid, but was never constructed (**Plate 3** shows the project alternative that was designed and advertised for bid as well as an alternative alignment). The contractor bids that were submitted were significantly higher than budgeted estimates.

The cost for the recycled water project (based on contractor bids) from the *Recycled Water Master Plan Update 2007* was estimated at $7,800,000 in 2007 dollars. Assuming a 3% inflation rate, costs for the project are estimated at $9,000,000 in 2012 dollars.

The estimated cost per acre-foot of water (using an estimated demand of 193 acre-feet per year based on previous billing records for the years 2010 and 2011) served is thus approximately $47,000, which is well above the District's benchmark for economic feasibility of recycled water facilities. This analysis shows that a recycled water system is not economically feasible at this time and, therefore, not required.

However, new irrigation systems should be designed so they can be readily separated from any domestic plumbing, and thus be easily converted to recycled water, should connection to the system become more feasible (LVMWD Code No. 4.3.202(e)).

Irrigation Demands Included in Table 1

Because connection to the Recycled Water System does not appear to be economically feasible at this time, the irrigation demands were also included in **Table 1**.

Section 7 - Sewer System and Sewage Generation

All sewage generated by the Malibu Institute Development will be treated and disposed of on-site by a private wastewater treatment system.

Section 8 - Construction Phasing and Acceptance

It is anticipated that improvements to the District's water system will be constructed in a single phase. The improvements, the new PRV and detector check shown on **Plate 2,** will be dedicated and accepted by the District only upon their completion in whole, unless other arrangements are agreed upon among the parties.

In accordance with standard policy, the District will consider final acceptance of the District owned potable water system facilities (those shown on **Plate 2**) when construction is complete. Construction shall be considered complete when the facilities related to the District owned potable system have been installed in accordance with the District's standards and the approved water system design report.

The owners must comply with the Special Conditions for performance bonds, temporary risers and hose bibs, and repair of damage to accepted water system components set forth in the District's memorandum entitled, "Review of Policy - Acceptance of Tract Water Systems (July 14, 1989)".

Section 9 - Water Conservation

In accordance with District Water Ordinance 11-86-161, the following water conservation measures are required:

- Waste and leakage of water is not allowed.
- For residential projects, all toilets installed shall use 1.6 gallons or less per flush, and all showerheads shall flow at 2.5 gallons per minute, or less, at 80 psi.

To obtain maximum benefit of the limited water resources of the State of California, the District and various incorporated cities have adopted landscape ordinances that require plant materials and irrigation systems to be water efficient. In accordance with District Ordinance No. 1-93-205, landscape and irrigation plans must be submitted to the District for review. The landscape and irrigation plans must be in conformance with District landscaping and irrigation specifications as contained in the Las Virgenes Municipal Water District Landscaping Guide.

Due to the severity of the water shortage the State of California is currently facing, various levels of mandatory water conservation will need to be implemented by the property owners. However, long-term water consumption data will be used to plan and design the water system.

Section 10 - Financial Impact on District

The new potable water system facilities downstream of the pressure reducing station at the golf course are for the benefit of the project participants and provide no benefit to the existing District system; therefore, no District financial participation in the new water system facilities related to the Project, including the installation of a detector check and PRV is warranted under District Rules and Regulations.

A portion of the existing 10-inch diameter pipeline buried approximately 60-feet below grade is expected to be replaced during the regarding of the golf course. Financial obligations and responsibilities will be addressed during the design of the planned development.

Section 11 - Environmental Review

The District is a “responsible agency” for the purpose of environmental review of this Project under the California Environmental Quality Act (CEQA). The lead agency for the environmental review is the County of Los Angeles or the next public agency that has permitting/approval authority over the project. Environmental documents may or may not be required for this proposed public water system.

Prior to approval of a “Final” Water System Design Report for this project, copies of adopted environmental and/or planning documents must be provided to the District, showing conditions of approval.

Section 12 - Conclusions and Recommendations

A. It is concluded that:

1. To provide adequate potable water service to the Project, the following facilities must be installed by the owners:

   a) The pressure reducing valve and detector check valve shown on **Plate 2**.

2. Any service connections within the Project that will experience pressures in excess of 150 psi will require a pressure regulator.

3. All buildings within the Project that will experience pressures in excess of 80 psi at the service connection will require individual pressure regulators ahead of the building plumbing in accordance with the 80 psi limitation imposed by the Plumbing Code.

4. Currently, a main extension for the District's Recycled Water System is not economically feasible and therefore not required, however, irrigation facilities should be installed for future conversion to recycled water per LVMWD Code 4.3.202(e).

5. The water system project is not proposed to be accepted in phases.

B. It is recommended that:

1. The proposed potable water system facilities shown on **Plate 2** and outlined herein be approved for planning purposes only.

2. The property owners have the Los Angeles County Fire Department verify the location of fire hydrants and the fire flow requirements for the Project and submit an approved plan to the District reflecting the fire flow demand and hydrant locations.

3. Because of the rugged nature of the terrain, the slope stability for the pipeline and the maintenance roads be reviewed and signed by a licensed engineering geologist or geotechnical engineer responsible for the Project.

4. The District require the property owners to dedicate properly recorded easements for appurtenances not in public streets, including the new pressure reducing valve and detector check valve. In addition, the property owners shall grant easements for general access, operation and maintenance of the District owned system.

5. The District require easement parcels for the detector check valve and pressure reducing station, including space for maintenance access.

6. The District require all above-ground District-owned facilities (i.e. meters larger than 2 inches, detector check installations, and backflow prevention devices) be installed above ground and screened from view in accordance with District standard plans.

7. The Board determine that no District financial participation in the construction of the on-site or off-site water system facilities is warranted for the Project's water system. The costs for the replacement of a portion of the existing 10-inch water main crossing the property on the northwest side will be further discussed and agreed to during the design phase of the development.

8. Copies of environmental documents in accordance with CEQA adopted by a lead agency or development permits showing conditions of approval be furnished for the preparation of a Final Water System Design Report.

9. Copies of development permits from the California Coastal Commission (if applicable) and other governing agencies be furnished prior to the approval of water system construction plans.

Section 13 - Limitations

Report Intent. This Water System Design Report is intended only to develop the hydraulic information necessary to design a water system. No effort has been made at this time to precisely locate existing or proposed facilities. Conflicts may develop as more information is discovered about both existing and proposed pipelines, street grades, etc. Corrections of conflicts related to this project will be the responsibility of the applicant.

Project Changes. This Water System Design Report is based upon maps of the Malibu Institute Development properties prepared by RCE Consultants, Inc., County of Los Angeles Planning Documents, and upon information submitted by the subject properties and its representatives. Accordingly, this design report may be subject to modification to reflect changes made by the applicant. This report may also be subject to modification to reflect additions or amendments to the District's Water Ordinance and the District's Design Standards prior to approval of the final design. Any revision in the above information or project map or deviation therefrom may invalidate the conclusions and recommendations. A supplemental or amended report must be prepared for the use of the District at the applicant's sole expense if the project or the data is changed.

Other Agency Approvals. This Water System Design Report has been prepared at the request of the owners of the Malibu Golf Club and the Project proponent. Preparation of this report does not indicate the District either supports or opposes the underlying Project or any related project. District staff will answer questions concerning this report. However, the Project proponent is solely responsible for securing necessary project approvals from state, regional, and local agencies with jurisdiction by law without the express or implied intervention or support of the District.

Project Delays. This Water System Design Report is based upon the assumption that the Project will be implemented in due course. A supplement, amendment or complete report must be prepared for the use of the District at the proponent's sole expense if the Project is unduly delayed.

Warranty of Supply. The preparation of this Water System Design Report does not constitute a commitment by the District to supply water or provide sanitation service to the Project. The Project will be assured of connection to the water and sanitation systems of the District only if the proponent also satisfies all terms and conditions for service as set forth in the District's code, and capacity is available at the time arrangements for service are finalized.

Fire flow is per current standards. The District does not guarantee future fire flow due to changing standards.

References

1. “Potable Water System Master Plan Update 2007,” Boyle Engineering Corporation, October 2007 (LVMWD Report No. 2389.00).

2. “Recycled Water Master Plan Update 2007,” Boyle Engineering Corporation, October 2007 (LVMWD Report No. 2389.01).

3. Los Angeles County Fire Department, Fire Flow Regulation No. 8.

4. “Malibu Golf Course Recycled Water Service Study,” Boyle Engineering Corporation, September 2001 (LVMWD Report No. 2163.00).

Appendices

A. E-mail and Architectural Drawings by Developer

B. Billing Records

C. Irrigation Water Projections

D. Fire Flow Requirement by LACFD

Appendix A

E-mail and Architectural Drawings by Developer

Baez, Fernando

From: Frank Cahill [fcahill@rceconsult.com]
Sent: Tuesday, July 10, 2012 9:50 AM
To: Gallagher, Ryan
Subject: FW: Malibu Institute - Water System Design
Attachments: Malibu CC_WP_proposed 25JUN12.pdf; 01446-03.TIF; 08287.TIF

FYI

From: Frank Cahill
Sent: Friday, July 06, 2012 4:55 PM
To: 'JZhao@lvmwd.com'
Cc: Victor Illig; Rich Clark
Subject: Malibu Institute - Water System Design

Mr. Zhao,

Following up on your discussions with Mr. Vic Illig of RCE regarding the proposed Malibu Institute development, the following summary of the project should include the information required by your consultant to prepare an analysis of the water system for the project:

The project consists of a golf course and the following buildings:

Malibu Institute	48,220 square feet
Security/Information Building	447 square feet
Golf Pro Shop/Grill	12,104 square feet
Cart Barn	9,162 square feet
Clubhouse	30,147 square feet
40 Guest Bungalows	109,140 square feet
Maintenance Building	10,500 square feet
Warehouse	4,623 square feet
Total	**224,343 square feet**

Please refer to the preliminary Vesting Tentative Tract Map exhibits and the preliminary Architectural Drawings at the following link:

https://rceconsult.sharefile.com/d/s3f0a8dea4e44540b

Fire Flow:
We discussed the project with the Fire Department and we were told that the Fire Flow should comply with the Fire Code. Based on discussions with the Architect (for maximum building size and construction type) and the California/Uniform Fire Code, a 35,200 (maximum) square foot Type IV building requires 3,250 gpm for 3 hours but is allowed a 50% reduction (actually up to 75% depending on the Fire Department) if sprinklered. This equates to 1,625 gpm for 3 hours. (The Architect agreed to separate the "Malibu Institute" building into separate fire areas using fire walls such that no single building area would be above 35,200 square feet).

Recycled Water:
We understand there are plans to bring recycled water to the project in the future but currently the design anticipates irrigating the golf course using domestic water. The irrigation demand calculation is attached to this e-mail.

Sewer:
There is no sewer system in the vicinity. The project sewage will be handled by a private on-site Waste Water Treatment System.

Schedule:

We are trying to get this project completed as soon as possible. Can we have your consultant's report completed by mid-August?

Please let me know if you need any further information and thank you for your cooperation.

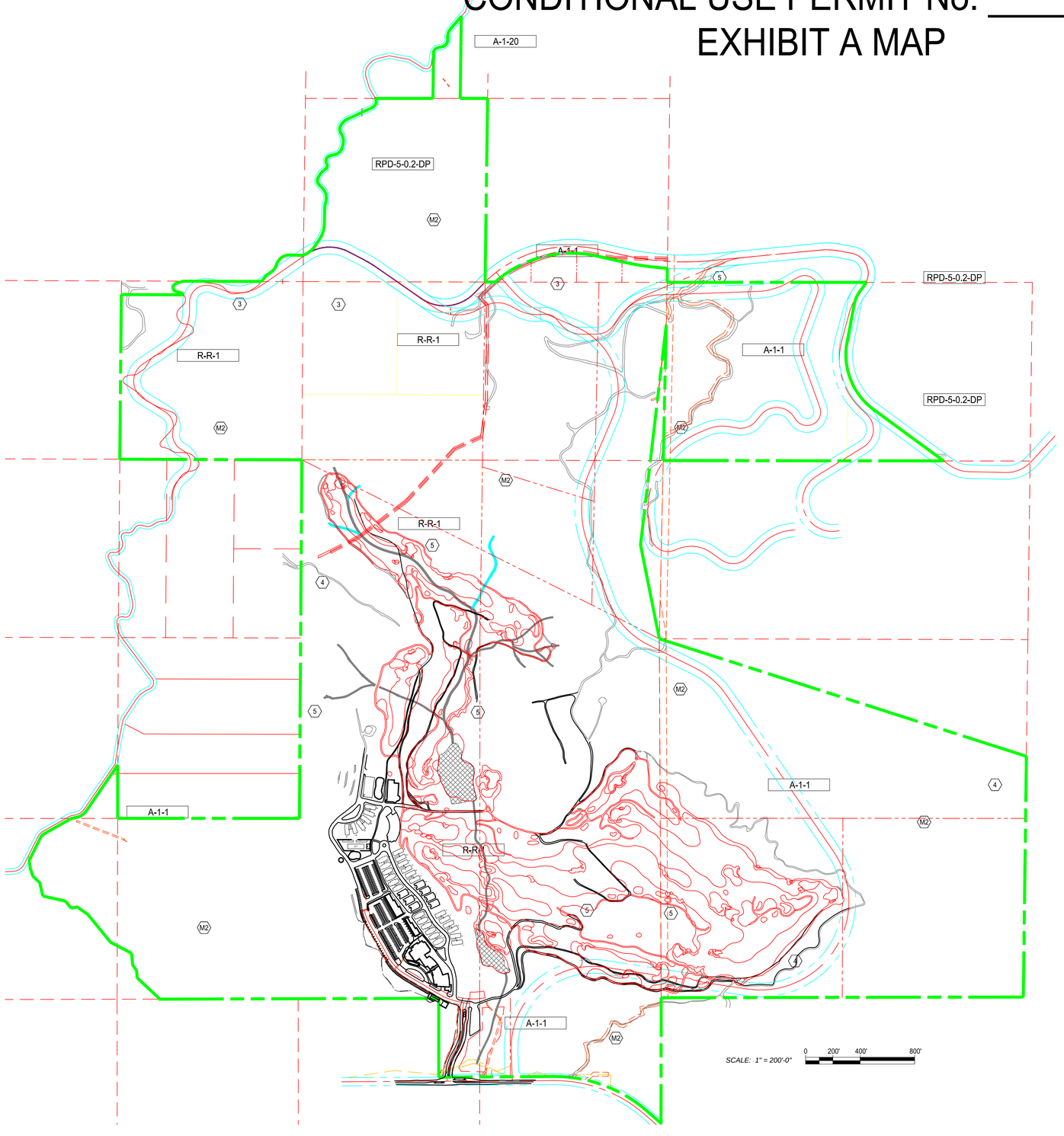
Regards,

Frank.

Frank Cahill, P.E.

RCE Consultants, Inc.
23332 Mill Creek Drive, Suite 205
Laguna Hills, CA 92653
949.453.0111 Extension 104
Fax: 949.453.0411
Cell: 949.838.4534
FCahill@rceconsult.com

VESTING TENTATIVE TRACT MAP NO. 71735
CONDITIONAL USE PERMIT No. _____
EXHIBIT A MAP



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S-2	SITE PLAN
S-3	NOT INCLUDED- SITE ELEVATIONS / SECTIONS
S-4	NOT INCLUDED- OAK TREE PERMIT
S-5	NOT INCLUDED- EXISTING LANDSCAPE DIAGRAM
S-6	NOT INCLUDED- LANDSCAPE / HABITAT RESTORATION
S-7	INFORMATION KIOSK PLANS / ELEVATIONS
S-8	MALIBU INSTITUTE BUILDING - MAIN LEVEL FLOOR PLAN- NORTH
S-9	MALIBU INSTITUTE BUILDING - MAIN LEVEL FLOOR PLAN- SOUTH
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S-28	BUNGALOW ELEVATIONS / SECTIONS
S-29	POOL RESTROOM / CHANGING ROOM FLOOR PLAN

LEGEND

	650 ACRE PROPERTY OUTINE
	PROPOSED DEVELOPMENT AREA
	VTTM 71735
	PROPOSED LOT LINE
	EXISTING PARCEL LINE
	CDFG JURISDICTION
⊕	EXISTING WELL (6 LOCATIONS)

MALIBU COASTAL LAND USE DESIGNATIONS

M2	MOUNTAIN LAND (1 DWELLING UNIT / 20 ACRES)
3	RURAL LAND (1 DWELLING UNIT / 10 ACRES)
4	RURAL LAND (1 DWELLING UNIT / 5 ACRES)
5	RURAL LAND (1 DWELLING UNIT / 2 ACRES)

ZONING INFORMATION

A-1-1	LIGHT AGRICULTURE (1 DWELLING UNIT / ACRE)
A-1-20	LIGHT AGRICULTURE (1 DWELLING UNIT / 20 ACRES)
R-R-1	RESORT AND RECREATION
RPD-5-0.2-DP	RESIDENTIAL PLANNED DEVELOPMENT

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CONSULTANT:

PROJECT NUMBER: *211089*

The Malibu Institute

901 Encinal Canyon Road
Malibu, CA 90265

SHEET TITLE:

EXHIBIT A MAP

DRAWN BY: *JET*
DATE ISSUED: *05.18.2012*

SHEET: **S-1**

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SITE PLAN

DRAWN BY: *NDH*
DATE ISSUED: *05.18.2012*

SHEET: **S-2**

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1 SITE PLAN
SCALE: 1" = 60'

N

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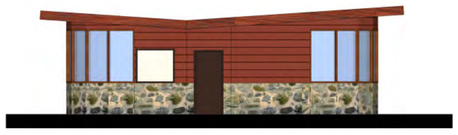
2. INFORMATION BUILDING ELEVATION- NORTH

SCALE: 1/8" = 1'-0"

3. INFORMATION BUILDING ELEVATION- SOUTH

SCALE: 1/8" = 1'-0"

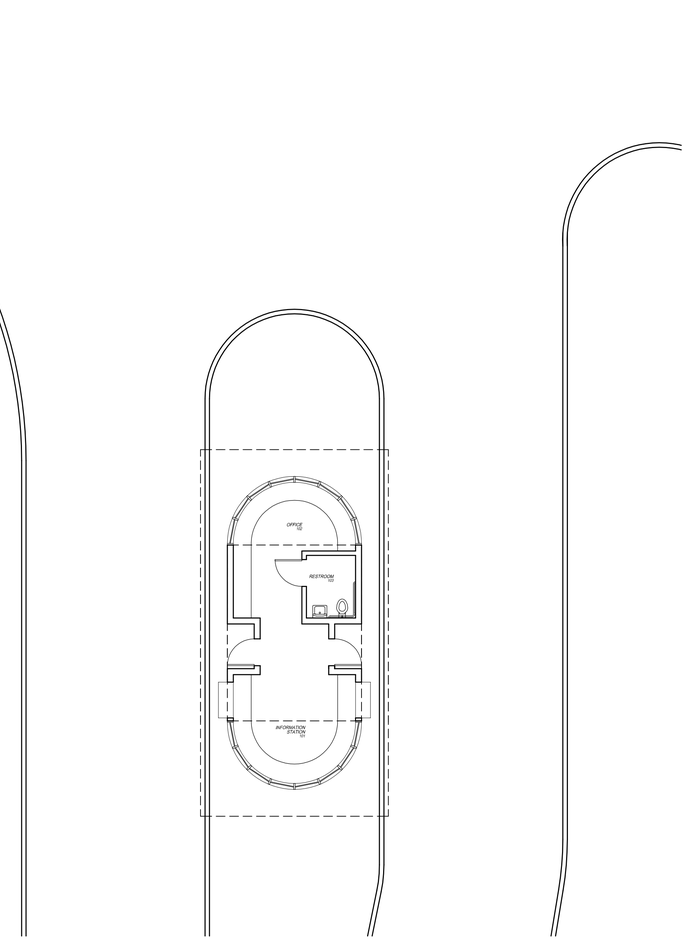


4. INFORMATION BUILDING ELEVATION- EAST

SCALE: 1/8" = 1'-0"

5. INFORMATION BUILDING ELEVATION- WEST

SCALE: 1/8" = 1'-0"



1 INFORMATION BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"

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INFORMATION BUILDING

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DATE ISSUED: 05.18.2012

SHEET: **S-7**

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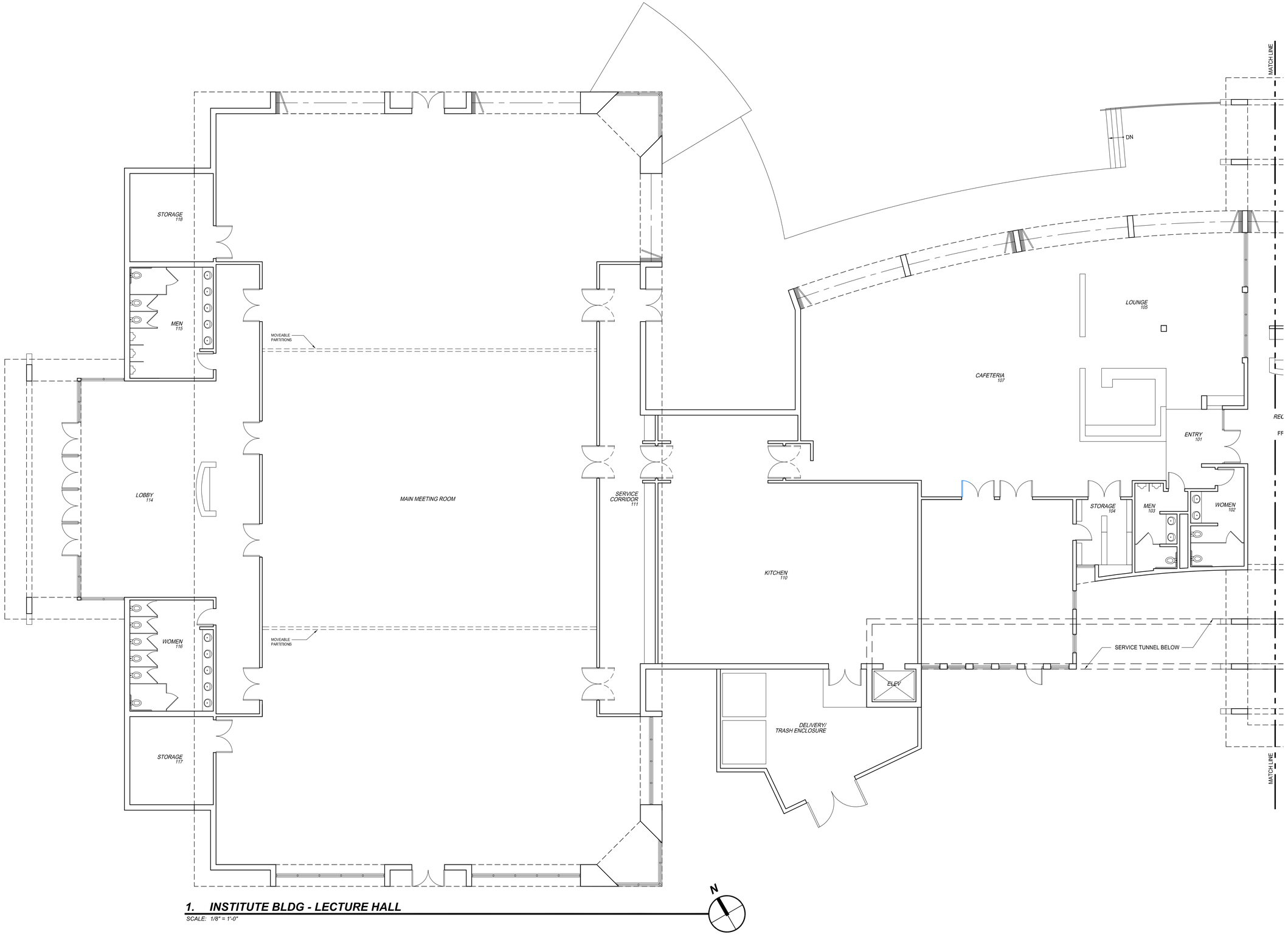

1. INSTITUTE BLDG - LECTURE HALL

SCALE: 1/8" = 1'-0"

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SHEET TITLE:

INSTITUTE BLDG
FLOOR PLAN
MAIN LEVEL
NORTH

DRAWN BY: *DMJ*

DATE ISSUED: *05.18.2012*

SHEET: **S-8**

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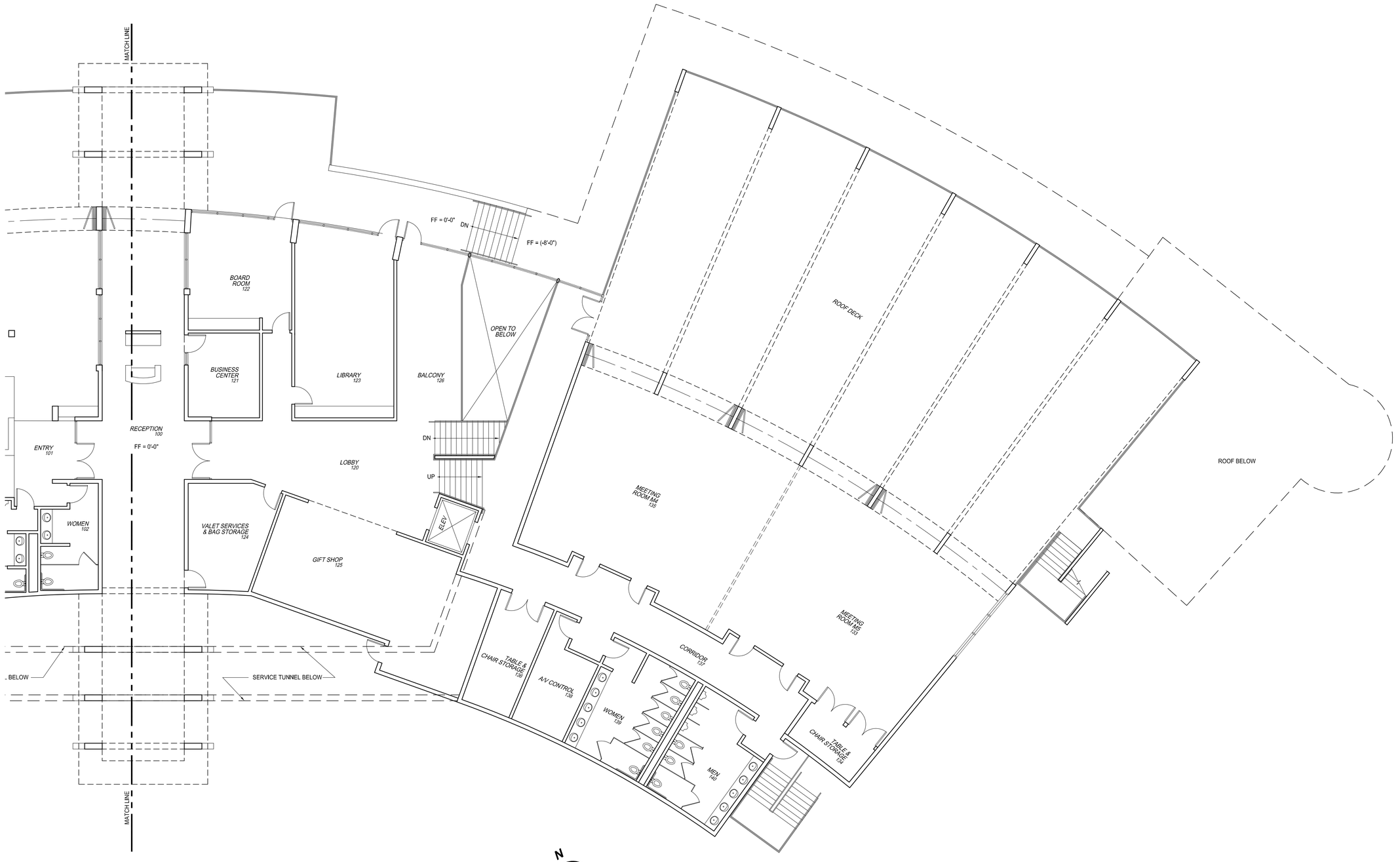

1 INSTITUTE BUILDING - MAIN/UPPER LEVELS

SCALE: 1/16" = 1'-0"

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SHEET TITLE:

INSTITUTE BLDG FLOOR PLAN MAIN LEVEL SOUTH

DRAWN BY: *DMJ*
DATE ISSUED: *05.08.2012*

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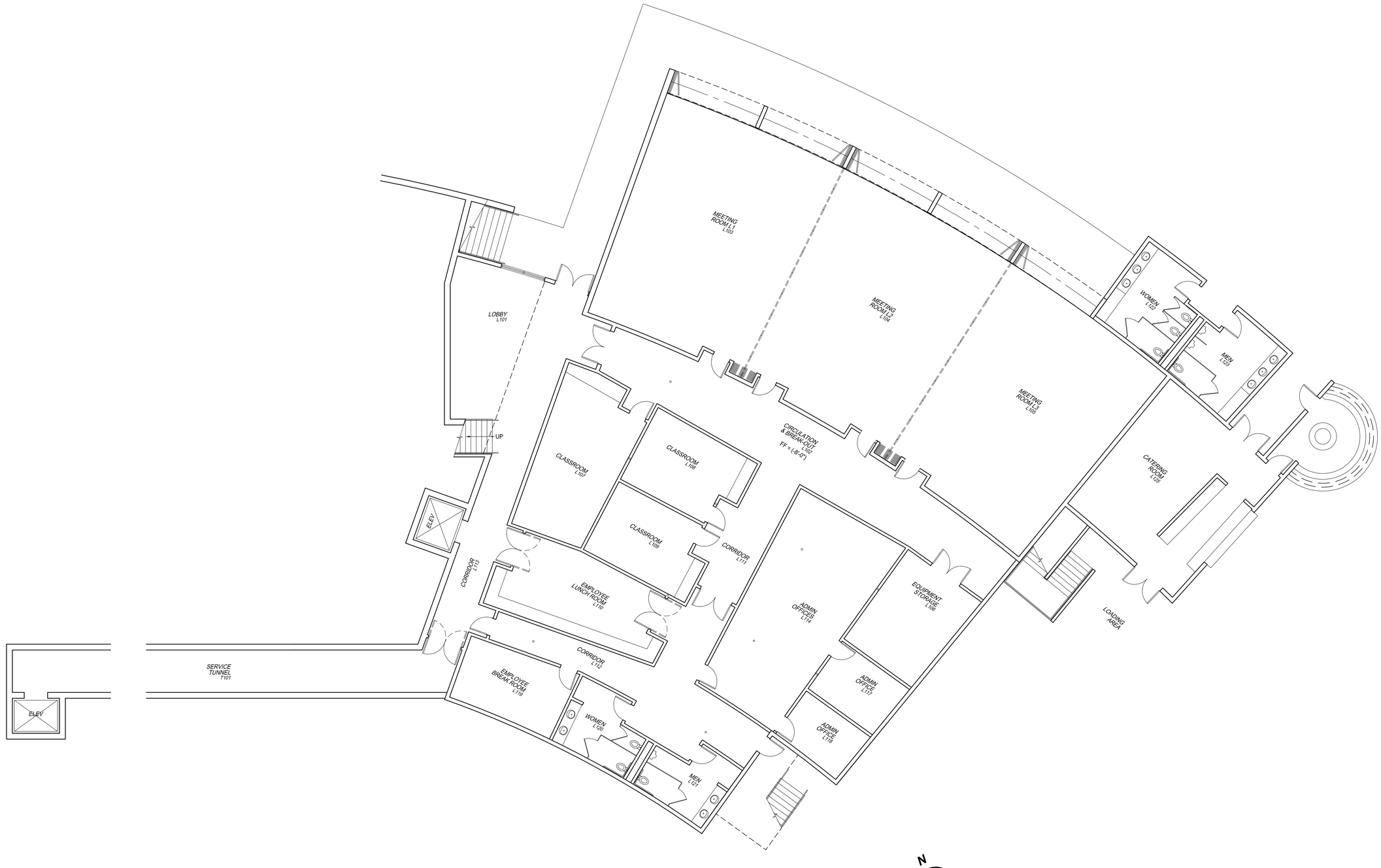

1 INSTITUTE BUILDING - LOWER LEVEL

SCALE: 1/8" = 1'-0"

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SHEET TITLE:

INSTITUTE BLDG
FLOOR PLAN
LOWER LEVEL

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: **S-10**

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1. INSTITUTE BUILDING - NORTH ELEVATION

SCALE: 1/16" = 1'-0"

2. INSTITUTE BUILDING - SOUTH ELEVATION

SCALE: 1/16" = 1'-0"

3. INSTITUTE BUILDING - EAST ELEVATION

SCALE: 1/16" = 1'-0"

4. INSTITUTE BUILDING - WEST ELEVATION

SCALE: 1/16" = 1'-0"

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INSTITUTE BLDG ELEVATIONS

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DATE ISSUED: 05.18.2012

SHEET: S-11

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CONSULTANT:

PROJECT NUMBER: *211089*

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Malibu, CA 90265

SHEET TITLE:

INSTITUTE BLDG ELEVATIONS

DRAWN BY: *CAI*
DATE ISSUED: *05.18.2012*

SHEET: **S-12**

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1. INSTITUTE BUILDING - SECTION WEST TO EAST
SCALE: 1/16" = 1'-0"

mbdt 3:34pm 18 May P:\2011\211089 Malibu Institute\300 Documents\300 Working CAD Files\211089-S-S-10 Malibu Institue Plans.dwg

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CONSTRUCTION

CONSULTANT:

PROJECT NUMBER: *211089*

The Malibu Institute

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Malibu, CA 90265

SHEET TITLE:

WAREHOUSE FLOOR PLAN / ELEVATIONS

DRAWN BY: *NDH/CI*
DATE ISSUED: *05.18.2012*

SHEET: **S-13**

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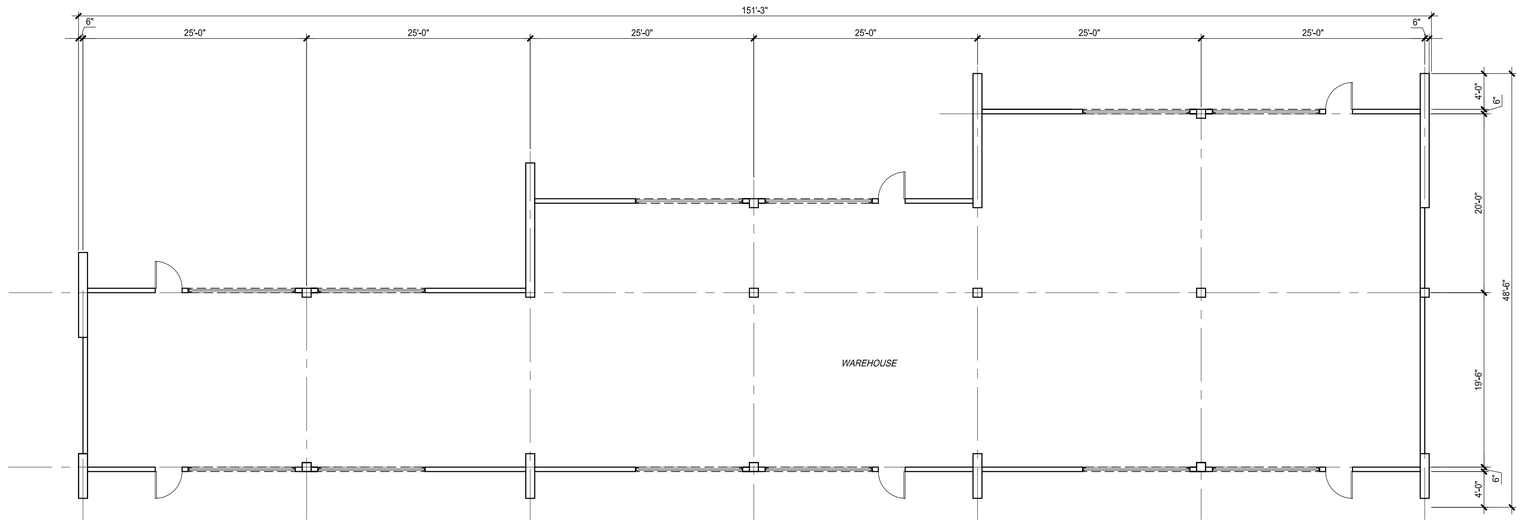


1. WAREHOUSE PLAN

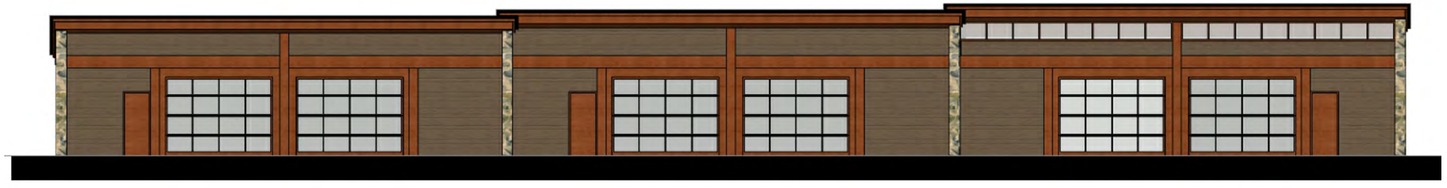
SCALE: 1/8" = 1'-0"

N

mhalk 3:45pm 18 May P:\2011\211089 Malibu Institute\300 Documents\300 Working CAD Files\211089 S-13-16 Cart Barn_Commissary Plan.dwg

1. WAREHOUSE ELEVATION- WEST

SCALE: 1/8" = 1'-0"

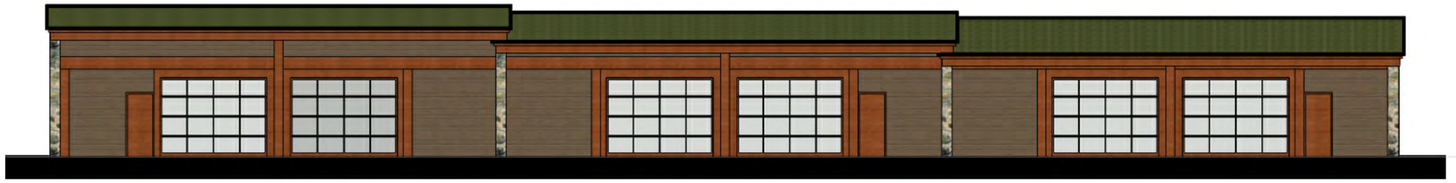


2. WAREHOUSE ELEVATION- NORTH

SCALE: 1/8" = 1'-0"

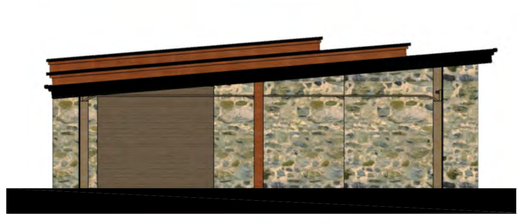
3. WAREHOUSE ELEVATION- EAST

SCALE: 1/8" = 1'-0"



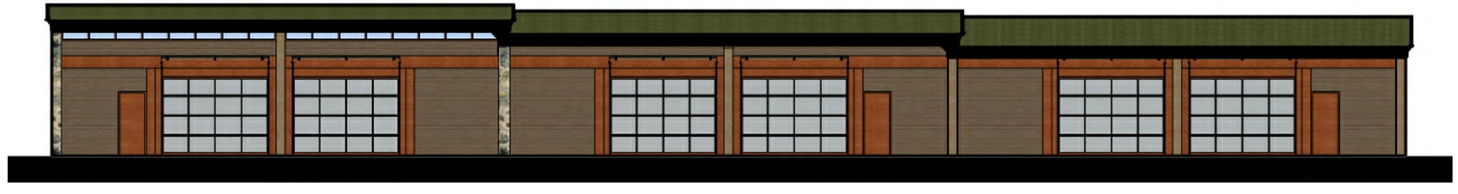
4. WAREHOUSE ELEVATION- SOUTH

SCALE: 1/8" = 1'-0"



5. WAREHOUSE SECTION- NORTH TO SOUTH

SCALE: 1/8" = 1'-0"



6. WAREHOUSE SECTION- EAST TO WEST

SCALE: 1/8" = 1'-0"

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CONSULTANT:

PROJECT NUMBER: *211089*

The Malibu Institute

901 Encinal Canyon Road
Malibu, CA 90265

SHEET TITLE:

WAREHOUSE ELEVATIONS / SECTIONS

DRAWN BY: *NDH/CI*
DATE ISSUED: *05.18.2012*

SHEET: **S-14**

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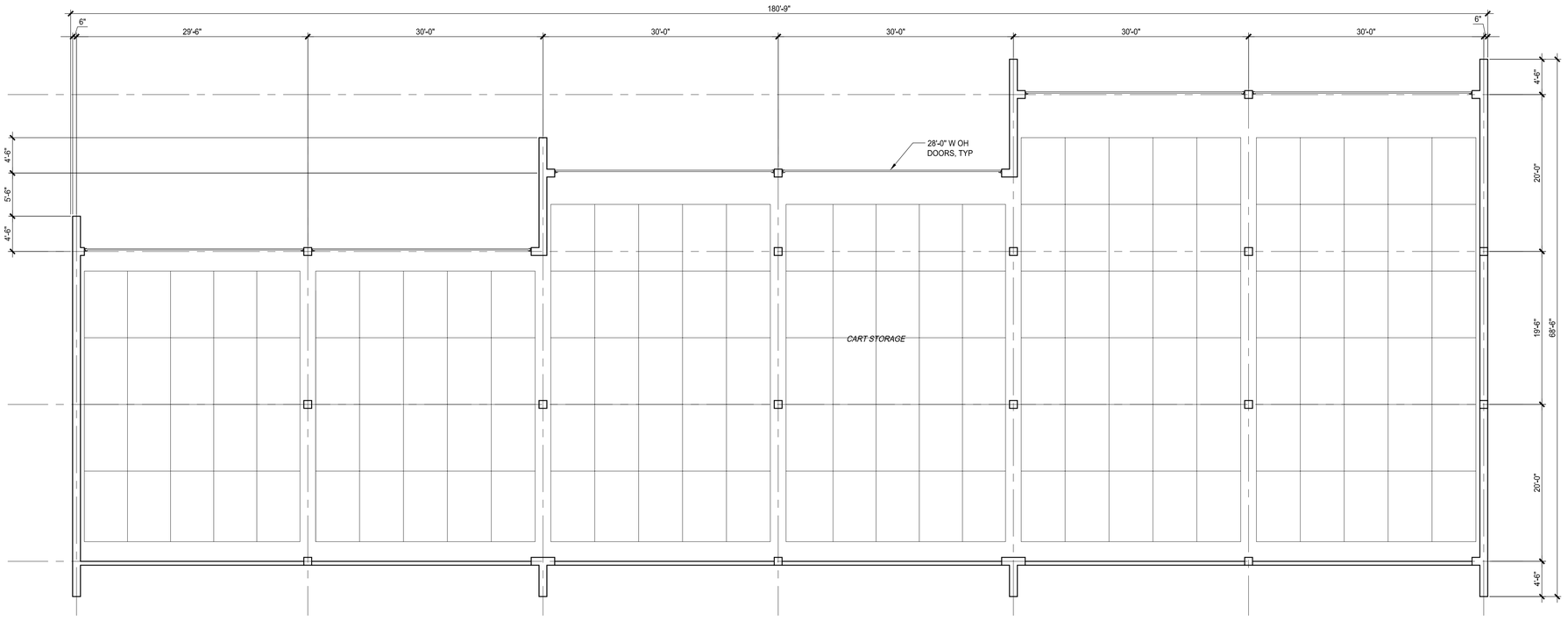

PROJECT NORTH

N

1. CART STORAGE PLAN

SCALE: 1/8" = 1'-0"

PROJECT NUMBER: *211089*

The Malibu Institute

901 Encinal Canyon Road
Malibu, CA 90265

SHEET TITLE:

CART STORAGE FLOOR PLAN / ELEVATIONS

DRAWN BY: *NDH/CI*
DATE ISSUED: *05.18.2012*

SHEET: **S-15**

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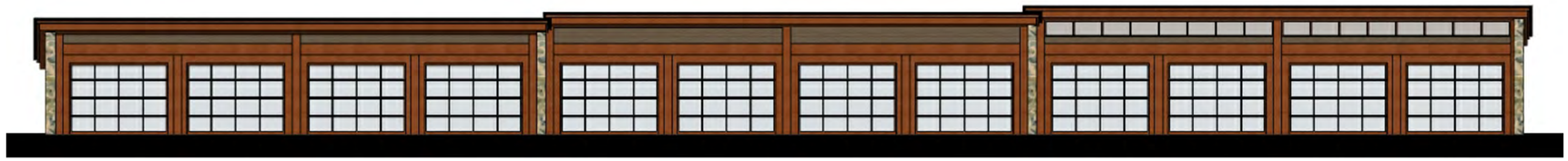
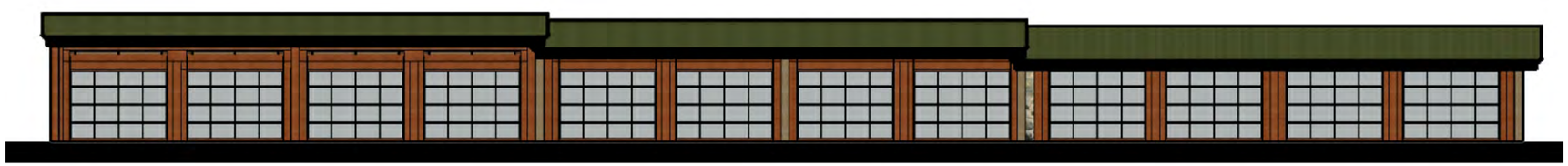


1. CART STORAGE ELEVATION- NORTH

SCALE: 1/8" = 1'-0"

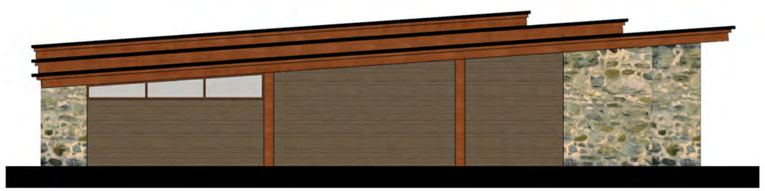
2. CART STORAGE ELEVATION- SOUTH

SCALE: 1/8" = 1'-0"



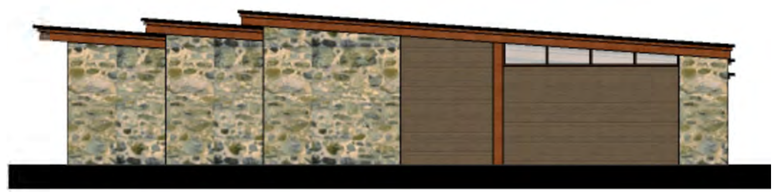
3. CART STORAGE SECTION- EAST TO WEST

SCALE: 1/8" = 1'-0"



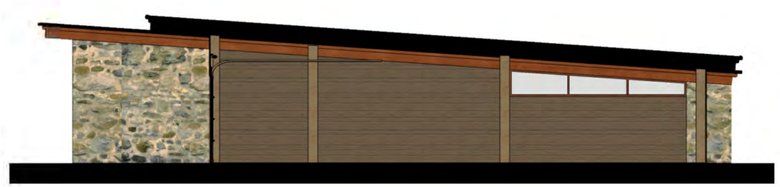
4. CART STORAGE ELEVATION- EAST

SCALE: 1/8" = 1'-0"



5. CART STORAGE ELEVATION- WEST

SCALE: 1/8" = 1'-0"



6. CART STORAGE SECTION- NORTH TO SOUTH

SCALE: 1/8" = 1'-0"

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CONSULTANT:

PROJECT NUMBER: 211089

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SHEET TITLE:

CART STORAGE ELEVATIONS / SECTIONS

DRAWN BY: NDH/CI
DATE ISSUED: 05.18.2012

SHEET: **S-16**

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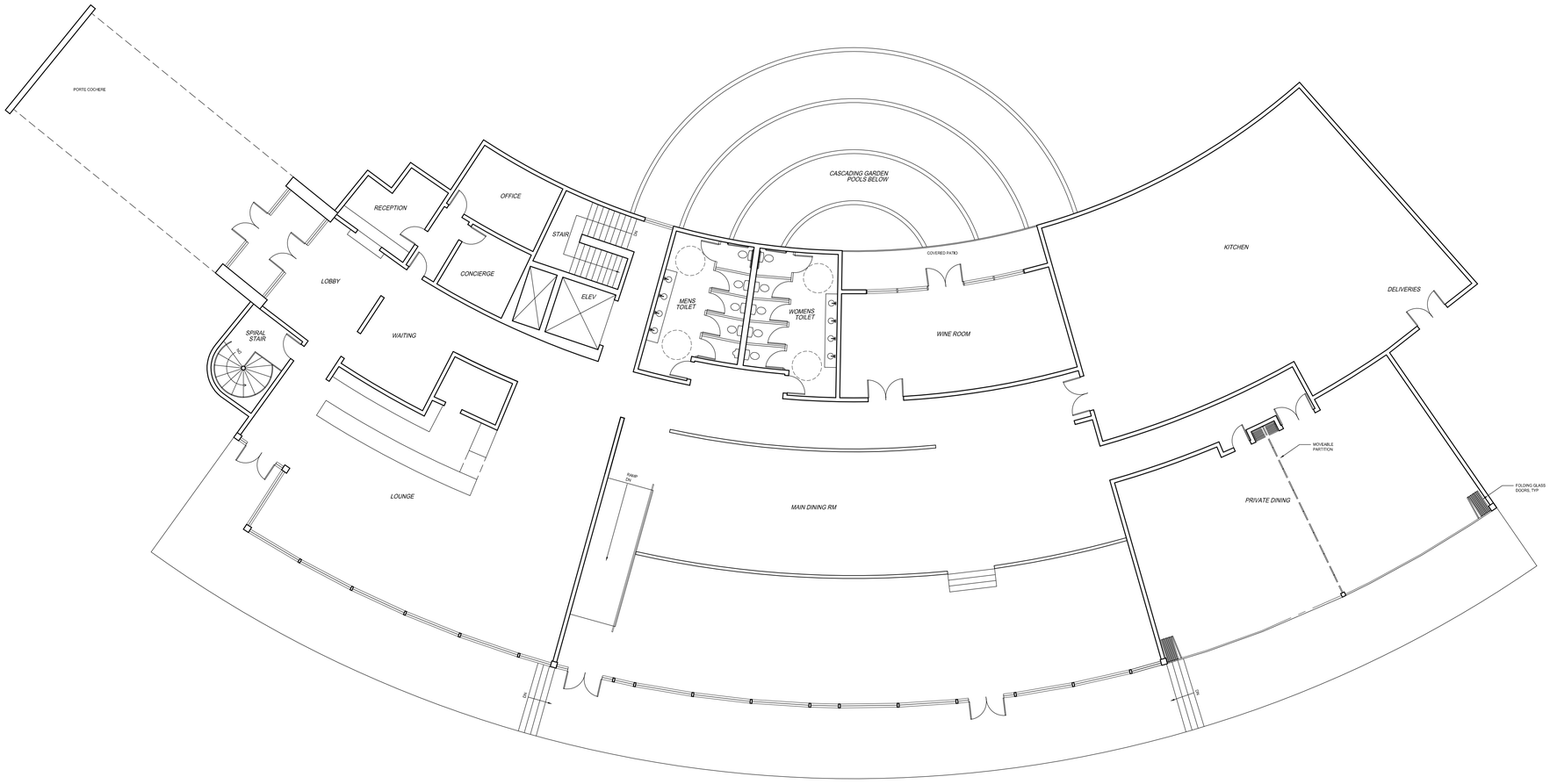

