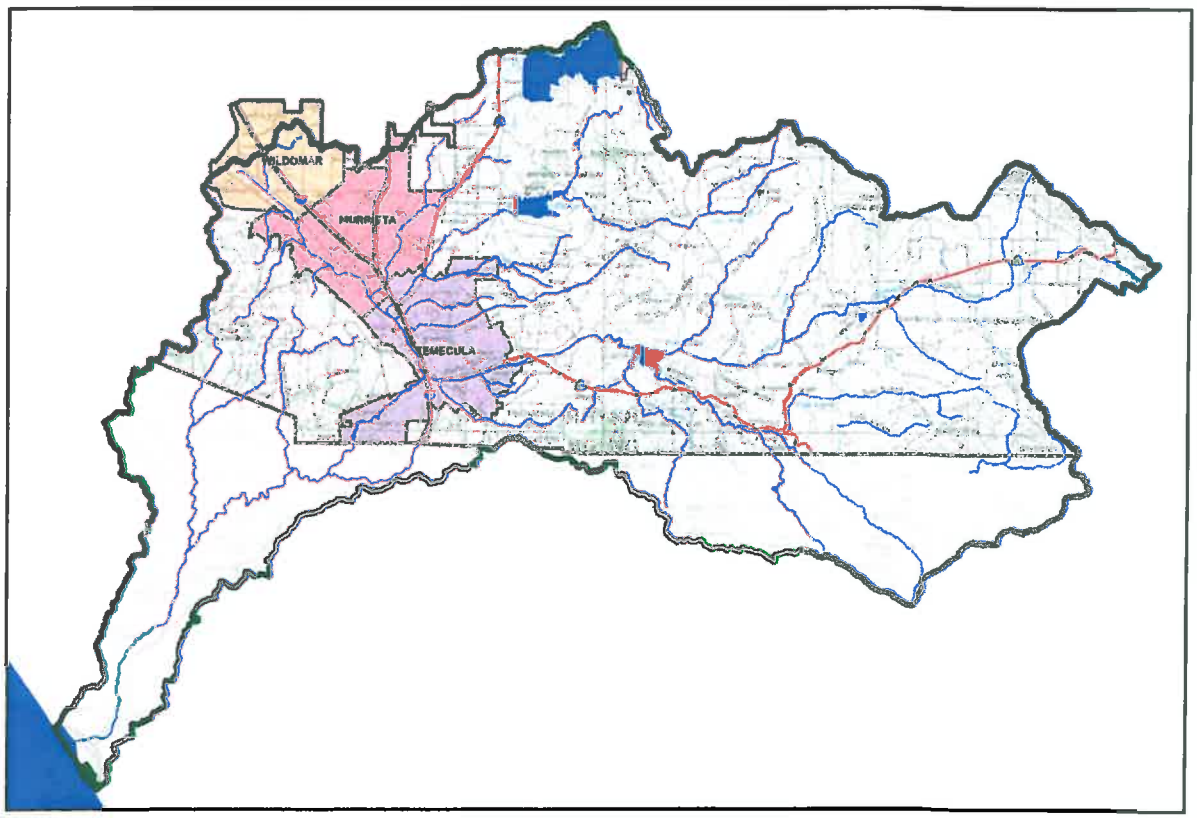
Project Specific Water Quality Management Plan

*A Template for preparing Project Specific WQMPs for Priority Development Projects located within the **Santa Margarita Region** of Riverside County*

Project Title CLINTON KEITH VILLAGE

Development No: Insert text here

Design Review/Case No: No 15-0013 Clinton Keith Village



X☐
Preliminary
☐ **Final**

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Regional Board Order No. **R9-2010-0016**

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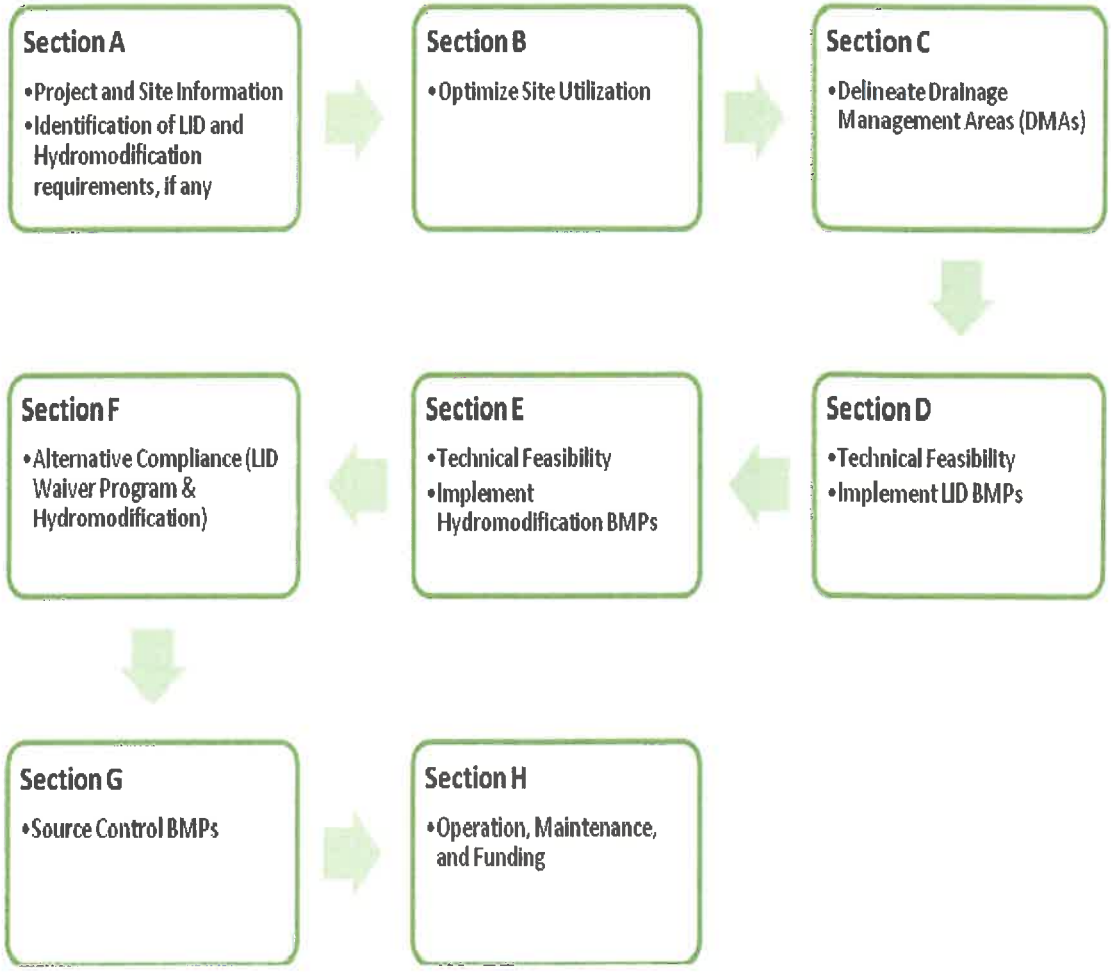
A Brief Introduction

The Municipal Separate Stormwater Sewer System (MS4) Permit[1] for the **Santa Margarita Region** (SMR) requires preparation of a Project-Specific Water Quality Management Plan (WQMP) for all Development Projects as defined in section F.1.d.(1) of the Permit. This Project-Specific WQMP Template for Development Projects in the **Santa Margarita Region** has been prepared to help document compliance and prepare a WQMP submittal. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



[1] Order No. R9-2010-0016, NPDES No. CAS0108766, Waste Discharge Requirements for Discharges from the MS4 Draining the County of Riverside, the Incorporated Cities of Riverside County, and the Riverside County Flood Control and Water Conservation District within the San Diego Region, California Regional Water Quality Control Board, November 10, 2010.

OWNER'S CERTIFICATION

This Project-Specific WQMP has been prepared George Clinton Keith Development LLC by Pfeiler & Associates for the Clinton Keith Village project.

This WQMP is intended to comply with the requirements of City Of Wildomar for chapter 13.12, which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater Best Management Practices until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Wildomar Water Quality Ordinance (Municipal Code Section13.12).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control Best Management Practices in this plan meet the requirements of Regional Water Quality Control Board Order No. **R9-2010-0016** and any subsequent amendments thereto."

Preparer's Signature	Date
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial-retail
Planning Area:	Wildomar
Community Name:	Wildomar
Development Name:	Clinton Keith Village
PROJECT LOCATION	
Latitude & Longitude (DMS): 33.5986North, 117.2403West	
Project Watershed and Sub-Watershed: Santa Margarita	
APN(s): 362-250-003	
Map Book and Page No Page 927, grid F-1	
PROJECT CHARACTERISTICS	
Proposed or potential land use(s)	Commercial retail
Proposed or Potential SIC Code(s)	5331
Area of Impervious Project Footprint (SF)	172854 SF
Total area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	45671 SF
Total Project Area (ac)	5.02 Ac
Does the project consist of offsite road improvements?	XY ☐ N
Does the project propose to construct unpaved roads?	☐ Y XN
Is the project part of a larger common plan of development (phased project)?	☐ Y XN
Is the project exempt from HMP Performance Standards?	☐ Y X N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	0 SF
Is the project located within any Multi-Species Habitat Conservation Plan (MSHCP Criteria Cell?	☐ Y X N
If so, identify the Cell number:	NA
Are there any natural hydrologic features on the project site?	☐ Y XN
Is a Geotechnical Report attached?	X Y ☐ N
If no Geotech. Report, list the Natural Resources Conservation Service (NRCS) soils type(s) present on the site (A, B, C and/or D)	D
What is the Water Quality Design Storm Depth for the project?	0.68"

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the Project vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas (DMAs)
- Proposed Structural Best Management Practices (BMPs)
- Drainage Path
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

- Drainage infrastructure, inlets, overflows

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Copermittee plan reviewer must be able to easily analyze your Project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the Receiving Waters that the Project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated Beneficial Uses, and proximity, if any, to a RARE Beneficial Use. Include a map of the Receiving Waters in Appendix 1. *(http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/)*

Table A.1 Identification of Receiving Waters

Receiving Waters	USEPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Murrieta Creek	metals, nutrients, pesticides, toxicity	Mun, Adr, Ind, Proc, Gwr, Rec 2, Warm, Wild	NA
Santa Margarita River (upper)	Pathogens, nutrients, Toxicity	REC 1, REC 2, COMM, WILD, RARE, Mun, Agr, Ind, Warm, Cold	10.5 miles
Santa Margarita River (Lower)	Nutrients, Toxicity	REC 1, REC 2, COMM, WILD, RARE, Mun, Agr, Ind, Warm, Cold	
Pacific Ocean	None	IND, NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR, SHELL, Biol, Aqua, Migr	30.5 MILES

A.3 Drainage System Susceptibility to Hydromodification

Using Table A.2 below, list in order of the point of discharge at the project site down to the Santa Margarita River, each drainage system or receiving water that the project site is tributary to. Continue to fill each row with the material of the drainage system, the storm drain susceptibility using the SWCT2 (Stormwater & Water Conservation Tracking Tool - http://rivco.permitrack.com/) or Map 2 of the Hydromodification Susceptibility Documentation Report and Mapping: Santa Margarita Region (Appendix D of the SMR HMP), and the condition for exempting the drainage system, if applicable. If the exemption includes receiving waters that were not evaluated in Appendix D, provide supporting documentation in Appendix 7 to demonstrate that they classify as Engineered, Fully Hardened and Maintained (EFHM) channels, consistent with the definition provided in Appendix D. Include a map exhibiting each drainage system and the associated susceptibility in Appendix 1.

Table A.2 Identification of Susceptibility to Hydromodification

Drainage System	Drainage System Material	Susceptibility of Drainage System	Hydromodification Exemption
City Storm Drain, .5 Mile	Pipe Reinforced Concrete Pipe	Not Susceptible	None
Murrieta Creek 10.5 miles(Upper and Lower)	Natural Earthen channel not engineered	Very Susceptible	None

Drainage System	Drainage System Material	Susceptibility of Drainage System	Hydromodification Exemption
Santa Margarita River	Natural earthen Channel not engineered	Not Susceptible, >20000 cfs	none

A.4 Additional Permits/Approvals required for the Project:

Table A.3 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	X N
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	X N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	X N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	XN
Statewide Construction General Permit Coverage	Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☐ N
Other *(please list in the space below as required)*	☐ Y	☐ N

If yes is answered to any of the questions above, the Copermittee No may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for LID Bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your Low Impact Development (LID) design and explain your design decisions to others.

The 2010 SMR MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

The existing site drains to an existing storm drain located in George Avenue. The proposed site will maintain that drainage pattern

Did you identify and protect existing vegetation? If so, how? If not, why?

No. The existing topography will not allow the site to be graded without removing the existing vegetation.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

No. Due to the amount of grading required no natural areas will be preserved.

Did you identify and minimize impervious area? If so, how? If not, why?

Due to the size of the site the ability to limit the impervious area is limited.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

As a part of the site plan pervious areas were created to direct runoff to within the site, such as landscape areas and infiltration trenches.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your Project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or Identification	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA-1	Mixed	13068	D
DMA-2	Mixed	10019	D
DMA-3	Mixed	13939	D
DMA-4	Mixed	34848	D
DMA-5	Mixed	3920	D
DMA-6	Mixed	25700	D
DMA-7	Mixed	21344	D
DMA-8	Mixed	32670	D
DMA-9	Mixed	34848	D

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column

Table C.2 Type 'A', Self-Treating Areas

DMA Name or Identification	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]

Note: (See Section 3.3 of WQMP Guidance Document) Ensure that partially pervious areas draining to a Self-Retaining area do not exceed the following ratio:

$$\left(\frac{2}{\text{Impervious Fraction}}\right) : 1$$

(Tributary Area: Self-Retaining Area)

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA-1 thru 9	BRB 1-9 and PP 7 and

Note: More than one DMA may drain to a single LID BMP; however, one DMA may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

An assessment of the feasibility of utilizing Infiltration BMPs is required for all projects, *except in the following case:*

- ☐ Harvest and Use BMPs will be implemented to address the Design Capture Volume (see the Harvest and Use Assessment below) for all Drainage Management Areas AND the project is exempt from HMP Performance Standards (*Proceed to Section D.2 and Section E*).

If the above box remains unchecked, perform a site-specific evaluation of the feasibility of Infiltration BMPs using each of the applicable criteria identified in Chapter 3.4.1 of the WQMP Guidance Document and complete the remainder of Section D.1.

Is there an infiltration concern (see discussion in Chapter 2.3.4 of the WQMP Guidance Document for further details)? ☐ Y X N

If yes has been checked, both Infiltration BMPs and Hydrologic Control BMPs that include an infiltration functionalities may not be feasible for the site. It is recommended that you contact your Copermittee to verify whether or not infiltration within the Project is infeasible.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Copermittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

- Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.3.4. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site...	YES	NO
...have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		x
If Yes, list affected DMAs:		
...have any DMAs located within 100 feet of a water supply well?		x
If Yes, list affected DMAs:		
...have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		

If Yes, list affected DMAs:		
...have measured in-situ infiltration rates of less than 1.6 inches / hour?	x	
If Yes, list affected DMAs:	All	
...have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		
If Yes, list affected DMAs:		
...have any contaminated groundwater plume in the vicinity of the site?	X	
If Yes, list affected DMAs:		
...geotechnical report identifies other site-specific factors that would preclude effective and safe infiltration?	X	
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies:

☐ Reclaimed water will be used for the non-potable water demands for the Project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

X The Design Capture Volume (DCV) will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the DCV will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: .48

Type of Landscaping (Conservation Design or Active Turf): truf

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 4.27

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-4 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: .62

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 2.56

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)

2.56	.48

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: can not be determined at this time

Project Type: commercial

Step 2: Identify the planned total of all impervious areas on the proposed Project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the Project site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces 4.27

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 142

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 606

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the Project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
606	Unknown at this time

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the Wet Season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed Project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the Project site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (Acres)

Step 3: Enter the Design Storm Depth for the Project site (see Exhibit A) into the left column of Table 2-5 in Chapter 2 to determine the minimum demand for non-potable uses of stormwater runoff per tributary impervious acre.

Enter the factor from Table 2-3: Enter Value

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum gpd of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the Project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment BMPs, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.3 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

X LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the Project as noted below in Section D.4

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee with jurisdiction over the Project site to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Other Limiting Geotechnical Conditions

Onsite retention may not be feasible due to specific geotechnical concerns identified in the Geotechnical Report. If any, describe below. If no, write N/A:

Not Applicable

Table D.2 Geotechnical Concerns for Onsite Retention Table

Type of Geotechnical Concern	DMAs Feasible (By Name or ID)	DMAs Infeasible (By Name or ID)
Collapsible Soil		
Expansive Soil		
Slopes		
Liquefaction		
Other		

D.5 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.3 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.3 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
1-9		☐	x	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Site drainage will be directed into infiltration trenches within the parking areas and adjacent to the proposed buildings.

D.6 LID BMP Sizing

Each LID BMP must be designed to ensure that the DCV will be addressed by the selected BMPs. First, calculate the DCV for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee with jurisdiction over the Project site. Utilize the worksheets found in the LID BMP Design Handbook or consult with the Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.4 below to document the DCV and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.4 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
BRB 1	*39639*	*Ac/Build/LS*	*.57*	*.56*	*22073.37*			
BRB 2	*33977*	*AC/LS*	*.88*	*.80*	*27066.09*			
BRB 3	*23087*	*AC/Build/LS*	*.85*	*.64*	*14802.89*			
BRB 4	*24829*	*AC/LS*	*.46*	*.60*	*13243.62*			
BRB 5	*19602*	*AC/LS*	*.90*	*.89*	*17484.98*			
BRB 6	*13504*	*AC/build/LS*	*.90*	*.89*	*12045.57*			
BRB 7	*37462*	*AC/LS*	*.90*	*.89*	*33416.1*			
BRB 8	*10454*	*AC/Build/LS*	*.56*	*.45*	*4716.64*			
BRB 9	*16117.2*	*AC*	*.90*	*.89*	*14376.54*			
						Design Storm Depth (in)	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	A_T 218671= Σ[A]				159225.8	.68	$[F] = \frac{[D] \times [E]}{12}$	9025

[B], [C] is obtained as described in Section 2.5 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Each LID BMP must be designed to ensure that the Design Capture Volume (DCV) will be addressed by the selected BMPs. First, calculate the Design Capture Volume for each LID BMP using the 'V_{BMP}' worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the

required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee. Complete Table D.5 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. You can add rows to the table as needed. Alternatively, the Santa Margarita Hydrology Model (SMRHM) can be used to size LID BMPs to address the DCV and, if applicable, to size Hydrologic Control BMPs to meet the Hydrologic Performance Standard of the SMR HMP, as identified in Section E.

Table D.5 LID BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	Design Capture Volume (ft^3)	Proposed Volume (ft^3)
BRB 1	DMA-1	Bio-retention basin 6'x176'	1251	1784
BRB 2	DMA-2	Bio-retention basin 24'x36'	1533	1572
BRB 3	DMA-3	Bio-retention basin 8'X66"	839	903
BRB 4	DMA-4	Bio-retention basin 6'X160'	751	1613
BRB 5	DMA-5	Bio-retention basin 6'X160'	991	684
PP 5	DMA-5	Pervious Pavement 2720SF	375	1088
BRB 6	DMA-6	Bio-retention basin 4'X110'	683	792
BRB 7	DMA-7	Bio-retention basin 4'X148'	1894	1066
PP 7	DMA-7	Pervious Pavement 4576SF	935	1830
BRB 8	DMA-8	Bio-retention basin 4'X148'	268	648
BRB 9	DMA-9	Bio-retention basin 4'X136	814	936

Section E: Implement Hydrologic Control BMPs and Sediment Supply BMPs

If a completed Table A.2 demonstrates that the project is exempt from HMP Performance Standards, specify N/A of proceed to Section F, if applicable, and Section G.

E.1 Onsite Feasibility of Hydrologic Control BMPs

An assessment of the feasibility of implementing onsite Hydrologic Control BMPs is required for all projects.

Select one of the following:

X Yes – The implementation of Hydrologic Control BMPs is feasible onsite. *(Proceed to Step E.3 and Step E.4)*

- *Or* -

☐ No – The project site is larger than one acre and the implementation of Hydrologic Control BMPs is not feasible onsite. *(Proceed to Step E.5 and Step F for Alternative Compliance upon approval of the Technical Feasibility Assessment by the Copermittee)*

☐ No – The project site is smaller than one acre and the implementation of Hydrologic Control BMPs is not feasible onsite. *(Proceed to Step E.2)*

If the reasons for infeasibility are different from those listed in Section D.1, describe the technical or spatial reasons that preclude the implementation of onsite Hydrologic Control BMPs. If none, write N/A:

Not applicable

Approval of the condition for infeasibility, if any, is required by the Copermittee. Has the condition for infeasibility been approved by the Copermittee?

☐ Y ☐ N x N/A

E.2 Meeting the HMP Performance Standard for Small Project Sites

Select one of the following:

☐ Yes – The project site is equal to or larger than one acre. *(Proceed to Step E.3, Step E.4, and Step E.5)*

- *Or* -

☐ No – The project site is less than one acre. *(Follow the remainder of Step E.2)*

Only a Simplified Technical Feasibility Study is required from the applicant. Complete the Simplified Technical Feasibility Study in Appendix 7, which must include, at a minimum, the soil conditions at the PDP, a demonstration of the lack of available space for onsite Hydrologic Control BMPs, an explanation of prohibitive costs to implement Hydrologic Control BMPs, and a written opinion from a Registered Geotechnical Engineer identifying the infeasibility due to geotechnical concerns.

Select one of the following:

☒ Yes – Onsite Hydrologic Control BMPs are feasible. *(Proceed to Step E., Step E.4, and Step E.5)*

- *Or* -

☐ No – Onsite Hydrologic Control BMPs are not feasible per the Simplified Technical Feasibility Study. *(Proceed to Section E.5 for Sediment Supply Performance Standard and Section F for Alternative Compliance)*

E.3 Hydrologic Control BMP Selection

Capture of the DCV and achievement of the Hydrologic Performance Standard may be met by combined and/or separate structural BMPs. Similarly, compliance with the two identified requirements may be fully or partially achieved onsite.

For each DMA, identify in Table E.1 if the DCV is fully or partially captured onsite, if the Hydrologic Performance Standard is fully or partially met onsite (by using the SMRHM identified in Step E.4), and if structural BMPs for compliance with the LID requirement and the Hydrologic Performance Standard are combined.

Table E.1 LID & Hydromodification BMP Location

DMA	LID BMP	Hydrologic Control BMP	Combined BMP	BMP type and ID
1-12	X Onsite ☐ Partially Onsite ☐ Offsite ☐ None Required	X Onsite ☐ Partially Onsite ☐ Offsite ☐ None Required	X Yes ☐ No	The bio-retention basins and pervious pavements will detain 10256 cubic feet of storm water which will mitigate the peak flows and volumes from site

For each DMA provide a narrative describing if the DCV and the Hydrologic Performance Standard are to be fully managed onsite. If not, the narrative should detail how and where offsite structural BMPs will achieve management of the DCV and the Hydrologic Performance Standard.

DMA 1 THRU 12 Drains to infiltration basins and pervious pavement and then to a retention basin system that will take the peak 10-year flow from the developed site to reduce the peak flow to predevelopment flow. The pervious pavement and infiltrations basins reduce the developed peak flows for the 2-year up to the 10-year flows based on the Santa Margarita Region Hydrology Model.

E.4 Hydrologic Control BMP Sizing

Each Hydrologic Control BMP must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA by more than ten percent over a one-year period. Using SMRHM, the applicant shall demonstrate that the performance of each designed Hydrologic Control BMP complies with the Hydrologic Performance Standard. Complete Table E.2 below and identify, for each DMA, the type of Hydrologic Control BMP, if the SMRHM model confirmed the management (Identified as "passed" in SMRHM), the total volume capacity of the Hydrologic Control BMP, the Hydrologic Control BMP footprint at top floor elevation, and the drawdown time of the Hydrologic Control BMP. SMRHM summary reports should be documented in Appendix 7.

Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table E.2 Hydrologic Control BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
BRB 1-9	All	Bio Retention Basins	X	.17	.14	
PP-6 to 7	6 and 7	Pervious pavement	X	.07	.23	
			☐			
			☐			

E.5 Implement Sediment Supply BMPs

The applicant may refer to Section 2.3 of the SMR HMP for a comprehensive description of the methodology to meet the Sediment Supply Performance Standard. Complete the following steps to determine compliance with the Sediment Supply Performance Standard:

Step 1: Identify if the site is a Significant Source of Bed Sediment Supply to the receiving channel

☐ Step 1.A – Is the Bed Sediment of onsite streams similar to that of receiving streams?

Rate the similarity: ☐ High
☐ Medium
x Low

Results from the geotechnical and sieve analysis to be performed both onsite and in the receiving channel should be documented in Appendix 7. Of particular interest, the results of the sieve analysis, the soil erodibility factor, a description of the topographic relief of the project area, and the lithology of onsite soils should be reported in Appendix 7.

☐ Step 1.B – Are onsite streams capable of delivering Bed Sediment Supply from the site, if any, to the receiving channel?

Rate the potential: ☐ High
☐ Medium
x Low

Results from the analyses of the sediment delivery potential to the receiving channel should be documented in Appendix 7 and identify, at a minimum, the Sediment Source, the distance to the receiving channel, the onsite channel density, the project watershed area, the slope, length, land use, and rainfall intensity.

☐ Step 1.C – Will the receiving channel adversely respond to a change in Bed Sediment Load?

Rate the need for bed sediment supply:

☐ High

☐ Medium

xLow

Results from the in-stream analysis to be performed both onsite should be documented in Appendix 7. The analysis should, at a minimum, quantify the bank stability and the degree of incision, provide a gradation of the Bed Sediment within the receiving channel, and identify if the channel is sediment supply-limited.

☐ Step 1.D – Summary of Step 1

Summarize in Table E.3 the findings of Step 1 and associate a score (in parenthesis) to each step. The sum of the three individual scores determines if a stream is a significant contributor to the receiving stream.

- Sum is equal to or greater than eight - Site is a significant source of sediment bed material – all on-site streams must be preserved or by-passed within the site plan. The applicant shall proceed to Step 2 for all onsite streams.
- Sum is greater than five but lower than eight. Site is a source of sediment bed material – some of the on-site streams must be preserved (with identified streams noted). The applicant shall proceed to Step 2 for the identified streams only.
- Sum is equal to or lower than five. Site is not a significant source of sediment bed material. The applicant may advance to Section F.

Table E.3 Triad Assessment Summary

Step	Rating			Total Score
1.A	☐ High (3)	☐ Medium (2)	X Low (1)	1
1.B	☐ High (3)		X Low (1)	1
1.C	☐ High (3)	☐ Medium (2)	X Low (1)	1
Significant Source Rating of Bed Sediment to the receiving channel(s)				3

Step 2: Preservation of Identified Onsite Channels

Onsite streams identified as a Significant Source of Bed Sediment should be avoided in the site design.

Check one of the following:

☐ The site design does avoid all onsite channels identified as a Significant Source of Bed Sediment *(The applicant may disregard subsequent steps of Section E.5 and directly advance directly to Section F.)*

- *Or* -

XThe site design **does NOT avoid** all onsite channels identified as a Significant Source of Bed Sediment *(The applicant may proceed with the subsequent steps of Section E.5).*

Provide in Appendix 7 a site map that identifies all onsite channels and highlights those onsite channels that were identified as a Significant Source of Bed Sediment. The site map shall demonstrate, if feasible, that the site design avoids those onsite channels identified as a Significant Source of Bed Sediment. In addition, the applicant shall describe the characteristics of each onsite channel identified as a Significant Source of Bed Sediment. If the design plan cannot avoid the onsite channels, please provide a rationale for each channel individually.

There are two small channels that cross the site. Both are at the head waters of a drainage area where the majority of the downstream areas have been fully improved with underground storm drain pipes. The two small channels extend less than 200-feet across the property and the terminus of the channels is less than 600-feet from the project site. Given the relatively small drainage area existing soil and length of the channels they are not a significant source of sediment.

Identified Channel #2 - Insert narrative description here

Identified Channel #3 - Insert narrative description here

Step 3: By-Pass of Upstream Drainage(s) to Preserve the discharge of Bed Sediment Supply to the receiving channel(s)

Onsite channels identified as a Significant Source of Bed Sediment Supply should be by-passed the discharge of Bed Sediment Supply to the receiving channel(s).

Check one of the following:

☐ The site design does avoid and/or bypass all onsite channels identified as a source of Bed Sediment Supply *(The applicant may directly advance to Section F.)*

- *Or* -

X The site design **does NOT avoid or by-pass** all onsite channels identified as a source of Bed Sediment Supply *(The applicant may proceed to an Alternative Approach, as defined in Section F).*

Provide in Appendix 7 a site map that identifies all onsite channels and highlights those onsite channels that were identified as a Significant Source of Bed Sediment Supply. The site map shall demonstrate, if feasible, that the site design avoids or by-passes those onsite channels of significant Bed Sediment Supply to the receiving channel(s). In addition, the applicant shall describe the characteristics of each onsite channel identified as a Significant Source of Bed Sediment Supply. If the design plan cannot avoid or by-pass the onsite channels, please provide a rationale for each channel individually.

Identified Channel #1 - Insert narrative description here

Identified Channel #2 - Insert narrative description here

Section F: Alternative Compliance

LID BMPs and Hydrologic Control BMPs are expected to be feasible on virtually all projects. Where LID BMPs and/or Hydrologic Control BMPs have been demonstrated to be infeasible as documented in Section D and/or Section E, respectively, other Treatment Control BMPs or alternative compliance approaches must be used (subject LID waiver and/or HMP alternative compliance approval by the Copermittee).

In addition, if supporting documentation demonstrates the infeasibility to implement Sediment Supply BMPs onsite (See Section E.5), the applicant may refer to Section F.5.

Check one of the following boxes:

X LID Principles, LID BMPs, Hydrologic Control BMPs, and Sediment Supply BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ LID Principles and LID BMPs have NOT been incorporated into the site design to fully address the LID requirements for all Drainage Management Areas AND HMP Performance Standards are not fully addressed in the following Drainage Management Areas.

- The following Drainage Management Areas are unable to be addressed using LID BMPs. A site specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Copermittee and included in Appendix 5. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated. The applicant should complete Section F.1, Section F.2, and Section F.3, as applicable.
- A site specific analysis demonstrating technical infeasibility of Hydrologic Control BMPs and Sediment Supply BMPs has been approved by the Copermittee and included in Appendix 7. Projects less than one acre have completed the Simplified Technical Feasibility Study. The applicant should complete Section F.5 and/or Section F.6, as applicable.

List DMAs Here.

- *Or* -

☐ LID Principles and LID BMPs have been incorporated into the site design to fully address the DCV for all Drainage Management Areas. However, HMP Performance Standards are not fully addressed in the following Drainage Management Areas. A site specific analysis demonstrating technical infeasibility of Hydrologic Control BMPs and Sediment Supply BMPs has been approved by the Copermittee and included in Appendix 7. Projects less than one acre have completed the Simplified Technical Feasibility. The applicant should complete Section F.5 and/or Section F.6, as applicable.

List DMAs Here.

F.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's Receiving Waters and their associated USEPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table F.1 below. If the identified General Pollutant Categories are the same as those listed for your Receiving Waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table F.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
X Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
X Restaurants (>5,000 ft²)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft²)	P	N	P	P	N	P	P	P
X Parking Lots (>5,000 ft²)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	X	☐	X	☐	☐	☐	☐

P = Potential
N = Not Potential
(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected
(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected
(3) A potential Pollutant is land use involving animal waste
(4) Specifically petroleum hydrocarbons
(5) Specifically solvents
(6) Bacterial indicators are routinely detected in pavement runoff

F.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement Smart Growth Principles are potentially eligible for Stormwater Credits. Utilize Table 3-7 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table F.2 Stormwater Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

[1]Cannot Exceed 50%
[2]Obtain corresponding data from Table 3-7 in the WQMP Guidance Document

F.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your Project, utilize Table F.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.5 of the WQMP Guidance Document for further information.

Table F.3 Treatment Control BMP Sizing

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
						Design Storm Depth (in)	*Minimum DCV or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D] \times [E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.5 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Stormwater Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

F.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential Pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table F.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Bio retention Basin	Nitrogen, Metal and Phosphorous	H
Pervious Pavement	Nitrogen, Metal and Phosphorous	H

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Copermittee Approved Study and provided in Appendix 6.

F.5 Hydrologic Performance Standard – Alternative Compliance Approach

Alternative compliance options are only available if the governing Copermittee has acknowledged the infeasibility of onsite Hydrologic Control BMPs and approved an alternative compliance approach. Attach to Appendix 7 the Technical Feasibility Study (Projects equal or greater than one acre) or Simplified Technical Feasibility Study (Projects less than one acre) along with a written approval from the Copermittee. The applicant may refer to Section 2.2.iv of the SMR HMP for extensive guidelines on the alternative compliance approach.

Select the pursued alternative and describe the specifics of the alternative:

X `Offsite Hydrologic Control Management within the same channel system

Provide an onsite detention system to reduce the peak flows from the developed site to the peak flow from the undeveloped site.

☐ In-Stream Restoration Project

Insert narrative description here

For Offsite Hydrologic Control BMP Option

Each Hydrologic Control BMP must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA by more than ten percent over a one-year period. Using SMRHM, the applicant shall demonstrate that the performance of each designed Hydrologic Control BMP is equivalent with the Hydrologic Performance Standard for onsite conditions. Complete Table F.4 below and identify, for each Hydrologic Control BMP, the equivalent DMA the Hydrologic Control BMP mitigates, that the SMRHM model passed, the total volume capacity of the BMP, the BMP footprint at top floor elevation, and the drawdown time of the BMP. SMRHM summary reports for the alternative approach should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table F.5 Offsite Hydrologic Control BMP Sizing

BMP Name / Type	Equivalent DMA (ac)	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
Infiltration trench	5.75 Ax	X	.16	.14	72
Pervious pavement	5.75 Ac	x	.16	.23	72
Retention Tank	5.75	X	.18	NA	NA
		☐			

For Instream Restoration Option

Attach to Appendix 7 the technical report detailing the condition of the receiving channel subject to the proposed hydrologic and sediment regimes. Provide the full design plans for the in-stream restoration project that have been approved by the Copermittee.

F.6 Sediment Supply Performance Standard - Alternative Compliance

The alternative compliance option to the Sediment Supply Performance Standard is only available if the governing Copermittee has approved the investigation of alternative Bed Sediment Supply options. Attach to Appendix 7 the Technical Feasibility Study, along with the modeling analysis, the long-term monitoring program, and the potential corrective actions, that demonstrate the performance of the overall alternative compliance program. The applicant may refer to Section 2.3.ii of the SMR HMP for extensive guidelines on the alternative compliance approach.

Provide a narrative describing the alternative Bed Sediment Supply approach, including the long-term monitoring program and the findings of the numerical modeling.

Insert narrative description here

Section G: Source Control BMPs

Source Control BMPs include permanent, structural features that may be required in your Project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The Maximum Extent Practicable (MEP) standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective structural BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources***: Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit***: Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative***: Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Structural and Operational Source Control BMP

Potential Sources of Runoff Pollutants	Structural Source Control BMPs	Operational Source Control BMPs
Landscaping	Bio-retention basin	Water efficient irrigation
Parking lot	Bio-retention basin and pervious pavement	Sweeping of parking lot

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
BRB-1 etc	Bio-retention basins	Grading and paving plans
PP-1 etc	Pervious pavement	Grading and paving plans

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. The Copermittee with jurisdiction over the Project site can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee with jurisdiction over the Project site will periodically verify that BMPs on your Project are maintained and continue to operate as designed. To make this possible, the Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement maintenance of BMPs in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized Operations and Maintenance or inspections but will require typical landscape maintenance as noted in Chapter 5, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

The Copermittee with jurisdiction over the Project site will also require that you prepare and submit a detailed BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: The site owner will be maintaining the BMP's

Will the proposed BMPs be maintained by a Homeowners' Association (HOA) or Property Owners Association (POA)?

X Y N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Acronyms, Abbreviations and Definitions

2010 SMR MS4 Permit	Order No. R9-2010-0016, an NPDES Permit issued by the San Diego Regional Water Quality Control Board.
Applicant	Public or private entity seeking the discretionary approval of new or replaced improvements from the Copermittee with jurisdiction over the project site. The Applicant has overall responsibility for the implementation and the approval of a Priority Development Project. The WQMP uses consistently the term "user" to refer to the applicant such as developer or project proponent. The WQMP employs also the designation "user" to identify the Registered Professional Civil Engineer responsible for submitting the Project-Specific WQMP, and designing the required BMPs.
Best Management Practice (BMP)	Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal storm water permits, BMPs are typically used in place of numeric effluent limits.
BMP Fact Sheets	BMP Fact Sheets are available in the LID BMP Design Handbook. Individual BMP Fact Sheets include sitting considerations, and design and sizing guidelines for seven types of structural BMPs (infiltration basin, infiltration trench, permeable pavement, harvest-and-use, bioretention, extended detention basin, and sand filter).
California Stormwater Quality Association (CASQA)	Publisher of the California Stormwater Best Management Practices Handbooks, available at www.cabmphandbooks.com.
Conventional Treatment Control BMP	A type of BMP that provides treatment of stormwater runoff. Conventional treatment control BMPs, while designed to treat particular Pollutants, typically do not provide the same level of volume reduction as LID BMPs, and commonly require more specialized maintenance than LID BMPs. As such, the 2010 SMR MS4 Permit and this WQMP require the use of LID BMPs wherever feasible, before Conventional Treatment BMPs can be considered or implemented.
Copermittees	The 2010 SMR MS4 Permit identifies the Cities of Murrieta, Temecula, and Wildomar, the County, and the District, as Copermittees for the SMR.
County	The abbreviation refers to the County of Riverside in this document.

CEQA	California Environmental Quality Act - a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.
CIMIS	California Irrigation Management Information System - an integrated network of 118 automated active weather stations all over California managed by the California Department of Water Resources.
CWA	Clean Water Act - is the primary federal law governing water pollution. Passed in 1972, the CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution by 1985, and ensuring that surface waters would meet standards necessary for human sports and recreation by 1983. CWA Section 402(p) is the federal statute requiring NPDES permits for discharges from MS4s.
CWA Section 303(d) Waterbody	Impaired water in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of urban runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.
Design Storm	The 2010 SMR MS4 Permit has established the 85th percentile, 24-hour storm event as the "Design Storm". The applicant may refer to Exhibit A to identify the applicable Design Storm Depth (D85) to the project.
DCV	Design Capture Volume (DCV) is the volume of runoff produced from the Design Storm to be mitigated through LID Retention BMPs, Other LID BMPs and Volume Based Conventional Treatment BMPs, as appropriate.
Design Flow Rate	The design flow rate represents the minimum flow rate capacity that flow-based conventional treatment control BMPs should treat to the MEP, when considered.
DCIA	Directly Connected Impervious Areas - those impervious areas that are hydraulically connected to the MS4 (i.e. street curbs, catch basins, storm drains, etc.) and thence to the structural BMP without flowing over pervious areas.
Discretionary Approval	A decision in which a Copermittee uses its judgment in deciding whether and how to carry out or approve a project.
District	Riverside County Flood Control and Water Conservation District.
DMA	A Drainage Management Area - a delineated portion of a project site that is hydraulically connected to a common structural BMP or conveyance point. The Applicant may refer to Section 3.3 for further guidelines on how to delineate DMAs.

Drawdown Time	Refers to the amount of time the design volume takes to pass through the BMP. The specified or incorporated drawdown times are to ensure that adequate contact or detention time has occurred for treatment, while not creating vector or other nuisance issues. It is important to abide by the drawdown time requirements stated in the fact sheet for each specific BMP.
Effective Area	Area which 1) is suitable for a BMP (for example, if infiltration is potentially feasible for the site based on infeasibility criteria, infiltration must be allowed over this area) and 2) receives runoff from impervious areas.
ESA	An Environmental Sensitive Area (ESA) designates an area "in which plants or animals life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments". (Reference: California Public Resources Code § 30107.5).
ET	Evapotranspiration (ET) is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is also an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity
FAR	The Floor Area Ratio (FAR) is the total square feet of a building divided by the total square feet of the lot the building is located on.
Flow-Based BMP	Flow-based BMPs are conventional treatment control BMPs that are sized to treat the design flow rate.
FPPP	Facility Pollution Prevention Plan
HCOC	Hydrologic Condition of Concern - Exists when the alteration of a site's hydrologic regime caused by development would cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects.
HMP	Hydromodification Management Plan – Plan defining Performance Standards for PDPs to manage increases in runoff discharge rates and durations.
Hydrologic Control BMP	BMP to mitigate the increases in runoff discharge rates and durations and meet the Performance Standards set forth in the HMP.
HSG	Hydrologic Soil Groups – soil classification to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSGs are A (very low runoff potential/high infiltration rate), B, C, and D (high runoff potential/very low infiltration rate)
Hydromodification	The 2010 SMR MS4 Permit identifies that increased volume, velocity, frequency and discharge duration of storm water runoff from developed areas has the potential to greatly accelerate downstream erosion, impair stream habitat in natural drainages, and negatively impact beneficial uses.

JRMP	A separate Jurisdictional Runoff Management Plan (JRMP) has been developed by each Copermittee and identifies the local programs and activities that the Copermittee is implementing to meet the 2010 SMR MS4 Permit requirements.
LID	Low Impact Development (LID) is a site design strategy with a goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques. LID site design BMPs help preserve and restore the natural hydrologic cycle of the site, allowing for filtration and infiltration which can greatly reduce the volume, peak flow rate, velocity, and pollutant loads of storm water runoff.
LID BMP	A type of stormwater BMP that is based upon Low Impact Development concepts. LID BMPs not only provide highly effective treatment of stormwater runoff, but also yield potentially significant reductions in runoff volume – helping to mimic the pre-project hydrologic regime, and also require less ongoing maintenance than Treatment Control BMPs. The applicant may refer to Chapter 2.
LID BMP Design Handbook	The LID BMP Design Handbook was developed by the Copermittees to provide guidance for the planning, design and maintenance of LID BMPs which may be used to mitigate the water quality impacts of PDPs within the County.
LID Bioretention BMP	LID Bioretention BMPs are bioretention areas are vegetated (i.e., landscaped) shallow depressions that provide storage, infiltration, and evapotranspiration, and provide for pollutant removal (e.g., filtration, adsorption, nutrient uptake) by filtering stormwater through the vegetation and soils. In bioretention areas, pore spaces and organic material in the soils help to retain water in the form of soil moisture and to promote the adsorption of pollutants (e.g., dissolved metals and petroleum hydrocarbons) into the soil matrix. Plants use soil moisture and promote the drying of the soil through transpiration. The 2010 SMR MS4 Permit defines "retain" as to keep or hold in a particular place, condition, or position without discharge to surface waters.
LID Biotreatment BMP	BMPs that reduce stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration, and other biological and chemical processes. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and plants, and collected through an underdrain.
LID Harvest and Reuse BMP	BMPs used to facilitate capturing Stormwater Runoff for later use without negatively impacting downstream water rights or other Beneficial Uses.

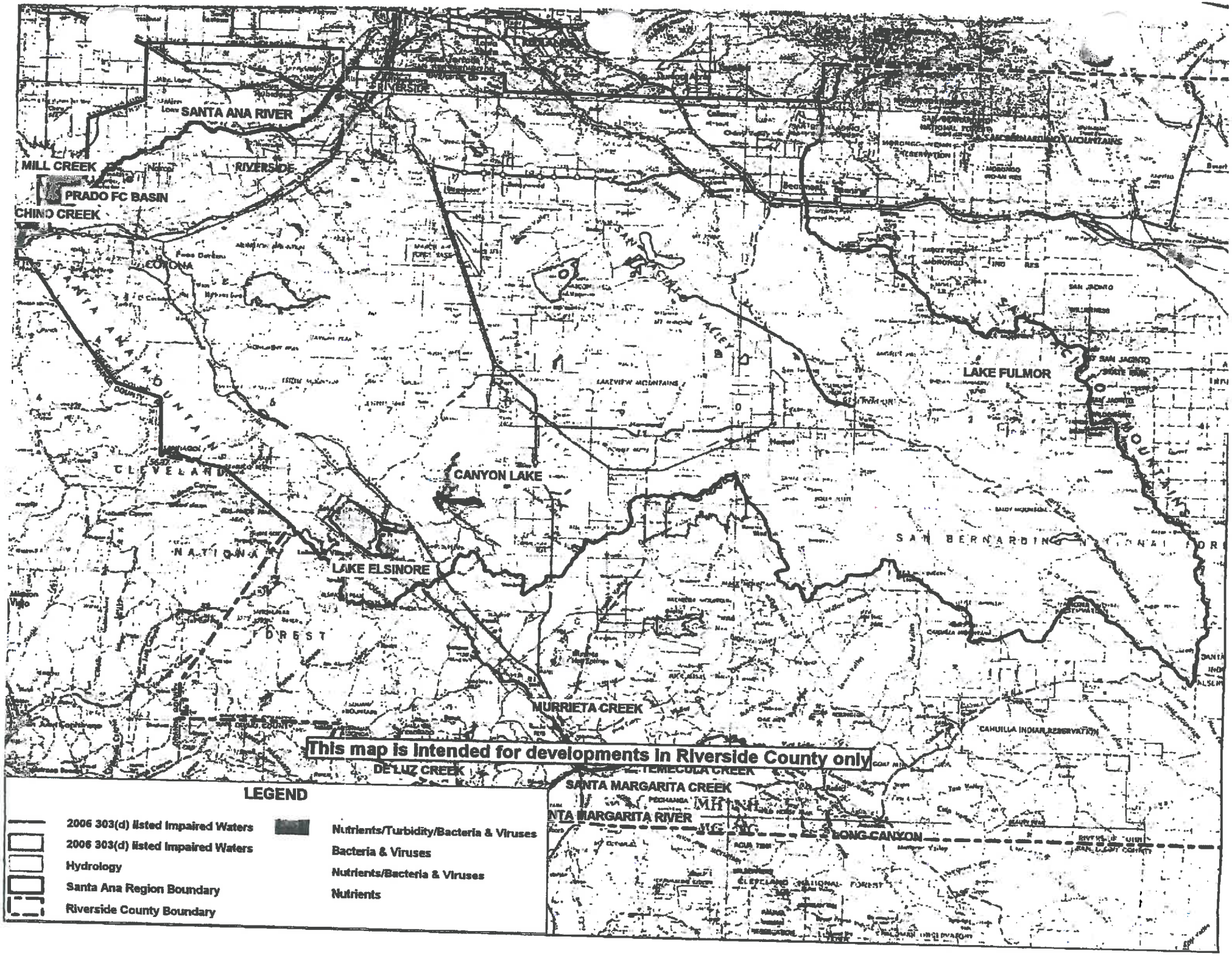
LID Infiltration BMP	BMPs to reduce stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Typical LID Infiltration BMPs include infiltration basins, infiltration trenches and pervious pavements.
LID Retention BMP	BMPs to ensure full onsite retention without runoff of the DCV such as infiltration basins, bioretention, chambers, trenches, permeable pavement and pavers, harvest and reuse.
LID Principles	Site design concepts that prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
MEP	Maximum Extent Practicable - standard established by the 1987 amendments to the CWA for the reduction of Pollutant discharges from MS4s. Refer to Attachment C of the 2010 SMR MS4 Permit for a complete definition of MEP.
MF	Multi-family – zoning classification for parcels having 2 or more living residential units.
MS4	Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.
New Development Project	Defined by the 2010 MS4 permit as 'Priority Development Projects' if the project, or a component of the project meets the categories and thresholds described in Section 1.1.1.
NPDES	National Pollution Discharge Elimination System - Federal program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project - Includes New Development and Redevelopment project categories listed in Section F.1.d(2) of Order No. R9-2009-0002.

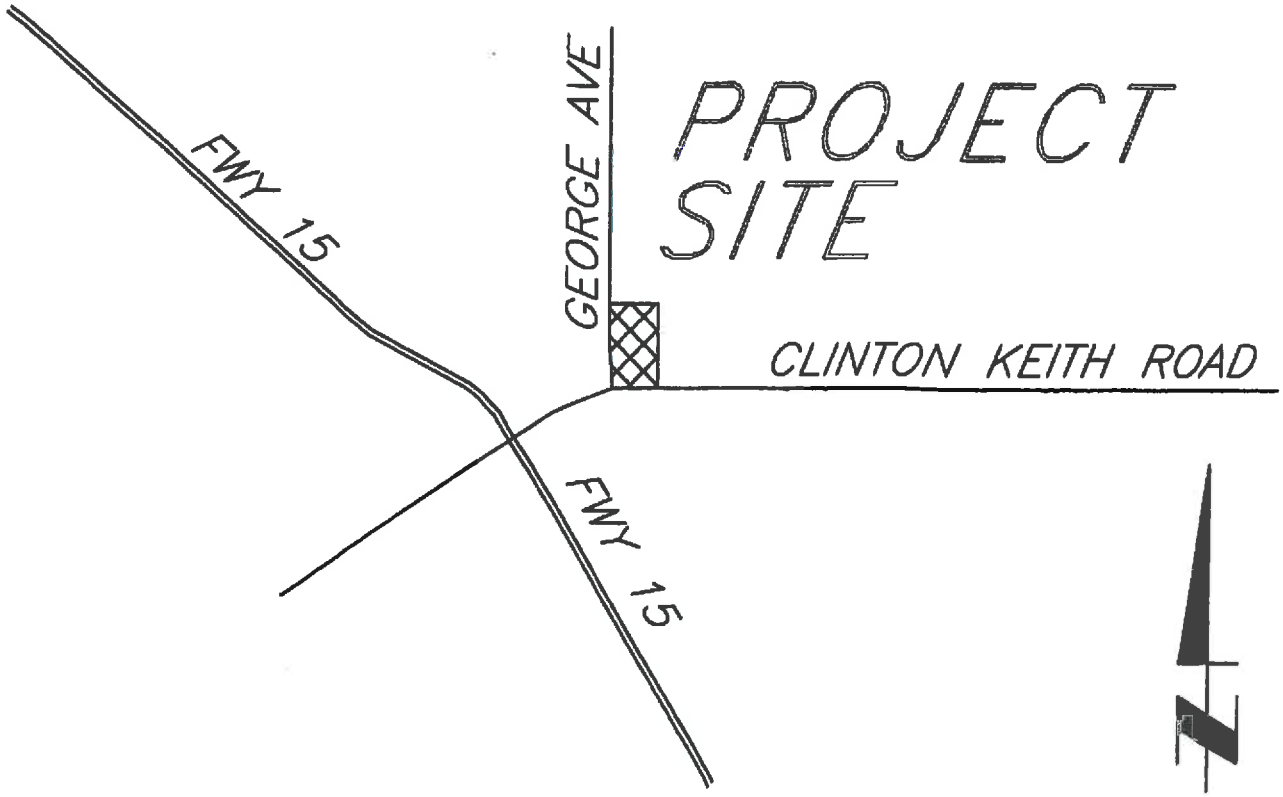
Priority Pollutants of Concern	Pollutants expected to be present on the project site and for which a downstream water body is also listed as Impaired under the CWA Section 303(d) list or by a TMDL.
Project-Specific WQMP	A plan specifying and documenting permanent LID Principles and Stormwater BMPs to control post-construction Pollutants and stormwater runoff for the life of the PDP, and the plans for operation and maintenance of those BMPs for the life of the project.
Receiving Waters	Waters of the United States.
Redevelopment Project	The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair. Project that meets the criteria described in Section 1.
Runoff Fund	Runoff Funds have not been established by the Copermittees and are not available to the Applicant. If established, a Runoff Fund will develop regional mitigation projects where PDPs will be able to buy mitigation credits if it is determined that implementing onsite controls is infeasible.
San Diego Regional Board	San Diego Regional Water Quality Control Board - The term "Regional Board", as defined in Water Code section 13050(b), is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200. State agency responsible for managing and regulating water quality in the SMR.
SCCWRP	Southern California Coastal Water Research Project
Site Design BMP	Site design BMPs prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
SF	Parcels with a zoning classification for a single residential unit.
SMC	Southern California Stormwater Monitoring Coalition
SMR	The Santa Margarita Region (SMR) represents the portion of the Santa Margarita Watershed that is included within the County of Riverside.

Source Control BMP	Source Control BMPs land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between Pollutants and runoff.
Stormwater Credit	Stormwater Credit can be claimed by an Applicant if certain development practices that provide broad-scale environmental benefits to communities are incorporated into the project design. Refer to Section 3.5.4 for additional information on Stormwater Credits.
Structural BMP	Structures designed to remove pollutants from stormwater runoff and mitigate hydromodification impacts.
SWPPP	Storm Water Pollution Prevention Plan
Tentative Tract Map	Tentative Tract Maps are required for all subdivision creating five (5) or more parcels, five (5) or more condominiums as defined in Section 783 of the California Civil Code, a community apartment project containing five (5) or more parcels, or for the conversion of a dwelling to a stock cooperative containing five (5) or more dwelling units.
TMDL	Total Maximum Daily Load - the maximum amount of a Pollutant that can be discharged into a waterbody from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.
USEPA	United States Environmental Protection Agency
Volume-Based BMP	Volume-Based BMPs applies to BMPs where the primary mode of pollutant removal depends upon the volumetric capacity such as detention, retention, and infiltration systems.
WQMP	Water Quality Management Plan
Wet Season	The 2010 SMR MS4 Permit defines the wet season from October 1 through April 30.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map


SANTA ANA RIVER
MILL CREEK
RIVERSIDE
PRADO FC BASIN
CHINO CREEK
CORONA
SAN JACINTO VALLEY
LAKE FULMOR
CANYON LAKE
LAKE ELSINORE
MURRIETA CREEK
DE LUZ CREEK
TEMECULA CREEK
SANTA MARGARITA CREEK
SANTA MARGARITA RIVER
LONG CANYON
This map is intended for developments in Riverside County only
LEGEND
2006 303(d) listed Impaired Waters
2006 303(d) listed Impaired Waters
Hydrology
Santa Ana Region Boundary
Riverside County Boundary
Nutrients/Turbidity/Bacteria & Viruses
Bacteria & Viruses
Nutrients/Bacteria & Viruses
Nutrients



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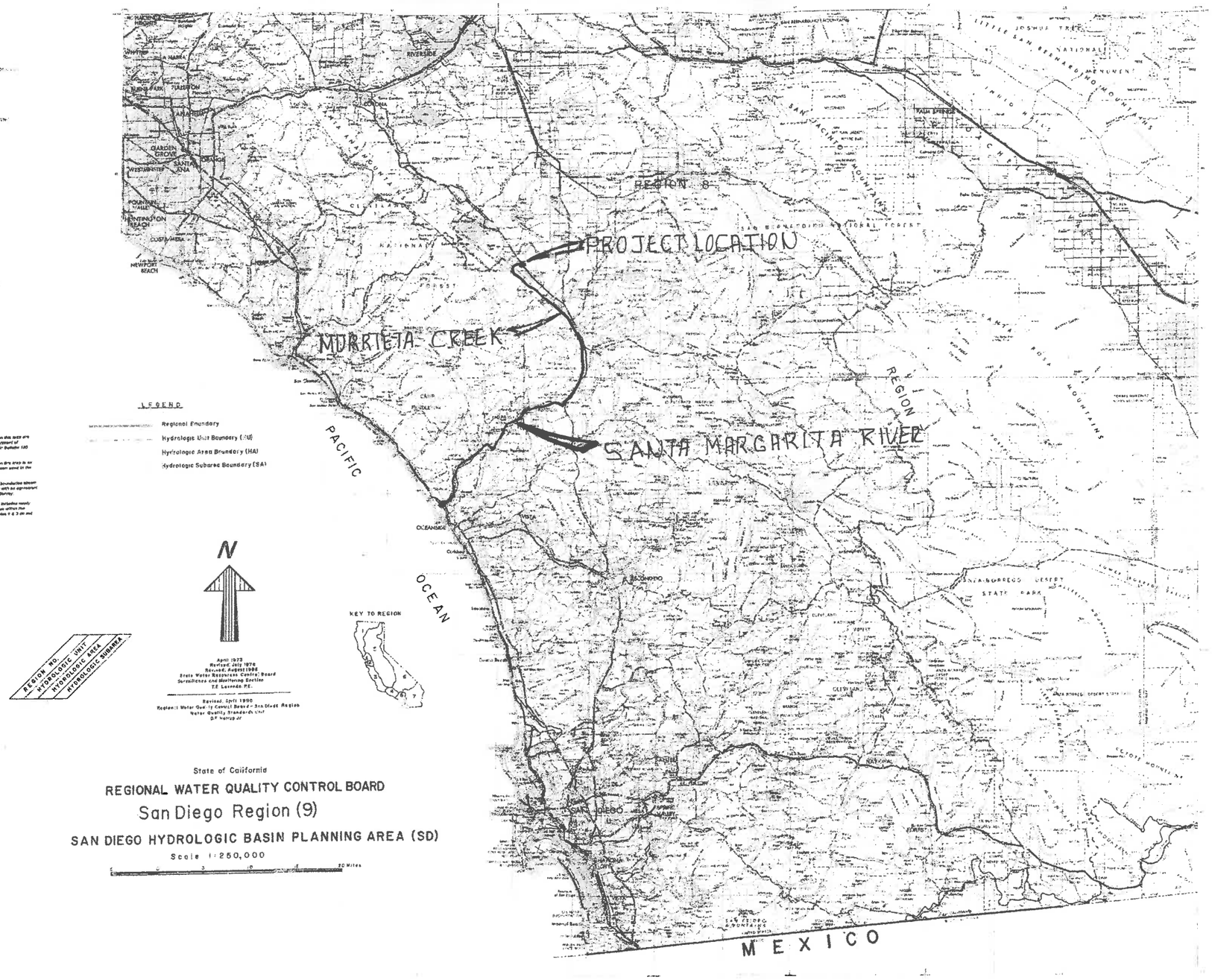
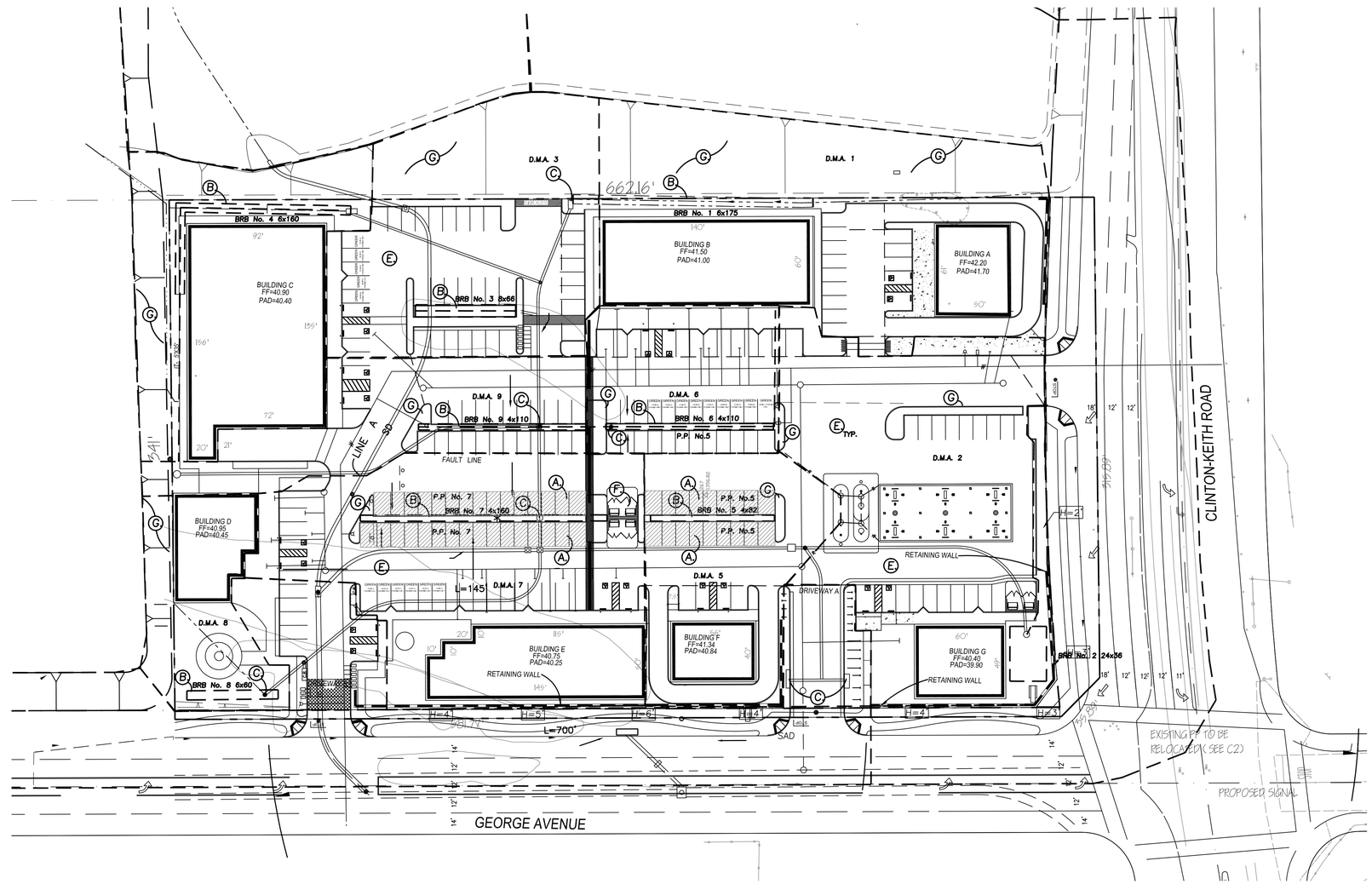
VICINITY MAP

NOT TO SCALE



RECEIVING WATERS

SCALE: 1"=40'



Ⓐ PURVIOUS PAVEMENT
Ⓑ BIO-RETENTION BASIN
Ⓒ CATCH BASIN DEBRIS FILTER
Ⓓ LANDSCAPE EFFICIENT IRRIGATION
Ⓔ PARKING LOT SWEEP
Ⓕ TRASH ENCLOSURE MAINTENANCE
Ⓖ EFFICIENT LANDSCAPE IRRIGATION

ABBREVIATIONS

AC=ASPHALT CONCRETE
BW=BACK OF WALK
TC=TOP OF CURB
FL=FLOW LINE
FS=FINISHED SURFACE
FF=FINISHED FLOOR
GB=GRADE BREAK
RD=ROOF DRAIN
CB=CATCH BASIN
CL=CENTER LINE
CF=CURB FACE
D/W=DRIVEWAY
CLR=CLEAR
SCO=SEWER CLEAN OUT
SMH=SEWER MANHOLE
SDMH=STORM DRAIN MANHOLE
WM=WATER METER
WV=WATER VALVE
FH=FIRE HYDRANT
FDC=FIRE DEPARTMENT CONNECTION
PIV=POST INDICATOR VALVE
GM=GAS METER
TE=TRASH ENCLOSURE
PP=POWER POLE
HC=HANDICAP
PL=PROPERTY LINE
EG=EDGE OF GUTTER
EP=EDGE OF PAVEMENT
PB=PULL BOX
CONC=CONCRETE
TW=TOP OF WALL
TOP=TOP OF SLOPE
TOE=TOE OF SLOPE
STA=STATION

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REVISED JANUARY 18, 2016

REGISTERED PROFESSIONAL ENGINEER
LYNN J. MUTCH
No. 29517
EXP. 3-31-17
CIVIL ENGINEER
STATE OF CALIFORNIA

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PREPARED FOR
GEORGE CLINTON-KEITH DEVELOPMENT
4921 Birch Street suite 125
Newport Beach Ca 92660

PRELIMINARY W.Q.M.P. EXHIBIT
CLINTON KEITH VILLAGE

DRAWN BY : DS
DATE: 20 JANUARY 2016
SHEET 1 OF 1
JOB NO.: 28049B

Appendix 2: Construction Plans

Grading and Drainage Plans

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

EnGEN CORPORATION

GEOTECHNICAL/GEOLOGICAL ENGINEERING STUDY

Zolfaghari Commercial
Assessors Parcel Number: 326-250-003
Clinton Keith Road and George Avenue
City of Murrieta, County of Riverside, California
Project Number: M3551-GS

April 6, 2007

Prepared for:
Mr. Reza Zolfaghari
c/o Mr. Reza Kassraian
23821 Hillhurst Drive, Suite 29
Laguna Niguel, California 92677

23759 Jackson Avenue, Murrieta, California 92562 · Phone (951) 834-9000 · Fax (951) 834-9001

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DRAWINGS

EnGEN CORPORATION

April 6, 2007

Mr. Reza Zolfaghari
c/o Mr. Reza Kassraian
23821 Hillhurst Drive, Suite 29
Laguna Niguel, California 92677
(714) 404-7131 / FAX (949) 495-0927

Regarding: **GEOTECHNICAL / GEOLOGICAL ENGINEERING STUDY**
Zolfaghari Commercial - Assessor's Parcel Number: 326-250-003
Clinton Keith Road and George Avenue
City of Murrieta, County of Riverside, California
Project Number: M3551-GS

Dear Mr. Zolfaghari:

According to your request and signed authorization, we have performed a Geotechnical/Geological Engineering Study for the subject project. The purpose of this study was to evaluate the existing geologic and geotechnical conditions within the subject property with respect to recommendations for rough grading of the site and design recommendations for foundations, slabs-on-grade, etc., for the proposed development. Submitted, herewith, are the results of this firm's findings and recommendations, along with the supporting data.

1.0 EXECUTIVE SUMMARY

A geotechnical/geological study of the subsurface conditions of the subject site has been performed for the proposed development. Exploratory excavations have been completed and earth material samples subjected to laboratory testing. The data has been analyzed with respect to the project information furnished to us for the proposed development. It is the opinion of this firm that the proposed development is feasible from a geotechnical/geological standpoint, provided that the recommendations presented in this report are implemented in the design and construction of the project.

The site primarily consists of shallow undocumented fill and alluvium overlying Pauba Formation bedrock. Some undocumented fill occurs on-site in the form of disked or tilled agricultural soils expected across the site in the upper 2 to 3 feet below ground surface (bgs). In addition, there was one backfilled and four open fault trenches with associated stockpiles on-site.

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The stockpiles and backfilled trench are considered undocumented fill material. The undocumented fill and shallow unsuitable alluvium should be removed to competent alluvium or bedrock according to the recommendations as provided in order to maintain tolerable settlement predictions. Anticipated removal depths to reach competent bottoms are on the order of 2 to 10-feet below existing ground surface, more specific recommendations based upon the Referenced No. 1 grading plans are discussed in section 8.2.5.

2.0 INTRODUCTION

2.1 **Authorization:** This report presents the results of the geotechnical engineering and engineering geology study performed on the subject site for the proposed development. Authorization to perform this study was in the form of a signed proposal.

2.2 **Scope of Work:** The scope of work performed for this study was designed to determine and evaluate the surface and subsurface conditions within the subject site with respect to its geotechnical characteristics, and to provide recommendations and criteria for use by the design engineer and architect for the development of the site and for design and construction of the proposed development. The scope of work included the following: site reconnaissance, surface geologic mapping; subsurface exploration; sampling of on-site earth materials; laboratory testing; engineering analysis of field and laboratory data; and the preparation of this report.

2.3 **Previous Site Studies:** A geologic study for on-site faulting was performed by Leighton Consulting, Inc. (Leighton), which identified on-site faulting and established a building setback zone. The documents produced as a result of this study, and provided to this firm include:

- **Leighton Consulting, Inc.**, *Geological Fault Hazard Investigation, Proposed ± 5-acre parcel, Assessor's Parcel Number 362-250-003, Wildomar, Riverside County, California*, prepared for Mr. Reza Zolfaghari, dated September 19, 2005.
- **Leighton Consulting, Inc.**, *Response to Review Comments, County of Riverside, Building and Safety Department, GEO Report No. 1524, Assessor's Parcel Number 362-250-003, Wildomar, County of Riverside, California*, Attention: Mr. Reza Zolfaghari, dated November 22, 2006.

- **Leighton Consulting, Inc.**, *2006, Fault Location Map, Geologic Location Fault Investigation, Assessor's Parcel Numbers 362-250-003 and 362-250-004*, Wildomar, California, Scale 1"=40', dated December 2005, Revised November 2006.

It is our understanding that the findings of the previous Fault Hazard Investigation were approved in the County of Riverside, Transportation and Land Management Agency, Planning Department letter dated January 5, 2007 and titled *Approval Comments, County Geologic Report No. 1524 (Fault Hazard), Geologic Fault Investigation, Proposed +/- 5 Acre Parcel, Assessor's Parcel Number 362-250-003, Wildomar, Riverside, California.* No additional geotechnical/geologic studies are known to have occurred for the subject site.

3.0 PROPOSED DEVELOPMENT / PROJECT DESCRIPTION

Grading plans were not available for review at the time of this study. The Referenced Fault Location Map provided proposed building footprints, finished floor elevations and site topography that were used to provide preliminary earthwork and foundation design recommendations. However the grading plans should be made available to this office for subsequent review so that additional recommendations may be prepared, if necessary. It is our understanding that the proposed development will consist of six (6) buildings to be one or two-story, concrete tilt-up, or block wall type structures with slab-on-grade foundations and associated landscape and hardscape improvements. It is assumed that relatively light loads will be imposed on the foundation soils. The foundation loads are not anticipated to exceed 2,000 pounds per lineal foot (plf) for continuous footings. The above project description and assumptions were used as the basis for the field and laboratory exploration and testing programs as well as the engineering analysis for the conclusions and recommendations presented in this report. This office should be notified if structures, foundation loads, grading, and/or details other than those represented herein are proposed for final development of the site so a review can be performed, supplemental evaluation prepared, and revised recommendations submitted, if necessary.

4.0 SITE DESCRIPTION

The subject site consists of approximately 5-acres located at the northeast corner of the intersection of Clinton Keith Road and George Avenue, in the City of Murrieta, County of Riverside, California. The site is comprised of rolling hills with regional drainage, primarily by

seasonal drainages, generally flowing to the southwest. A concrete V-ditch parallels the eastern portion of the southern property line. The site was covered by a moderately thick amount of grasses, weeds, and brush at the time of our field study. It is our understanding that Clinton Keith Road may have been formerly aligned within roughly the southeastern most 200-feet, measured from the southeast corner and it is possible that related abandoned improvements may exist in this area of the site.

5.0 FIELD STUDY

Field reconnaissance and geologic mapping was conducted on March 13, 2007, by our Field Geologist. A study of the property's subsurface condition was performed to evaluate underlying earth strata and the presence of groundwater. Three (3) exploratory soil borings were excavated on the study site by **2 Bit Drilling** utilizing a CME 45 truck-mounted drill rig, equipped with 7.0-inch outside diameter continuous flight hollow-stem augers. The maximum depth explored on site was approximately 50.5-feet below the existing ground surface (bgs). Relatively undisturbed ring samples of the earth materials encountered were obtained at various depths in the exploratory borings. Bulk samples were collected from the soil borings. All soil samples were subsequently returned to our soils laboratory for verification of field classifications and testing. Bulk samples were obtained from cuttings developed during the excavation process and represent a mixture of the soils within the depth indicated on the logs. Relatively undisturbed samples of the earth materials encountered in the soil borings were obtained by driving a thin-walled steel sampler lined with 1.0-inch high, 2.416-inch inside diameter brass rings. The sampler was driven with successive drops of a 140-pound weight having a free fall of approximately 30-inches. The blow counts for each successive 6.0-inches of penetration, or fraction thereof, are shown in the Geotechnical Boring Logs presented in the Appendix. The ring samples were retained in close-fitting moisture-proof containers and returned to our laboratory for testing. The approximate locations of the soil borings are denoted on the Geotechnical Site Plan (Plate 1). The exploratory soil borings were backfilled with soil cuttings.

6.0 LABORATORY TESTING

6.1 **General:** The results of laboratory tests performed on samples of earth material obtained during the field investigation are presented in the Geotechnical Boring Logs in the Appendix. Following is a listing and brief explanation of the laboratory tests performed. The samples

obtained during the field investigation will be discarded 30 days after the date of this report. This office should be notified immediately if retention of samples will be needed beyond 30 days.

6.2 **Classification:** The field classification of soil materials encountered in the geotechnical borings was verified in the laboratory, in general accordance with the Unified Soils Classification System, ASTM D 2488-00, Standard Practice for Determination and Identification of Soils (Visual-Manual Procedures).

6.3 **In-Situ Moisture Content and Density Test:** The in-situ moisture content and dry density were determined in general accordance with ASTM D 2216-98 and ASTM D 2937-00 procedures, respectively, for each selected undisturbed sample obtained. The dry density is determined in pounds per cubic foot and the moisture content is determined as a percentage of the oven dry weight of the soil.

6.4 **Maximum Dry Density / Optimum Moisture Content Relationship Test:** Maximum dry density/optimum moisture content relationship determinations were performed on samples of near-surface earth material in general accordance with ASTM D 1557-02 procedures using a 4.0-inch diameter mold. Samples were prepared at various moisture contents and compacted in five (5) layers using a 10-pound weight dropping 18-inches and with 25 blows per layer. A plot of the compacted dry density versus the moisture content of the specimens is constructed and the maximum dry density and optimum moisture content determined from the plot.

6.5 **Consolidation Test:** Settlement predictions of the on-site soil and compacted fill behavior under load were made, based on consolidation tests that were performed in general accordance with ASTM D 2435-03 procedures. The consolidation apparatus is designed to receive a 1.0-inch high, 2.416-inch diameter ring sample. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore water and pore pressure. Loads normal to the face of the specimen are applied in several increments in a geometric progression under both field moisture and submerged conditions. The resulting changes in sample thickness are recorded at selected time intervals. Water was added to the test apparatus at various loads to create a submerged condition and to measure the collapse potential (hydroconsolidation) of the sample. The resulting change in sample thickness was recorded.

6.6 **Direct Shear Test (Remolded):** Direct shear tests were performed on selected samples of near-surface earth material in general accordance with ASTM D 3080-03 procedures. The shear machine is of the constant strain type. The shear machine is designed to receive a 1.0-inch high, 2.416-inch diameter ring sample. Specimens from the sample were sheared at various pressures normal to the face of the specimens. The specimens were tested in a submerged condition. The maximum shear stresses were plotted versus the normal confining stresses to determine the shear strength (cohesion and angle of internal friction).

6.7 **Expansion Test:** Laboratory expansion tests were performed on samples of near-surface earth material in general accordance with the California Building Code Standard (CBC 18-2). In this testing procedure, a remolded sample is compacted in two (2) layers in a 4.0-inch diameter mold to a total compacted thickness of approximately 1.0-inch by using a 5.5-pound weight dropping 12-inches and with 15 blows per layer. The sample is compacted at a saturation of between 49 and 51 percent. After remolding, the sample is confined under a pressure of 144 pounds per square foot (psf) and allowed to soak for 24 hours. The resulting volume change due to the increase in moisture content within the sample is recorded and the Expansion Index (EI) calculated.

6.8 **Soluble Sulfate Test:** Samples of near-surface earth material were obtained for soluble sulfate testing for the site. The concentration of soluble sulfates was determined in general conformance with California Test Method 417 procedures.

6.9 **pH/Minimum Resistivity:** Sample(s) of near surface soils were tested for pH and minimum resistivity in general conformance to CTM 643.

6.10 **Chloride Content:** Sample(s) of near surface soils were test4ed for chloride content in general conformance to CTM 422.

6.11 **R-Value Test:** An evaluation was performed on a selected representative soil sample in general accordance with California Test Method 301. The resistance (R-Value) test method is used to measure the potential strength of subgrade, subbase, and base course materials for use in road pavements.

7.0 ENGINEERING GEOLOGY

7.1 **Geologic Setting:** The site is located in the Northern Peninsular Range on the structural unit known as the Perris Block. The Perris Block is bounded on the northeast by the San Jacinto

To estimate the potential ground shaking, **EnGEN Corporation** has analyzed the seismic parameters using the probabilistic ground motion analysis. The probabilistic ground motion analysis requires information regarding fault geometry, the magnitude of the maximum credible earthquake on each fault, and the regional attenuation equation, which relates the considered seismic parameters to the magnitude and the source-site distance.

To perform this analysis, **EnGEN Corporation** utilized the computer software FRISKSP developed by Thomas F. Blake (Blake, 2004c).

The attenuation relationships by Boore et al. (1997) for soil type SD (stiff soil – shear wave velocity 250 m/s) was utilized. For a complete discussion of the software and probabilistic methods the reader is referred to Blake (2000a, b, c).

The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, distance from the source (epicenter), and the site response characteristics. The Elsinore Fault – Temecula Valley Segment is potentially capable of producing the most intense horizontal ground acceleration at the site, due to its proximity and associated maximum credible earthquake magnitude of 6.8. **Such an earthquake near the site could produce seismic shaking with an estimated maximum credible peak horizontal ground acceleration of 0.68g. The maximum credible peak horizontal acceleration is the maximum acceleration that appears capable of occurring under the presently known tectonic framework, and has a 10 percent chance of exceedance in 50 years.**

In sum, these results are based on many unavoidable geological and statistical uncertainties, but are consistent with current standard-of-practice. As engineering seismology evolves, and as more fault-specific geological data are gathered, more certainty and different methodologies may also evolve.

7.4 **Earth Materials:** A brief description of the earth materials encountered in the exploratory excavations is presented in the following sections. A more detailed description of the earth materials encountered is presented on the Geotechnical Boring Logs in the Appendix. The earth material strata as shown on the logs represent the conditions in the actual exploratory locations and other variations may occur between the excavations. Lines of demarcation between the earth materials on the logs represented the approximate boundary between the material types; however, the transition may be gradual.

7.4.1 **Undocumented Fill Material (Afu):** Undocumented fill material exists at the subject site in the form of tilled agricultural soils. Based on the soil samples collected on-site, it appears that the disturbed soils are limited to the upper 2 to 3-feet bgs. However, some deeper areas may occur. Some additional undocumented fill material exists in the form of stockpiled fault trench excavation soils. It is possible that additional undocumented fill material may be encountered in the southeastern most corner of the site, extending into the property approximately 200-feet. This area appears to be the location of former Catt Road/Clinton Keith Road and also appears to be a cut area, but may have subsurface abandoned utilities in the area associated with the former road. These materials and any other encountered undocumented fills should be removed and may be reused in fill provided they are properly cleaned of organics and debris. Also, based on our review of the referenced Fault Hazard Investigations, fault trench LFT-2 was backfilled without proper documentation. Therefore, the backfilled materials associated with this trench are considered undocumented fills.

7.4.2 **Alluvium (Qal):** Alluvium underlies the undocumented fill material and overlies the Pauba Formation bedrock. Based on our observations and the regional topography, the relatively thin alluvium generally thickens to the northwest across the site. The alluvium was observed to be primarily comprised of silty sands, and to a lesser extent, of clean or clayey sands. The alluvium exhibited conditions that were loose to medium dense, dry to moist, and porous to non-porous.

7.4.3 **Pauba Formation (Qps):** Pauba Formation bedrock was encountered below the undocumented fill or alluvium to the maximum depth explored (50.5-feet bgs). It was found to consist predominantly of clean, clayey, and silty sandstone with occasional sandy siltstone or sandy claystone. Soils encountered were found to be moist to wet and very dense or stiff to very hard in-place.

7.5 **Groundwater:** Groundwater was encountered at a depth of approximately 15-feet bgs in boring B-2 (approximately 1326 elevation based upon topography of the Leighton Fault Map, Plate 1) at the time of the field study. Groundwater was not encountered in the shallow borings, B-1 and B-3.

7.6 **Liquefaction Evaluation:** Liquefaction is a phenomenon where a sudden large decrease of shearing resistance takes place in fine-grained cohesionless and/or low plasticity cohesive

soils due to the cyclic stresses produced by earthquakes causing a sudden, but temporary, increase of porewater pressure. The increased porewater pressure occurs below the water table, but can cause propagation of groundwater upward into overlying soil and possibly to the ground surface and cause sand boils as excess porewater escapes. Potential hazards due to liquefaction include significant total and/or differential settlements of the ground surface and structures as well as possible collapse of structures due to loss of support of foundations. It has been shown by laboratory testing and from the analysis of soil conditions at sites where liquefaction has occurred that the soil types most susceptible to liquefaction are saturated, fine-grained sand to sandy silt with a mean grain size ranging from approximately 0.075 mm to 0.5 mm. These soils derive their shear strength from intergranular friction and do not drain quickly during earthquakes. Published studies and field and laboratory test data indicate that coarse-grained sands and silty or clayey sands beyond the above-mentioned grain size range are considerably less vulnerable to liquefaction. To a large extent, the relative density of the soil also controls the susceptibility to liquefaction for a given number of cycles and acceleration levels during a seismic event. Other characteristics such as confining pressure and the stresses created within the soil during a seismic event also affect the liquefaction potential of a site. Liquefaction of soil does not generally occur at depths of greater than 40 to 50-feet below ground surface due to the confining pressure at that depth. To perform the liquefaction analysis, the computer software LIQUEFY2 (Blake, 1998) is typically utilized. The potential for liquefaction of the site is considered to be low due to the following conditions:

- High relative densities (based upon corrected SPT blow counts of 30 or more blows per foot) were encountered in the majority of the soils below the zone of proposed recompaction.

The total and differential potential settlement in the event of liquefaction has been calculated at 0-inches, assuming a maximum groundwater elevation of 10-feet bgs. Based on these findings, no further evaluation of liquefaction is considered necessary and settlement due to liquefaction is anticipated to be negligible.

7.7 **Secondary Effects of Seismic Activity:** The secondary effects of seismic activity normally considered as possible hazards to a site include various types of ground failure and induced flooding from dam failure. The nearest large confined body of water to the site is Lake Elsinore, located approximately 5 miles to the northwest and approximately

100-feet lower than the subject site. It is our understanding that the regional body of water has water surface elevation controls designed to provide appropriate safety factors with respect to the seismic forces that are expected to act on them. Therefore, seismically-induced flooding and earthquake-induced surface flooding due to seiches is considered low. Due to the distance from the Pacific Ocean and the site elevation of approximately 1,340 above mean sea level, the probability of a tsunami impacting the site is considered nil. The probability of occurrence of each type of ground failure depends on the severity of the earthquake, the distance of the site from the zone of maximum energy release of the quake, the topography of the site, the subsurface materials at the site, and groundwater conditions beneath the site, besides other factors. Since there are active faults on the site, the probability of hazards due to fault ground surface rupture is considered high. A structural setback zone was established by Leighton where structures for human occupancy should not be located (Leighton, 2006b). Due to the low topographic relief on-site, it is considered that the potential for earthquake-induced landslides is low.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 **General:** The conclusions and recommendations presented in this report are based on the results of field and laboratory data obtained from the exploratory excavations located across the property, and the project description and assumptions presented in Section 3.0, Proposed Development/Project Description, of this report. Based on the field and laboratory data and the engineering analysis performed, it is considered that the proposed development is feasible from a geotechnical/geological standpoint. The actual conditions of the near-surface supporting material across the site may vary. The nature and extent of variations of the surface and subsurface conditions between the exploratory excavations may not become evident until construction. If variations of the material become evident during grading, this office should be notified so that **EnGEN Corporation** can evaluate the characteristics of the material and, if needed, prepare revisions to the recommendations presented herein. Recommendations for general site grading, foundations, slab support, pavement design, slope maintenance, etc., are presented in the subsequent paragraphs.

8.2 Earthwork Recommendations:

8.2.1 **General:** The grading recommendations presented in this report are intended for: 1) the use of a conventional shallow foundation system and concrete slabs cast on-grade; and 2) the

rework of unsuitable near-surface earth materials to create an engineered building pad and suitable support for exterior hardscape (sidewalks, patios, etc.) and pavement. If pavement subgrade soils are prepared at the time of rough grading of the building site and the areas are not paved immediately, additional observations and testing of the subgrade soil will have to be performed before placing aggregate base material or asphaltic concrete or PCC pavement to locate areas which may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. The following recommendations may need to be modified and/or supplemented during rough grading as field conditions require.

8.2.2 **Clearing:** All debris, refuse, roots, grasses, weeds, brush and other deleterious materials should be removed from the proposed structure, exterior hardscape and pavement areas, as well as any areas to receive structural fill before grading is performed. No discing or mixing of organic material into the soils should be performed. Man-made objects encountered should be overexcavated and exported from the site. Any water wells encountered should be abandoned by a licensed well contractor.

8.2.3 **Excavation Characteristics:** Excavation and trenching within the undocumented fill, alluvium and Pauba Formation is anticipated to be relatively easy. These materials are anticipated to be rippable with conventional large grading equipment. A rippability study is not considered to be necessary.

8.2.4 **Suitability of On-Site Materials as Fill:** In general, the on-site earth materials present are considered suitable for reuse as fill. Fill materials should be free of significant amounts of organic materials and/or debris. Fill materials should not contain rocks greater than 6-inches in maximum diameter in the upper 5.0-feet of fill. Fill materials should not contain rocks greater than 12-inches in maximum diameter between 5 and 10-feet below proposed pad grade. Fills deeper than 10-feet may be used for oversize disposal. Oversize disposal of rocks greater than 12-inches maximum diameter may be conducted in accordance with Section 8.2.7, Oversize Material, of this report.

8.2.5 **Removal and Recompaction:** All existing undocumented fills and/or unsuitable, loose, or disturbed near-surface soil in areas that will support structural fills, structures, exterior hardscape (sidewalks, patios, etc.), and pavement should be removed. The grading plans should be made available for review by this office in order to prepare additional

recommendations, if necessary. The following recommendations are based on field and laboratory results:

1. Any undocumented fill material to be encountered at the time of grading will require removal to competent alluvium.
2. The proposed detention area system and any improvements crossing the on-site fault zone should be designed and constructed in a manner that is compatable with potential fault related movement, including strong shaking and ground rupture.
3. All alluvium should be removed to competent Pauba Formation bedrock in the area of the proposed building pads. Based on our field and laboratory findings, removals deeper than 10-feet below existing grade, were not proposed or are not expected, except for proposed Building E. However, the exact removal depth should be determined based on exposed conditions to be encountered during grading. Based upon the field and laboratory findings, and the provided proposed Finished Floor elevations for the proposed structures on-site, the preliminary anticipated removal depths are as follows:

Building	Proposed Finished Floor Elevation	Preliminary Anticipated Removal Recommendation
"Drug Store" A B	1339.6 1342.1 1340.7	Competent bedrock is anticipated at the depth of the proposed pad grades for buildings A, B and "Drug Store". Bedrock bottoms should be inspected for competency and uniformity and tested for final expansion index. If expansive soils are found (EI 20 or more), selective grading or updated design may be necessary.
C	1343.2	Remove existing soils in area to receive fill to expose. Competent bedrock, anticipated at 3 to 4-feet bgs. Overexcavate cut and shallow fill areas a minimum of 3-feet below proposed grade.
D	1342.7	Remove existing soils in area to receive fill to expose. Competent bedrock, anticipated at 3 to 4-feet bgs. Overexcavate cut and shallow fill areas a minimum of 4-feet below proposed grade.

* Table continued see next page

Building	Proposed Finished Floor Elevation	Preliminary Anticipated Removal Recommendation
E	1339.1	Remove alluvium to competent bedrock or groundwater, if first encountered. Removals to bedrock are anticipated to be 10-feet bgs in the area of B-3 (south portion of Building E) and approximately 15-feet below original ground surface near station 2+35 of LFT-1 (north portion of Building E). It appears that the bedrock is deepest near the middle of Building E based upon its absence within the excavated depth of LFT-1 (approximately 12-feet below original ground surface) and the interpreted axis of the surface drainage through this general area. If ground water is encountered at the time of removals, specialized equipment or alternatives may be necessary to perform grading in this area.
Fault Trenches (LFT-1 and LFT 7) underlying building areas	Not Applicable	Should be backfilled at 95% relative compaction in areas to remain underlying building areas and 90% relative compaction in other areas.
Previously backfilled Fault Trench LFT-2	Not Applicable	Remove and recompact the undocumented fill to 90% relative compaction.

4. Horizontal building removals outside of building footprints should extend a distance equal to half the maximum fill depth below proposed grade with a minimum of 5-feet.
5. Bedrock bottoms should be inspected by the Project Geologist/Engineer or his/her representative to verify competency. Bottoms which are not found to be competent should be deepened.
6. Removals in the remaining hardscape portions of the site should be performed to 2-feet below the undocumented fill and alluvial bedrock in fill areas, and to 2-feet below proposed grade in cut areas the undocumented fill and alluvial bedrock in fill areas.
7. All exposed removal and overexcavation bottoms should be inspected by the Project Geologist, and/or his representative prior to placement of any fill.
8. The approved exposed bottoms of all removal areas should be scarified 12-inches, brought to near optimum moisture content, and compacted to a minimum of 90 percent

relative compaction before placement of fill. Maximum dry density and optimum moisture content for compacted materials should be determined in accordance with ASTM D 1557-02 procedures.

9. Geologic contacts as shown on the attached site plan are approximate. Final determination of removal and overexcavation depths should be made during grading.

10. If import material, selective grading or other specific activity associated with maintaining very low or low expansion soils near the finish surface is planned to be used, this firm should be notified immediately to perform additional testing and provide further recommendations, as necessary.

8.2.6 **Fill Placement Requirements:** All fill material, whether on-site material or import, should be approved by the Project Geotechnical Engineer and/or his representative before placement. All fill should be free of vegetation, organic material, and debris. Oversized material should be disposed of in accordance with Section 8.2.7, Oversize Material, of this report. Import fill should be no more expansive than the existing on-site material. Approved fill material should be placed in horizontal lifts not exceeding 10-inches in compacted thickness and watered or aerated to obtain near optimum moisture content (±2.0 percent of optimum). Each lift should be spread evenly and should be thoroughly mixed to ensure uniformity of soil moisture. Structural fill should meet a minimum relative compaction of 90 percent. Maximum dry density and optimum moisture content for compacted materials should be determined in accordance with ASTM D 1557-02 procedures. Moisture content of fill materials should not vary more than 2.0 percent from optimum, unless approved the Project Geotechnical Engineer.