1 CLUB HOUSE PLAN - MAIN LEVEL

SCALE: 3/32" = 1'-0"

N

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CONSULTANT:

PROJECT NUMBER: *211089*

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901 Encinal Canyon Road
Malibu, CA 90265

SHEET TITLE:

CLUB HOUSE
MAIN LEVEL
FLOOR PLAN

DRAWN BY: *NDH*

DATE ISSUED: *05.18.2012*

SHEET: ***S-17***

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ndh8 2:40pm 18 May P:\2011\211089 Malibu Institute\300 Documents\300 Working CAD Files\211089 S-17 & 18 Clubhouse Plans.dwg

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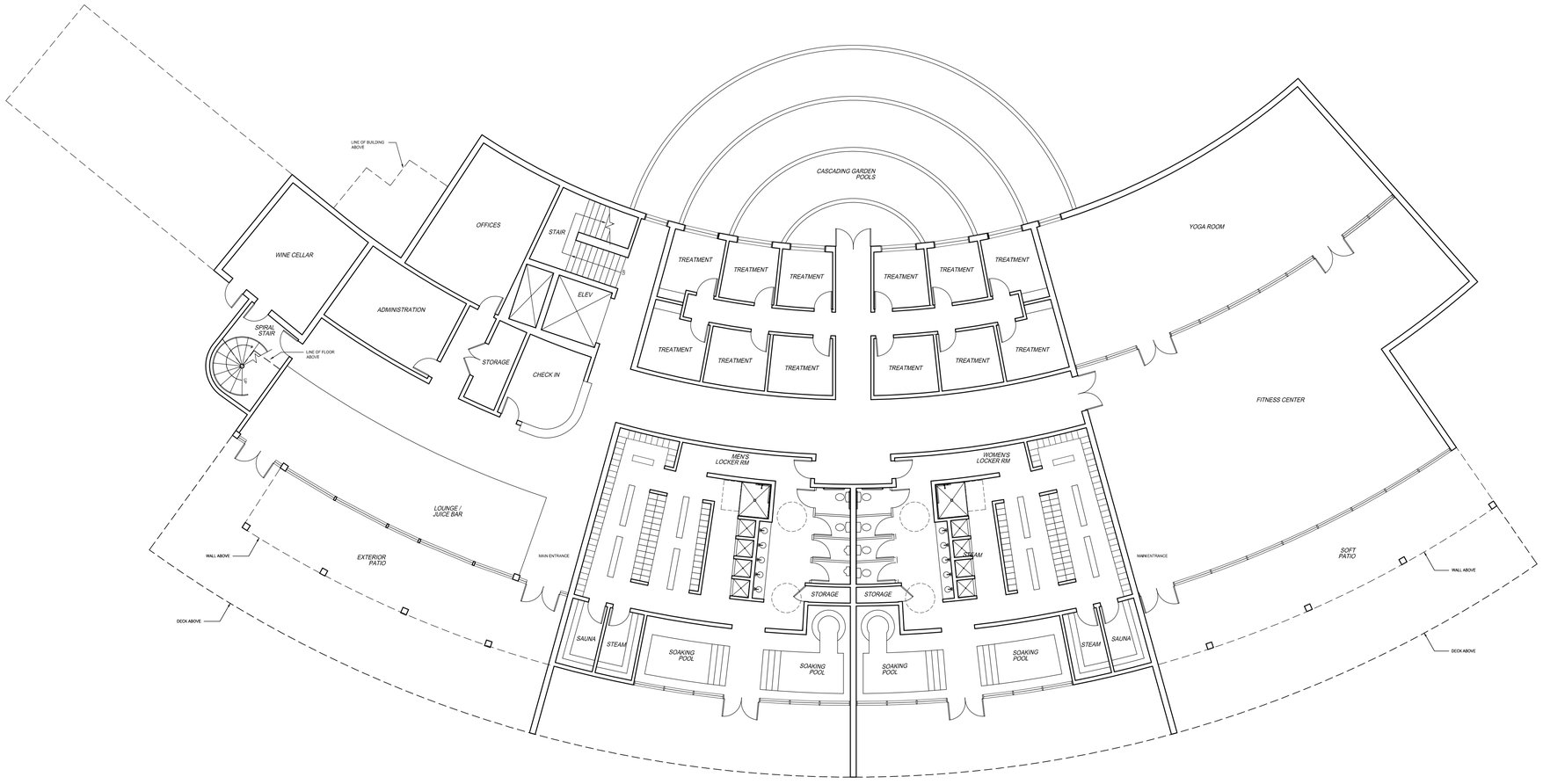

1 CLUB HOUSE PLAN - LOWER LEVEL

SCALE: 3/32" = 1'-0"

N

PROJECT NUMBER: *211089*

The Malibu Institute

901 Encinal Canyon Road
Malibu, CA 90265

SHEET TITLE:

CLUBHOUSE LOWER LEVEL FLOOR PLAN

DRAWN BY: *NDH*
DATE ISSUED: *05.18.2012*

SHEET: **S-18**

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2. CLUB HOUSE ELEVATION - NORTH

SCALE: 1/16" = 1'-0"

1. CLUB HOUSE ELEVATION - SOUTH

SCALE: 1/16" = 1'-0"

3. CLUB HOUSE ELEVATION - WEST

SCALE: 1/16" = 1'-0"

4. CLUB HOUSE ELEVATION - EAST

SCALE: 1/16" = 1'-0"

5. CLUB HOUSE SECTION - WEST/EAST

SCALE: 1/16" = 1'-0"

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Malibu, CA 90265

SHEET TITLE:

CLUBHOUSE ELEVATIONS & SECTIONS

DRAWN BY: *NDH*
DATE ISSUED: *05.18.2012*

SHEET: **S-19**

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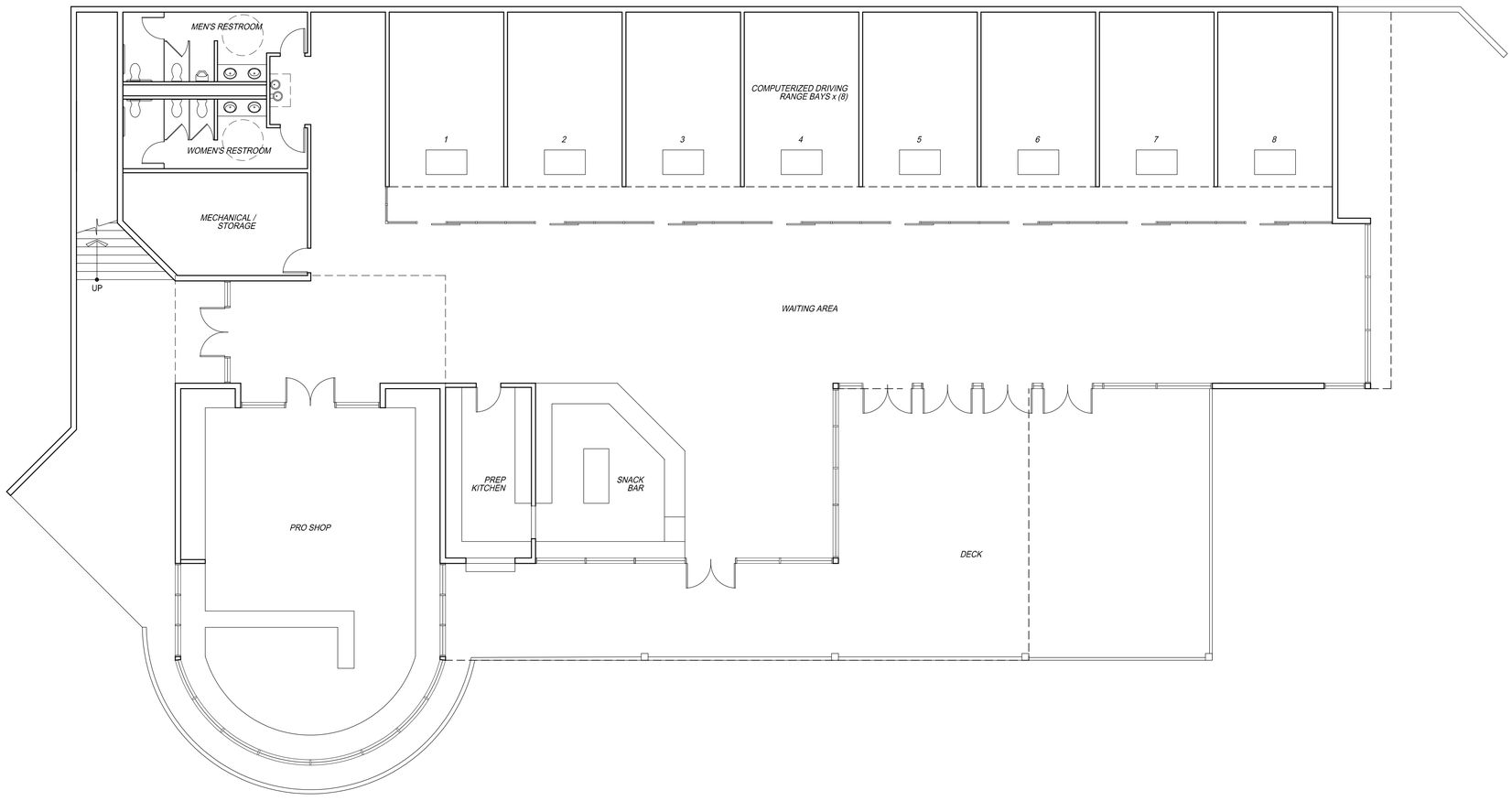

1 GOLF PRO SHOP - MAIN LEVEL

SCALE: 1/8" = 1'-0"

N

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SHEET TITLE:

GOLF PRO SHOP
MAIN LEVEL
FLOOR PLAN

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: **S-20**

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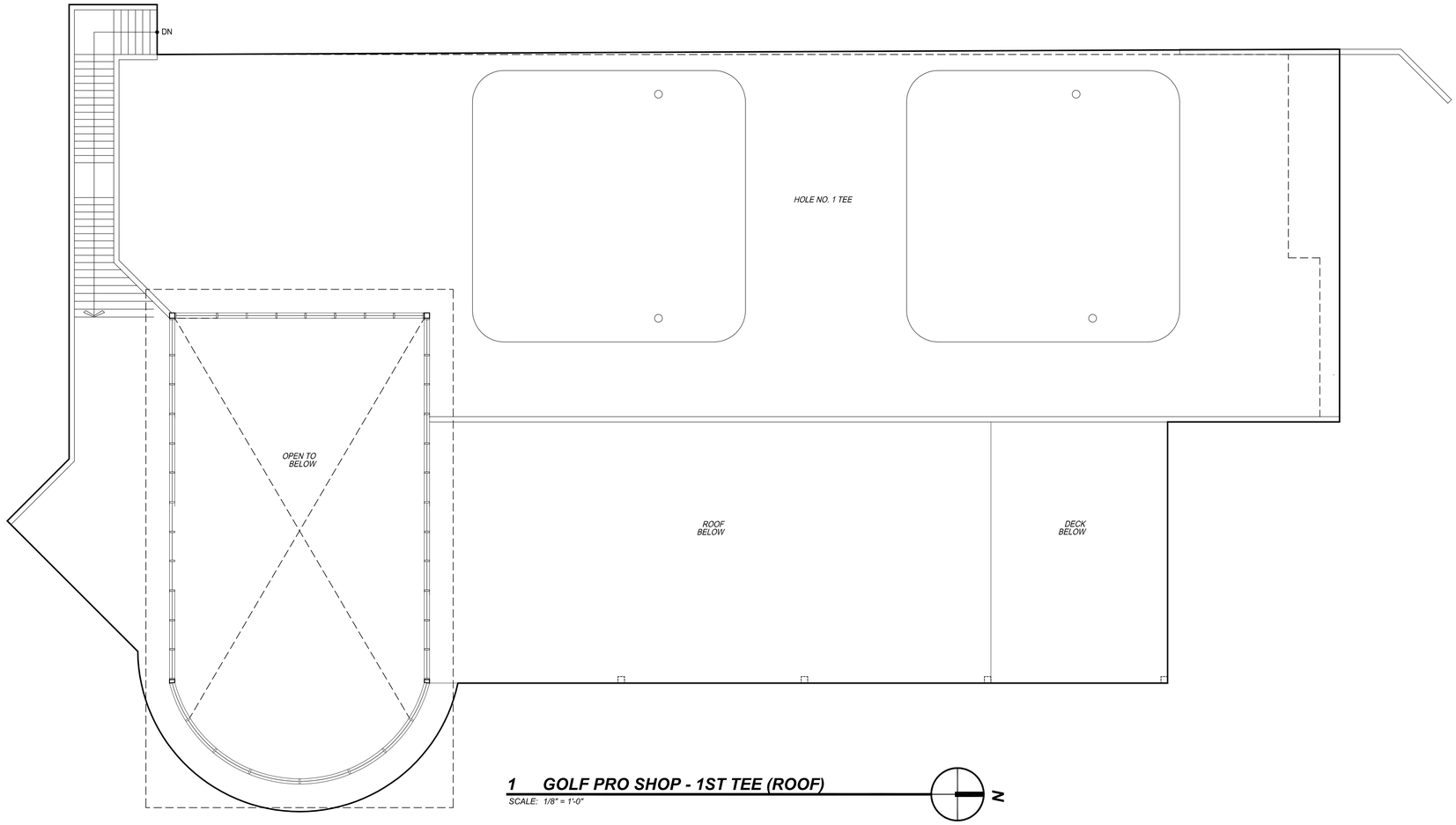
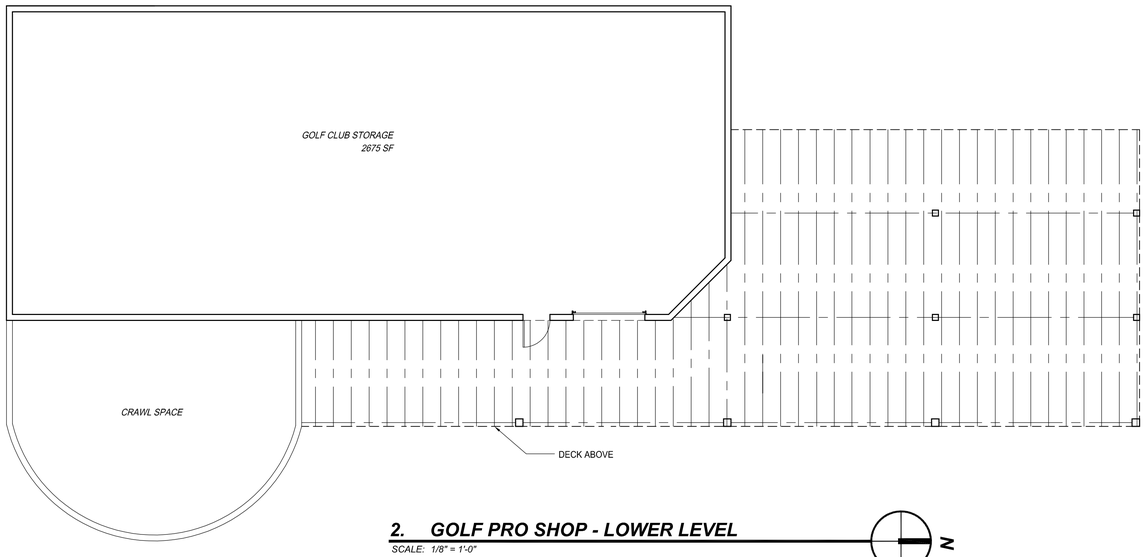


1 GOLF PRO SHOP - 1ST TEE (ROOF)

SCALE: 1/8" = 1'-0"

N



2. GOLF PRO SHOP - LOWER LEVEL

SCALE: 1/8" = 1'-0"

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CONSTRUCTION

CONSULTANT:

PROJECT NUMBER: *211089*

The Malibu Institute

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SHEET TITLE:

GOLF PRO SHOP
UPPER/LOWER
FLOOR PLANS

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: **S-21**

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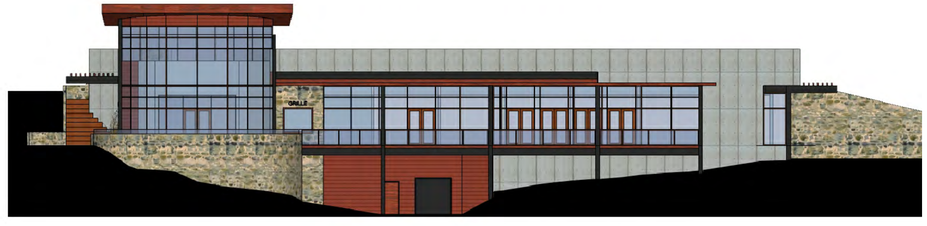
1. GOLF PRO SHOP ELEVATION- WEST

SCALE: 1/16" = 1'-0"



2. GOLF PRO SHOP ELEVATION- EAST

SCALE: 1/16" = 1'-0"

3. GOLF PRO SHOP SECTION- NORTH TO SOUTH

SCALE: 1/16" = 1'-0"

4. GOLF PRO SHOP ELEVATION- NORTH

SCALE: 1/16" = 1'-0"

5. GOLF PRO SHOP ELEVATION- SOUTH

SCALE: 1/16" = 1'-0"

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SHEET TITLE:

GOLF PRO SHOP UPPER/LOWER FLOOR PLANS

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: **S-22**

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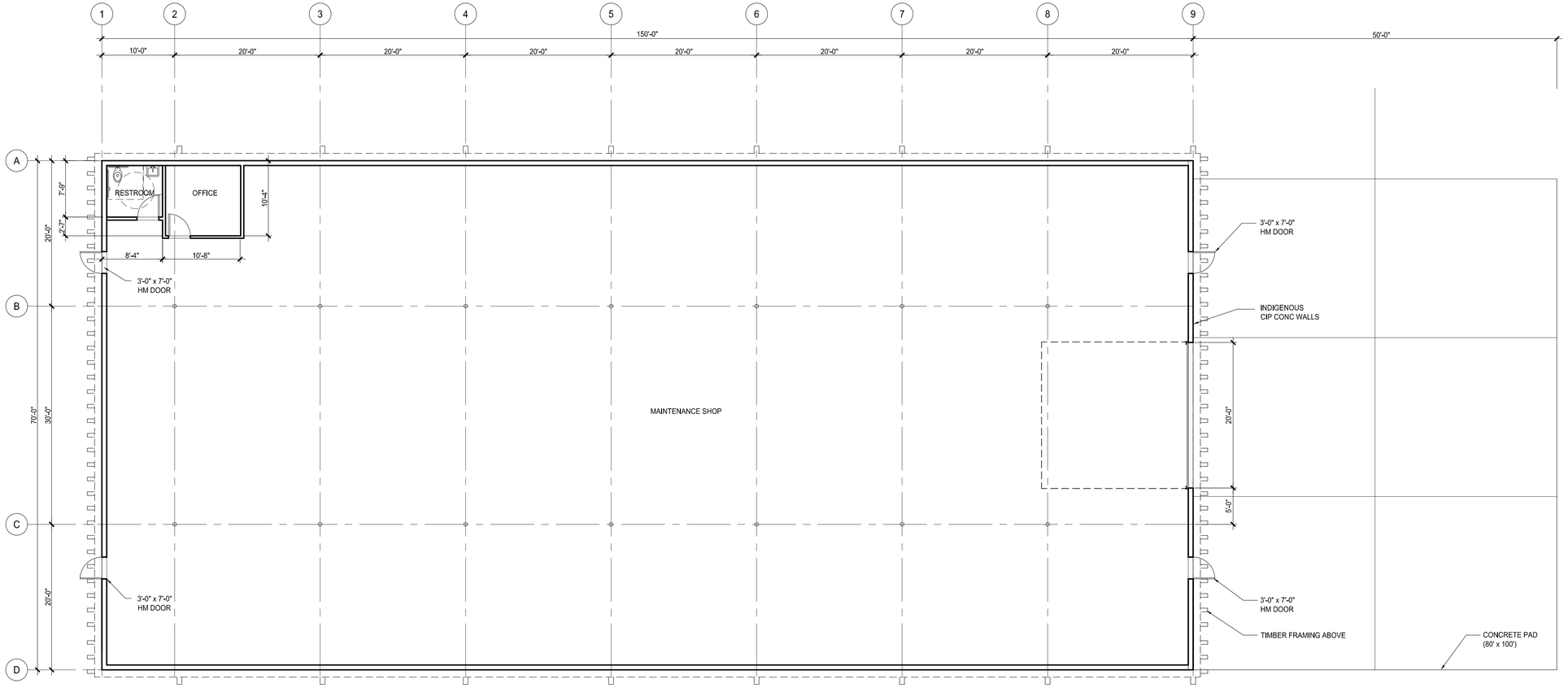
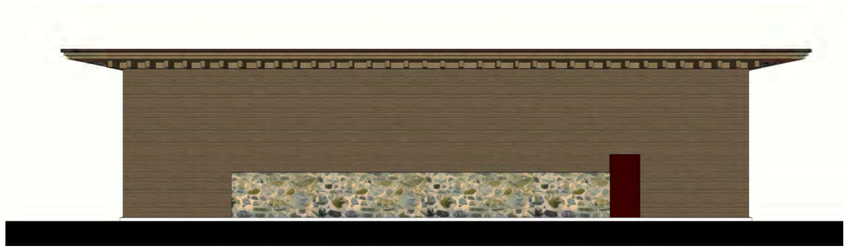


1. MAINTENANCE BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"

N



4. MAINTENANCE BUILDING ELEVATION - SOUTH

SCALE: 1/8" = 1'-0"

2. MAINTENANCE BUILDING ELEVATION - NORTH

SCALE: 1/8" = 1'-0"

3. MAINTENANCE BUILDING ELEVATION - EAST & WEST

SCALE: 1/8" = 1'-0"

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SHEET TITLE:

MAINTENANCE BLDG PLAN & ELEVATIONS

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: **S-23**

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CONSULTANT:

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SHEET TITLE:

BUNGALOW FLOOR PLANS UNITS A & C

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: **S-24**

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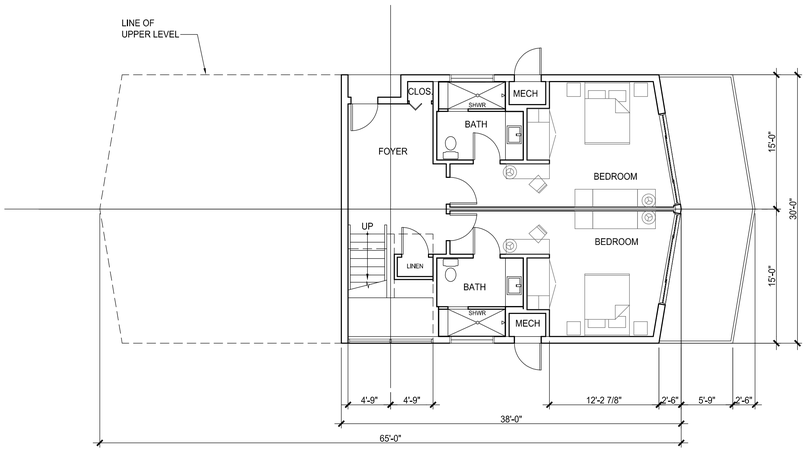
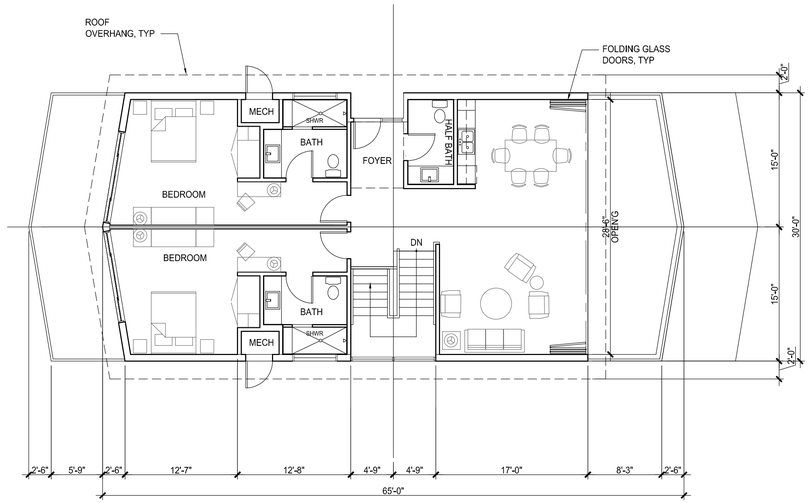
4. BUNGALOW TYPE C - UPPER LEVEL FLOOR PLAN

SCALE: 1/8" = 1'-0"



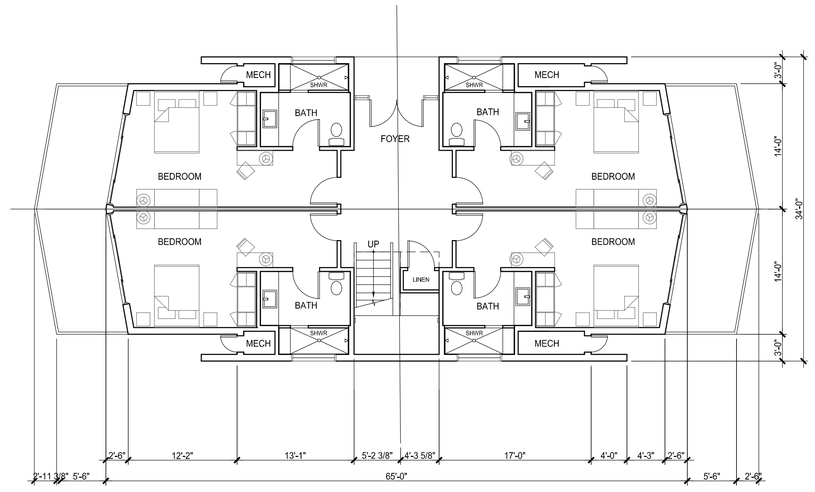
3. BUNGALOW TYPE C - LOWER LEVEL FLOOR PLAN

SCALE: 1/8" = 1'-0"



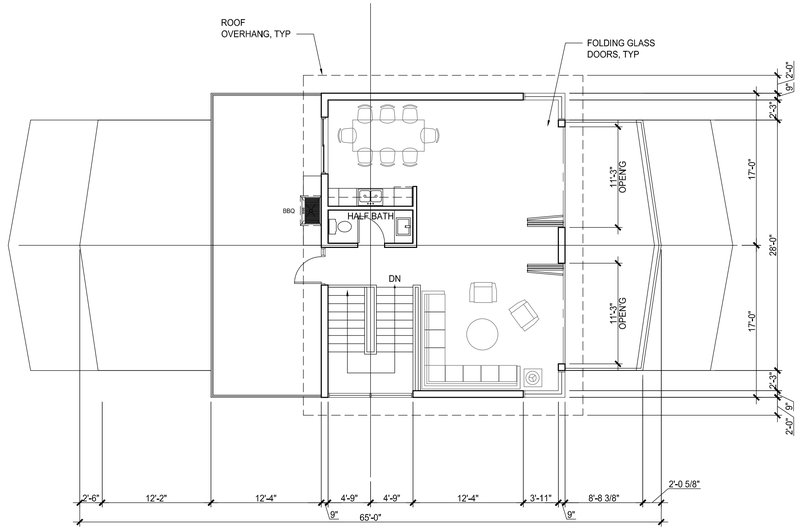
2. BUNGALOW TYPE A - SECOND FLOOR PLAN

SCALE: 1/8" = 1'-0"

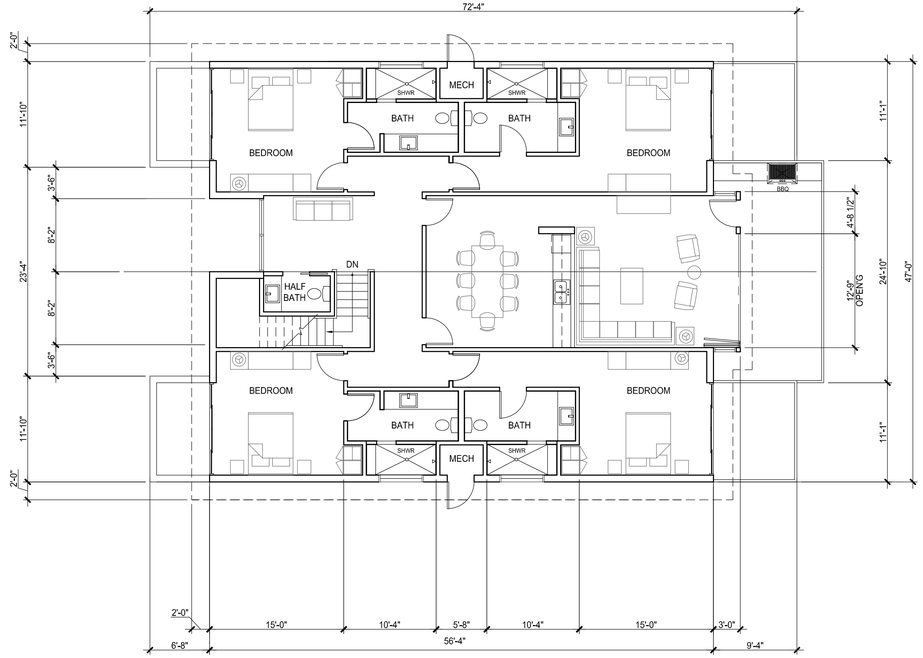


1. BUNGALOW TYPE A - FIRST FLOOR PLAN

SCALE: 1/8" = 1'-0"

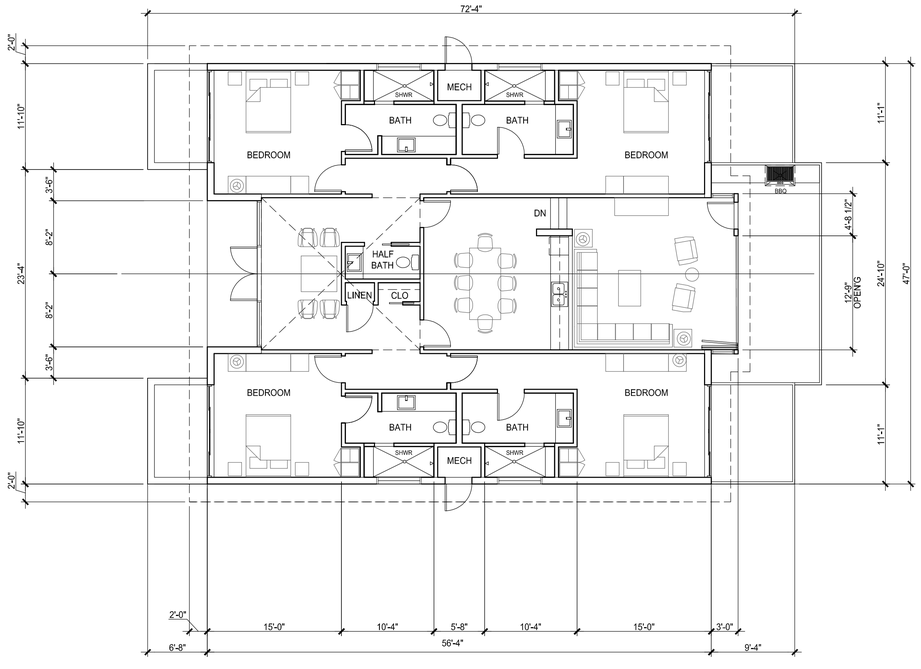


mhdl 2:34pm 18 May P:\2011\211089 Malibu Institute\300 Documents\300 Working CAD Files\211089 S-24 & S-25 Unit Plans.dwg



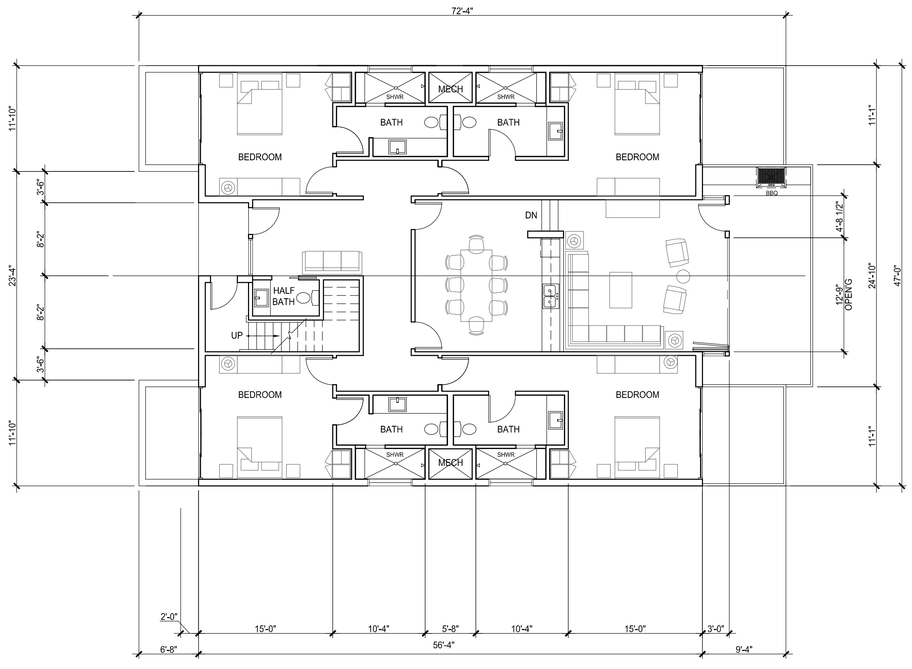
2. BUNGALOW TYPE B2 - SECOND FLOOR PLAN

SCALE: 1/8" = 1'-0"



3. BUNGALOW TYPE B - FLOOR PLAN

SCALE: 1/8" = 1'-0"



1. BUNGALOW TYPE B2 - FIRST FLOOR PLAN

SCALE: 1/8" = 1'-0"

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CONSULTANT:

PROJECT NUMBER: *211089*

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901 Encinal Canyon Road
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SHEET TITLE:

BUNGALOW
FLOOR PLANS
UNIT B

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: **S-25**

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2. UNIT A - NORTH ELEVATION

SCALE: 1/8"=1'-0"

1. UNIT C - NORTH ELEVATION

SCALE: 1/8"=1'-0"

6. UNIT A - WEST ELEVATION

SCALE: 1/8"=1'-0"

5. UNIT A - EAST ELEVATION

SCALE: 1/8"=1'-0"

4. UNIT C - WEST ELEVATION

SCALE: 1/8"=1'0"

3. UNIT C - EAST ELEVATION

SCALE: 1/8"=1'0"

8. UINT A - SOUTH ELEVATION

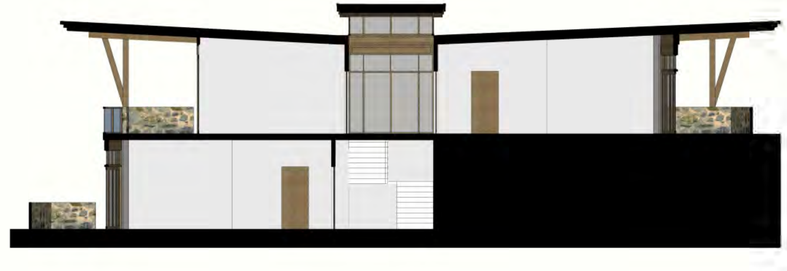
SCALE: 1/8"=1'-0"

7. UINT C - SOUTH ELEVATION

SCALE: 1/8"=1'-0"

10. UNIT A - WEST/ EAST SECTION

SCALE: 1/8"=1'-0"



9. UNIT C - EAST/WEST SECTION

SCALE: 1/8"=1'-0"

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CONSULTANT:

PROJECT NUMBER: *211089*

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Malibu, CA 90265

SHEET TITLE:

UNIT A & C ELEVATIONS & SECTIONS

DRAWN BY: *JMB*

DATE ISSUED: *5.18.2012*

SHEET: **S-26**

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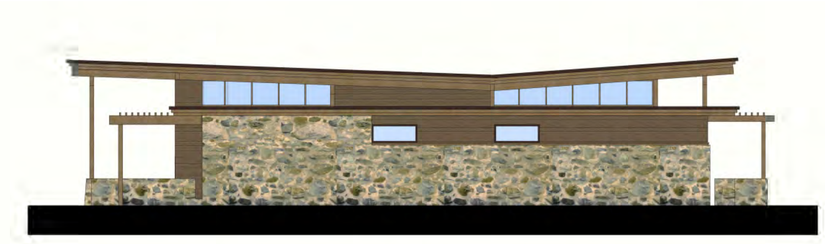
mholt 2:26pm 18 May P:\2011\211089 Malibu Institute\#300 Documents\300 Working CAD Files\211089 S-26 & S-27 Unit Elev.dwg



2. UNIT B - NORTH ELEVATION

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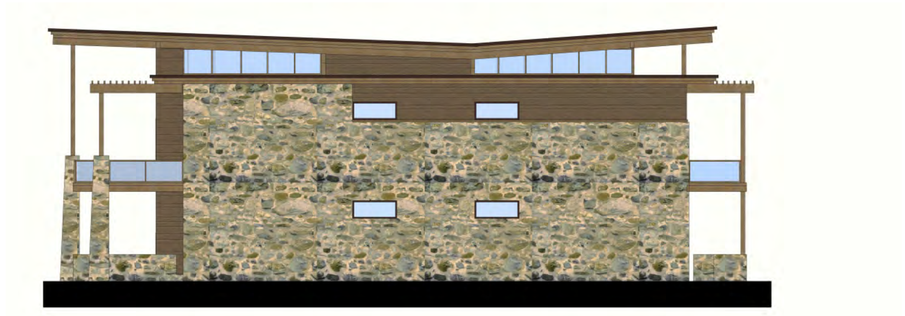


1. UNIT B2 - NORTH ELEVATION

SCALE: 1/8"=1'-0"

6. UNIT B - WEST ELEVATION

SCALE: 1/8"=1'-0"

5. UNIT B - EAST ELEVATION

SCALE: 1/8"=1'-0"

4. UNIT B2 - WEST ELEVATION

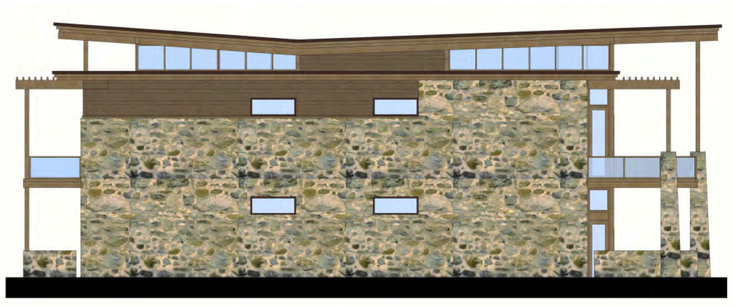
SCALE: 1/8"=1'-0"

3. UNIT B2 - EAST ELEVATION

SCALE: 1/8"=1'-0"

8. UNIT B - SOUTH ELEVATION

SCALE: 1/8"=1'-0"



7. UNIT B2 - SOUTH ELEVATION

SCALE: 1/8"=1'-0"

10. UNIT B - EAST/WEST SECTION

SCALE: 1/8"=1'-0"

9. UNIT B2 - EAST/WEST SECTION

SCALE: 1/8"=1'-0"

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PRELIMINARY
NOT FOR
CONSTRUCTION

CONSULTANT:

PROJECT NUMBER: *211089*

The Malibu Institute

901 Encinal Canyon Road
Malibu, CA 90265

SHEET TITLE:

UNIT B ELEVATIONS & SECTIONS

DRAWN BY: *JMB*
DATE ISSUED: *5.18.2012*

SHEET: **S-27**

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mtdt: 2:21pm 18 May P:\2011\211089 Malibu Institute\300 Documents\300 Working CAD Files\211089 S-26 & S-27 Unit Elev.dwg

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PRELIMINARY
NOT FOR
CONSTRUCTION

CONSULTANT:

PROJECT NUMBER: *211089*

The Malibu Institute

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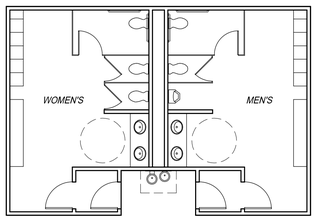
Malibu, CA 90265



1. POOL RESTROOM & CHANGING ROOM FLOOR PLAN
SCALE: 1/8" = 1'-0"

SHEET TITLE:

POOL RESTROOM & CHANGING ROOM FLOOR PLAN

DRAWN BY: *DMJ*
DATE ISSUED: *05.18.2012*

SHEET: ***S-29***

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overson 4:24pm 18 May P:\2011\211089 Malibu Institute\300 Documents\300 Working CAD Files\211089 S-29 Changing Rooms.dwg

Appendix B

Billing Records

Created Date/Time: 09/11/2012 04:00:55 PM
Customer Number: 062120
Account Number: 0000960100
Service Address: 901 ENCINAL CANYON RD
Mailing Address:
MALIBU GOLF CLUB, LLC
901 ENCINAL CYN RD
MALIBU,CA 90265

Service	Read Date	Meter #	Previous	Current	Days	Billed Usage	Units	Average	Ave (gal
Water	8/28/2012 0:00	27800752	999006	28898	62	29892	HCF	482.13	360633
Water	6/27/2012 0:00	27800752	976579	999006	63	22427	HCF	355.98	266273
Water	4/25/2012 0:00	27800752	967890	976579	62	8689	HCF	140.15	104832
Water	2/23/2012 0:00	27800752	961938	967890	64	5952	HCF	93	69564
Water	12/21/2011 0:00	27800752	958394	961938	56	3544	HCF	63.29	47341
Water	10/26/2011 0:00	27800752	939669	958394	64	18725	HCF	292.58	218850
Water	8/23/2011 0:00	27800752	914346	939669	57	25323	HCF	444.26	332306
Water	6/27/2011 0:00	27800752	895797	914346	63	18549	HCF	294.43	220234
Water	4/25/2011 0:00	27800752	890846	895797	62	4951	HCF	79.85	59728
Water	2/22/2011 0:00	27800752	888566	890846	63	2280	HCF	36.19	27070
Water	12/21/2010 0:00	27800752	885070	888566	57	3496	HCF	61.33	45875
Water	10/25/2010 0:00	27800752	867662	885070	63	17408	HCF	276.32	206687
Water	8/23/2010 0:00	27800752	841742	867662	60	25920	HCF	432	323136
Water	6/24/2010 0:00	27800752	821872	841742	59	19870	HCF	336.78	251911
Water	4/26/2010 0:00	27800752	815766	821872	63	6106	HCF	96.92	72496
Water	2/22/2010 0:00	27800752	814486	815766	56	1280	HCF	22.86	17099
Water	12/28/2009 0:00	27800752	808323	814486	62	6163	HCF	99.4	74351
Water	10/27/2009 0:00	27800752	787583	808323	62	20740	HCF	334.52	250221
Water	8/26/2009 0:00	27800752	755111	787583	63	32472	HCF	515.43	385542
Irrigation	6/24/2009 0:00	27800752	731406	755111	62	23705	HCF	382.34	285990

Appendix C

Irrigation Water Projections

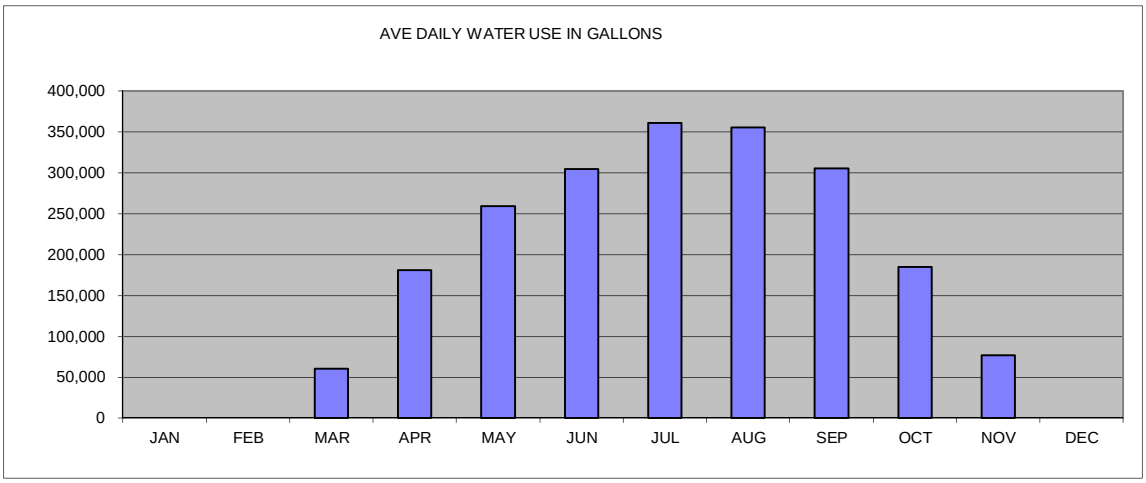
MALIBU COUNTRY CLUB

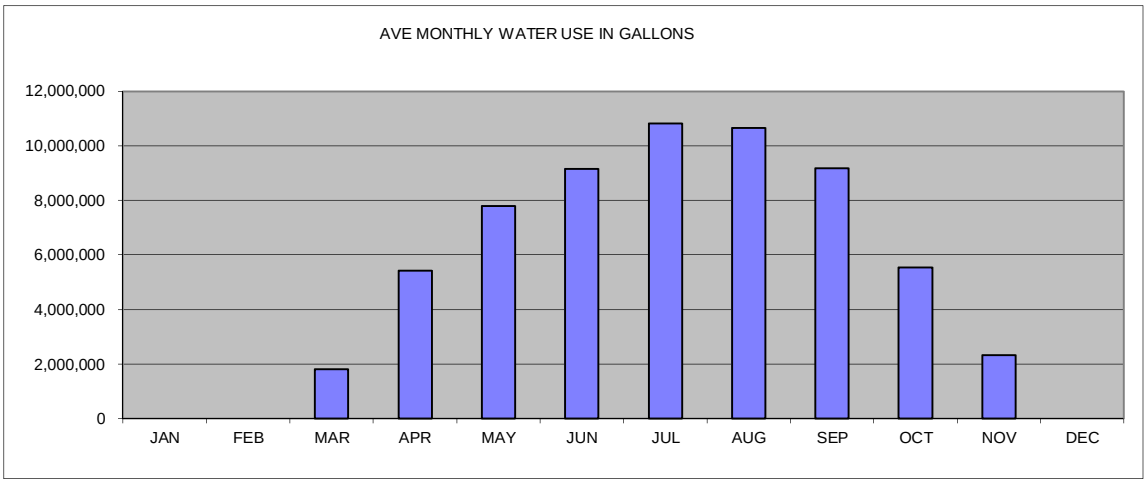
IRRIGATION WATER PROJECTIONS
TOTAL SEASON REQUIREMENTS AND PEAK FLOW
SEASONAL WATER USE

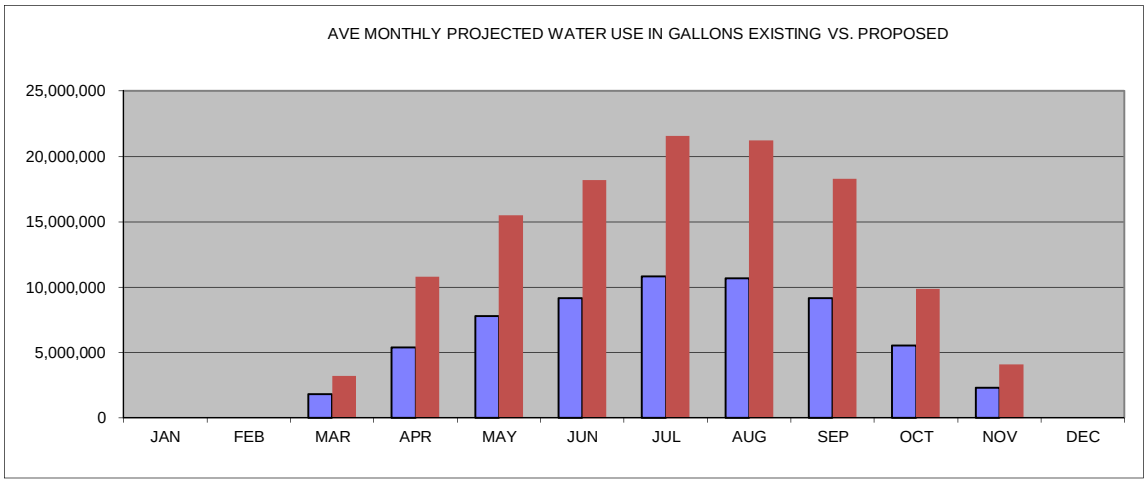
Proposed Development

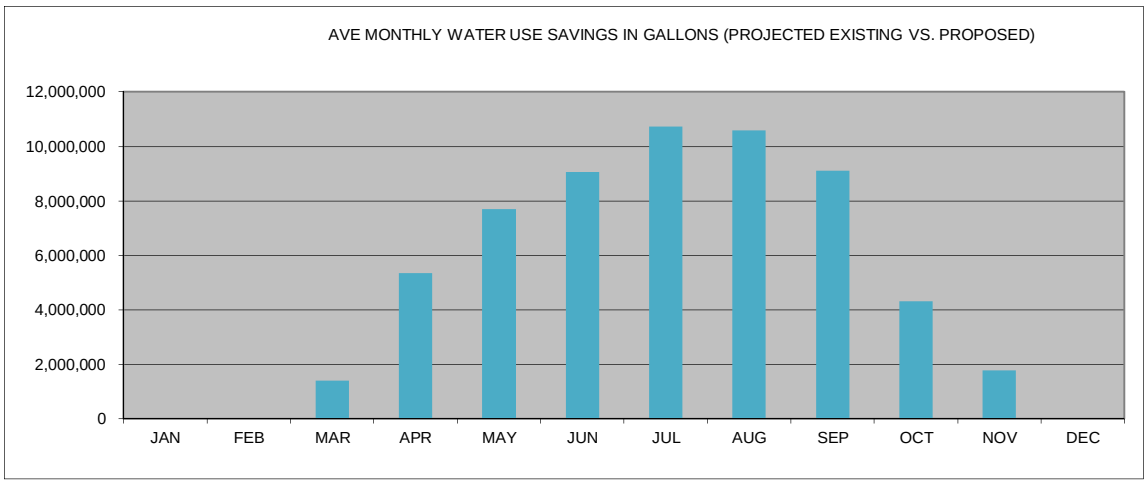
Note: Does not reflect grow-in requirements.