8.2.7 **Oversize Material:** Oversize material is defined as rock, or other irreducible material with a dimension greater than 12-inches. Oversize material shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Project Geotechnical Engineer. Placement operations shall be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted fill (windrow). Alternative methods, such as water jetting or wheel rolling with a backhoe may be required to achieve compaction in the fill materials immediately adjacent to the windrow. Oversize material shall not be placed within ten (10) vertical feet of finish grade, within fifteen (15) lateral feet of a finished slope face, or within two (2) feet of future utilities.

8.2.8 **Compaction Equipment:** It is anticipated that fill compaction for the project will be achieved by the use of a combination of rubber-tired and track-mounted heavy construction equipment. 'Compaction by rubber-tired or track-mounted equipment, by itself, may not be sufficient. Adequate water trucks, water pulls, and/or other suitable equipment should be available to provide sufficient moisture and dust control. The actual selection of equipment is the responsibility of the contractor performing the work and should be such that uniform and proper compaction of the fill is achieved. Specialized equipment may be required for activities near the groundwater table.

8.2.9 **Shrinkage and Bulking:** There will be a material loss due to the clearing and grubbing operations. Shrinkage of undocumented fill (Afu) and alluvium (Qal) that is excavated and replaced as compacted fill should be anticipated. It is estimated that the average shrinkage of these materials will be on the order of 5 percent, based on fill volumes when compacted to a minimum of 90 percent relative compaction. A higher relative compaction would mean a larger shrinkage value.

8.2.10 **Fill Slopes:** Finish fill slopes should not be inclined steeper than 2:1 (horizontal to vertical). Fill slope surfaces should be compacted to 90 percent relative compaction based on a maximum dry density for the soil as determined by ASTM D 1557-02 procedures to the face of the finished slope. Fill slopes should be constructed in a skillful manner so that they are positioned at the design orientations and slope ratio. Achieving a uniform slope surface by subsequent thin wedge filling should be avoided. Any add-on correction to a fill slope should be conducted under the observation and recommendations of the Project Geotechnical Engineer. The proposed add-on correction procedures should be submitted in writing by the contractor prior to commencement of corrective grading and reviewed by the Project Geotechnical Engineer. Compacted fill slopes should be backrolled with suitable equipment for the type of soil being used during fill placement at intervals not exceeding 4.0-feet in vertical height. As an alternative to the backrolling of the fill slopes, over-filling of the slopes will be considered acceptable and preferred. The fill slope should be constructed by over-filling with compacted fill a minimum of 3.0-feet horizontally, and then trimmed back to exposed the dense inner core of the slope surface.

8.2.11 **Cut Slopes:** All cut slopes should not be inclined steeper than 2:1 (horizontal to vertical). Steeper cut slopes will require slope stability analysis to verify stability. All cut slopes should be inspected by the Project Engineering Geologist to check for any adverse geologic

conditions. Cut slopes with adverse geologic conditions may require flattening or buttressing to maintain stability.

8.2.12 **Keyways:** A keyway excavated into competent native earth materials should be constructed at the toe of all fill slopes that are proposed on natural grades of 5:1 (horizontal to vertical) or steeper. Keyways should be a minimum of 15-feet wide (equipment width) and tilted a minimum of 2 percent into the hillside. A series of level benches should be constructed into competent native earth materials on natural grades of 5:1 (horizontal to vertical) or steeper prior to placing fill.

8.2.13 **Subdrains:** Although the need for subdrains is not anticipated at this time, final recommendations should be made during grading by the Project Engineering Geologist.

8.2.14 **Observation and Testing:** During grading, observation and testing should be conducted by the Project Geotechnical Engineer and/or his representative to verify that the grading is being performed according to the recommendations presented in this report. The Project Geotechnical Engineer and/or his representative should observe the scarification and the placement of fill and should take tests to verify the moisture content, density, uniformity and degree of compaction obtained. Where testing demonstrates insufficient density, additional compaction effort, with the adjustment of the moisture content where necessary, should be applied until retesting shows that satisfactory relative compaction has been obtained. The results of observations and testing services should be presented in a formal Finish Grading Report following completion of the grading operations. Grading operations undertaken at the site without the Project Geotechnical Engineer and/or his representative present may result in exclusions of the affected areas from the finish grading report for the project. The presence of the Project Geotechnical Engineer and/or his representative will be for the purpose of providing observations and field testing and will not include any supervision or directing of the actual work of the contractor or the contractor's employees or agents. Neither the presence and/or the non-presence of the Project Geotechnical Engineer and/or his field representative nor the field observations and testing shall excuse the contractor in any way for defects discovered in the contractor's work.

8.2.15 **Soil Expansion Potential:** Upon completion of fine grading of the building pad, near-surface samples should be obtained for expansion potential testing to identify the expansion potential for each lot and assign appropriate foundation and slab-on-grade

recommendations for construction. Our Expansion Index (EI) testing on-site indicates that soil expansivity is EI=18, which is classified as having a very low expansion potential. **Based on our observations of the subsurface soils, expansive soils may be present on site.** Mixing of these soils during grading could affect the overall EI of the fill. If selective grading is desired in order to ensure that expansive soils are not used near pad grade, this option should be discussed with this firm and the grading contractor prior to grading the site. Should alternative foundation design be preferred over these recommendations, it is recommended that the client or the clients authorized representative coordinate with this office at the earliest possible date in order to ensure final foundation plans reflect the recommendations of this firm. **Final foundation design parameters should be based on EI testing of near-surface soils and be performed at the conclusion of rough grading.**

8.2.16 **Soil Corrosivity:** Test results for pH, minimum resistivity, sulfate content and chloride content (CTM 417, CT 643, CTM 422 procedures) were analyzed and processed by Prime Testing, Inc. A non-detectable concentration (less than 0.001%) by weight) of water soluble sulfates were reported. As a result, normal Type II cement may be used in concrete that will come in contact with native soils. Additional corrosivity related test results provided but not interpreted included a pH of 7.1, a minimum resistively of 2,500 ohm-cm, and a chloride content of 170 ppm. Should additional corrosivity analysis be desires, a Corrosion Engineer should be consulted. Laboratory analytical results are included in the Appendix.

8.3 Foundation Design Recommendations:

8.3.1 **General:** Foundations for the proposed structures may consist of conventional column footings and continuous wall footings founded upon properly compacted fill, as recommended in Section 8.2, the Earthwork Recommendations, of this report. The recommendations presented in the subsequent paragraphs for foundation design and construction are based on geotechnical characteristics and a very low expansion potential for the supporting soils and are not intended to preclude more restrictive structural requirements. The Structural Engineer for the project should determine the actual footing width and depth to resist design vertical, horizontal, and uplift forces.

8.3.2 **Foundation Size:** Continuous footings should have a minimum width of 12-inches. Continuous footings should be continuously reinforced with a minimum of one (1) No. 4 steel reinforcing bar located near the top and one (1) No. 4 steel reinforcing bar located near the

bottom of the footings to minimize the effects of slight differential movements which may occur due to minor variations in the engineering characteristics or seasonal moisture change in the supporting soils. Final foundation size and reinforcing should be determined by the Project Structural Engineer based on structural loads and the expansive potential of the supporting soils. Column footings should have a minimum width of 18-inches by 18-inches and be suitably reinforced, based on structural requirements. A grade beam, founded at the same depths and reinforced the same as the adjacent footings, should be provided across the garage, doorways, or any other types of perimeter openings.

8.3.3 **Depth of Embedment:** Exterior and interior footings founded in properly compacted fill should extend to a minimum depth of 12-inches below lowest adjacent finish grade for one story structures and 18-inches below lowest adjacent final grade for two story structures. Deeper footings may be necessary for expansive soils purposes, depending on the final determination of pad specific expansive potential.

8.3.4 **Bearing Capacity:** Provided the recommendations for site earthwork, minimum footing width, and minimum depth of embedment for footings are incorporated into the project design and construction, the allowable bearing value for design of continuous and column footings for the total dead plus frequently-applied live loads is 2,000 psf for continuous footings, and 2,000 psf for column footings in properly compacted fill or bedrock. The allowable bearing value has a factor of safety of at least 3.0 and may be increased by 33.3 percent for short durations of live and/or dynamic loading, such as wind or seismic forces.

8.3.5 **Settlement:** Footings designed according to the recommended bearing values and the maximum assumed wall and column loads are not expected to exceed a maximum settlement of 0.75-inch or a differential settlement of 0.50-inch in properly compacted fill under static load conditions.

No liquefaction is anticipated for the subject site; therefore, it is our opinion that dynamic settlement is not a design consideration for this site.

8.3.6 **Lateral Capacity:** Additional foundation design parameters for resistance to static lateral forces are as follows:

Allowable Lateral Pressure (Equivalent Fluid Pressure), Passive Case: Competent Bedrock or Compacted Fill– 250 pcf

Allowable Coefficient of Friction: Competent Bedrock or Compacted Fill – 0.35

Lateral load resistance may be developed by a combination of friction acting on the base of foundations and slabs and passive earth pressure developed on the sides of the footings and stem walls below grade when in contact with properly compacted fill or competent bedrock. The above values are allowable design values and have safety factors of at least 2.0 incorporated into them and may be used in combination without reduction in evaluating the resistance to lateral loads. The allowable values may be increased by 33.3 percent for short durations of live and/or dynamic loading, such as wind or seismic forces. For the calculation of passive earth resistance, the upper 1.0-foot of material should be neglected unless confined by a concrete slab or pavement. The maximum recommended allowable passive pressure is 5.0 times the recommended design value.

8.3.7 **Seismic Design Parameters:** The following seismic design factors apply:

Design Fault: Elsinore – Temecula Segment

Fault Type: Type B Fault

Closest Distance to Fault: 1.2 Km

Soil Profile Type: SD

8.4 **Slab-on-Grade Recommendations:** The recommendations for concrete slabs, both interior and exterior, excluding PCC pavement, are based upon the expansion potential for the supporting material. Concrete slabs should be designed to minimize cracking as a result of shrinkage. Joints (isolation, contraction, and construction) should be placed in accordance with the American Concrete Institute (ACI) guidelines. Special precautions should be taken during placement and curing of all concrete slabs. Excessive slump (high water / cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could result in excessive shrinkage, cracking, or curling in the slabs. It is recommended that all concrete proportioning, placement, and curing be performed in accordance with ACI recommendations and procedures.

8.4.1 **Interior Slabs:** Interior concrete slabs-on-grade should be a minimum of 4.0-inches nominal in thickness and be underlain by a 1.0 to 2.0-inches of clean coarse sand or other approved granular material placed on properly prepared subgrade per Section 8.2, Earthwork

Recommendations, of this report. Minimum slab reinforcement should consist of No. 3 reinforcing bars placed 24-inches on center in both directions, or a suitable equivalent as determined by the Project Structural Engineer. Final pad identification and slab construction requirements will be presented in the compaction report upon completion of grading. It is essential that the reinforcing be placed at mid-depth in the slab. The concrete section and/or reinforcing steel should be increased appropriately for anticipated excessive or concentrated floor loads. In areas where moisture sensitive floor coverings are anticipated over the slab, we recommend the use of a polyethylene vapor barrier with a minimum of 10.0 mil in thickness be placed beneath the slab. The moisture barrier should be overlapped or sealed at splices and covered top and bottom by a 1.0 to 2.0-inch minimum layer of clean, moist (not saturated) sand to aid in concrete curing and to minimize potential punctures.

8.4.2 **Exterior Slabs:** All exterior concrete slabs cast on finish subgrade (patios, sidewalks, etc., with the exception of PCC pavement) should be a minimum of 4.0-inches nominal in thickness and should be underlain by a minimum of 12.0-inches of soil that has been prepared in accordance with Section 8.2, Earthwork Recommendations, of this report. Reinforcing in the slabs and the use of a compacted sand or gravel base beneath the slabs should be according to the current local standards.

8.5 **Pavement Design Recommendations:** The following recommendations for the structural pavement section for the proposed parking and driveway areas for the subject development are presented for preliminary design purposes only. **The final design should be based on the soils located near subgrade.** The pavement section has been determined in general accordance with **CalTrans** design procedures and is based on an assumed Traffic Index (TI) and an assumed R-Value of 34, which corresponds to the test results from B-1 at 0 to10-feet. The R-Value of any imported fill material may vary from the assumed value thereby changing the proposed pavement section design.

The sections listed below are provided for reference purposes and are calculated as a minimum based on varying Traffic Indexes:

Traffic Index	Calculated Section
5.0	3-inches Asphaltic Concrete over 5-inches Aggregate Base, placed properly compacted subgrade.

6.0	3-inches Asphaltic Concrete over 7.5-inches Aggregate Base, placed properly compacted subgrade.

Asphalt concrete pavement materials should be as specified in Sections 39-2.01 and 39-2.02 of the current **CalTrans** Standard Specifications or a suitable equivalent. Aggregate base should conform to ¾-inch Class II material as specified in Section 26-1.02B of the current **CalTrans** Standard Specifications or a suitable equivalent. In public roadways the subgrade soil, including utility trench backfill, should be compacted to at least 95 percent relative compaction. The aggregate base material should be compacted to at least 95 percent relative compaction. Maximum dry density and optimum moisture content for subgrade and aggregate base materials should be determined according to ASTM D 1557-02 procedures. If pavement subgrade soils are prepared at the time of rough grading of the building site and the areas are not paved immediately, additional observations and testing will have to be performed before placing aggregate base material, asphaltic concrete, or PCC pavement to locate areas that may have been damaged by construction traffic, construction activities, and/or seasonal wetting and drying. In the proposed pavement areas, soil samples should be obtained at the time the subgrade is graded for R-Value testing according to California Test Method 301 procedures to verify the pavement design recommendations.

8.6 **Utility Trench Recommendations:** Utility trenches within the zone of influence of foundations or under building floor slabs, exterior hardscape, and/or pavement areas should be backfilled with properly compacted soil. All utility trenches within the building pad and extending to a distance of 5.0-feet beyond the building exterior footings should be backfilled with on-site or similar soil. Where interior or exterior utility trenches are proposed to pass beneath or parallel to building, retaining wall, and/or decorative concrete block perimeter wall footings, the bottom of the trench should not be located below a 1:1 plane projected downward from the outside bottom edge of the adjacent footing unless the utility lines are designed for the footing surcharge loads. It is recommended that all utility trenches excavated to depths of 5.0-feet or deeper be cut back according to Section 8.9, Temporary Construction Excavation Recommendations, of this report or be properly shored during construction. Backfill material should be placed in a lift thickness appropriate for the type of backfill material and compaction equipment used. Backfill material should be compacted to a

minimum of 90 percent relative compaction by mechanical means. In public roadway areas, backfill material should be compacted to a minimum 95-percent relative compaction. Jetting or flooding of the backfill material will not be considered a satisfactory method for compaction unless the procedures are reviewed and approved in writing by the Project Geotechnical Engineer. Maximum dry density and optimum moisture content for backfill material should be determined according to ASTM D 1557-02 procedures.

8.7 **Finish Lot Drainage Recommendations:** Positive drainage should be established away from the tops of slopes, the exterior walls of structures, the back of retaining walls, and the decorative concrete block perimeter walls. Finish lot surface gradients in unpaved areas should be provided next to tops of slopes and buildings to guide surface water away from foundations and slabs and from flowing over the tops of slopes. The surface water should be directed toward suitable drainage facilities. Ponding of surface water should not be allowed next to structures or on pavements. In unpaved areas, a minimum positive gradient of 4.0 percent away from the structures and tops of slopes for a minimum distance of 3.0-feet and a minimum of 1.0 percent pad drainage off the property in a non-erosive manner should be provided. Landscape trees and plants with high water needs should be planted at least 5.0-feet away from the walls of the structures. Downspouts from roof drains should discharge to a surface which slopes away from the structure a minimum of 5.0-feet from the exterior building walls. In no case should downspouts from roof drains discharge into planter areas immediately adjacent to the building unless there is positive drainage away from the structure at a minimum gradient of 2.0 percent, directed onto a permanent all-weather surface or subdrain system.

8.8 **Planter Recommendations:** Planters around the perimeter of the structures should be designed to ensure that adequate drainage is maintained and minimal irrigation water is allowed to percolate into the soils underlying the buildings.

8.9 **Temporary Construction Excavation Recommendations:** Temporary construction excavations for rough grading, foundations, retaining walls, utility trenches, etc., more than 5.0-feet in depth and to a maximum depth of 15-feet should be properly shored or cut back to the following inclinations:

Earth Material	Inclination
Compacted Fill, Alluvium or Pauba Formation Bedrock	1.5:1

No surcharge loads (spoil piles, earthmoving equipment, trucks, etc.) should be allowed within a horizontal distance measured from the top of the excavation slope equal to 1.5 times the depth of the excavation. Excavations should be initially observed by the Project Geotechnical Engineer, Project Engineering Geologist, and/or their representative to verify our recommendations or to make additional recommendations to maintain stability and safety. Moisture variations, differences in the cohesive or cementation characteristics, or changes in the coarseness of the deposits may require slope flattening or, conversely, permit steepening upon review by the Project Geotechnical Engineer, Project Engineering Geologist, and/or their representative. Deep utility trenches may experience caving which will require special considerations to stabilize the walls and expedite trenching operations. Surface drainage should be controlled along the top of the slope to preclude erosion of the slope face. If excavations are to be left open for long periods, the slopes should be sprayed with a protective compound and/or covered to minimize drying out, raveling, and/or erosion of the slopes. For excavations more than 5.0-feet in depth which will not be cut back to the recommended slope inclination, the contractor should submit to the owner and/or the owner's designated representative detailed drawings showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection. If the drawings do not vary from the requirements of the OSHA Construction Safety Orders (CAL OSHA or FED OSHA, whichever is applicable for the project at the time of construction), a statement signed by a registered Civil or Structural Engineer in the State of California, engaged by the contractor at his expense, should be submitted certifying that the contractor's excavation safety drawings comply with OSHA Construction Orders. If the drawings vary from the applicable OSHA Construction Safety Orders, the drawings should be prepared, signed, and sealed by a Registered Civil or Structural Engineer in the State of California. The contractor should not proceed with any excavations until the project owner or his designated representative has received and acknowledged the properly prepared excavation safety drawings.

8.10 **Retaining Wall Recommendations:**

8.10.1 **Earth Pressures:** Retaining walls backfilled with non-expansive granular soil (EI=0) or very low expansive potential materials (Expansion Index of 20 or less) within a zone extending upward and away from the heel of the footing at a slope of 0.5:1 (horizontal to vertical) or flatter can be designed to resist the following static lateral soil pressures:

Condition	Level Backfill	2:1 Slope

Active	30 pcf	45 pcf
At Rest	60 pcf	--

Walls that are free to deflect 0.01 radian at the top may be designed for the above-recommended active condition. Walls that need to be restricted from such movement should be assumed rigid and designed for the at-rest condition. The above values assume well-drained backfill and no buildup of hydrostatic pressure. Surcharge loads, dead and/or live, acting on the backfill behind the wall or directly on the wall should also be considered in the design.

8.10.2 **Foundation Design:** Retaining wall footings should be founded to the same depths into properly compacted fill as standard foundations and may be designed for the same average allowable bearing value across the footing (as long as the resultant force is located in the middle one-third of the footing), and with the same allowable static lateral bearing pressure and allowable sliding resistance as previously recommended. When using the allowable lateral pressure and allowable sliding resistance, a factor of safety of 1.0 may be used. If ultimate values are used for design, an approximate factor of safety of 1.5 should be achieved.

8.10.3 **Subdrain:** A subdrain system should be constructed behind and at the base of all retaining walls to allow drainage and to prevent the buildup of excessive hydrostatic pressures. Typical subdrains may include weep holes with a continuous gravel gallery, perforated pipe surrounded by filter rock, or some other approved system. Gravel galleries and/or filter rock, if not properly designed and graded for the on-site and/or import materials, should be enclosed in a geotextile fabric such as Mirafi 140N, Supac 4NP, or a suitable substitute in order to prevent infiltration of fines and clogging of the system. The perforated pipes should be at least 4.0-inches in diameter. Pipe perforations should be placed downward. Gravel filters should have volume of at least 1.0 cubic foot per lineal foot of pipe. Subdrains should maintain a positive flow gradient and have outlets that drain in a non-erosive manner. In the case of subdrains for basement walls, they need to empty into a sump provided with a submersible pump activated by a change in the water level.

8.10.4 **Backfill:** Backfill directly behind retaining walls (if backfill width is less than 3 feet) may consist of 0.5 to 0.75-inch diameter, rounded to subrounded gravel enclosed in a geotextile fabric such as Mirafi 140N, Supac 4NP, or a suitable substitute or a clean sand (Sand

Equivalent Value greater than 50) water jetted into place to obtain proper compaction. If water jetting is used, the subdrain system should be in place. Even if water jetting is used, the sand should be densified to a minimum of 90 percent relative compaction. If the specified density is not obtained by water jetting, mechanical methods will be required. If other types of soil or gravel are used for backfill, mechanical compaction methods will be required to obtain a relative compaction of at least 90 percent of maximum dry density. Backfill directly behind retaining walls should not be compacted by wheel, track or other rolling by heavy construction equipment unless the wall is designed for the surcharge loading. If gravel, clean sand or other imported backfill is used behind retaining walls, the upper 18-inches of backfill in unpaved areas should consist of typical on-site material compacted to a minimum of 90 percent relative compaction in order to prevent the influx of surface runoff into the granular backfill and into the subdrain system.

Maximum dry density and optimum moisture content for backfill materials should be determined in accordance with ASTM D 1557-02 procedures.

9.0 PLAN REVIEW

Grading and foundation plans for the proposed development should be provided for review by **EnGEN Corporation** to verify compatibility with site geotechnical conditions and conformance with the recommendations contained in this report. If **EnGEN Corporation** is not accorded the opportunity to make the recommended review, we will assume no responsibility for misinterpretation of the recommendations presented in this report.

10.0 PRE-BID CONFERENCE

It may be desirable to hold a pre-bid conference with the owner or an authorized representative, the Project Architect, the Project Civil Engineer, the Project Geotechnical Engineer, and the proposed contractors present. This conference will provide continuity in the bidding process and clarify questions relative to the grading and construction requirements of the project.

11.0 PRE-GRADING CONFERENCE

Before the start of grading, a conference should be held with the owner or an authorized representative, the contractor, the Project Architect, the Project Civil Engineer, and the Project Geotechnical Engineer present. The purpose of this meeting should be to clarify

questions relating to the intent of the grading recommendations and to verify that the project specifications comply with the recommendations of this geotechnical engineering report. Any special grading procedures and/or difficulties proposed by the contractor can also be discussed at that time.

12.0 CONSTRUCTION OBSERVATIONS AND TESTING

Rough grading of the property should be performed under engineering observation and testing performed by **EnGEN Corporation.** Rough grading includes, but is not limited to, overexcavation cuts, fill placement, and excavation of temporary and permanent cut and fill slopes. In addition, **EnGEN Corporation** should observe all foundation excavations.

Observations should be made before installation of concrete forms and/or reinforcing steel to verify and/or modify the conclusions and recommendations in this report. Observations of overexcavation cuts, fill placement, finish grading, utility or other trench backfill, pavement subgrade and base course, retaining wall backfill, slab presaturation, or other earthwork completed for the subject development should be performed by **EnGEN Corporation.** If the observations and testing to verify site geotechnical conditions are not performed by **EnGEN Corporation**, liability for the performance of the development is limited to the actual portions of the project observed and/or tested by **EnGEN Corporation.** If parties other than **EnGEN Corporation** are engaged to perform soils and materials observations and testing, they must be notified that they will be required to assume complete responsibility for the geotechnical aspects of the project by concurring with the recommendations in this report or providing alternative recommendations. Neither the presence of the Project Geotechnical Engineer and/or his field representative, nor the field observations and testing, shall excuse the contractor in any way for defects discovered in the contractor's work. The Project Geotechnical Engineer and/or his representative shall not be responsible for job or project safety. Job or project safety shall be the sole responsibility of the contractor.

13.0 CLOSURE

This report has been prepared for use by the parties or project named or described in this document. It may or may not contain sufficient information for other parties or purposes. In the event that changes in the assumed nature, design, or location of the proposed development as described in this report are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes

are reviewed and the conclusions and recommendations of this report modified or verified in writing. This study was conducted in general accordance with the applicable standards of our profession and the accepted geotechnical engineering principles and practices at the time this report was prepared. No other warranty, implied or expressed beyond the representations of this report, is made. Although every effort has been made to obtain information regarding the geotechnical and subsurface conditions of the site, limitations exist with respect to the knowledge of unknown regional or localized off-site conditions which may have an impact at the site. The recommendations presented in this report are valid as of the date of the report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man on this and/or adjacent properties.

If conditions are observed or information becomes available during the design and construction process which are not reflected in this report, **EnGEN Corporation** should be notified so that supplemental evaluations can be performed and the conclusions and recommendations presented in this report can be modified or verified in writing. This report is not intended for use as a bid document. Any person or company using this report for bidding or construction purposes should perform such independent studies and explorations as he deems necessary to satisfy himself as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of the work on this project. Changes in applicable or appropriate standards of care or practice occur, whether they result from legislation or the broadening of knowledge and experience. Accordingly, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes outside the control of **EnGEN Corporation** which occur in the future.

Thank you for the opportunity to provide our services. If we can be of further service or you should have questions regarding this report, please contact this office at your convenience.

Respectfully submitted,
EnGEN Corporation

Eric Davisson, RG 8231
Senior Staff Geologist
Expires 02-28-09

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STATE OF CALIFORNIA

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FILE: EnGEN\Reporting\GS\M3551-GS Reza Zolfaghari, Zolfaghari Property

APPENDIX

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TABLE 1

DISTANCE TO STATE DESIGNATED ACTIVE FAULTS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE Mi	(Km)	MAXIMUM EARTHQUAKE MAG (Mw)
Elsinore – Temecula	0.76	1.2	6.8
Elsinore – Glen Ivy	6.9	11.1	6.8
Elsinore – Julian	20.1	32.4	7.1
San Jacinto – San Jacinto Valley	20.3	32.6	6.9
San Jacinto – Anza	21.1	33.9	7.2
Chino – Central Avenue (Elsinore)	24.6	39.6	6.7
San Joaquin Hills	24.9	40.1	6.6
Newport – Inglewood (Offshore)	28.6	46.1	7.1
Whittier	28.9	46.5	6.8
San Jacinto – San Bernardino	29.0	46.6	6.7
Rose Canyon	34.5	55.5	7.2
San Andreas – San Bernardino	35.4	56.9	7.5
San Andreas – SB-Coach.	35.4	56.9	7.7
San Andreas – Whole	35.4	56.9	8.0
San Andreas –SB-Coach.	35.4	56.9	7.7
Newport – Inglewood (L.A. Basin)	39.4	63.4	7.1
Cucamonga	41.6	67.0	6.9
Puente Hills Blind Thrust	42.6	68.6	7.1
San Jacinto – Coyote Creek	43.2	69.6	6.6
North Frontal Fault Zone (West)	43.5	70.0	7.2
Pinto Mountian	43.5	70.0	7.2
San Jose	43.9	70.6	6.4
Coronado Bank	44.9	72.3	7.0
Palos Verdes	45.7	73.6	7.3
Sierra Madre	46.3	74.5	7.2
Cleghorn	46.8	75.3	6.5
Lenwood-Lockhart-Old Woman Sprgs	47.3	76.1	7.5
Earthquake Valley	47.6	76.6	6.5
North Frontal Fault Zone (East)	49.6	79.9	6.7
San Andreas – Coachella	49.7	80.0	7.2
San Andreas – 1857 Rupture	50.0	80.5	7.8
San Andreas – Cho Moj	50.0	80.5	7.8
San Andreas – Mojave	50.0	80.5	7.4
Burnt Mountain	54.2	87.2	6.5
Clamshell - Sawpit	56.4	90.8	6.5
Eureka Peak	57.5	92.5	6.4
Helendale – South Lockhardt	57.5	92.5	7.3
Raymond	58.2	93.6	6.5
Upper Elysian Park Blind Thrust	59.2	95.2	6.4
Landers	60.9	98.0	7.3

TABLE 2
POTENTIAL SETTLEMENT DUE TO LIQUEFACTION CALCULATIONS
BORING NO. B-2

Layer No.	Depth Range (ft)	SPT	$(N_1)_{60}$	FS	Ev %	Layer Thickness (ft)	ΔH
1	0-10	77	81	>1.5	Non Liquefiable (H_2O density)	10	0
2	10-15	90	77	>1.5	Non Liquefiable (density)	5	0
3	15-35	95	68	>1.5	Non Liquefiable (density)	20	0
4	35-40	100	60	>1.5	Non Liquefiable (density)	5	0
5	40-50	100	59	>1.5	Non Liquefiable (density)	10	0

Total ΔH = 0-inches
Differential ΔH = 0-inches

- Non-Liquefiable (H_20) = Non-Liquefiable due to lack of groundwater
- Non-Liquefiable (clay) = Non-Liquefiable due to clay content in excess of 15 percent
- Non-Liquefiable (density) = Non-Liquefiable due to high relative densities, $(N_1)_{60}$ of 30 or more.

- Groundwater set at 10-feet bgs
- Earthquake Magnitude (M)w= 6.8
- Horizontal Ground Acceleration (probabilistic method)=0.68 g

GEOTECHNICAL BORING LOGS
(B-1 through B-3)

GEOTECHNICAL BORING LOG

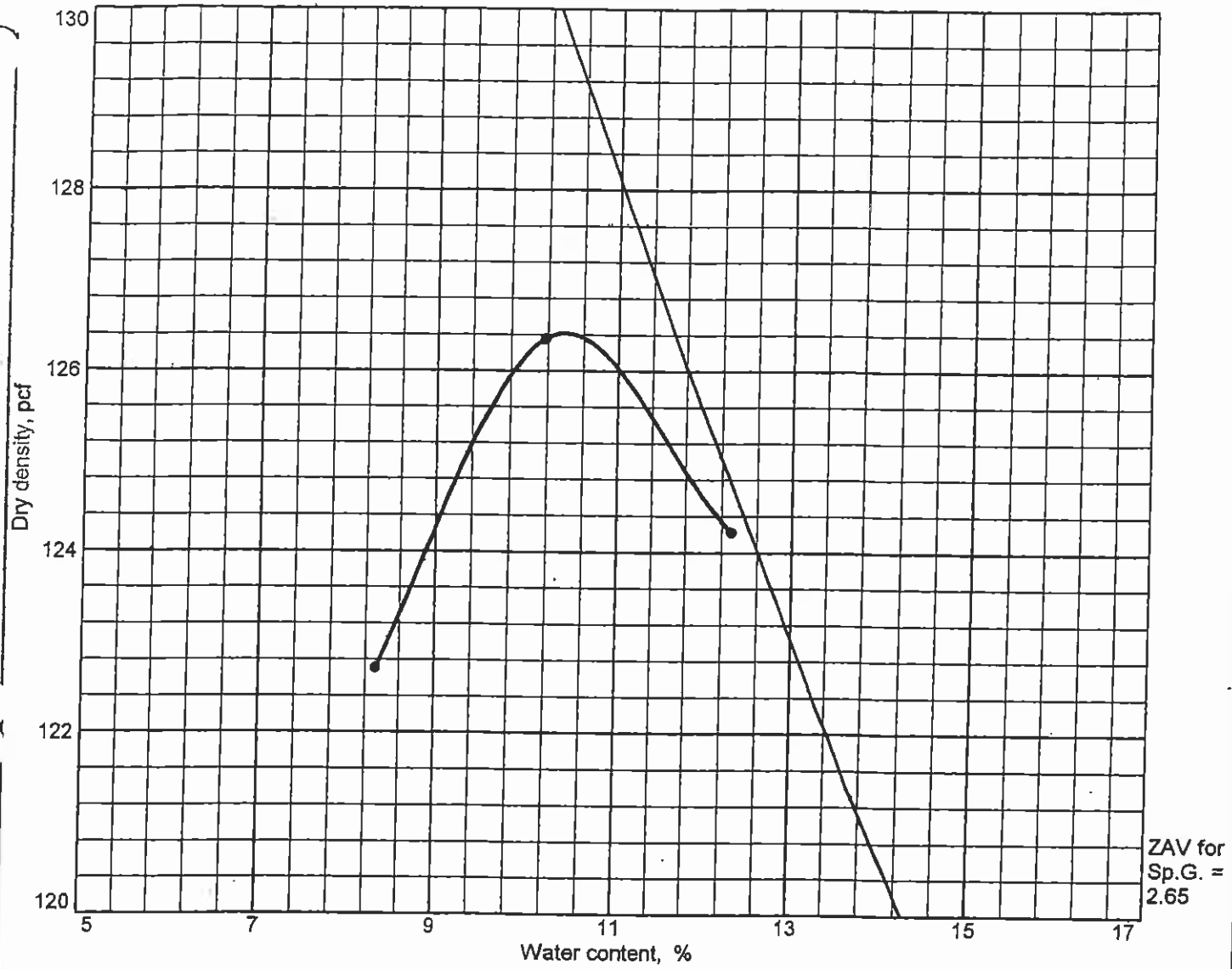
Project Number: M3551-GS
Boring Number: B1
Date: 03/13/07

Project: Zolfaghari Commercial
Surface Elevation: 1352
Logged By: ED

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content	Maximum Density	Optimum Moisture Content
	UNDOCUMENTED FILL (Afu) Silty fine- to medium-grained sand, light olive brown (5Y 5/3), dry, medium dense.		0	SM					
	PAUBA FORMATION (Qps) Fine sandy siltstone, light olive brown (2.5Y 5/4), moist, very dense.	■		ML	16-29-50/1	109.1	6.7		
			5					126.4	10.4
	Fine sandy claystone, strong brown (7.5YR 5/6), moist, very hard.	■			48-50/4	120.7	11.9		
	Silty fine sandstone, light olive brown (2.5 Y 5/4), moist, very dense.	■	10		18-38-50/5	113.3	8.4		
	Cobble or boulder.					113.3	8.4		
	Silty fine to medium sandstone, olive brown (2.5Y 4/4), moist, very dense. Total Depth 15-feet bgs. No Groundwater Encountered.	■	15		24-37-50/6	126.8	8.4		
			20						
			25						
			30						
			35						

s:

OPTIMUM MOISTURE/MAXIMUM DENSITY TEST REPORT



Test specification: ASTM D 1557-02 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	SM		8.3					

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 126.4 pcf Optimum moisture = 10.4 %	SILTY SAND, LIGHT OLIVE BROWN

Project No. M3551-GS **Client:** REZA ZOLFAGHARI
Project: ZOLFAGHARI COMMERCIAL

Location: CLINTON KEITH ROAD

Remarks:
SAMPLE # B1 @ 0-10
BUILDING A
COLLECTED BY ED
COLLECTED ON (3/13/07)

OPTIMUM MOISTURE/MAXIMUM DENSITY TEST REPORT
ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Figure–

UBC Laboratory Expansion Test Results

3/16/2007

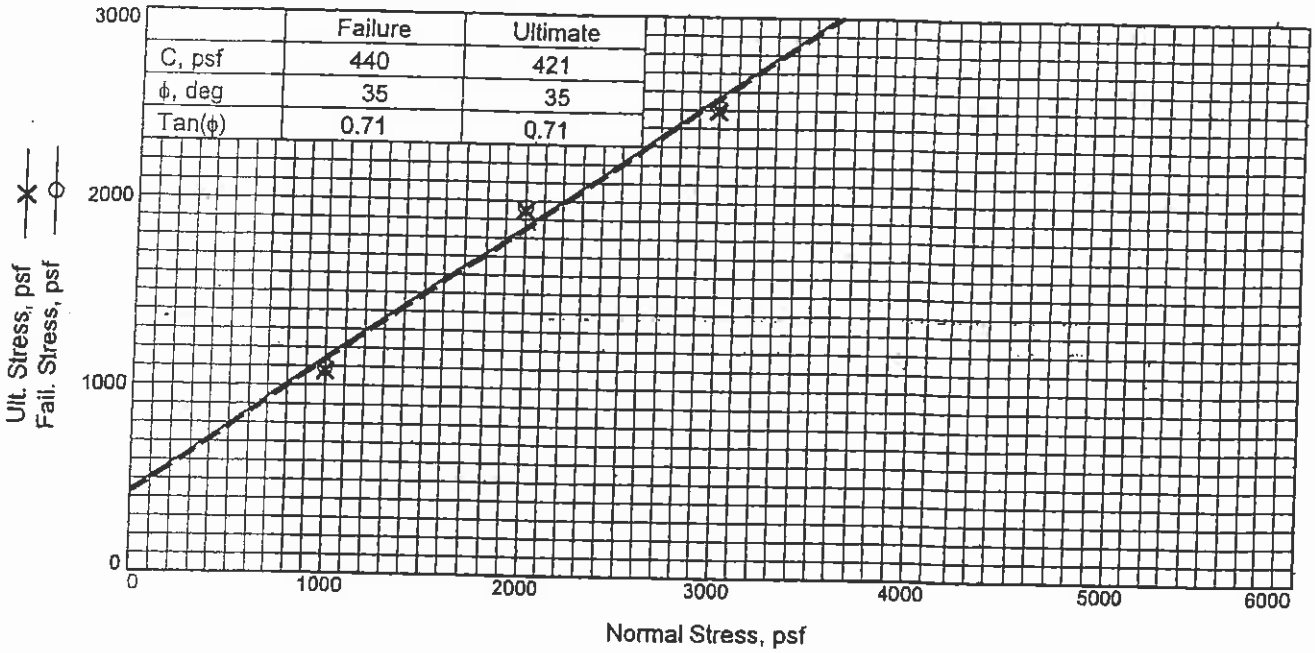
Job Number: M3551-GS
Job Name: ZOLFAGHARI COMMERCIAL
Location: CLINTON KEITH ROAD
Sample Source: B1 @ 0-10 (BUILDING A)
Sampled by: ED (3/13/07)
Lab Technician: SW
Sample Descr: SILTY SAND, LIGHT OLIVE BROWN

Wet Compacted Wt.:	587.9
Ring Wt.:	188.0
Net Wet Wt.:	399.9
Wet Density:	120.8
Wet Soil:	202.8
Dry Soil:	185.2
Initial Moisture (%):	9.5%
Initial Dry Density:	110.3
% Saturation:	48.6%
nal Wt. & Ring Wt.:	620.7
t Final Wt.:	432.7
Dry Wt.:	365.2
Loss:	67.5
Net Dry Wt.:	361.9
Final Density:	109.3
Saturated Moisture:	18.7%

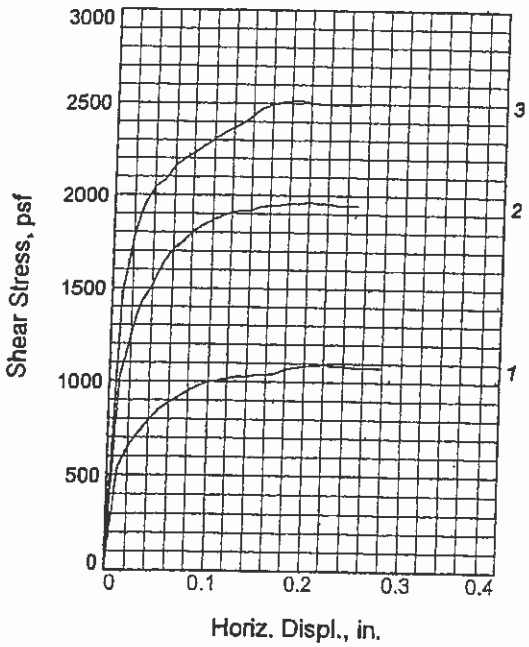
	Dial	Change	Time
Reading 1:	0.100	N/A	11:15
Reading 2:	0.110	0.010	11:30
Reading 3:	0.117	0.017	11:45
Reading 4:	0.118	0.018	16-Mar

Expansion Index:	18
Adjusted Index: (UBC 18-2)	17.3

EnGEN Corporation
25759 Jefferson Avenue, Murrieta, CA
92562
(951) 834-9000
Fax: (951) 834-9001



	Failure	Ultimate
C, psf	440	421
ϕ, deg	35	35
Tan(ϕ)	0.71	0.71



Sample No.		1	2	3
Initial	Water Content, %	11.3	11.3	11.3
	Dry Density, pcf	113.7	113.7	113.7
	Saturation, %	65.6	65.6	65.6
	Void Ratio	0.4556	0.4556	0.4556
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	N/A	N/A	N/A
	Dry Density, pcf			
	Saturation, %			
	Void Ratio			
	Diameter, in.			
	Height, in.			
Normal Stress, psf		1000	2000	3000
Fail. Stress, psf		1096	1966	2514
Displacement, in.		0.22	0.20	0.18
Ult. Stress, psf		1076	1946	2494
Displacement, in.		0.25	0.23	0.21
Strain rate, in./min.		0.20	0.20	0.20

Sample Type: REMOLDED
Description: SILTY SAND, LIGHT OLIVE BROWN
LL= **PL=** **PI=**
Specific Gravity= 2.65
Remarks: BUILDING A
COLLECTEED BY ED
COLLECTED ON (3/13/07)

Figure _____

Client: REZA ZOLFAGHARI

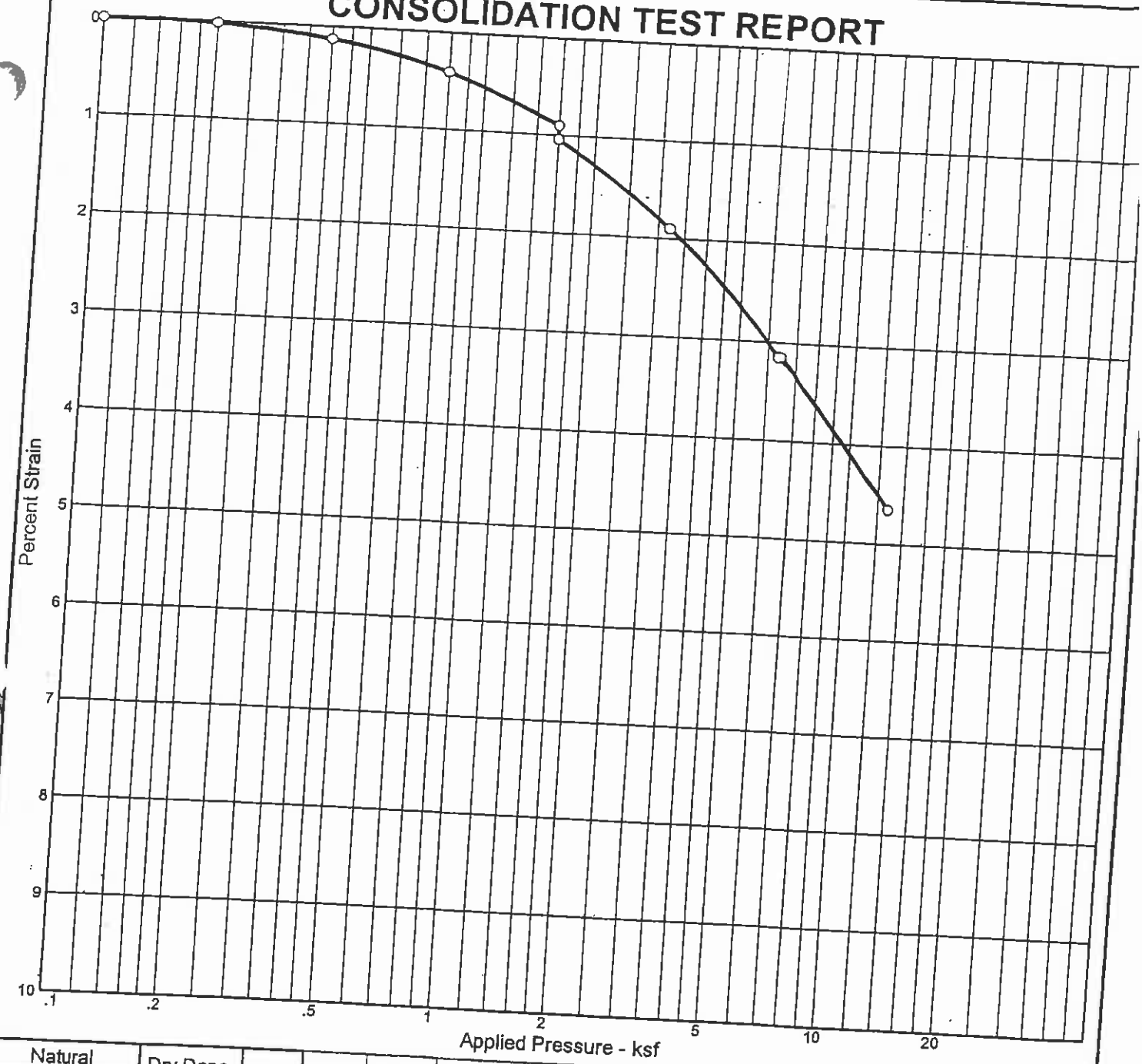
Project: ZOLFAGHARI COMMERCIAL

Source of Sample: SHEAR
Sample Number: B1 @ 1-10
Proj. No.: M3551-GS **Date:** 3/19/07

DIRECT SHEAR TEST REPORT
ENVIRONMENTAL AND GEOTECHNICAL
ENGINEERING NETWORK CORPORATION

Tested By: SB **Checked By:** JH

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Clpse. %	e_o
78.6 %	12.5 %	116.3			2.65		3.89	0.07			0.1	0.422

MATERIAL DESCRIPTION	USCS	AASHTO
SILTY SAND, LIGHT OLIVE BROWN	SM	

Project No. M3551-GS **Client:** REZA ZOLFAGHARI

Project: ZOLFAGHARI COMMERCIAL

Source: CONSOL

Sample No.: B2 @ 5

CONSOLIDATION TEST REPORT

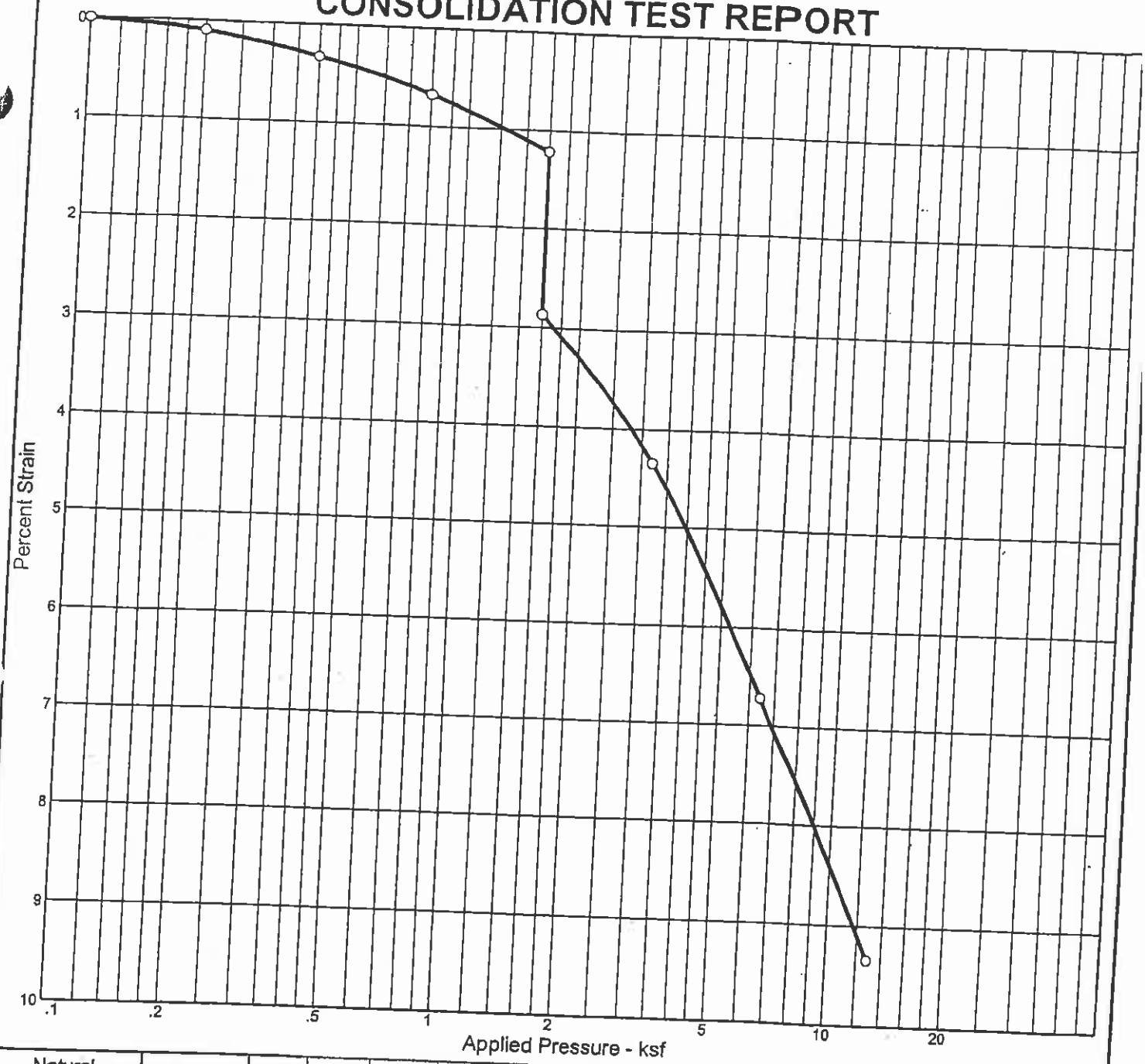
ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Remarks:

COLLECTED BY ED
COLLECTED ON (3/13/07)

Figure

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Clpse. %	e_o
27.8 %	3.4 %	124.5			2.65		3.56	0.12			1.7	0.329

MATERIAL DESCRIPTION	USCS	AASHTO
SILTY SAND, BROWN	SM	

Project No. M3551-GS **Client:** REZA ZOLFAGHARI

Project: ZOLFAGHARI COMMERCIAL

Source: CONSOL **Sample No.:** B3 @ 2.5

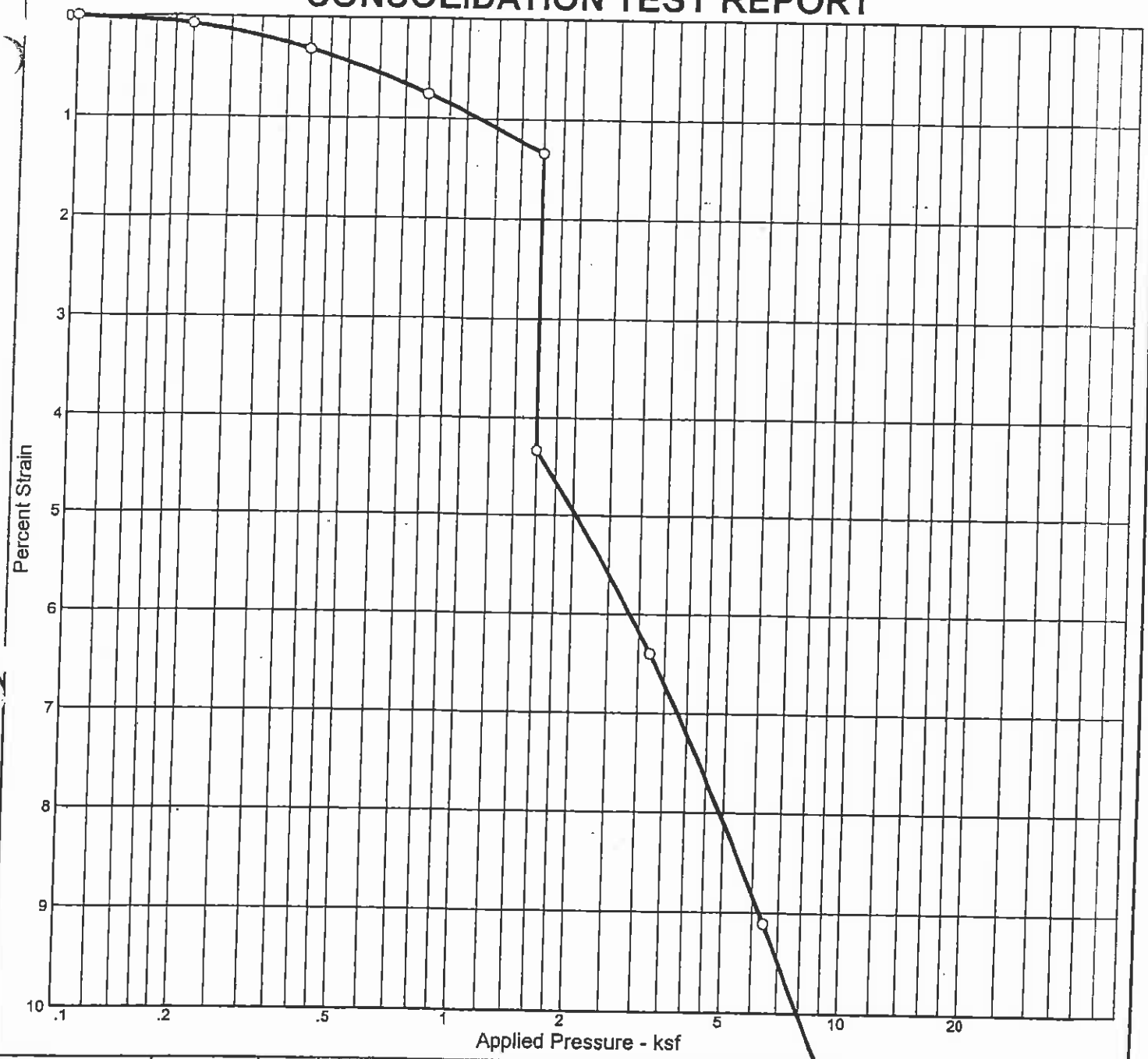
Remarks:
COLLECTED BY ED
COLLECTED ON (3/13/07)

CONSOLIDATION TEST REPORT

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Figure

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Clpse. %	e_o
47.6 %	6.4 %	121.7			2.65		3.40	0.13			3.0	0.359

MATERIAL DESCRIPTION	USCS	AASHTO
SILTY SAND, BROWN	SM	

Project No. M3551-GS **Client:** REZA ZOLFAGHARI

Project: ZOLFAGHARI COMMERCIAL

Source: CONSOL **Sample No.:** B3 @ 5

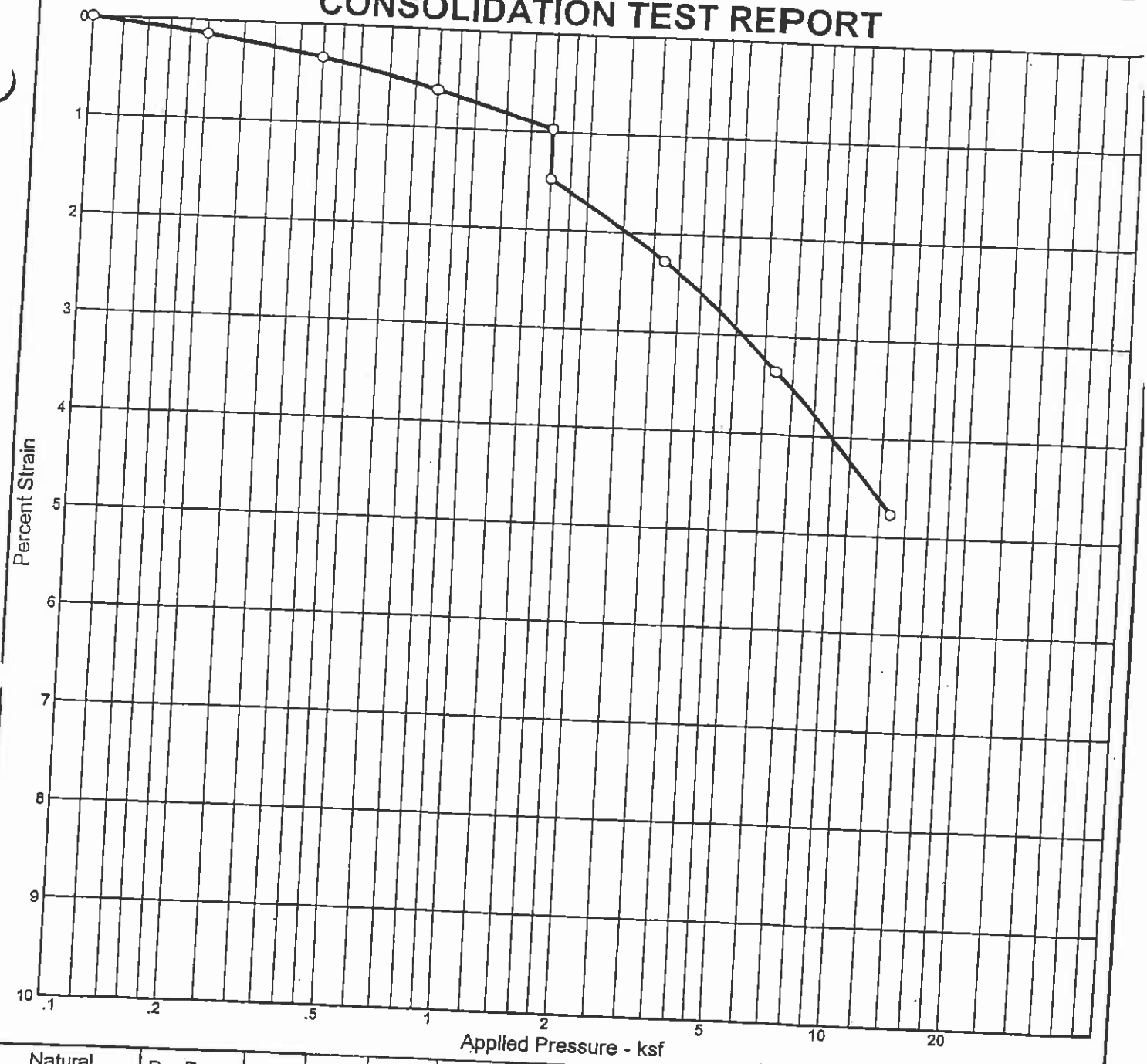
Remarks:
COLLECTED BY ED
COLLECTED ON (3/13/07)

CONSOLIDATION TEST REPORT

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Figure

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Clpse. %	e_o
78.0 %	8.0 %	130.0			2.65		4.32	0.06			0.5	0.272

MATERIAL DESCRIPTION	USCS	AASHTO
SILTY SAND, BROWN	SM	

Project No. M3551-GS **Client:** REZA ZOLFAGHARI

Project: ZOLFAGHARI COMMERCIAL

Source: CONSOL

Sample No.: B3 @ 7.5

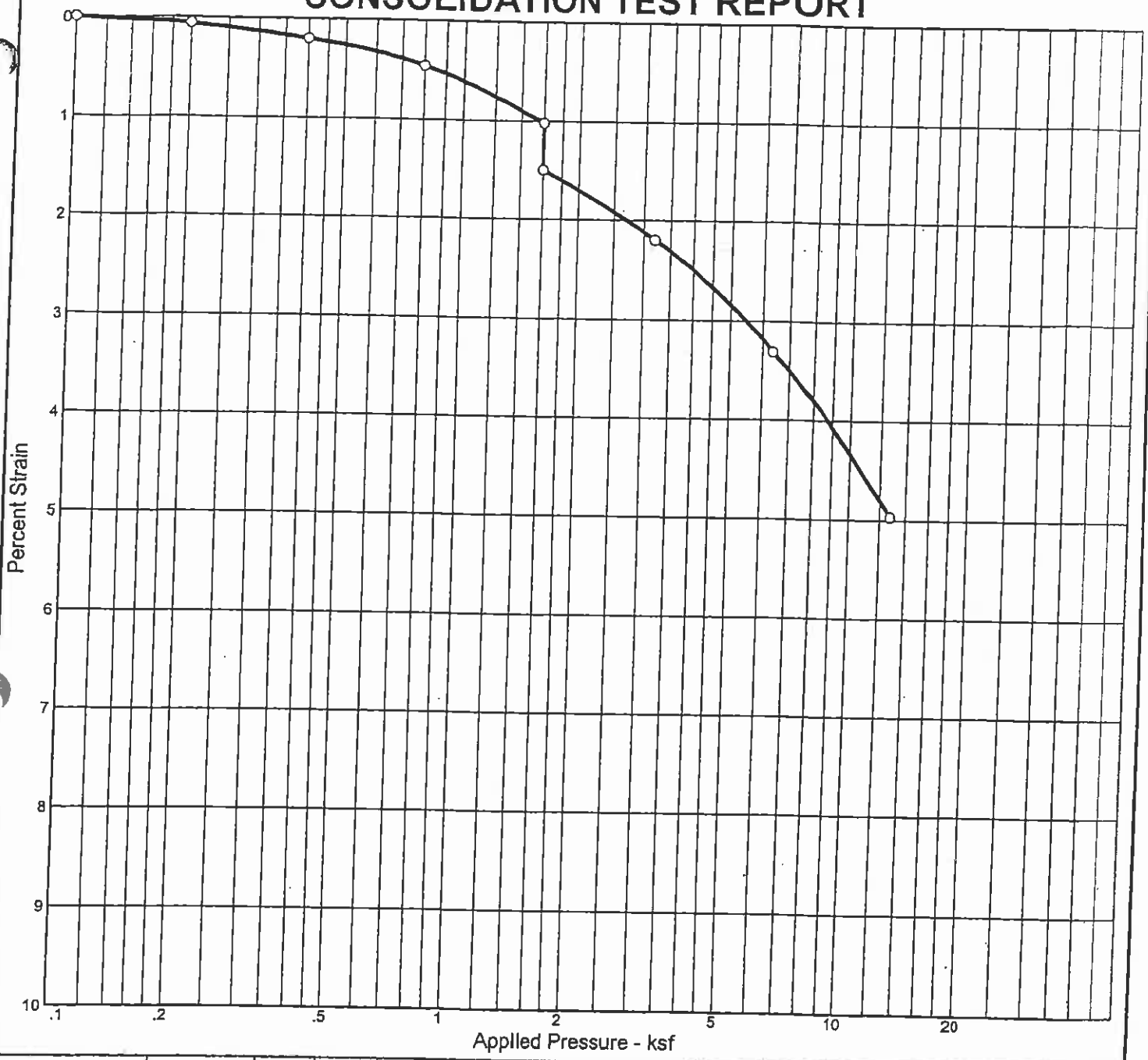
Remarks:
COLLECTED BY ED
COLLECTED ON (3/13/07)

CONSOLIDATION TEST REPORT

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Figure

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_r	Swell Press. (ksf)	Clpse. %	e_o
74.5 %	8.5 %	127.1			2.65		2.32	0.07			0.5	0.302

MATERIAL DESCRIPTION	USCS	AASHTO
SILTY SAND W/CLAY, BROWN	SM	

Project No. M3551-GS **Client:** REZA ZOLFAGHARI

Project: ZOLFAGHARI COMMERCIAL

Source: CONSOL **Sample No.:** B3 @ 10

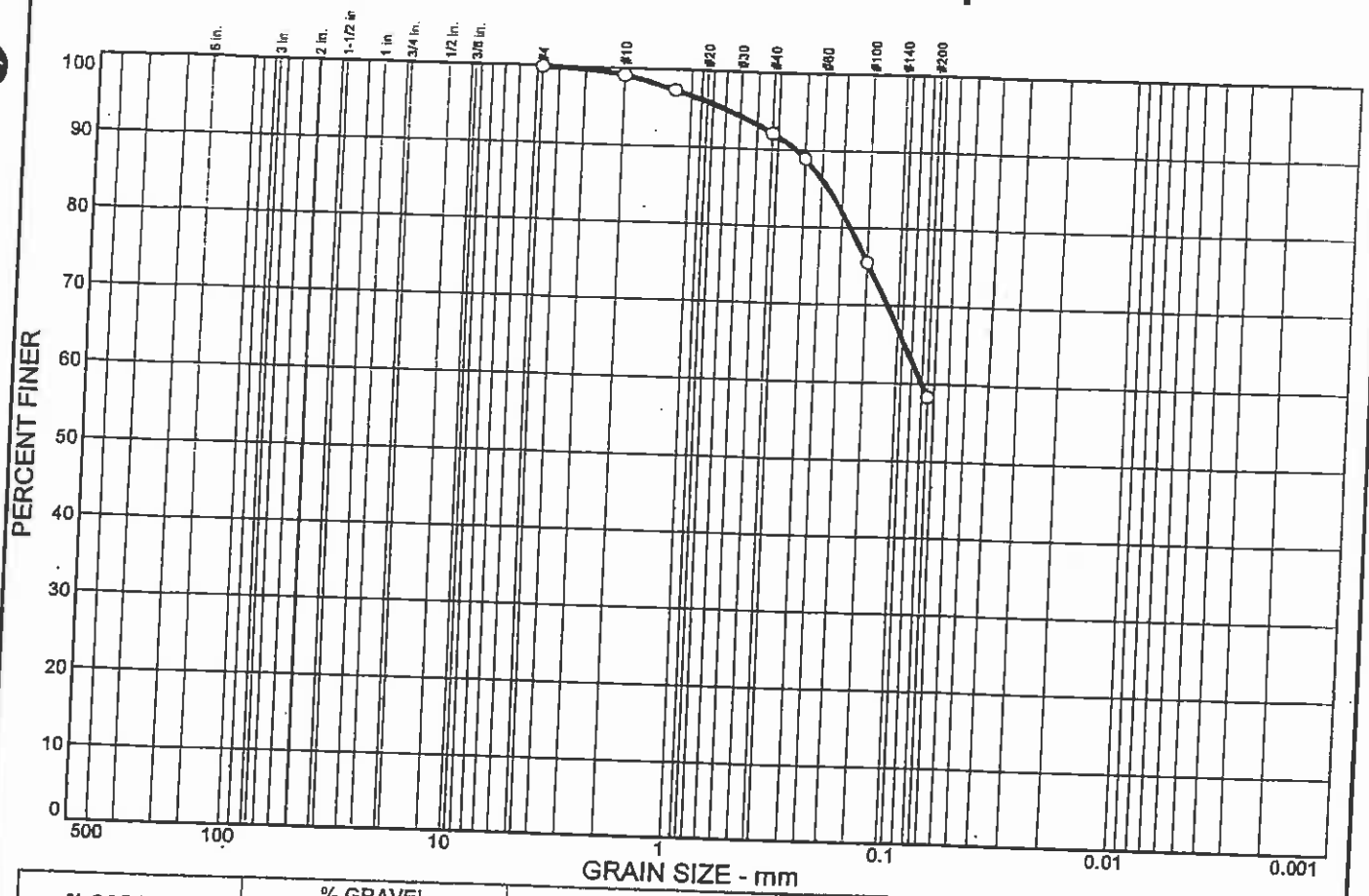
Remarks:
COLLECTED BY ED
COLLECTED ON (3/13/07)

CONSOLIDATION TEST REPORT

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
			0.8	7.0	33.8	58.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	99.9		
#10	99.1		
#16	97.3		
#40	92.1		
#50	88.9		
#100	75.5		
#200	58.3		

* (no specification provided)

Material Description

FINE SANDY SILT, BROWN

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.234 D_{60}= 0.0802 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

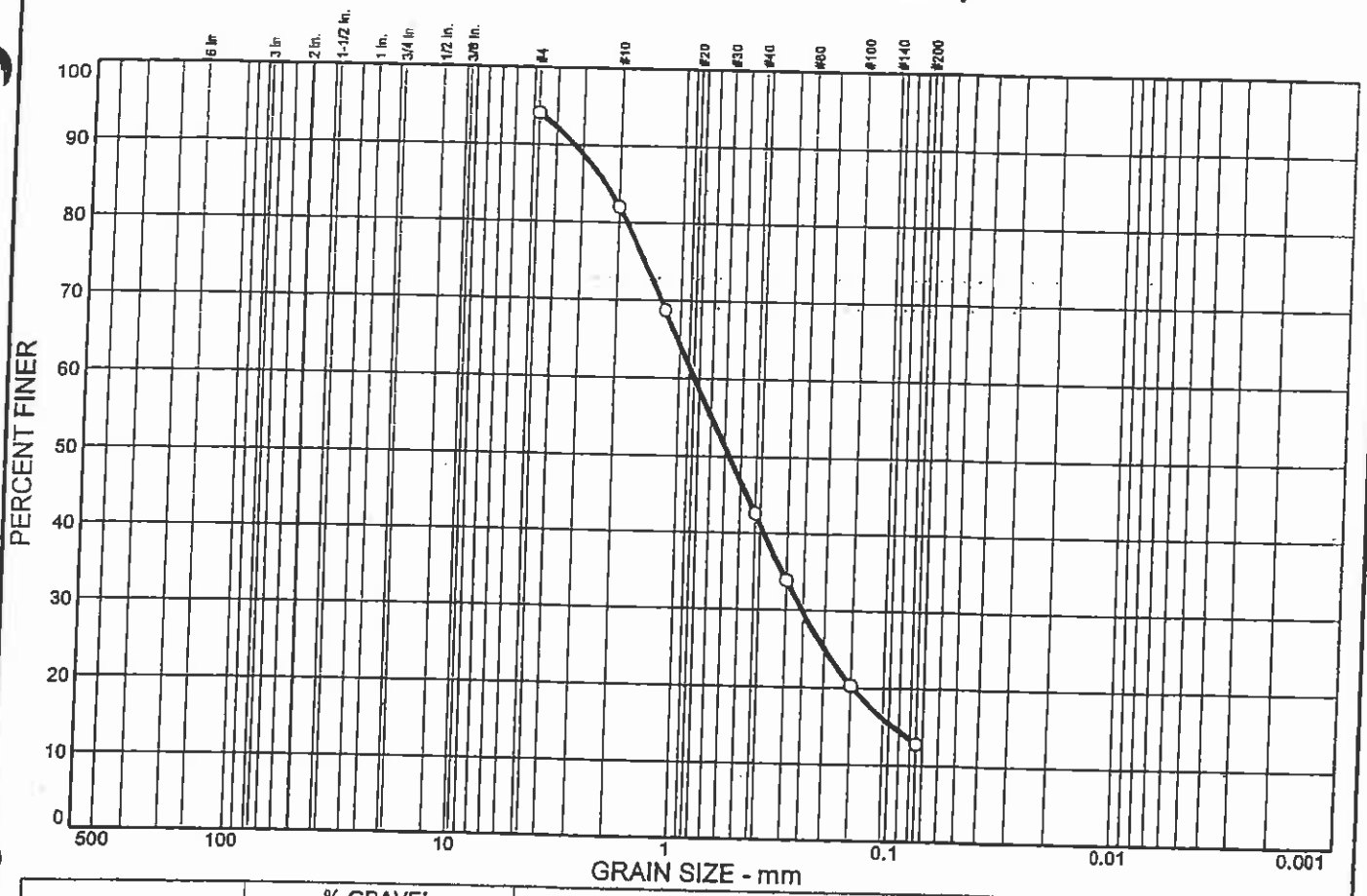
COLLECTED BY ED
COLLECTED ON (3/13/07)

Sample No.: B2 @ 10 **Source of Sample:** SIEVE **Date:** 3/22/07
Location: **Elev./Depth:**

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Client: REZA ZOLFAGHARI
Project: ZOLFAGHARI COMMERCIAL
Project No: M3551-GS **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
			12.1	39.4	29.8	12.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	94.1		
#10	82.0		
#16	68.7		
#40	42.6		
#50	33.9		
#100	20.3		
#200	12.8		

* (no specification provided)

Material Description

SAND, GREY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 2.34 D_{60}= 0.846 D_{50}= 0.570
D_{30}= 0.253 D_{15}= 0.0954 D_{10}=
C_u= C_c=

Classification

USCS= SP AASHTO=

Remarks

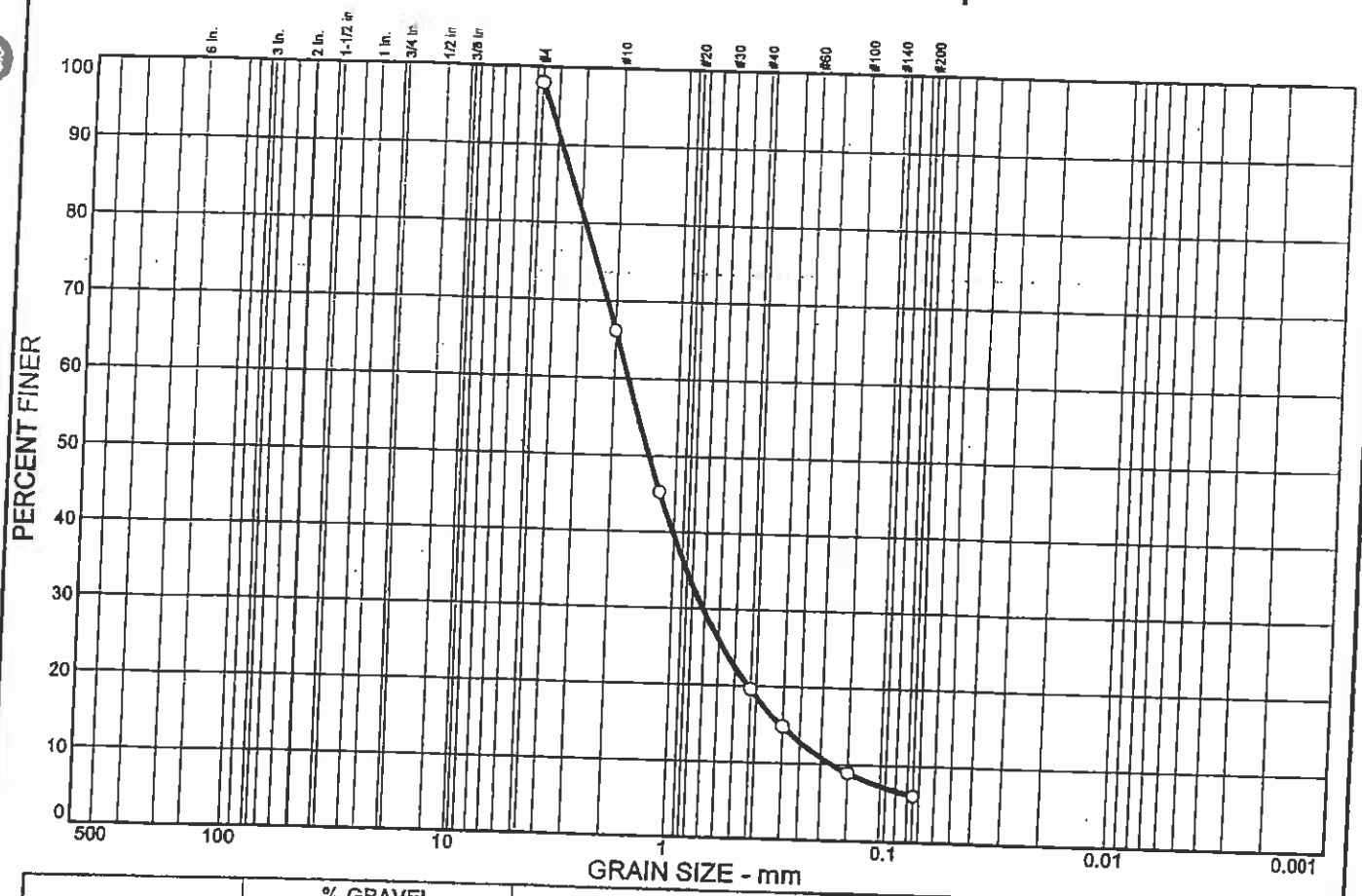
COLLECTED BY ED
COLLECTED ON (3/13/07)

Sample No.: B2 @ 15 **Source of Sample:** SIEVE **Date:** 3/22/07
Location: **Elev./Depth:**

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Client: REZA ZOLFAGHARI
Project: ZOLFAGHARI COMMERCIAL
Project No: M3551-GS **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
			31.9	46.5	13.5	6.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	98.0		
#10	66.1		
#16	45.3		
#40	19.6		
#50	14.8		
#100	8.9		
#200	6.1		

* (no specification provided)

Material Description

MEDIUM TO COARSE SAND, LIGHT BROWN

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 3.30 D_{60}= 1.72 D_{50}= 1.34
D_{30}= 0.711 D_{15}= 0.305 D_{10}= 0.179
C_u= 9.63 C_c= 1.65

Classification

USCS= SP AASHTO=

Remarks

COLLECTED BY ED
COLLECTED ON (3/13/07)

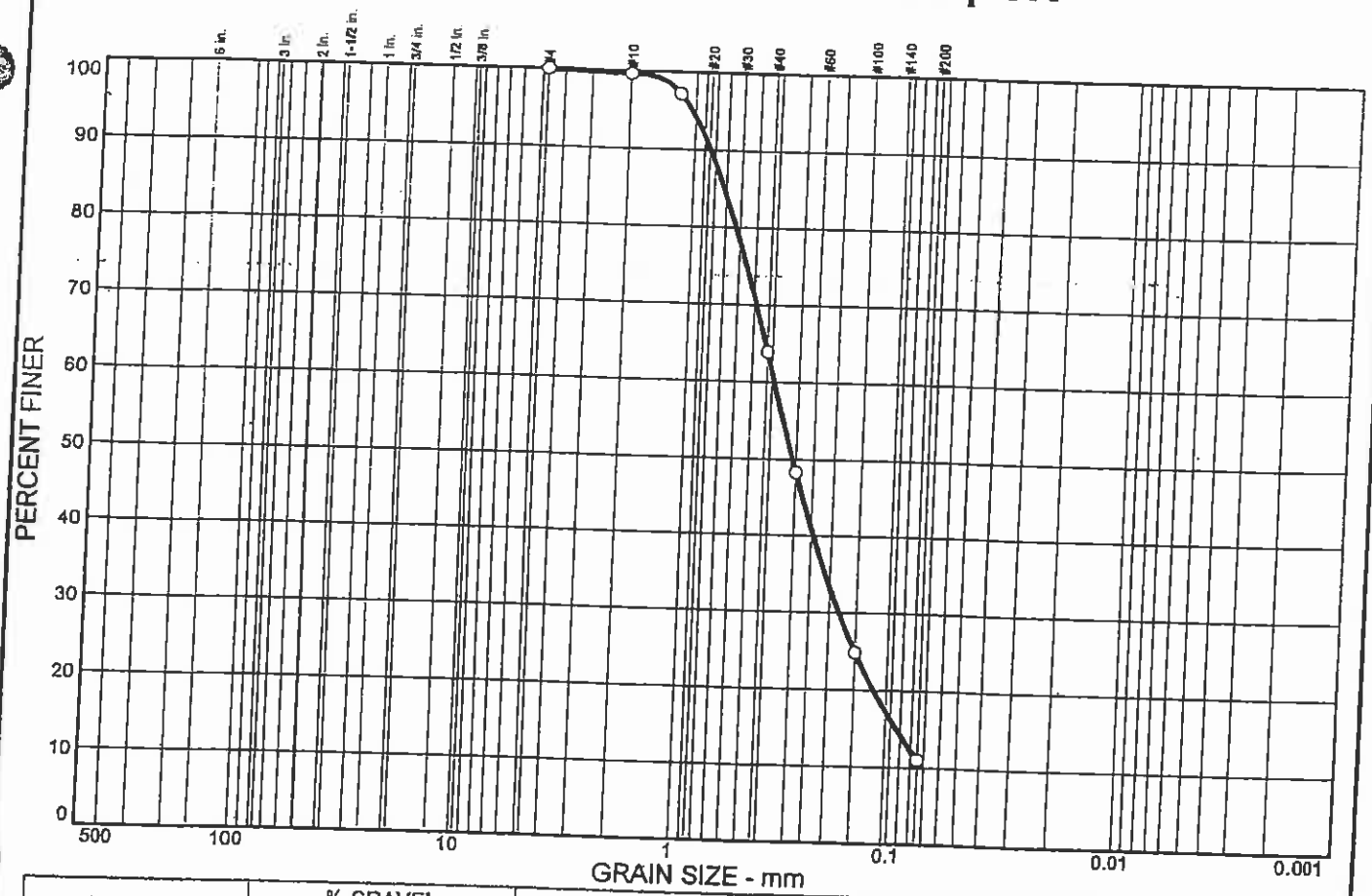
Sample No.: B2 @ 35 **Source of Sample:** SIEVE **Date:** 3/22/07
Location: **Elev./Depth:**

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION

Client: REZA ZOLFAGHARI
Project: ZOLFAGHARI COMMERCIAL
Project No: M3551-GS

Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.3	35.8	52.9	11.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#16	97.2		
#40	63.9		
#50	48.3		
#100	24.9		
#200	11.0		

* (no specification provided)

Material Description

FINE SAND, LIGHT BROWN

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.717 D_{60}= 0.390 D_{50}= 0.312
D_{30}= 0.180 D_{15}= 0.0941 D_{10}=
C_u= C_c=

Classification

USCS= SP AASHTO=

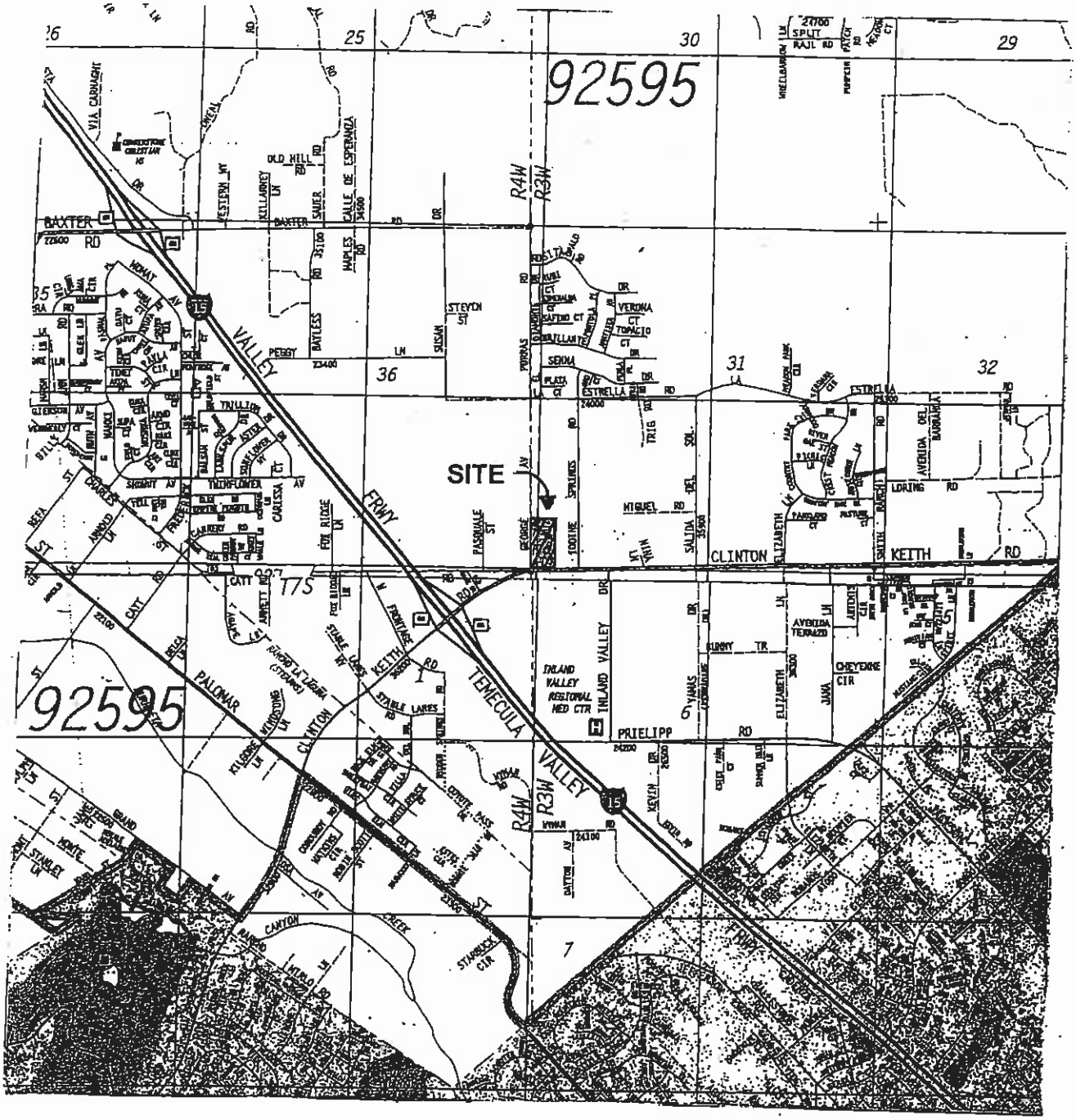
Remarks

COLLECTED BY ED
COLLECTED ON (3/13/07)

Sample No.: B2 @ 40 **Source of Sample:** SIEVE **Date:** 3/22/07
Location: **Elev./Depth:**

ENVIRONMENTAL AND GEOTECHNICAL ENGINEERING NETWORK CORPORATION	**Client:** REZA ZOLFAGHARI **Project:** ZOLFAGHARI COMMERCIAL **Project No:** M3551-GS **Figure**

DRAWINGS



EGAL DESCRIPTION: P N.: 326-250-003	SITE LOCATION MAP	PROJECT NUMBER: M3551-GS DATE: APRIL 2007

PERCOLATION TEST DATA

ENGEN CORPORATION

SOILS PERCOLATION FEASIBILITY STUDY
STORMWATER INFILTRATION BASINS
Clinton Keith Village - Assessor's Parcel Number: 326-250-003
Clinton Keith Road and George Avenue, City of Murrieta, County of Riverside, California
Project Number: M3551-P

April 22, 2008

Prepared for:

Venture Point Development
Mr. John E. Clement
3419 Via Lido, Suite 640
Newport Beach, California 92663

25759 Jefferson Avenue, Murrieta, California 92562 • Phone: (951) 834-9000 • Fax: (951) 834-9001

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3.2 PERCOLATION TESTING 2

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4.1 EARTH MATERIALS 3
4.2 GROUNDWATER 3

5.0 PRELIMINARY SYSTEM DESIGN RECOMMENDATIONS 3

6.0 CLOSURE 4

APPENDIX:
PROJECT REFERENCES
PERCOLATION TEST RESULTS
EXPLORATORY BORING LOGS
DRAWINGS

April 22, 2008

Venture Point Development
Mr. John E. Clement
3419 Via Lido, Suite 640
Newport Beach, California 92663
(949) 673-4660 / FAX (949) 673-4540

Regarding: **SOILS PERCOLATION FEASIBILITY STUDY**
STORMWATER INFILTRATION BASINS
Clinton Keith Village - Assessor's Parcel Number: 326-250-003
Clinton Keith Road and George Avenue
City of Murrieta, County of Riverside, California
Project Number: M3551-P

Dear Mr. Clement:

In accordance your request and signed proposal, **EnGEN Corporation** has performed a Soils Percolation Feasibility Study for the above referenced project. The purpose of this study was to perform percolation testing within the subject property for use in the design of stormwater infiltration basins. Submitted herewith are the results of this firm's findings, along with the supporting data.

1.0 PROPOSED DEVELOPMENT

The proposed development of the subject parcel will consist of a commercial/retail development, along with associated hardscape and landscape improvements. Capture of stormwater run-off for the proposed development will be managed by the use of stormwater infiltration basins.

2.0 SITE DESCRIPTION

The subject site consists of vacant land totaling approximately 5-acres in size. The subject site is located on the northeast corner of Clinton Keith Road and George Avenue in the City of Murrieta, County of Riverside, California. Topography across the proposed infiltration areas consist of relatively flat terrain, with surface drainage by sheet flow generally to the southwest at a gradient of less than five percent. At the time of the field study, no wells were observed within 100-feet of the proposed infiltration area.

3.0 SUBSURFACE STUDY

3.1 PREVIOUS STUDY

Field reconnaissance and geologic mapping of the site was performed on March 13, 2007, by our Field Geologist (Referenced No. 1 Report). A study of the property's subsurface condition was performed to evaluate underlying earth strata and the presence of groundwater. Three (3) exploratory soil borings (B1, B2 & B3) were excavated on the study site by 2 Bit Drilling utilizing a CME 45 truck-mounted drill rig, equipped with 7.0-inch outside diameter continuous flight hollow-stem augers. The maximum depth explored on site was approximately 50.5-feet below the existing ground surface (bgs). The boring logs associated with this previous study are located in the Appendix of this report.

3.2 TEST HOLE EXCAVATION

Two (2) exploratory backhoe pits (TP-1 and TP2) were excavated on the subject property to depths of 6.0-feet and 11.0-feet, respectively below surface elevation within the area of the proposed basins. The location of the backhoe pits were determined by Glen Holmes of Pfeifer & Associates. Upon completion of testing, the exploratory backhoe pits were not backfilled. It is recommended that the backhoe pits be backfilled with reasonable effort to restore the area to its natural condition as a temporary safety precaution. As with any area as small and deep as a backhoe pit, consolidation and subsidence of the backfill soil may result in time, causing a depression of the area and a potentially hazardous condition. The client is advised to periodically examine the excavated area and, if necessary, backfill any noted depressions.

3.3 PERCOLATION TESTING

The percolation test areas were verified as being in undisturbed natural earth materials. One (1) percolation test hole was excavated in the bottom of each backhoe pit (TP-1 and TP-2) and tested within the anticipated infiltration areas on the subject site. The percolation test holes were filled with water and allowed to presoak for a minimum of 24 hours prior to testing. Percolation testing was performed in general accordance with the procedures outlined in Chapter 3 of the "Waste Disposal for Individual Homes, Commercial and Industrial" publication issued by the **Riverside County Department of Environmental Health**. A time interval of 30-minutes was utilized for TP-1. A time

interval of 30 minutes were used for the first two readings and then every ten (10) minutes thereafter for TP-2. The percolation test results are presented in Section 5.1.