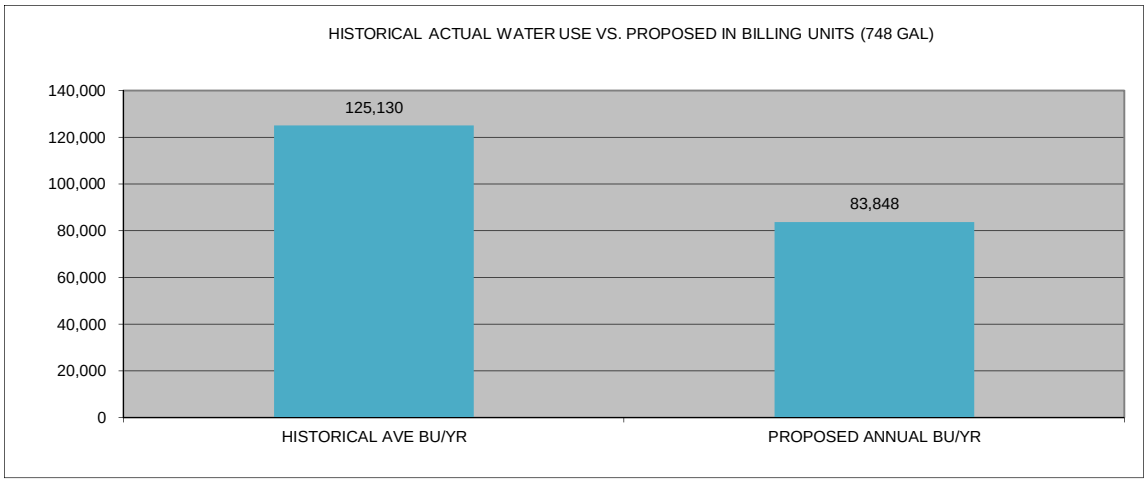
Area Description	Total Area (Sq. Ft.)	Total Area (Acre)	Total Season Req.(Ac.Ft.)	Peak Season Flow(GPM)
TOTAL ALL AREAS				
Warm Season Turf	2,630,000	60.38	177.17	914
Cool Season Turf	110,000	2.53	8.47	44
Native Grasslands	568,560	13.05	0.00	0
Native Reveg	450,000	10.33	0.00	0
Other	0	0.00	0.00	0
Lakes	108,900	2.50	6.85	N/A
TOTAL	3,867,460	88.78	192.49	958
Minimum Pump Station Flow Rate			958	
Safety Factor (15%)			144	
Proposed Pump Station Flow Rate			**1,101**	






AVE MONTHLY PROJECTED WATER USE IN GALLONS EXISTING VS. PROPOSED
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC


AVE MONTHLY WATER USE SAVINGS IN GALLONS (PROJECTED EXISTING VS. PROPOSED)
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC


HISTORICAL ACTUAL WATER USE VS. PROPOSED IN BILLING UNITS (748 GAL)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
125,130
83,848
HISTORICAL AVE BU/YR
PROPOSED ANNUAL BU/YR

MALIBU COUNTRY CLUB
Note: Does not reflect grow-in requirements.

Crop Coefficient	Kc	
	Ave	Overseeded
Warm Season Turf	0.65	
Cool Season Turf	0.65	
Native Grasslands	0.00	
Native Reveg	0.00	
Other	0.60	
Other	0.00	
Lakes	0.84	

Irrigation Window	Hrs
Warm Season Turf	6.0
Cool Season Turf	6.0
Native Grasslands	6.0
Native Reveg	6.0
Other	6.0
Other	6.0
Lakes	16.0

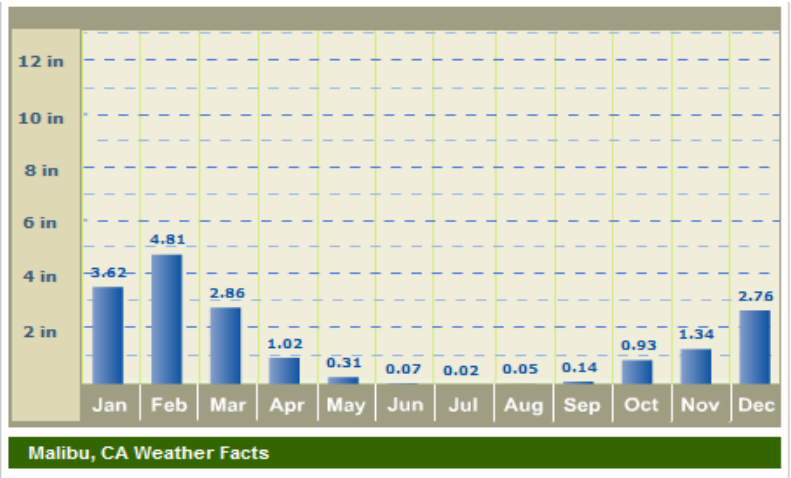
Distribution Uniformity	DU
Warm Season Turf	0.80
Cool Season Turf	0.70
Native Grasslands	0.80
Native Reveg	0.70
Other	0.70
Other	0.70
Lakes	1.00

ETo	Inches
JAN	2.20
FEB	2.60
MAR	3.40
APR	4.50
MAY	5.40
JUN	5.90
JUL	6.70
AUG	6.40
SEP	5.40
OCT	3.90
NOV	2.60
DEC	1.90
TOTAL	50.90

Rain	Inches
JAN	3.62
FEB	4.81
MAR	2.86
APR	1.02
MAY	0.31
JUN	0.07
JUL	0.02
AUG	0.05
SEP	0.14
OCT	0.93
NOV	1.34
DEC	2.76
TOTAL	17.93
EFF RF	75%

Net	Inches
JAN	0.00
FEB	0.00
MAR	1.26
APR	3.74
MAY	5.17
JUN	5.85
JUL	6.69
AUG	6.36
SEP	5.30
OCT	3.20
NOV	1.60
DEC	0.00
TOTAL	39.15

Leaching Factor	
JAN	1.00
FEB	1.00
MAR	1.00
APR	1.00
MAY	1.04
JUN	1.08
JUL	1.12
AUG	1.16
SEP	1.20
OCT	1.20
NOV	1.00
DEC	1.00



Appendix D

Fire Flow Requirement by LACFD

Lippman, David

From: Victor Illig <villig@rceconsult.com>
Sent: Monday, February 11, 2013 3:02 PM
To: Frank Cahill
Subject: FW: TR 71735 - Malibu Institute Subdivision

See below.

Vic Illig

RCE Consultants, Inc.
23332 Mill Creek Drive, Suite 205
Laguna Hills, CA 92653
949.453.0111 Extension 110
Fax: 949.453.0411
Cell: 949.838.4540
villig@rceconsult.com

From: Padilla, Juan [mailto:Juan.Padilla@fire.lacounty.gov]
Sent: Monday, January 28, 2013 10:21 AM
To: Victor Illig
Subject: TR 71735 - Malibu Institute Subdivision

Vic,

Based on the information you provided, the required fire flow for this project will be 2000gpm @ 20psi for 2hrs duration. This requirement is based on the information on the cover letter which states the Institute Building being a total 49,058sf and the construction type being Type IV. The floor plan states the Institute Building being 39,091sf but no construction type information is provided.

In order to resolve the outstanding Fire Department holds per the latest subdivision committee report, I would like to set up a field inspection with you to perform a walk through of the site. This should provide better visuals of the existing topography and the location of future buildings in relationship to the required access.

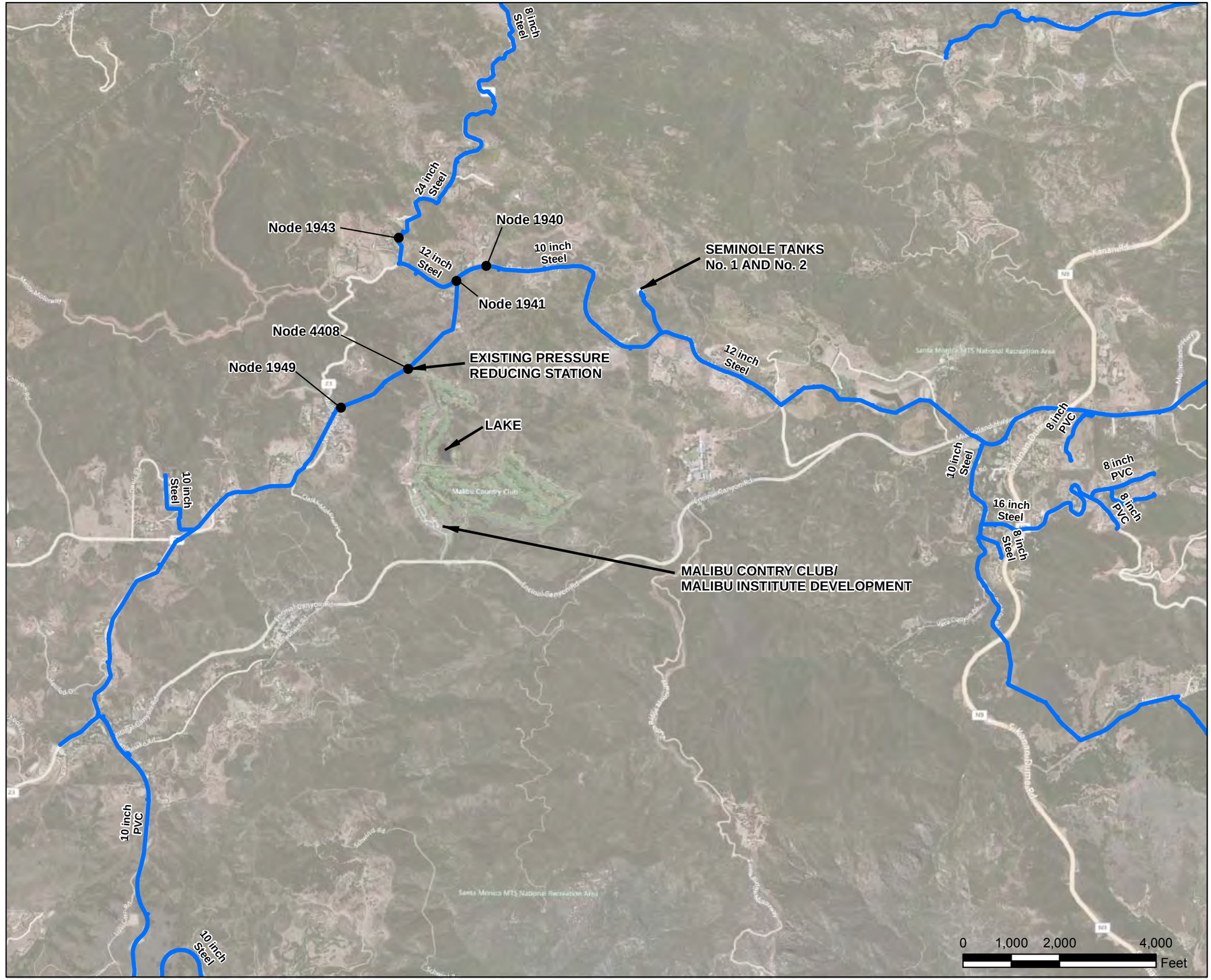
The following are some days that will work for me; Jan 30th, Feb 5th, Feb 6th, or Feb 7th. I would like to meet around 10am. Let me know so we can set up this appointment.

Thank you,

Juan C. Padilla
County of Los Angeles Fire Department
Fire Prevention Division
Land Development Unit
323-890-4243

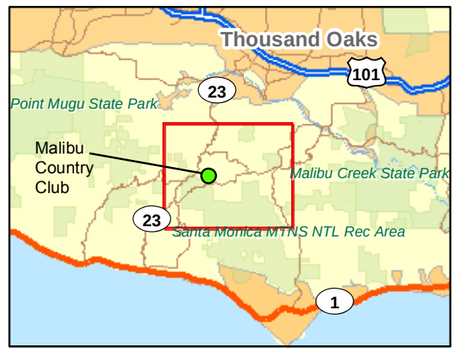
From: Victor Illig [mailto:villig@rceconsult.com]
Sent: Thursday, January 24, 2013 3:34 PM

Plates



LEGEND

EXISTING PIPE



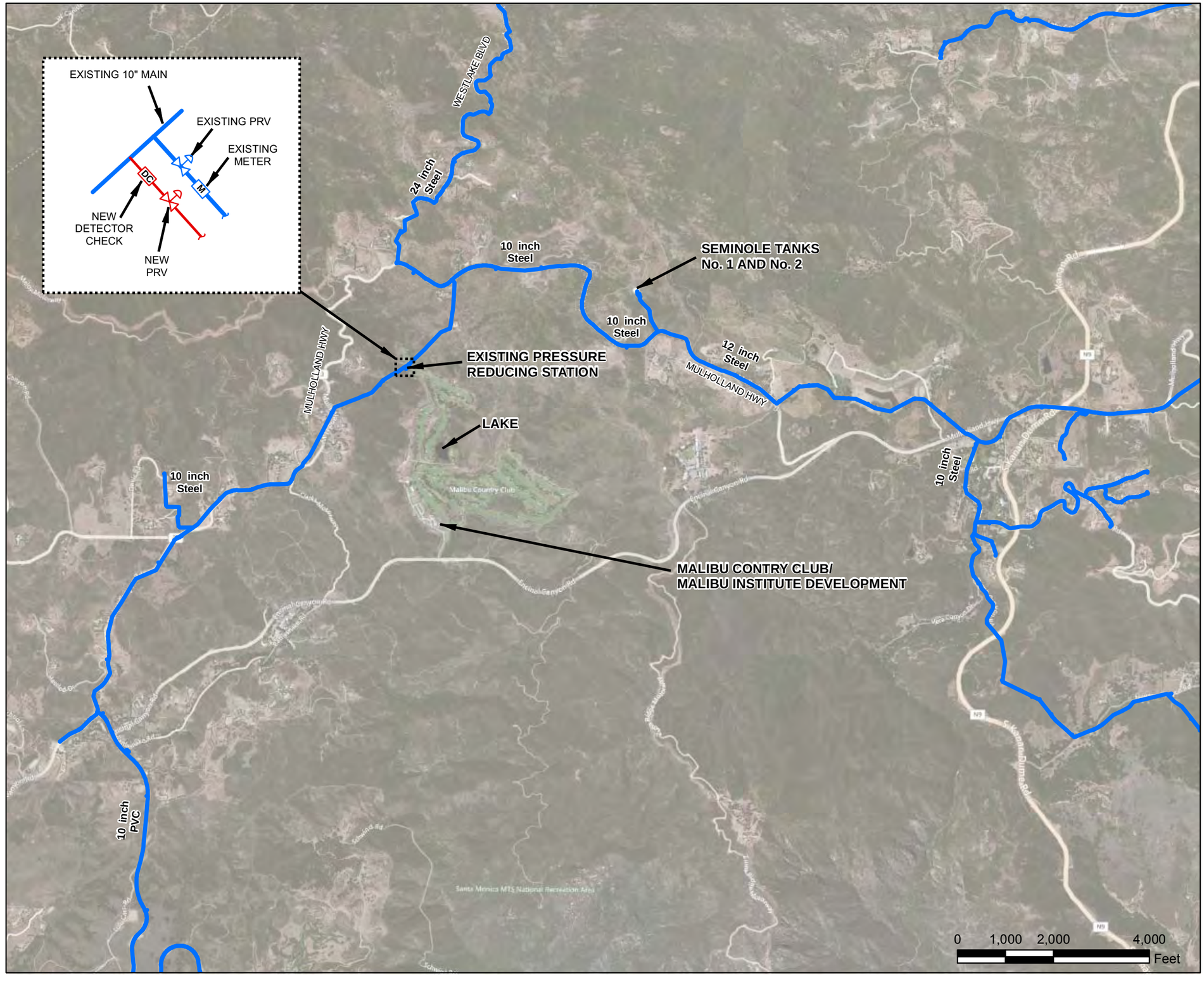
AECOM

Las Virgenes Municipal Water District

Malibu Institute Development

EXISTING POTABLE WATER SYSTEM

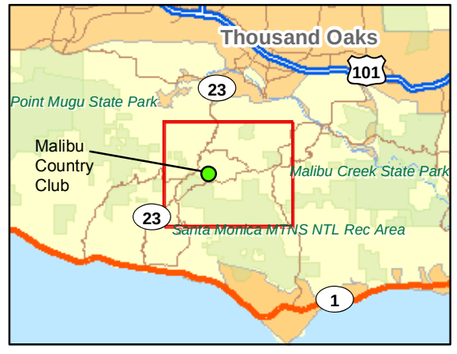
60274327	September 2012	**Plate 1**



N
W E
S

LEGEND

- EXISTING PIPE
- M — EXISTING METER
- EXISTING PRV
- DC — NEW DETECTOR CHECK PER LVMWD STP. PLAN PW-109
- NEW PRV



AECOM

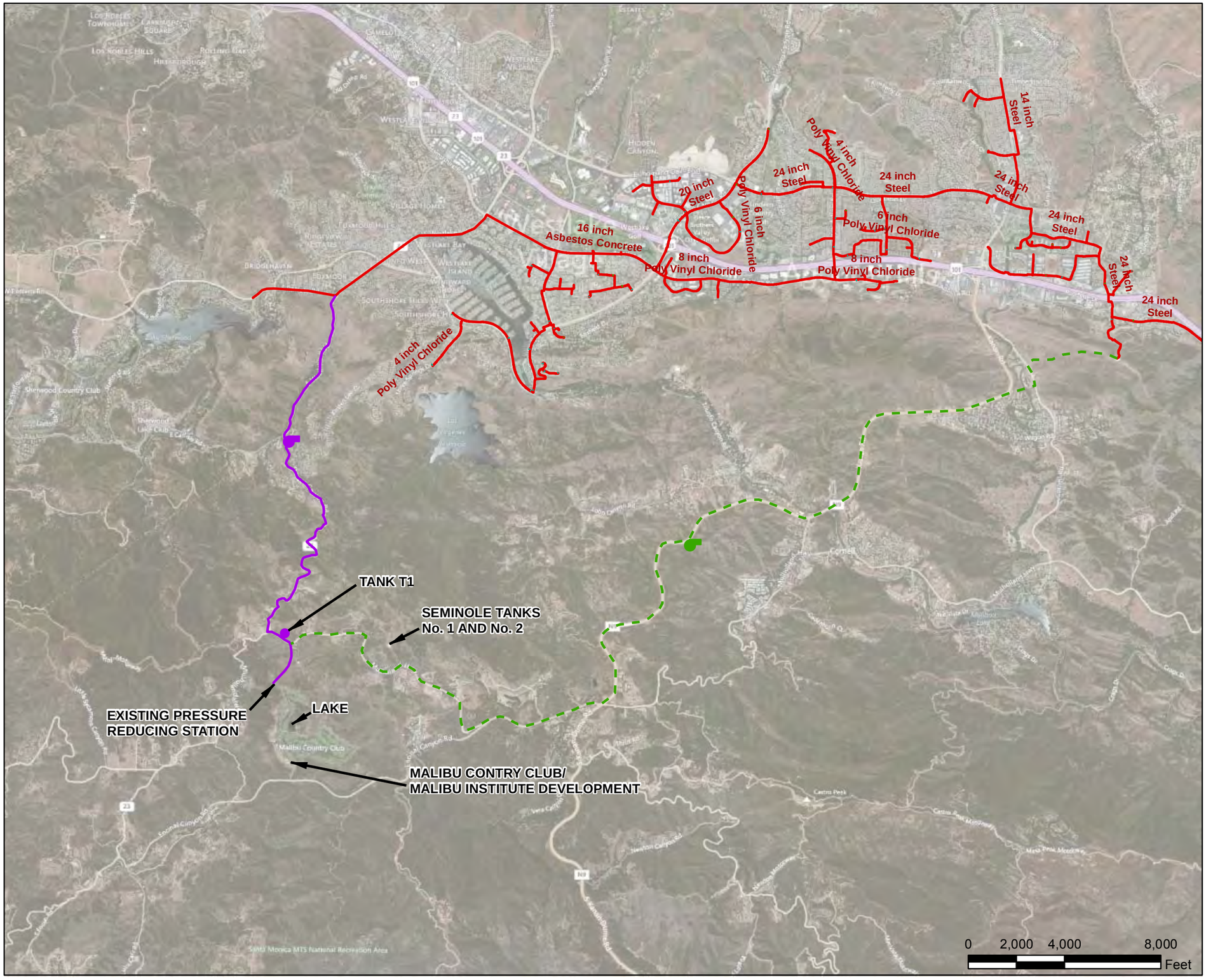
Las Virgenes Municipal Water District

Malibu Institute Development

EXISTING AND PROPOSED POTABLE WATER SYSTEM

60274327	February 2013	**Plate 2**

Path: V:\LVMWD\GIS Files\Malibu_Potable Water newline-Feb2013.mxd



N

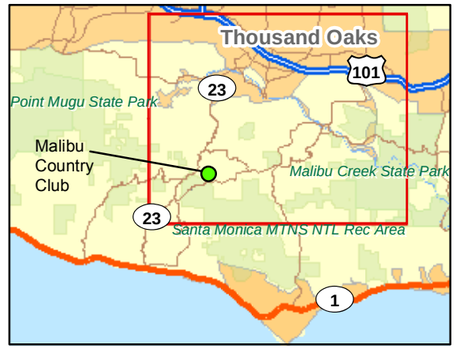
W E

S

LEGEND

- EXISTING PIPELINE
- PROPOSED PIPELINE
- PROPOSED ALTERNATIVE PIPELINE
- PROPOSED PUMP STATION
- PROPOSED ALTERNATIVE PUMP STATION
- PROPOSED TANK

NOTE:
PROPOSED IMPROVEMENTS ARE BASED ON THE FINDINGS OF LVMWD REPORT NO. 263.00 (MALIBU GOLF COURSE RECYCLED WATER SERVICE STUDY).



AECOM

Las Virgenes Municipal Water District

Malibu Institute Development

EXISTING AND PROPOSED RECYCLE WATER SYSTEM

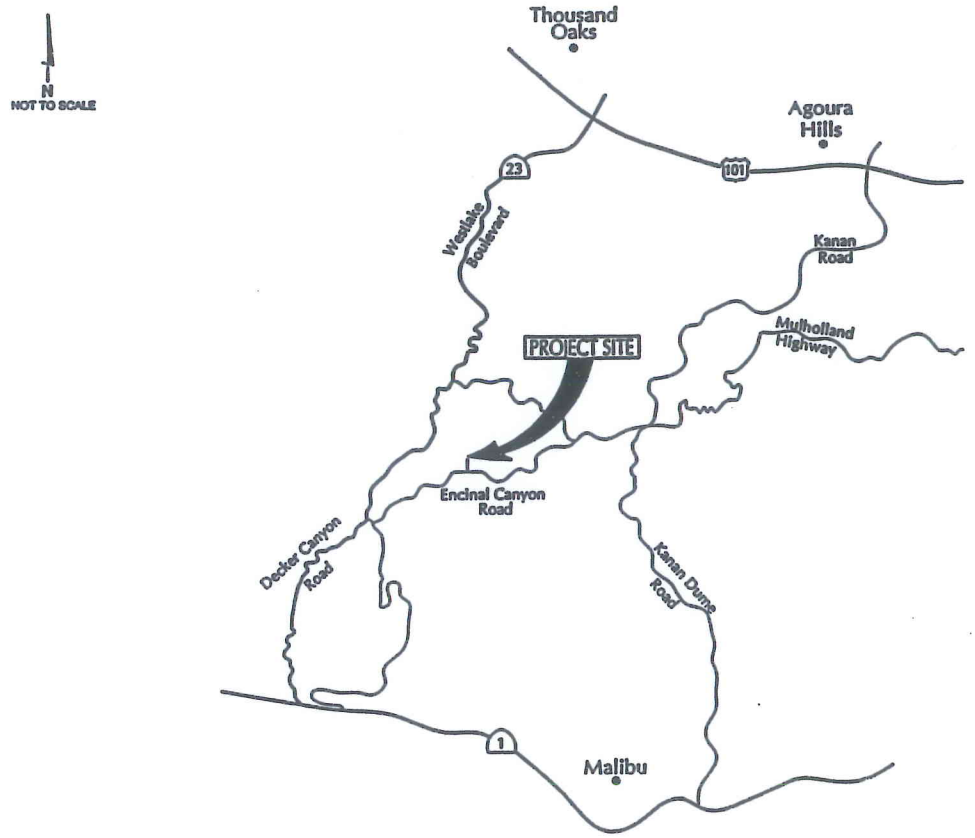
60274327	September 2012	**Plate 3**

Appendix H

Traffic and Circulation Study, Associated Transportation Engineers, September 13, 2013

MALIBU INSTITUTE PROJECT
COUNTY OF LOS ANGELES, CALIFORNIA

TRAFFIC AND CIRCULATION STUDY



September 13, 2013 **ATE #11067**

Prepared For:

Envicom
28328 Agoura Road
Agoura Hills, CA 91301

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100 N. Hope Avenue, Suite 4, Santa Barbara, CA 93110-1686 • (805) 687-4418 • FAX (805) 682-8509

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Since 1978

Richard L. Pool, P.E.
Scott A. Schell, AICP, PTP

September 13, 2013

11067R04.wpd

Primo Tapia
Envicom
28328 Agoura Road
Agoura Hills, CA 91301

TRAFFIC AND CIRCULATION STUDY FOR THE MALIBU INSTITUTE PROJECT - COUNTY OF LOS ANGELES, CALIFORNIA

Associated Transportation Engineers (ATE) has prepared the following traffic and circulation study for the for the Malibu Institute Project, located in the unincorporated Malibu area of Los Angeles County. It is our understanding that this report will be included in the traffic section of the project's environmental documents. The following report address comments made by the Los Angeles County Department of Public Works on the initial traffic report that was prepared by ATE in December of 2012 and March of 2013.

We appreciate the opportunity to assist you with this project.

Associated Transportation Engineers

By: Scott A. Schell, AICP, PTP
Principal Transportation Planner

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INTRODUCTION

The following study contains an analysis of potential traffic and circulation impacts associated with the Malibu Institute Project, located in the unincorporated Malibu area of Los Angeles County. The study provides information relative to existing and future traffic conditions within the vicinity of the project site. The project's access, circulation and parking system is also reviewed. A section analyzing the project's potential to impact the Los Angeles County Congestion Management Program (CMP) facilities is provided.

PROJECT DESCRIPTION

The project is proposing to develop an educational retreat facility at the existing Malibu Golf Club, located at 901 Encinal Canyon Road. The existing golf club contains an 18-hole golf course, a clubhouse, restaurant, and bar which are open to the public. The retreat facility would include 40 bungalows, each with 4 bedrooms (160 total rooms) and a shared entertainment area for overnight accommodations, as well as on-site educational facilities. An updated and redesigned golf course with a new clubhouse and restaurant would continue to be open to the public. It is anticipated, however, that public use of the golf course would be reduced as guests staying at the retreat would have priority for rounds of golf during their stay. The educational retreat would be designed to accommodate groups of guests attending multi-day educational events. The project proposes to provide a shuttle service for guests arriving at the airports located in the Los Angeles area (LAX and Burbank) and for groups located in the region. Vehicular access to the project site is provided via the Clubhouse Drive/Encinal Canyon road intersection. A total of 387 parking spaces are proposed on site that would be shared between the Malibu Institute and the golf course. The project's location within the County is shown in Figure 1. Figure 2 presents the project site plan.

SCOPE OF TRAFFIC STUDY

The trip generation, trip distribution, level of service methodologies, study-area intersections, growth factors, etc., used in this study were developed through consultation with Los Angeles County Department of Public Works. A copy of the scope of work Memorandum of Understanding (MOU) that was approved by the Los Angeles County Department of Public Works is included in the Technical Appendix for reference. Pursuant to Los Angeles County Traffic Impact Analysis Report Guidelines[1], the following traffic scenarios are analyzed:

- Existing Conditions (Year 2012)
- Existing + Project
- Existing + Related Projects + Project (Cumulative + Project)

[1] Traffic Impact Analysis Report Guidelines, Los Angeles County Department of Public Works, January 1997.

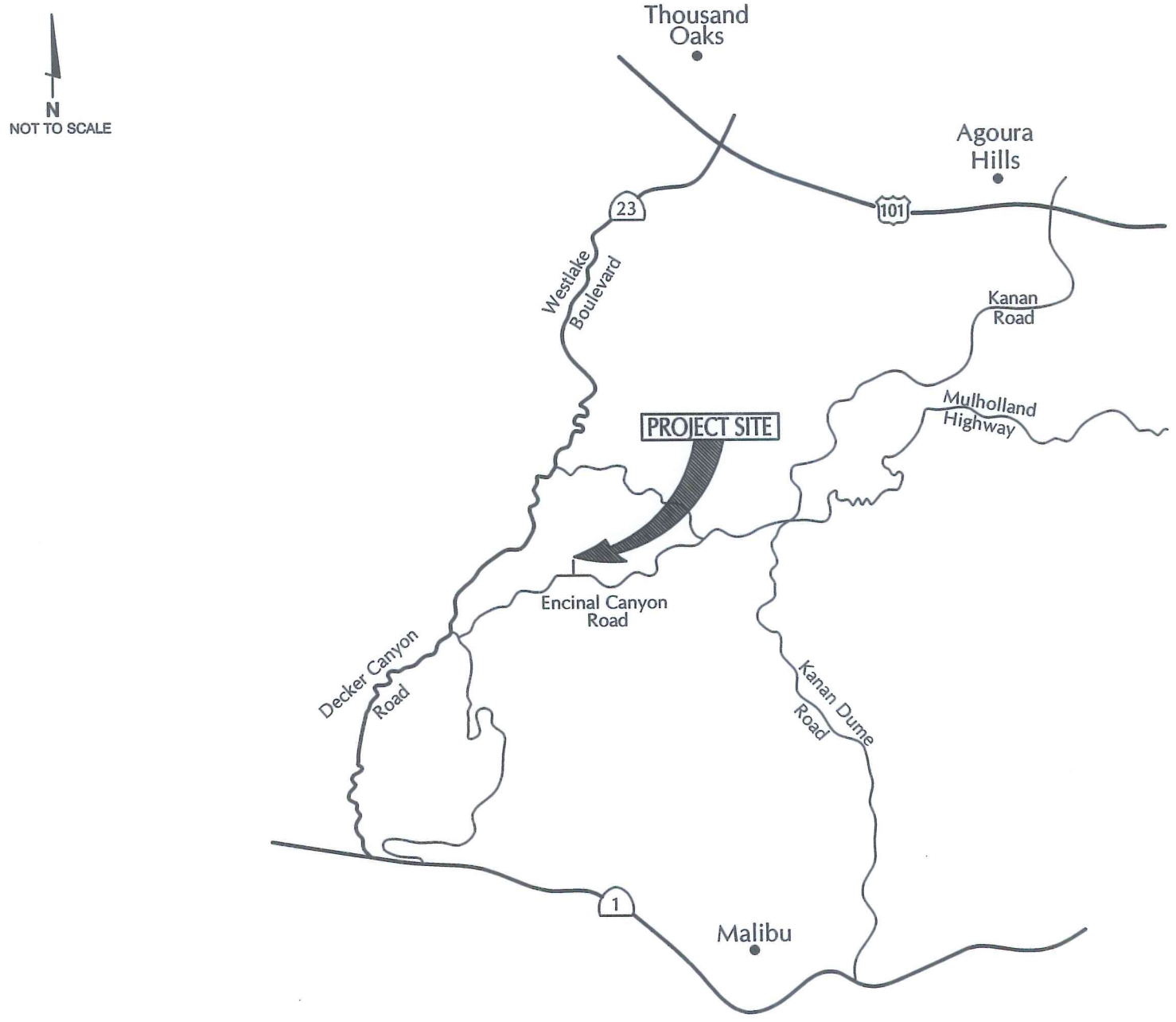


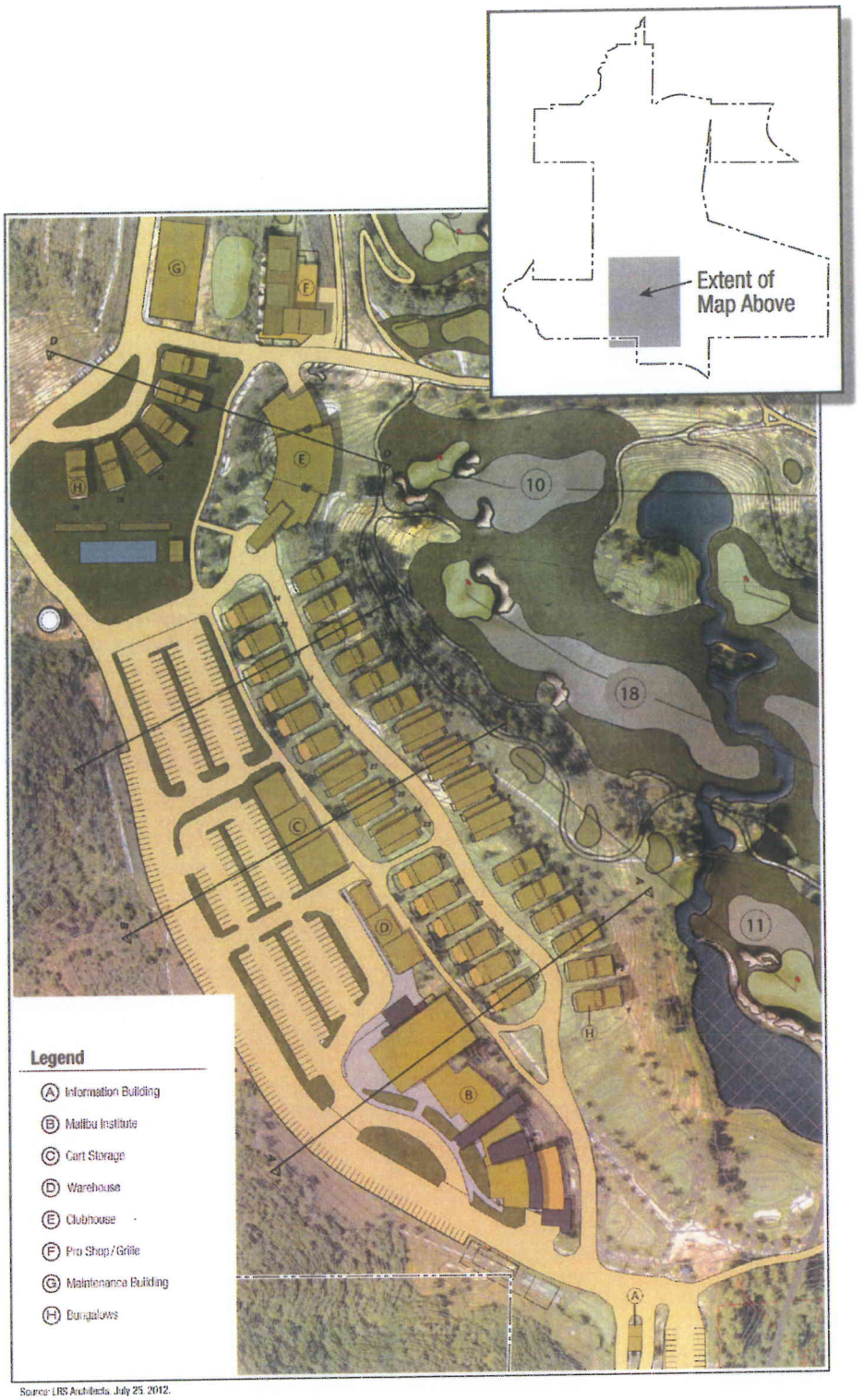
FIGURE 1

PROJECT SITE LOCATION AND EXISTING STREET NETWORK

ASSOCIATED TRANSPORTATION ENGINEERS

MMF - #11067

N
NOT TO SCALE



ASSOCIATED TRANSPORTATION ENGINEERS

PROJECT SITE PLAN

FIGURE 2

MMF - #11067

In addition to Los Angeles County, the traffic analysis includes intersections located in the adjacent jurisdictions of the City of Agoura Hills and the City of Malibu. Table 1 lists the study-area intersections and corresponding jurisdiction. Figure 3 presents the existing lane geometries and traffic controls for the study-area intersections.

Table 1
Study-Area Intersections

Intersection	Jurisdiction
1. Decker Canyon Road (SR23)/Lechusa Road	Los Angles County
2. Lechusa Road/Encinal Canyon Road	Los Angles County
3. Encinal Canyon Road/Clubhouse Drive	Los Angles County
4. Encinal Canyon Road/Kanan Road	Los Angles County
5. U.S. 101 NB Ramps-Canwood Street/Kanan Road	City of Agoura Hills
6.U.S. 101 SB Ramps-Roadside Drive/Kanan Road	City of Agoura Hills
7. Pacific Coast Highway (SR 1)/Kanan Dume Road	City of Malibu

EXISTING CONDITIONS

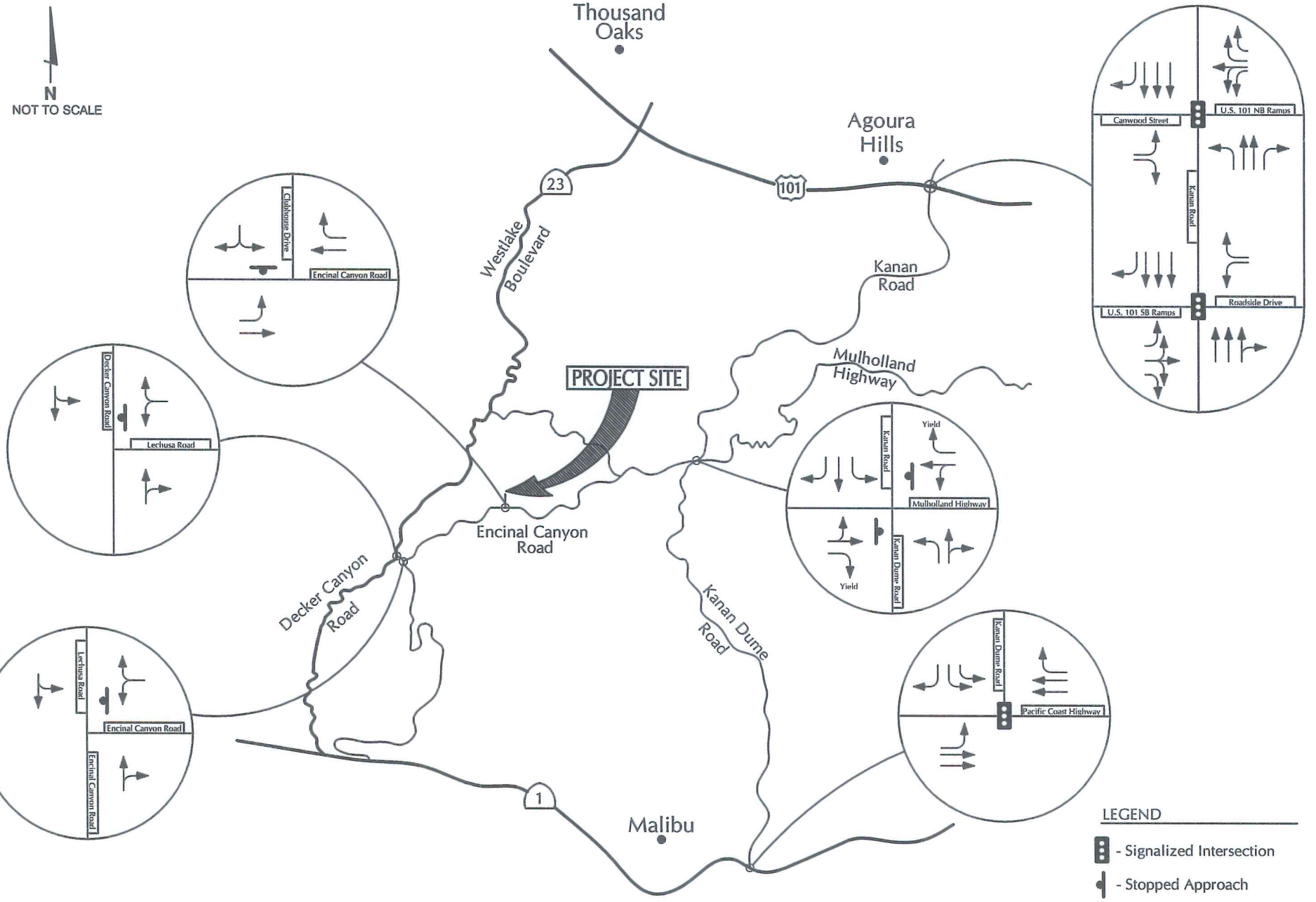
Existing Street Network

The project site is served by a network of highways, arterial streets and collector streets, as illustrated in Figure 1. The following text provides a brief discussion of the major components of the study-area street network.

U.S. Highway 101, located north of the project site, is a multi-lane interstate highway serving the Pacific Coast between the City of Los Angeles and the State of Washington. Access between the site and U.S. Highway 101 is provided via the Westlake Boulevard (SR23) interchange to the west and the Kanan Road (County Highway N9) interchange to the east.

Pacific Coast Highway (State Route 1), is an east-west state highway that extends along the Pacific Coast. The Pacific Coast Highway (PCH) connects the City of Oxnard on the west to the City of Santa Monica on the east.

State Route 23, located west of the project site, is a two-lane highway that extends as Westlake Boulevard from the Thousand Oaks area on the north to the western Malibu region on the south. South of its intersection with Mulholland Highway, SR 23 continues as Decker Canyon Road until its terminus at the PCH.



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EXISTING LANE GEOMETRY AND TRAFFIC CONTROLS

FIGURE 3

MMF - #11067

Kanan Road (Los Angeles County Highway N9), located east of the project site, is a two-lane County maintained highway that extends south from the Agoura Hills area to the central Malibu region. South of its intersection with Mulholland Highway, the roadway continues as Kanan Dume Road until terminating at the PCH.

Encinal Canyon Road, located south of the project site, is a two-lane road that extends southwesterly from Mulholland Highway until its terminus at the PCH. Encinal Canyon Road provides access to the project via its connection with Clubhouse Drive.

Existing Roadway Operations

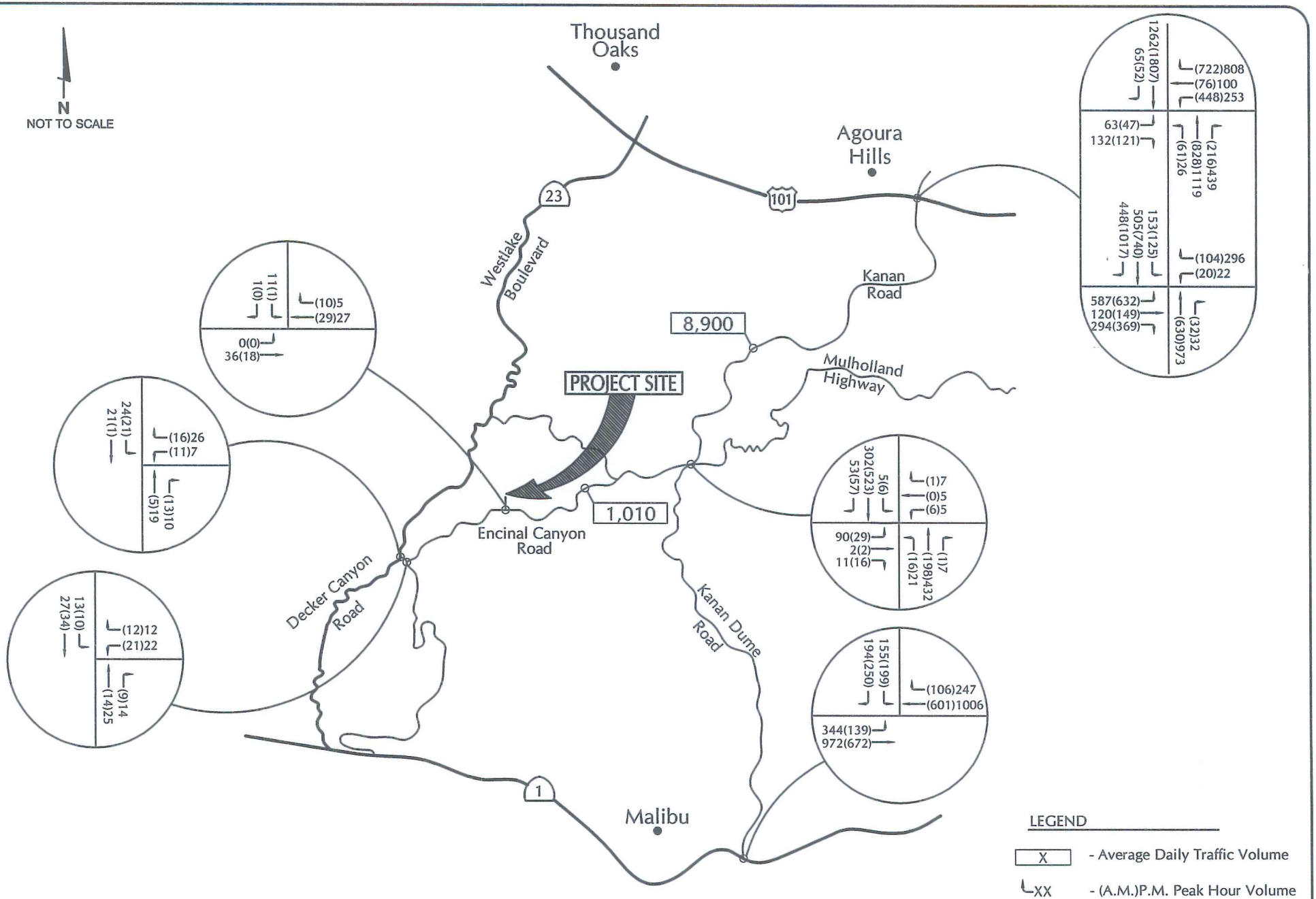
Existing average daily traffic (ADT) volumes for the study-area roadway segments were obtained through traffic counts conducted in September of 2012 for this study. Figure 4 presents the Existing ADT volumes. "Levels of Service" (LOS) A through F are used to rate operations, with LOS A indicating free flow operations and LOS F indicating congested operations (more complete definitions of levels of service are included in the Technical Appendix). Table 2 presents the Existing levels of service (LOS) for the study-area roadways.

Table 2
Existing Roadway Operations

Roadway Segment	Roadway Classification	Number of Lanes	Roadway Capacity	Existing ADT	LOS
Encinal Canyon Road @ Clubhouse Drive	Limited Secondary Highway	2	18,000 (a)	1,010	LOS A
Kanan Road n/o Mulholland Highway	Limited Secondary Highway	2	18,000 (a)	8,900	LOS A

(a) Equates to LOS E operations.

The data presented in Table 2 show that the study-area roadways currently operate at LOS A.



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EXISTING TRAFFIC VOLUMES

FIGURE 4

MMF - #11067

Existing Intersection Operations

Because traffic flow is most constrained at intersections, detailed traffic flow analyses focus on the operating conditions of critical intersections during peak travel periods. Figure 4 presents the Existing A.M. and P.M. peak hour traffic volumes for the key intersections within the study area. Existing peak hour traffic volumes were derived from traffic counts collected for this study in September of 2012 and March 2013 as well as traffic count data obtained from the City of Malibu (traffic count data is contained in the Technical Appendix). Levels of service were calculated for the study-area intersections using the Intersection Capacity Utilization (ICU) methodology pursuant to Los Angeles County, City of Agoura Hills, and City of Malibu requirements (calculation worksheets are contained in the Technical Appendix for reference). Table 3 presents the Existing A.M. and P.M. peak hour levels of service for the study-area intersections.

Table 3
Existing Intersection Operations

Intersection	Control	A.M. Peak		P.M. Peak	
		V/C	LOS	Delay	LOS
Decker Canyon Road/Lechusa Road	2-Way Stop	0.142	A	0.167	A
Lechusa Road/Encinal Canyon Road	2-Way Stop	0.163	A	0.170	A
Encinal Canyon Road/Clubhouse Drive	2-Way Stop	0.119	A	0.131	A
Mulholland Highway/Kanan Road	2-Way Stop	0.460	A	0.441	A
U.S. 101 NB Ramps/Kanan Road	Signal	0.688	B	0.629	B
U.S. 101 SB Ramps/Kanan Road	Signal	0.481	A	0.615	B
PCH/Kanan Dume Road	Signal	0.437	A	0.677	B

As shown in Table 3, the study-area intersections operate in the LOS A to B range during the peak periods. These operations are considered acceptable based on Los Angeles County, City of Agoura Hills, and City of Malibu standards.

THRESHOLDS OF SIGNIFICANCE

The project study-area includes three jurisdictions: the County of Los Angeles, the City of Agoura Hills, and the City of Malibu. The thresholds of significance and impact criteria for each jurisdiction are outlined in the following section.

County of Los Angeles Roadway Impact Thresholds

The County of Los Angeles has established criteria which are used to evaluate the traffic impacts resulting from construction of a project. The project is considered to generate a significant impact to 2-lane roadways when it adds the following percentages based on LOS of the pre-project conditions.

Two-Lane Roadway Impact Thresholds				
		Pre-Project Level of Service		
Directional Split	Peak Hour Capacity	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%

County of Los Angeles Intersection Impact Thresholds

Impacts to intersections are considered significant if the project-related increase in the volume to capacity (V/C) ratio equals or exceeds the thresholds shown below.

Intersection Impact Thresholds		
Pre-Project		
LOS	V/C	Project V/C Increase
C	0.71 - 0.80	0.04 or more
D	0.81 - 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

City of Agoura Hills Intersection Impact Thresholds

A significant impact at a signalized intersection would occur when a proposed project increases traffic demand by:

- 4% or greater (V/C increase $\geq$ 0.04) at a facility that would operate at LOS C with project-generated traffic volumes.
- 2% or greater (V/C increase $\geq$ 0.02) at a facility that would operate at LOS D with project-generated traffic volumes.
- 1% or greater (V/C increase $\geq$ 0.01) at a facility that would operate at LOS E/F with project-generated traffic volumes.

City of Malibu Intersection Impact Thresholds

A significant impact would result if an intersection operating at LOS D, E, or F with a V/C ratio of greater than 0.800 would experience a project-related V/C ratio increase equal to, or greater than, 0.020.

PROJECT-SPECIFIC ANALYSIS

Project Trip Generation

Trip generation estimates were developed for the project based on the rates presented in the Institute of Transportation Engineers (ITE) Trip Generation report.[2] The rates for Resort Hotel (Land Use Code #330) were selected as the best fit as the resort hotel rates are based on studies of facilities that provide extensive amenities where guests are more likely to stay on-site rather than leave for activities.

At the request of Los Angeles County Department of Public Works staff, the trip generation estimates assume 160 individual rooms rather than the 40 bungalow units that are proposed. As noted in the project description, the bungalows would be rented out to groups and the rooms within the bungalows would not be rented out individually. Thus the majority of the guests staying in the bungalows would travel together to the site rather than driving individually (see Technical Appendix for further information on retreat operations). Furthermore, the analysis assumes no credit for the proposed shuttle system which will transport groups to and from the educational retreat. The trip generation forecasts presented in the analysis are therefore very conservative and overstate actual project traffic generation levels. Table 4 presents the trip generation estimates for the project.

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2 Trip Generation, Institute of Transportation Engineers 9th Edition, 2012.

Table 4
Malibu Institute Project Trip Generation Estimates

Land Use	Size	ADT		A.M. Peak Hour		P.M. Peak Hour	
		Rate	Trips	Rate	Trips (In/Out)	Rate	Trips (In/Out)
Resort Hotel	160 Rooms	6.24 (a)	998	0.37	59 (42/17)	0.49	78 (34/44)

(a) There is no ADT rate for Resort Hotels. The ADT rate was derived from the ITE Hotel rates (Land Use Code #310). The ADT rate for ITE Hotel Rooms is 12.74 x P.M. peak hour rate. Thus, ADT rate for Resort Hotels = 12.74 x 0.49 = 6.24.