4.0 SUBSURFACE CONDITIONS

4.1 EARTH MATERIALS

The earth materials encountered within the exploratory borings previously excavated on the subject parcel consisted of alluvium overlying Pauba Formation Bedrock to the maximum depths explored (50.5-feet bgs). For a detailed description of material types encountered in the exploratory borings, refer to the Exploratory Boring Logs presented in the Appendix. Refusal was not encountered within 50.5-feet of the surface in the areas explored. The earth material strata as shown on the Exploratory Boring Logs generally represents the conditions in the actual backhoe pit locations. However variations may occur throughout the subject property.

4.2 GROUNDWATER

Groundwater was encountered at 15-feet bgs in boring B2. Groundwater was not encountered in borings B1 & B3.

5.0 PERCOLATION TEST DATA

5.1 RESULTS

The following table presents the actual drop in water level recorded in the test holes during percolation testing.

Location	Time (Minutes)	Water Level Drop (Feet)
TP-1	30	.12
TP-1	60	.09
TP-1	90	.09
TP-1	120	.08
TP-1	150	.07
TP-1	180	.07
TP-1	210	.06
TP-1	240	.06
TP-1	270	.05
TP-1	300	.05
TP-1	330	.05
TP-1	360	.05

Location	Time (Minutes)	Water Level Drop (Feet)
TP-2	30	.75
TP-2	60	.65
TP-2	70	.26
TP-2	80	.24
TP-2	90	.24
TP-2	100	.23
TP-2	110	.23
TP-2	120	.22
TP-2	130	.22
TP-2	140	.21
TP-2	150	.21
TP-2	160	.20

5.2 DESIGN RATE

The final percolation rate for a six-hour test suggests that soils percolation will occur at rates of 0.1-feet per hour for TP-1 and 1.8-feet per hour for TP-2. **(As a result, an infiltration rate of 1.2 inches per hour for TP-1 and 21.6 inches per hour for TP-2 may be used for design of infiltration trenches or ponds).**

6.0 CLOSURE

This report has been prepared for use by the parties or project named or described in this document. It may or may not contain sufficient information for other parties or purposes. In the event that changes in the assumed nature, design, or location of the proposed structure and/or project as described in this report are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions and recommendations of this report modified or verified in writing. This study was conducted in general accordance with the applicable standards of the Geotechnical Engineering profession and accepted sewage disposal system testing and design principles and practices at the time this report was prepared. No other warranty, implied or expressed beyond the representations of this report is made.

Although every effort has been made to obtain information regarding the subsurface conditions of the site, limitations exist with respect to the knowledge of unknown regional or localized off-site conditions which may have an impact on the parcels. The recommendations presented in this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man on this and/or adjacent properties. If conditions are observed or information becomes available during the design and construction process that are not reflected in this report, **EnGEN Corporation** should be notified so that supplemental evaluations can be performed and the conclusions and recommendations presented in this report can be modified or verified in writing. In addition, changes in applicable or appropriate standards of care or practice occur, whether they result from legislation or the broadening of knowledge and experience. Accordingly, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes outside of our control which occur in the future.

Thank you for the opportunity to provide our services. Please direct any questions you may have regarding this report to this office at your convenience.

Respectfully submitted,
EnGEN Corporation

S. Ryan Waroff
V.P. – General Manager

Osbjorn Bratene, GE 162
President
Expires 09-30-09

REGISTERED PROFESSIONAL ENGINEER
OSBJORN BRATENE
No. 162
Exp. 09-30-09
GEOTECHNICAL
STATE OF CALIFORNIA

RW/OB:al

Distribution: (4) Addressee

FILE EnGEN/Reporting/P/M3551-P Venture Point Development

PROJECT REFERENCE

1. **EnGEN Corporation,** Zolfaghari Commercial, Assessors Parcel Number: 326-250-003, Clinton Keith Road and George Avenue, City of Murrieta, County of Riverside, California, Project Number: M3551-GS, April 6, 2007.

PERCOLATION TEST RESULTS

PERCOLATION TEST RESULTS

EnGEN Corporation Project Number: M3551-P

CLINTON KEITH ROAD

Percolation Test No. TP-1 Date of Test. 4/11/2008

No.	Time (Military Time)	D-Time (In Minutes)	D1 (In Feet)	D2 (In Feet)	D2 - D1 (In Inches)	R-Value (Min/Inch)	SF/100 (Gallons)
	7 07						
1	7 37	30.00	5.00	5.12	1 44	20.83	50
2	8 07	30.00	5.00	5 09	1.08	27.78	65
3	8 37	30 00	5.00	5 09	1.08	27 78	65
4	9 07	30.00	5.00	5.08	0.96	31 25	70
5	9 37	30.00	5.00	5 07	0 84	35 71	80
6	10 07	30.00	5.00	5.07	0.84	35 71	80
7	10 37	30.00	5 00	5.06	0 72	41 67	90
8	11 07	30.00	5.00	5.06	0 72	41.67	90
9	11 37	30.00	5.00	5.05	0.60	50.00	110
10	12 07	30 00	5.00	5.05	0.60	50.00	110
11	12 37	30 00	5.00	5 05	0.60	50.00	110
12	13 07	30.00	5 00	5.05	0.60	50 00	110

SLOPE ACROSS SITE IS: 5%		TEST PIT DEPTH IS: 6.00	Feet
MINIMUM PIT DEPTH IN FT. 6.00		MINIMUM COVER: N/A	Feet

PERCOLATION TEST RESULTS

CLINTON KEITH ROAD

Percolation Test No. TP-2 Date of Test: 4/11/2008

No.	Time (Military Time)	D-Time (In Minutes)	D1 (In Feet)	D2 (In Feet)	D2 - D1 (In Inches)	R-Value (Min/Inch)	SF/100 (Gallons)
	7 15						
1	7.45	30.00	10.00	10.75	9.00	3.33	20
2	8 15	30 00	10.00	10.65	7.80	3.85	20
3	8 25	10 00	10.00	10.26	3.12	3.21	20
4	8.35	10.00	10.00	10 24	2.88	3.47	20
5	8.45	10.00	10.00	10 24	2.88	3 47	20
6	8.55	10.00	10.00	10 23	2.76	3 62	20
7	9.05	10.00	10.00	10.23	2.76	3.62	20
8	9.15	10.00	10.00	10 22	2.64	3.79	20
9	9.25	10.00	10 00	10.22	2.64	3 79	20
10	9.35	10.00	10 00	10.21	2.52	3 97	20
11	9.45	10.00	10.00	10.21	2.52	3.97	20
12	9.55	10 00	10.00	10.20	2.40	4.17	20

SLOPE ACROSS SITE IS: 5%		TEST PIT DEPTH IS: 11.00	Feet
MINIMUM PIT DEPTH IN FT. 11.00		MINIMUM COVER: N/A	Feet

EXPLORATORY BORING LOGS

(B1 THROUGH B3)

GEOTECHNICAL BORING LOG

Project Number: M3551-GS
Boring Number: B1
Date: 03/13/07

Project: Zolfaghari Commercial
Surface Elevation: 1352
Logged By: ED

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content	Maximum Density	Optimum Moisture Content
	UNDOCUMENTED FILL (Afu) Silty fine- to medium-grained sand, light olive brown (5Y 5/3), dry, medium dense.		0	SM					
	PAUBA FORMATION (Qps) Fine sandy siltstone, light olive brown (2.5Y 5/4), moist, very dense.			ML	16-29-50/1	109.1	6.7		
			5						
	Fine sandy claystone, strong brown (7.5YR 5/6), moist, very hard.				48-50/4	120.7	11.9		
	Silty fine sandstone, light olive brown (2.5 Y 5/4), moist, very dense.		10		18-38-50/5	113.3	8.4		
	Cobble or boulder.					113.3	8.4		
	Silty fine to medium sandstone, olive brown (2.5Y 4/4), moist, very dense. Total Depth 15-feet bgs. No Groundwater Encountered.		15		24-37-50/6	126.6	8.4		
			20						
			25						
			30						
			35						

Notes:

GEOTECHNICAL BORING LOG

Project Number: M3551-GS
Boring Number: B2
Date: 03/13/07

Project: Zolfaghari Commercial
Surface Elevation: 1341
Logged By: ED

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content	Maximum Density	Optimum Moisture Content
	UNDOCUMENTED FILL (Afu) Silty fine- to medium-grained sand, brown (10YR 4/3), dry, dense.		0	SM					
	PAUBA FORMATION (Qps) Silty fine sandstone, Light Yellowish Brown (2.5Y 6/3), moist, very dense.			SM	23-34-47		22.9		
			5		22-50/5	116.3	12.5		
					35-46-50/3		16.0		
	Fine sandy siltstone, olive (5Y 5/4), moist, very dense, a few fine gravel, angular.		10	ML	15-50/4		16.5		
	Fine to medium sandstone, pale olive (5Y 6/3), wet, very dense.		15	SP	50/6		10.6		
	Fine to medium sandstone, pale olive (5Y 6/3), wet, very dense.		20	SP	40-50		13.5		
	Fine to medium sandstone, pale olive (5Y 6/3), wet, very dense.		25	SP	50/5		12.8		
	Fine to medium sandstone, pale olive (5Y 6/3), wet, very dense.		30	SP	23-50/3		13.1		
	Medium to coarse sandstone, light gray (2.5Y 7/2), wet, very dense.		35	SP	45-50/3		11.0		

Notes:

GEOTECHNICAL BORING LOG

Project Number: M3551-GS
Boring Number: B2
Date: 03/13/07

Project: Zolfaghari Commercial
Surface Elevation: 1341
Logged By: ED

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content	Maximum Density	Optimum Moisture Content
	Fine to medium sandstone, light gray (2.5Y 7/2), wet, very dense, 1-inch recovery.		40	SP	50/2		20.1		
	No recovery.		45		50/5				
	Fine to medium sandstone, pale olive (5Y 6/3), wet, very dense. Total Depth 50.5-feet bgs. Groundwater Encountered at 15-feet bgs.		50	SP	55/2		15.4		
			55						
			60						
			65						
			70						

Notes:

GEOTECHNICAL BORING LOG

Project Number: M3551-GS
Boring Number: B3
Date: 03/13/07

Project: Zolfaghari Commercial
Surface Elevation: 1533
Logged By: ED

Soil Graphic	Description	Sampler	Sample Depth	USCS	Blow Count	Dry Density	In-Situ Moisture Content	Maximum Density	Optimum Moisture Content
	UNDOCUMENTED FILL (Afu) Silty fine- to medium-grained sand, yellowish brown (10YR 5/4), dry, loose.		0	SM					
	ALLUVIUM (Qal) Silty fine- to medium-grained sand, yellowish brown (10YR 5/4), dry, very dense, slightly porous.			SM	20-31-50/6	124.5	3.4		
	Silty fine- to medium-grained sand, dark yellowish brown (10YR 4/4), moist, dense.		5	SM	19-30-33	121.8	6.4		
	Silty fine- to medium-grained sand, dark yellowish brown (10YR 4/4), moist, dense.			SM	16-22-31	130.0	8.0		
	PAUBA FORMATION (Qps) Silty fine sandstone with clay, light olive brown (2.5Y 5/4), moist, very dense. Total Depth 11.5-feet bgs. No Groundwater Encountered.		10	SM	27-34-50/6	127.0	8.5		
			15						
			20						
			25						
			30						
			35						

Notes:

Symbol Description

Strata symbols

Silty sand

Silt

Poorly graded sand

Misc. Symbols

Boring continues

Soil Samplers

California sampler

Standard penetration test

Notes:

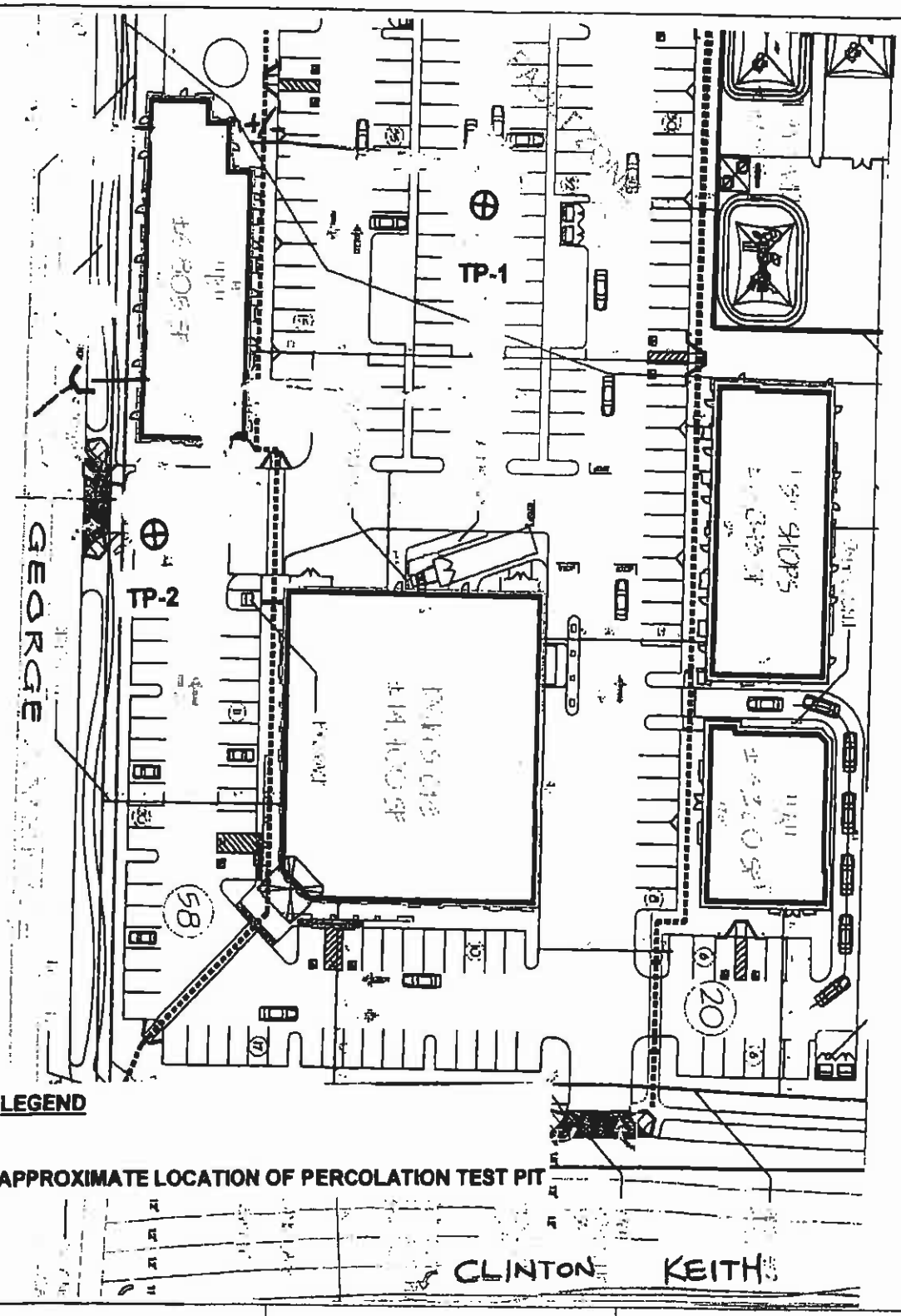
1. Exploratory borings were drilled on 03/13/07 using a 7-inch diameter continuous flight power auger.

2. Water was encountered at the time of drilling at the depths shown.

3. Boring locations were measured from existing features and elevations extrapolated from the final design plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.



LEGEND

TP-1 ⊕ APPROXIMATE LOCATION OF PERCOLATION TEST PIT

LEGAL DESCRIPTION: **A.P.N.: 326-250-003**	**SITE MAP**	**PROJECT NUMBER: M3551-P** **DATE: APRIL 2008**

EnGEN Corporation • 25759 Jefferson Avenue • Murrieta, California 92562 • (951) 834-9000 • (951) 834-9001

EnGEN CORPORATION

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

EnGEN CORPORATION

PHASE I ENVIRONMENTAL SITE ASSESSMENT
Zolfaghari Property
Assessor's Parcel Number: 362-250-003
Clinton Keith Road and George Avenue
Wildomar area of Riverside County, California
Project Number: M3551-EA1

November 2, 2006

Prepared for:

Mr. Reza Zolfaghari
c/o Mr. Reza Kassraian
23821 Hillhurst Drive, Suite 29
Laguna Niguel, California 92677

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EnGEN CORPORATION

November 2, 2006

Mr. Reza Zolfaghari
c/o Mr. Reza Kassraian
23821 Hillhurst Drive, Suite 29
Laguna Niguel, California 92677
(714) 404-7131 / FAX (714) 495-0927

Attention: Mr. Reza Kassraian

Regarding: **PHASE I ENVIRONMENTAL SITE ASSESSMENT**
Zolfaghari Property
Assessor's Parcel Number: 362-250-003
Clinton Keith Road and George Avenue
Wildomar area County of Riverside, California
Project Number: M3551-EA1

Dear Mr. Kassraian:

This report presents the results of our Phase I Environmental Site Assessment (ESA) performed at the target property located in the Wildomar area of Riverside County, California. The scope of work for this assessment is described in Section 2.0 of this report.

1.0 EXECUTIVE SUMMARY

1.1 **GOVERNMENT DATABASE SEARCH:** The target property is not listed in any of the governmental databases searched which document environmental risk associated with hazardous materials or petroleum hydrocarbons.

ENVIRONMENTAL RECORDS SEARCH: The environmental database records search suggests that five (5) sites are located within the American Society for Testing and Materials (ASTM) search radius of up to a distance of 5,280-feet (1-mile) of the target property that are known to be associated with the use and/or storage of hazardous materials or petroleum hydrocarbons. The five (5) sites include USA Gasoline Corporation Facility (identified as Resource Conservation and Recovery Act [RCRA] small quantity generators), Tomra Pacific Inc./Albertsons (Recycling Facility), Inland Valley Regional Medical Center, Clinton Keith Chevron (identified to have a leaking underground storage tank [LUST]), and Promt Cleaners (Drycleaner Facility). Reviews of available aerial

photographs suggest that the property had a former agricultural use and that a dirt road was historically located through the southeastern corner of the target property.

1.3 **SITE INSPECTION:** A site inspection was conducted at the target property on October 16, 2006. The target property is located northwest of the intersection of George Avenue and Clinton Keith Road in the Wildomar area of Riverside County, California. The site is undeveloped land. Minor amounts of construction debris or trash were observed throughout the target property. Open trenches were observed on the target property at the time of our site reconnaissance. A refrigerator was observed at the bottom of the western most open trench. Photographs of the site are presented in Appendix A.

1.4 **RECOMMENDATIONS:** Based on our findings, there are no recognized environmental conditions and one (1) potential environmental condition related to pesticides and herbicides. The target property was historically used for agricultural purposes and should be tested for pesticides and herbicides to confirm current concentrations are acceptable.

1.5 **ENVIRONMENTAL HEALTH DEPARTMENT FILE REVIEW:** A file review was requested with the County of Riverside Department of Environmental Health (CRDEH), Hazardous Materials Management Division for the target property, but not completed due to the County's current backlog of requests. If a file is located, any negative information revealed upon review will be reported as a letter addendum to this document. A review of records on file with the CRDEH is not expected to disclose conditions that would impact the environmental quality of the target property which have not been uncovered by other historical resources explored during the course of this Phase I site assessment.

2.0 INTRODUCTION

2.1 **PURPOSE OF WORK:** The purpose of a Phase I ESA is to present any identified past or present environmentally related events and conditions which may negatively impact the subject property.

2.2 **SCOPE OF SERVICES:** The assessment includes: 1) a search of available environmental records in governmental databases; 2) completion of an on-site inspection; 3) interviews with the property owner(s) or tenant(s) as appropriate; 4) a permits search; 5) contacts with regulatory agencies; and 6) review of historical aerial photographs.

2.3 **ASSUMPTIONS:** There is a possibility, even with the proper application of these methodologies, there may exist on the target property conditions that could not be identified within the scope of the assessment or which were not reasonable identifiable from the available information. **EnGEN Corporation** believes that the information obtained from the record review and the interviews concerning the site is reliable. However, **EnGEN Corporation** cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete.

2.4 **PROJECT SPECIFIC LIMITATIONS AND EXCEPTIONS:** The findings and conclusions contain all of the limitations inherent in these methodologies that are referred to in ASTM 1527-05. The general limitations are further discussed in Section 14 of this report. Specific limitations and exceptions to this Phase I ESA are more specifically described below: **EnGEN Corporation** was limited by the available records that were provided or readily accessible to the public and their inherent accuracy. The existing soil stock piles covered the native ground in the area of the fault trenches and therefore observations could not be made of native underlying condition.

2.5 **SPECIAL TERMS AND CONDITIONS:** Authorization to perform this work was in the form of a contract signed on October 13, 2006, by Mr. Reza Kassraian as an agent of the property owner, Mr. Reza Zolfaghari.

2.6 **USER RELIANCE:** **EnGEN Corporation** hereby certifies to Mr. Reza Zolfaghari that this report was prepared in conformance with all applicable laws, statutes, ordinances, rules, and regulations, and promulgated by all applicable governmental authorities concerning the topic of the report. The conclusions and recommendations provided in the report are in no way influenced or controlled by the client for which the work was performed. Mr. Reza Zolfaghari may rely on the findings of the reports as if **EnGEN Corporation** had performed the work directly under contract to any purchaser or assignee of the property within the Limiting Conditions of this report.

3.0 SITE DESCRIPTION

3.1 **SITE LOCATION AND LEGAL DESCRIPTION:** The target property consists of approximately 5.85-acres located northwest of the intersection of George Avenue and Clinton Keith Road in the Wildomar area of Riverside County, California. The site legal description is:

Assessor's Parcel Number (APN): 362-250-003. To the extent of our reasonable research no assigned street address has been identified for the target property.

3.2 **SITE AND VICINITY GENERAL CHARACTERISTICS:** The topography across the target property consists of rolling hills, with overall regional topography generally sloping to the southwest (see site photographs, Appendix A).

3.3 **CURRENT PROPERTY USE:** The property is not currently in use.

3.4 **DESCRIPTIONS OF STRUCTURES, ROADS, OTHER IMPROVEMENTS ON THE SITE:** Based on our site reconnaissance, a concrete lined drainage "V-ditch" located in the southeastern most portion of the target property was the only apparent existing improvement to the target property. However, based on our historical document review, it appears that Clinton Keith Road once went through the southeast portion of the project. It is unknown whether associated utilities or other improvements may occur in the form roadway area.

3.5 **CURRENT USES OF ADJOINING PROPERTIES:** Based on our site reconnaissance, the surrounding properties are comprised of vacant undeveloped land with the exception of paved Clinton Keith Road to the south and on-going grading activities to the adjacent west of the target property.

4.0 USER PROVIDED INFORMATION

4.1 **TITLE RECORDS:** No title records were provided.

4.2 **ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS:** No records were provided.

4.3 **SPECIALIZED KNOWLEDGE:** No specialized knowledge related to any potential or known environmental impacts was provided to **EnGEN Corporation**. Further, **EnGEN Corporation** has no specialized knowledge related to any potential or known environmental impacts related to the target property.

4.4 **COMMONLY KNOWN OR REASONABLY ASCERTAINABLE INFORMATION:** No additional information for the target property is known by **EnGEN Corporation** that is not presented in this report. No additional sources of reasonably ascertainable information were revealed within the scope of services for this study.

4.5 **VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES:** No specialized knowledge related to any potential or known environmental impacts affecting the target property's property value was provided to **EnGEN Corporation**. Because purchase price is sometimes considered confidential, the user should evaluate whether the purchase price was below the fair market value for the property at the time it was purchased as a result of contamination.

4.6 **REASON FOR PERFORMING THIS PHASE I ESA:** To the best of our knowledge, the reason for performing this Phase I ESA is to evaluate the target property's overall development potential.

5.0 RECORDS REVIEW

5.1 **STANDARD ENVIRONMENTAL RECORD SOURCES:** Standard records searched for the purposes of this Phase I ESA included the readily available federal and state government databases described in ASTM 1527-05, was performed by Environmental Data Resources (EDR). For more detail on the included federal and state government or tribal databases that were readily available for this search please refer to the EDR report attached in the Appendix.

5.2 **ADDITIONAL ENVIRONMENTAL RECORD SOURCES:** Additional records searched for the purposes of this Phase I ESA included a database search of the readily available government databases described in ASTM 1527-05, was performed by EDR. For more detail on the included local or regional government databases that were readily available for this search please refer to the EDR report attached in the Appendix.

When the property descriptor includes a known street address, the governmental database search by EDR is complimented by performing manual verification of any existing Building Permits from the appropriate government entity, Regional Water Quality Control Board file review, and County Department of Environmental Health file review. However, in the case of the target property, no known street address was revealed. Therefore, the additional records reviews were not considered reasonably ascertainable for this study.

5.3 PHYSICAL SETTING SOURCES

5.3.1 **TOPOGRAPHY:** Select historical United State Geological Survey (USGS) Quadrangle

Topographic Maps covering the target property were reviewed for this Phase I ESA. The reviewed maps and general topographic setting of the target property was:

Date	Quadrangle	Scale	Topographic Setting
1901	Elsinore	1:250,000	Slightly sloping to the southwest.
1947	Murrieta	1:50,000	Slightly sloping to the southwest.
1953	Murrieta	1:24,000	Slightly sloping to the southwest.
1979	Murrieta	1:24,000	Slightly sloping to the southwest.

5.3.2 **REGIONAL GEOLOGY:** The site is located in the Northern Peninsular Range on the southern sector of the structural unit known as the Perris Block. The Perris Block is bounded on the northeast by the San Jacinto Fault Zone, on the southwest by the Elsinore Fault Zone, and on the north by the Cucamonga Fault Zone. The southern boundary of the Perris Block is not as distinct, but is believed to coincide with a complex group of faults trending southeast from the Murrieta, California area. The Peninsular Range is characterized by large Mesozoic age intrusive rock masses flanked by volcanic, metasedimentary, and sedimentary rocks. Various thicknesses of alluvial sediments derived from the erosion of the elevated portions of the region fill the low-lying areas.

5.3.3 **SOIL CONDITIONS:** Based on information of the EDR report from the Soils Conservation Service STATSGO data, the surface soils are expected to be comprised of interbedded sandy and gravelly loam to a total depth of 73-inches.

5.3.4 **GROUNDWATER CONDITIONS:** The approximate depth to groundwater is unknown. A list of regional wells and groundwater depths are presented the attached EDR report (Appendix). However, it is our understanding that based on the current government efforts to protect the water supply, well locations are not accurate and therefore no interpretation of groundwater depth or quality is provided.

5.4 **HISTORICAL USE INFORMATION:** Research within the limits of this Phase I Site Assessment including aerial photo review, historical topographic maps, government database search were utilized in evaluating past property uses.

5.5 Historical Aerial Photograph Review

Date	Flyer	Scale	Description
2002	USGS	1"=666'	Primarily undeveloped/vacant land with a public paved road along the southern border and abandoned/overgrown dirt road crosses into the southeastern portion of the site where it continues parallel to the southern border. A dirt road trends along the western property boundary.
1994	USGS	1"=666'	Primarily undeveloped/vacant land with a public paved road along the southern border and abandoned dirt road that crosses into the southeastern portion of the site where it continues parallel to the southern border and an apparent abandoned private dirt driveway continues to the northeast direction where it joins an offsite in use road. A dirt road trends along the western property boundary.
1989	USGS	1"=666'	Primarily undeveloped/vacant land with a public paved road along the southern border and abandoned dirt road that crosses into the southeastern portion of the site where it continues parallel to the southern border and an apparent abandoned private dirt driveway continues to the northeast direction where it joins an offsite in use road. A dirt road trends along the western property boundary.
1980	AMI	1"=600'	Primarily undeveloped/vacant land with a public dirt road along the southern border that crosses into the southeastern portion of the site where it continues parallel to the southern border and an apparent abandoned private dirt driveway continues to the northeast direction where it joins an offsite in use road.
1967	Western	1"=555'	Primarily undeveloped land with a public dirt road along the southern border that crosses into the southeastern portion of the site where it continues parallel to the southern border and an apparent abandoned private dirt driveway continues to the northeast direction.
1953	Pacific Air	1"=555'	Primarily agricultural land with a public dirt road along the southern border that crosses into the southeastern portion of the site where it continues parallel to the southern border and an apparent private dirt driveway continues to the northeast direction.
1938	Laval	1"=555'	Primarily undeveloped/vacant land with a public dirt road along the southern border that crosses into the southeastern portion of the site where it continues parallel to the southern border and an apparent private dirt driveway continues to the northeast direction.

5.6 **FIRE INSURANCE MAPS:** No historical fire insurance maps (Sanborn Maps) were located during the governmental database search for the target property (EDR, 2006).

5.7 **CITY DIRECTORIES:** No City Directories for the target property were located during our governmental database search for the target property (EDR, 2006).

5.8 **CHAIN OF TITLE:** A chain-of-title search of current and historic land ownership was not included within **EnGEN Corporation's** agreed upon proposed scope of services as outlined in the October 13, 2006 proposal associated with this Phase I ESA. Historical research of the target property was performed using other resources, such as aerial photograph review, topographic map review, and government records.

5.9 **ADDITIONAL ENVIRONMENTAL RECORD SOURCES:** No additional environmental reports or surveys were provided to **EnGEN Corporation** nor are any known to be readily ascertainable.

5.10 **HISTORICAL USE ON ADJOINING PROPERTIES:** Adjoining properties to the north, east, west and south have all had apparent historical agricultural uses. In addition, the adjacent property to the west appears to have been used for past residential purposes.

6.0 SITE RECONNAISSANCE

6.1 **GENERAL:** An inspection of the target property was conducted on October 16, 2006. The site inspection included reconnaissance and surface observations throughout the target property and a photographic survey to document the site inspection operations. The photographic survey can be found in Appendix A of this report.

6.2 **SITE CONDITIONS:** At the time of the site reconnaissance the target property was undeveloped and entirely enclosed around its perimeter by a chain-link fence. Portions of the target property were covered by open trenches for purposes of a geotechnical fault study at the time of our site reconnaissance and are otherwise undeveloped. However, construction type debris or trash was located sporadically throughout the target property which appears to be associated with apparent dumping on the property. A refrigerator was dumped at the bottom of the western most fault trench. The quantity of construction debris observed was minor.

7.0 INTERVIEWS

7.1 **INTERVIEW WITH OWNER:** At the time of our acquisition of this project contract, it was expressed to us by the client representative, Mr. Reza Kassraian, that there were no known environment problems at the target property.

7.2 **INTERVIEW WITH SITE MANAGER:** It is our understanding that there is no site manager as there are no active operations on-site.

7.3 **INTERVIEW WITH OCCUPANTS:** The target property has no occupants.

7.4 **INTERVIEW WITH LOCAL GOVERNMENT OFFICIALS:** Governmental agency information was obtained through other means included in this report, such as, governmental database records research.

7.5 **INTERVIEW WITH OTHERS:** An interview with neighbors or other persons was not considered necessary due to the lack of development surrounding the target property.

8.0 FINDINGS

Based on the available government database records and site reconnaissance, the following findings are presented of the target property:

8.1 **HAZARDOUS WASTE MANIFESTS:** Hazardous waste manifests are used when transporting hazardous wastes for legal disposal. There are no known operations on the subject property involving the transportation or storage of regulated materials.

8.2 **AIR EMISSIONS:** There are no known operations on the subject property which require an Air Quality Management District (AQMD) permit. At the time of the site inspection, no unusual odors were encountered on the subject property and no other conditions were observed that would be a concern from an air emissions standpoint. Active air emissions tracking is on-going at the Inland Valley Regional Medical Center located less than one-half mile southeast of the target property but, no violations have been reported based on available data.

8.3 **PESTICIDES AND HERBICIDES:** At the time of the site inspection the target property was not in use for agricultural purposes. However, the target property was used for these purposes at the time of the 1953 aerial photograph and therefore may possibly incorporate the use or disposal of pesticides and herbicides on the target property (see Aerial Photographs, Appendix B). Pesticides may have been utilized during this time. Based on the evidence uncovered within the scope of this site assessment, no negative impact to the target property from pesticides is anticipated; however, this cannot be confirmed without sampling and testing. If the client wishes to test for contaminant

levels associated with pesticide or herbicide use, this office can provide these services; however, it is not within the scope of work of this Phase I ESA.

8.4 **WASTEWATER:** At the time of the site inspection, there was no observed evidence of stormwater, drains, drainage ditches, injection systems or other liquid wastes either on the target property or on adjacent properties along the perimeter of the target property.

8.5 **WASTE GENERATION, STORAGE AND DISPOSAL:** At the time of the site inspection, there was no evidence observed on the target property that would indicate that the site had past or current use for the generation, storage, treatment, or disposal of hazardous waste.

8.6 **MATERIAL SAFETY DATA SHEETS (MSDS):** Material Safety Data Sheets (MSDS) document the on-site use of hazardous materials. Currently, there are no MSDS for the target property.

8.7 **BUILDING PERMITS:** Building permits are not readily ascertainable from the Riverside County Building and Safety Department for properties which do not have addresses; therefore, no building permits were available for the target property. However, it is assumed that building permits may exist for the site based on the presence of the current and historic site improvements, such as, concrete V-ditch located in the southeast portion of the target property and the former dirt road through the southeast portion of the target property which may include associated buried utilities.

8.8 **CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SANTA ANA REGION (CRWQCB, SAR):** Because the California Regional Water Quality Control Board, Santa Ana Region (CRWQCB, SAR) maintains files according to address, and the target property has no known address, a file review was not requested from the CRWQCB, SAR for the target property.

8.9 **COUNTY OF RIVERSIDE HEALTH DEPARTMENT, HAZARDOUS MATERIALS MANAGEMENT DIVISION:** Because the County of Riverside, Department of Environmental Health (CRDEH) maintains files according to address, and the target property has no known address, a file review was not requested from the CRDEH for the target property.

8.10 ASBESTOS

8.10.1 **BACKGROUND:** Asbestos is a naturally occurring mineral fiber utilized in a multitude of building material products due to its high tensile strength and excellent fire resistant properties. The EPA has defined asbestos materials as being either friable or non-friable materials.

8.10.2 **FRIABLE:** Material is defined as being easily broken or crushed by hand pressure (i.e., soft acoustical ceilings or blown-on fireproofing). Friable asbestos-containing building materials were banned for manufacture and sale in the United States in 1978 and all stocks remaining on the shelves are presumed to have been depleted by 1980.

8.10.3 **NON-FRIABLE**: Material is generally found in pre-manufactured products that bind the asbestos in an adhesive material such as roofing felts, floor tile, transite pipe and mastics. This is significant due to the ability to create a fiber release and cause human exposure during normal activities. The EPA currently does not require the removal of asbestos-containing materials that do not present a problem for human exposure. After friable asbestos was banned, significant labeling requirements went into effect for non-friable asbestos-containing materials and many substitutes became available. Asbestos-containing flooring materials and mastic were used less and less in construction after 1978. By 1984, their use in buildings constructed in the United States was nearly non-existent due to the labeling requirements and potential liability to both the manufacturer and real estate developer. While never banned from use in roofing materials, labeling and liability concerns resulted in the voluntary removal of asbestos from roof mastic/sealants by the major manufacturers in 1989.

8.10.4 **HIGH/LOW RISK MATERIAL**: On October 11, 1994, a new FED-OSHA ruling became effective, which redefined building materials perceived as asbestos-containing into four classes of work and modified the way in which these asbestos-containing materials are handled. Under this ruling, "thermal system insulation and sprayed-on or troweled on or otherwise applied surfacing materials installed before 1980 are considered PACM (presumed asbestos-containing material)" unless sampled and identified by a certified individual as to asbestos content. These materials are considered high-risk materials for abatement and their removal is classified under Class I Removal Activities. Other building materials, such as "floor or ceiling tiles, siding, roofing, transit panels (floor sheeting, floor or roof mastics) are also considered PACM (presumed asbestos-

containing material)" unless sampled and identified by a certified individual as to asbestos content, but are considered low risk materials for abatement and their removal is classified under Class II, III and IV Removal and Repair and Maintenance Operations.

8.10.5 **SMALL SCALE SHORT TERM DURATION**: Significant under these new regulations is the deletion of the category of "Small Scale Short Term Duration" removal activities which regularly allowed Class I, II, III and IV activities to proceed with less regulatory oversight. Under the NESHAPS laws of 1976 and as later amended, asbestos does not have to be removed from a facility until such time as it undergoes major renovations or is demolished. Until that time, the present emphasis by the EPA is to recommend repair of any damaged areas and management of the asbestos-containing materials. Prior to any renovation work being done involving asbestos-containing materials of 260 lineal feet or 160 square feet or more in area, the local branch of the EPA must be notified. Prior to the demolition of any building or house, mandatory bulk sampling must be accomplished and if asbestos is present, notification must be made to the local branch of the EPA and Air Quality Management District. In California, for the removal of any asbestos-containing materials greater than 0.1% by weight, notifications must also be made to CAL-OSHA and a licensed contractor with an asbestos certification is required for any work which exceeds 100 square feet.

8.10.6 **BUILDING MATERIALS PRESUMED TO CONTAIN FRIABLE ASBESTOS**: Friable asbestos-containing materials were not observed at the time of our site reconnaissance and are therefore not considered present at the target property.

8.10.7 **BUILDING MATERIALS PRESUMED TO CONTAIN NON-FRIABLE ASBESTOS**: Non-friable asbestos-containing materials were not observed at the time of our site reconnaissance and are therefore not considered present on-site.

8.11 POLY-CHLORINATED BIPHENYLS (PCBS)

8.11.1 **BACKGROUND**: PCBs were materials widely used as a coolant in electrical equipment from the 1920s to the 1970s. They were banned from use in most electrical equipment in the latter part of the 1970s and 1980s, after it was determined that PCBs could cause health problems if ingested, and cancer when they underwent a chemical change as a result of a fire or explosion. Small amounts of PCBs were used as a coolant in

fluorescent light tube fixture ballast until 1978, at which time they were banned.

8.12 **PCBs ON THE PROPERTY**: Based upon a site inspection, no PCBs or PCB sources appear to exist on the subject property. Based on the apparent age of the refrigerator located at the base of the open trench, it is not anticipated that PCBs were utilized in the abandoned appliance.

8.13 **ABOVE-GROUND FUEL STORAGE TANKS (AST'S)**: No above ground storage tanks were visible on the subject property.

8.14 **UNDERGROUND STORAGE TANKS (UST'S)**: At the time of the site inspection, there was no observed evidence of underground storage tanks on the target property. An active LUST case that affects the drinking water aquifer is located less than one-half mile southeast of the target property.

8.15 Summary of Government Records Search Findings:

8.15.1 **GENERAL**: A search of environmental records in governmental databases was completed using the services of Environmental Data Resources Inc. (EDR). These databases document the occurrence, use, disposal, discharge and/or transport of hazardous materials and petroleum hydrocarbons. The records search focuses on investigating critical or "border zone" sites near the subject property. The State of California, Department of Health Services, has defined these sites as being within 2,000-feet (approximately 0.4-mile) of the subject property. Other sites at more distant locations may be listed also but are not considered critical. A search report prepared by EDR is included in Appendix D. The report meets the governmental records search requirements of ASTM Standard Practice for ESAs, ASTM E 1527-05 Significant findings are summarized in the subsequent sections of this report.

8.15.2 **SITE FINDINGS (GOVERNMENT RECORDS SEARCH)**: The target property is not listed in any of the governmental databases searched.

8.15.3 **EPA ID NUMBER**: An Environmental Protection Agency Identification Number (EPA ID) is assigned to and used by a facility to dispose of hazardous chemicals over a certain specified quantity. There is no EPA ID Number for the site.

8.15.4 **OFF-SITE FINDINGS (GOVERNMENT RECORDS SEARCH)**: Five (5) reported sites found in

the records within the ASTM search radius of the target property hydrocarbons (EDR, 2006). A summary of the identified potential off-site sources follows, for additional detail refer to Appendix D.

USA Gasoline Corporation Facility is located less than one-quarter mile west of the target property at 23905 Catt Road. This site is identified as a small quantity generator of an aqueous solution with less than 10% total organic residues. No violations were reported for this facility.

Tomra Pacific Inc/ Albertsons is located less than on-quarter mile south-southwest of the target property at 23893 Clinton Keith Road. This site is identified on SWRCY list that tracks recycler's state wide. Based on our field study it appears that this facility recycles glass, plastics and aluminum drink containers. No violations were reported for this facility.

Clinton Keith Chevron is located less than one-quarter mile west of the target property at 23805 Clinton Keith Road. This site is listed as maintaining 3 UST's. Based on our confirmatory site visit, it appears that this facility maintains 1 diesel UST and 2 unleaded gasoline type UST's. No violations were reported for this facility.

Inland Valley Regional Medical Center is located less than one-half mile southeast of the target property at 36485 Inland Valley Drive and was listed as having two separate records for the same address. This site is reported to have a leaking underground storage tank (LUST) that has affected the drinking water aquifer, methyl tertiary butyl ether (mtbe) has been confirmed in groundwater, and the site is listed on Emissions Inventory Data (EMI) for air emission tracking. No air violations were reported for this facility. Based on regional topography it appears that this site is hydrogeologically downgradient of the target property.

Promt Cleaners is located less than one-eight mile south by soutwest of the target property at 23905 Clinton Keith Road. This site is identified as a drycleaner with no violations.

8.16 **RADON**: Radon comes from the natural breakdown (radioactive decay) of uranium. The Environmental Protection Agency (EPA) estimates that the average soil in the United

States contains only about one part per million of uranium. Uranium is found in about 150 materials, including granite, phosphate and shale. Granite is a major concern for the presence of radon, as some deposits have been found to contain extremely high levels of uranium. According to Mr. David Quinton of the State Department of Radon, the chance of radon being a hazard in Southern California is less than one percent.

8.17 **LEAD-BASED PAINT**: Because the target property is undeveloped and no apparent sources exist on-site, the use or storage of lead based paint is not considered to be a concern on the target property (see Photographic Survey, Appendix A).

8.18 **REGULATORS ACTIONS**: A search of available environmental records revealed no evidence of regulatory actions on the target property.

8.19 **KNOWN SITE PROBLEMS**: Based on the work conducted within the scope of this Phase I ESA, there are no known site problems from a hazardous materials standpoint. The existing refrigerator at the base of the existing fault study trench should be removed and properly disposed of.

8.20 **REGIONAL OR ADJACENT PROBLEMS**: Regional or adjacent problems that would have an impact on the site from a hazardous materials standpoint were not identified through the course of the work performed for this study.

9.0 OPINION

9.1 **PROFESSIONAL OPINION ON POSSIBLE CONTAMINATION**: No recognized environmental conditions that indicate an existing release, past release or material threat of a release of hazardous substances or petroleum products was revealed for the target property. The potential environmental conditions revealed for the target property includes pesticides and herbicides from agricultural use. Based on our experience in this part of southwest Riverside County, properties with similar histories such as past agricultural use typically yield low concentrations of pesticides and herbicides and should be tested for confirmation of existing concentrations. The refrigerator on-site is considered to represent de minimus conditions as a worst-case. The off-site LUST case is located approximately 2,500 feet down-gradient and therefore, is not considered to be a threat to impact the target property. Due to the site reconnaissance observations and the nature

of the above reported environmental cases within the ASTM search radius of the target property, it is our interpretation that the target property is unaffected from off-site sources. Please refer to the EDR Data, Inc. report in the Appendix for further details and a list of databases searched.

10.0 CONCLUSIONS

10.1 **GENERAL**: Other than the property use for agricultural purposes which may have introduced pesticides or herbicides to the target property, no conditions were revealed that would indicate a recognized liability from a hazardous materials standpoint for the target property. However, the presence of chemical compounds in soil cannot be confirmed without subsurface sampling and analytical testing, which is not within the scope of this study.

10.2 **ENVIRONMENTAL RECORDS SEARCH**: An environmental records search revealed no known environmental problems associated with hazardous materials within the target property. However, the need for confirmatory sampling to verify the off-site sources which had no reported violations should be determined by the client as described in the following sections of this report.

10.3 **SITE RECONNAISSANCE**: Based on the site reconnaissance performed at the target property, the only potential negative impacts suggested were from herbicides and pesticides and the chemicals associated with the onsite refrigerator that may potentially impact the target property.

11.0 RECOMMENDATIONS

Based on our findings, no sampling is considered necessary for recognized environmental conditions. The site was used for former agricultural purposes. Sampling for pesticides and herbicides, may be prudent and would also provide confirmatory data of potential environmental conditions. Because there was no evidence observed of contaminates during the physical inspection of the target property, and government data-base searches identified only "off-site" historical source sites, the decision to perform a physical sampling and testing operation should be based on the client's threshold of comfort.

12.0 DEVIATIONS

This Phase I ESA is in general accordance with the scope of services and ASTM 1527-05, with the excluding the exceptions and/or limiting conditions as discussed in the Limitations and Exceptions as described within Section 2.4, 14 and 15 of this report.