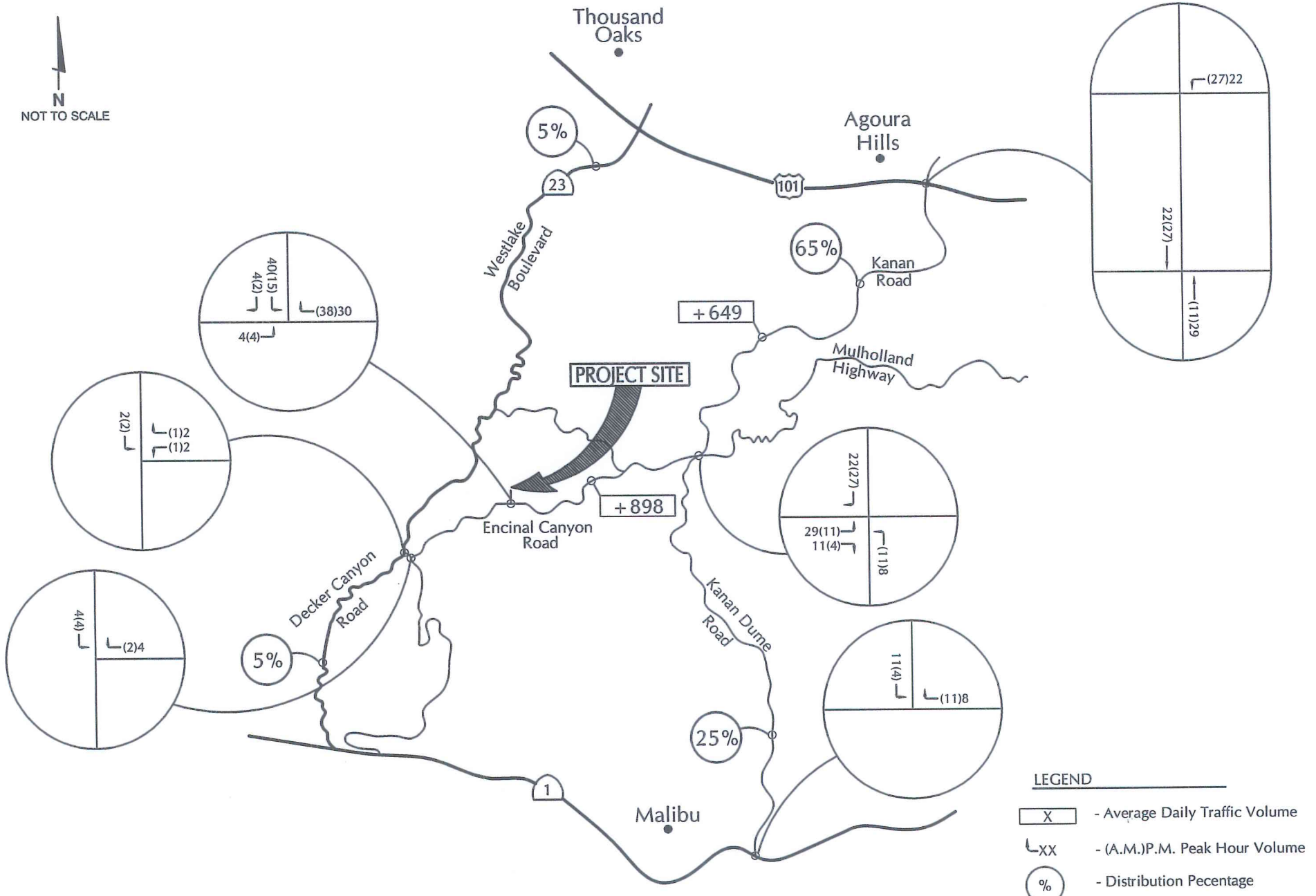
The data presented in Table 4 indicate that the Malibu Institute Project would generate 998 average daily trips, 59 A.M. peak hour trips and 78 P.M. peak hour trips.

Application of the ITE Resort Hotel rates likely overestimates the trip generation for the project given the remote location of the site in the Malibu hills as well as the unique operations of the educational retreat. As reviewed in the project description, the Malibu Institute will be designed to accommodate groups that would use the facility for multi-day educational retreats. Thus, application of the ITE Resort Hotel rates may produce higher trip estimates than anticipated because guests would be focused on educational seminars and would travel off-site with less frequency than a typical resort hotel.

Furthermore, while the golf course will remain open to the public, public usage is anticipated to decrease as a result of the project as guests staying at the resort facility would have first priority for use of the golf course. The analysis assumes no credit for the anticipated reduction in trips for the golf course in order to provide a conservative analysis.

Project Trip Distribution

Trip distribution percentages were developed for the project based on observations of traffic flows at the Encinal Canyon Road/Clubhouse Drive and Kanan Road/Encinal Canyon Road intersections and the anticipated origins of the guests staying at the educational retreat. The trip distribution percentages are shown in Table 5 and in Figure 5.



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PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

FIGURE 5

MMF - #11067

Table 5
Project Trip Distribution

Origin/Destination	Direction	Percentage
Kanan Road	North (to U.S. 101/Agoura Hills) South (to SR1/Malibu-Santa Monica)	65% 25%
Decker Canyon Road (SR 23)	North (to U.S. 101/Thousand Oaks) South (to SR1/Malibu)	5% 5%
Total		**100%**

Existing + Project Road Operations

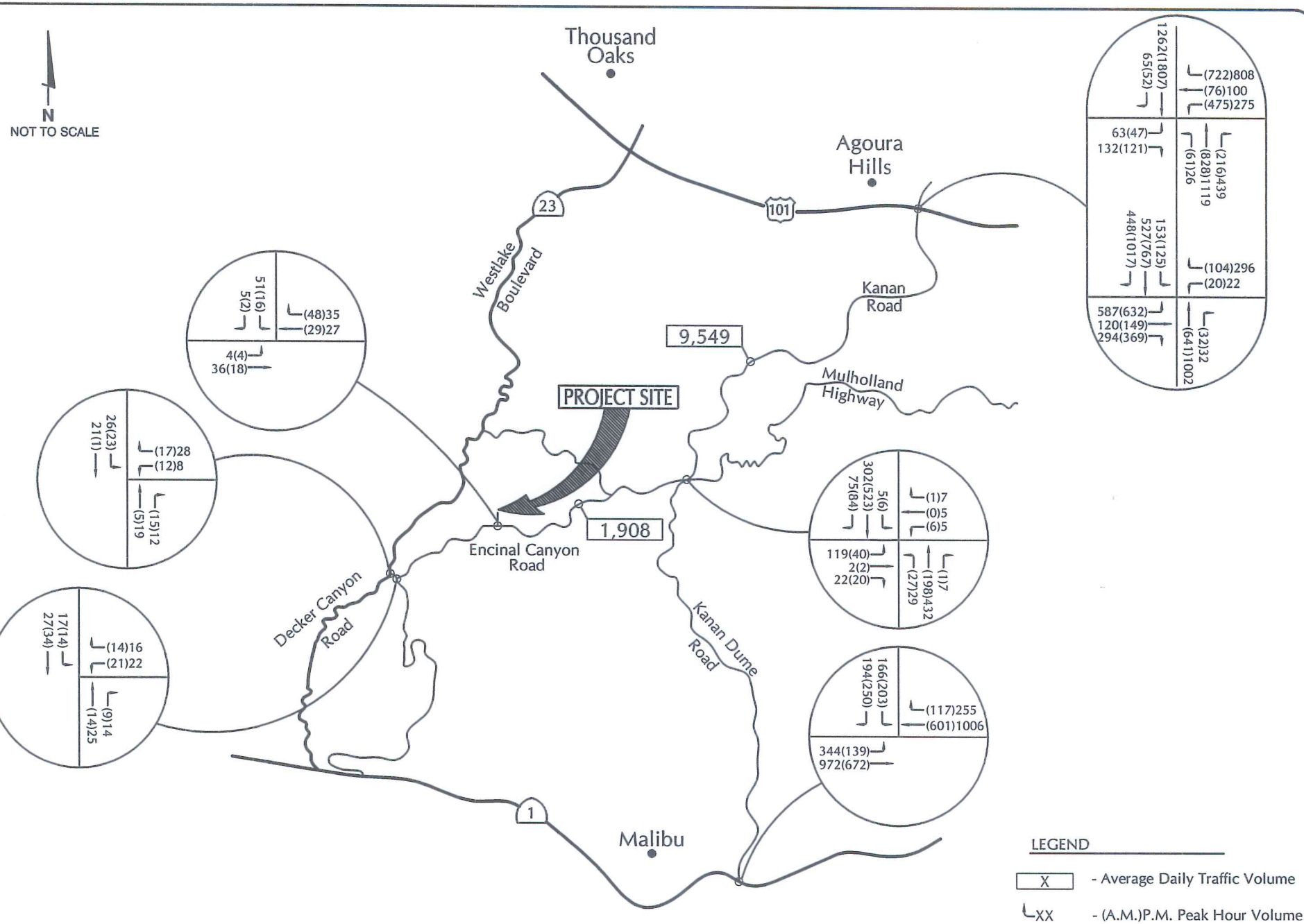
Existing + Project traffic volumes are presented on Figure 6. Table 6 compares the Existing and Existing + Project roadway forecasts and identifies project-specific impacts based on the County's roadway standards.

Table 6
Existing + Project Roadway Operations

Roadway Segment	ADT				LOS	Project Impact?
	Roadway Capacity (a)	Existing	Project Added	Existing + Project		
Encinal Canyon Road @ Clubhouse Drive	18,000	1,010	+898	1,908	LOS A	No
Kanan Road n/o Encinal Canyon Road	18,000	8,900	+649	9,549	LOS A	No

(a) Equates to LOS E operations.

As shown in Table 6, the study-area roadways are forecast to operate at LOS A with Existing + Project traffic volumes. The project would not significantly impact the study-area roadway segments based on County thresholds.



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EXISTING + PROJECT TRAFFIC VOLUMES

FIGURE 6

MMF - #11067

Existing + Project Intersection Operations

Levels of service were calculated for the study-area intersections assuming the Existing + Project traffic volumes presented on Figure 7. Tables 7 and 8 compare the Existing and Existing + Project levels of service and identify project-specific impacts based on the applicable thresholds.

Table 7
Existing + Project Levels of Service - A.M. Peak Hour

Intersection	V/C / LOS		Project Added		Project Impact?
	EX	EX + PR	Trips	V/C	
Decker Canyon Road/Lechusa Road	0.142/LOS A	0.146/LOS A	6	0.004	No
Lechusa Road/Encinal Canyon Road	0.163/LOS A	0.166/LOS A	6	0.003	No
Encinal Canyon Rd/Clubhouse Drive	0.119/LOS A	0.129/LOS A	59	0.010	No
Mulholland Highway/Kanan Road	0.460/LOS A	0.474/LOS A	53	0.014	No
U.S. 101 NB Ramps/Kanan Road	0.688/LOS B	0.698/LOS B	27	0.010	No
U.S. 101 SB Ramps/Kanan Road	0.481/LOS A	0.483/LOS A	38	0.002	No
PCH/Kanan Dume Road	0.437/LOS A	0.438/LOS A	15	0.001	No

Table 8
Existing + Project Levels of Service - P.M. Peak Hour

Intersection	V/C / LOS		Project Added		Project Impact?
	EX	EX + PR	Trips	V/C	
Decker Canyon Road/Lechusa Road	0.167/LOS A	0.171/LOS A	8	0.004	No
Lechusa Road/Encinal Canyon Road	0.170/LOS A	0.176/LOS A	8	0.006	No
Encinal Canyon Rd/Clubhouse Drive	0.131/LOS A	0.158/LOS A	78	0.027	No
Mulholland Highway/Kanan Road	0.441/LOS A	0.459/LOS A	70	0.018	No
U.S. 101 NB Ramps/Kanan Road	0.629/LOS B	0.629/LOS B	22	0.000	No
U.S. 101 SB Ramps/Kanan Road	0.615/LOS B	0.621/LOS C	51	0.006	No
PCH/Kanan Dume Road	0.677/LOS B	0.681/LOS B	19	0.004	No

The data presented in Tables 7 and 8 show that the study-area intersections are forecast to continue operating at LOS C or better during the peak hour periods with Existing + Project traffic. The project's traffic additions would not generate impacts to the study-area intersections based on the Los Angeles County, City of Agoura Hills, and City of Malibu thresholds.

SITE ACCESS AND CIRCULATION

Access to the project site is provided via Clubhouse Drive, which also provides access to the Malibu Golf Club. Clubhouse Drive is 48-feet wide with two 20-foot travel lanes that are separated by a 8-foot raised median. Adequate sight distance is provided at the intersection to allow vehicles to safely enter and exit the site. The operational analysis completed for the project show that the Clubhouse Drive/Encinal Canyon Road intersection is forecast to operate at LOS A under Cumulative + Project traffic volumes. Based on this analysis, Clubhouse Drive will adequately accommodate project-related traffic.

PARKING

The project is proposing to provide a total of 378 parking spaces that will be shared between the Malibu Institute and the golf course. The total parking supply meets the County's Zoning Ordinance parking requirements for the individual uses for both sites, however the individual parking lots do not satisfy the parking requirements for the individual parcels, as the majority of the parking spaces are located on the Malibu Institute lot (County Zoning Ordinance parking requirements are contained in the Technical Appendix for reference). The project is therefore requesting a permit to authorize shared parking between the Malibu Institute and

the golf course in order to satisfy the overall parking requirements for the project. It is also anticipated that on-site parking demands would be significantly less than the code requirements due to the operation of the Malibu Institute. For example, many guests would arrive via shuttle and would not park on-site (shuttle operations are reviewed in the following section), also the conference center would be used primarily by Malibu Institute guests, and many Malibu Institute guests would use the golf course.

SHUTTLE SERVICE OPERATIONS

The Malibu Institute is proposing to provide a shuttle service for guests arriving at the airports located in the Los Angeles area (LAX and Burbank) and for groups located in the region. The following section outlines the operations of the proposed shuttle service.

Shuttle Operations. The Malibu Institute shuttle program will provide a shuttle service for all guests utilizing the educational retreat facilities. The shuttle service will be advertised as part of the Malibu Institute's package of services to groups that book the facility. The shuttles will be available to transport groups to and from area airports (primarily the LAX and Burbank Airports). The shuttle service will operate on a reservation system that would be used at the time the facility is booked for the educational retreat events. The shuttle service will also be available to transport local groups located in the greater southern California region to and from the site for the educational retreats.

Hours of operation: The shuttle vans will make scheduled trips from the Malibu Institute to pick up and drop-off guests from the early morning (6:00 A.M.) to the late evening (11:00 P.M.) periods and would be booked through a reservation system as described above. Shuttle service would be available 7-days a week.

Shuttle Fleet: The Malibu Institute will utilize 14-passenger shuttle vans designed specifically for the hotel/airport industry. The shuttle program will start with a fleet of four shuttle vans and thus would have a combined capacity of 56 passengers. The size of the shuttle fleet would be adjusted as needed to meet the demands of the guests.

Shuttle Routes: The proposed route from the site to the LAX Airport would be Encinal Canyon Road east to Mulholland Highway east to Kanan Dume Road south to the PCH and east to the airport. The route to the Burbank Airport (and other southern California locations) would be from Encinal Canyon Road east to Mulholland Highway to Kanan Road to U.S. Highway 101 and east to the airport. The routes are illustrated on figures contained in the Technical Appendix. The round trip time for these routes is estimated at 2 to 3 hours. With 4 shuttle vans, both airports could be served with at least two shuttle vans on any given day.

Shuttle Staging Areas: Several convenient shuttle loading/unloading areas would be incorporated in the design of the project site. The shuttles would utilize the existing shuttle stops available at the area airports to pick-up and drop-off passengers.

CUMULATIVE ANALYSIS

Cumulative Traffic Forecasts

Cumulative traffic volume forecasts were developed based on a list of related projects located within the surrounding areas of Los Angeles County as well as the cities of Malibu and Agoura Hills. Trip generation estimates for the related projects were developed based on rates contained in the ITE Trip Generation report. The cumulative project lists and trip generation calculations are contained in the Technical Appendix for reference. Figure 7 presents the related project-added traffic volumes. The traffic generated by the related projects was added to the Existing volumes and the resulting "Cumulative" volumes are presented on Figure 8. Existing + Related Projects + Project (Cumulative + Project) volumes are shown on Figure 9.

Cumulative + Project Roadway Operations

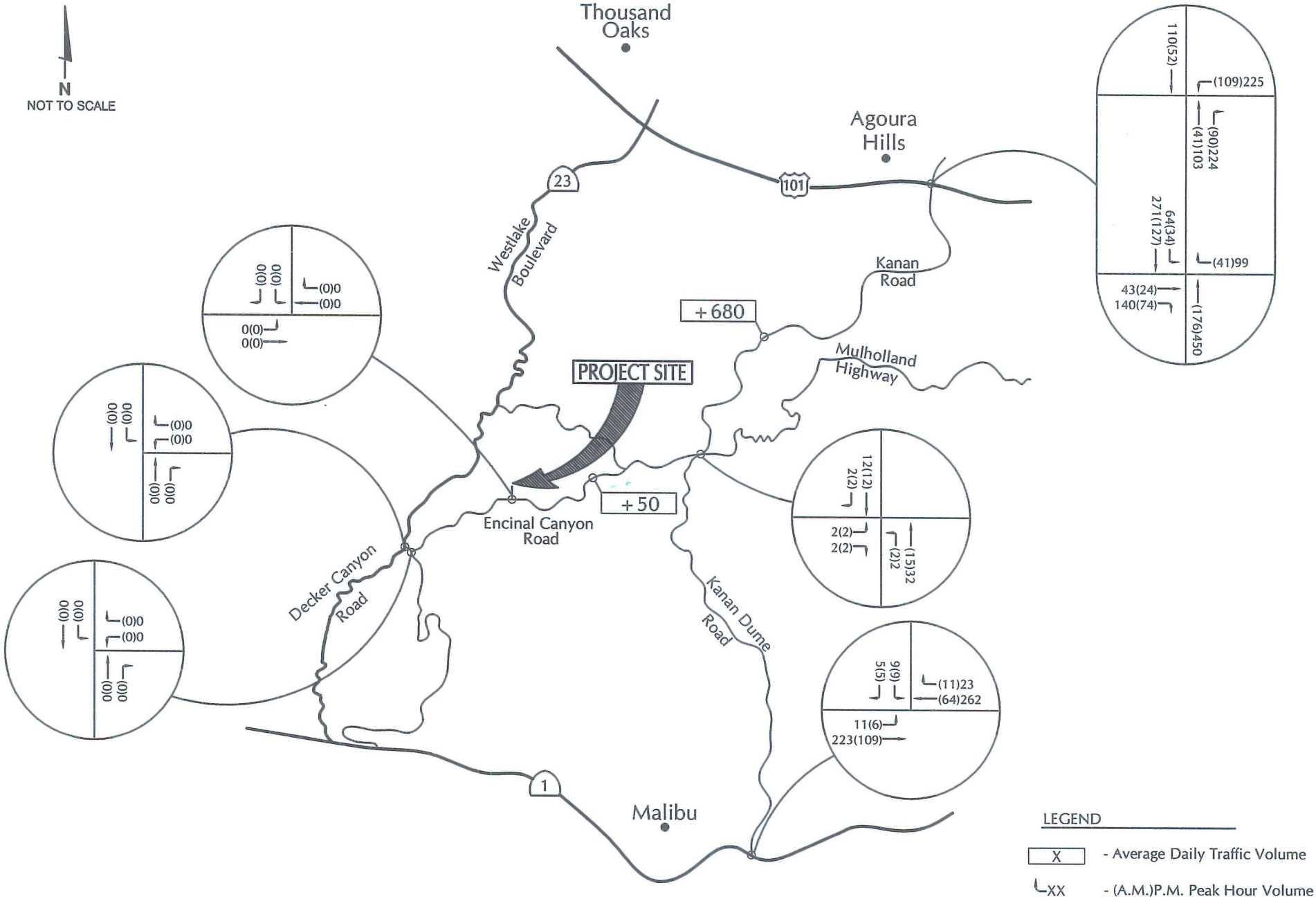
Table 9 compares the Cumulative and Cumulative + Project roadway forecasts and identifies cumulative impacts based on the County's roadway standards.

Table 9
Cumulative + Project Roadway Operations

Roadway Segment	ADT			LOS	Cumulative Impact?
	Roadway Capacity (a)	Cumulative + Project ADT	Project-Added ADT		
Encinal Canyon Road @ Clubhouse Drive	18,000 ADT	2,038 ADT	+898 ADT	LOS A	No
Kanan Road n/o Encinal Canyon Road	18,000 ADT	10,929 ADT	+649 ADT	LOS A	No

(a) Equates to LOS E operations.

As shown in Table 9, the study-area roadways are forecast to operate at LOS A with Cumulative + Project traffic volumes. The project would not contribute to significant cumulative roadway impacts based on County thresholds.



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RELATED PROJECT-ADDED TRAFFIC VOLUMES

FIGURE 7

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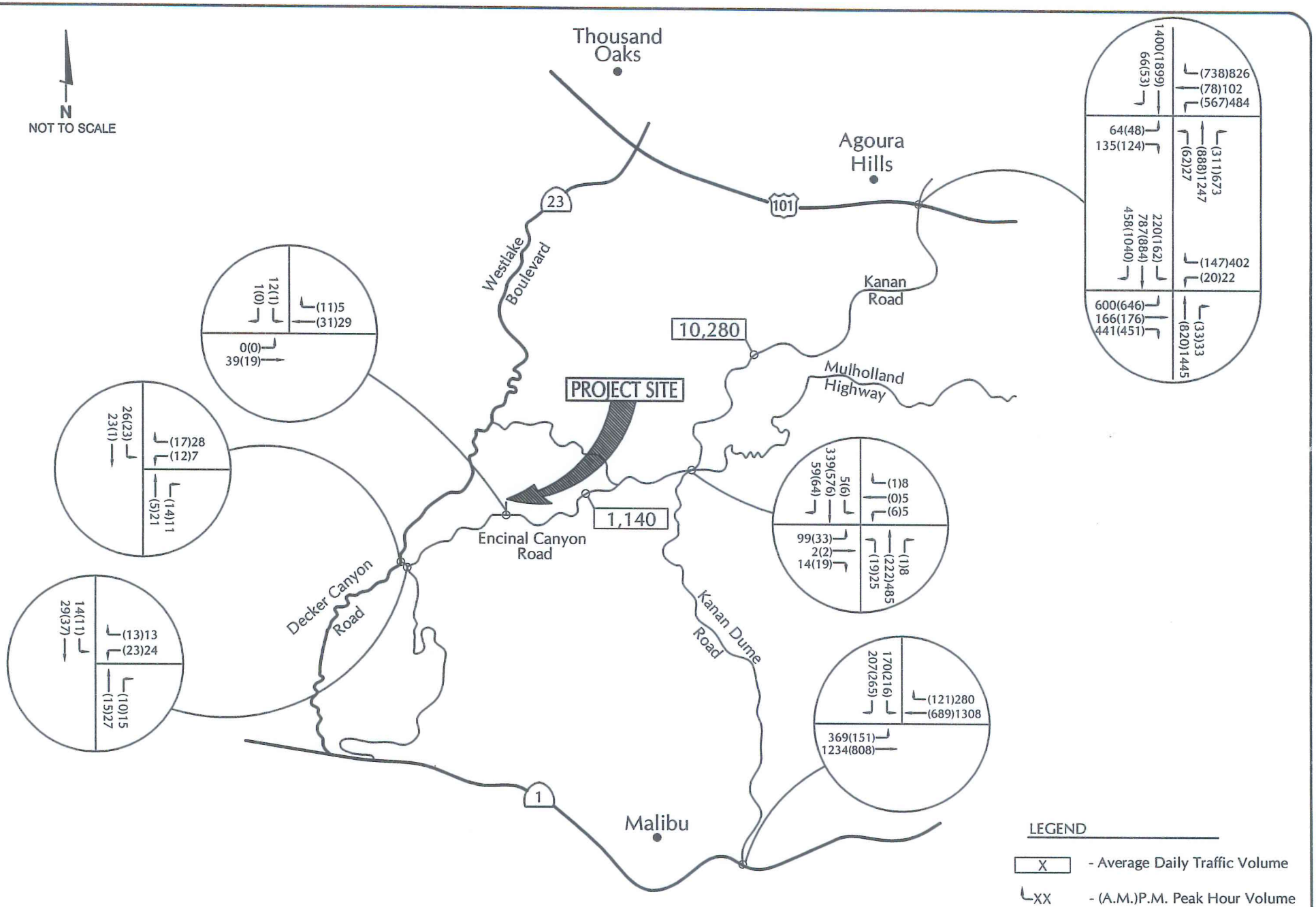

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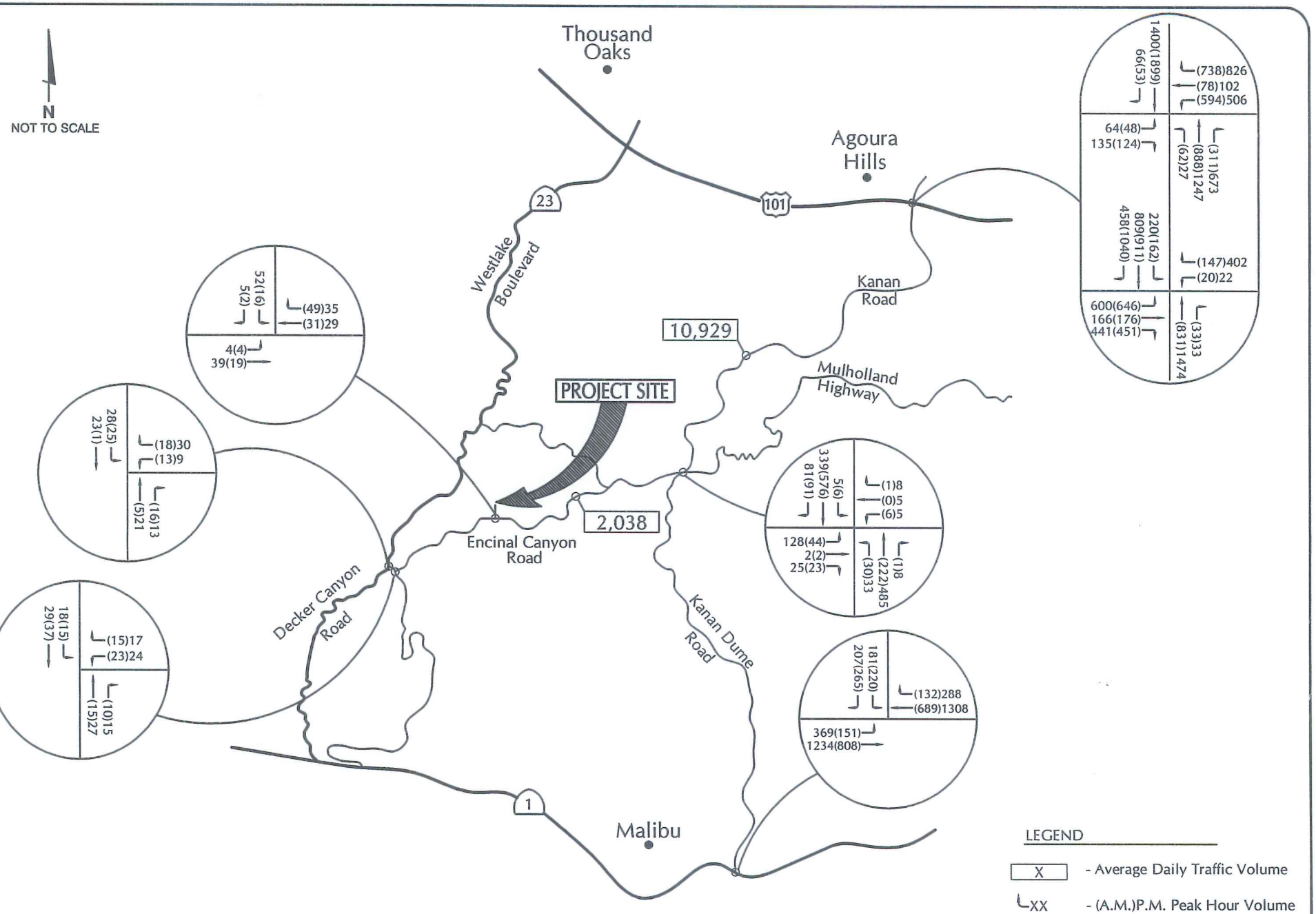
CUMULATIVE TRAFFIC VOLUMES

FIGURE 8

MMF - #11067



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CUMULATIVE + PROJECT TRAFFIC VOLUMES

FIGURE 9

MMF - #11067

Cumulative Intersection Operations

Levels of service were calculated for the study-area intersections assuming the Existing volumes and the Existing + Related Projects + Project (Cumulative + Project) traffic volumes. Tables 10 and 11 present the levels of service forecasts for these scenarios and identify the significance of the Project's traffic additions to the cumulative impacts based on the applicable thresholds (Los Angeles County, City of Agoura Hills, and City of Malibu).

Table 10
Cumulative + Project Intersection Operations - A.M. Peak Hour

Intersection	V/C / LOS		Cumulative + Project-Added V/C	Exceed Threshold?	Project-Added	
	Existing	Cumulative + Project			Trips	V/C
SR 23/Lechusa Road	0.142/LOS A	0.146/LOS A	0.004	No	6	0.004
Lechusa Road/Encinal Canyon Road	0.163/LOS A	0.166/LOS A	0.003	No	6	0.003
Encinal Canyon Rd/Clubhouse Drive	0.119/LOS A	0.129/LOS A	0.010	No	59	0.010
Mulholland Highway/Kanan Road	0.460/LOS A	0.484/LOS A	0.024	No	53	0.014
U.S. 101 NB Ramps/Kanan Road	0.689/LOS B	0.747/LOS C	**0.058**	**Yes**	27	0.009
U.S. 101 SB Ramps/Kanan Road	0.481/LOS A	0.553/LOS A	0.072	No	38	0.002
PCH/Kanan Dume Road	0.437/LOS A	0.465/LOS A	0.028	No	15	0.001

Bolded items exceed County of Los Angeles thresholds.

Table 11
Cumulative + Project Intersection Operations - P.M. Peak Hour

Intersection	V/C / LOS		Cumulative + Project-Added V/C	Exceed Threshold?	Project-Added	
	Existing	Cumulative + Project			Trips	V/C
SR 23/Lechusa Road	0.167/LOS A	0.171/LOS A	0.004	No	8	0.004
Lechusa Rd./Encinal Canyon Rd.	0.170/LOS A	0.176/LOS A	0.006	No	8	0.006
Encinal Canyon Rd./Clubhouse Dr.	0.131/LOS A	0.158/LOS A	0.027	No	78	0.027
Mulholland Highway/Kanan Rd.	0.441/LOS A	0.480/LOS A	0.039	No	70	0.018
U.S. 101 NB Ramps/Kanan Road	0.590/LOS A	0.686/LOS B	0.096	No	22	0.007
U.S. 101 SB Ramps/Kanan Road	0.615/LOS B	**0.805/LOS D**	**0.190**	**Yes**	51	0.006
PCH/Kanan Dume Road	0.677/LOS B	0.773/LOS C	**0.096**	**Yes**	19	0.004

Bolded items exceed County of Los Angeles thresholds.

The data presented in Tables 10 and 11 show that the development of the related projects would generate cumulative impacts at the U.S. 101 NB Ramps/Kanan Road intersection during the A.M. peak period and the U.S. 101 SB Ramps/Kanan Road and PCH/Kanan Dume Road intersections during the P.M. peak hour period based on the County's thresholds. Cumulative mitigation measures are discussed in the following section. It is noted that the project's traffic additions would not exceed the cumulative impact thresholds for the City of Agoura Hills and the City of Malibu.

Mitigation Measures

The U.S. 101 NB Ramps/Kanan Road and PCH/Kanan Dume Road intersections are forecast to operate at LOS C with Existing + Related Projects + Project traffic volumes. Caltrans and the Cities of Agoura Hills and Malibu consider LOS C operations acceptable thus no cumulative mitigations are required at these two locations.

The U.S. 101 Southbound Ramps/Kanan Road intersection is forecast to operate at LOS D under Existing + Related Projects + Project traffic volumes, which is considered unacceptable based on Caltrans and the City of Agoura Hills operating standards. The Agoura Village

Specific Plan EIR[3] has identified a mitigation measure for this intersection in order to bring operations to an acceptable level with cumulative traffic volumes. The mitigation measure included widening the northbound approach to provide a third though-lane and restriping the southbound approach to provide an additional left-turn lane. The westbound approach would also be widened to accommodate the dual southbound left-turns. It is noted that the northbound approach has recently been restriped to provide the third through-lane and is accounted for in the traffic analysis. A detailed discussion of the design and feasibility of the mitigation measure was presented in the Agoura Village Specific Plan EIR and is presented in the Technical Appendix for reference. Schematic figures showing the design of the mitigation measure are also contained in the Technical Appendix. Table 12 compares the Existing + Related Projects + Project LOS with and without the proposed improvements.

Table 12
U.S. 101 NB Ramps/Kanan Road Mitigated P.M. Peak Hour Intersection Operations

Intersection	V/C / LOS		
	Existing	Existing + Related Projects + Project (Existing Geometry)	Existing + Related Projects + Project (w/ Improvements)
U.S. 101 SB Ramps/Kanan Road	0.567LOS A	0.805/LOS D	0.737/LOS C

The data presented in Table 12 indicate that the U.S. 101 SB Ramp/Kanan Road intersection would operate at LOS C with the planned improvements. These operations are considered acceptable based on Caltrans and the City of Agoura Hills operating standards.

The project would be required to contribute to the cost of implementing the cumulative improvements. The project's fair share contribution to the cost of implementing the planned improvements is 4% as presented in Table 13.

Table 13
U.S. 101 NB Ramps/Kanan Road Mitigated Intersection Improvements
Project Fair Share Contribution

Related Project-Added Trips	Project-Added Trips	Project Fair Share Contribution
1,123 PHT	51 PHT	4%

[3] Agoura Village Specific Plan EIR, City of Agoura Hills, March 2006.

The estimated cost for implementing the identified mitigation measure is $169,000 (cost estimate sheet contained in the Technical Appendix for reference). The Project's fair share contribution to the mitigation costs is estimated at $6,760.

LOS ANGELES COUNTY CMP ANALYSIS

Criteria

As presented in the Los Angeles County Congestion Management Program (CMP), the criteria used to determine a significant traffic impact resulting from development projects is: "a significant impact occurs when the proposed project increases traffic demand on a CMP facility by 2% of capacity (V/C ≥ 0.02), causing LOS F (V/C > 1.00). If the facility is already at LOS F, a significant impact occurs when the proposed project increases traffic demand by 2% of capacity (V/C ≥ 0.02)."

Potential Impacts

The nearest CMP intersection to the project site is the Kanan Dume/PCH intersection, located in the City of Malibu. The traffic analysis indicates that this intersection is forecast to operate at LOS C under Cumulative and Cumulative + Project traffic volumes and the project's traffic additions would not increase the intersection V/C ratio by 2% or more. The project would therefore not generate a significant impact to the Los Angeles County CMP facilities.

■ ■ ■

STUDY PARTICIPANTS AND REFERENCES

Associated Transportation Engineers

Scott A. Schell, AICP, PTP, Principal Transportation Planner
Matthew Farrington, Transportation Planner

References

Traffic Impact Analysis Report Guidelines, Los Angeles County Department of Public Works, January 1997.

Highway Capacity Manual, Transportation Research Special Report 209, National Research Council, 2010.

Trip Generation, Institute of Transportation Engineers 9th Edition, 2012.

Persons Contacted

Chakravarthy, Sri, City of Agoura Hills
Cook, Allison, City of Agoura Hills
DuBoux, Rob, City of Malibu
Lau, Suen Fei, Los Angeles County Depart of Public Works
Parker-Bozylinski, Joyce, City of Malibu
Zako, Launda, Los Angeles County Depart of Public Works

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LOS ANGELES COUNTY MEMORANDUM OF UNDERSTANDING

SCOPING FOR TRAFFIC STUDY

Project Name:	Malibu Institute Project

This Memorandum of Understanding (MOU) acknowledges Los Angeles County Department of Public Works, Traffic and Lighting Division (TLD) requirements of traffic impact analysis for the project and is subject to change:

Project Address:	901 Encinal Canyon Road, Malibu, CA 90265		
Project Description:	Educational Retreat with 40 Bungalows for overnight accommodations		
City:	Malibu, CA		
Project Buildout Year:		**Ambient or CMP Growth Rate per Year:**	
Closest Intersection (Xtn) to the Project			
Xtn N/S Street Name:	Clubhouse Drive		
Xtn E/W Street Name:	Encinal Canyon Road		
Thomas Guide Pg+Grid:	586/H-7	**Los Angeles County Supervisorial District:**	3

	Consultant	**Developer**
Company:	Associated Transportation Engineers	Malibu Associates LLC
Name:	Scott A. Schell	Thomas C. Hix
Address:	100 N. Hope Avenue, Ste. 4	480 San Antonio Road Ste. 205
City, State, Zip Code:	Santa Barbara, CA 93110	Mountain View, CA 94040
Phone #:	(805) 687-4418	
Fax #:	(805) 682-8509	
Email:	sschell@atesb.com	

By: Scott A Schell

Print Name: Scott A. Schell, AICP, PTP

Consultant/Developer's Representative

Date 8-23-12

Reviewed By:

Print Name:

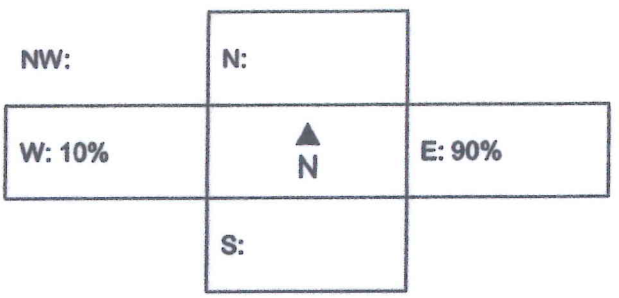
TLD's Representative

Date

SCOPING FOR TRAFFIC STUDY

Project Name:	Malibu Institute Project

1. Traffic Distribution: Figure(s) illustrating project trip distribution in percentages and volumes at the studied intersections analyzed.



Trip Credit: Exact amount of credit subject to approval by TLD.

Transportation Demand Management (TDM)	Yes/no	No
Existing Active Land Use	Yes/no	Yes – 18 Hole Golf Course
Previous Land Use	Yes/no	No
Internal Trip Reduction	Yes/no	No
Pass-by Trip Reduction	Yes/no	No

SCOPING FOR TRAFFIC STUDY

Project Name:	Malibu Institute Project

2. Trip Generation

Trip Generation Rate(s) Source: I	I – Institute of Transportation Engineers; S – San Diego Traffic Generators; C – County; O – Other:	Edition: 8th	

Land Use Code	Land Use	Rate Based on	Qty	*AVTE vs	ADT	Weekday a.m. peak		Weekday p.m. peak		Weekend peak hour	
						In	Out	In	Out	In	Out
330	Resort Hotel	Avg	40 Rooms		233	9	3	7	10	11	9
310	Hotel (Ratios used to develop ADT and Weekend peak hour rates for Resort Hotel)	Avg									
				Total							

* - Average Vehicle Trip Ends.

SCOPING FOR TRAFFIC STUDY

Project Name:	Malibu Institute Project

3. Study Intersections: At minimum, the study shall include the following intersections. The list is subject to change after related projects, trip generation and distribution are determined. Consultant should check with adjoining Cities regarding their requirements in addition to the following County/City intersections. Documentation of the consultation from these agencies shall be included in the traffic study.

Xtn #	% County	Thomas Guide Page+Grid	N↕ S/E↔W Street Name	City	Signalized	CMP
1		586/H-7	Clubhouse Drive/Encinal Canyon Road	LA County	No	No
2		587/D-6	Mullholland Drive/Kanan Road	LA County	No	No
3		626/F-1	Decker Canyon Road (SR 23)/Encinal Canyon Road-Lechusa Road	LA County	No	No
4						
5						
6						
7						
8						
9						
10						

Cites/Agencies to be consulted: .Los Angeles County, CALTRANS, City of Malibu

SCOPING FOR TRAFFIC STUDY

Project Name:	Malibu Institute Project

4. Related Projects: Consultant should check with Los Angeles County Department of Regional Planning and planning departments of adjoining Cities. Documentation of the consultation from these agencies shall be included in the traffic study. Related projects list shall be submitted to TLD for our review and approval before being incorporated in the study.

5. Congested Management Program (CMP): A CMP TIA is required for all projects required to prepare an Environmental Assessment based on local determination or projects requiring a traffic study. Where the project meets the criteria established in the Transportation Impact Analysis (TIA section of the County of Los Angeles' CMP TIA Land Use Analysis Guidelines, a CMP analysis must be prepared. At a minimum, the geographic area examined in the TIA must include the following:

- All CMP arterial monitoring intersections (see Appendix A, exhibit A-2, page A-15 of the 2002 Guidelines), including freeway on- or off-ramp intersections, where the proposed project will add 50 or more trips during either the a.m. or p.m. peak hours.
- Main line freeway monitoring locations (see Chapter 2, exhibit 2-4, page 16 of the 2002 Guidelines) where the project will add 150 or more trips, in either direction, during the a.m. or p.m. weekday peak hours.

A copy of the 2002 CMP Land Use Analysis Guidelines can be obtained by calling the CMP Hotline at (213) 922-2830.

6. Freeway Analysis: The potential traffic impact on the following Freeway(s) must be considered.

_____

_____

_____

The applicant shall consult with the State of California Department of Transportation (Caltrans) to determine the California Environmental Quality Act levels of significance with regard to traffic impacts on Caltrans' freeway facilities. This consultation shall also include a determination of Caltrans requirements for the study of traffic impacts to its facilities and the mitigation of any such impacts. This analysis must follow the most current Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) and can be obtained from http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tiguide.pdf. If Caltrans finds that the project has a significant impact on the freeway, Caltrans shall be requested to include the basis for this finding in their response. If fees are proposed to mitigate the freeway impact, Caltrans shall be requested to identify the specific project to which the fees will apply. These written comments from Caltrans shall be included with the traffic study and submitted to Public Works for review and approval. If a documented good faith effort is made to consult with Caltrans and written comments cannot be obtained from within a reasonable amount of time, an analysis of the freeway impact shall be made using the County of Los Angeles' CMP Land Use Analysis Guidelines.

SCOPING FOR TRAFFIC STUDY

Project Name:	Malibu Institute Project

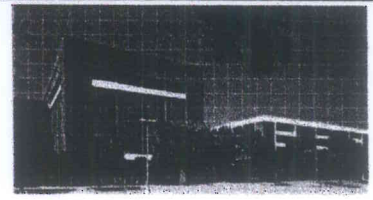
7. Other:

• For the proposed project and/or cumulative mitigation measures, a feasibility study, cost estimate, and conceptual plan (including signing and striping plans, signal plans, etc.) for the improvements may be required and should be included in the study for review and approval.
Traffic counts:
• Must be taken on Tuesdays, Wednesdays or Thursdays.
• Must exclude holidays, and the first weekdays before and after the holiday.
• Must be taken on days when local schools or colleges are in session.
• Must be taken on days of good weather, and avoid atypical conditions (e.g., road construction, detours, or major traffic incidents).
• Traffic counts used for other traffic studies in the area shall **NOT** be reused again, unless 25% of the counts conducted for that particular traffic study are validated with new counts. The difference in volumes between the old and new counts at each corresponding movement should not be more than 10%.
• New traffic counts shall be checked to ensure the difference in volumes at corresponding approaches, if applicable, between two adjacent intersections is no more than 10% unless the difference can be justified.
• The County's methodology shall be used when evaluating the County and/or County/City intersections. The applicant must confer with Caltrans and City of Los Angeles in order to select the methodology to use when determining the impact to the freeways and the transportation circulation system within their respective jurisdictions.

This analysis must follow the most current Traffic Impact Analysis Report Guidelines.

SCOPING FOR TRAFFIC STUDY

Project Name:	Malibu Institute Project

Please return signed page 1 of 8 in person, by Mail, by Email or by Fax	
In Person	**By Mail**
Los Angeles County Department of Public Works **Traffic Studies Section, Traffic Studies Unit** **1000 South Fremont Avenue** **Building A-9E, 4th Floor** **Alhambra, CA 91803-8800**  **Our building, on the left with parking structure on the right. Check the following web site, for additional information: http://www.thealhambra.net/index.asp**	**Los Angeles County Department of Public Works** **Traffic and Lighting Division,** **Traffic Studies Section, Traffic Studies Unit** **P.O. Box 1460** **Alhambra, CA 91802-1460**

By Fax

	Processing Engineer	Section	Telephone No.	Fax No.	E-Mail Address
	Jeff PLETYAK, P.E.	Traffic Studies	(626) 300-4721	(626) 300-4736	JPety@ladpw.org
✔	Suen Fei LAU, P.E.	Traffic Studies	(626) 300-4820		SFLau@ladpw.org
	Peggy Oki, P.E.	Traffic Studies	(626) 300-4866		POki@ladpw.org
	Isaac Wong	Traffic Studies	(626) 300-4796		IsWong@ladpw.org
	Virgilio Lazatin	Traffic Studies	(626) 300-4766		V Lazatin @ladpw.org

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
TRAFFIC AND LIGHTING DIVISION
APPLICATION FOR ENVIRONMENTAL IMPACT REPORT
TRAFFIC STUDY REVIEW SERVICES, ORDINANCE NO. 91-0101

Road Fund No:	B03	Revenue Source	9254	Program No:	R291
PCA No.:				Date:	
Project No.:				Studies No.:	
Project Name:					
Applicant/Engineer:				Telephone No.:	
Company:				Fax No.:	
Address:					
City:				Zip:	

The traffic study (TS, required as part of the environmental review process, has been received. **Before a traffic study review can begin, the indicated fee must be paid to this Department.** The fee may be paid in person or mailed to:

In Person	By Mail
Cashier, Mezzanine (626) 458-6399 Los Angeles County Department of Public Works 900 South Fremont Avenue Alhambra, CA 91803-1331	Cashier, Mezzanine Los Angeles County Department of Public Works P.O. Box 1460 Alhambra, CA 91802-1460

Please return this form along with your payment to insure proper credit to your account. Make check payable to the Los Angeles County Department of Public Works.

TS review fees are based on the number of Average Daily Trips (ADT's) generated by the project and for six traffic conditions as indicated on page 5 of our 1997 guidelines, as follows:

ADT's		**FEE (Effective March 1, 2008)*	Conditions/phases/alternatives
1 - 1,000		$1,574	
1,001 - 5,000		$3,147	
5,001 - 10,000		$3,935	
10,001 and over		$4,722	
ADT For This Project:		Fee:	$0

* For additional information, http://planning.co.la.ca.us/docFee.htm ** Additional fee is required for additional traffic conditions/phases/alternatives, and for 3 rd & alternating subsequent reviews of the study for the same project.

	Processing Engineer	Section	Telephone No.	Fax No.	E-Mail Address
	Jeff PLETYAK, P.E.	Traffic Studies	(626) 300-4721	(626) 300-4736	JPety@ladpw.org
✔	Suen Fei LAU, P.E.	Traffic Studies	(626) 300-4820		SFLau@ladpw.org
	Peggy Oki, P.E.	Traffic Studies	(626) 300-4866		POki@ladpw.org
	Isaac Wong	Traffic Studies	(626) 300-4796		IsWong@ladpw.org
	Virgilio Lazatin	Traffic Studies	(626) 300-4766		V Lazatin @ladpw.org

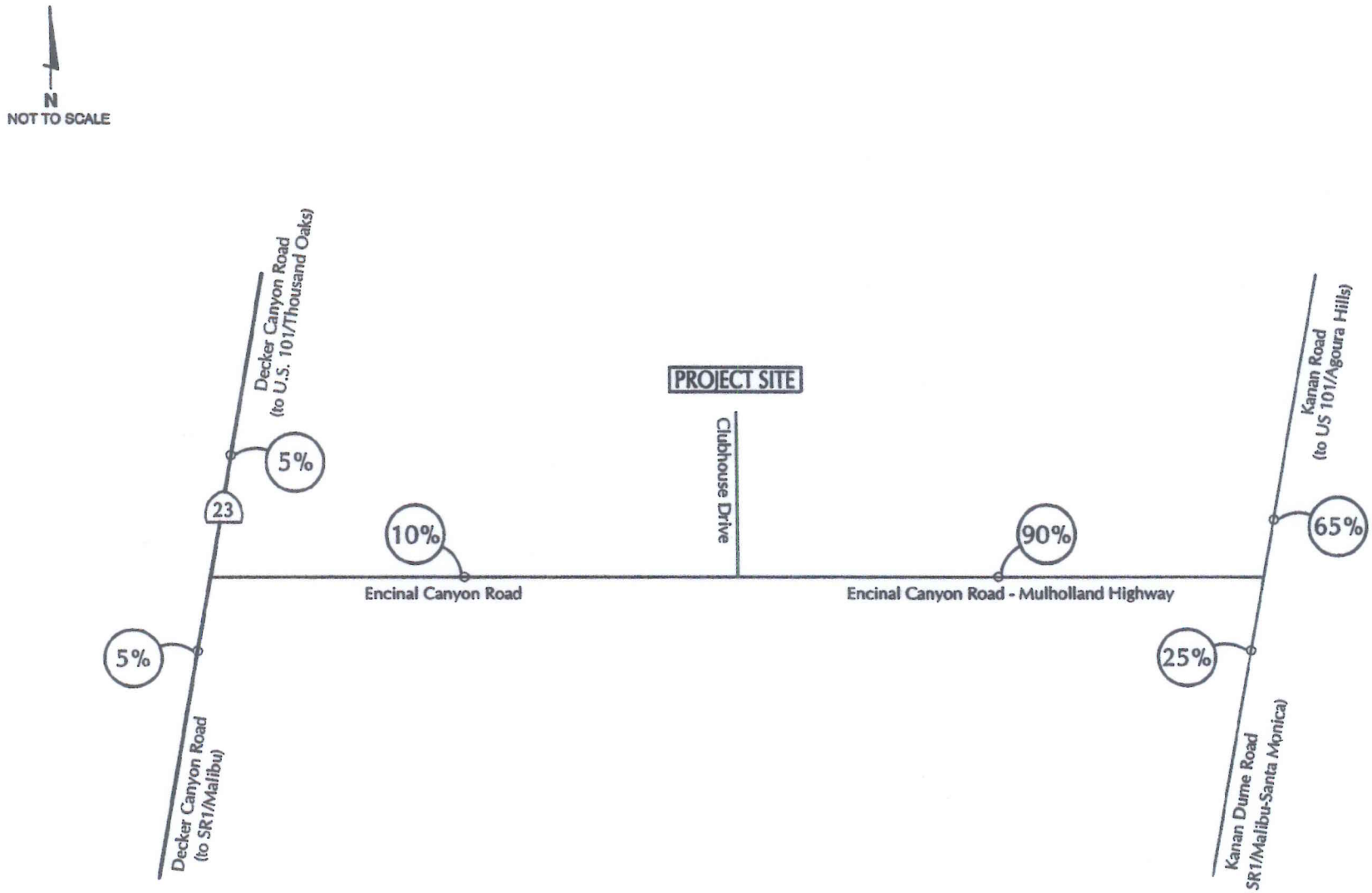
cc: Cashier Note: Normal review time is 6-8 weeks after review fee is paid and receipt is received by Land Development Review Unit or Studies Section along with the report and related materials (site plan, etc).
P:\tlpub\WPFILES\LAND DEVELOPMENT REVIEW\Fei\TSS Blank 2009.doc Updated 05/13/09

Associated Transportation Engineers
Trip Generation Worksheet - With In/Out Splits

#11067 - MALIBU INSTITUTE PROJECT

Land Use	Size	ADT		A.M.						P.M.					
		Rate	Trips	Rate	Trips	In %	Trips	Out %	Trips	Rate	Trips	In %	Trips	Out %	Trips
Proposed Uses:															
Resort Hotel	40	5.82	233	0.310	12	71%	9	29%	3	0.42	17	43%	7	57%	10

Notes:
ITE Hotel ADT Rate = 13.85 * PM Peak Hour Rate
Thus, ITE Resort Hotel ADT Rate = 5.82 (13.85 x 0.42).



ASSOCIATED
TRANSPORTATION
ENGINEERS

PROJECT TRIP DISTRIBUTION PERCENTAGES

FIGURE 1

MMF - #11067

LEVEL OF SERVICE DEFINITIONS

Signalized Intersection Level of Service Definitions

LOS	Delay[a]	V/C Ratio	Definition
A	< 10.0	< 0.60	Progression is extremely favorable. Most vehicles arrive during the green phase. Many vehicles do not stop at all.
B	10.1 - 20.0	0.61 - 0.70	Good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	20.1 - 35.0	0.71 - 0.80	Only fair progression, longer cycle lengths, or both, result in higher cycle lengths. Cycle lengths may fail to serve queued vehicles, and overflow occurs. Number of vehicles stopped is significant, though many still pass through intersection without stopping.
D	35.1 - 55.0	0.81 - 0.90	Congestion becomes more noticeable. Unfavorable progression, long cycle lengths and high v/c ratios result in longer delays. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	55.1 - 80.0	0.91 - 1.00	High delay values indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent
F	> 80.0	> 1.00	Considered unacceptable for most drivers, this level occurs when arrival flow rates exceed the capacity of lane groups, resulting in many individual cycle failures. Poor progression and long cycle lengths may also contribute to high delay levels.

[a] Average control delay per vehicle in seconds.

Unsignalized Intersection Level of Service Definitions

The HCM[1] uses *control delay* to determine the level of service at unsignalized intersections. Control delay is the difference between the travel time actually experienced at the control device and the travel time that would occur in the absence of the traffic control device. Control delay includes deceleration from free flow speed, queue move-up time, stopped delay and acceleration back to free flow speed.

LOS	Control Delay Seconds per Vehicle
A	< 10.0
B	10.1 - 15.0
C	15.1 - 25.0
D	25.1 - 35.0
E	35.1 - 50.0
F	> 50.0

[1] Highway Capacity Manual, National Research Board, 2000

ASSOCIATED TRANSPORTATION ENGINEERS
100 North Hope Avenue, Suite 4, Santa Barbara, CA 93110-1686 • (805) 687-4418 • FAX (805) 682-8509

TRAFFIC COUNT DATA

Prepared by NDS/ATD

VOLUME

Encinal Cyn Rd E/o Clubhouse Dr

Day: Thursday
Date: 9/6/2012

City: Malibu
Project #: CA12_5359_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	483	531	1,014

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			13		11		24	
00:15			1		2		3		12:15			7		9		16	
00:30			0		1		1		12:30			9		7		16	
00:45			0	1	0	3	0	4	12:45			10	39	14	41	24	80
01:00			0		1		1		13:00			7		10		17	
01:15			0		1		1		13:15			12		9		21	
01:30			1		0		1		13:30			16		6		22	
01:45			0	1	0	2	0	3	13:45			6	41	18	43	24	84
02:00			0		0		0		14:00			15		11		26	
02:15			0		2		2		14:15			11		8		19	
02:30			0		0		0		14:30			7		12		19	
02:45			0		1	3	1	3	14:45			13	46	12	43	25	89
03:00			0		0		0		15:00			17		7		24	
03:15			0		0		0		15:15			9		9		18	
03:30			0		0		0		15:30			20		11		31	
03:45			0		0		0		15:45			15	61	13	40	28	101
04:00			0		0		0		16:00			14		9		23	
04:15			0		0		0		16:15			10		8		18	
04:30			1		0		1		16:30			15		7		22	
04:45			0	1	0		0	1	16:45			7	46	5	29	12	75
05:00			1		0		1		17:00			10		5		15	
05:15			1		1		2		17:15			9		8		17	
05:30			3		3		6		17:30			10		7		17	
05:45			3	8	4	8	7	16	17:45			14	43	10	30	24	73
06:00			0		0		0		18:00			5		6		11	
06:15			2		6		8		18:15			8		7		15	
06:30			5		6		11		18:30			8		4		12	
06:45			2	9	10	22	12	31	18:45			8	29	3	20	11	49
07:00			2		9		11		19:00			7		5		12	
07:15			7		10		17		19:15			5		3		8	
07:30			5		7		12		19:30			1		6		7	
07:45			2	16	5	31	7	47	19:45			3	16	7	21	10	37
08:00			6		9		15		20:00			3		5		8	
08:15			4		15		19		20:15			3		1		4	
08:30			7		8		15		20:30			3		1		4	
08:45			5	22	8	40	13	62	20:45			3	12	7	14	10	26
09:00			4		15		19		21:00			0		2		2	
09:15			3		2		5		21:15			1		2		3	
09:30			6		10		16		21:30			0		5		5	
09:45			7	20	15	42	22	62	21:45			0	1	1	10	1	11
10:00			5		16		21		22:00			2		2		4	
10:15			11		9		20		22:15			0		0		0	
10:30			4		10		14		22:30			2		0		2	
10:45			7	27	12	47	19	74	22:45			5	9	4	6	9	15
11:00			7		7		14		23:00			0		2		2	
11:15			9		7		16		23:15			1		1		2	
11:30			8		10		18		23:30			2		2		4	
11:45			6	30	7	31	13	61	23:45			2	5	0	5	2	10
TOTALS				135		229		364	TOTALS				348		302		650
SPLIT %				37.1%		62.9%		35.9%	SPLIT %				53.5%		46.5%		64.1%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	483	531	1,014

AM Peak Hour	11:15	09:30	09:30	PM Peak Hour	15:00	13:45	15:00
AM Pk Volume	36	50	79	PM Pk Volume	61	49	101
Pk Hr Factor	0.692	0.781	0.898	Pk Hr Factor	0.763	0.681	0.815
7 - 9 Volume	38	71	109	4 - 6 Volume	89	59	148
7 - 9 Peak Hour	08:00	08:00	08:00	4 - 6 Peak Hour	16:00	17:00	16:00
7 - 9 Pk Volume	22	40	62	4 - 6 Pk Volume	46	30	75
Pk Hr Factor	0.786	0.667	0.816	Pk Hr Factor	0.767	0.750	0.815

ITM Peak Hour Summary

Prepared by:

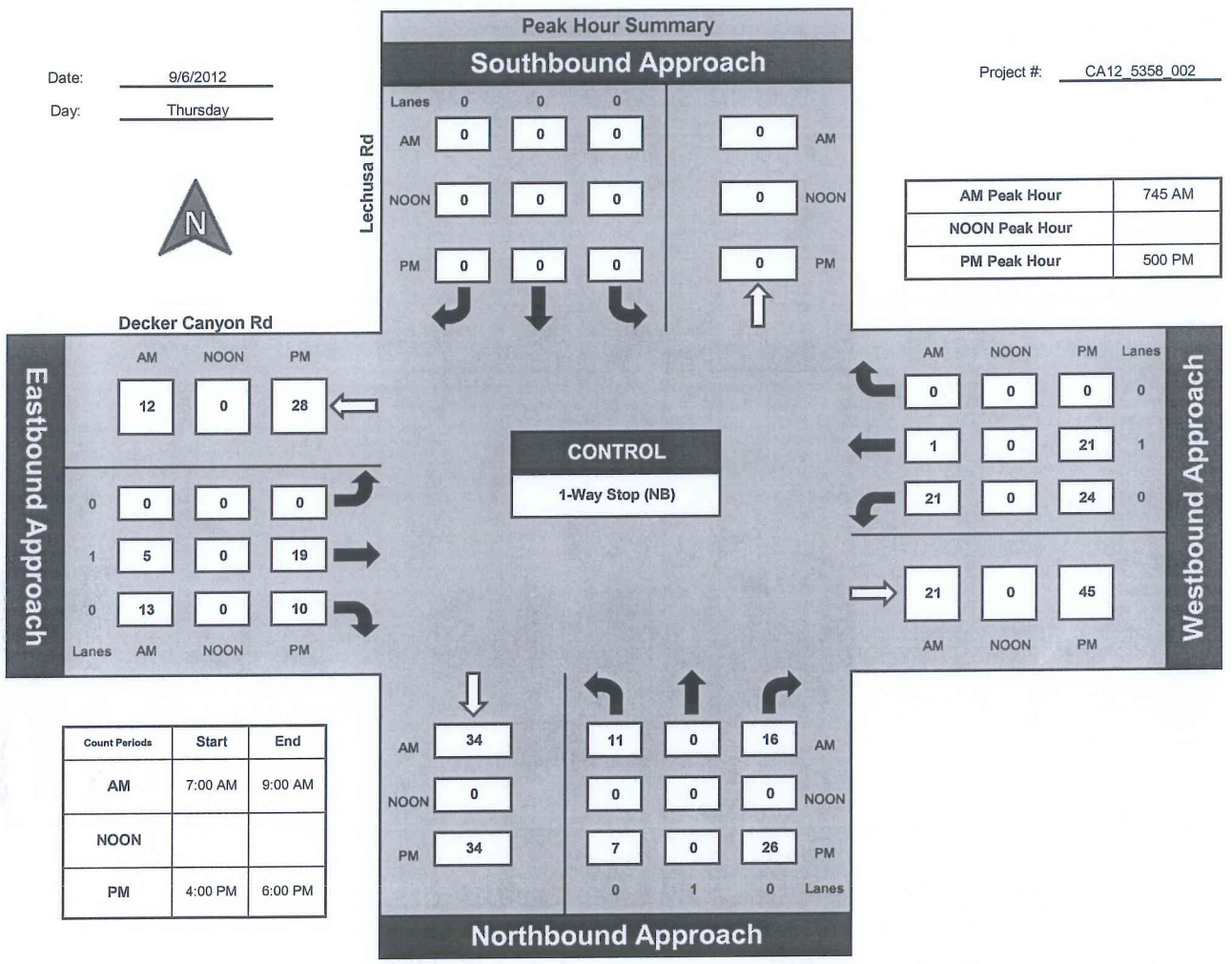
National Data & Surveying Services

Lechusa Rd and Decker Canyon Rd , City of Malibu

Date: 9/6/2012

Day: Thursday

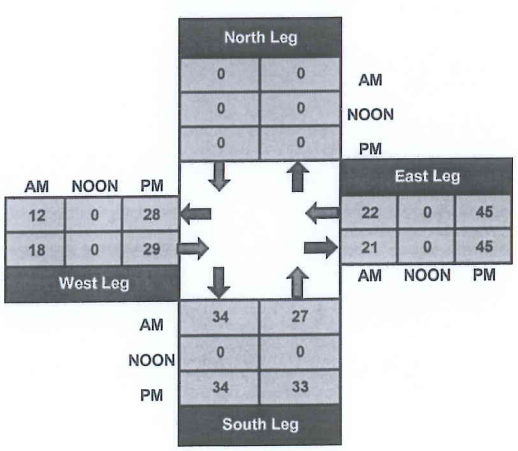
Project #: CA12_5358_002



AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



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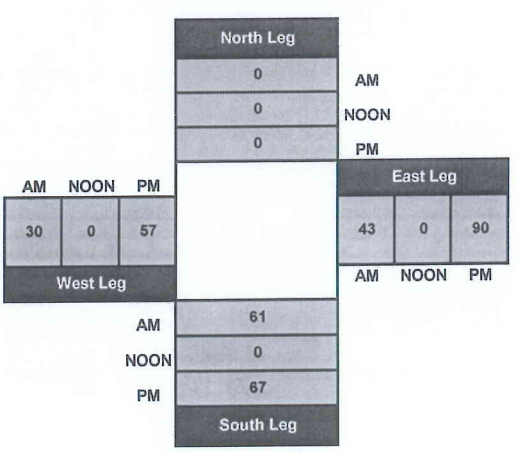


ITM Peak Hour Summary

Prepared by:

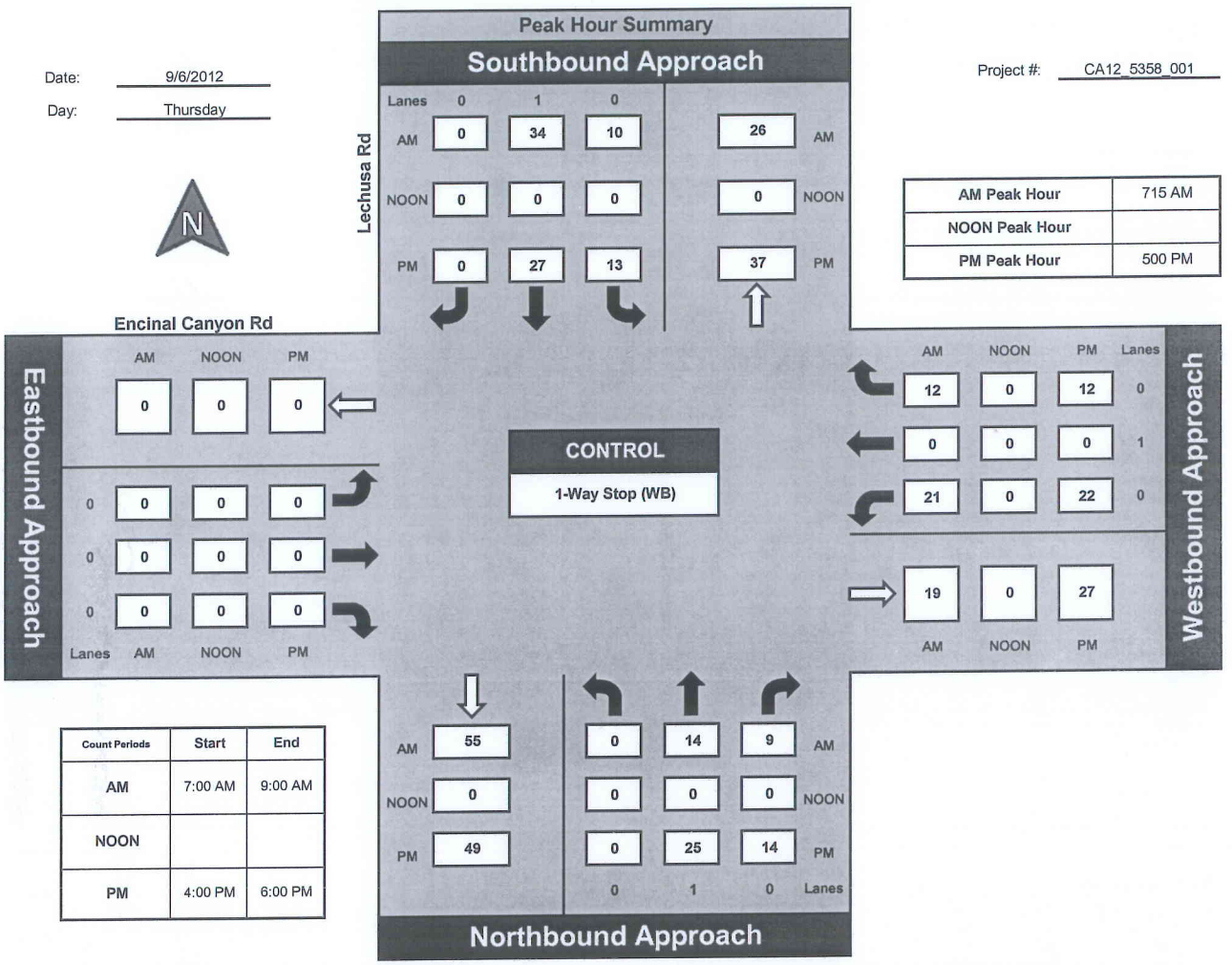
National Data & Surveying Services

Lechusa Rd and Encinal Canyon Rd , City of Malibu

Date: 9/6/2012

Day: Thursday

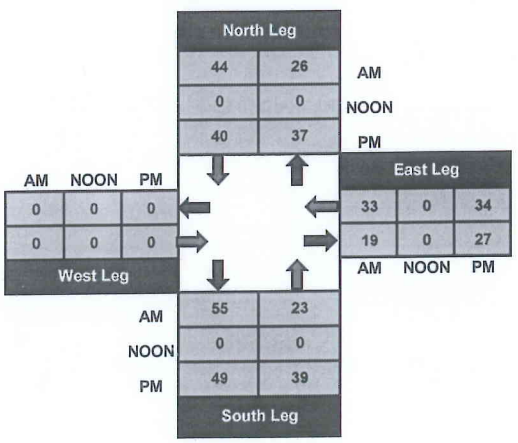
Project #: CA12_5358_001



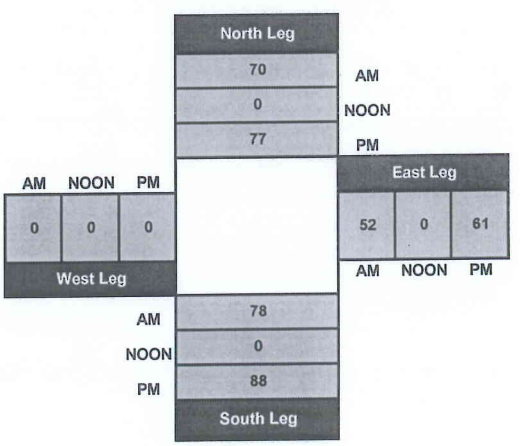
AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

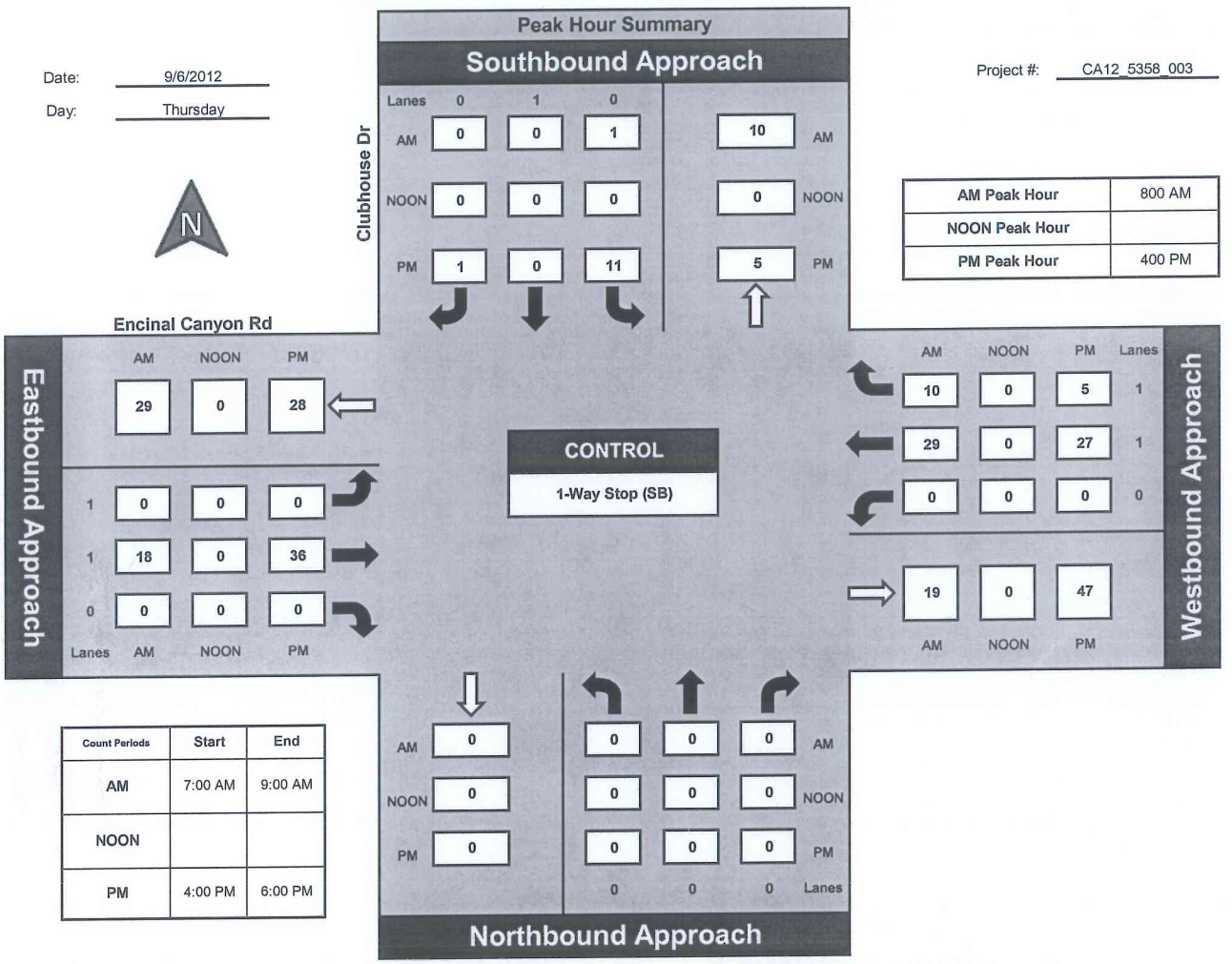
National Data & Surveying Services

Clubhouse Dr and Encinal Canyon Rd , City of Malibu

Date: 9/6/2012

Day: Thursday

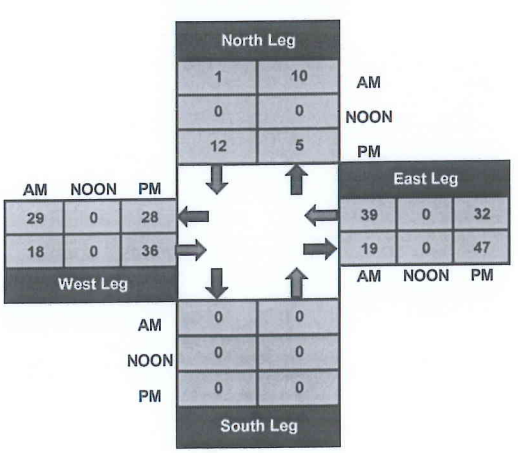
Project #: CA12_5358_003



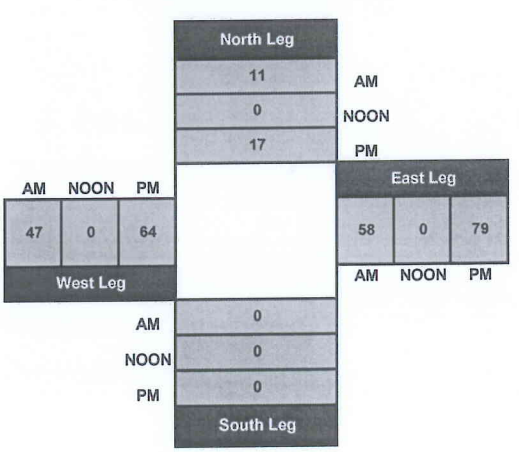
AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

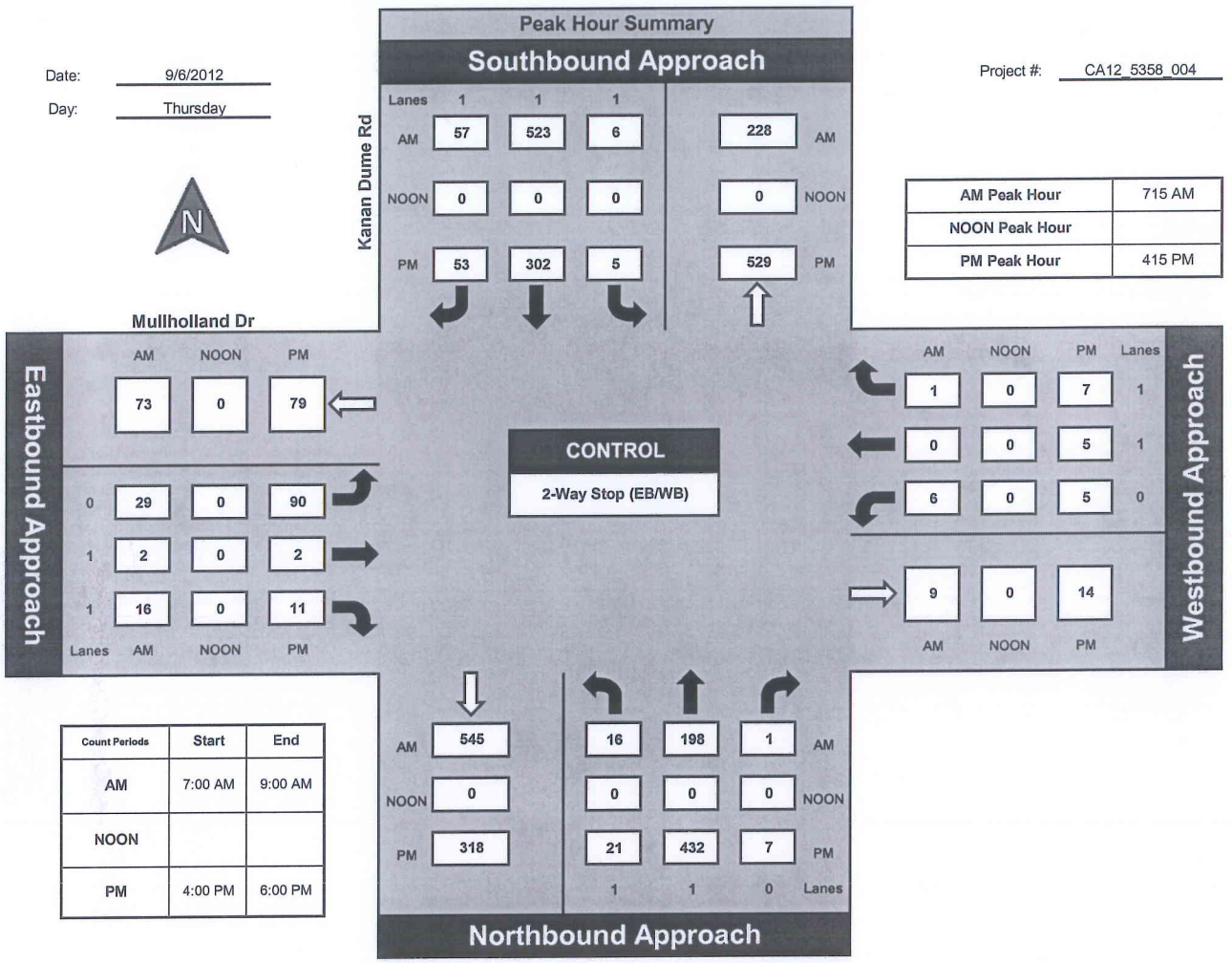
National Data & Surveying Services

Kanan Dume Rd and Mullholland Dr , City of Malibu

Date: 9/6/2012

Day: Thursday

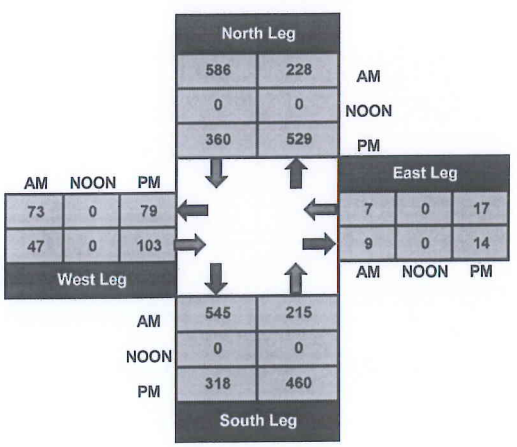
Project #: CA12_5358_004



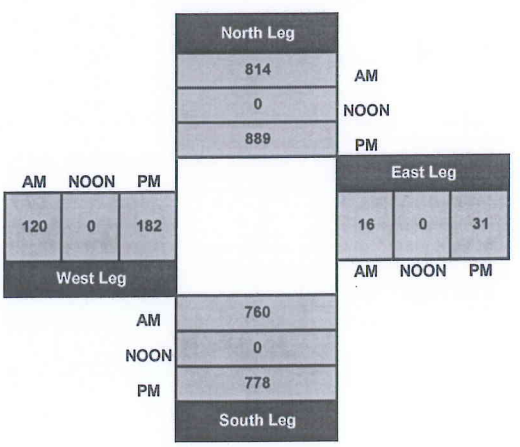
AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	415 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



#5

ITM Peak Hour Summary

Prepared by:

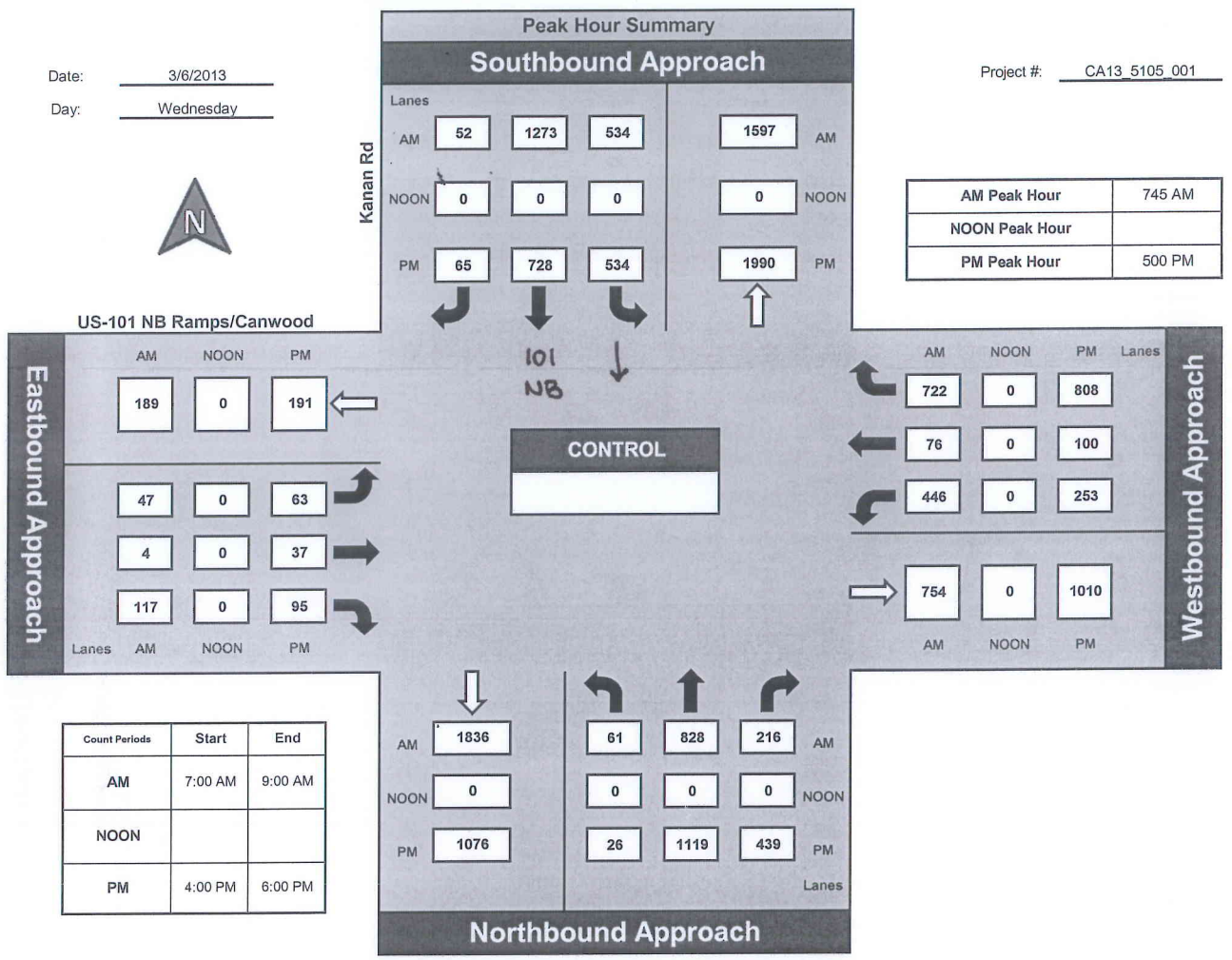
National Data & Surveying Services

Kanan Rd and US-101 NB Ramps/Canwood , City of Agoura Hills

Date: 3/6/2013

Day: Wednesday

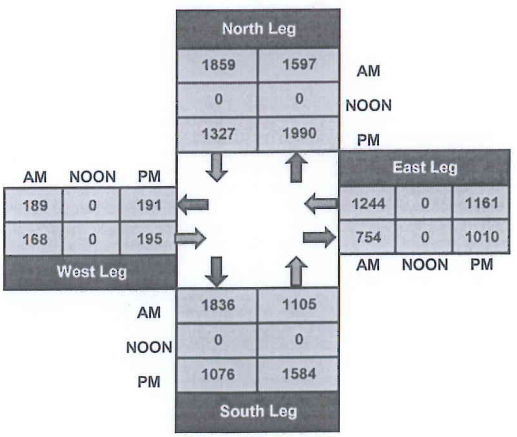
Project #: CA13_5105_001



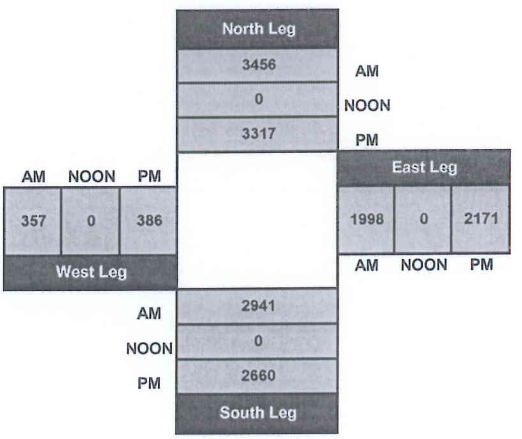
AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



#5-RTOR

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Kanan Rd and US-101 NB Ramps/Canwood , City of Agoura Hills

Date: 3/6/2013

Day: Wednesday

Project #: CA13_5105_001

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg		
25	314	AM
0	0	NOON
37	207	PM

West Leg			East Leg		
AM	NOON	PM			
25	0	37	314	0	207
52	0	47	0	0	0
			AM	NOON	PM

South Leg	
AM	52 0
NOON	0 0
PM	47 0

Total Volume Per Leg

North Leg	
339	AM
0	NOON
244	PM

West Leg			East Leg		
AM	NOON	PM			
77	0	84	314	0	207
			AM	NOON	PM

South Leg	
AM	52
NOON	0
PM	47

#6_RTOF

ITM Peak Hour Summary

Prepared by:

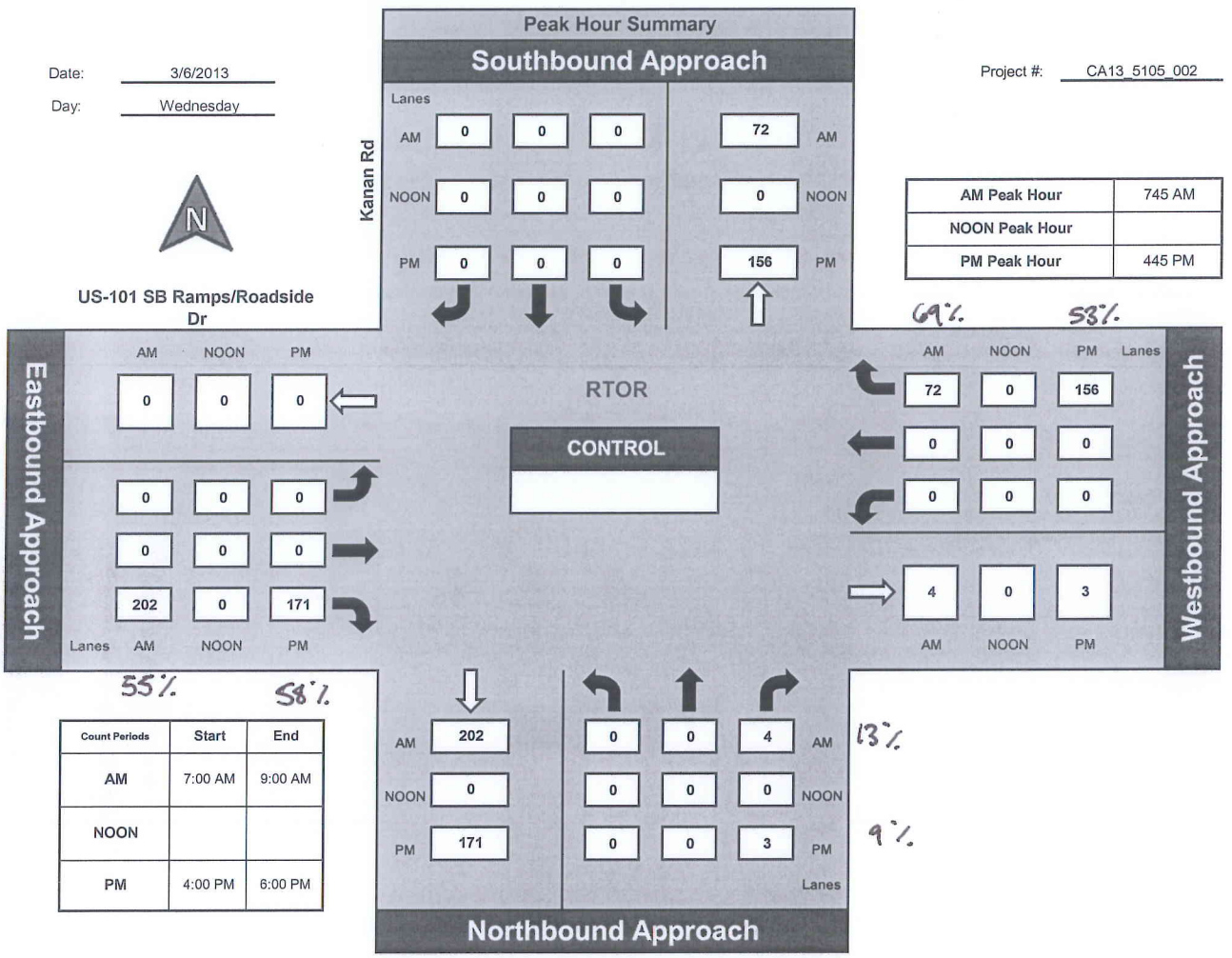
National Data & Surveying Services

Kanan Rd and US-101 SB Ramps/Roadside Dr , City of Agoura Hills

Date: 3/6/2013

Day: Wednesday

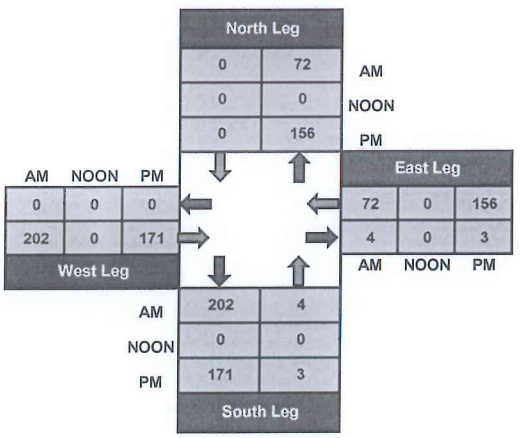
Project #: CA13_5105_002



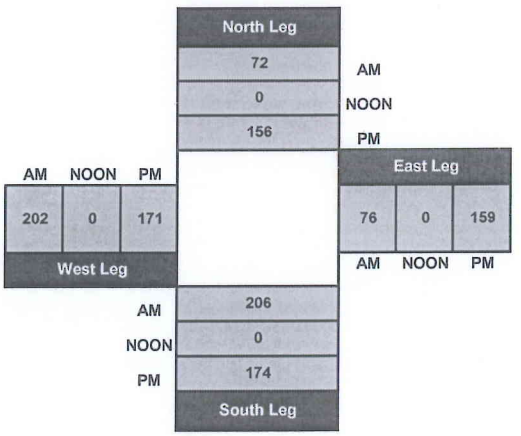
AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



#6

ITM Peak Hour Summary

Prepared by:

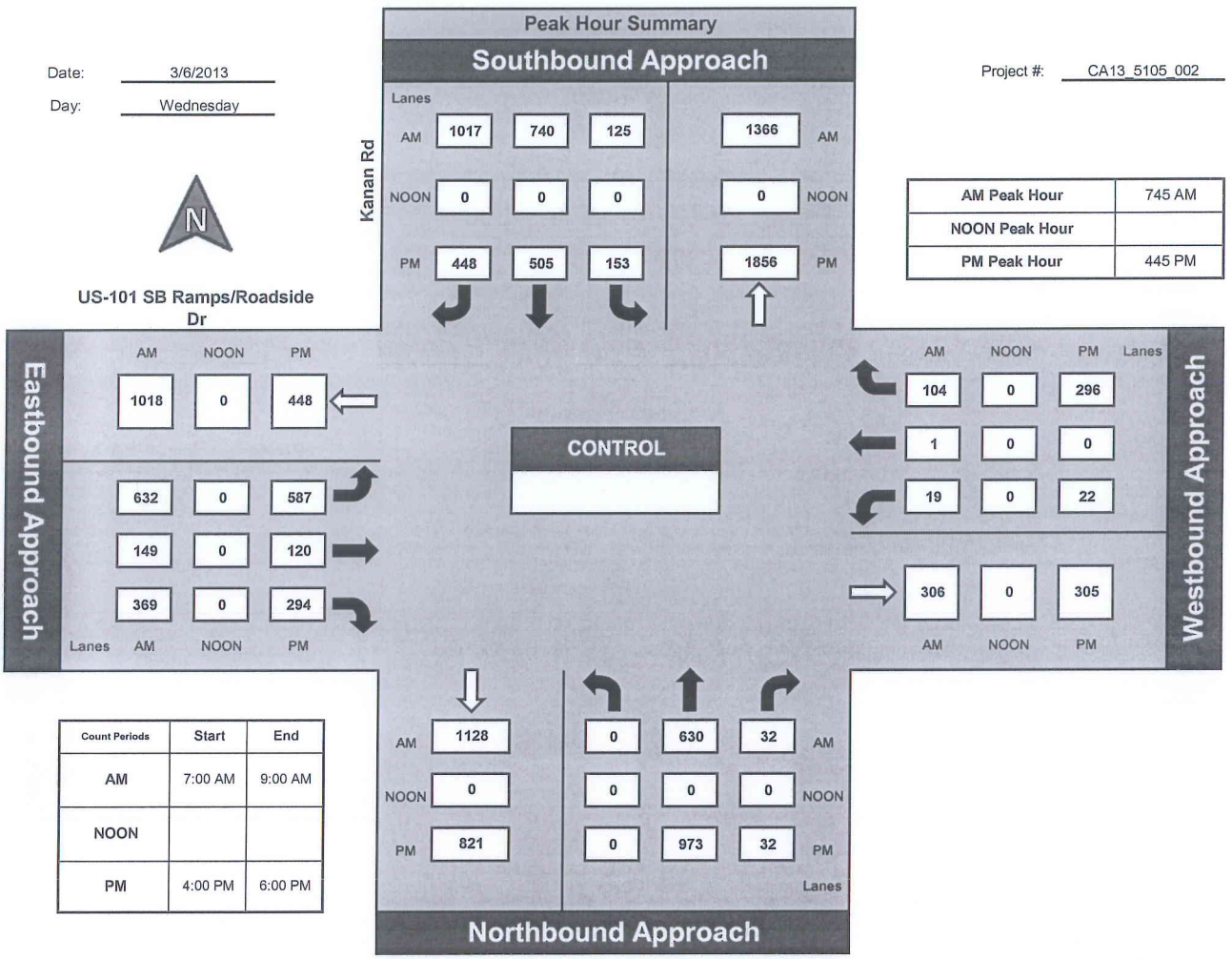
National Data & Surveying Services

Kanan Rd and US-101 SB Ramps/Roadside Dr , City of Agoura Hills

Date: 3/6/2013

Day: Wednesday

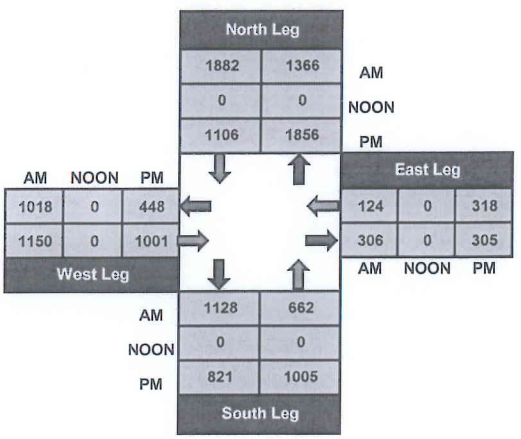
Project #: CA13_5105_002



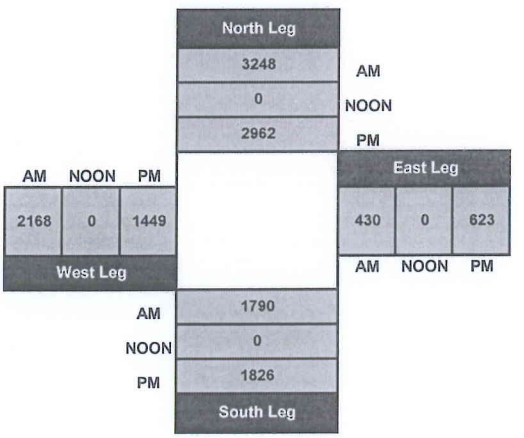
AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



#7

ITM Peak Hour Summary

Prepared by:

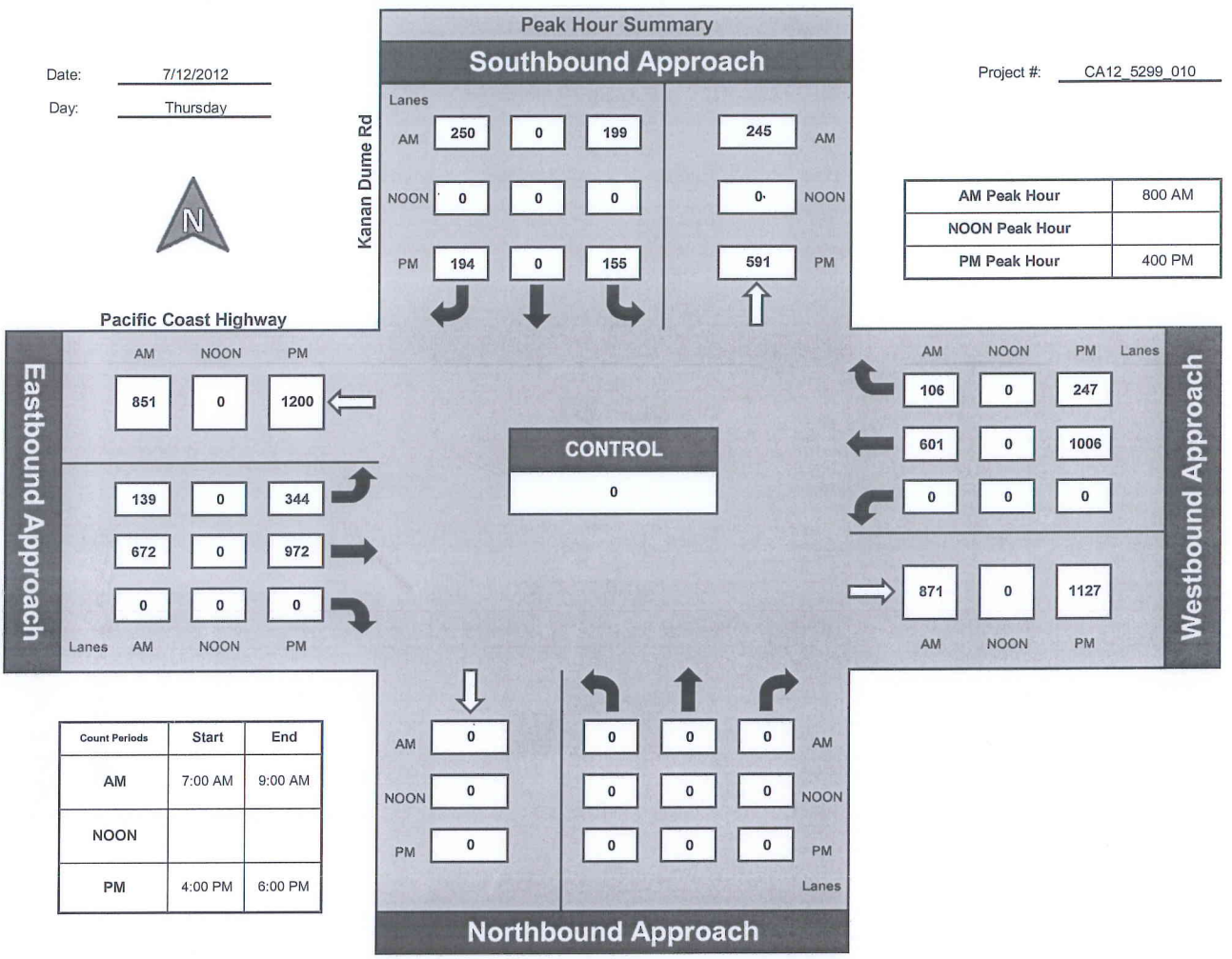
National Data & Surveying Services

Kanan Dume Rd and Pacific Coast Highway , City of Malibu

Date: 7/12/2012

Day: Thursday

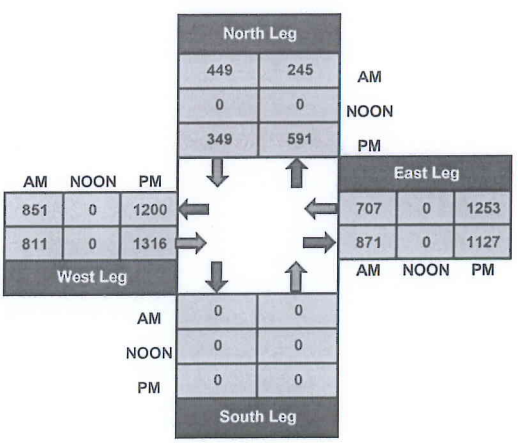
Project #: CA12_5299_010



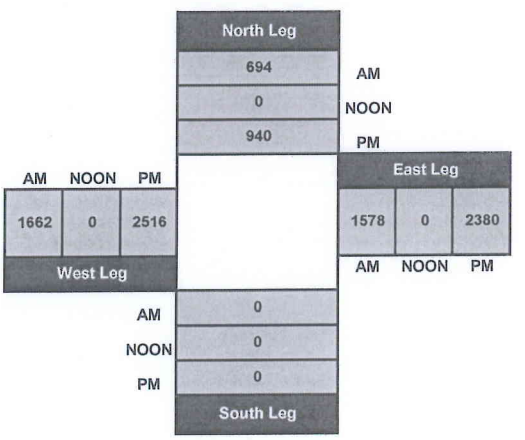
AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS

Reference 1 Decker Canyon Road (SR23)/Lechusa Road
Reference 2 Lechusa Road/Encinal Canyon Road
Reference 3 Clubhouse Drive/Encinal Canyon Road
Reference 4 Kanan Dume Road/Encinal Canyon Road
Reference 5 U.S. 101 NB Ramps-Canwood Street/Kanan Road
Reference 6 U.S. 101 SB Ramps-Roadside Drive/Kanan Road
Reference 7 Pacific Coast Highway/Kanan Dume Road

#11067 MALIBU INSTITUTE PROJECT REF: 01 AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *DECKER CANYON ROAD*

E/W STREET: *LECHUSA ROAD*

CONTROL TYPE: *UNSIGNALIZED*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	0	5	13	21	1	0	0	0	0	11	0	16
(B) PROJECT-ADDED:	0	0	2	2	0	0	0	0	0	1	0	1
(C) CUMULATIVE:	0	5	13	21	1	0	0	0	0	11	0	16

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TR	LT		LR

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A + B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B + C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	1	1600	5	5	5	5	0.011 *	0.013 *	0.011 *	0.013 *
NBR	0	0	13	15	13	15	-	-	-	-
SBL	0	0	21	23	21	23	-	-	-	-
SBT	1	1600	1	1	1	1	0.014 *	0.015 *	0.014 *	0.015 *
SBR	0	0	0	0	0	0	-	-	-	-
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	11	12	11	12	-	-	-	-
WBT	1	1600	0	0	0	0	0.017 *	0.018 *	0.017 *	0.018 *
WBR	0	0	16	17	16	17	-	-	-	-
			LOST TIME:				0.100 *	0.100 *	0.100 *	0.100 *
			TOTAL INTERSECTION CAPACITY UTILIZATION:				**0.142**	**0.146**	**0.142**	**0.146**
			SCENARIO LEVEL OF SERVICE:				A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 01 PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***DECKER CANYON ROAD***

E/W STREET: ***LECHUSA ROAD***

CONTROL TYPE: ***UNSIGNALIZED***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	0	19	10	24	21	0	0	0	0	7	0	26
(B) PROJECT-ADDED:	0	0	2	2	0	0	0	0	0	2	0	2
(C) CUMULATIVE:	0	19	10	24	21	0	0	0	0	7	0	26

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TR	LT		LR

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	1	1600	19	19	19	19	0.018 *	0.019 *	0.018 *	0.019 *
NBR	0	0	10	12	10	12	-	-	-	-
SBL	0	0	24	26	24	26	-	-	-	-
SBT	1	1600	21	21	21	21	0.028 *	0.029 *	0.028 *	0.029 *
SBR	0	0	0	0	0	0	-	-	-	-
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	7	9	7	9	-	-	-	-
WBT	1	1600	0	0	0	0	0.021 *	0.023 *	0.021 *	0.023 *
WBR	0	0	26	28	26	28	-	-	-	-
			LOST TIME:				0.100 *	0.100 *	0.100 *	0.100 *
			TOTAL INTERSECTION CAPACITY UTILIZATION:				**0.167**	**0.171**	**0.167**	**0.171**
			SCENARIO LEVEL OF SERVICE:				A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 02 AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *LECHUSA ROAD*

E/W STREET: *ENCINAL CANYON ROAD*

CONTROL TYPE: *UNSIGNALIZED*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	0	14	9	10	34	0	0	0	0	21	0	12
(B) PROJECT-ADDED:	0	0	0	4	0	0	0	0	0	0	0	2
(C) CUMULATIVE:	0	14	9	10	34	0	0	0	0	21	0	12

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TR	LT		LR

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	1	1600	14	14	14	14	0.014 *	0.014 *	0.014 *	0.014 *
NBR	0	0	9	9	9	9	-	-	-	-
SBL	0	0	10	14	10	14	-	-	-	-
SBT	1	1600	34	34	34	34	0.028 *	0.030 *	0.028 *	0.030 *
SBR	0	0	0	0	0	0	-	-	-	-
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	21	21	21	21	-	-	-	-
WBT	1	1600	0	0	0	0	0.021 *	0.022 *	0.021 *	0.022 *
WBR	0	0	12	14	12	14	-	-	-	-
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.163**	**0.166**	**0.163**	**0.166**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 02 PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***LECHUSA ROAD***

E/W STREET: ***ENCINAL CANYON ROAD***

CONTROL TYPE: ***UNSIGNALIZED***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	0	25	14	13	27	0	0	0	0	22	0	12
(B) PROJECT-ADDED:	0	0	0	4	0	0	0	0	0	0	0	4
(C) CUMULATIVE:	0	25	14	13	27	0	0	0	0	22	0	12

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TR	LT		LR

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	1	1600	25	25	25	25	0.024 *	0.024 *	0.024 *	0.024 *
NBR	0	0	14	14	14	14	-	-	-	-
SBL	0	0	13	17	13	17	-	-	-	-
SBT	1	1600	27	27	27	27	0.025 *	0.028 *	0.025 *	0.028 *
SBR	0	0	0	0	0	0	-	-	-	-
EBL	0	0	0	0	0	0	-	-	-	-
EBT	0	0	0	0	0	0	-	-	-	-
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	22	22	22	22	-	-	-	-
WBT	1	1600	0	0	0	0	0.021 *	0.024 *	0.021 *	0.024 *
WBR	0	0	12	16	12	16	-	-	-	-
			LOST TIME:				0.100 *	0.100 *	0.100 *	0.100 *
			TOTAL INTERSECTION CAPACITY UTILIZATION:				**0.170**	**0.176**	**0.170**	**0.176**
			SCENARIO LEVEL OF SERVICE:				A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 03 AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *CLUBHOUSE DRIVE*

E/W STREET: *ENCINAL CANYON ROAD*

CONTROL TYPE: *UNSIGNALIZED*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	0	0	0	1	0	0	0	18	0	0	29	10
(B) PROJECT-ADDED:	0	0	0	15	0	2	4	0	0	0	0	38
(C) CUMULATIVE:	0	0	0	1	0	0	0	18	0	0	29	10

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
		LR	L T	T R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	0	0	0	0	0	0	-	-	-	-
NBR	0	0	0	0	0	0	-	-	-	-
SBL	0	0	1	16	1	16	-	-	-	-
SBT	1	1600	0	0	0	0	0.001 *	0.011 *	0.001 *	0.011 *
SBR	0	0	0	2	0	2	-	-	-	-
EBL	1	1600	0	4	0	4	0.000	0.003	0.000	0.003
EBT	1	1600	18	18	18	18	0.011	0.011	0.011	0.011
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	0	0	0	0	-	-	-	-
WBT	1	1600	29	29	29	29	0.018 *	0.018 *	0.018 *	0.018 *
WBR	1	1600	10	48	10	48	0.006	0.030	0.006	0.030
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.119**	**0.129**	**0.119**	**0.129**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 03 PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *CLUBHOUSE DRIVE*

E/W STREET: *ENCINAL CANYON ROAD*

CONTROL TYPE: *UNSIGNALIZED*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	0	0	0	11	0	1	0	36	0	0	27	5
(B) PROJECT-ADDED:	0	0	0	40	0	4	4	0	0	0	0	30
(C) CUMULATIVE:	0	0	0	11	0	1	0	36	0	0	27	5

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
		LR	L T	T R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	0	0	0	0	0	0	-	-	-	-
NBR	0	0	0	0	0	0	-	-	-	-
SBL	0	0	11	51	11	51	-	-	-	-
SBT	1	1600	0	0	0	0	0.008 *	0.035 *	0.008 *	0.035 *
SBR	0	0	1	5	1	5	-	-	-	-
EBL	1	1600	0	4	0	4	0.000	0.003	0.000	0.003
EBT	1	1600	36	36	36	36	0.023 *	0.023 *	0.023 *	0.023 *
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	0	0	0	0	-	-	-	-
WBT	1	1600	27	27	27	27	0.017	0.017	0.017	0.017
WBR	1	1600	5	35	5	35	0.003	0.022	0.003	0.022
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.131**	**0.158**	**0.131**	**0.158**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 04 AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: ***A.M. PEAK HOUR***

N/S STREET: ***KANAN ROAD***

E/W STREET: ***ENCINAL CANYON ROAD***

CONTROL TYPE: ***UNSIGNALIZED***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	16	198	1	6	523	57	29	2	16	6	0	1
(B) PROJECT-ADDED:	11	0	0	0	0	27	11	0	4	0	0	0
(C) CUMULATIVE:	18	213	1	6	535	59	31	2	18	6	0	1

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TR	L T R	LT R	LT R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	16	27	18	29	0.010 *	0.017 *	0.011 *	0.018 *
NBT	1	1600	198	198	213	213	0.124	0.124	0.134	0.134
NBR	0	0	1	1	1	1	-	-	-	-
SBL	1	1600	6	6	6	6	0.004	0.004	0.004	0.004
SBT	1	1600	523	523	535	535	0.327 *	0.327 *	0.334 *	0.334 *
SBR	1	1600	57	84	59	86	0.036	0.053	0.037	0.054
EBL	0	0	29	40	31	42	-	-	-	-
EBT	1	1600	2	2	2	2	0.019 *	0.026 *	0.021 *	0.028 *
EBR	1	1600	16	20	18	22	0.010	0.013	0.011	0.014
WBL	0	0	6	6	6	6	-	-	-	-
WBT	1	1600	0	0	0	0	0.004 *	0.004 *	0.004 *	0.004 *
WBR	1	1600	1	1	1	1	0.001	0.001	0.001	0.001
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.460**	**0.474**	**0.470**	**0.484**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 04 PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *9/6/2012*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *KANAN ROAD*

E/W STREET: *ENCINAL CANYON ROAD*

CONTROL TYPE: *UNSIGNALIZED*

TRAFFIC VOLUME SUMMARY

	NORTH BOUND			SOUTH BOUND			EAST BOUND			WEST BOUND		
VOLUMES	L	T	R	L	T	R	L	T	R	L	T	R
(A) EXISTING:	21	432	7	5	302	53	90	2	11	5	5	7
(B) PROJECT-ADDED:	8	0	0	0	0	22	29	0	11	0	0	0
(C) CUMULATIVE:	23	464	7	5	314	55	92	2	13	5	5	7

GEOMETRICS

	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
LANE GEOMETRICS	L TR	L T R	LT R	LT R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	21	29	23	31	0.013	0.018	0.014	0.019
NBT	1	1600	432	432	464	464	0.274 *	0.274 *	0.294 *	0.294 *
NBR	0	0	7	7	7	7	-	-	-	-
SBL	1	1600	5	5	5	5	0.003 *	0.003 *	0.003 *	0.003 *
SBT	1	1600	302	302	314	314	0.189	0.189	0.196	0.196
SBR	1	1600	53	75	55	77	0.033	0.047	0.034	0.048
EBL	0	0	90	119	92	121	-	-	-	-
EBT	1	1600	2	2	2	2	0.058 *	0.076 *	0.059 *	0.077 *
EBR	1	1600	11	22	13	24	0.007	0.014	0.008	0.015
WBL	0	0	5	5	5	5	-	-	-	-
WBT	1	1600	5	5	5	5	0.006 *	0.006 *	0.006 *	0.006 *
WBR	1	1600	7	7	7	7	0.004	0.004	0.004	0.004
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.441**	**0.459**	**0.462**	**0.480**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

UNSIGNALIZED INTERSECTION

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT REF: 05 AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *03/06/2013*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *KANAN ROAD*

E/W STREET: *U.S. 101 NB RAMPS-CANWOOD STREET (SPLIT-PHASED)*

CONTROL TYPE: *UNSIGNALIZED*

TRAFFIC VOLUME SUMMARY

	NORTH BOUND			SOUTH BOUND			EAST BOUND			WEST BOUND		
VOLUMES	L	T	R	L	T	R	L	T	R	L	T	R
(A) EXISTING:	61	828	216	0	1807	52	47	0	121	448	76	722
(B) PROJECT-ADDED:	0	0	0	0	0	0	0	0	0	27	0	0
(C) CUMULATIVE:	61	869	306	0	1859	52	47	0	121	557	76	722

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT R	TTT R	L R	L LT RR

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	61	61	61	61	0.038 *	0.038 *	0.038 *	0.038 *
NBT	2	3200	828	828	869	869	0.259	0.259	0.272	0.272
NBR (a)	1	1600	216	216	306	306	0.135	0.135	0.191	0.191
SBL	0	0	0	0	0	0	-	-	-	-
SBT	3	4800	1807	1807	1859	1859	0.376 *	0.376 *	0.387 *	0.387 *
SBR (b)	1	1600	27	27	27	27	0.017	0.017	0.017	0.017
EBL	1	1600	47	47	47	47	0.029	0.029	0.029	0.029
EBT	0	0	0	0	0	0	-	-	-	-
EBR (c)	1	1600	68	68	68	68	0.043 *	0.043 *	0.043 *	0.043 *
WBL	0	0	448	475	557	584	-	-	-	-
WBT	2	2880	76	76	76	76	0.182 *	0.191 *	0.220 *	0.229 *
WBR (d)	2	3200	412	412	412	412	0.129	0.129	0.129	0.129
					LOST TIME:		0.050 *	0.050 *	0.050 *	0.050 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.689**	**0.698**	**0.738**	**0.747**
					SCENARIO LEVEL OF SERVICE:		B	B	C	C

NOTES:

(a) RIGHT-TURN OVERLAP WITH WB LEFT-TURNS
(b) 48% RTOR
(c) 44% RTOR
(d) 43% RTOR

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 05 PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *03/06/2013*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *KANAN ROAD*

E/W STREET: *U.S. 101 NB RAMPS-CANWOOD STREET (SPLIT-PHASED)*

CONTROL TYPE: *UNSIGNALIZED*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	26	1119	439	0	1262	65	63	0	132	253	100	808
(B) PROJECT-ADDED:	0	0	0	0	0	0	0	0	0	22	0	0
(C) CUMULATIVE:	26	1222	663	0	1372	65	63	0	132	478	100	808

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	L TT R	TTT R	L R	L LT RR

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	1	1600	26	26	26	26	0.016	0.016	0.016	0.016
NBT	2	3200	1119	1119	1222	1222	0.350 *	0.350 *	0.382 *	0.382 *
NBR (a)	1	1600	439	439	663	663	0.274	0.274	0.414	0.414
SBL	0	0	0	0	0	0	-	-	-	-
SBT	3	4800	1262	1262	1372	1372	0.263	0.263	0.286	0.286
SBR (b)	1	1600	34	34	34	34	0.021	0.021	0.021	0.021
EBL	1	1600	63	63	63	63	0.039	0.039	0.039	0.039
EBT	0	0	0	0	0	0	-	-	-	-
EBR (c)	1	1600	74	74	74	74	0.046 *	0.046 *	0.046 *	0.046 *
WBL	0	0	253	275	478	500	-	-	-	-
WBT	2	2880	100	100	100	100	0.123	0.130	0.201 *	0.208 *
WBR (d)	2	3200	461	461	461	461	0.144 *	0.144 *	0.144	0.144
					LOST TIME:		0.050 *	0.050 *	0.050 *	0.050 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.590**	**0.590**	**0.679**	**0.686**
					SCENARIO LEVEL OF SERVICE:		A	A	B	B

NOTES:

(a) RIGHT-TURN OVERLAP WITH WB LEFT-TURNS
(b) 48% RTOR
(c) 44% RTOR
(d) 43% RTOR

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 06 AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *03/06/2013*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *KANAN ROAD*

E/W STREET: *U.S. 101 SB RAMPS-ROADSIDE DRIVE (SPLIT-PHASED)*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	0	630	32	125	740	1017	632	149	369	20	0	104
(B) PROJECT-ADDED:	0	11	0	0	27	0	0	0	0	0	0	0
(C) CUMULATIVE:	0	806	32	159	867	1017	632	173	443	20	0	104

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	T T TR	L TT R	L LTR R	L R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	3	4800	630	641	806	817	0.136 *	0.138 *	0.173 *	0.175 *
NBR (a)	0	0	22	22	22	22	-	-	-	-
SBL	1	1600	125	125	159	159	0.078 *	0.078 *	0.099 *	0.099 *
SBT	2	3200	740	767	867	894	0.231	0.240	0.271	0.279
SBR (b)	1	1600	1017	1017	1017	1017	0.636	0.636	0.636	0.636
EBL	0	0	632	632	632	632	-	-	-	-
EBT	3	4800	149	149	173	173	0.197 *	0.197 *	0.209 *	0.209 *
EBR (c)	0	0	166	166	199	199	-	-	-	-
WBL	1	1600	20	20	20	20	0.013	0.013	0.013	0.013
WBT	0	0	0	0	0	0	-	-	-	-
WBR (d)	1	1600	32	32	32	32	0.020 *	0.020 *	0.020 *	0.020 *
					LOST TIME:		0.050 *	0.050 *	0.050 *	0.050 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.481**	**0.483**	**0.551**	**0.553**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

(a) 13% RTOR
(b) RIGHT-TURN OVERLAP WITH EB LEFT-TURNS
(c) 55% RTOR
(d) 69% RTOR

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 06 PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE:

TIME PERIOD: ***P.M. PEAK HOUR***

N/S STREET: ***KANAN ROAD***

E/W STREET: ***U.S. 101 SB RAMPS-ROADSIDE DRIVE (SPLIT-PHASED)***

CONTROL TYPE: ***SIGNAL***

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	0	973	32	153	505	448	587	120	294	22	0	296
(B) PROJECT-ADDED:	0	29	0	0	22	0	0	0	0	0	0	0
(C) CUMULATIVE:	0	1423	32	217	776	448	587	163	434	22	0	395

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND TT TR	SOUTH BOUND L TT R	EAST BOUND L LTR R	WEST BOUND L R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A + B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B + C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	3	4800	973	1002	1423	1452	0.209 *	0.215 *	0.303 *	0.309 *
NBR (a)	0	0	29	29	29	29	-	-	-	-
SBL	1	1600	153	153	217	217	0.096 *	0.096 *	0.136 *	0.136 *
SBT	2	3200	505	527	776	798	0.158	0.165	0.243	0.249
SBR (b)	1	1600	448	448	448	448	0.280	0.280	0.280	0.280
EBL	0	0	587	587	587	587	-	-	-	-
EBT	3	4800	120	120	163	163	0.173 *	0.173 *	0.194 *	0.194 *
EBR (c)	0	0	123	123	182	182	-	-	-	-
WBL	1	1600	22	22	22	22	0.014	0.014	0.014	0.014
WBT	0	0	0	0	0	0	-	-	-	-
WBR (d)	1	1600	139	139	186	186	0.087 *	0.087 *	0.116 *	0.116 *
			LOST TIME:				0.050 *	0.050 *	0.050 *	0.050 *
			TOTAL INTERSECTION CAPACITY UTILIZATION:				**0.615**	**0.621**	**0.799**	**0.805**
			SCENARIO LEVEL OF SERVICE:				**B**	**B**	**C**	**D**

NOTES:

(a) 9% RTOR
(b) RIGHT-TURN OVERLAP WITH EB LEFT-TURNS
(c) 58% RTOR
(d) 53% RTOR

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT REF: 06 PM_MIT

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE:

TIME PERIOD: *P.M. PEAK HOUR* *MITIGATED*

N/S STREET: *KANAN ROAD*

E/W STREET: *U.S. 101 SB RAMPS-ROADSIDE DRIVE (SPLIT-PHASED)*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	0	973	32	153	505	448	587	120	294	22	0	296
(B) PROJECT-ADDED:	0	29	0	0	22	0	0	0	0	0	0	0
(C) CUMULATIVE:	0	1423	32	217	776	448	587	163	434	22	0	395

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
	TT TR	LL TT R	L LTR R	L R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVEMENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	3	4800	973	1002	1423	1452	0.209 *	0.215 *	0.303 *	0.309 *
NBR (a)	0	0	29	29	29	29	-	-	-	-
SBL	2	3200	153	153	217	217	0.048 *	0.048 *	0.068 *	0.068 *
SBT	2	3200	505	527	776	798	0.158	0.165	0.243	0.249
SBR (b)	1	1600	448	448	448	448	0.280	0.280	0.280	0.280
EBL	0	0	587	587	587	587	-	-	-	-
EBT	3	4800	120	120	163	163	0.173 *	0.173 *	0.194 *	0.194 *
EBR (c)	0	0	123	123	182	182	-	-	-	-
WBL	1	1600	22	22	22	22	0.014	0.014	0.014	0.014
WBT	0	0	0	0	0	0	-	-	-	-
WBR (d)	1	1600	139	139	186	186	0.087 *	0.087 *	0.116 *	0.116 *
			LOST TIME:				0.050 *	0.050 *	0.050 *	0.050 *
			TOTAL INTERSECTION CAPACITY UTILIZATION:				**0.567**	**0.573**	**0.731**	**0.737**
			SCENARIO LEVEL OF SERVICE:				A	A	C	C

NOTES:

(a) 9% RTOR
(b) RIGHT-TURN OVERLAP WITH EB LEFT-TURNS
(c) 58% RTOR
(d) 53% RTOR

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT REF: 07 AM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *JULY 12, 2012*

TIME PERIOD: *A.M. PEAK HOUR*

N/S STREET: *KANAN DUME ROAD*

E/W STREET: *PACIFIC COAST HIGHWAY (SR1)*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	T	R	SOUTH BOUND L	T	R	EAST BOUND L	T	R	WEST BOUND L	T	R
(A) EXISTING:	0	0	0	199	0	250	139	672	0	0	601	106
(B) PROJECT-ADDED:	0	0	0	4	0	0	0	0	0	0	0	11
(C) CUMULATIVE:	0	0	0	208	0	255	145	781	0	0	665	117

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
		LL R	L TT	TT R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVE-MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	0	0	0	0	0	0	-	-	-	-
NBR	0	0	0	0	0	0	-	-	-	-
SBL	2	3200	199	203	208	212	0.062 *	0.063 *	0.065 *	0.066 *
SBT	0	2880	0	0	0	0	0.000	0.000	0.000	0.000
SBR (a)	1	1600	215	215	219	219	0.134	0.134	0.137	0.137
EBL	1	1600	139	139	145	145	0.087 *	0.087 *	0.091 *	0.091 *
EBT	2	3200	672	672	781	781	0.210	0.210	0.244	0.244
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	0	0	0	0	-	-	-	-
WBT	2	3200	601	601	665	665	0.188 *	0.188 *	0.208 *	0.208 *
WBR	1	1600	73	81	81	88	0.046	0.051	0.051	0.055
					LOST TIME:		0.100 *	0.100 *	0.100 *	0.100 *
					TOTAL INTERSECTION CAPACITY UTILIZATION:		**0.437**	**0.438**	**0.464**	**0.465**
					SCENARIO LEVEL OF SERVICE:		A	A	A	A

NOTES:

(a) Right-turn not critical due to overlap phase with EB left-turn

Printed: 09/09/13

#11067 MALIBU INSTITUTE PROJECT **REF:** 07 PM

INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: *JULY 12, 2012*

TIME PERIOD: *P.M. PEAK HOUR*

N/S STREET: *KANAN DUME ROAD*

E/W STREET: *PACIFIC COAST HIGHWAY (SR1)*

CONTROL TYPE: *SIGNAL*

TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND L	NORTH BOUND T	NORTH BOUND R	SOUTH BOUND L	SOUTH BOUND T	SOUTH BOUND R	EAST BOUND L	EAST BOUND T	EAST BOUND R	WEST BOUND L	WEST BOUND T	WEST BOUND R
(A) EXISTING:	0	0	0	155	0	194	344	972	0	0	1006	247
(B) PROJECT-ADDED:	0	0	0	11	0	0	0	0	0	0	0	8
(C) CUMULATIVE:	0	0	0	164	0	199	355	1195	0	0	1268	270

GEOMETRICS

LANE GEOMETRICS	NORTH BOUND	SOUTH BOUND	EAST BOUND	WEST BOUND
		LL R	L TT	TT R

TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)
SCENARIO 2 = EXISTING + PROJECT VOLUMES (A+B)
SCENARIO 3 = EXISTING + RELATED PROJECTS (C)
SCENARIO 4 = EXISTING + RELATED PROJECTS + PROJECT (B+C)

LEVEL OF SERVICE CALCULATIONS

MOVEMENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES 1	2	3	4	SCENARIO V/C RATIOS 1	2	3	4
NBL	0	0	0	0	0	0	-	-	-	-
NBT	0	0	0	0	0	0	-	-	-	-
NBR	0	0	0	0	0	0	-	-	-	-
SBL	2	3200	155	166	164	175	0.048 *	0.052 *	0.051 *	0.055 *
SBT	0	2880	0	0	0	0	0.000	0.000	0.000	0.000
SBR (a)	1	1600	167	167	171	171	0.104	0.104	0.107	0.107
EBL	1	1600	344	344	355	355	0.215 *	0.215 *	0.222 *	0.222 *
EBT	2	3200	972	972	1195	1195	0.304	0.304	0.373	0.373
EBR	0	0	0	0	0	0	-	-	-	-
WBL	0	0	0	0	0	0	-	-	-	-
WBT	2	3200	1006	1006	1268	1268	0.314 *	0.314 *	0.396 *	0.396 *
WBR	1	1600	170	176	186	192	0.106	0.110	0.116	0.120
			LOST TIME:				0.100 *	0.100 *	0.100 *	0.100 *
			TOTAL INTERSECTION CAPACITY UTILIZATION:				**0.677**	**0.681**	**0.769**	**0.773**
			SCENARIO LEVEL OF SERVICE:				**B**	**B**	**C**	**C**

NOTES:

(a) Right-turn not critical due to overlap phase with EB left-turn

Printed: 09/09/13

BUNGALOW DESIGN AND OPERATIONAL METHODOLOGY

THE MALIBU INSTITUTE

Bungalow Design and Operational Methodology

Background/Previous Plan

In the Malibu Institute entitlement applications submitted to Los Angeles County in September 2011, The Malibu Institute proposed to develop an educational retreat on the 650-acre property with over 100,000 square feet of meeting facilities, along with visitor-serving accommodations in 58 bungalow structures consisting of 4-5 separately locked-off suites totaling 271 individual keys, a 6-hole golf course and a spa/wellness center. This development proposal did not receive support from the Regional Planning office due to the overall density, lack of clustering, total number of individual suites available in the bungalows and the removal of the existing 18-hole golf course.

Revised Current Plan

After numerous meetings with Regional Planning and the District Supervisor's office, a revised plan and operational concept was submitted to Regional Planning in June 2012. In the revised plan, the Malibu Institute has been substantially re-designed to accommodate group-oriented educational/corporate style retreats in association with the University of Southern California. A shuttle program is included as part of the project that would transport groups to and from the site. The existing 18-hole golf course will be remodeled to make it more environmentally and player friendly and the overnight bungalows were clustered and reduced to a total of 40 units. Additionally, the space designed and dedicated to meetings was reduced from over 100,000 to approximately 25,000 square feet, catering to the same group requiring multiple break-out rooms. Most importantly, the bungalow units were specifically designed to accommodate group business or golf foursomes with four bedrooms and an adjoining entertainment/meeting area for guests affiliated with the same group or family, not separate lock-off units. The bungalows would not be conducive to unaffiliated individuals since the individual bedrooms in the bungalow open up directly to the entertainment area and all the bedrooms are accessed through one central main door of the bungalow.

Operational Methodology

The Malibu Institute is being designed to the highest environmental design principles available today including seeking LEED™ Platinum certification (or equivalent) in all of the buildings, solar arrays, and charging stations for electric vehicles. As a part of this sustainable philosophy, shuttle vans and carpooling will be strongly promoted to all Institute guests. Even though there will be 387 dedicated parking spaces due to the County parking requirement based on building square footage, the design of the facility and the bungalows are for affiliated groups and it is projected that the majority of the guests will utilized shuttle vans and or carpools. It is highly unlikely and impractical that a group sharing a four-bedroom bungalow would travel in four separate vehicles. Well-documented industry standards would also support the reduced traffic generation based on similarly designed hospitality units. Additionally, since the facility is designed to attract multi-day golf oriented style educational and corporate retreats, the majority of the daily golf rounds and attendees utilizing the meeting space will be the same people, thereby further reducing the traffic generation. Furthermore, the dining facilities will also cater to the same captive audience since the bungalows will not have kitchen facilities.

LOS ANGELES COUNTY PARKING REQUIREMENTS

Burden of Proof for Parking Permit
Parking Permit No. 201100005
The Malibu Institute

Background

The Applicant proposes to develop the Malibu Institute, a sports-oriented educational retreat affiliated with the University of Southern California, to complement a remodeled 18-hole golf course on a 650-acre property currently operated as the 18-hole Malibu Golf Club in the unincorporated Malibu area of Los Angeles County. The Project would provide for the development of educational and meeting facilities, overnight visitor-serving accommodations in 40 bungalows, a warehouse, a cart storage building, a clubhouse with a spa and pool, a pro shop, and a maintenance building. The Project would allow the continued public use of a remodeled 18-hole golf course, improved with an environmentally superior design.

The Project would incorporate many "green" features. All development would occur in areas previously disturbed by construction and operation of the existing golf course. By clustering development of the buildings and accommodations on approximately 20 acres and the remodeled golf course on 107 acres in the southern portion of the 650-acre property, over 450 acres of native coastal scrub and chaparral, including oak woodland forest, would be left undisturbed and become permanently dedicated open space. The Institute building, which would contain the educational and meeting facilities, would use the building footprint, foundation and infrastructure of the existing clubhouse and cart barn. The remodeled 18-hole golf course would use a "smart" irrigation system and drought-tolerant grasses and native vegetation, which would use 35% less water than the existing golf course. As part of the golf course remodel, the Project would remove 1,590 non-native trees, including palm trees, and plant only native, drought-tolerant trees within the remodeled areas around the golf course. The Project would replace over 185,000 square feet of existing non-pervious parking lots and cart paths with pervious material to allow infiltration of storm water and improve water quality. The buildings and accommodations would incorporate sustainable and green design with the goal of achieving LEED™ Platinum certification (or equivalent) for all buildings on the property. The Project would use photovoltaic panels over shade structures in the expanded surface parking area to generate most of the energy needs for the Project and would replace existing outdoor overhead parking lot lighting, which currently can be seen from off-site, with lighting complying with Dark Skies initiatives and the County's Rural Lighting Outdoor Lighting District Ordinance. Finally, the Project would remove multiple septic tanks throughout the property and install an on-site wastewater treatment system with effluent meeting Title 22 standards for reuse as irrigation for the remodeled golf course.

The Project would create a project far below the maximum allowable density. The Malibu Institute would be consistent with the low-intensity development mandate of the County-approved Santa Monica Mountains Local Coastal Program (LCP). Pursuant to the Local Implementation Plan (LIP) of the LCP, the portion of the site designated Commercial Recreation in the LCP, which consists of approximately 330.5 acres of the 650-acre site, could be developed at a maximum land use intensity of 0.3 FAR (Floor to Area Ratio). However, the proposed 224,287 square feet of development proposed for the Project constitutes a FAR of just .016, which is only 5% the 4,318,974 square feet of development allowed under the LIP.

The County Code would require the following parking for the Project:

Proposed Use	Square Feet (GSF)	Spaces/Square Footage	Required Parking
Information Building	447 sq. ft.	1/250 sq. ft.	2
Malibu Institute	48,164 sq. ft.	1:3 occ, based on 193 occupant load	64
Cart Storage	9,162 sq. ft.	1:2 full-time employees	1
Warehouse	4,623 sq. ft.	1/1000 sq. ft	5
Clubhouse	30,147 sq. ft.	1:3 occ, based on 121 occupant load	40
Pro Shop/Grille	12,104 sq. ft.	10/each hole	180
Maintenance Building	10,500 sq. ft.	1:2 full-time employees	6
40 Guest Bungalows	160 rooms 109,140 sq. ft.	1 per 2 guestrooms	80
Total	224,287 sq. ft.		**378**

Pursuant to Los Angles County Zoning Code section 22.56.990, projects proposing a parking arrangement different than the parking requirements of County Code section 22.52 require a parking permit. Although the Malibu Institute would satisfy Code-required parking for the entire Project, in order to cluster the buildings in the southern portion of the 650-acre property and allow the dedication of over 450 acres of permanent open space, the Project can not satisfy Code-required parking on each respective lot, and, instead would provide shared parking between lots. Accordingly, the Applicant requests a parking permit to authorize the use of shared parking between lots on the property. No tandem or compact spaces are proposed to meet Code-required parking.

The following findings of fact are required pursuant to Los Angeles County Code section 22.56.1020, all of which are affirmatively proven:

A. That there will be no need for the number of parking spaces required by Part 11 of Chapter 22.52 because:

1. The age and/or physical condition of the residents is such that the use of an automobile is unlikely, or

2. The nature of the use is such that there is a reduced occupancy, or

3. The business or use has established a viable transportation program for its employees and/or customers to use transportation modes other than the single occupant automobile. Such a program shall include positive incentive such as van pools, transit fare subsidies, commuter travel allowances, car pools or bicycle commuter facilities. Where appropriate, proximity to freeways with high-occupancy vehicle (HOV) lanes, bus routes, park-and-ride facilities, people movers, rapid transit stations,

bikeways, or other similar facilities, shall be a factor in this consideration, or

4. **Sufficient land area is reserved or an alternative arrangement is approved to insure that the parking requirements may be complied with should the use, occupancy, or transportation program change. Such reservation or alternative may be waived for certain a senior citizen and handicapped person housing development where the director finds that it is unnecessary because of the anticipated permanent nature of such use. If required, the reserved land shall be so located and developed in such a manner that it can be feasibility converted to parking if needed;**

The Project would provide parking as required by County Code, however, the demand for parking would be less than Code requirements due to the nature of the proposed uses at the Malibu Institute. The strict interpretation of the County Code would require a certain number of parking spaces for each use on a lot at the property, even though the same people would be engaging in the those uses on the property. For example, the people using the Malibu Institute conference center would be the same people residing in the guest bungalows. All parking would be located on pervious surface parking lots containing a total of 387 parking spaces within the property. Pervious pedestrian, bicycle and electric cart pathways would be provided throughout the development area to enhance non-motorized circulation, and get guests out of their cars as soon as they arrive at the Malibu Institute. All required parking would be provided on-site at pervious surface parking lots using photovoltaic panels over shade structures in the parking area to generate most of the energy needs for the Project. Accordingly, the proposed parking would have no effect on the circulation or parking in the surrounding area.

Shared parking would be used to provide parking for all uses proposed at the property. When there are major events at the Malibu Institute, the Project proposes the use of valet services, if necessary, to handle overflow parking for these events. The valet parking attendants would supervise any shared parking when in use to ensure easy ingress and egress of employees, independent contractors and visitors from those spaces. No tandem or compact parking spaces would be required for the Project.

B. **That there will be no conflicts arising from special parking arrangements allowing shared facilities, tandem spaces or compact spaces because:**

1. **Uses sharing parking facilities operate at different times of the day or days of the week, or**

2. **Parking facilities using tandem spaces will employ valets or will utilize other means to insure a workable plan, or**

3. **Apartment houses using compact spaces for a portion of the required parking have a management program or homeowners' association to assure an efficient distribution of all parking spaces;**

The Project would provide parking as required by County Code, however, the demand for parking would be less than Code requirements due to the nature of the proposed uses at the Malibu Institute. The strict interpretation of the County Code would require each of the uses at the Malibu Institute to provide a certain number of parking spaces for each use on a lot, even though the same people would be using the different uses on the property. For example, the

people using the Malibu Institute meeting rooms would be the same people using the guest bungalows. All parking would be located on pervious surface parking lots containing 387 parking spaces within the property. Pervious pedestrian, bicycle and electric cart pathways would be provided throughout the development area to enhance non-motorized circulation, and get guests out of their cars as soon as they arrive at the Malibu Institute. All required parking would be provided on-site at pervious surface parking lots using photovoltaic panels over shade structures in the parking area to generate most of the energy needs for the Project. Accordingly, the proposed parking would have no effect on the circulation or parking in the surrounding area.

Shared parking would be used to provide parking for all uses proposed at the property. When there are major events at the Malibu Institute, the Project proposes the use of valet services, if necessary, to handle overflow parking for special events. The valet parking attendants would supervise any shared parking when in use to ensure easy ingress and egress of employees, independent contractors and visitors from those spaces. No tandem or compact parking spaces would be required for the Project.

C. That off-site facilities, leases of less than 20 years, rear lot transitional parking lots and uncovered residential parking spaces will provide the required parking for uses because:

1. Such off-site facilities are controlled through ownership, leasing or other arrangement by the owner of the use for which the site serves and are conveniently accessible to the main use, or

2. Such leases are written in such a way as to prevent multiple leasing of the same spaces or cancellation without providing alternate spaces; such leases shall contain other guarantees assuring continued availability of the spaces, or

3. Such transitional lots are designed to minimize adverse effects on surrounding properties, or

4. Uncovered parking for low and moderate income residential developments will be appropriately screened and compatible with the surrounding neighborhood;

The Project would provide parking as required by County Code, however, the demand for parking would be less than Code requirements due to the nature of the proposed uses at the Malibu Institute. The strict interpretation of the County Code would require each of the uses at the Malibu Institute to provide a certain number of parking spaces for each use on a lot, even though the same people would be using the different uses on the property. For example, the people using the Malibu Institute meeting rooms likely would be the same people using the guest bungalows. All parking would be located on pervious surface parking lots containing 387 parking spaces within the property. No tandem or compact parking spaces would be required for the Project. Accordingly, the proposed parking would have no effect on the circulation or parking in the surrounding area.

D. That the requested parking permit at the location proposed will not result in traffic congestion, excessive off-site parking, or unauthorized use of parking facilities developed to serve surrounding property;

The Project would provide parking as required by County Code, however, the demand for parking would be less than Code requirements due to the nature of the proposed uses at the Malibu Institute. The strict interpretation of the County Code would require each of the uses at the Malibu Institute to provide a certain number of parking spaces for each use on a lot, even though the same people would be using the different uses on the property. For example, the people using the Malibu Institute meeting rooms likely would be the same people using the guest bungalows. All parking would be located on pervious surface parking lots containing 387 parking spaces within the property. The 387 spaces are more than the Code-required 378 parking spaces and will be adequate to serve the uses at the property.

Pervious pedestrian, bicycle and electric cart pathways would be provided throughout the development area to enhance non-motorized circulation, and get guests out of their cars as soon as they arrive at the Malibu Institute. All required parking would be provided on-site at pervious surface parking lots using photovoltaic panels over shade structures in the parking area to generate most of the energy needs for the Project. Accordingly, the proposed parking would have no effect on the circulation or parking in the surrounding area.

E. That the proposed site is adequate in size and shape to accommodate the yards, walls, fences, loading facilities, landscaping and other development features prescribed in the Zoning Ordinance.

The site would be sufficiently large for the Project. The Project would be located within 20 acres of the larger 650-acre property, which is more than adequate to accommodate the Project and any yards, walls, fences, parking and loading facilities, landscaping and other development features. The clustering of development on 20 acres in the southern and central portions of the property would allow the dedication of over 450 acres as permanent open space.

The Project would comply with County development standards. To ensure there is ample parking, the Project would provide 387 parking spaces, which would be a sufficient number of spaces to accommodate the proposed uses and more than the 378 parking spaces required by the Los Angeles County Code.

PARKING MATRIX FORM

The Malibu Institute
PROJECT NO: VTTM No. 71735
PERMIT NO:

SITE ADDRESS: 901 Encinal Canyon Road, Malibu, California 90265
APN: See Attachment

	NAME OF BUSINESS	ADDRESS, UNIT OR SUITE NO.	USE (Retail, office, restaurant, residential, etc.)	GROSS SQ. FT. OF UNIT	OCCUPANT LOAD[1] (If applicable)	PARKING RATIO	SPACES REQUIRED[2]	SPACES PROVIDED
1	See Attachment							
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

1 Attach completed Building & Safety Occupancy Load Determination Form A.

2 Please refer to Sec. 22.52 Pt. 11 of the Zoning Ordinance.

3 If the total number of required spaces is a fraction, round to the nearest whole number.

TOTAL SPACES REQUIRED[3]	See Attachment
TOTAL SPACES PROVIDED	See Attachment
Difference	See Attachment

A negative difference may require an authorized Parking Permit or Minor Parking Deviation.

By my signature below, I certify that this analysis data is true to the best of my knowledge.

PROPERTY OWNER OR APPLICANT SIGNATURE

7-25-12
DATE OF SIGNATURE

THOMAS HIX
PRINT NAME

Attach additional sheets, if necessary.

85

Malibu Institute
901 Encinal Canyon Road

Parking Matrix
Title 22.52.1000

LRS Project No. 211089
July 26, 2012

Individual Use Calculation

Description	Use Classification	Area	Beds	Occ Load	Parking Ratio		Total Count
Information Building	Commercial Office	447		4	1/ 250	sf	2
Malibu Institute	Assembly	48164		193	1/ 3	occ	64
Cart Storage	Industrial	9162		2	1/ 2	occ	1
Warehouse	Industrial	4623		5	1/ 1000	sf	5
Clubhouse	Assembly	30147		121	1/ 3	occ	40
Pro Shop/Grille	Recreation	12104		N/A	10/ 1	hole	180
Maintenance Building	Industrial	10500		11	1/ 2	occ	6
Bungalows	Hotel	109140	160	160	1/ 2	bed	80
Total		224287		495			378
Stalls provided							387

Parking Ratios cited in Zoning Code-

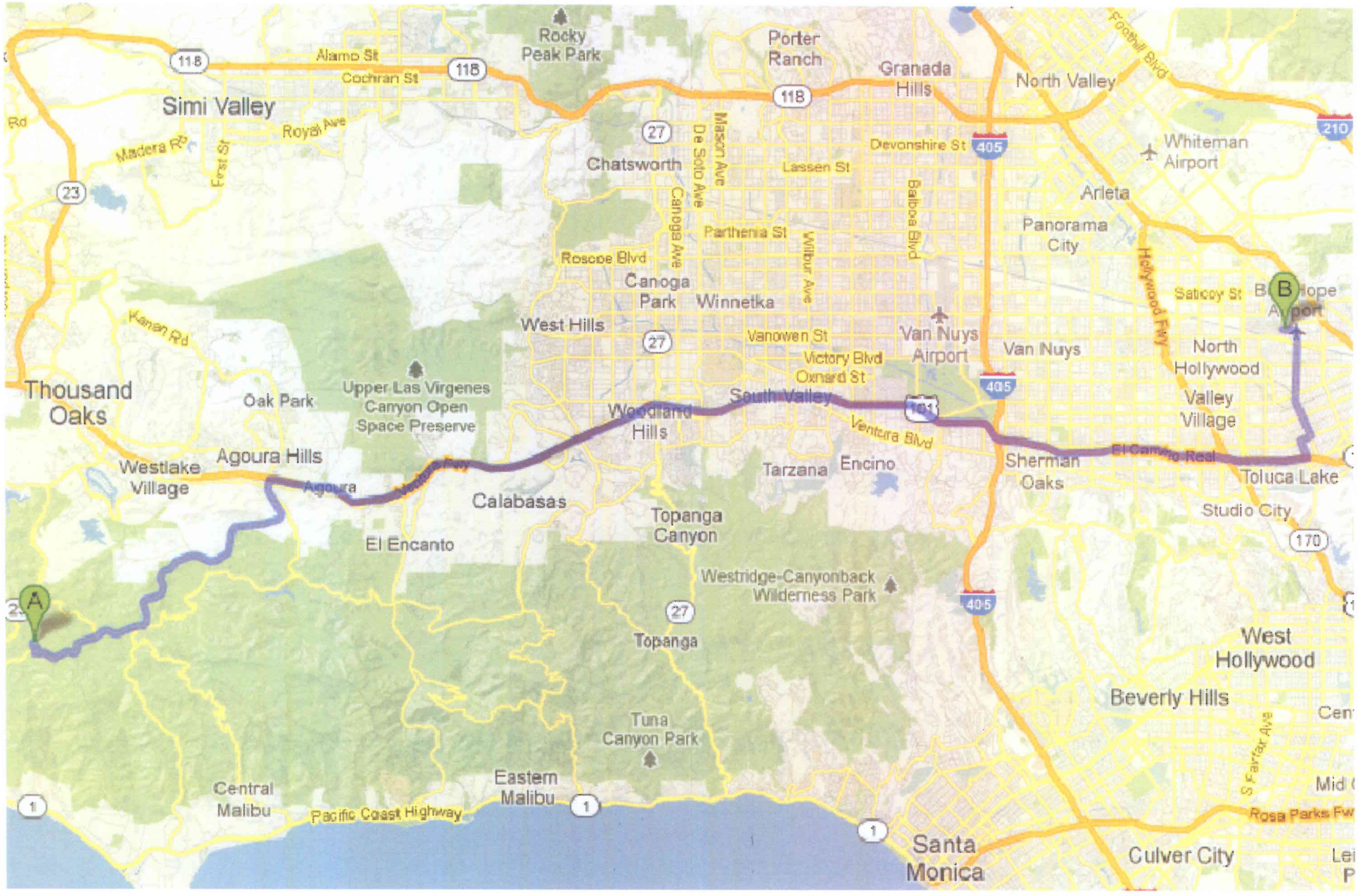
Office	22.52.1100-Office. 1:250 sf of area.
Assembly	22.52.1110.A.1-Entertainment, assembly and dining. 1:3 occupants based on 1:250 sf / occupant.
Guest Rooms	22.52.1130.4.1-Hotels, Clubs, Fraternity and Sorority houses, and Dormitories. 1:2 guestrooms.
Recreation	22.52.1115-Golf courses. 10 spaces:1 hole
Industrial	22.52.1140-Industrial Uses. 1:1,000 sf or 1:2 full-time employees
Industrial	22.52.1140-Industrial Uses. 1/2 employees or 1/1,000 sf of area.

The Malibu Institute
Attachment to Parking Matrix Form
Vesting Tentative Tract Map No. 71735

Assessor's Parcel Numbers:

1) 2058-015-003
2) 2058-015-013
3) 2058-015-037
4) 2058-015-045
5) 2058-015-046
6) 4471-001-028
7) 4471-001-029
8) 4471-001-032
9) 4471-001-033
10) 4471-001034
11) 4471-001-035
12) 4471-001-036
13) 4471-001-037
14) 4471-001-039
15) 4471-001-041
16) 4471-001-042
17) 4471-001-043
18) 4471-002-010
19) 4471-002-011
20) 4471-002-026
21) 4471-002-027
22) 4471-003-010
23) 4471-003-011
24) 4471-003-030
25) 4471-003-031
26) 4471-003-032
27) 4471-021-028
28) 4471-021-033
29) 4471-021-034

SHUTTLE ROUTE FIGURES



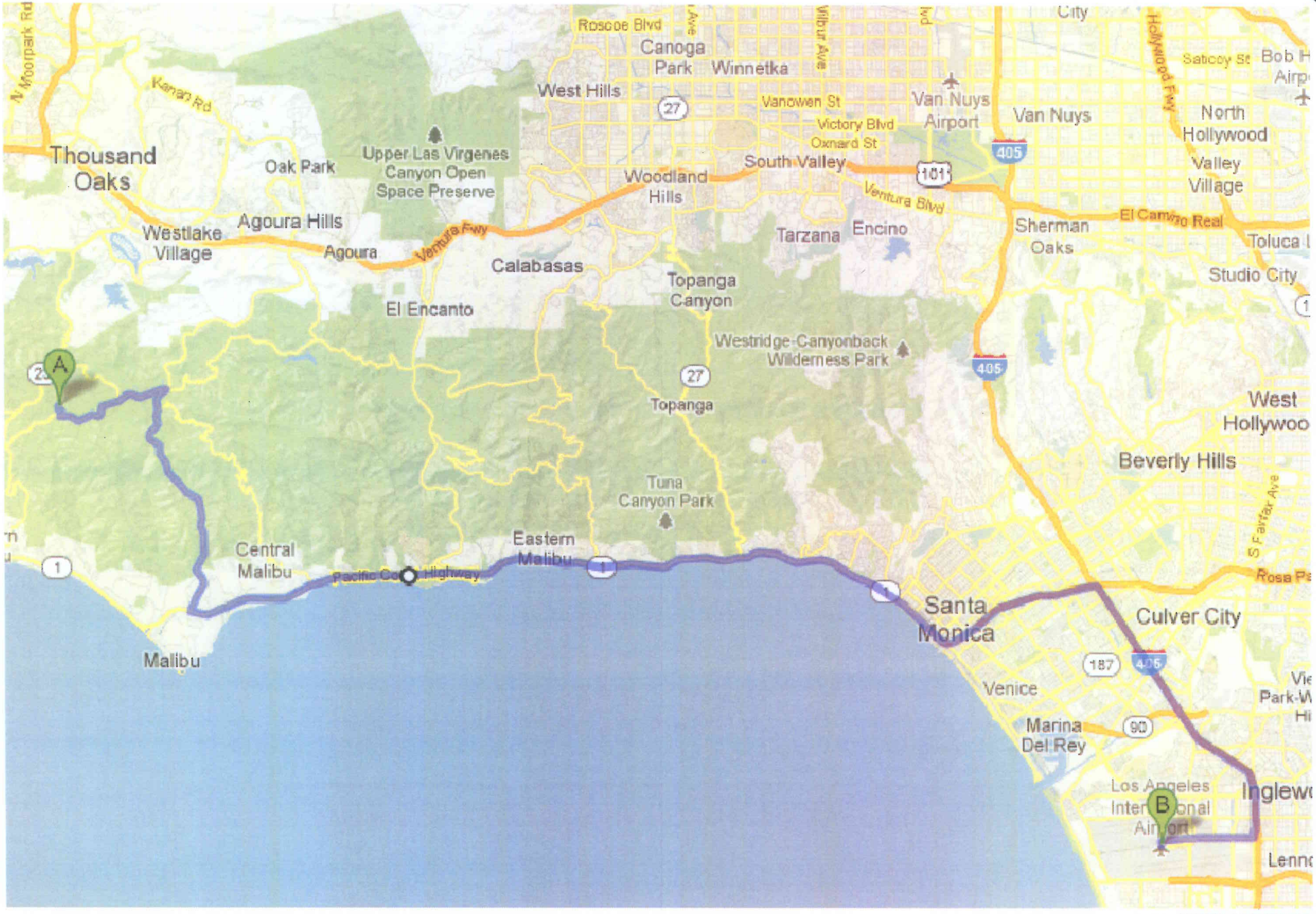
SOURCE: GOOGLE MAPS

ASSOCIATED TRANSPORTATION ENGINEERS

SHUTTLE ROUTE TO/FROM BURBANK AIRPORT

FIGURE

MMF - #11067



SOURCE: GOOGLE MAPS

ASSOCIATED TRANSPORTATION ENGINEERS

SHUTTLE ROUTE TO/FROM LOS ANGELES AIRPORT

FIGURE

MMF - #11067

CUMULATIVE PROJECT LISTS

NOTICE OF INTENT
TO ADOPT A MITIGATED NEGATIVE DECLARATION

In accordance with Section 15072 of the California Environmental Quality Act Guidelines, this notice is to inform public agencies, County residents and the general public that the County of Los Angeles Department of Public Works (LACDPW) has completed an Initial Study/Mitigated Negative Declaration (IS/MND) for the following proposed project:

Project Title: Camp Vernon Kilpatrick Replacement Project

Project Description: Camp Vernon Kilpatrick is an existing juvenile residential treatment camp that accommodates up to 125 detainee occupants and is comprised of 44,878 square feet (sf) of buildings; 86,325 sf of outdoor facilities; surface parking (39 spaces); and hardscape and landscape. The proposed Camp Vernon Kilpatrick Replacement Project (Project) site includes 11.7 acres that is partially developed with the existing Camp Kilpatrick facility. The Project does not involve any earth-disturbing or other Project-related activities at the adjacent Camp Miller to the south, which would remain operational during proposed Project construction. The County is proposing to demolish all existing structures and outdoor facilities at Camp Kilpatrick (with the exception of the swimming pool and kitchen/dining hall) and construct a replacement camp that would accommodate up to 120 detainee occupants and have approximately 47,000 sf of new buildings; 65,095 sf of outdoor facilities; surface parking (up to 180 spaces); and hardscape and landscape. The proposed structures and related facilities would be located generally in the same footprint as the existing Camp Kilpatrick facilities. However, the proposed Camp Kilpatrick replacement would reconfigure the physical design of the detainee housing and other facilities. Primarily, the two existing dormitories would be replaced with four smaller cottages that would enhance implementation of the County of Los Angeles Probation Department's current rehabilitation programming. In addition, the proposed Project would include Administration, Support Center/Education, Gymnasium/ Chapel/Visiting, and Maintenance/ Warehouse buildings. The existing centralized recreation area would be removed and a replacement multi-purpose field with track and a paved sports court would be constructed. The existing vehicular access from Encinal Canyon Road to Camp Kilpatrick would remain the same with Project implementation. A new 14-foot-high perimeter fence would be installed to replace the existing fence. In addition, the dining hall within the existing kitchen that is shared with Camp Miller would be repurposed through interior remodeling to manage food carts for meal transport to the proposed cottages.