13.0 ADDITIONAL SERVICES

This Phase I ESA did not include any additional services such as confirmatory sampling.

14.0 GENERAL LIMITATIONS

14.1 **ASTM STANDARDS**: This report is intended to satisfy the requirements of a Phase I ESA as outlined in the ASTM standards. This standard is intended to define the scope of due diligence necessary in a real estate transaction to provide for the "innocent buyer's defense" under the SARA amendments to CERCLA.

14.2 **TIME, SCOPE AND DATE LIMITATIONS**: The findings set forth in this Phase I ESA are strictly limited in time and scope to the date of evaluation(s). Government records searched are limited to the accuracy of the agency-prepared lists. It should be the decision of the owner and/or client to proceed to further sampling and analysis based on their comfort level, legal requirements, and/or project needs. If the client wishes to test for contaminant levels associated with petroleum hydrocarbons, pesticide, or herbicide use, this office can provide these services. Should the client wish to confirm air quality, this office does not perform these services. Any additional subsurface investigation and sampling to confirm the conclusions of this report is not within the scope of this report Phase I ESA.

14.3 **SCIENTIFIC TASK LIMITATIONS**: The conclusions presented in the report are based solely on the services described herein and not on scientific tasks or procedures beyond the scope of the agreed upon Phase I ESA.

14.4 **ACKNOWLEDGEMENTS**: It is hereby acknowledged that, within the scope of this survey, no level of assessment can ensure the real property is completely free of chemicals or toxic substances.

15.0 CLOSURE

15.1 **INTENDED PARTIES USE**: This report has been prepared for use by the parties or project named or described in this document. It may or may not contain sufficient information for other parties or purposes.

15.2 **PROJECT CHANGES**: In the event that changes in the assumed nature, design, or location of the proposed development as described in this report are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions and recommendations of this report modified or verified in writing.

15.3 **STANDARDS OF CARE**: This study was conducted in general accordance with the applicable standards of our profession and the accepted geotechnical engineering principles and practices at the time this report was prepared. No other warranty, implied or expressed beyond the representations of this report, is made.

15.4 **UNDISCLOSED CONDITIONS**: Although every effort has been made to obtain information regarding the geotechnical and subsurface conditions of the site, limitations exist with respect to the knowledge of unknown regional or localized off-site conditions which may have an impact at the site. The recommendations presented in this report are valid as of the date of the report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man on this and/or adjacent properties. If conditions are observed or information becomes available during the design and construction process which are not reflected in this report, **EnGEN Corporation** should be notified so that supplemental evaluations can be performed and the conclusions and recommendations presented in this report can be modified or verified in writing.

15.5 **INTENDED USE**: This report is not intended for use as a bid document. Any person or company using this report for bidding or construction purposes should perform such independent studies and explorations as he deems necessary to satisfy himself as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of the work on this project.

15.6 **CHANGES IN STANDARDS OF CARE:** Changes in applicable or appropriate standards of care or practice occur, whether they result from legislation or the broadening of knowledge and experience. Accordingly, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes outside the control of EnGEN Corporation which occur in the future.

This public records search was conducted with available Federal, State, County and City agency departments, according to recognized procedures and current availability of records. Conclusions resulting from these searches are solely a result of the same. EDR, Inc., the source of environmental risk data submitted with this assessment, assumes no responsibility for events that are not part of these public records.

We hope this report meets your present needs. Should you have any questions, or if clarification is needed, please contact this office at your convenience.

Respectfully submitted,
EnGEN Corporation

Eric Davisson, REA 8127
Senior Staff Geologist
Expires 06-30-07

H. Wayne Bainbridge, REA 4002
Chief Executive Officer
Expires 05-01-07

ED/HWB:ll

Distribution: (4) Addressee

FILE: EnGEN\Reporting\EA1\T3551-EA1 Zolfaghari Property

REFERENCES

1. California Code of Regulations, Title 22, Chapter 30 Regulations for Hazardous Waste Transport and Disposal, California Highway Patrol.

2. California Environmental Protection Agency, State Water Resources Control Board, 2006, Geotracker, Your link to environmental data for regulated facilities in California, website: http://geotracker.swrcb.ca.gov/, 2006.

3. California Geologic Survey, 2002, California Geomorphic, Provinces, Note 36.

4. Environmental Data Resources, Inc., 2006a, Sanborn Map Report, report dated October 20, 2006.

5. Environmental Data Resources, Inc., 2006b, The EDR-Radius Map with GeoCheck, report dated October 25, 2006.

6. Environmental Data Resources, Inc., 2006c, The EDR-Historical Topographic, report dated October 23, 2006.

7. Environmental Data Resources, Inc., 2006d, The EDR-Aerial Photography Print Service, report dated October 23, 2006.

8. FEDERAL, 29 CFR, Part 1910.120; 40 CFR Part 761, DOT; 49 CFR Parts 172.516; Toxic Substance Control Act.

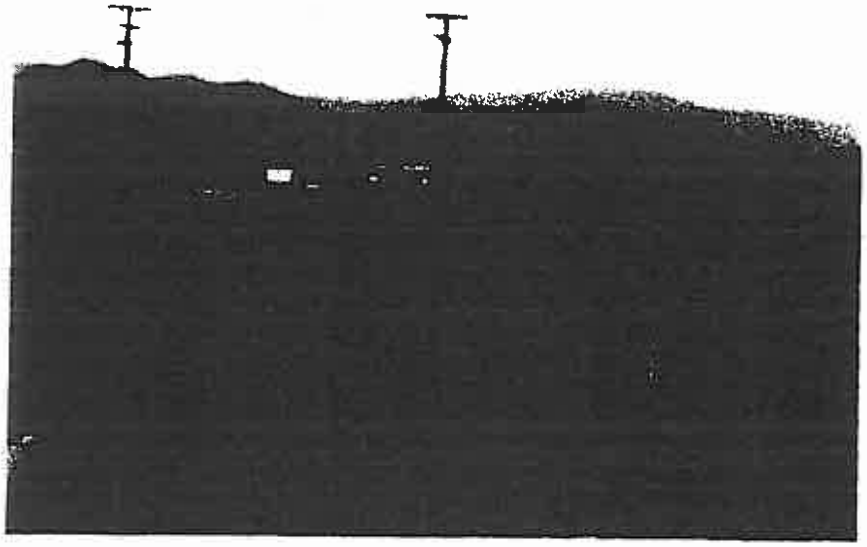
9. Morton, D. M., 1999, Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle, Southern California, Version 1.0, United States Geological Survey, Open File Report 99-172.

APPENDIX A

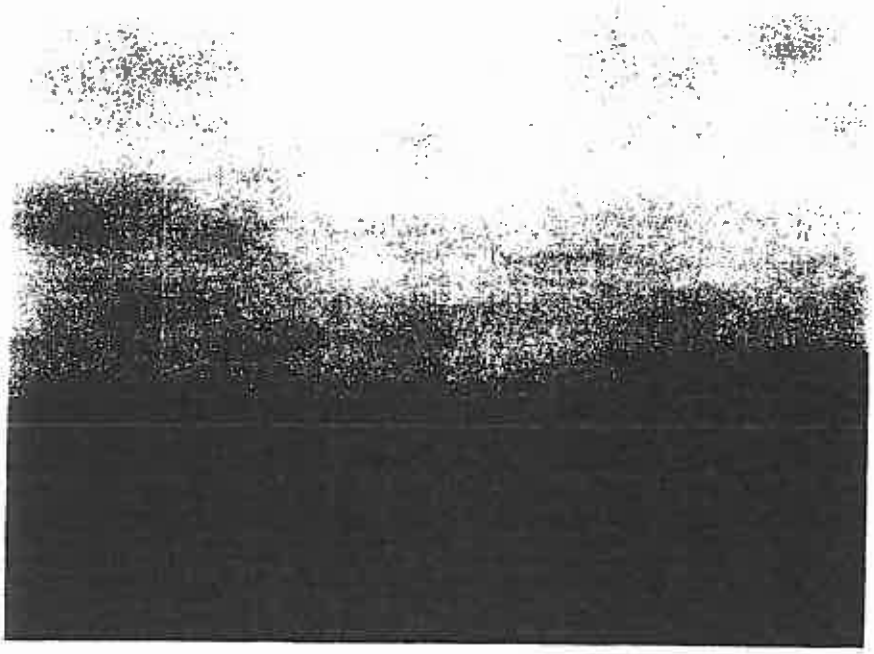
PHOTOGRAPHIC SURVEY

Mr. Reza Zolfaghari
Zolfaghari Residence
Project Number: M3551-EA1
November 2006

Photographic Survey

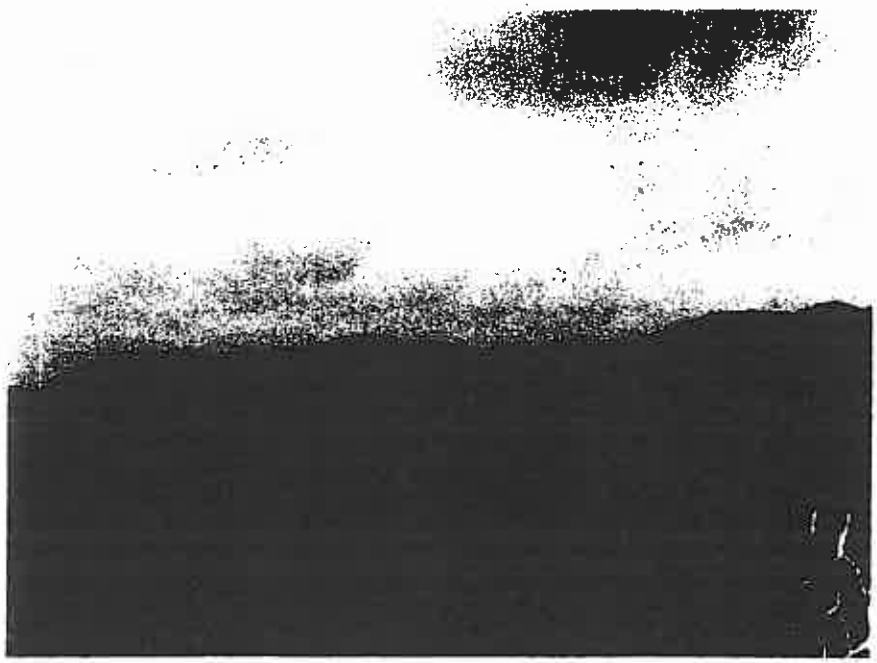


Photograph Number 1: Southeast of target property facing west.

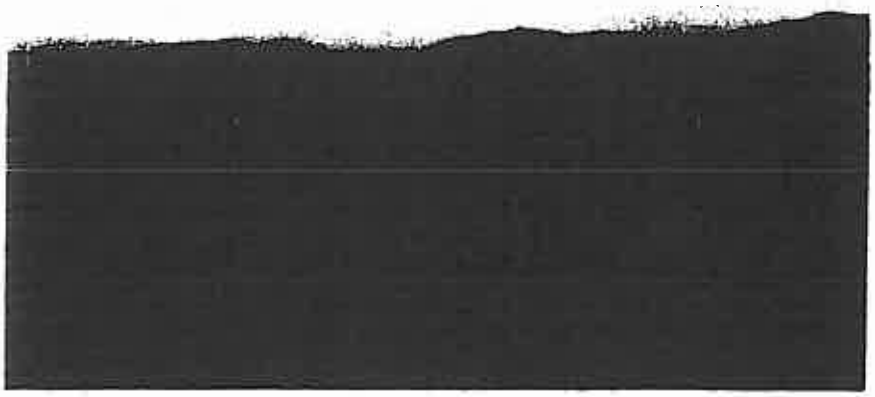


Photograph Number 2: Southeast corner of target property facing northwest

Photographic Survey



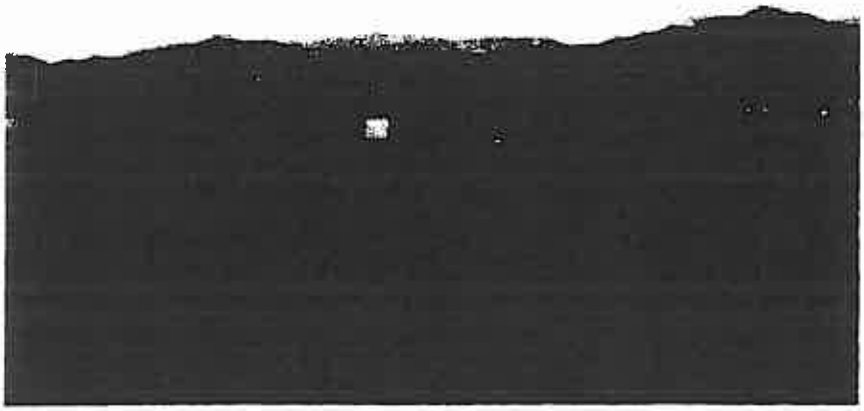
Photograph Number 3: Southeast corner of target property facing north.



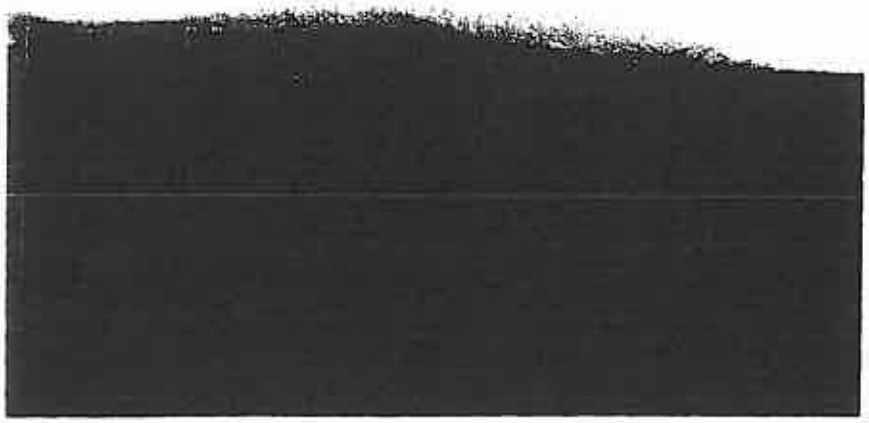
Photograph Number 4: East central portion of target property facing south.

Mr. Reza Zolfaghari
Zolfaghari Residence
Project Number: M3551-EA1
November 2006

Photographic Survey

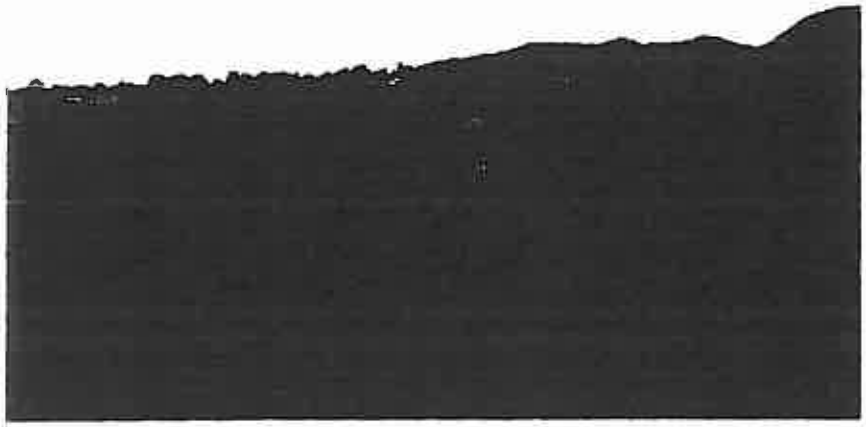


Photograph Number 5: East central portion of target property facing southwest.

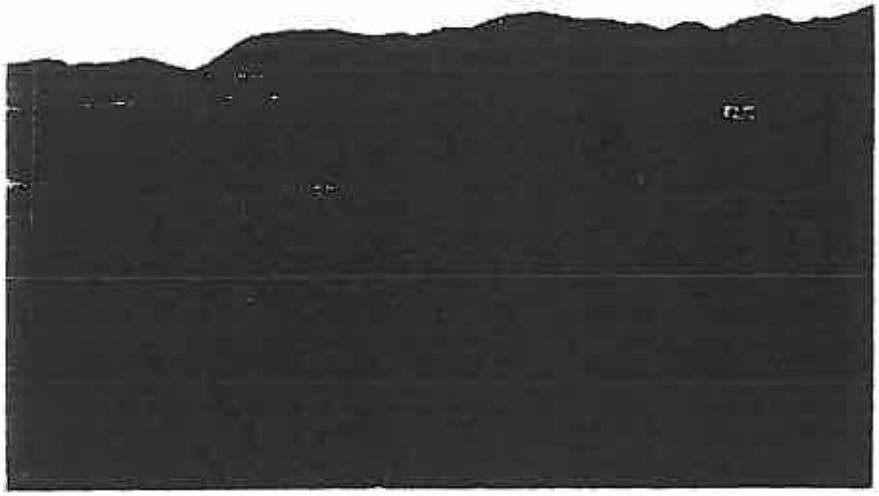


Photograph Number 6: East central portion of target property facing west.

Photographic Survey



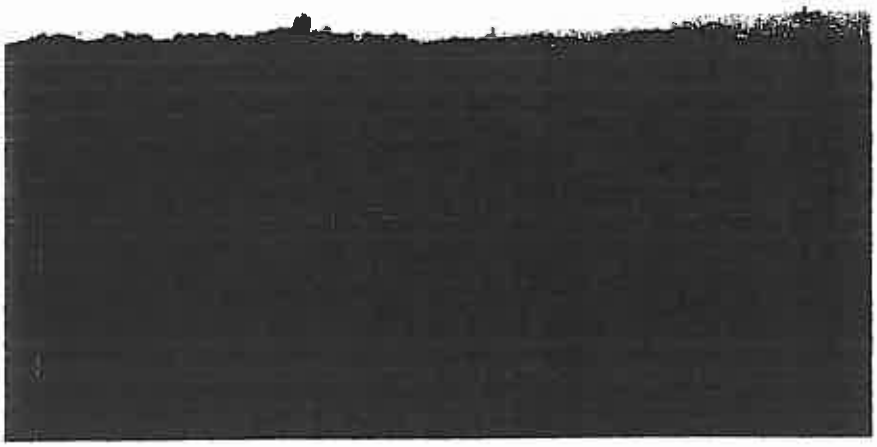
Photograph Number 7: East central portion of target property facing northwest.



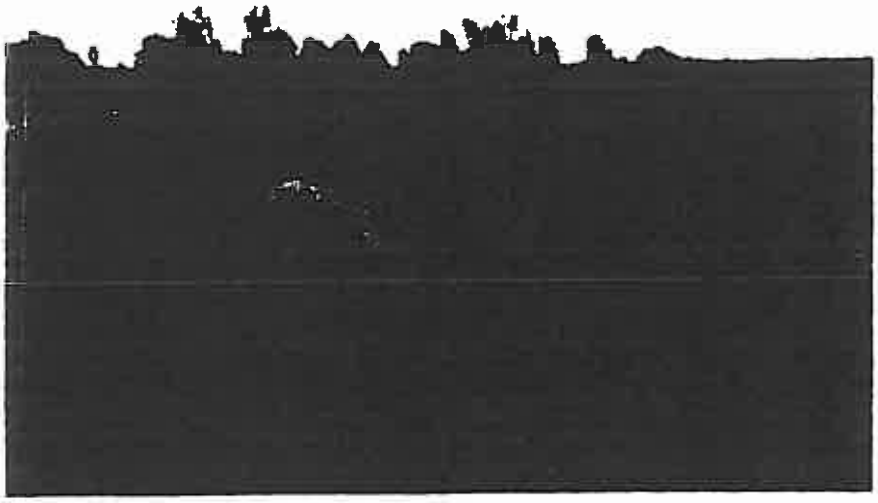
Photograph Number 8: East central portion of target property facing north.

Mr. Reza Zolfaghari
Zolfaghari Residence
Project Number: M3551-EA1
November 2006

Photographic Survey

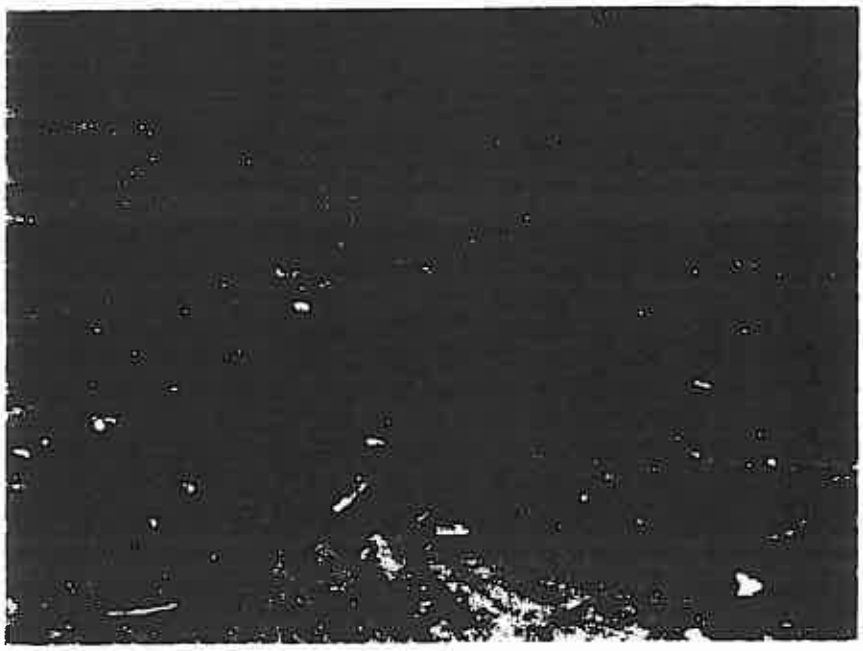


Photograph Number 9: Northwest corner of target property facing southeast.



Photograph Number 10: Northwest corner of target property facing east.

Photographic Survey

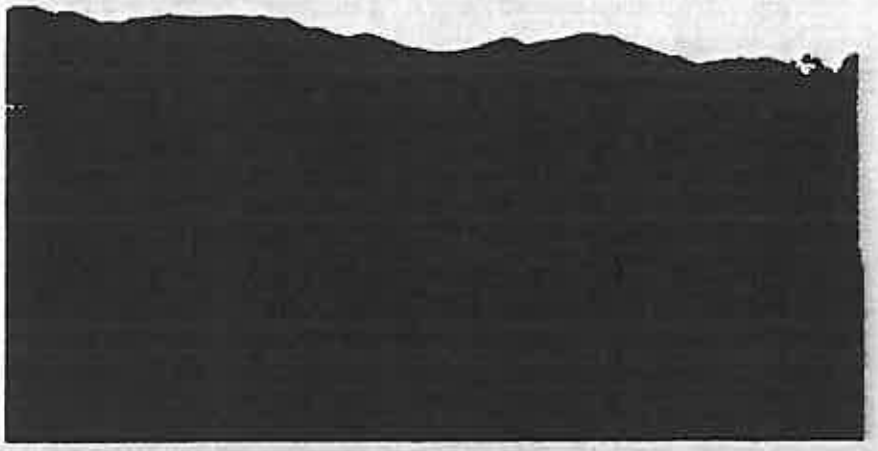


Photograph Number 11: General debris in northwest portion of target property.

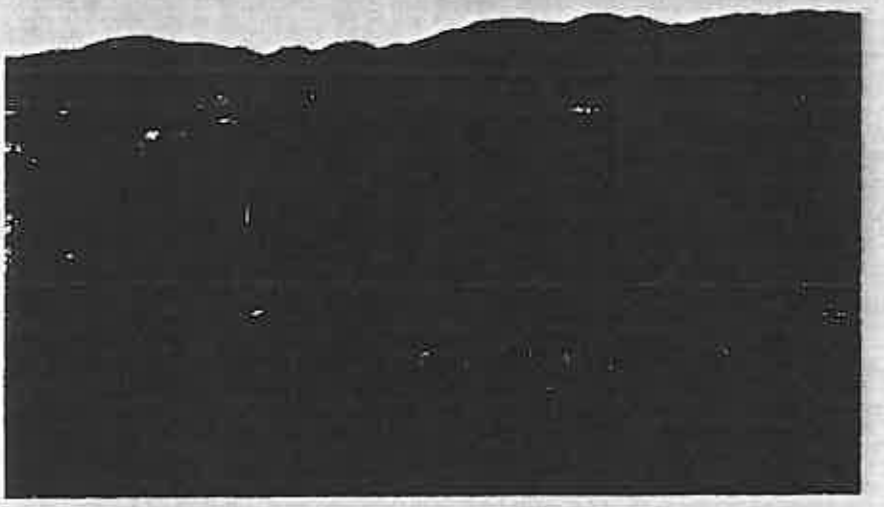
Photograph Number 12: Southwest corner of target property facing east.

Mr. Reza Zolfaghari
Zolfaghari Residence
Project Number: M3551-EAT
November 2006

Photographic Survey

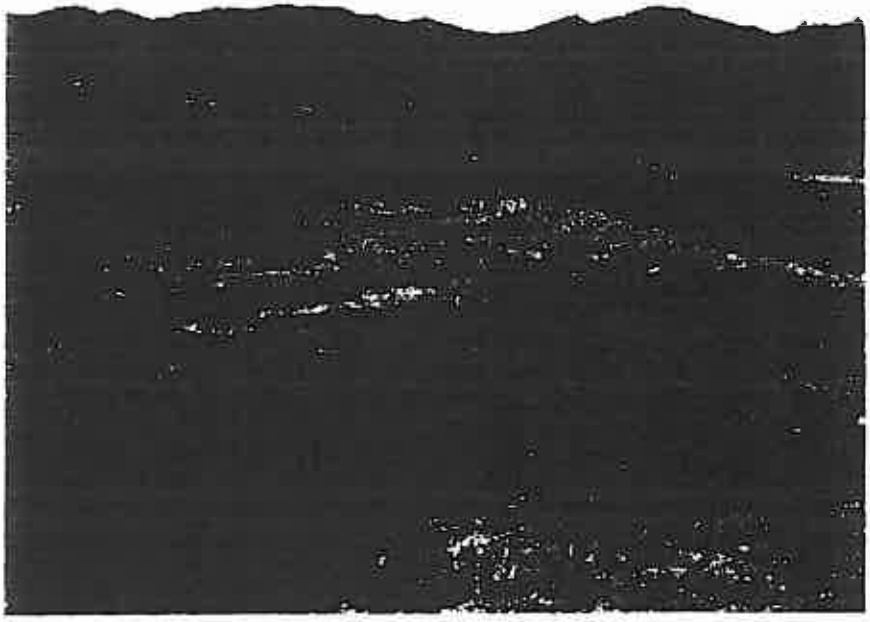


Photograph Number 13: Southwest corner of target property facing northeast.

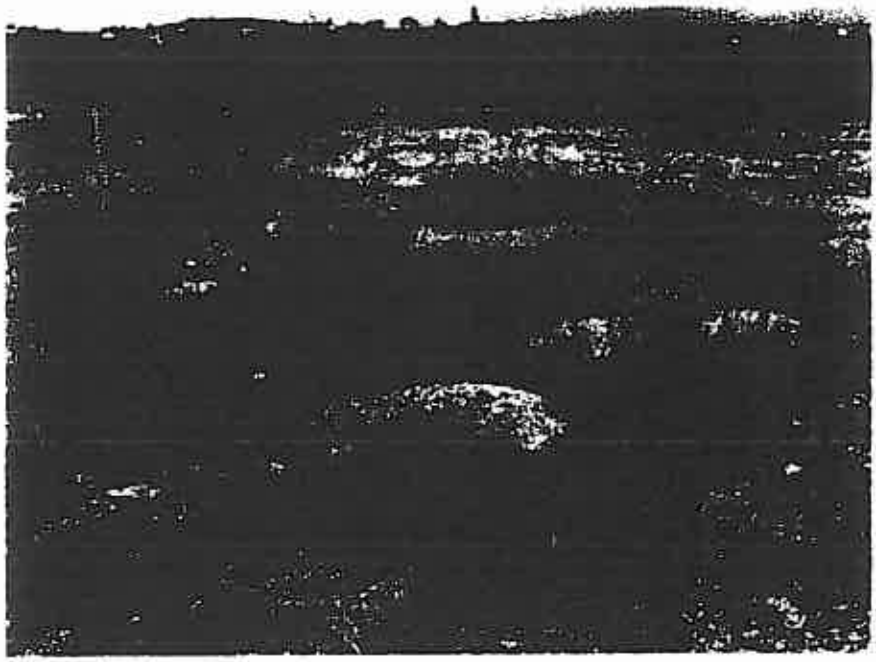


Photograph Number 14: Southwest corner of target property facing north.

Photographic Survey



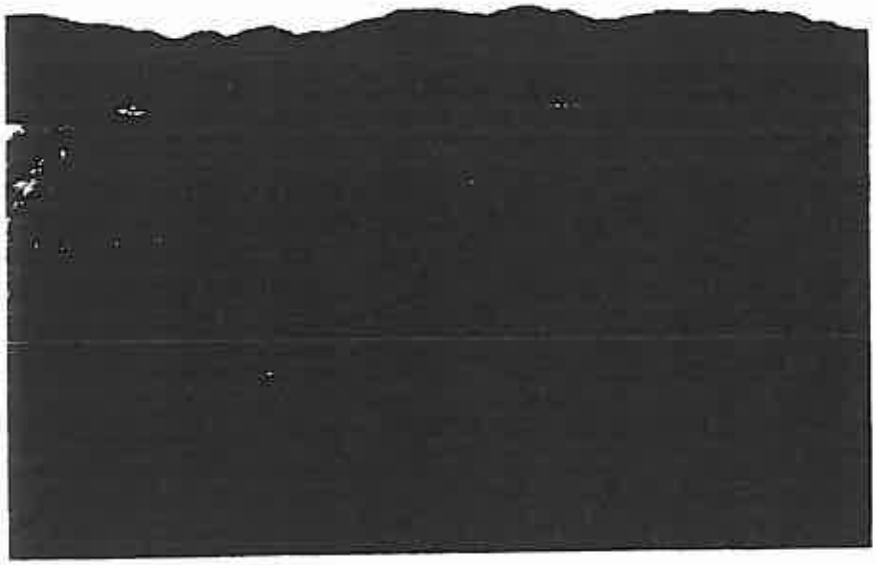
Photograph Number 15: Central portion of target property facing north.



Photograph Number 16: Concrete piles in southeast portion of target property.

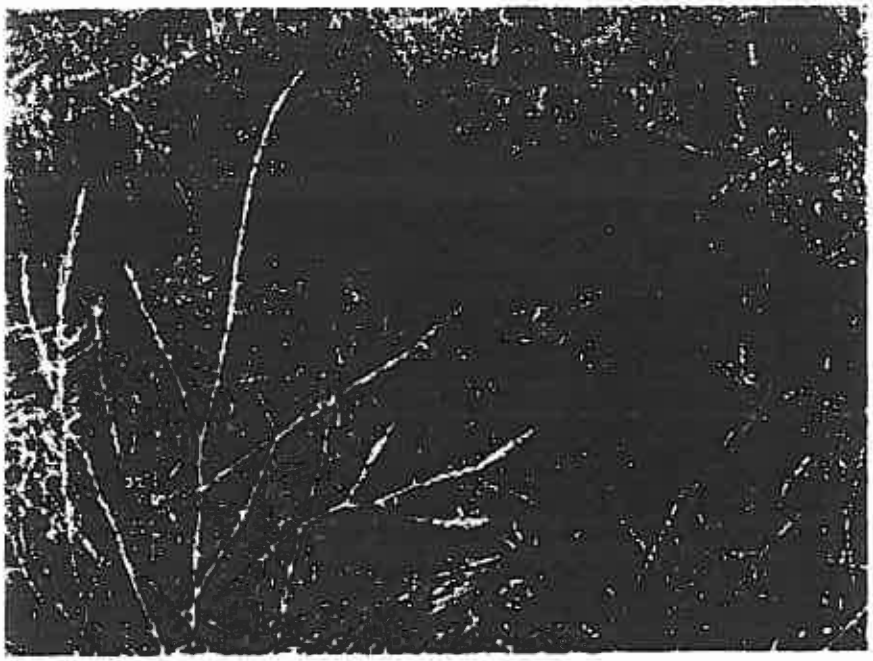
Photographic Survey

Photograph Number 19: Refrigerator in western most trench.

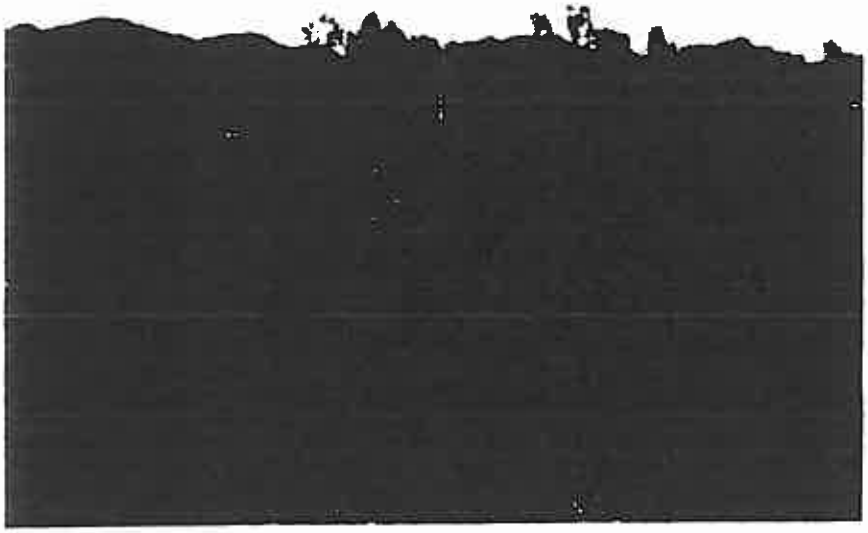


Photograph Number 20: West central portion of target property facing north.

Photographic Survey

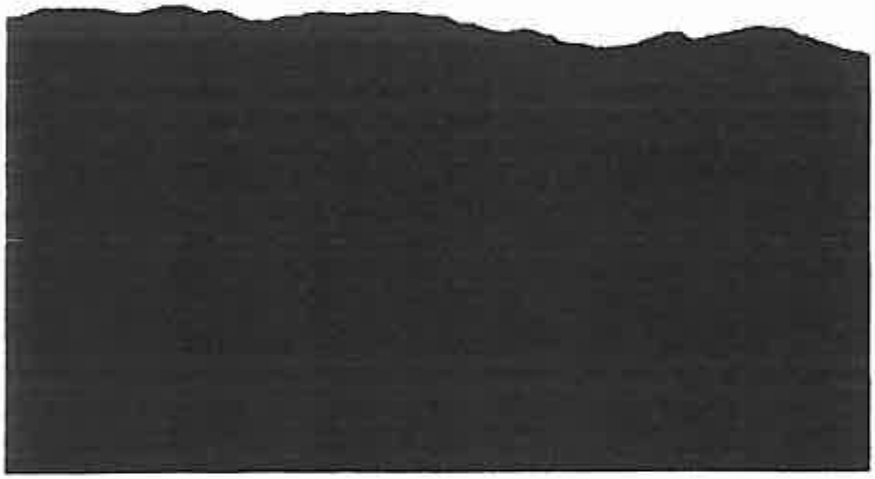


Photograph Number 17: Partially buried cable in southeast portion of target property.

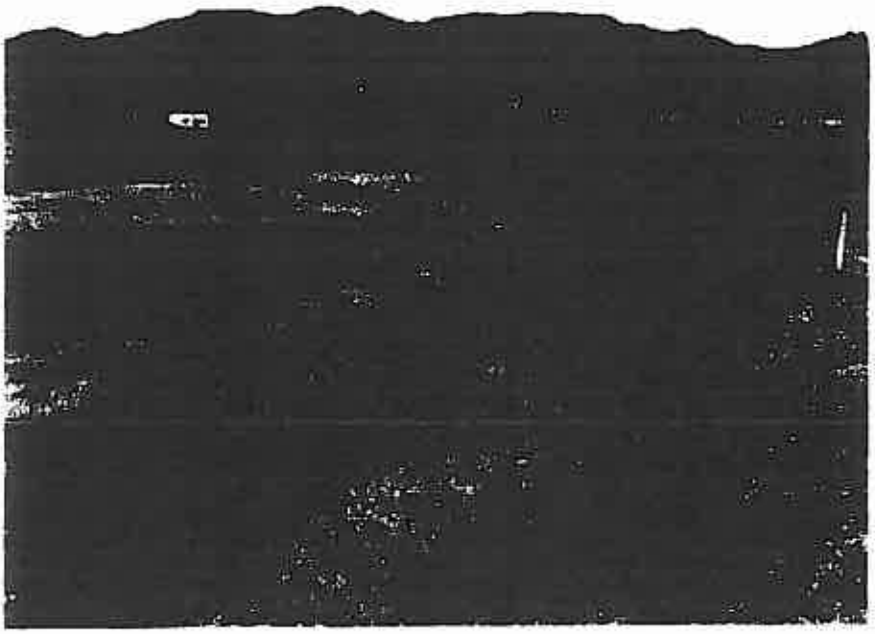


Photograph Number 18: Rock pile in eastern portion of the target property.

Photographic Survey

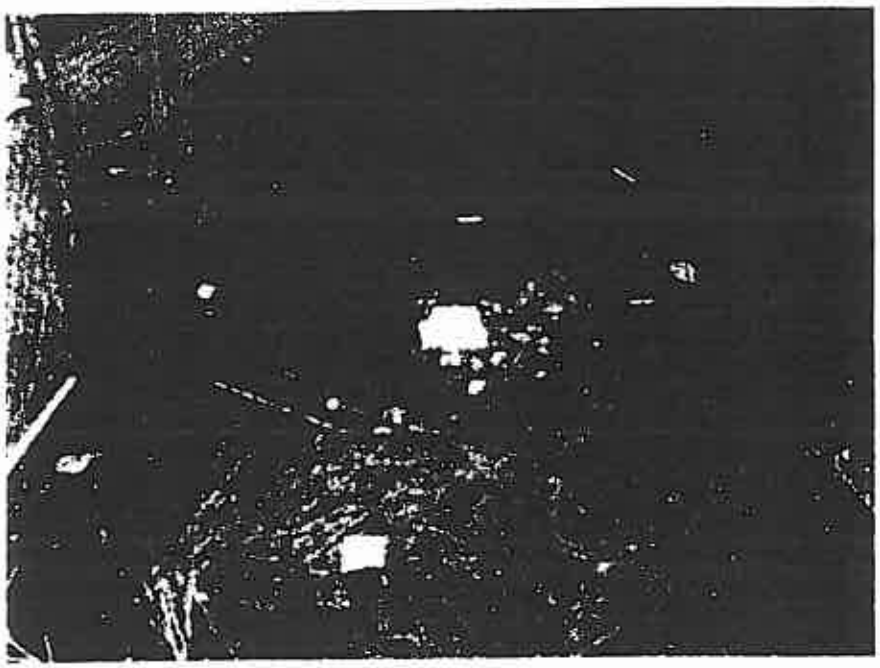


Photograph Number 21: West-central portion of target property facing northeast.



Photograph Number 22: Central portion of target property facing northeast.

Photographic Survey



Photograph Number 23: General debris in southwest portion of target property.