Project Location: Camp Kilpatrick is located at 427 South Encinal Canyon Road within the unincorporated County and the Santa Monica Mountains. The City of Malibu is located approximately 3.5 miles to the south of the Project site, and the cities of Westlake Village and Thousand Oaks are located approximately 3 and 5 miles to the north-northwest, respectively.

Public Review Period: **September 28, 2012 through October 29, 2012**

Lead Agency: County of Los Angeles

Contact Person: Mr. Vincent Yu
County of Los Angeles Department of Public Works
900 South Fremont Avenue
PMD II, 5th Floor
Alhambra, California 91803

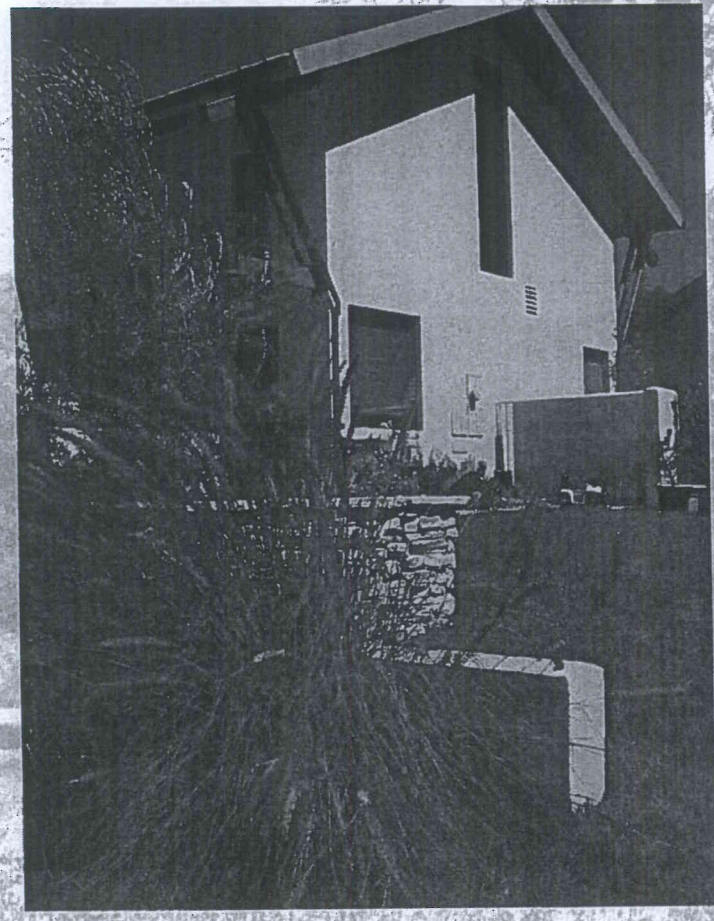
Availability of Mitigated Negative Declaration: The IS/MND and all referenced documents will be available for public review at the LACDPW office listed above between the hours of 7:00 AM and 5:00 PM Monday through Thursday. The document can also be reviewed online at ftp://dpwftp.co.la.ca.us/pub/PMD/CampKilpatrick/ and at the Malibu Library, located at 23519 West Civic Center Way in Malibu, California 90265 during business hours.

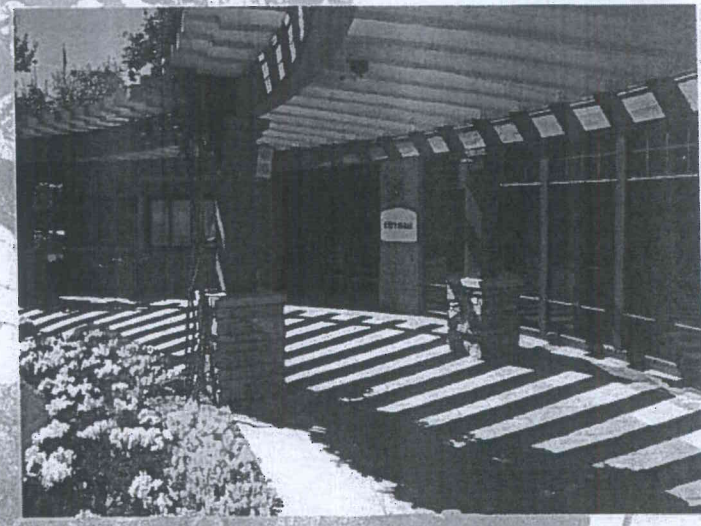
Methods of Submitting Comments: Please submit any comments on the IS/MND to Mr. Vincent Yu at the above listed address or email to: vyu@dpw.lacounty.gov before 5:00 p.m. on Monday, October 29, 2012.

City of Agoura Hills Development Summary

CITY OF AGOURA HILLS

Department of Planning and Community Development
30001 Ladyface Court, Agoura Hills, CA 91301
www.ci.agoura-hills.ca.us
(818) 597-7309





Commercial and Residential Projects December 2012 Quarterly Report

COMMERCIAL AND MIXED-USE PROJECTS IN REVIEW - DECEMBER 2012

Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	City Contact
1	**E.F. Moore & Co.**	03-CUP-006	SEC of Agoura and Kanan Road	2061-031-020	18 acres (784,080 sq.ft.)	Retail/office: 48,500 MFU:95	Agoura Village Mixed Use Development Env. Review: MND	A. Cook (818) 597-7310
2	**Heathcote for Buckley**	03-CUP-019	South of Agoura Road near western City Limits	2061-001-031	3 acres (130,680 sq.ft.)	14075.00	Commercial/Medical Building Env. Review: TBD	V. Darbouze (818) 597-7328
3	**Cornerstone/ Coast to Coast**	07-AVDP-002 + PM 70559	SEC Agoura Road and Cornell Road	2061-029-008/16; 2061-030-001/013	5.58 acres (243,172 sq.ft.)	Retail: 26,000 sq.ft. Office: 18,000 sq.ft. MFU: 35/41,000	Agoura Village Mixed Use Development Env. Review: MND	A. Cook (818) 597-7310
4	**Agoura-Kanan, LLC/ The Martin Group/Symphony Development**	07-AVDP-001	4995 Kanan Road	2061-033-016	21.58 acres (940,024.8 sq.ft.)	MFU: 107 units Retail:167,000	First phase of development & parcelization of site includes 107 res.units over 62,000sq.ft. of retail space. (other phases to include 30,000 sq.ft. of retail and 75,000 sq.ft. of commercial space). Env. Review: MND	A. Cook (818) 597-7310
5	**Agile Ventures, LLC**	07-AVDP-003	28870 Agoura Road	2061-029-003 and 2061-029-004	1.2 acres (48,709 sq. ft.)	17,249sq. ft.	Construct a two-story office condo (17 units) (Tr.Map required) on two-lots (PM required to combine lots for project.) Env. Review: MND	A. Cook (818) 597-7310
6	**Whizin Market Square, LLC/ Tucker Investment Group, LLC**	08-AVDP-001	28888 thru 28914 Roadside Drive	2061-007-041, 051, 052, 054, 055	8.95 acres (389,890 sq. ft.)	100,000 sq. ft. existing floor area, 14,850 sq. ft. of new flr.area and 5,800 sq. ft. of new outdoor dining areas.	Concept: 100,000sq.ft.of existing flr.area, 14,850 sq.ft.of new retail & restaurant flr.area, add 88 new parking spaces to existing 515 parking spaces & demolish baseball batting cages. Add 5,800 sq. ft. of outdoor dining, public seating, play areas, open space for outdoor entertainment & community gathering uses. Env. Review: Catex	D. Hooper (818) 597-7342

COMMERCIAL AND MIXED-USE PROJECTS IN REVIEW - DECEMBER 2012

7	**Ron Underwood (McDonald's Restaurant)**	05-SPR-018 Minor Amendment	29161 Canwood Street	2048-011-069	N/A	N/A	Façade remodel to the existing Mc Donald's Restaurant and Sign Program Update. Env. Review: Catex	R.Madrigal (818) 597-7339
8	**Steven Mongeau**	12-SPR-008	29136 Roadside Drive	2061-006-037, 2061-006-038, 2061-006-039	N/A	N/A	Façade remodel to the existing Burger King and revise signage. Env. Review: Catex	R.Madrigal (818) 597-7339
9	**Owen Nostrant**	12-AVDP-001	29112 Roadside Drive	2061-006-042	1.33 acres (57,817 sq.ft.)	6,512 sq.ft.	Add a new trellis element on the front elevation of the Roadside Lumber building; reconfiguring the easterly parking lot and driveways; relocating and removing accessory structures; providing new landscaping on both parcels; and providing a new monument sign on the westerly parcel. Env. Review: Catex	D. Hooper (818) 597-7342
10	**Owen Nostrant**	12-AVDP-002	29130 Roadside Drive	2061-006-048	0.44 acres (19,152 sq.ft.)	7,500 sq.ft.	Exterior Remodel and 744 sq.ft. addition to a retail showroom space at an existing lumber yard/hardware supply store Env Review: Catex	D. Hooper (818) 597-7342
11	**SACW for Sprint**	12-CUP-001	28020 Dorothy Drive	2061-013-037	N/A	N/A	Replacing antennas with new 4G antennas + additional equipment on the roof Env. Review: Catex	V.D. (818) 597-7328
12	**SACW for Sprint**	12-CUP-002	30125 Agoura Road	2061-005-058+047	N/A	N/A	Replacing antennas and equipment on the roof. Env. Review: Catex	V.D. (818) 597-7328

COMMERCIAL AND MIXED-USE PROJECTS IN REVIEW	ACRES	SQ.FT.	# OF UNITS
Commercial - New	**49.36**	**290,824.00**	**N/A**
Commercial - T.I. /Addition	**10.28**	**15,594.00**	**N/A**
Residential - New			**237**
Outdoor Use	**N/A**	**6,332**	**N/A**

COMMERCIAL AND MIXED-USE PROJECTS APPROVED - DECEMBER 2012

Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	City Contact
1P	**Elias Ben Hazany**	07-CUP-001	5226 Palo Comado Canyon Road	2052-008-030	0.45 acre (19,602 sq.ft.)	1,454.7 sq. ft.	Remodel existing gas station building and remove the service-bay facilities in order to convert entire building to a Food Mart. Env. Review: Catex	R. Madrigal (818) 597-7339
2P	**Shirvanian Family Investment (New ABC North)**	06-CUP-003 06-OTP-005 PM 65503	Lots between 28700 and 28811 Canwood Street	2048-012-026	10 acres (435,600 sq.ft.)	103,000 sq. ft.	Industrial park with 7 buildings Env. Review: MND	D. Hooper (818) 597-7342
3P	**Ware Malcomb for Agoura Business Center West,LLC (William Poe)**	07-CUP-010 07-GPA-001 07-ZC-001 PM 69426 08-VAR-006	Northwest corner of Canwood Street and Derry Ave.	2048-012-022 and 2048-012-027	The entire Lot 2 of Tr.33249 is 8.82 acres buildable area; however, with the new Parcel Map, the project site is proposed to be 1.93 acres (840,708 sq.ft.)	21,782 sq. ft.	A GPA and ZC app.to change project site from Bus.Manufacturing to Commercial Retail and a CUP app.to construct 3 retail buildings totalling 21,782 sq.ft. Env. Review: MND	V. Darbouze (818) 597-328
4P	**APB Properties LLC (Formerly 27489 Agoura Road LLC)**	11-SPR-009, 11-OTP-019, 11-VAR-002, VTPM 67397 (Ref Cases: 06-SPR-009, 06-OTP-021, 08-VAR-003, VTPM 67397)	27489 Agoura Road	2064-006-006, 007, 009, 016, 018, 019	5 empty lots and one developed lot for a site total of approx. 4.18 acres	30,000 sq. ft. (existing bldg. on site is 24,450 sq. ft.)	Time Extension for a project: 2 bldgs. One single-story, 10,000 sq.ft. and one two-story, 20,400 sq. ft. and a Parcel Map to combine the 6 lots. Env. Review: MND Addendum	V. Darbouze (818) 597-7328
5P	**Whizin Market Square, LLC/**	12-SP-035 & 12-VAR-003	28888-28914 Roadside Dr.	2061-007-041, 051, 052, 054, 055	N/A	N/A	Sign Program Amendment. Env. Review: Catex	D. Hooper (818) 597-7342

COMMERCIAL AND MIXED-USE PROJECTS APPROVED - DECEMBER 2012

6P	**PDC for AT&T**	11-CUP-002	28030 Dorothy Drive	2061-013-037	N/A	N/A	Upgrade wireless telecommunication facility. Env. Review: Catex	V. Darbouze (818) 597-7328
7P	**PDC for AT&T**	11-CUP-003	30105-30131 Agoura Road	2061-005-058	N/A	N/A	Upgrade wireless telecommunication facility. Env. Review: Catex	V. Darbouze (818) 597-7328
8P	**Acqua E Farina, Inc. Aka Blue Table**	12-CUP-005	28912 Roadside Drive, Suite 100	2061-007-041	8.95 acres (389,890 sq. ft.)	1,100 sq.ft + 500 sq.ft	Request a type 41 and type 20 license from ABC in a 500 sq.ft. addition to an existing restaurant Env. Review: Catex	V.D. (818) 597-7328
9P	**Steven P. Dahl**	12-SPR-006 & 12-VAR-004	5017 Lewis Road	2061-009-028 & 062	N/A	N/A	Improvements to building. Request for a reduction in the parking requirement. Env. Review: Catex	R.Madrigal (818) 597-7339

COMMERCIAL AND MIXED-USE PROJECTS APPROVED TOTAL:	ACRES	SQ.FT.	# OF UNITS
Commercial - New	**119**	**155,182.00**	**N/A**
Commercial - T.I. /Addition	**9.4**	**1,954.00**	**N/A**
Residential			**0**

City of Agoura Hills
December 2012

COMMERCIAL PROJECTS RECENTLY COMPLETED

Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	Env. Review
1C	**1534 McCadden LLC (Sunset Room)**	05-CUP-001 Amendment #2 + Amendment #3	29020 Agoura Road	2061-031-023 and 024	N/A	N/A	Amend CUP to extend hours for live entertainment, relocate dance floor, new ABC license. Revise conditions of approval.	Catex
2C	**Lulthly, Joseph**	07-CUP-008 07-OTP-005 07-VAR-002	28818 Agoura Road	2061-029-002	0.68 acres (29,722 sq.ft.)	1,062 sq. ft.	Convert existing non-conforming S.F. D.U in BP-OR Zone to Com. Bldg. and add a 113 sq. ft. to 1st floor; a 729 sq. ft. to 2nd floor and a new 220 sq. ft. covered patio; convert lattice patio cover to solid roof and convert the 684 sq. ft. garage to work area.	Catex
3C	**Scott Johnson**	12-SP-010	29041 Thousand Oaks Boulevard	2051-006-011	N/A	N/A	Sign Program Amendment.	Catex
4C	**Scheu Development Co. for Agoura Hills Corporate point, LLC**	98-CUP-012 98-OTP-010 Amendment TPM 71468 12-SP-024 12-VAR-002	30200 and 30300 Agoura Road	2061-002-022	26 acres (1,132,560 sq.ft.)	71,844 sq. ft.	Amendment to approved application to extend the approval beyond the allowed extension already granted for two com. office buildings on 5.23 acres The balance of the site to be deed restricted to prevent development.	EIR
5C	**Conrad Hilton Foundation**	09-CUP-001, 09-OTP-003, 10-VAR-004, VTPM 71284, 09-DA-001 12-SP027	30440 and 30500 Agoura Rd. (south side of Agoura Rd., east of Reyes Adobe)	2061-002-024 and 2061-002-048	66 acres (2,874,960 sq.ft.)	90,300 sq.ft.	Construct the Foundation headquarters in a three-phase campus style development. Phase I: One 22,240 sqft. office building with one 450 sqft. maintenance building and retaining walls.	EIR

COMMERCIAL PROJECTS RECENTLY COMPLETED

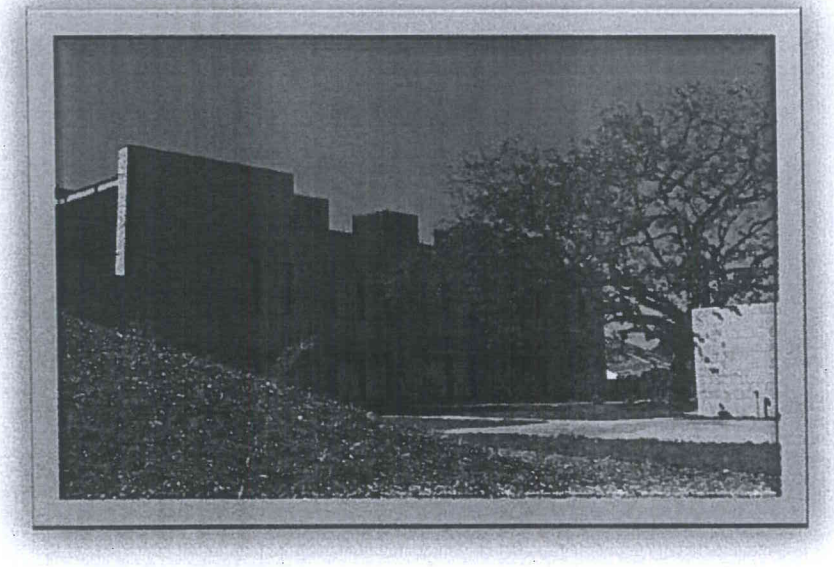
6C	**Conrad Hilton Foundation**	12-SP-027	30440 Agoura Road	2061-002-024 &048	N/A	N/A	Establish a Sign Program.	Catex
7C	**Tavistock Freebirds, LLC**	12-CUP-003	29125 Canwood St	2048-011-074	N/A	N/A	Reqest for ABC Liquor License	Catex

COMMERCIAL PROJECTS COMPLETED TOTALS (FROM ABOVE)	ACRES	SQ.FT.	# of UNITS
Commercial - New	92	94,084.00	N/A
Commercial - T.I./Addition	0.68	1,062.00	N/A
Residential - New			N/A
Outdoor Use		933.00	N/A

Agoura Hills Corporate Point

Freebirds

COMMERCIAL PROJECTS RECENTLY COMPLETED



Hilton Foundation

Luithly Office Building Conversion

RESIDENTIAL PROJECTS IN REVIEW - DECEMBER 2012

Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	City Contact
1	**Carlos Khantzis and Steve Rice**	08-CUP-001; 08-SPA-001; 08-VAR-002; 08-OTP-004; VTTM 71742	30800 Agoura Road	2061-001-025	7.1 acres (309,494 sq.ft.)	104,138 sq. ft.	46 res. Condo units in 2 two-story, 34 ft.high buildings, including 6 affordable units; 2,786 sq.ft. of common area (multi-purpose rooms, offices) A separate 3,004 sq. ft. senior recreation center building; 129 parking spaces; A Specific Plan Amend.to permit residential use; A Variance to reduce front,side & rear set-backs and to increase retaining wall heights. Tent.Tr. Map & OakTree Permit. Env. Review: MND	D. Hooper (818) 597-7342
2	**Debbie Thomas**	11-SPR-004	5437 Colodny Drive	2055-013-047	0.68 acres (29,920 sq.ft.)	564 sq.ft.	New Garage, garage conversion and accessory structure Env. Review: Catex	R. Madrigal (818) 597-7339
3	**Avi and Lisa Siboni**	11-SPR-006, 11-OTP-012	5446 Lewis Road	2055-005-070	0.63 acres (27,485 sq. ft.)	5,088 sq.ft.	New single-family residence Env. Review: Catex	R. Madrigal (818) 597-7339
4	**Manny Montes**	13-SPR-002	5427 Colodny Drive	2055-013-015	1 acre (43,560 sq. ft.)	1,218 sq. ft. + 1,153 sq. ft.	Addition to main house and a new garage and recreation room Env. Review: Catex	R. Madrigal (818) 597-7339

RESIDENTIAL PROJECTS IN REVIEW TOTALS	ACRES	SQ.FT.	# OF UNITS
New Construction	**7.73**	**109,226.00**	**47**
Room Additions	**1.68**	**1,717.00**	**2**

RESIDENTIAL PROJECTS APPROVED - DECEMBER 2012

Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	City Contact
1P	**Riopharm USA Inc.**	03-CUP-010 03-VAR-005 TR 48901 (Formerly: TT48901, 90-CUP-010, 98-CUP-007)	27650 Agoura Rd.	2061-014-007 through 015 & 2061-014-18 through 20 & 2061-014-23 through 26	10.58 acres (460,864 sq.ft.)	Three models from 2,777 to 3,235 sqft. 84,945 sqft.	24 Single-Family Residences Env. Review: EIR	D. Hooper (818) 597-7339
2P	**Stockton/ lamburg (Ben Menahem)**	03-CUP-016 03-OTP-017	6149 Palo Comado Canyon Rd.	2055-023-073	0.92 acres (40,080 sq.ft.)	3,994 sq.ft. + 475 sqft garage = 4,469 sqft.	A two-story custom house with three car garage Env. Review: Catex	V. Darbouze (818) 597-7328
3P	**Lucian T. Hood for Steven & Katy Rishoff**	09-SPR-003	5411 Colodny Drive	2055-013-014	1.69 acres (73,649 sq.ft.)	1,980 sq. ft. existing; 3,407 sq. ft. proposed	Remodel and single story room addition of a 380 sq. ft. pool room and 1,047 sq. ft. attached garage. Env. Review: Catex	R. Madrigal (818) 597-7339
4P	**Daniel Farkash for Heather Danko**	10-CUP-001	28414 Foothill Drive	2055-017-025	0.459 acres (20,000 sq.ft.)	1,148 sq. ft. existing; 1,938 sq. ft. total proposed	Remodel and 790 sq. ft. room addition to a 1,148 sq. ft. single-family residence Env. Review: Catex	V. Darbouze (818) 597-7328
5P	**Allen Adel**	10-SPR-004 10-OTP-011	5622 Foothill Drive	2055-017-007	0.87 acres (37,900 sq.ft.)	3680 sq. ft. + 672 sqft. garage = 4,352 sqft.	One-story single-family dwelling unit with a garage connected by a breezeway Env. Review: Catex	V. Darbouze (818) 597-7339
6P	**Ashnoor Pirouti**	03-CUP-023 + 05-OTP-012	28454 Renee Dr.	2061-021-005	0.116 acres (5,040 sq.ft.)	1,874 sq.ft. with a 616 sq.ft. garage = 2,490 sqft.	Two-story single-family dwelling unit Env. Review: Catex	V. Darbouze (818) 597-7339

RESIDENTIAL PROJECTS APPROVED - DECEMBER 2012

Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	City Contact
7P	**Ashnoor Pirouti**	03-CUP-022 + 05-OTP-011	28458 Renee Dr.	2061-021-023	0.148 acres (6,452 sq.ft.)	2431 sq.ft. with 568 sq.ft. garage = 2,999 sqft.	Two-story single-family dwelling unit Env. Review: Catex	V. Darbouze (818) 597-7339
8P	**M. Kamal & Associates, LLC for Henry M. Halimi**	08-CUP-002; 08-ZC-001; 08-GPA-001; PM 69698 (Ref: 06-PAR-002 & 05-PSR-001)	28700 Thousand Oaks Blvd. (Park zoned lot east of Carell, north side of Thousand Oaks Blvd.)	2048-003-002	9.6 acres to be divided into 7.2 of open space and 2.4 of developable land.	6,850 sq. ft.	A Parcel Map to subdivide one lot into two lots to construct a 6,850 sq. ft. D. U. on a hillside, donate one lot for park purposes, change the zone, amend the Gen. Plan. Env. Review: Catex	R. Madrigal (818) 597-7339
9P	**Marzi Zion for Feldman**	11-SPR-010	6131 Rustling Oaks Drive	2051-009-017	0.14 acres (6,290 sq. ft.)	3,026 sq. ft.	527 sq. ft. addition to a 3,026 sq. ft. two-story residence. Env. Review: Catex	R. Madrigal (818) 597-7339
10P	**Brent Schneider for Zahavi**	11-SPR-005	6021 Colodny Drive	2055-028-036	1.04 acres (45,227 sq.ft.)	5,781 sq.ft.	New single-family residence Env. Review: Catex	R. Madrigal (818) 597-7339
11P	**Aitan Hillel**	12-SPR-002 12-OTP-005 12-SP-011 12-ZC-001 12-GPA-001	Southeast Corner of Chesebro and Driver Avenue	2052-008-043	0.93 acres (40,715 sq.ft.)	Living: 24,107 sq.ft. Garages: 11,592 sq.ft. Total: 35,699 sq.ft.	A request to change the zone and build an 18-unit townhome complex Env. Review: MND	Doug Hooper (818) 597-7342
12P	**Arc Design Group, Inc.**	12-SPR-003 & 12-OTP-007	28080 Balkins Drive	2055-023-098	1.03 acres (44,991 sq. ft.)	5506 sq. ft.	4,037 sq.ft., two story house, 701 sq. ft. attached garage, and a 768 sq. ft. detached garage/storage/ workshop) Env. Review: Catex	R. Madrigal (818) 597-7339

RESIDENTIAL PROJECTS APPROVED - DECEMBER 2012

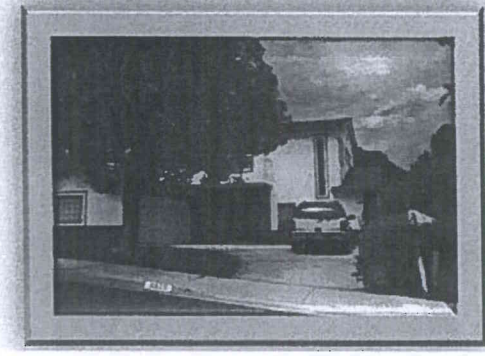
Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	City Contact
13P	**Abudalu, Joseph (Architect: Studio by Design)**	06-CUP-019	28303 Laura La Plante Drive	2061-022-051	0.53 acres (23,090 sq.ft.)	3,630 sq. ft.	Construct 3,230 sq. ft., 2-story S.F.D. with a 400 sq. ft. attached garage. Env. Review: Catex	R. Madrigal (818) 597-7339
14P	**Kurt Menslage**	12-SPR-007	6005 Rainbow Hills Road	2056-055-004	0.24 acres (10,658 sq.ft.)	327 sq.ft.	A room addition in a volume ceiling. Env. Review: Catex	V. Darbouze (818) 597-7328
15P	**Tracy Hrach**	12-SPR-004	5310 Colodny Drive	2055-007-053	0.31 acres (13,724 sq. ft.)	8,391 sq. ft.	5 Unit Apartment Complex Env. Review: Catex	R. Madrigal (818) 597-7339
16P	**Kenneth and Patricia Berkman**	12-SPR-009	28920 Dargan Street	2050-003-010	0.16 acres (6,900 sq.ft.)	1924 sq.ft. + 430 sq.ft. garage	A request to add a 687 sq.ft. second floor to a one-story residence Env. Review: Catex	V. Darbouze (818) 597-7328

RESIDENTIAL PROJECTS APPROVED TOTALS	ACRES	SQ.FT.	# OF UNITS
New Construction	**18.87**	**165,112**	**55**
Room Additions	**2.69**	**5,738**	**5**

RESIDENTIAL PROJECTS RECENTLY COMPLETED

Map No.	Project Name	Case No.	Project Location	Parcel No.	Site Sqft.	Use Sqft.	Project Description	Env. Review
1C	Keith Blinkinsoph	10-CUP-004 10-OTP-006	28441 Lewis Place	2061-022-023 through 025	0.53 acres (23,108 sq.ft.)	4,226 sq. ft.	Two-story single-family dwelling unit	Catex
2C	Jim English/Tim Ahern for Jane Swenson	03-CUP-011 Amendment 11-VAR-001	28354 Balkins Drive	2055-021-042	N/A	N/A	Amend CUP to allow for a pool increasing the lot coverage	Catex
3C	Howard Littman	11-SPR-002	5525 Softwind Way	2053-017-015	0.13 acres (5798 sq. ft.)	2,840 sq. ft.	1,072 sq. ft. first and second-story addition to a 1,768 sq. ft. SFR	Catex
4C	Salpi Manoukian for Simon	11-SPR-007	30227 Walford Ct.	2056-031-014	0.35 sqft. (15,400 sq. ft.)	846 sq. ft.	Second-story addition to a 3,039 single-story residence.	Catex
5C	Von Buck	03-CUP-017 03-OTP-016	27801 Blythedale Rd.	2055-001-035	4.27 acres (186,001.2 sq.ft.)	4,274 sqft with 1,272 sqft. Garage = 5,546 sqft.	A two-story custom house with three car garage	Catex

RESIDENTIAL PROJECTS COMPLETED TOTALS	ACRES	SQ.FT.	# OF UNITS
Completed New Dwellling Units	4.59	9,772.00	2
Completed Room Additions	0.48	1,918.00	2
Other	0.00	0.00	0



City of Agoura Hills Development Summaries

CITY OF AGOURA HILLS

RESIDENTIAL PROJECTS –IN REVIEW

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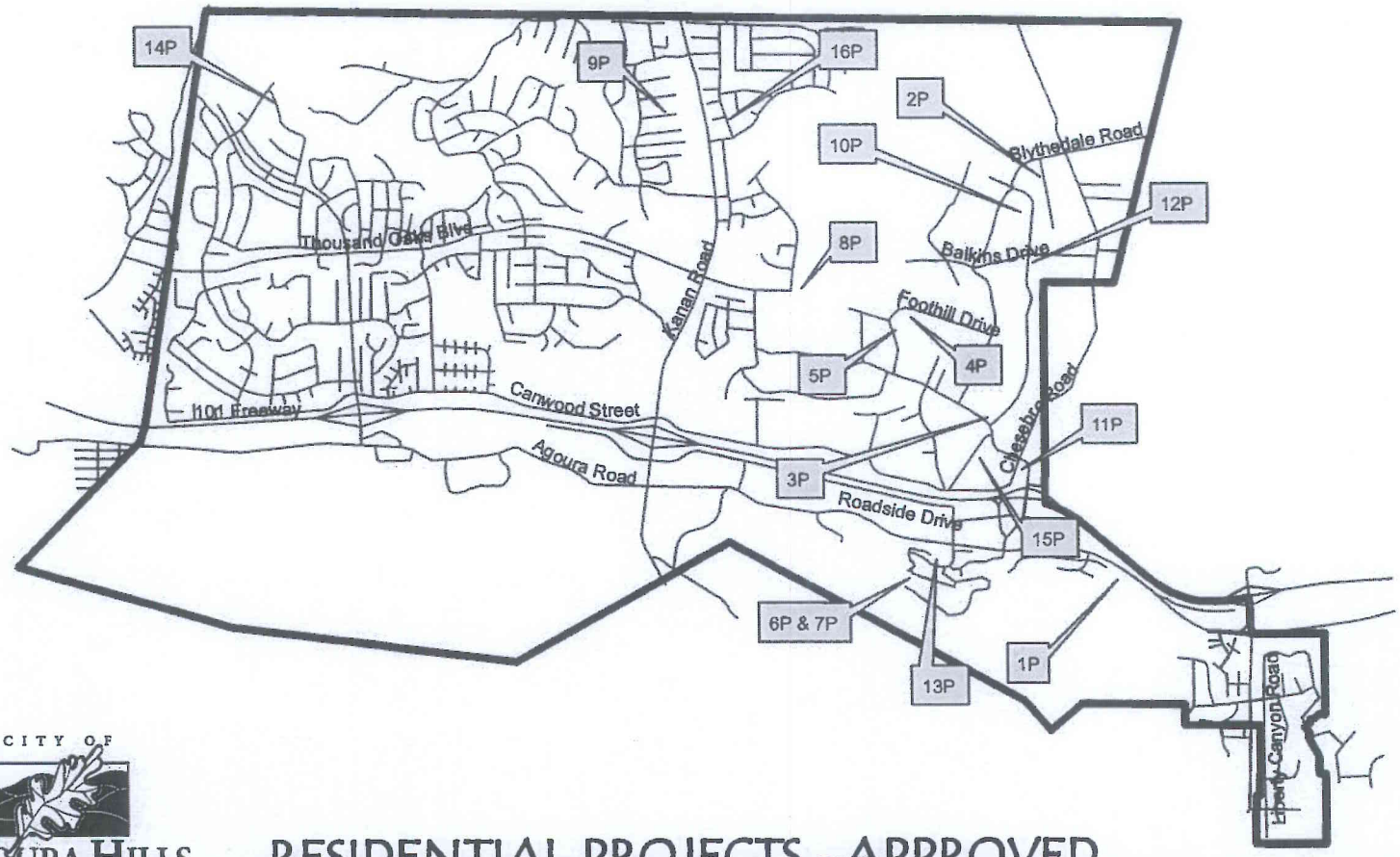
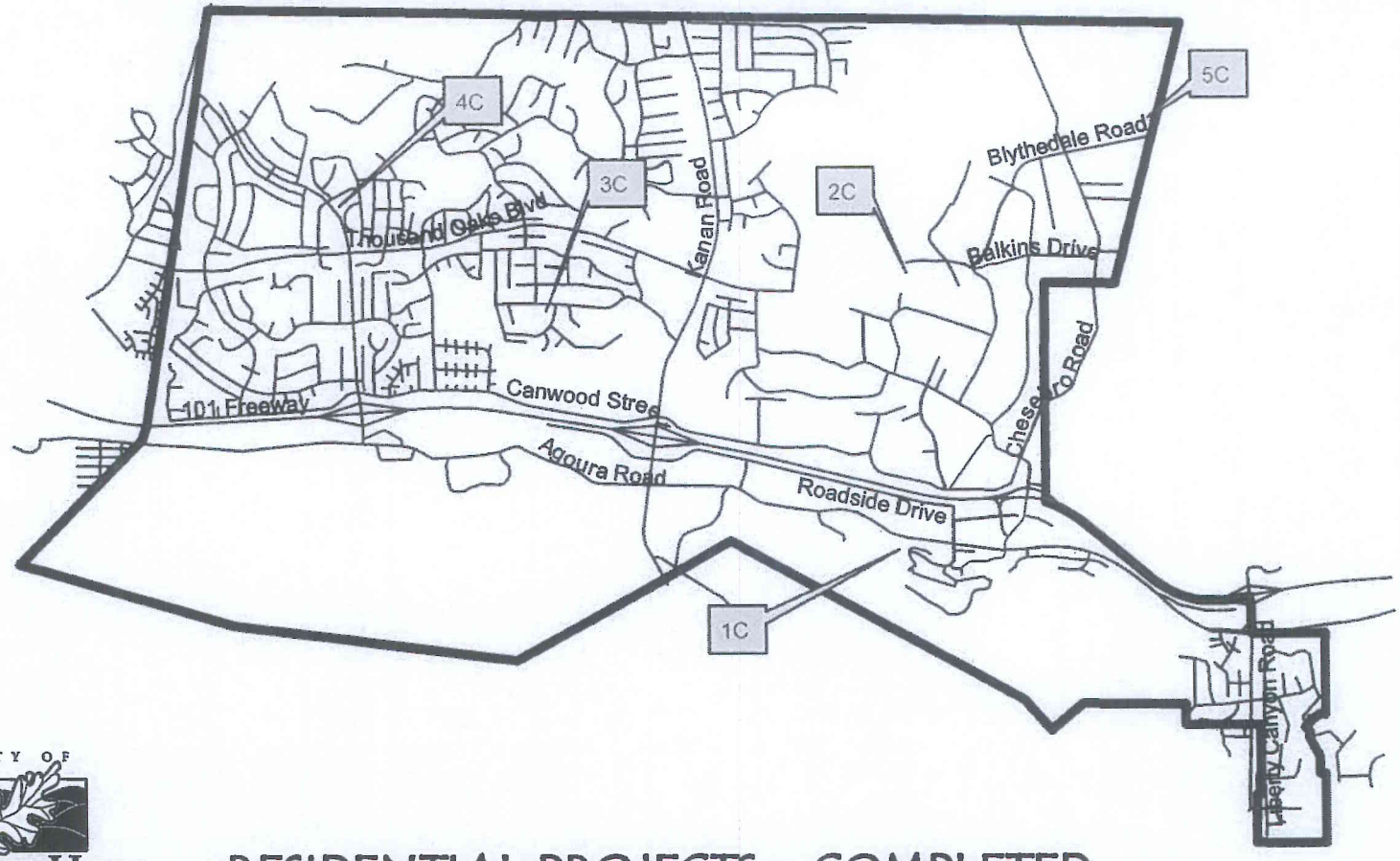
City of Agoura Hills Development Summaries



CITY OF AGOURA HILLS

RESIDENTIAL PROJECTS –APPROVED

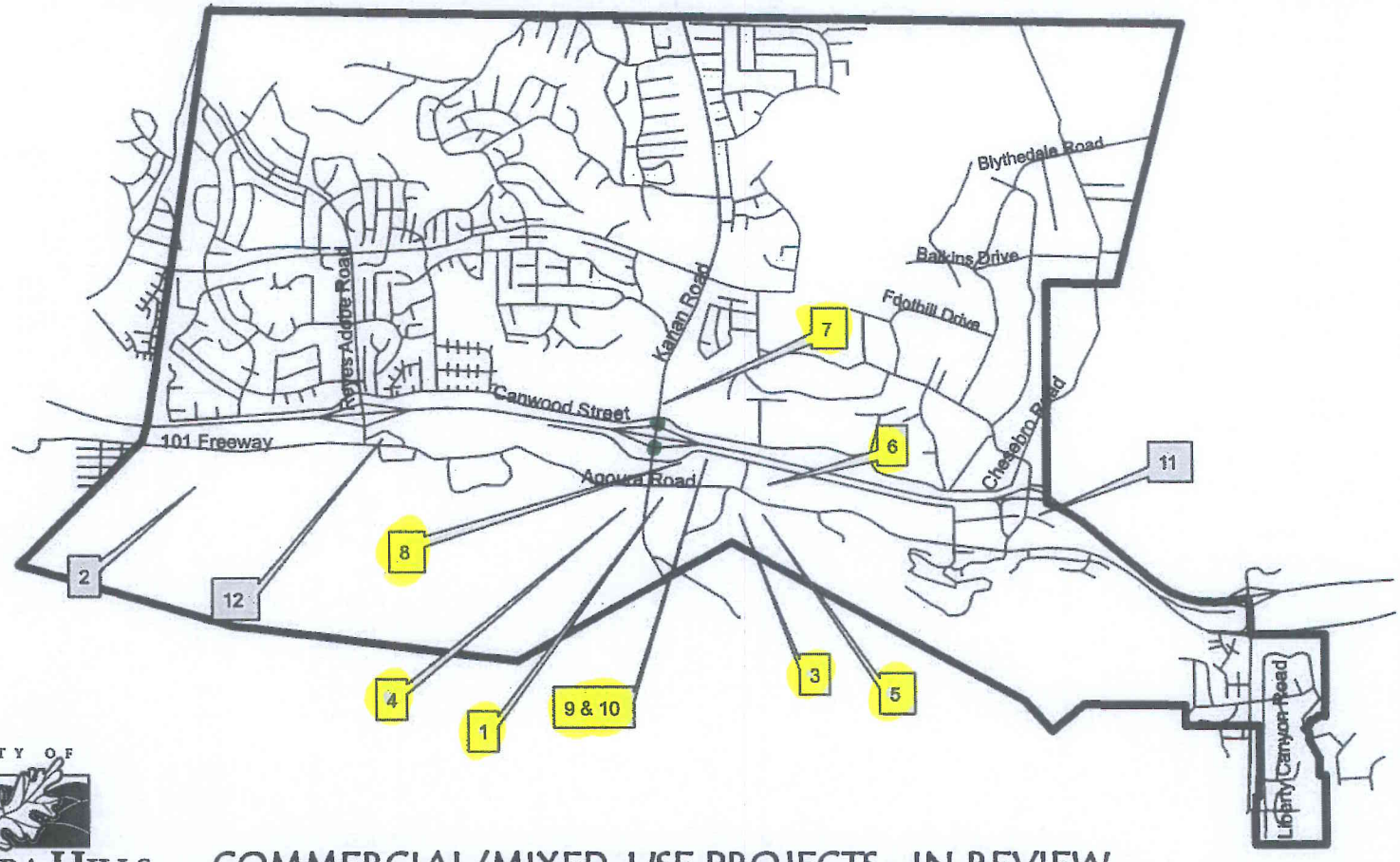
City of Agoura Hills Development Summaries



CITY OF AGOURA HILLS

RESIDENTIAL PROJECTS—COMPLETED

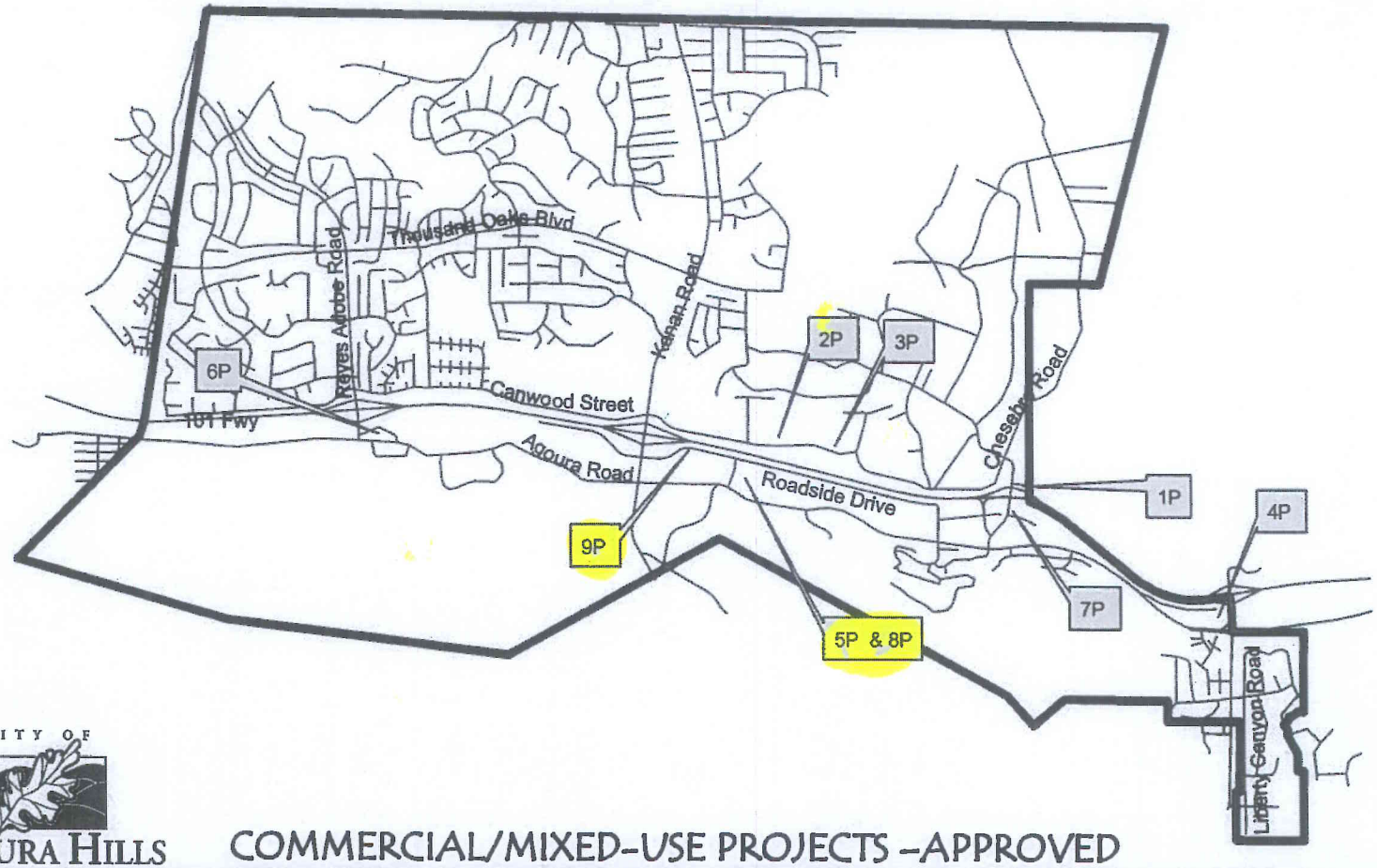
City of Agoura Hills Development Summaries



CITY OF AGOURA HILLS

COMMERCIAL/MIXED-USE PROJECTS –IN REVIEW

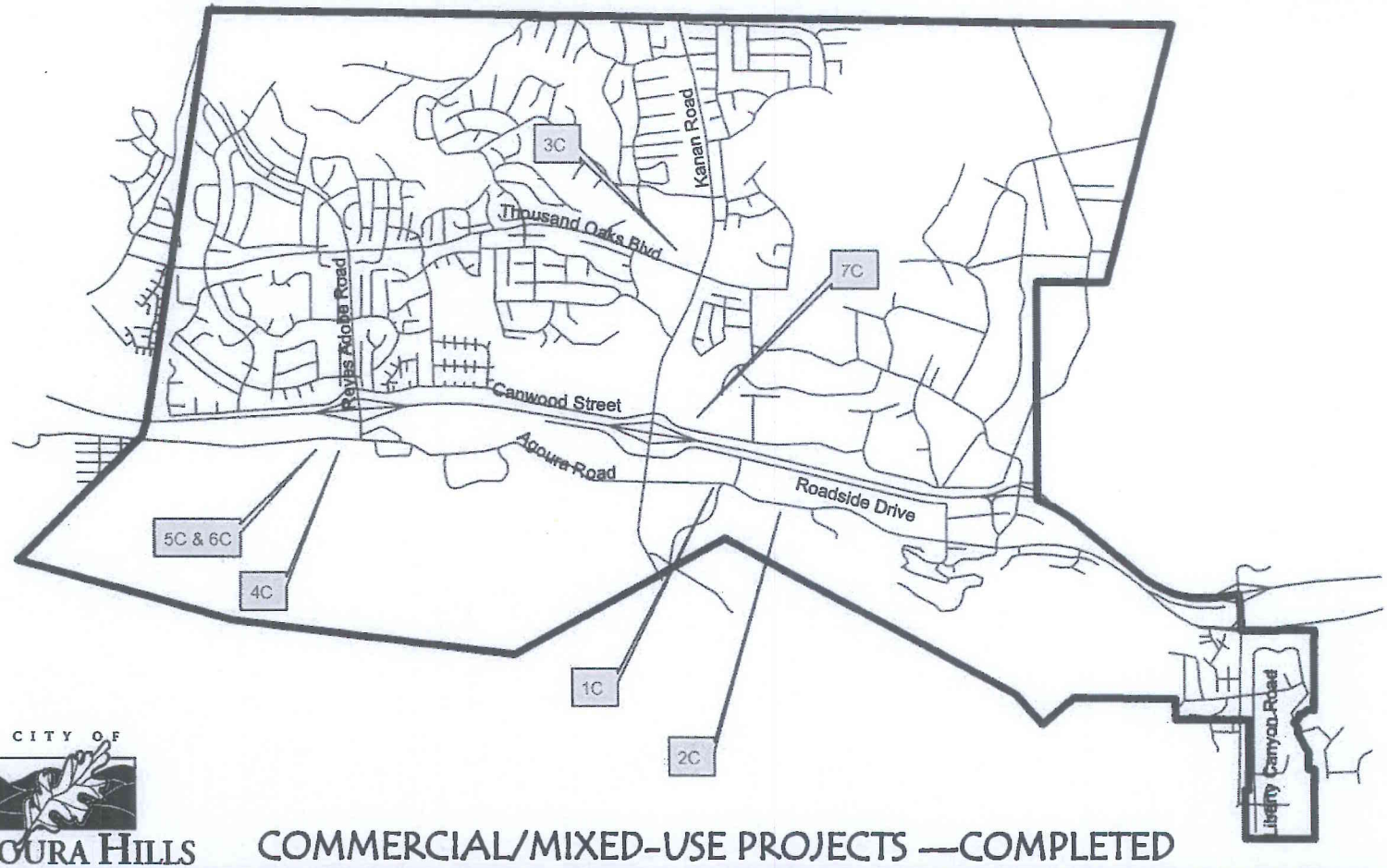
City of Agoura Hills Development Summaries



CITY OF AGOURA HILLS

COMMERCIAL/MIXED-USE PROJECTS –APPROVED

City of Agoura Hills Development Summaries



CITY OF AGOURA HILLS

COMMERCIAL/MIXED-USE PROJECTS —COMPLETED

CITY OF MALIBU

Planning Department

Active Commercial Projects Report

Projects Submitted from 08/31/12 to 09/14/12

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
22729 PACIFIC COAST HWY		Vacant	CUP 12-008	Open	09/14/12	Pending	To Be Assigned	CC	Parking on (e) Pavement
22741 PACIFIC COAST HWY		Vacant	CUP 12-009	Open	09/14/12	Pending	To Be Assigned	CC	Joint Use of (e) Parking Facility at 22741 P.C.H.
22761 PACIFIC COAST HWY	1	Dun & Bradstreet Credibility Corp	PC 12-016	Closed	09/06/12	09/06/12	Amanda Lafond	CC	Planning Clearance, Same Company & Owner, Proposed Tenant Improvement
22761 PACIFIC COAST HWY	1	Dun & Bradstreet Credibility Corp	OC 12-141	Open	09/11/12	Pending	Amanda Lafond	CC	Tenant Improvement, reconfigure existing office
22837 PACIFIC COAST HWY	C	Leelawadee	PC 12-015	Closed	09/05/12	09/06/12	Amanda Lafond	CC	Planning Clearance for Change of Ownership at Thai Foot Massage
23387 PACIFIC COAST HWY	Parcel	Malibu Shell	SP 12-021	Open	09/10/12	Pending	Joseph Lezama	CV-1	Temp. Sign. "Try Our New Car Wash"
30745 PACIFIC COAST HWY		Trancas Country Market	CDPA 12-011	Open	09/05/12	Pending	Richard Mollica	CC	Lighting Revisions to CDP 07-076

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
23401 CIVIC CENTER WAY		Whole Foods Market	SP 10-020	Open	05/05/10	Pending	Bonnie Blue	CV-1	Master Sign Program
23401 CIVIC CENTER WAY		Vacant Parcel	SP 11-019	Open	11/22/11	Pending	Amanda Lafond	CV-1	No Trespassing Sign

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** Includes Closed Projects from 08-31-2012 to 09-14-2012

CITY OF MALIBU
Planning Department
Active Commercial Projects Report

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
23401 CIVIC CENTER WAY		Whole Foods Market	CDP 10-022, LM 10-004, LDP 10-015, SPR 10-042, SPR 10-043, MM 10-009, VAR 10-028, VAR 10-029, VAR 10-030, VAR 10-031, CUP 10-013, GPA 11-001, ZMA 11-001, EIR 11-001	Open	05/05/10	Pending	Bonnie Blue	CV-1	New Shopping Center - Whole Foods Market
23410 CIVIC CENTER WAY		Malibu Country Mart	CDP 06-102, CE 06-217	Pre-BPC	10/09/06	11/18/08	Stephanie Danner	CV-1	AOWTS
23465 CIVIC CENTER WAY		Vacant Lot	CDP 05-106, SPR 07-126, SPR 07-127, SPR 07-148, SPR 07-149, MM 07-044, MM 07-045, CUP 05-003, CUP 07-018, CUP 07-019, CUP 08-013, LLA 05-003, EIR 06-001	OK for BPC	06/21/05	02/19/08	Stefanie Edmondson	TCO	La Paz Commercial Development - NO Municipal Use Option
23465 CIVIC CENTER WAY		Vacant Lot	CDP 05-107, LCPA 06-003, JUPA 07-001, CUP 05-004, GPA 07-002, LLA 05-004, ZMA 07-002, ZTA 07-002, EIR 06-001, DA 07-001	OK for BPC	06/21/05	02/19/08	Stefanie Edmondson	TCO	La Paz Commercial - Proposed - Municipal Use Option
23525 CIVIC CENTER WAY		Common Area	TUP 12-019	Open	07/26/12	Pending	Amanda Lafond	I	Lions Club Market Place
23575 CIVIC CENTER WAY		Vacant	CDP 12-039, LCPA 12-003, SPR 12-062, MM 12-004, VAR 12-025, CUP 12-003	Open	05/15/12	Pending	Joseph Smith	CC	Malibu Sycamore Village - New Commercial Building FAR of .20
23575 CIVIC CENTER WAY		Vacant	CDP 12-040, SPR 12-063, VAR 12-026, CUP 12-004, ARC 12-017	Open	05/15/12	Pending	Joseph Smith	CC	Malibu Sycamore Village - New Commercial Building FAR of .15

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CITY OF MALIBU
Planning Department
Active Commercial Projects Report

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
3730 CROSS CREEK RD	A	Malibu Hardware & Masonry	OC 12-128, CDPE 12-055	Closed	08/21/12	09/12/12	Amanda Lafond	CV-1	Crown Cleaning on 16 Sycamore Trees
3806 CROSS CREEK RD		Charter Building Site	CDP 11-020, VAR 11-022, CE 12-052	OK for BPC	05/17/10	06/05/12	Stefanie Edmondson	CV-1	Upgrade OWTS & Existing Stairs in Frontyard Setback
3822 CROSS CREEK RD	3834	Chipotle	SP 12-003	Needs Final Ins	02/22/12	09/19/12	Adrian Fernandez	CV-1	New Sign Chipotle
3822 CROSS CREEK RD	3828	Super Boutique	SP 12-005	Needs Final Ins	03/19/12	09/19/12	Adrian Fernandez	CV-1	New Sign - Pericone MD/Super Boutique
3822 CROSS CREEK RD	3834	Chipotle	CE 12-046, CUPA 12-002	Pre-BPC	03/12/12	04/17/12	Adrian Fernandez	CV-1	Change of Tenant from Mixt Greens to Chipotle Mexican Grill (Formerly OC 12-008) to Operate a New Restaurant Serving Beer and Wine
3822 CROSS CREEK RD	Common A	Malibu Village	OC 12-083	Open	06/08/12	Pending	Adrian Fernandez	CV-1	Parking Lot Re-striping for ADA
3835 CROSS CREEK RD	3835A	Common Area	APR 11-035, CDPE 11-038, CE 11-095	Needs Final Ins	08/12/11	09/28/11	Ha Ly	CV-1	Add 79 Square Feet to Existing Bathrooms
3835 CROSS CREEK RD		Common Area	TUP 12-018	Closed	07/26/12	09/05/12	Amanda Lafond	CV-1	Fashion Night Out
3939 CROSS CREEK RD	3939A	Common Area	TUP 12-020	Closed	08/06/12	09/07/12	Joseph Lezama	CV-1	Two week TUP for two events (Surfaid)
3939 CROSS CREEK RD	D250	Vacant	APR 09-074, SPR 09-047, CDPE 09-081, CE 09-137	Needs Final Ins	09/15/09	10/20/09	Richard Mollica	CV-1	Change to Roofline
3939 CROSS CREEK RD	3939A	Common Area	TUP 12-022	Open	08/13/12	Pending	Amanda Lafond	CV-1	Malibu Film Festival
3939 CROSS CREEK RD	3939A	Common Area	PA 12-026	Open	05/29/12	Pending	Stefanie Edmondson	CV-1	2-4 question Pre-App for Signage
29169 HEATHERCLIFF RD	Suite 112	Savory Coffee	OC 09-132, CUP 09-006	Open	08/20/09	Pending	Stephanie Danner	CC	New Restaurant - Village Café & Tenant Improvements

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** Includes Closed Projects from 08-31-2012 to 09-14-2012

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CITY OF MALIBU
Planning Department
Active Commercial Projects Report

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
29169 HEATHERCLIFF RD		Common Area	OC 12-076	Open	06/04/12	Pending	Amanda Lafond	CC	New Windwalls
29211 HEATHERCLIFF RD		Common Area	OC 12-077	Open	06/04/12	Pending	Amanda Lafond	CC	New Windwall
29211 HEATHERCLIFF RD	Suite 60	Lily's Café & Pastries	OC 11-135	Open	11/10/11	Pending	Stephanie Danner	CC	Tenant Improvement - New Public Restrooms & Hallway Leading to Restrooms
29211 HEATHERCLIFF RD	Suite 30	Chase	SP 12-022	Open	09/17/12	Pending	To Be Assigned	CC	New plate sign
4000 MALIBU CANYON RD		Vacant	CDP 11-028, LM 12-002, LDP 11-030, SPR 11-011, MM 11-004, VAR 11-013, VAR 11-037, VAR 12-002, VAR 12-003, VAR 12-007, CUP 11-007, TTM 11-001, EIR 12-001	Open	06/07/11	Pending	Stephanie Danner	CV-2	New 146 room hotel, fractional ownership, related improvements
23841 MALIBU RD	21	Chase	OC 12-015	Open	02/09/12	Pending	Joseph Lezama	CC	TI - Interior Remodel, Façade Change, Paving, Landscaping, Lighting
23841 MALIBU RD	21	Chase	SP 12-006	Open	04/10/12	Pending	Joseph Lezama	CC	Sign for Chase bank
23841 MALIBU RD	24	Kanpei	CUP 12-002, CE 12-104	Pre-BPC	05/01/12	Pending	Stephanie Danner	CC	New full service Chinese restaurant with beer/wine sales
30128 MORNING VIEW DR		Malibu United Methodist Church	TUP 12-023	Open	08/16/12	Pending	Amanda Lafond	I	Annual Pie Festival
20356 PACIFIC COAST HWY		Moonshadows	CDP 07-136	Open	11/15/07	Pending	Richard Mollica	CV-1	New Seawall, New AOWTS, Follow up ECDP Parking Reconstruction
21150 PACIFIC COAST HWY		Duke's Restaurant	SP 10-043	OK for BPC	11/29/10	05/02/11	Stefanie Edmondson	CV-1	Signage

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CITY OF MALIBU
Planning Department
Active Commercial Projects Report

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
21216 PACIFIC COAST HWY		Malibu 76 Circle K	CUP 11-004	Appealed	03/17/11	12/06/11	Stephanie Danner	CV-1	CUP - Offsite Sale of Beer & Wine
22235 PACIFIC COAST HWY	A	Malibu Collective Care	CE 12-058, CUPA 12-001	Pre-BPC	02/21/12	05/15/12	Ha Ly	CC	Amend CUP for Operating Hours
22333 PACIFIC COAST HWY		Malibu Sands Shopping Center	ACDP 07-131, CV 07-038, CE 08-018	OK for BPC	11/06/07	12/06/11	Joseph Lezama	CC	New OWTS
22333 PACIFIC COAST HWY		MBSC	SP 12-008	Open	04/13/12	Pending	Amanda Lafond	CC	New Building Mounted Sign
22467 PACIFIC COAST HWY		Vacant	CDP 07-100, LDP 11-017, SPR 07-093, MM 07-031	Open	08/13/07	Pending	Ha Ly	CV-1	New Commercial Building
22669 PACIFIC COAST HWY		Club Soba	APR 10-064, CV 10-030	Open	11/22/10	Pending	Richard Mollica	CC	Awning & Fencing
22716 PACIFIC COAST HWY		Vacant	DP 06-020, CDP 05-192, LDP 11-021, IS 06-007, ND 06-008, SPR 05-050, VAR 05-039, VAR 05-040, CUP 06-010	Needs Final Ins	11/30/05	01/16/07	Stefanie Edmondson	CC	New Restauraunt - Formerly Pierview
22716 PACIFIC COAST HWY		Vacant	SP 10-002	Open	01/21/10	Pending	Stefanie Edmondson	CC	New Restaurant Signage
22725 PACIFIC COAST HWY		McDonald's	OC 10-165	Open	12/21/10	Pending	Adrian Fernandez	CC	Parking Lot Restriping
22725 PACIFIC COAST HWY		McDonald's	ACDP 11-053, CV 06-029, CE 12-014	Pre-BPC	11/21/11	04/10/12	Adrian Fernandez	CC	New AOWTS
22729 PACIFIC COAST HWY		Vacant	SP 07-021	Open	09/17/07	Pending	Ha Ly	CC	New Sign for Westside Estate Real Estate Agency at 22741 PCH
22729 PACIFIC COAST HWY		Vacant	DP 08-014, CDP 08-055, EXT 12-017, CE 10-063, SPR 10-012, VAR 10-005, VAR 10-006, VAR 10-007, CUP 10-003	Pre-BPC	07/08/08	06/01/10	Ha Ly	CC	New Commercial Building, Demolition of Existing Gas Station

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CITY OF MALIBU
Planning Department
Active Commercial Projects Report

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
22941 PACIFIC COAST HWY		Chabad of Malibu	CDP 07-152, SPR 07-145, MM 07-047, MM 07-048, VAR 07-067, VAR 07-068, VAR 08-011, VAR 08-070	Open	12/13/07	Pending	Stephanie Danner	CV-1	Additon & Remodel Existing Commerical Building
22941 PACIFIC COAST HWY		Cleaners	ACDP 10-012	Open	04/12/10	Pending	Joseph Lezama	CV-1	New AOWTS Follow up to ECDP 08-007
22959 PACIFIC COAST HWY		Vacant	CDP 09-067, SPR 09-061, MM 09-012, MM 09-013, VAR 09-043, CUP 09-010	Open	11/04/09	Pending	Joseph Smith	CV-1	New Commercial Building (office/retail), Grading, Retaining Walls, 31 Parking Spaces, New AOWTS
22969 PACIFIC COAST HWY	22967	Malibu Real Estate	SP 11-018	Needs Final Ins	11/01/11	Pending	Joseph Lezama	CV-1	Repair and Replace Sign / Change Copy
23359 PACIFIC COAST HWY		Common Area	SP 12-018	Open	07/25/12	Pending	Amanda Lafond	CV-1	Master Sign Program
23359 PACIFIC COAST HWY		Common Area	OC 12-084	Open	06/08/12	Pending	Adrian Fernandez	CV-1	Parking Lot Re-striping for ADA
23359 PACIFIC COAST HWY	3888	GROM	CUP 11-002	Open	02/28/11	Pending	Ha Ly	CV-1	Outdoor Seating Area
23387 PACIFIC COAST HWY		Malibu Shell	SP 12-012	Open	05/31/12	Pending	Amanda Lafond	CV-1	Monument Sign
23614 PACIFIC COAST HWY		Chevron	DP 10-021, CDP 10-026, MND 10-001, IS 10-002	Needs Final Ins	06/07/10	12/06/11	Joseph Smith	CG	Demolition of Existing Service Station and Removal of 4 - 10,000 Gallon USTs; No New Development
23670 PACIFIC COAST HWY		Chevron	OC 12-095	Open	06/22/12	Pending	Stefanie Edmondson	CC	Panels and Roll-up Doors to House & Enclose Drink Coolers
24108 PACIFIC COAST HWY			CDP 07-145, SPR 07-139	Open	12/06/07	Pending	Ha Ly	PD	"Crummer" Revised NSFR - Lot 1

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CITY OF MALIBU
Planning Department
Active Commercial Projects Report

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
24120 PACIFIC COAST HWY		Vacant	CDP 07-144, IS 09-007, TTM 07-003, EIR 09-001	Open	12/06/07	Pending	Ha Ly	PD	"Crummer" Subdivision & 5 New Single-Family Residences - Revisions
24120 PACIFIC COAST HWY		Vacant	CDP 07-146, SPR 07-140	Open	12/06/07	Pending	Ha Ly	PD	"Crummer" Revised NSFR - Lot 2
24120 PACIFIC COAST HWY			ZTA 12-001, LCPA 12-001	Open	03/14/12	Pending	Ha Ly	PD	Crummer - Removal of LUP Policy 2.78
24134 PACIFIC COAST HWY			CDP 07-147, SPR 07-141	Open	12/06/07	Pending	Ha Ly	PD	"Crummer" Revised NSFR - Lot 3
24150 PACIFIC COAST HWY			CDP 07-148, SPR 07-142	Open	12/06/07	Pending	Ha Ly	PD	"Crummer" Revised NSFR - Lot 4
24174 PACIFIC COAST HWY			CDP 07-149, SPR 07-143	Open	12/06/07	Pending	Ha Ly	PD	"Crummer" Revised NSFR - Lot 5
24903 PACIFIC COAST HWY		Vacant	CDP 05-055, EXT 09-021, EXT 10-015, SPR 02-052, SPR 04-006, VAR 04-001, IS 03-004, ND 03-006	Needs Final Ins	03/30/05	05/15/06	Ha Ly	CN	New Commercial Building
25001 PACIFIC COAST HWY		Existing Retail	PA 12-017	Open	03/23/12	Pending	Richard Mollica	CN	4 Question Pre-App - Proposed New Use and Parking
26101 PACIFIC COAST HWY		Unocal Gas Station	APR 07-120, GPMA 09-001, CUP 07-015, ZMA 09-002, CE 10-062	Needs Final Ins	09/17/07	05/18/10	Richard Mollica	CC	Unocal Gas Station - Interior Remodel Conveinience Store
27400 PACIFIC COAST HWY		Geoffrey's	ACDP 09-046, CE 12-004	OK for BPC	07/16/09	02/14/12	Joseph Smith	CV-1	Commercial New OWTS
28955 PACIFIC COAST HWY		Malibu Gym	OC 10-051	Open	04/15/10	Pending	Ha Ly	CN	Replace Stairs with Elevator; Construct New Exterior Stairs
30050 PACIFIC COAST HWY		Zuma Beach	TUP 12-021	Open	07/31/12	Pending	Joseph Lezama	OS	Malibu Nautica Triathlon

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CITY OF MALIBU
Planning Department
Active Commercial Projects Report

Active Projects

Street Address	Unit Number	Occupant	Permit Numbers	Status	Received	Planning Approval	Planner	Zone	Description
30745 PACIFIC COAST HWY		How's Market & Trancas Shopping Center	CDPA 11-009, MM 12-002, VAR 12-004, VAR 12-005	Pre-BPC	10/06/11	02/21/12	Richard Mollica	CC	New Roof, Pole Lighting, Landscaping, Changes to Nursery
30745 PACIFIC COAST HWY	G	Erewhon Food Market	CUP 12-006	Open	08/20/12	Pending	Richard Mollica	CC	Tenant Improvement New Use- Erewhon Food Market
30745 PACIFIC COAST HWY	R6	Starbucks	CUP 12-007	Open	08/21/12	Pending	Richard Mollica	CC	T.I. and Addition for Starbucks (Trancas)
30745 PACIFIC COAST HWY		How's Market & Trancas Shopping Center	CDP 07-076, MND 07-009, JUPA 09-001, LDP 11-013, SPR 07-073, MM 09-001, VAR 07-041, VAR 09-011, CUP 07-009, CUP 07-013, CUP 09-001, GPA 09-001, IS 07-010, ZMA 09-002	OK for BPC	06/18/07	08/04/09	Richard Mollica	CC	Commercial Center Renovation (30811 & 30745 PCH)
30745 PACIFIC COAST HWY		Tranacas Country Mart	CUP 07-009	Open	06/18/07	Pending	Richard Mollica	CC	Two New Restaurants - La Spiaggia & RG
30745 PACIFIC COAST HWY		Trancas Country Market	SP 11-017	Open	10/11/11	Pending	Ha Ly	CC	Master Sign Program
33905 PACIFIC COAST HWY		Malibu Riding & Tennis Club	CUP 05-002	Open	06/08/05	Pending	Stefanie Edmondson	CR	Renewal of Conditional Use Permit, Merge Previous Coastal Commission Approvals
6506 WESTWARD BEACH RD		Malibu Country Inn	ACDP 09-033, CV 09-038	Open	05/18/09	Pending	Joseph Lezama	CV-1	New AOWTS
3625 WINTER CANYON RD		Our Lady of Malibu	TUP 12-024	Open	09/17/12	Pending	Joseph Lezama	I	Fall Festival

For more information, contact Patricia Salazar at (310) 456-2489 x245.

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** Includes Closed Projects from 08-31-2012 to 09-14-2012

CITY OF MALIBU

Planning Department

Active Commercial Projects Report

Staff Directory

Name	Phone
Blue, Bonnie	(310) 456-2489, x258
Crawford, Dave	(310) 456-2489, x277
Danner, Stephanie	(310) 456-2489, x276
Edmondson, Stefanie	(310) 456-2489, x233
Fernandez, Adrian	(310) 456-2489, x482
Huerta, Jose	(310) 456-2489, x234
Lafond, Amanda	(310) 456-2489, x301
Lezama, Joseph	(310) 456-2489, x353
Ly, Ha	(310) 456-2489, x250
Mollica, Richard	(310) 456-2489, x346
Reassignment	(310) 456-2489, x485
Rossine, Tracey	(310) 456-2489, x274
Smith, Joseph	(310) 456-2489, x336
Tent, Lisa	(310) 456-2489, x359

Planning Status Codes

Status	Status Description
Open	Submitted planning application under conformance review.
Pre-BPC	Planning application in which a decision has been rendered; however, conditional of approval or an appeal period are still pending.
Appealed	Planning application in which an appeal has been filed and in progress.
OK for BPC	Planning application in which a decision has been rendered and may proceed to submit to building plan check.
Needs Final Ins	Planning application in which a decision has been rendered, building plan check is completed, and is pending final planning approval.
Pending LCPA	Planning application includes a Local Coastal Program Amendment which requires review and certification by the California Coastal Commission.

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CITY OF MALIBU

Planning Department

Active Commercial Projects Report

Planning Permit Acronym Guide

Acronym	Description	Acronym	Description
ACDP	Admin CDP	OTD	Offer to Dedicate
ACDPA	ACDP Amendment	PA	Pre-Application
AP	Appeal	PC	Planning Clearance
APR	Administrative Plan Review	PV	Planning Verification
ARC	Archeology Review	SEP	Special Event Permit
CCA	Coastal Commission Appeal	SP	Sign
CDP	Coastal Development Permit	SPR	Site Plan Review
CDPA	CDP Amendment	TPM	Tentative Parcel Map
CDPE	CDP Exemption	TTM	Tentative Tract Map
CE	Categorical Exemption	TUP	Temporary Use Permit
CIP	Capital Improvement Project	VAR	Variance
COC	Certificate of Compliance	VRP	View Restoratin Program
CUP	Conditional Use Permit	WTF	Wireless Telecommunications Facility
CUPA	CUP Amendment	ZC	Zoning Clearance
CV	Code Violation	ZMA	Zoning Map Amendment
DA	Development Agreement	ZTI	Zoning Text Interpretation
DP	Demolition	ZV	Zoning Verification
ECDP	Emergency CDP		
EIR	Environmental Impact Report		
EXT	Extension		
GPA	General Plan Amendment		
GPMA	General Plan Map Amendment		
IS	Initial Study		
JUPA	Joint Use Parking Agreement		
LCPA	LCP Amendment		
LDP	Landscape Documentation Package		
LLA	Lot Line Adjustment		
LM	Lot Merger		
MM	Minor Modification		
MND	Mitigated Negative Declaration		
ND	Negative Declaration		
NS	Neighborhood Standards		
OC	Over the Counter		

Other Project Acronyms

Acronym	Description
AOWTS	Advance Onsite Wastewater Treatment System
OWTS	Onsite Wastewater Treatment System

*Report does not include: 1) wireless telecommunication facilities; 2) public works projects; 3) educational, religious, or public facilities.
** Includes Closed Projects from 08-31-2012 to 09-14-2012

Associated Transportation Engineers
Trip Generation Worksheet - With In/Out Splits

CUMULATIVE PROJECT TRIP GENERATION

Land Use	Size	Multi-Trip	ADT		A.M.						P.M.					
			Rate	Trips	Rate	Trips	In %	Trips	Out %	Trips	Rate	Trips	In %	Trips	Out %	Trips
Los Angles County																
Camp Vernon Kilpatrick				50		3		3				3				3
557 Westlake Lot Split	2	1.00	9.57	19	0.750	2	25%	1	75%	1	1.01	2	63%	1	37%	1
Agoura Hills																
1 EF Moore	48,500	1.00	11.01	534	1.550	75	88%	66	12%	9	1.49	72	82%	59	18%	13
	95	1.00	5.81	552	0.440	42	16%	7	84%	35	0.52	49	67%	33	33%	16
3 Cornerstone	26,000	1.00	46.55	1,210	1.400	36	61%	22	39%	14	4.55	118	44%	52	56%	66
	18,000	1.00	11.01	198	1.550	28	88%	25	12%	3	1.49	27	17%	5	83%	22
	35	1.00	5.81	203	0.440	15	16%	2	84%	13	0.52	18	67%	12	33%	6
4 Martin Group	107	1.00	9.57	1,024	0.750	80	25%	20	75%	60	1.01	108	63%	68	37%	40
	167,000	1.00	42.94	7,171	1.000	167	61%	102	39%	65	3.73	623	44%	274	56%	349
5 Agile	17,249	1.00	11.01	190	1.550	27	88%	24	12%	3	1.49	26	17%	4	83%	22
6 Whizin Market Square	14,850	1.00	132.39	1,966	3.300	49	62%	30	38%	19	11.25	167	48%	80	52%	87
(Outdoor Dining)	5,800	1.00	127.15	737	10.810	63	55%	35	45%	28	9.85	57	60%	34	40%	23
Malibu																
Whole Foods	24,549	1.00	102.24	2,510	3.590	88	61%	54	39%	34	10.50	258	44%	114	56%	144
Retail/Food Service	38,425	1.00	94.91	3,647	2.288	88	60%	53	40%	35	8.72	335	49%	164	51%	171
Rancho Malibu Hotel	146	1.00	8.17	1,193	0.560	82	61%	50	39%	32	0.59	86	40%	34	60%	52
Crummer (SFD)	5	1.00	9.57	48	0.750	4	25%	1	75%	3	1.01	5	63%	3	37%	2
La Paz				2863		150		122		28		248		76		172
Sycamore Village	76,000	1.00	74.76	5,682	1.720	131	60%	79	40%	52	6.96	529	49%	259	51%	270
22959 PCH retail	4,517	1.00	46.55	210	1.400	6	88%	5	12%	1	4.55	21	82%	17	18%	4
22959 PCH office	2,360	1.00	22.66	53	2.970	7	81%	6	19%	1	3.40	8	27%	2	73%	6
24903 PCH Office	9,685	1.00	22.66	219	2.970	29	81%	23	19%	6	3.40	33	27%	9	73%	24
Hows Market/Trancas	53,423	1.00	84.57	4,518	1.990	106	60%	64	40%	42	7.82	418	49%	205	51%	213

28

U.S. 101 SB RAMPS-ROADSIDE DRIVE/KANAN ROAD INTERSECTION IMPROVEMENTS

and the right-turn lane which are separated by a wide striped channelization island. There is sufficient pavement width between the raised median and the western curb (43 ft) to restripe the approach to two left-turn lanes and a right-turn lane. In addition, the westbound approach should be restriped to a shared through/right-turn lane and a dedicated right-turn lane, or be widened to include an additional lane (through, through-right, and right-turn lane) to provide LOS C during the P.M. peak hour. The mitigated level of service is shown below in Table 4.11-10.

T-2(f) **Kanan Road/Canwood Street (E) intersection (P.M. peak hour):** This intersection was recently reconstructed as part of the Kanan Road/U.S. 101 interchange improvement project. Kanan Road contains two northbound through lanes and a right-turn lane; the southbound approach contains a left-turn lane and three through lanes. A third northbound through lane (two through lanes and a through-right-turn lane) is required to provide LOS C during the P.M. peak hour. This mitigation measure would require some widening of the north side of the intersection for 200 ft or more to provide three receiving lanes. The mitigated level of service is shown below in Table 4.11-10.

T-2(g) **Kanan Road/Roadside Drive - U.S. 101 Southbound Ramps intersection (P.M. peak hour):** Additional capacity on the northbound and southbound approaches will need to be provided at this intersection to provide LOS C operations. The required improvements are outlined below:

There are three northbound receiving lanes provided on the north side of the intersection. Under the proposed intersection design, two lanes continue onto the overpass and one lane traps into the U.S. 101 Southbound On-Ramp. The northbound approach would contain one through lane and one shared through/right-turn lane. This approach should be widened to provide two through lanes and one shared through/right-turn lane.

Under the proposed intersection design, the southbound approach would contain one left-turn lane, two through lanes and one right-turn lane. To provide LOS C during the P.M. peak hour, a second southbound left-turn lane is needed. There is sufficient roadway width provided on the north leg of the intersection and the overpass to provide dual left-turn lanes, two through lanes and a right-turn lane on the southbound approach, and retain the three northbound receiving lanes provided on the north side of the intersection. The bike lane on the southbound approach shown on the proposed intersection design may need to be eliminated. It is noted that the lane widths on the north leg (11-foot left-turn lanes, 11-foot through lanes and 12 to 13-foot right-turn lanes) would be less than the lane widths specified by Caltrans (12-foot left-turn lanes, 12-foot through lanes and 16-foot right-turn lanes), and would require approval of a design exception.

Additionally, the east leg of the intersection (Roadside Drive) would need to be widened to the south to provide two receiving lanes.

Implementation of the above improvements would result in LOS C (V/C 0.78). The mitigated geometry is shown below followed by the mitigated level of service as shown in Table 4.11-10.

Kanan Road-Roadside Drive/U.S. 101 Southbound Ramps Mitigated Intersection Geometry

Scenario	Northbound	Southbound	Eastbound	Westbound
Future Geometry	T TR	L TT R	L LTR R	L R
Mitigated Geometry	*TT TR*	LL TT R	L LTR R	L R

L =left-turn lane , LT = left-turn/through lane, LTR = left-turn/through/right turn lane two right-turn lane, T = through lane, R = right turn lane, RT = right turn/through lane

T-2(h) **Dorothy Drive/U.S. 101 Southbound Ramps intersection (P.M. peak hour):** This intersection is currently controlled by stop signs on all approaches. Signalizing this intersection would result in LOS C during the P.M. peak hour, therefore mitigating the project's impact to a level of insignificance. The mitigated levels of service are shown below in Table 4.11-10.

Scenario	Northbound	Southbound	Eastbound	Westbound
Future Geometry	T TR	L TT R	L LTR R	L R
Mitigated Geometry	TT TR	L TT R	L LTR R	L R

L =left-turn lane , LT = left-turn/through lane, LTR = left-turn/through/right turn lane two right-turn lane, T = through lane, R = right turn lane, RT = right turn/through lane

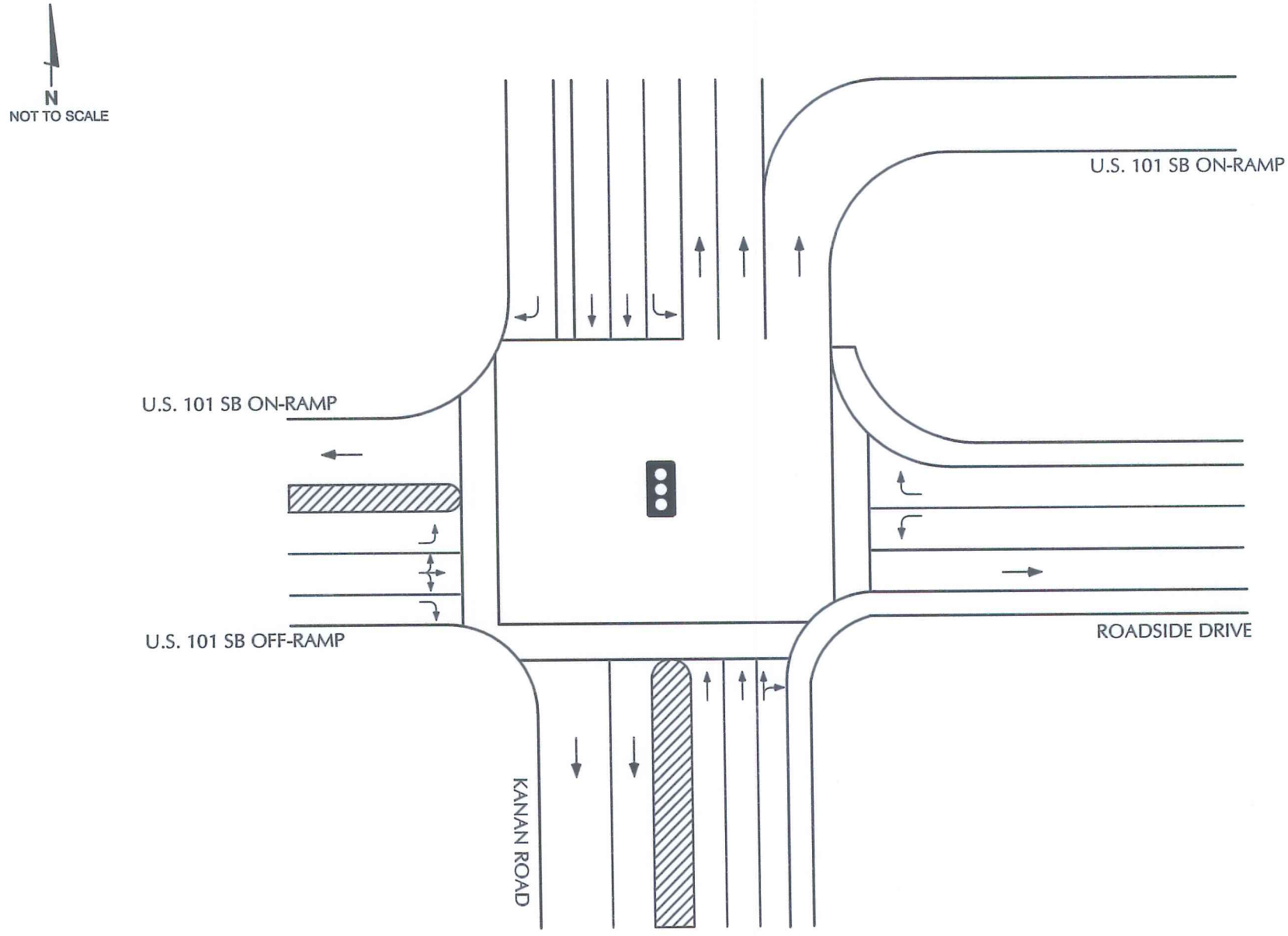
Table 4.11-9 Cumulative + Proposed Agoura Village Specific Plan Mitigated A.M. Peak Hour Intersection Levels of Service

Intersection	Cum+AVSP A.M. Peak Hour	Mitigated A.M. Peak Hour
Kanan Rd/Canwood St - U.S. 101 NB	**0.92/LOS E**	0.78/LOS C
Palo Comado Cyn Rd/U.S. 101 NB	**>50.0 sec/LOS F**	0.64/LOS B

Bolded values exceed City LOS C standard.

Table 4.11-10 Cumulative + Proposed Agoura Village Specific Plan Mitigated P.M. Peak Hour Intersection Levels of Service

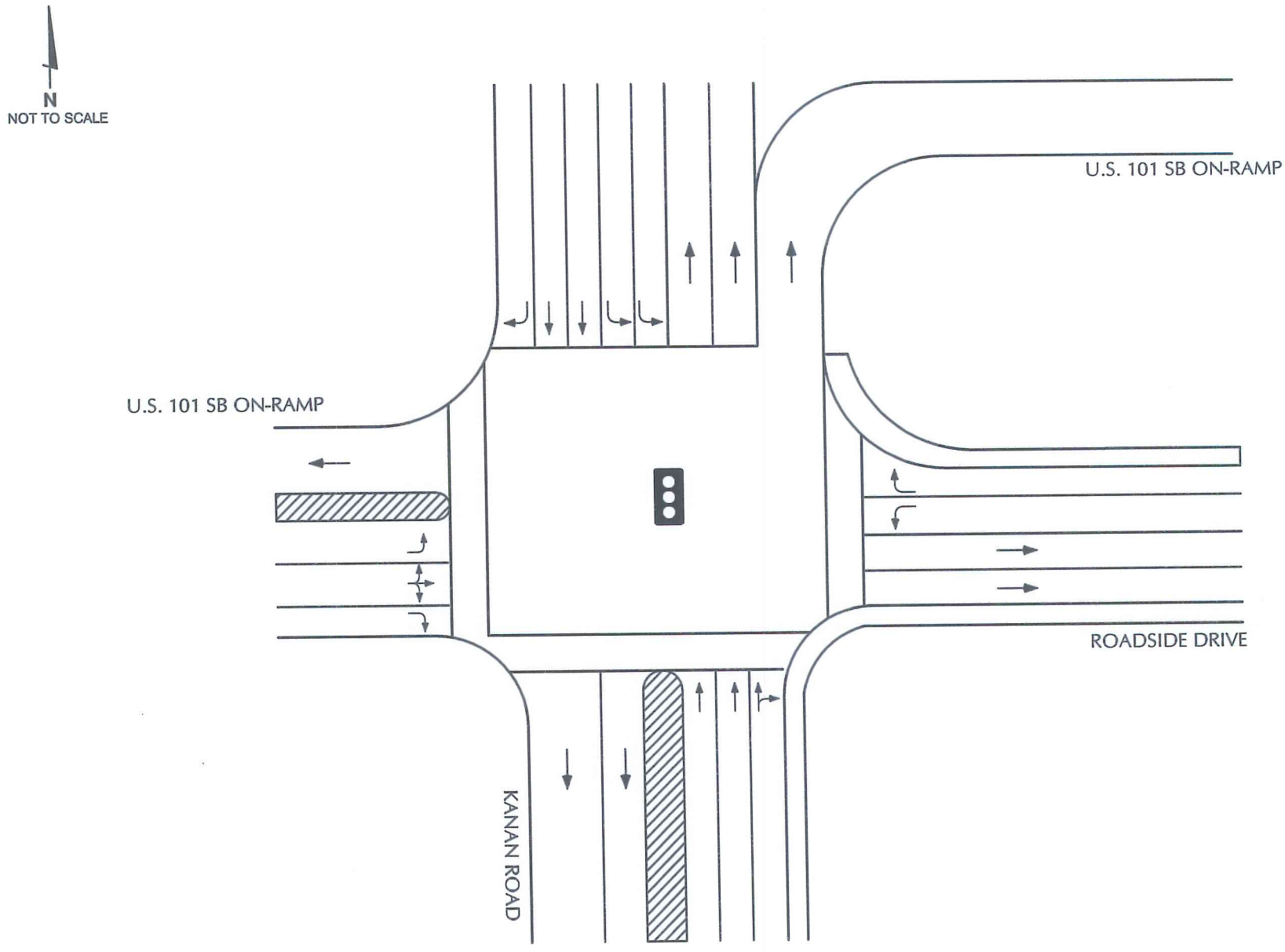
Intersection	Cum+AVSP P.M. Peak Hour	Mitigated P.M. Peak Hour
Reyes Adobe Rd/Canwood St	**0.85/LOS D**	0.57/LOS A
Reyes Adobe Rd/U.S. 101 SB Ramps	**0.82/LOS D**	0.72/LOS C
Reyes Adobe Rd/Agoura Rd	**0.89/LOS D**	0.75/LOS C
Kanan Rd/Canwood St (E)	**0.86/LOS D**	0.77/LOS C



ASSOCIATED TRANSPORTATION ENGINEERS

KANAN ROAD/U.S.101 SB RAMPS-ROADSIDE DRIVE INTERSECTION
(EXISTING GEOMETRY)

FIGURE A



ASSOCIATED TRANSPORTATION ENGINEERS

KANAN ROAD/U.S.101 SB RAMPS-ROADSIDE DRIVE INTERSECTION
(RESTRIPED GEOMETRY)

FIGURE B

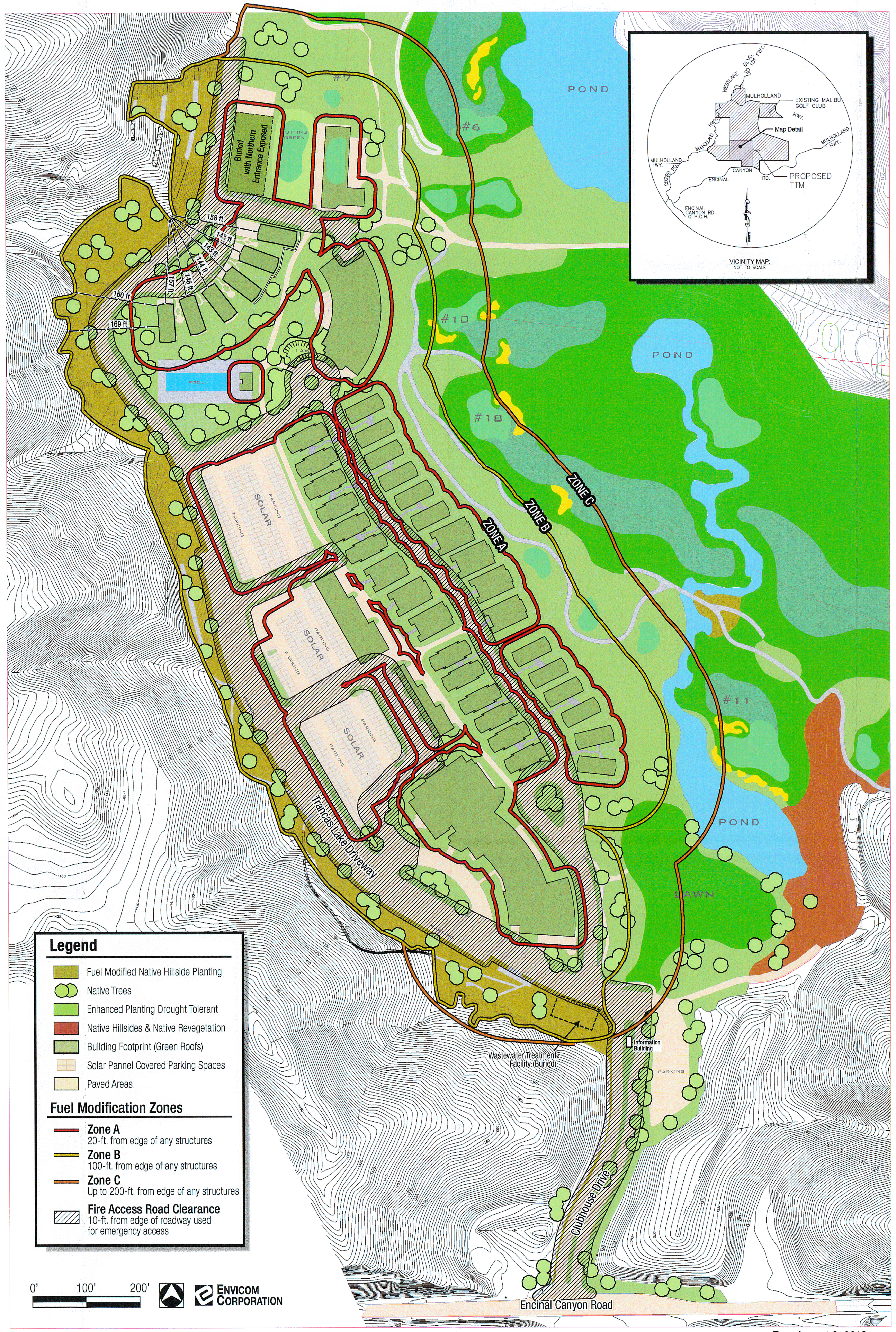
KANAN ROAD/U.S. 101 SB RAMPS-ROADSIDE DRIVE
MITIGATION MEASURE COST ESTIMATE

ITEM	COST
1.) STRIPING	$2,000
2.) SIGNAL MODIFICATION	$45,000
3.) WIDENING (a)	$100,000
4.) CONTINGENCY	$22,000
TOTAL:	**$169,000**
PROJECT SHARE (4%):	**$6,760**

(a) ASSUMES NO RIGHT-OF-WAY NEEDED

Appendix I

Preliminary Fuel Modification Plan
Approved October 23, 2013



Rev: August 8, 2013

Fuel Modification Zones

ASSESSMENT NOTES AND MAINTENANCE AGREEMENT FOR FUEL MODIFICATION PLAN

Zone A – Setback Zone

- Extends 20 feet beyond the edge of any combustible structure, accessory structure, appendage or projection. Overhangs or other parts of the structure not accurately reflected on the plans may negate the approval of plant location on the approved plan.
- Irrigation by automatic or manual systems shall be provided to landscaping to maintain healthy vegetation and fire resistance.
- Landscaping and vegetation in this zone shall consist primarily of green lawns, ground covers not exceeding 6 inches in height, and adequately spaced shrubs. The overall characteristics of the landscape shall provide adequate defensible space in a fire environment.
- Plants in Zone A shall be inherently highly fire resistant and spaced appropriately. Species selection should be made referencing the Fuel Modification Plant List. Other species may be utilized subject to approval. Final or revised Plans submitted after 6 months from the initial submittal will have plants in all zones evaluated based on the most current Fuel Modification Plant List available from the Fuel Modification Unit.
- Except for dwarf varieties or mature trees small in stature, trees are generally not recommended within Zone A.
- Target species will typically not be allowed within 30 or more feet of combustible structures and may require removal if existing on site.
- Vines and climbing plants shall not be allowed on any combustible structure requiring review.

Zone B – Irrigated Zone

- Extends from the outermost edge of Zone A to 100 feet from structure or as noted on plan.
- Irrigation by automatic or manual systems shall be provided to landscaping to maintain healthy vegetation and fire resistance where planting is proposed.
- Landscaping and vegetation in this zone shall typically consist primarily of green lawns, ground covers, and adequately spaced shrubs and trees.
- Unless otherwise approved, Ground covers shall be maintained at a height not to exceed 6 inches in Zone B, 12 inches is acceptable within 50 feet of a structure and 18 inches beyond 50 feet in Zone B if it is on a slope. The overall characteristics of the landscape shall provide adequate defensible space in a fire environment. Specimen native plants may be approved to remain if properly maintained for adequate defensible space. Annual grasses and weeds shall be maintained at a height not to exceed 3 inches.
- Plants in Zone B shall typically be fire resistant and spaced appropriately. Species selection should be made referencing the Fuel Modification Plant List. Other species may be utilized subject to approval.
- Vegetation in this zone may consist of modified existing native plants, adequately spaced ornamental shrubs and trees, or both. There may also be replacement landscape planting with ornamental or native species to meet minimum slope coverage requirements of City or County agencies or other Landscape or Hillside ordinances. In all cases the overall characteristics of the landscape shall provide adequate defensible space in a fire environment.
- Target species will typically not be allowed within 30 or more feet of combustible structures and may require removal if existing on site. This distance may extend to 50 feet if the situation dictates.
- Irrigation systems are not required for this zone if it consists entirely of native plants. (Native plants are generally not compatible with regular, un-seasonal supplemental water.)
- All trees, unless otherwise approved, shall be planted far enough from structures and Fire Department accesses as to not overhang any structure or access at maturity.

Zone C – Native Brush Thinning Zone

- Extends from the outermost edge of Zone B up to 200 feet from structure or as noted on plan.
- Required thinning and clearance will be determined upon inspection. Required clearance may increase to the maximum allowed by the Fire Code as needed because of vegetation growth.
- Irrigation systems are not required for this zone if it consists entirely of native plants. (Native plants are generally not compatible with regular, un-seasonal supplemental water.)
- Vegetation in this zone may consist of modified existing native plants, adequately spaced ornamental shrubs and trees, or both. There may also be replacement landscape planting with ornamental or native species to meet minimum slope coverage requirements of City or County agencies or other Landscape or Hillside ordinances. In all cases the overall characteristics of the landscape shall provide adequate defensible space in a fire environment
- Plants in Zone C shall be spaced appropriately. Existing native vegetation shall be modified by thinning and removal of those species constituting a fire risk. These species include, but are not limited to chamise, sage, sage brush, and buckwheat.
- Annual grasses and weeds shall be maintained at a height not to exceed 3 inches.
- General spacing for existing native shrubs or groups of shrubs is 15 feet between canopies. Native plants may be thinned by reduced amounts as the distance from development increases.
- General spacing for existing native trees or groups of trees is 30 feet between canopies. This distance may increase or decrease depending on the slope, arrangement of the trees in relation to slope, and the species of tree.

#5139
COUNTY OF LOS ANGELES
FIRE DEPARTMENT
PREVENTION SERVICES BUREAU
PRELIMINARY
FUEL MODIFICATION PLAN
APPROVED
FFP-201300001
By [signature] Date 10/23/13
FUEL MODIFICATION UNIT
The stamping of this plan and specifications SHALL NOT be held to permit or to be an approval of the violation of any provisions of any County/City or State law

Fire Access Road Zone

- Extends a minimum of 10 feet from the edge of any public or private roadway that may be used as access for fire-fighting apparatus or resources.
- Clear and remove flammable growth for a minimum of 10 feet on each side of Fire Access Roads. (Fire Code 325.10) Additional clearance beyond 10 feet may be required upon inspection.
- Fire access roads, driveways and turnarounds shall be maintained in accordance with fire code. Fire Access Roads shall have unobstructed vertical clearance for a width of 20 feet. (Fire Code 503.2.1)
- Landscaping and native plants within the Fire Access Road Zone shall be appropriately spaced and maintained to provide safe egress in wildland fire environments.
- All trees, unless otherwise approved, shall be planted far enough from structures and Fire Department accesses as to not overhang any structure or access at maturity.

Maintenance

Routine maintenance shall be regularly performed in all zones. Requirements include but are not limited to those items in the Fuel Modification Guidelines and those outlined below:

- Removal or thinning of undesirable combustible vegetation and removal of dead or dying landscaping to meet minimum brush clearance requirements.
- Pruning and thinning to reduce the overall fuel load and continuity of fuels.
- Fuel loads shall be reduced by pruning lower branches of trees and tree-form shrubs to 1/3 of their height, or 6 feet from lowest hanging branches to the ground, to help prevent fire from spreading and make maintenance easier. Trees with understory plants should be limbed up at least three times the height of the underlying vegetation or up to a height of 40 feet, whichever is less, to help prevent fire from spreading upward into the crown.
- Accumulated plant litter and dead wood shall be removed. Debris and trimmings produced by thinning and pruning should be removed from the site or chipped and evenly dispersed in the same area to a maximum depth of 6 inches.
- All invasive species and their parts should be removed from the site.
- Manual and automatic irrigation systems shall be maintained for operational integrity and programming. Effectiveness should be regularly evaluated to avoid over or under-watering.
- Compliance with the Fire Code is a year-round responsibility. Enforcement will occur following inspection by the Fire Department. Annual inspections for brush clearance code requirements are conducted following the natural drying of grasses and fine fuels, between the months of April and June depending on geographic region. Inspection for compliance with an approved Fuel modification Plan may occur at any time of year.
- Brush Clearance enforcement issues on adjacent properties should be directed to the County of Los Angeles Fire Department's Brush Clearance Unit at (626) 969-2375.
- All future plantings shall be in accordance with the County of Los Angeles Fire Department Fuel Modification Guidelines and approved prior to installation. Changes to the approved plan which require an additional plan review will incur a plan review fee.
- Questions regarding landscape planting and maintenance with regard to fire safety should be directed to the Fire Department's Fuel Modification Unit at (626) 969-5205.

Long Term Maintenance Agreement

- All future plantings shall be in accordance with the County of Los Angeles Fire Department Fuel Modification Guidelines.
- All Lots within this project will be required to submit plans to the Fuel Modification Unit prior to landscaping being installed and must be identified in the CC&Rs.
- Changes to the landscaping in common areas or individual lots reviewed by te Fuel Modification Unit Shall be approved prior to installation.
- Walls may be required on lots based on location of structure and proximity to slope (to be determined upon final tract submittal or individual lot review).
- Adjoining property owners are responsible for offsite Brush Clearance as required by the Fire Code.
- Zone C may be adjusted during inspection depending upon field conditions.

The property owner(s) agree to be responsible for the long-term maintenance of this Fuel Modification plan, as described herein. A Covenant & Agreement identifying the applicable Fuel Modification Plan will be recorded on the parcel(s) or CC&R's approved, prior to occupancy being granted. Notification of Fuel Modification requirements is to be made upon sale to new owners. Proposed changes to the Final Fuel Modification plan must be submitted to the Fuel Modification Unit for approval, prior to implementation. Plans will be reviewed based on the current plant list. Regular inspections will be performed by the Fire Department to ensure compliance with the approved plan. Failure to comply with the Fuel Modification Plan requirements may result in an Administrative Fine of at least $500 per violation, as well as possible liens, assessments, and legal action. Violations may also be corrected at the owners expense with the cost placed on the property tax bill with the addition of an Abatement Enforcement Cost of $648.

THOMAS HIX	[signature]	9/26/13
Name (Print)	Signature	Date
Name (Print)	Signature	Date

Approval of this Fuel Modification Plan constitutes approval for only those Codes reviewed as part of the Fuel Modification process and does not replace the needed approval of any other office or agency with jurisdiction and review responsibility for those items which may or may not be illustrated on the plan.