APPENDIX B

AERIAL PHOTOGRAPHS

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDRs professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

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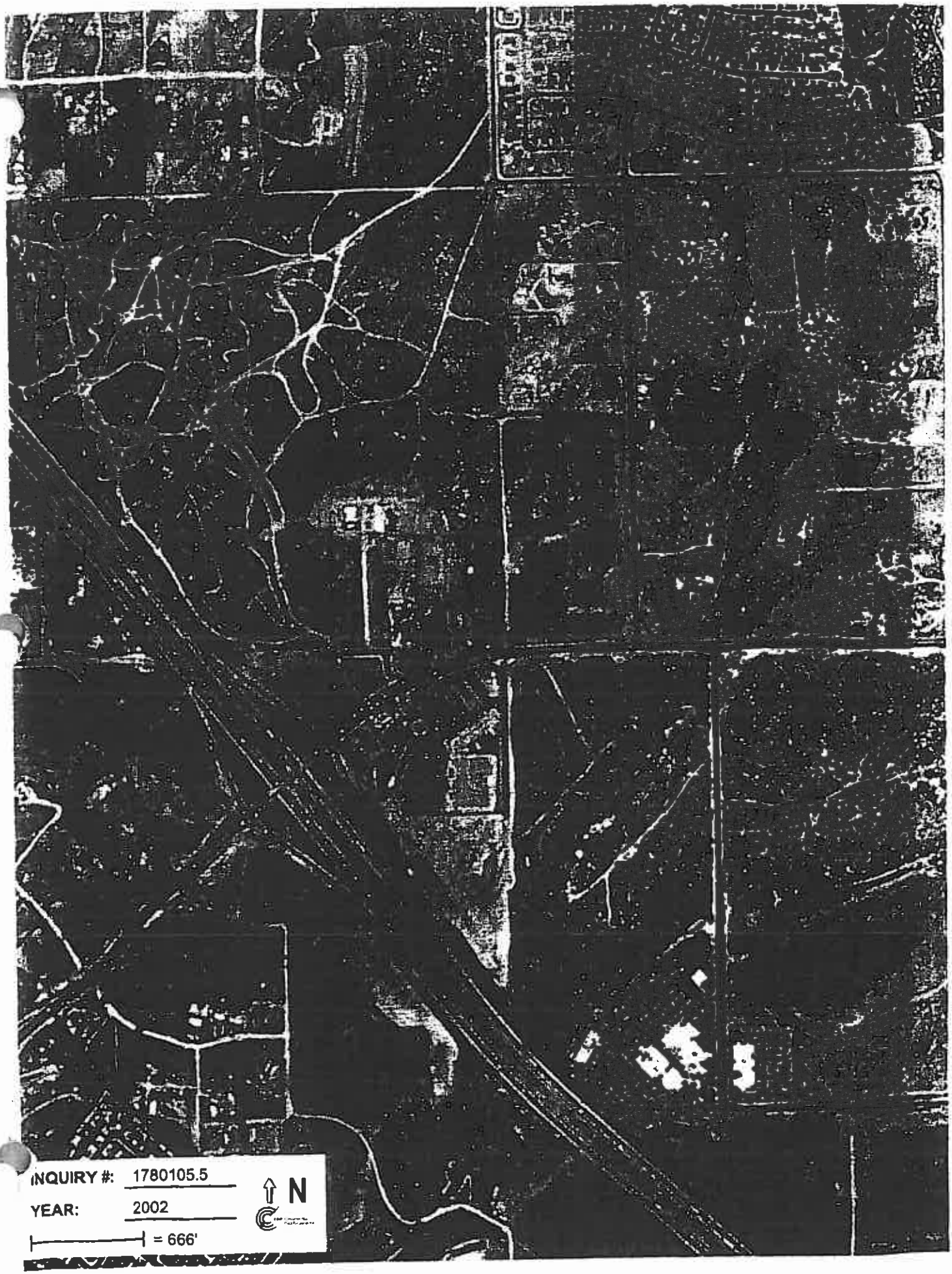
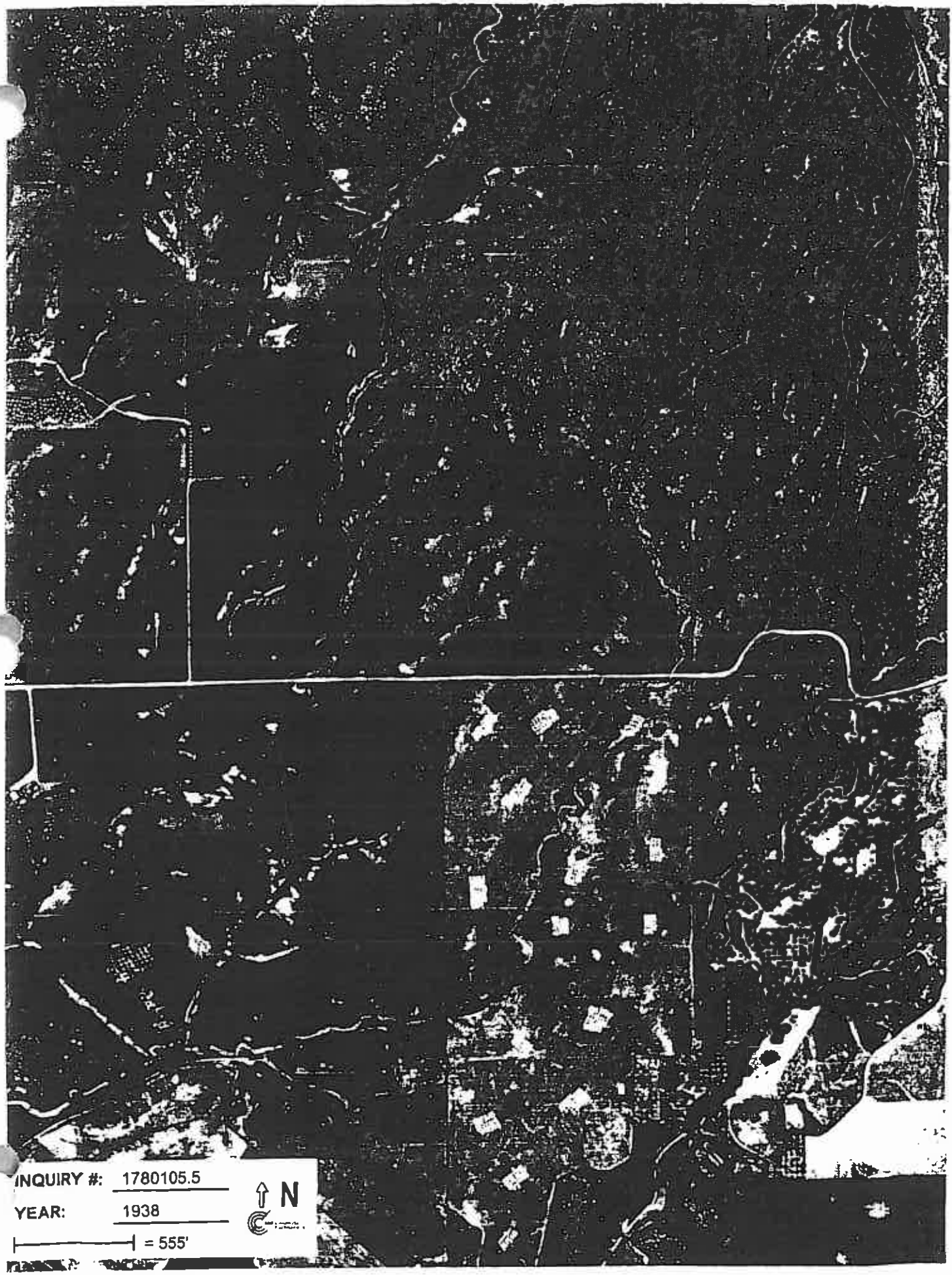
Date EDR Searched Historical Sources:
Aerial Photography October 23, 2006

Target Property:
Clinton Keith Road & George Avenue
Murrieta, CA 92595

Year	*Scale*	*Details*	*Source*
1938	Aerial Photograph. Scale: 1"=555'	Flight Year: 1938	Laval
1953	Aerial Photograph. Scale: 1"=555'	Flight Year: 1953	Pacific Air
1967	Aerial Photograph. Scale: 1"=555'	Flight Year: 1967	Western
1980	Aerial Photograph. Scale: 1"=600'	Flight Year: 1980	AMI
1989	Aerial Photograph. Scale: 1"=666'	Flight Year: 1989	USGS
1994	Aerial Photograph. Scale: 1"=666'	Flight Year: 1994	USGS
2002	Aerial Photograph. Scale: 1"=666'	Flight Year: 2002	USGS


INQUIRY #: 1780105.5
YEAR: 2002
= 666'
N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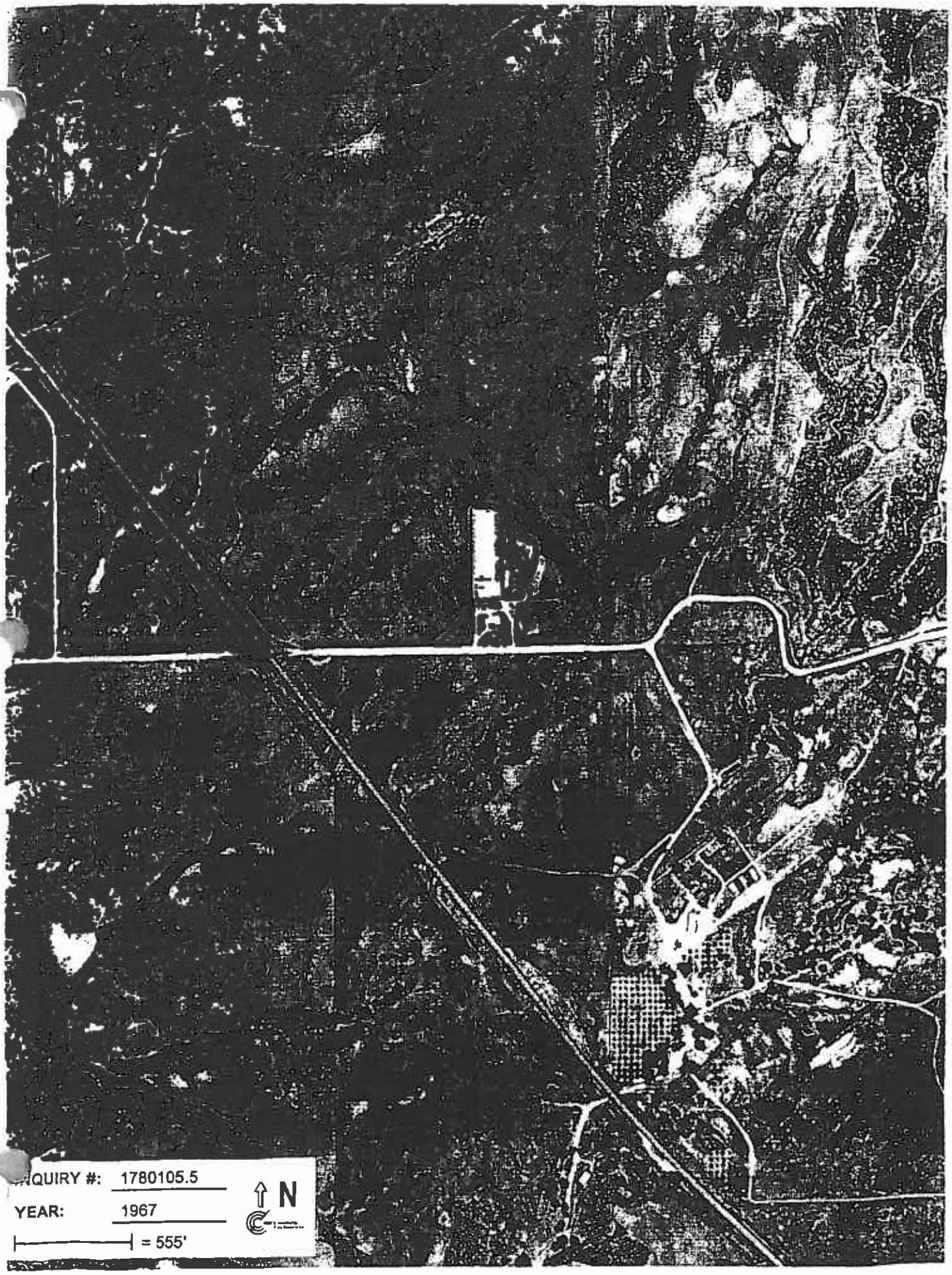
YEAR: 1938
= 555'
N

INQUIRY #: 1780105.5
YEAR: 1953
= 555'
N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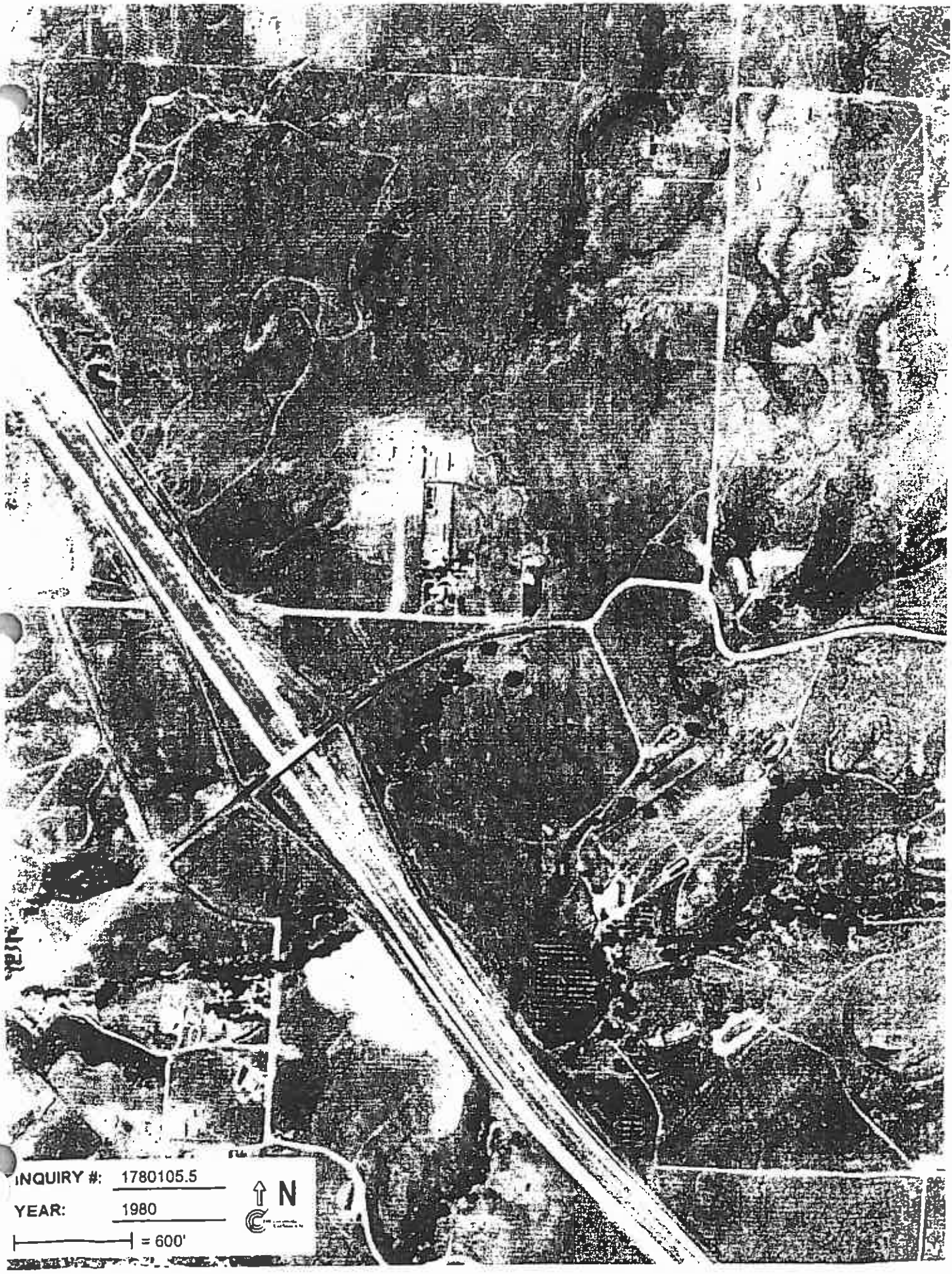
= 555'
N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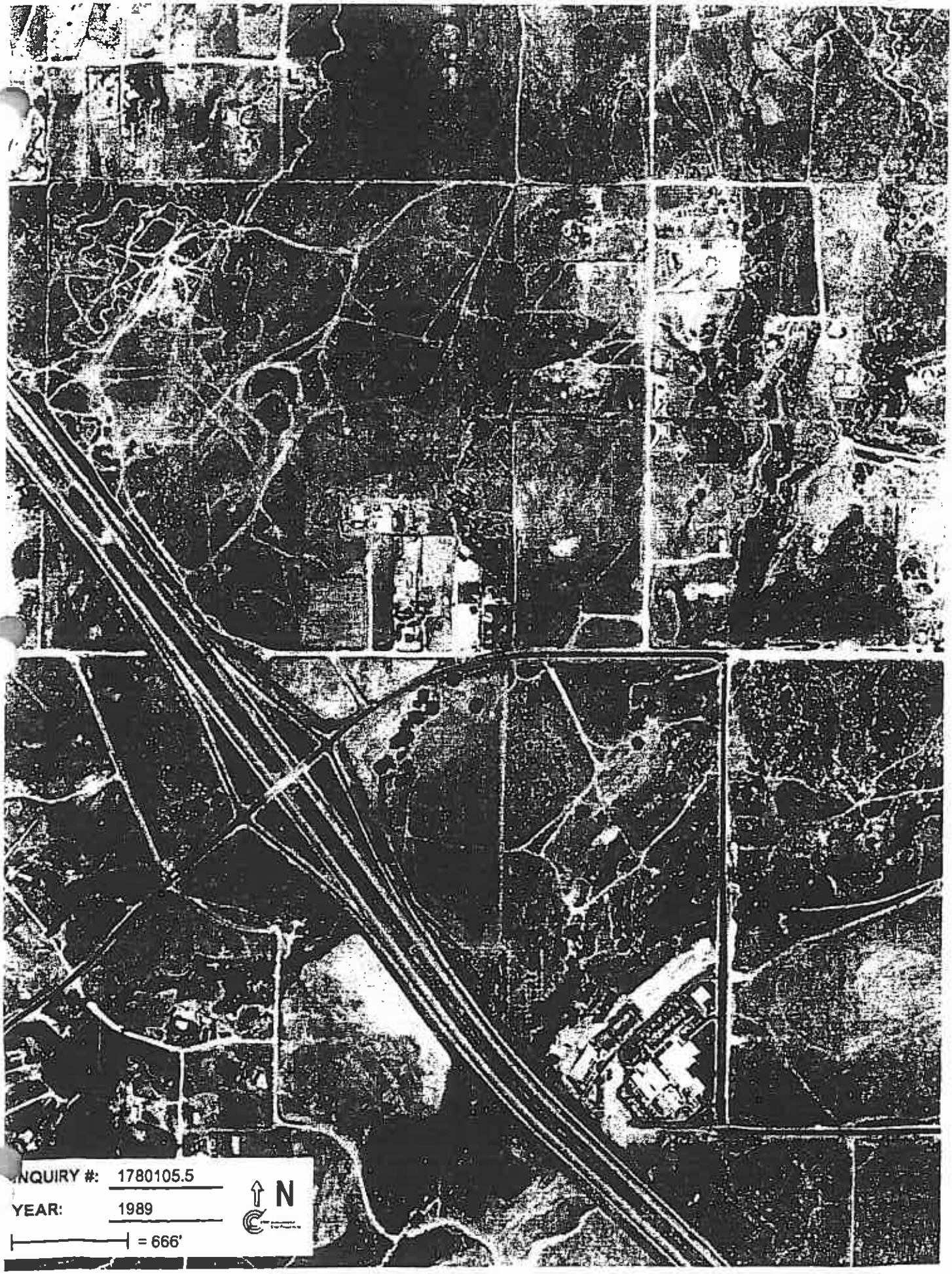
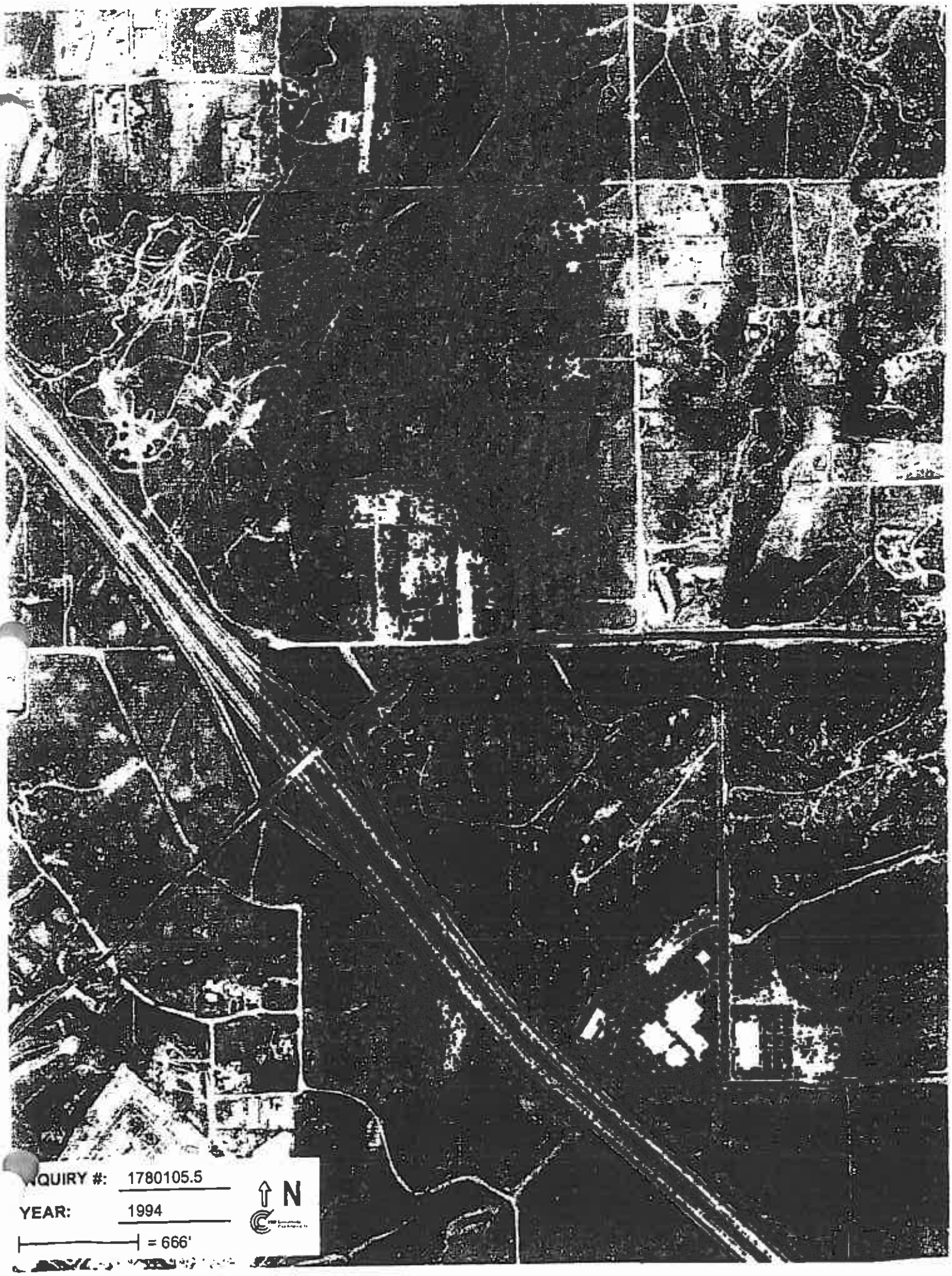
YEAR: 1980
= 600'
N


INQUIRY #: 1780105.5
YEAR: 1989
= 666'
N


QUIRY #: 1780105.5
YEAR: 1994
= 666'
N

APPENDIX C

HISTORICAL TOPOGRAPHIC MAPS

EDR Historical Topographic Map Report

Zolfaghari Residence
Clinton Keith Road & George Avenue
Murrieta, CA 92595

Inquiry Number: 1780105.4

October 23, 2006

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Rd
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
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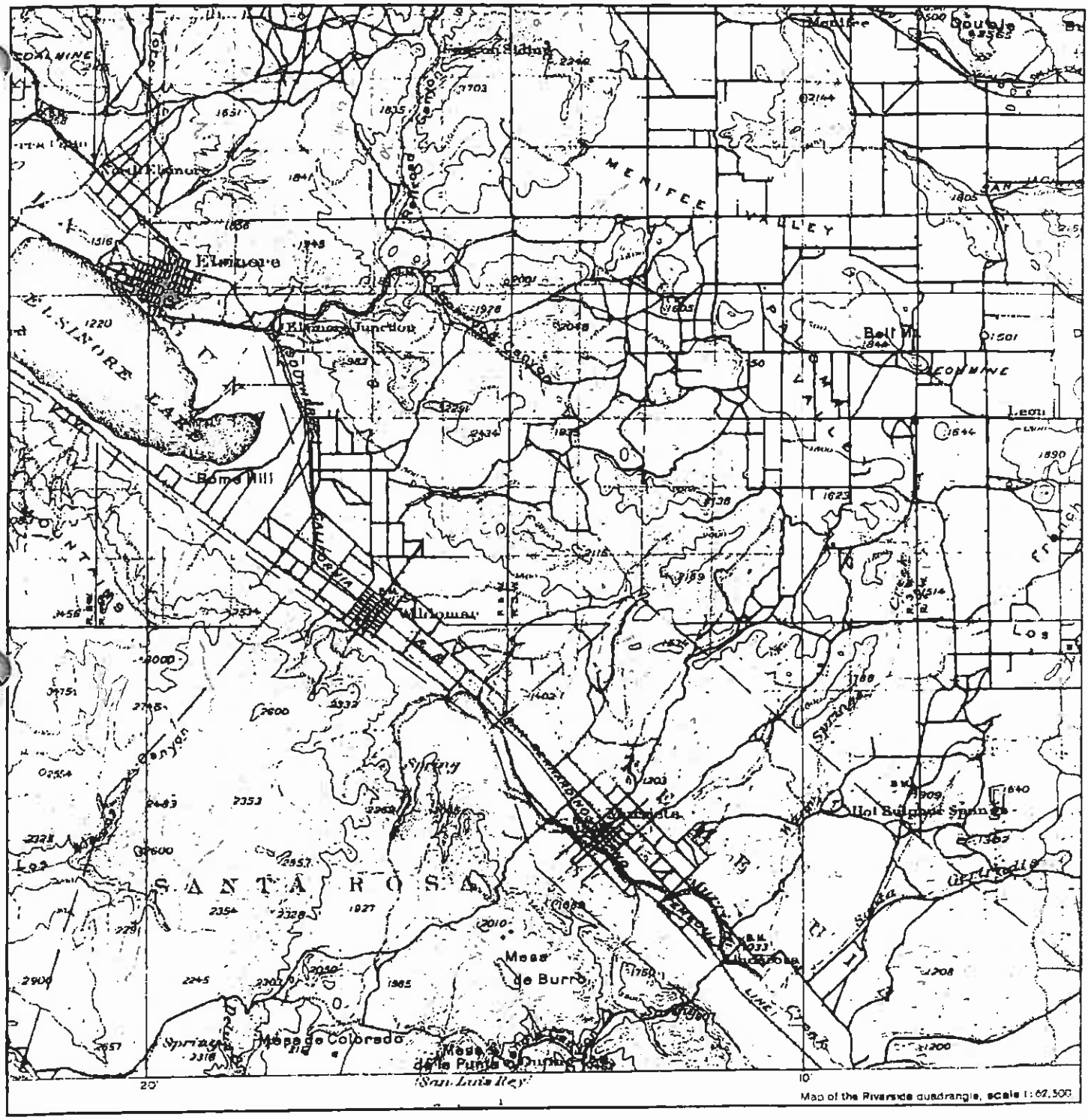
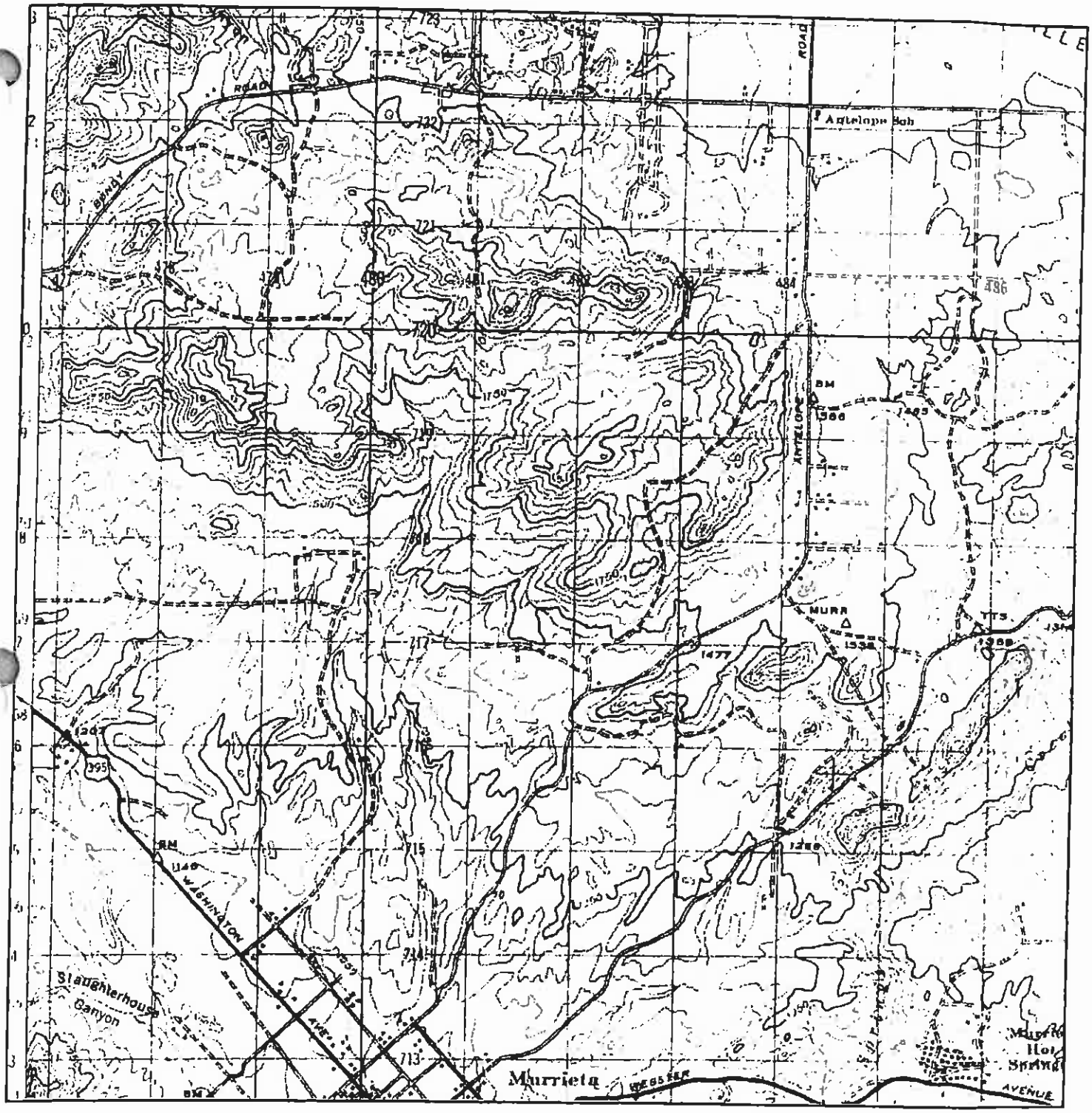
Historical Topographic Map



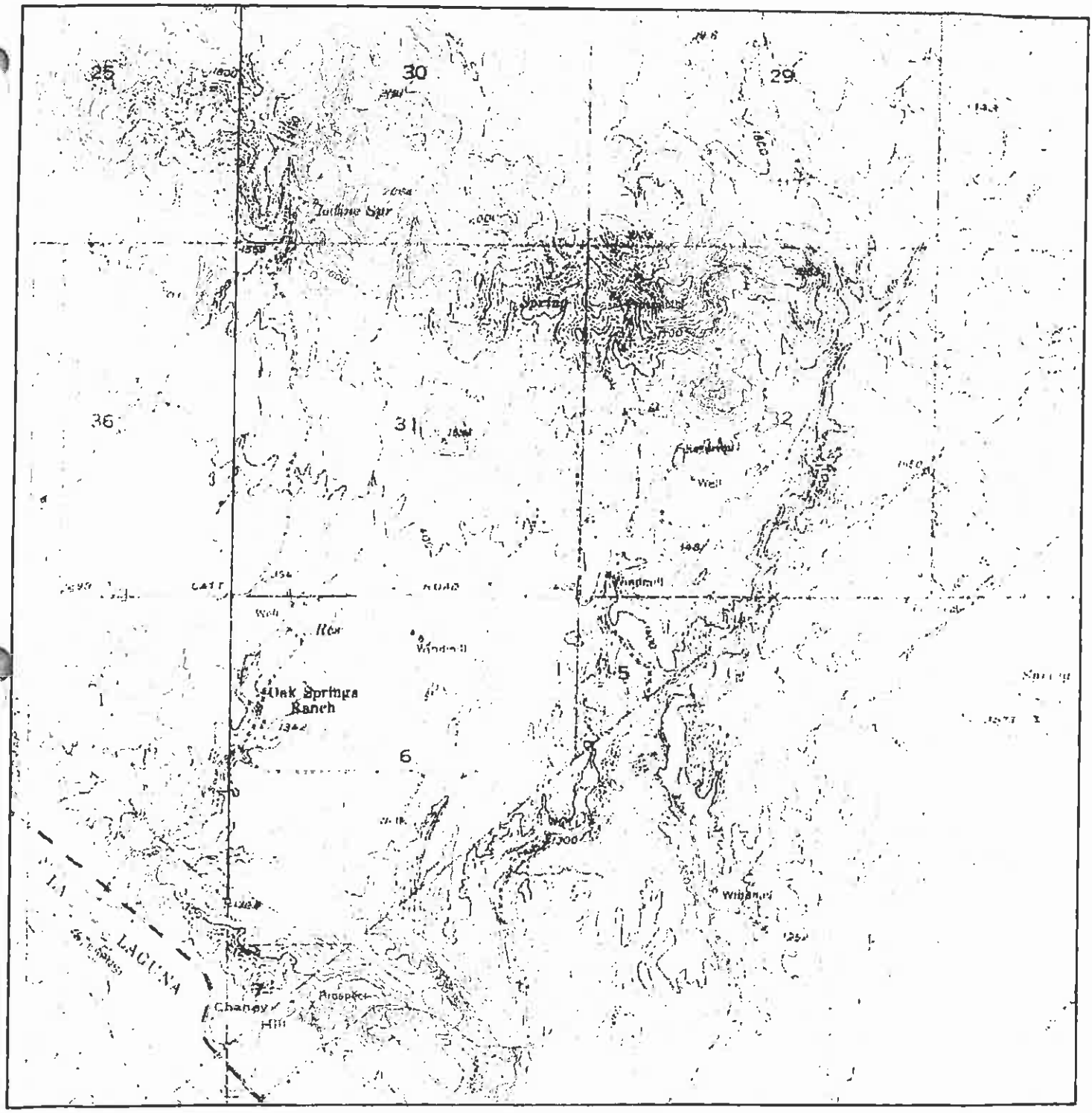
N	TARGET QUAD NAME: ELSINORE MAP YEAR: 1901 SERIES: 30 SCALE: 1:125000	SITE NAME: Zolfaghari Residence ADDRESS: Clinton Keith Road & George Avenue Murrieta, CA 92595 LAT/LONG: 33.598 / 117.2406	CLIENT: Engen Corporation CONTACT: Alayna Lesicko INQUIRY#: 1780105.4 RESEARCH DATE: 10/23/2006

Historical Topographic Map



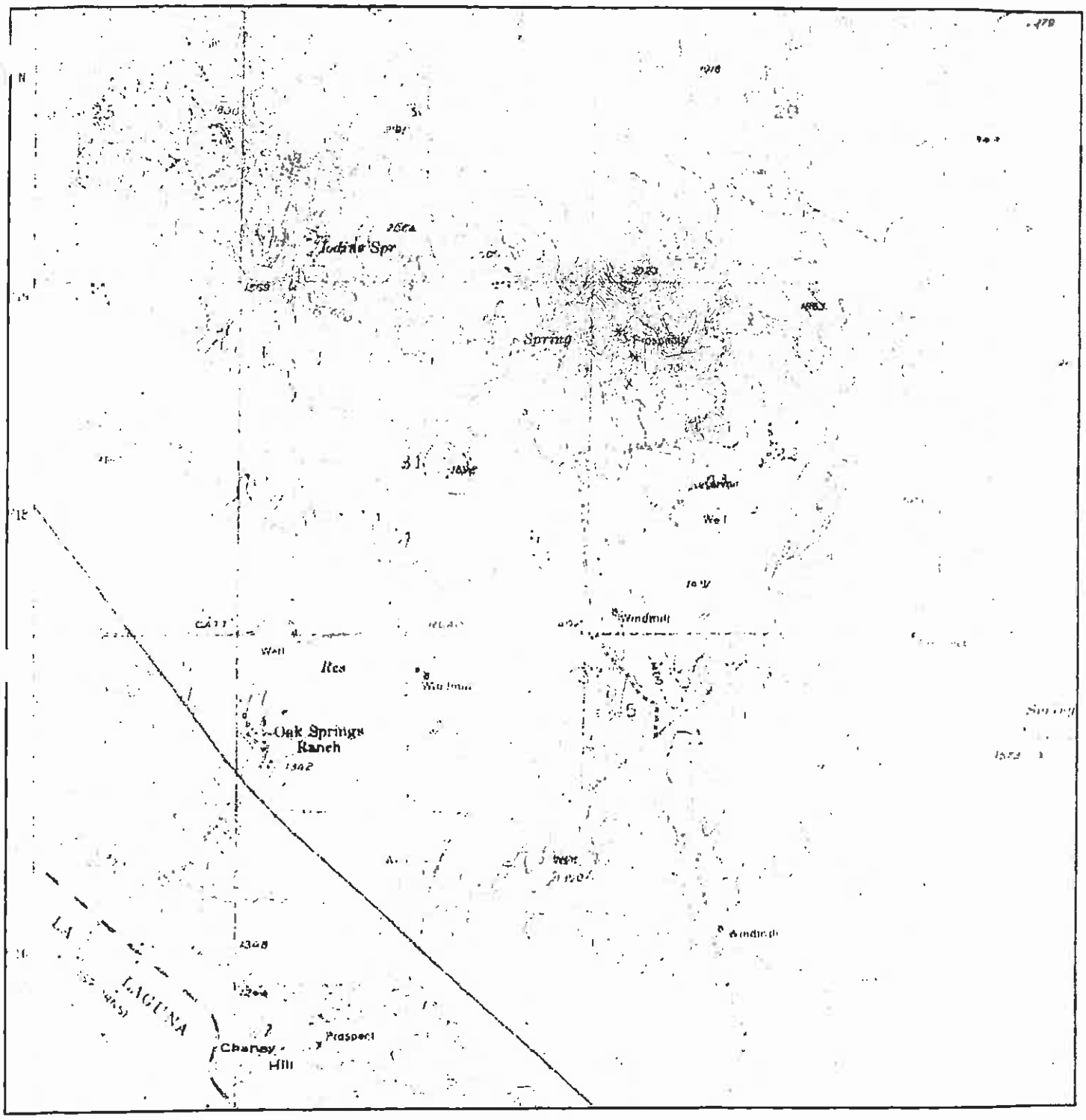
N	TARGET QUAD NAME: MURRIETA MAP YEAR: 1947 SERIES: 15 SCALE: 1:50000	SITE NAME: Zolfaghari Residence ADDRESS: Clinton Keith Road & George Avenue Murrieta, CA 92595 LAT/LONG: 33.598 / 117.2406	CLIENT: Engen Corporation CONTACT: Alayna Lesicko INQUIRY#: 1780105.4 RESEARCH DATE: 10/23/2006

Historical Topographic Map



N	TARGET QUAD NAME: MURRIETA MAP YEAR: 1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Zolfaghari Residence ADDRESS: Clinton Keith Road & George Avenue Murrieta, CA 92595 LAT/LONG: 33.598 / 117.2406	CLIENT: Engen Corporation CONTACT: Alayna Lesicko INQUIRY#: 1780105.4 RESEARCH DATE: 10/23/2006

Historical Topographic Map



N	TARGET QUAD NAME: MURRIETA MAP YEAR: 1979 PHOTOREVISED: 1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Zolfaghari Residence ADDRESS: Clinton Keith Road & George Avenue Murrieta, CA 92595 LAT/LONG: 33.598 / 117.2406	CLIENT: Engen Corporation CONTACT: Alayna Lesicko INQUIRY#: 1780105.4 RESEARCH DATE: 10/23/2006

The EDR Environmental LienSearch™ Report

ZOLFAGHARI RESIDENCE
RIVERSIDE COUNTY
MURRIETA, CA 92595

Project Number: 1780105.7S

October 26, 2006

EDR® Environmental Data Resources Inc

NCO℠

The Standard in Environmental Risk Information

440 Wheelers Farm Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

EDR Environmental LienSearch™ Report

The EDR Environmental LienSearch Report includes results from a search of available land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

TARGET PROPERTY INFORMATION

ADDRESS

ZOLFAGHARI RESIDENCE
Clinton Keith Road & George Avenue
Murrieta, CA 92595

DEED INFORMATION

Type of Deed: WD ☐ QCD ☐ Other ☒ DEED

Title is vested in: Raza Zolfaghari

Title received from: Elso Haghverdian

Deed Dated: May 19, 2005
Deed Recorded: June 15, 2005
Document No.: 2005-0466698

LEGAL DESCRIPTION

Description: Legal attached as Exhibit "A."

Assessor's Parcel Number: 362-250-003

ENVIRONMENTAL LIEN

Environmental Lien: Found ☐ Not Found ☒

If yes:

1st Party:

2nd Party:

Dated:
Recorded:
Book:
Page:
Comments:

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

Other AUL's: Found ☐ Not Found ☒

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with any questions or comments.

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EXHIBIT A

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RECORDING REQUESTED BY
LAWYERS TITLE

DOC # 2005-0466698
06/13/2005 08:00A Fee:18.00
Page 1 of 4
Recorded In Official Records
County of Riverside
Larry W. Ward
Assessor, County Clerk & Recorder

RECORDING REQUESTED BY:

AND WHEN RECORDED MAIL TO:

Reza Zolfaghari
8127 East Cliffway Drive
Orange, CA 92869

M	S	U	PAGE	SIZE	DA	PCOR	NCOR	SMF	MAC
	1		4			✓			
A	R	L			COPY	LONG	REFUND	NCHG	EXAM

Title Order No.: TRA 0165

INTERSPOUSAL TRANSFER GRANT DEED

(Excluded from reappraisal under California Constitution Article 13 A Section 1 et seq.)

16

T
LW

DOCUMENTARY TRANSFER TAX is $NONE

[ ] computed on full value of property conveyed, or
[ ] computed on full value less value of liens or encumbrances remaining at time of sale.
[X] is exempt from imposition of the Documentary Transfer Tax pursuant to Revenue and Taxation Code Section 11927(a), on transferring community, quasi- community, or quasi-marital property, assets between spouses pursuant to a judgment, and order, or a written agreement between spouses in contemplation of any such judgment or order.
[ ] A transfer to a trustee for the beneficial use of a spouse, or the surviving spouse of a deceased transferor, or by a trustee of such a trust to the spouse of the trustor.
[X] A creation, transfer, or termination, solely between spouses, of any co-owner's interest.
[ ] The distribution of a legal entity's property to a spouse or former spouse in exchange for the interest of such spouse in the legal entity in connection with a property settlement agreement or a decree of dissolution of a marriage or legal separation.

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

Elso Haghverdian, wife of grantee herein

hereby GRANT(s) to: Reza Zolfaghari, a married man as his sole and separate property

the real property in the unincorporated, County of Riverside, State of California, described as:

LEGAL DESCRIPTION ATTACHED HERETO AS EXHIBIT "A" AND MADE A PART HEREOF

A.P. # 382-250-003

DATED May 10, 2005

Elso Haghverdian

STATE OF CALIFORNIA
COUNTY OF Orange
On May 20, 2005
Before me, Denise Moore
A Notary Public in and for said State, personally appeared
Elso Haghverdian

Personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.
WITNESS my hand and official seal.

DENISE MOORE
Commission # 1491258
Notary Public - California
Orange County
My Comm. Expires Apr 4, 2008

Signature Denise Moore (This area for official notarial seal)

MAIL TAX STATEMENTS TO PARTY SHOWN BELOW; IF NO PARTY SHOWN, MAIL AS DIRECTED ABOVE:

93002220-12

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EXHIBIT "A"

All that certain real property situated in the County of Riverside, State of California, described as follows:

Parcel(s) 3 of Parcel Map No. 9806, in the County of Riverside, State of California, as per Plat recorded in Book 48, of Parcels Maps, Page(s) 72, in the Office of the County Recorder of said County.

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LandAmerica Lawyers Title

Lawyers Title Company
18551 Von Karman, Suite 100-200
Irvine, California 92612
Phone: (949) 223-5575

PENALTY OF PERJURY AFFIDAVIT
(GOVERNMENT CODE 27361.7)

I certify under the penalty of perjury that the notary seal on the document to which this statement is attached reads as follows:

Name of the Notary: Denise Moore

Date Commission expires: April 6, 2008

County Where Bond is Filed: Orange

Commission No.: 1481253 Manufacturer/Vendor No.: NNA1

Place of Execution: Irvine, Ca, Date: June 8, 2005

Signature: _____
LAWYERS TITLE COMPANY

I further certify under the penalty of perjury that the illegible portion of the document to which this statement is attached reads as follows (if applicable):

See Attached

Date: June 8, 2005

Signature: _____
LAWYERS TITLE COMPANY

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RECORDING REQUESTED BY:
Lawyers Title Company

AND WHEN RECORDED MAIL TO:

THIS SPACE FOR RECORDER'S USE ONLY:

Title Order No.: 09300220-12 Escrow No.: 7455694-DSC

INTERSPOUSAL TRANSFER GRANT DEED

(Excluded from reappraisal under California Constitution Article 13 A Section 1 et seq.)

DOCUMENTARY TRANSFER TAX is NONE

[ ] computed on full value of property conveyed, or
[ ] computed on full value less value of liens or encumbrances remaining at time of sale,
[X] is exempt from imposition of the Documentary Transfer Tax pursuant to Revenue and Taxation Code Section 11927(a), an transferring community, quasi- community, or quasi-marital property, assets between spouses pursuant to a judgment, and order, or a written agreement between spouses in contemplation of any such judgment or order.
[ ] A transfer to a trustee for the beneficial use of a spouse, or the surviving spouse of a deceased transferor, or by a trustee of such a trust to the spouse of the trustor.
[X] A creation, transfer, or termination, solely between spouses, of any co-owner's interest.
[ ] The distribution of a legal entity's property to a spouse or former spouse in exchange for the interest of such spouse in the legal entity in connection with a property settlement agreement or a decree of dissolution of a marriage or legal separation.

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

hereby GRANT(s) to:

the real property in the ~~City of Wildomar~~ unincorporated County of Riverside, State of California, described as:

Parcel 3 of Parcel Map No. 9806, in the County of Riverside, State of California, as per Plat recorded in Book 48, of Parcels Maps, Page(s) 72, in the Office of the County Recorder of said County.

Also Known as: Vacant Land, APN: 042-131-137-5 The Northeast Corner of George & Clinton Keith Road, Wildomar, CA
A.P. # 042-131-137-5

STATE OF
COUNTY OF _____
On _____
Before me, _____
A Notary Public in and for said State, personally appeared

_____

_____

Personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.
WITNESS my hand and official seal.

_____
(Signature)

_____
Print Name

Signature_____ (This area for official notarial seal)

MAIL TAX STATEMENTS TO PARTY SHOWN BELOW; IF NO PARTY SHOWN, MAIL AS DIRECTED ABOVE:

APPENDIX D

REGULATORY ENVIRONMENTAL RECORDS DOCUMENTATION (EDR REPORT)

The EDR Radius Map
with GeoCheck®

Zolfaghari Residence
Clinton Keith Road & George Avenue
Murrieta, CA 92595

Inquiry Number: 1783181.1s

October 25, 2006

EDR® Environmental
Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

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Internet: www.edrnet.com

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Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	6
Orphan Summary	14
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting Source Map	A-8
Physical Setting Source Map Findings	A-9
Physical Setting Source Records Searched	A-36

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Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

CLINTON KEITH ROAD & GEORGE AVENUE
MURRIETA, CA 92595

COORDINATES

Latitude (North):	33.598000 - 33' 35' 52.8"
Longitude (West):	117.240600 - 117' 14' 26.2"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	477676.5
UTM Y (Meters):	3717417.2
Elevation:	1342 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	33117-E2 MURRIETA, CA
Most Recent Revision:	1979
West Map:	33117-E3 WILDOMAR, CA
Most Recent Revision:	1979

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL RECOVERY	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned

EXECUTIVE SUMMARY

CORRACTS	Corrective Action Report
RCRA-TSDF	Resource Conservation and Recovery Act Information
RCRA-LQG	Resource Conservation and Recovery Act Information
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
US BROWNFIELDS	A Listing of Brownfields Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
ODI	Open Dump Inventory
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

HIST Cal-Sites	Historical Calsites Database
CA BOND EXP. PLAN	Bond Expenditure Plan
SCH	School Property Evaluation Program
Toxic Pits	Toxic Pits Cleanup Act Sites
SWF/LF	Solid Waste Information System
CA WDS	Waste Discharge System
WMUDS/SWAT	Waste Management Unit Database
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CA FID UST	Facility Inventory Database
SLIC	Statewide SLIC Cases
HIST UST	Hazardous Substance Storage Container Database
AST	Aboveground Petroleum Storage Tank Facilities
SWEEPS UST	SWEEPS UST Listing
CHMIRS	California Hazardous Material Incident Report System
Notify 65	Proposition 65 Records
DEED	Deed Restriction Listing
VCP	Voluntary Cleanup Program Properties
WIP	Well Investigation Program Case List
CDL	Clandestine Drug Labs
RESPONSE	State Response Sites
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
ENVIROSTOR	EnviroStor Database

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations

EXECUTIVE SUMMARY

Lower Elevation	Address	Dist / Dir	Map ID	Page
TOMRA PACIFIC INC/ALBERTSONS #	23893 CLINTON KEITH RD	1/8 - 1/4 SSW	3	9

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 10/11/2006 has revealed that there are 2 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
INLAND VALLEY REGIONAL MED CTR Facility Status: Leak being confirmed	***36485 INLAND VALLEY DR***	***1/4 - 1/2 SSE***	***A5***	***9***
INLAND VALLEY REGIONAL MEDICAL	***36485 INLAND VALLEY DR***	***1/4 - 1/2 SSE***	***A6***	***12***

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 07/11/2006 has revealed that there are 2 UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
USA GASOLINE CORPORATION FACIL	***23905 CATT RD***	***1/8 - 1/4 W***	***2***	***7***
CLINTON KEITH CHEVRON	23805 CLINTON KEITH RD	1/8 - 1/4 WSW	4	9

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

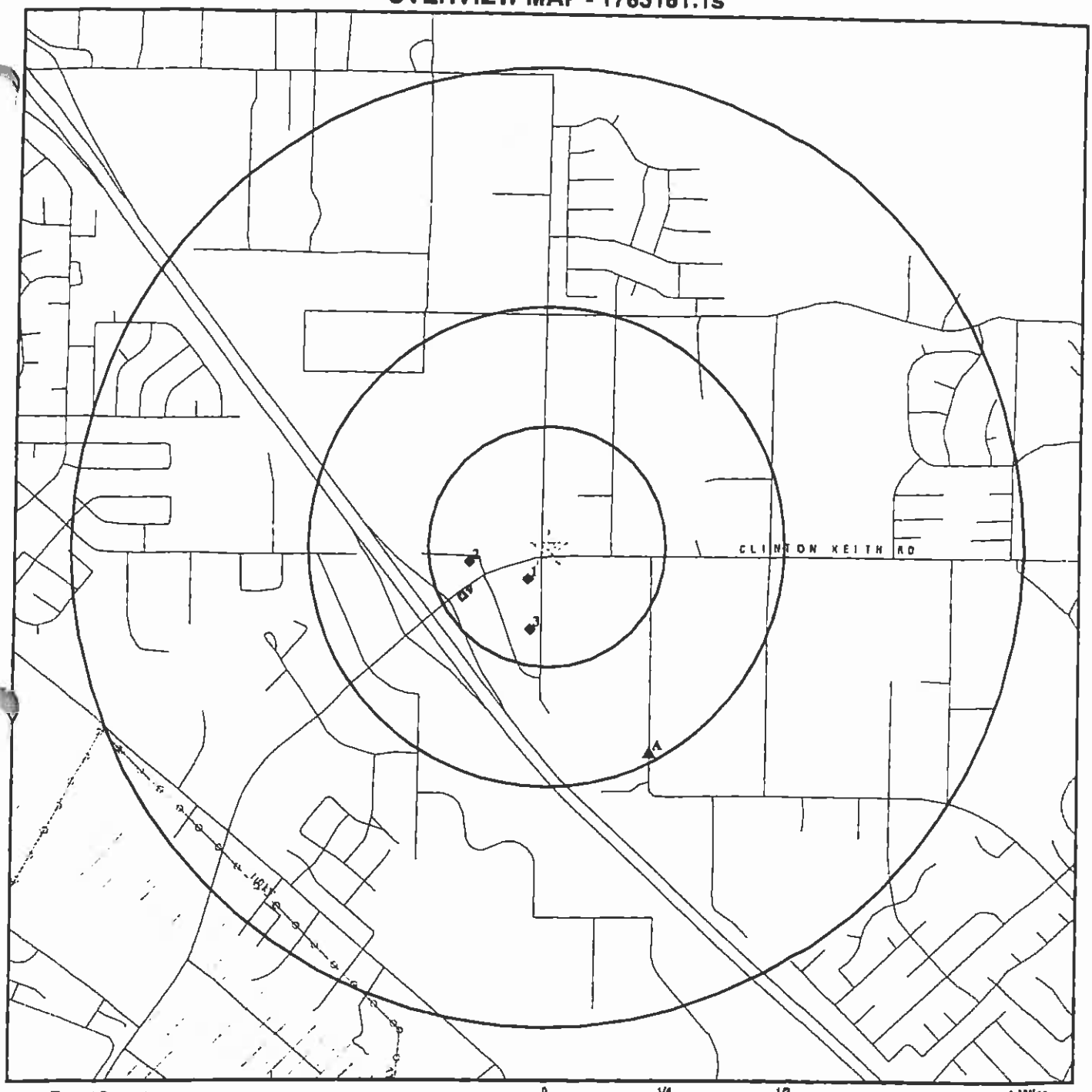
A review of the CLEANERS list, as provided by EDR, and dated 04/18/2005 has revealed that there is 1 CLEANERS site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
PROMT CLEANERS	23905 CLINTON KEITH RD	0 - 1/8 SSW	1	6

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:
There were no unmapped sites in this report.

OVERVIEW MAP - 1783181.1s



Target Property

- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

0 1/4 1/2 1 Miles

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Zolfaghari Residence ADDRESS: Clinton Keith Road & George Avenue Murrieta CA 92595 LAT/LONG: 33.5980 / 117.2406	CLIENT: Engen Corporation CONTACT: Alayna Lesicko INQUIRY #: 1783181.1s DATE: October 25, 2006 5:34 pm

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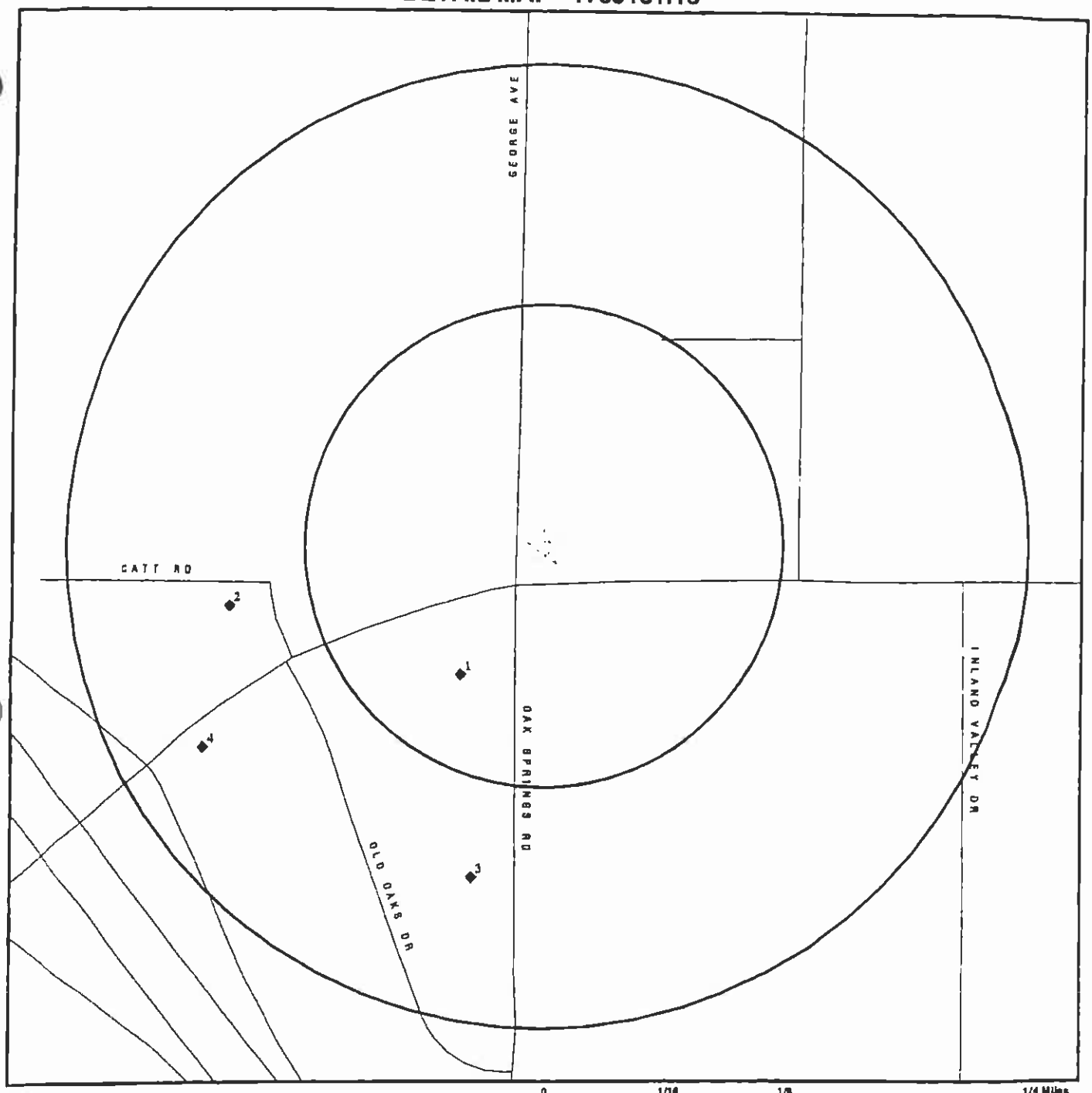
DETAIL MAP - 1783181.1s



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Zolfaghari Residence ADDRESS: Clinton Keith Road & George Avenue Murrieta CA 92595 LAT/LONG: 33.5980 / 117.2406	CLIENT: Engen Corporation CONTACT: Alayna Lesicko INQUIRY #: 1783181.1s DATE: October 25, 2006 5:34 pm

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL RECORDS								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
NPL RECOVERY		TP	NR	NR	NR	NR	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.500	0	0	0	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRA TSD		0.500	0	0	0	NR	NR	0
RCRA Lg. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRA Sm. Quan. Gen.		0.250	0	1	NR	NR	NR	1
ERNS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
STATE AND LOCAL RECORDS								
Hist Cal-Sites		1.000	0	0	0	0	NR	0
CA Bond Exp. Plan		1.000	0	0	0	0	NR	0
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
State Landfill		0.500	0	0	0	NR	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
Cortese		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	1	0	NR	NR	1
LUST		0.500	0	0	2	NR	NR	2
CA FID UST		0.250	0	0	NR	NR	NR	0
SLIC		0.500	0	0	0	NR	NR	0
UST		0.250	0	2	NR	NR	NR	2
HIST UST		0.250	0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
AST		0.250	0	0	NR	NR	NR	0
SWEEPS UST		0.250	0	0	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
Notify 65		1.000	0	0	0	0	NR	0
DEED		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
DRYCLEANERS		0.250	1	0	NR	NR	NR	1
WIP		0.250	0	0	NR	NR	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
RESPONSE		1.000	0	0	0	0	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
ENVIROSTOR		1.000	0	0	0	0	NR	0
TRIBAL RECORDS								
INDIAN RESERV		1.000	0	0	0	0	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
EDR PROPRIETARY RECORDS								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0
EDR Historical Auto Stations		0.250	0	0	NR	NR	NR	0
EDR Historical Cleaners		0.250	0	0	NR	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID Direction Distance Distance (ft.) Elevation	Site	Database(s)	EDR ID Number EPA ID Number
1 SSW < 1/8 420 ft.	**PROMT CLEANERS** **23905 CLINTON KEITH RD STE 119** **WILDOMAR, CA 92595**	**CLEANERS**	**S108077031** **N/A**

Relative:
Lower

Actual:
1338 ft.

CLEANERS:

EPA Id:	CAL000265634
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7211
SIC Description:	Power Laundries, Family and Commercial
Create Date:	01/30/2003
Facility Active:	Yes
Inactive Date:	Not reported
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	23905 CLINTON KEITH RD STE 119
Mailing Address 2:	Not reported
Mailing State:	CA
Mailing Zip:	925950000
Region Code:	4
Owner Name:	OKHWAN KIM
Owner Address:	23905 CLINTON KEITH RD STE 119
Owner Address 2:	Not reported
Owner Telephone:	9093047572
Contact Name:	OKHWAN KIM
Contact Address:	23905 CLINTON KEITH RD STE 119
Contact Address 2:	Not reported
Contact Telephone:	9093047572

EPA Id:	CAL000265634
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7212
SIC Description:	Garment Pressing, and Agents for Laundries and Drycleaners
Create Date:	01/30/2003
Facility Active:	Yes
Inactive Date:	Not reported
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	23905 CLINTON KEITH RD STE 119
Mailing Address 2:	Not reported
Mailing State:	CA
Mailing Zip:	925950000
Region Code:	4
Owner Name:	OKHWAN KIM
Owner Address:	23905 CLINTON KEITH RD STE 119
Owner Address 2:	Not reported
Owner Telephone:	9093047572
Contact Name:	OKHWAN KIM
Contact Address:	23905 CLINTON KEITH RD STE 119
Contact Address 2:	Not reported
Contact Telephone:	9093047572

EPA Id:	CAL000265634
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7216
SIC Description:	Drycleaning Plants, Except Rug Cleaning

PROMT CLEANERS (Continued) **S106077031**

Create Date:	01/30/2003
Facility Active:	Yes
Inactive Date:	Not reported
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	23905 CLINTON KEITH RD STE 119
Mailing Address 2:	Not reported
Mailing State:	CA
Mailing Zip:	925950000
Region Code:	4
Owner Name:	OKHWAN KIM
Owner Address:	23905 CLINTON KEITH RD STE 119
Owner Address 2:	Not reported
Owner Telephone:	9093047572
Contact Name:	OKHWAN KIM
Contact Address:	23905 CLINTON KEITH RD STE 119
Contact Address 2:	Not reported
Contact Telephone:	9093047572

EPA Id:	CAL000265634
NAICS Code:	81232
NAICS Description:	Drycleaning and Laundry Services (except Coin-Operated)
SIC Code:	7219
SIC Description:	Laundry and Garment Services, NEC (except diaper service and clothing alteration and repair)
Create Date:	01/30/2003
Facility Active:	Yes
Inactive Date:	Not reported
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	23905 CLINTON KEITH RD STE 119
Mailing Address 2:	Not reported
Mailing State:	CA
Mailing Zip:	925950000
Region Code:	4
Owner Name:	OKHWAN KIM
Owner Address:	23905 CLINTON KEITH RD STE 119
Owner Address 2:	Not reported
Owner Telephone:	9093047572
Contact Name:	OKHWAN KIM
Contact Address:	23905 CLINTON KEITH RD STE 119
Contact Address 2:	Not reported
Contact Telephone:	9093047572

2
West
1/8-1/4
879 ft.

Relative:
Lower

Actual:
1337 ft.

USA GASOLINE CORPORATION FACILITY NO 844
23905 CATT RD
WILDOMAR, CA 92595

RCRA-SQG **1006806025**
FINDS **CAR000144287**
HAZNET
UST

USA GASOLINE CORPORATION FACILITY NO 844 (Continued) **1006806025**

RCRAInfo:
Owner: USA GAS CORP
EPA ID: CAR000144287

Contact. CHUCK MILLER
818-865-9200

Classification: Small Quantity Generator
TSDF Activities: Not reported

Violation Status: No violations found

FINDS:
Other Pertinent Environmental Activity Identified at Site

California - Hazardous Waste Tracking System - Datamart

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZNET:
Gepaid: CAR000144287
Contact: CHARLES MILLER
Telephone: 8188659200
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 30101 AGOURA CT STE 200
Mailing City,St,Zip: AGOURA HILLS, CA 913010000
Gen County: Riverside
TSD EPA ID: CAT080013352
TSD County: Riverside
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Recycler
Tons: 2.08
Facility County: Riverside

UST:
Region: STATE
Local Agency: Los Angeles, Los Angeles County
Facility ID: 23905

Map ID / Direction / Distance / Distance (ft.) / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
3 SSW 1/8-1/4 926 ft.	**TOMRA PACIFIC INC/ALBERTSONS #6735** **23893 CLINTON KEITH RD** **WILDOMAR, CA 92595**	SWRCY	S107137949 N/A

Relative: Lower

Actual: 1332 ft.

SWRCY:

Certification Status:	O
Facility Phone Number:	Not reported
Date facility became certified:	09/24/04
Date facility began operating:	10/01/04
Date facility ceased operating:	Still operating
Whether The Facility Is Grandfathered:	Not reported
Convenience Zone Where Faciltiy Located:	5630
Convenience Zone Where Faciltiy Located 2:	5971
Convenience Zone Where Faciltiy Located 3:	0
Convenience Zone Where Faciltiy Located 4:	0
Convenience Zone Where Faciltiy Located 5:	0
Convenience Zone Where Faciltiy Located 6:	0
Convenience Zone Where Faciltiy Located 7:	0
Aluminum Beverage Containers Redeemed:	AL
Glass Beverage Containers Redeemed:	GL
Plastic Beverage Containers Redeemed:	PL
Other mat beverage containers redeemed:	Not reported
Refillable Beverage Containers Redeemed:	Not reported

4 WSW 1/8-1/4 1088 ft.	**CLINTON KEITH CHEVRON** **23805 CLINTON KEITH RD** **WILDOMAR, CA 92595**	UST	U004009987 N/A

Relative: Lower

Actual: 1323 ft.

UST:

Region:	RIVERSIDE
Total Tanks:	3

A5 SSE 1/4-1/2 2529 ft.	**INLAND VALLEY REGIONAL MED CTR** **36485 INLAND VALLEY DR** **WILDOMAR, CA 92595**	LUST EMI	S104228126 N/A

Site 1 of 2 in cluster A

Relative: Equal

Actual: 1342 ft.

LUST:

Region:	STATE
Case Type:	Drinking Water Aquifer affected
Cross Street:	CLINTON KEITH RD
Enf Type:	VC
Funding:	Not reported
How Discovered:	OM
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	Piping
Global Id:	T0606599184
Stop Date:	1999-07-20 00:00:00
Confirm Leak:	2000-04-07 00:00:00
Workplan:	1999-08-03 00:00:00
Prelim Assess:	Not reported
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported

INLAND VALLEY REGIONAL MED CTR (Continued) **S104228126**

Monitoring:	Not reported
Close Date:	Not reported
Discover Date:	1999-07-20 00:00:00
Enforcement Dt:	Not reported
Release Date:	1999-08-03 00:00:00
Review Date:	1999-09-16 00:00:00
Enter Date:	1999-09-16 00:00:00
MTBE Date:	Not reported
GW Qualifier:	Not reported
Soil Qualifier:	Not reported
Max MTBE GW ppb:	Not reported
Max MTBE Soil ppb:	Not reported
County:	33
Org Name:	Not reported
Reg Board:	San Diego Region
Status:	Leak being confirmed
Chemical:	12034, 76
Contact Person:	Not reported
Responsible Party:	UNIVERSAL HEALTH SERVICES
RP Address:	367 S GULPH RD KING OF PRUSSIA PA 19406
Interim:	Not reported
Oversight Prgm:	LUST
MTBE Class:	*
MTBE Conc:	0
MTBE Fuel:	0
MTBE Tested:	MTBE Detected. Site tested for MTBE and MTBE detected
Staff:	SJP
Staff Initials:	UNK
Lead Agency:	Regional Board
Local Agency:	33000L
Hydr Basin #:	TEMECULA VALLEY (9-5
Beneficial:	MUNBU
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Local Case #:	99-15433
Case Number:	9UT3960
Qty Leaked:	Not reported
Abate Method:	Not reported
Operator:	Not reported
Water System Name:	Not reported
Well Name:	Not reported
Distance To Lust:	0
Waste Discharge Global ID:	Not reported
Waste Disch Assigned Name:	Not reported
Summary:	Not reported

LUST:

Case Number:	9UT3960
Local Agency:	33000
Substance:	12034
Qty Leaked:	Not reported
Date Found:	07/20/1999
How Found:	Other Means
Date Stopped:	07/20/1999
How Stopped:	Repair Piping
Source:	Piping

INLAND VALLEY REGIONAL MED CTR (Continued) **S104228126**

Cause:	Unknown
Lead Agency:	Local Agency
Case Type:	Soil only
Status:	Preliminary site assessment workplan submitted
Abate Method:	Not reported
Confirm Date:	/ /
Submit Workplan:	8/3/99
Prelim Assess:	/ /
Desc Pollution:	Not reported
Remed Plan:	/ /
Remed Action:	Not reported
Began Monitor:	Not reported
Enforce Type:	Not reported
Enforce Date:	Not reported
Closed Date:	Not reported
Pilot Program:	LOP
Local Case:	99-15433
Basin Number:	902.31
Gwater Depth:	Not reported
Beneficial Use:	MUNBU
NPDES Number:	Not reported
priority:	2
File Dispn:	Not reported
Release Date:	08/03/1999
Interim Remedial Actions:	Not reported
Cleanup and Abatement order Number:	Not reported
Waste Discharge Requirement Number:	Not reported

LUST:

Region:	RIVERSIDE
Site Closed:	Referred to Water Board
Employee ID:	37
Facility ID:	9915433
Case Type:	Drinking Water Aquifer affected
Status:	9

EMI:

Year:	1990
Carbon Monoxide Emissions Tons/Yr:	33
Air Basin:	SC
Facility ID:	54732
Air District Name:	SC
SIC Code:	8062
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	1
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smlr Tons/Yr:	0

Map ID / Direction / Distance / Distance (ft.) / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
A6 SSE 1/4-1/2 2529 ft.	**INLAND VALLEY REGIONAL MEDICAL CENTER** **36485 INLAND VALLEY DR** **WILDOMAR, CA 92595**	LUST UST SWEEPS UST	U003713800 N/A

Site 2 of 2 in cluster A

Relative:
Equal

Actual:
1342 ft.

LUST:

Region:	8
Case Type:	Soil only
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Not reported
How Stopped:	Not reported
Leak Cause:	Not reported
Leak Source:	Not reported
Global ID:	T0606599143
How Stopped Date:	Not reported
Review Date:	4/7/2000
Workplan:	Not reported
Prelim Assess:	Not reported
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	Not reported
Discover Date:	Not reported
Enforcement Date:	Not reported
Review Date:	6/14/2000
Enter Date:	6/14/2000
MTBE Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Max MTBE GW:	Not reported
Max MTBE Soil:	Not reported
County:	Riverside
Operator:	Not reported
Regional Board:	08
Facility Status:	Leak being confirmed
Substance:	76
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.591114
Longitude:	-117.236964
MTBE Concentration:	0
MTBE Fuel:	0
MTBE Tested:	NRQ
Staff:	RS
Staff Initials:	Not reported
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	TEMECULA VALLEY (9-5
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	No
Local Case Num:	99-15433
Case Number:	083303712T

INLAND VALLEY REGIONAL MEDICAL CENTER (Continued) U003713800

Qty Leaked: Not reported
Abate Method: Not reported
MTBE Class: *
Summary: Not reported

UST:
Region: STATE
Local Agency: 33000
Facility ID: 411

SWEEPS UST:
Status: A
Comp Number: 20290
Number: 1
Board Of Equalization: 44-018075
Ref Date: 11-03-92
Act Date: 11-03-92
Created Date: 02-27-89
Tank Status: A
Owner Tank Id: 001182
Swrcb Tank Id: 33-000-020290-000001
Actv Date: 11-03-92
Capacity: 20000
Tank Use: M.V. FUEL
Stg: P
Content: DIESEL
Number Of Tanks: 1

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2006
Next Scheduled EDR Contact: 10/30/2006
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2006
Next Scheduled EDR Contact: 10/30/2006
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: N/A
Last EDR Contact: 08/02/2006
Next Scheduled EDR Contact: 10/30/2006
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL RECOVERY: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/19/2006
Date Data Arrived at EDR: 06/22/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 62

Source: EPA
Telephone: 703-603-8960
Last EDR Contact: 09/21/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 07/17/2006
Date Data Arrived at EDR: 08/02/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 41

Source: EPA
Telephone: 703-603-8960
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/15/2006
Date Data Arrived at EDR: 03/17/2006
Date Made Active in Reports: 04/13/2006
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

RCRA: Resource Conservation and Recovery Act Information

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/13/2006
Date Data Arrived at EDR: 06/28/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 56

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/28/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 01/12/2006
Date Made Active in Reports: 02/21/2006
Number of Days to Update: 40

Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Last EDR Contact: 10/24/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 07/03/2006
Date Data Arrived at EDR: 07/19/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 35

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Annually

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/21/2006
Date Data Arrived at EDR: 03/27/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 09/07/2006
Next Scheduled EDR Contact: 10/02/2006
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/21/2006
Date Data Arrived at EDR: 03/27/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 09/07/2006
Next Scheduled EDR Contact: 10/02/2006
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 02/08/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 177

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 08/11/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 01/19/2006
Date Made Active in Reports: 02/21/2006
Number of Days to Update: 33

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Varies

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/13/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 55

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/11/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Semi-Annually

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/14/2004
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 04/25/2005
Number of Days to Update: 69

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/21/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 47

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 11/04/2005
Date Data Arrived at EDR: 11/28/2005
Date Made Active in Reports: 01/30/2006
Number of Days to Update: 63

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 07/20/2006
Date Data Arrived at EDR: 07/21/2006
Date Made Active in Reports: 08/22/2006
Number of Days to Update: 32

Source: EPA
Telephone: 202-564-6064
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 06/22/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 62

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/22/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/14/2006
Date Data Arrived at EDR: 07/18/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 50

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

Date of Government Version: 07/14/2006
Date Data Arrived at EDR: 07/18/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 50

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 05/11/2006
Date Made Active in Reports: 05/22/2006
Number of Days to Update: 11

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 10/16/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 02/13/2006
Date Data Arrived at EDR: 04/21/2006
Date Made Active in Reports: 05/11/2006
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/17/2006
Next Scheduled EDR Contact: 10/16/2006
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/07/2006
Date Data Arrived at EDR: 08/09/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 28

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 08/09/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/10/2006
Date Data Arrived at EDR: 07/20/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 48

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/16/2006
Date Data Arrived at EDR: 06/28/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 56

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/27/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/21/2006
Date Data Arrived at EDR: 07/25/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 43

Source: EPA
Telephone: N/A
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2003
Date Data Arrived at EDR: 06/17/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 48

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 10/20/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Biennially

STATE AND LOCAL RECORDS

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 08/28/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: No Update Planned

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SCH: School Property Evaluation Program
This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 08/29/2006
Date Data Arrived at EDR: 08/30/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 36

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/30/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 07/31/2006
Next Scheduled EDR Contact: 10/30/2006
Data Release Frequency: No Update Planned

SWF/LF (SWIS): Solid Waste Information System
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/13/2006
Date Data Arrived at EDR: 09/13/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 22

Source: Integrated Waste Management Board
Telephone: 916-341-6320
Last EDR Contact: 09/13/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Quarterly

CA WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 09/20/2006
Date Data Arrived at EDR: 09/21/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 34

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 09/21/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Quarterly

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 05/29/2001
Date Made Active in Reports: 07/26/2001
Number of Days to Update: 58

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 10/10/2006
Date Data Arrived at EDR: 10/12/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 13

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 10/12/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Quarterly

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 10/11/2006
Date Data Arrived at EDR: 10/12/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 13

Source: State Water Resources Control Board
Telephone: 916-341-5752
Last EDR Contact: 10/12/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Quarterly

LUST REG 5: Leaking Underground Storage Tank Database

Date of Government Version: 07/01/2006
Date Data Arrived at EDR: 07/26/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 29

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 10/25/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-346-7491
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-4130
Last EDR Contact: 08/07/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Varies

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 10/17/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LUST REG 7: Leaking Underground Storage Tank Case Listing

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-346-7491
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 916-542-5424
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 09/25/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: No Update Planned

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-576-2220
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 10/09/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Quarterly

LUST REG 3: Leaking Underground Storage Tank Database

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 08/15/2006
Next Scheduled EDR Contact: 11/13/2006
Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SLIC: Statewide SLIC Cases
The Spills, Leaks, Investigations, and Cleanups (SLIC) listings includes unauthorized discharges from spills and leaks, other than from underground storage tanks or other regulated sites.

Date of Government Version: 10/11/2006
Date Data Arrived at EDR: 10/12/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 13

Source: State Water Resources Control Board
Telephone: 916-341-5752
Last EDR Contact: 10/12/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 10/09/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 08/15/2006
Next Scheduled EDR Contact: 11/13/2006
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Unregulated sites that impact groundwater or have the potential to impact groundwater.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SLIC REG 6L: SLIC Sites

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

Date of Government Version: 04/06/2006
Date Data Arrived at EDR: 04/06/2006
Date Made Active in Reports: 05/11/2006
Number of Days to Update: 35

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 10/05/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

Date of Government Version: 08/30/2006
Date Data Arrived at EDR: 08/31/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 35

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/28/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: Annually

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 07/11/2006
Date Data Arrived at EDR: 07/12/2006
Date Made Active in Reports: 07/26/2006
Number of Days to Update: 14

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 10/12/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Semi-Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 01/30/2006
Date Data Arrived at EDR: 01/30/2006
Date Made Active in Reports: 02/17/2006
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5712
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 10/31/2006
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1980's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 11/30/2005
Date Made Active in Reports: 01/19/2006
Number of Days to Update: 50

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

NOTIFY 65: Proposition 65 Records
Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 10/16/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: No Update Planned

DEED: Deed Restriction Listing
Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 10/04/2006
Date Data Arrived at EDR: 10/05/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 20

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/05/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Semi-Annually

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 08/29/2006
Date Data Arrived at EDR: 08/30/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 36

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/30/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 04/18/2005
Date Data Arrived at EDR: 04/18/2005
Date Made Active in Reports: 05/06/2005
Number of Days to Update: 18

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 10/02/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/25/2006
Date Data Arrived at EDR: 07/26/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 29

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

CDL: Clandestine Drug Labs
A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 05/17/2006
Date Data Arrived at EDR: 05/17/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 29

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Varies

RESPONSE: State Response Sites
identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 08/29/2006
Date Data Arrived at EDR: 08/30/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 36

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/30/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: Quarterly

HAZNET: Facility and Manifest Data
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2003
Date Data Arrived at EDR: 10/11/2005
Date Made Active in Reports: 10/31/2005
Number of Days to Update: 20

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 09/14/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Annually

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/11/2006
Number of Days to Update: 27

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 10/20/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Varies

ENVIROSTOR: EnviroStor Database
The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 08/29/2006
Date Data Arrived at EDR: 08/30/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 36

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/30/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: Quarterly

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 02/08/2005
Date Made Active in Reports: 08/04/2005
Number of Days to Update: 177

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 08/11/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 06/28/2006
Number of Days to Update: 19

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 06/23/2006
Date Made Active in Reports: 08/02/2006
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 07/10/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 64

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 01/04/2005
Date Data Arrived at EDR: 01/21/2005
Date Made Active in Reports: 02/28/2005
Number of Days to Update: 38

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Minnesota, Mississippi and North Carolina.

Date of Government Version: 01/01/2006
Date Data Arrived at EDR: 02/27/2006
Date Made Active in Reports: 03/28/2006
Number of Days to Update: 29

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Semi-Annually

INDIAN UST R4: Underground Storage Tanks on Indian Land

Date of Government Version: 01/01/2006
Date Data Arrived at EDR: 02/27/2006
Date Made Active in Reports: 03/28/2006
Number of Days to Update: 29

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 06/23/2006
Date Made Active in Reports: 08/02/2006
Number of Days to Update: 40

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 07/10/2006
Date Made Active in Reports: 09/12/2006
Number of Days to Update: 64

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

Date of Government Version: 06/06/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN UST R5: Underground Storage Tanks on Indian Land

Date of Government Version: 12/02/2004
Date Data Arrived at EDR: 12/29/2004
Date Made Active in Reports: 02/04/2005
Number of Days to Update: 37

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 07/28/2006
Number of Days to Update: 49

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 06/08/2006
Date Data Arrived at EDR: 06/09/2006
Date Made Active in Reports: 06/30/2006
Number of Days to Update: 21

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

Date of Government Version: 06/30/2006
Date Data Arrived at EDR: 07/03/2006
Date Made Active in Reports: 09/06/2006
Number of Days to Update: 65

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Semi-Annually

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Historical Auto Stations: EDR Proprietary Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR Historical Cleaners: EDR Proprietary Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 08/08/2006
Date Data Arrived at EDR: 08/10/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 14

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Semi-Annually

Underground Tanks

Date of Government Version: 08/08/2006
Date Data Arrived at EDR: 08/10/2006
Date Made Active in Reports: 09/18/2006
Number of Days to Update: 39

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 09/05/2006
Date Data Arrived at EDR: 09/05/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 30

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 08/28/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: Semi-Annually

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 07/11/2006
Date Data Arrived at EDR: 07/12/2006
Date Made Active in Reports: 07/27/2006
Number of Days to Update: 15

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 07/10/2006
Next Scheduled EDR Contact: 11/06/2006
Data Release Frequency: Semi-Annually

KERN COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 09/05/2006
Date Data Arrived at EDR: 09/05/2006
Date Made Active in Reports: 09/18/2006
Number of Days to Update: 13

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 07/07/1999
Date Made Active in Reports: N/A
Number of Days to Update: 0

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 05/16/2006
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 05/31/2006
Date Data Arrived at EDR: 07/25/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 30

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 08/14/2006
Next Scheduled EDR Contact: 11/13/2006
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities

Date of Government Version: 08/15/2006
Date Data Arrived at EDR: 08/25/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 41

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 08/16/2006
Next Scheduled EDR Contact: 11/13/2006
Data Release Frequency: Varies

City of Los Angeles Landfills

Date of Government Version: 03/01/2006
Date Data Arrived at EDR: 04/06/2006
Date Made Active in Reports: 05/11/2006
Number of Days to Update: 35

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 09/11/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/05/2006
Date Data Arrived at EDR: 02/16/2006
Date Made Active in Reports: 03/13/2006
Number of Days to Update: 25

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 08/14/2006
Next Scheduled EDR Contact: 11/13/2006
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Date of Government Version: 05/30/2006
Date Data Arrived at EDR: 05/31/2006
Date Made Active in Reports: 06/14/2006
Number of Days to Update: 14

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 09/11/2006
Next Scheduled EDR Contact: 11/13/2006
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

City of Long Beach Underground Storage Tank

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 08/23/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Date of Government Version: 08/15/2006
Date Data Arrived at EDR: 08/17/2006
Date Made Active in Reports: 09/18/2006
Number of Days to Update: 32

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 08/14/2006
Next Scheduled EDR Contact: 11/13/2006
Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 08/08/2006
Date Data Arrived at EDR: 08/29/2006
Date Made Active in Reports: 09/18/2006
Number of Days to Update: 20

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 07/31/2006
Next Scheduled EDR Contact: 10/30/2006
Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination

Date of Government Version: 10/09/2006
Date Data Arrived at EDR: 10/09/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 16

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 09/25/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Semi-Annually

Closed and Operating Underground Storage Tank Sites

Date of Government Version: 06/28/2006
Date Data Arrived at EDR: 06/29/2006
Date Made Active in Reports: 07/26/2006
Number of Days to Update: 27

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 09/25/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Annually

ORANGE COUNTY:

List of Industrial Site Cleanups

Petroleum and non-petroleum spills.

Date of Government Version: 09/01/2006
Date Data Arrived at EDR: 09/18/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 37

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 09/06/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 09/01/2006
Date Data Arrived at EDR: 09/20/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 35

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 09/06/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 09/01/2006
Date Data Arrived at EDR: 09/20/2006
Date Made Active in Reports: 10/20/2006
Number of Days to Update: 30

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 09/06/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 08/30/2006
Date Data Arrived at EDR: 08/31/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 35

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 08/14/2006
Next Scheduled EDR Contact: 12/19/2006
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 08/08/2006
Date Data Arrived at EDR: 08/08/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 16

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 10/16/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Quarterly

Underground Storage Tank Tank List

Date of Government Version: 08/08/2006
Date Data Arrived at EDR: 08/08/2006
Date Made Active in Reports: 09/18/2006
Number of Days to Update: 41

Source: Health Services Agency
Telephone: 951-358-5055
Last EDR Contact: 10/16/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Contaminated Sites

Date of Government Version: 08/02/2006
Date Data Arrived at EDR: 08/18/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 48

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 08/02/2006
Next Scheduled EDR Contact: 10/30/2006
Data Release Frequency: Quarterly

ML - Regulatory Compliance Master List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 08/02/2006
Date Data Arrived at EDR: 08/25/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 41

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 08/02/2006
Next Scheduled EDR Contact: 10/30/2006
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 09/26/2006
Date Data Arrived at EDR: 10/17/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 8

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 05/16/2005
Date Data Arrived at EDR: 05/18/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 29

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 10/20/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 11/01/2005
Date Data Arrived at EDR: 12/29/2005
Date Made Active in Reports: 01/19/2006
Number of Days to Update: 21

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 08/21/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities

Date of Government Version: 09/18/2006
Date Data Arrived at EDR: 09/20/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 35

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Underground Storage Tank Information

Date of Government Version: 09/18/2006
Date Data Arrived at EDR: 09/20/2006
Date Made Active in Reports: 10/20/2006
Number of Days to Update: 30

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST

A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 07/25/2006
Date Data Arrived at EDR: 08/10/2006
Date Made Active in Reports: 09/18/2006
Number of Days to Update: 39

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 10/16/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory

List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 08/25/2006
Date Data Arrived at EDR: 08/25/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 41

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 10/09/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Annually

Fuel Leak List

Date of Government Version: 10/10/2006
Date Data Arrived at EDR: 10/11/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 14

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 10/09/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 09/25/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: No Update Planned

LOP Listing

A listing of open leaking underground storage tanks.

Date of Government Version: 09/29/2006
Date Data Arrived at EDR: 10/02/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 23

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 09/25/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Hazardous Material Facilities

Date of Government Version: 09/07/2006
Date Data Arrived at EDR: 09/08/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 27

Source: City of San Jose Fire Department
Telephone: 408-277-4659
Last EDR Contact: 09/05/2006
Next Scheduled EDR Contact: 12/04/2006
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks

Date of Government Version: 07/05/2006
Date Data Arrived at EDR: 07/25/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 30

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Quarterly

Underground Storage Tanks

Date of Government Version: 07/03/2006
Date Data Arrived at EDR: 07/26/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 29

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 10/18/2006
Next Scheduled EDR Contact: 12/25/2006
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites

Date of Government Version: 07/24/2006
Date Data Arrived at EDR: 07/25/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 30

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/22/2007
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks

Date of Government Version: 12/31/0005
Date Data Arrived at EDR: 01/05/2006
Date Made Active in Reports: 01/31/2006
Number of Days to Update: 26

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 10/16/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 08/28/2006
Date Data Arrived at EDR: 09/26/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 29

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/13/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2006
Date Data Arrived at EDR: 09/05/2006
Date Made Active in Reports: 10/05/2006
Number of Days to Update: 30

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 08/25/2006
Next Scheduled EDR Contact: 11/20/2006
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 08/28/2006
Date Data Arrived at EDR: 09/22/2006
Date Made Active in Reports: 10/25/2006
Number of Days to Update: 33

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/13/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 06/28/2006
Date Data Arrived at EDR: 07/27/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 28

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 10/12/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Date of Government Version: 07/19/2006
Date Data Arrived at EDR: 08/01/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 23

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 10/16/2006
Next Scheduled EDR Contact: 01/15/2007
Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2004
Date Data Arrived at EDR: 02/17/2006
Date Made Active in Reports: 04/07/2006
Number of Days to Update: 49

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 09/11/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 06/01/2006
Date Data Arrived at EDR: 07/06/2006
Date Made Active in Reports: 08/01/2006
Number of Days to Update: 26

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 10/05/2006
Next Scheduled EDR Contact: 01/01/2007
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 08/01/2006
Date Data Arrived at EDR: 08/30/2006
Date Made Active in Reports: 10/16/2006
Number of Days to Update: 47

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/30/2006
Next Scheduled EDR Contact: 11/27/2006
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 05/04/2006
Date Made Active in Reports: 06/06/2006
Number of Days to Update: 33

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 09/11/2006
Next Scheduled EDR Contact: 12/11/2006
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 09/30/2005
Date Data Arrived at EDR: 05/09/2006
Date Made Active in Reports: 05/24/2006
Number of Days to Update: 15

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 09/18/2006
Next Scheduled EDR Contact: 12/18/2006
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/17/2006
Date Made Active in Reports: 05/02/2006
Number of Days to Update: 46

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 10/23/2006
Next Scheduled EDR Contact: 01/08/2007
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

ZOLFAGHARI RESIDENCE
CLINTON KEITH ROAD & GEORGE AVENUE
MURRIETA, CA 92595

TARGET PROPERTY COORDINATES

Latitude (North):	33.59800 - 33' 35' 52.8"
Longitude (West):	117.2406 - 117' 14' 26.2"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	477676.5
UTM Y (Meters):	3717417.2
Elevation:	1342 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	33117-E2 MURRIETA, CA
Most Recent Revision:	1979
West Map:	33117-E3 WILDOMAR, CA
Most Recent Revision:	1979

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

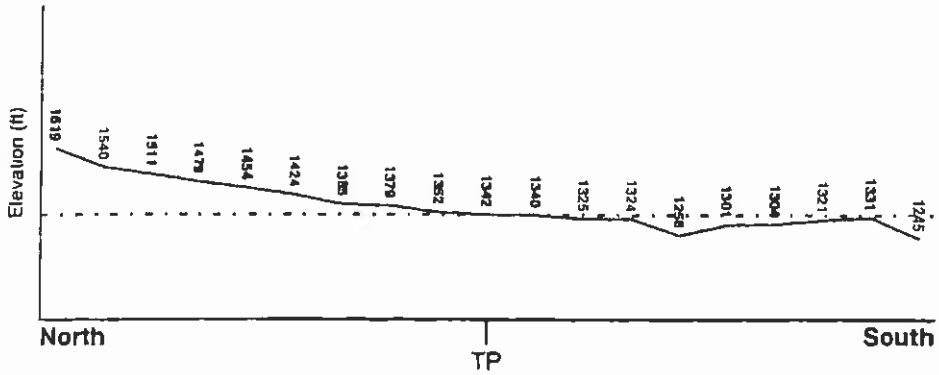
TOPOGRAPHIC INFORMATION

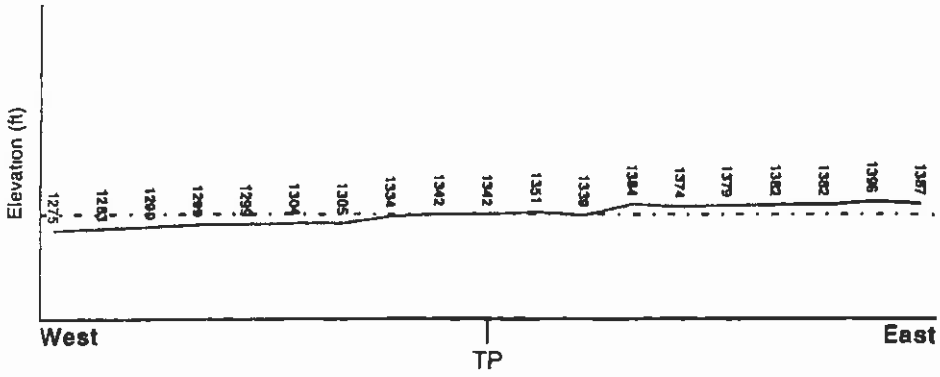
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SSW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 1342 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
RIVERSIDE, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property:	0602452730B
Additional Panels in search area:	0602452710B 0607510000A

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
MURRIETA	Not Available

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

***Site-Specific Hydrogeological Data*:**

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site-specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Cenozoic
System:	Quaternary
Series:	Quaternary
Code:	Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	RAMONA
Soil Surface Texture:	sandy loam
Hydrologic Group:	Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.
Soil Drainage Class:	Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel:	MODERATE
Depth to Bedrock Min:	> 60 inches
Depth to Bedrock Max:	> 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	14 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 2.00 Min: 0.60	Max: 7.30 Min: 5.60
2	14 inches	23 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 2.00 Min: 0.60	Max: 7.30 Min: 6.10
3	23 inches	29 inches	gravelly - loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 2.00 Min: 0.60	Max: 7.30 Min: 6.10
4	29 inches	68 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 0.60 Min: 0.20	Max: 7.30 Min: 6.10
5	68 inches	73 inches	gravelly - sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 0.60 Min: 0.20	Max: 8.40 Min: 6.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: clay loam
fine sandy loam
silt loam
coarse sandy loam

Surficial Soil Types: clay loam
fine sandy loam
silt loam
coarse sandy loam

Shallow Soil Types: gravelly - loam
stratified
clay

loam
sandy clay loam

Deeper Soil Types: weathered bedrock
stratified
gravelly - fine sandy loam
very fine sandy loam
silty clay loam

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS3125751	0 - 1/8 Mile NW
2	USGS3125728	1/8 - 1/4 Mile ESE
A3	USGS3125717	1/4 - 1/2 Mile SW
A4	USGS3125718	1/4 - 1/2 Mile SW
5	USGS3125712	1/4 - 1/2 Mile SE
B6	USGS3125750	1/4 - 1/2 Mile East
7	USGS3125705	1/4 - 1/2 Mile SW
B8	USGS3125762	1/4 - 1/2 Mile East
B9	USGS3125761	1/4 - 1/2 Mile East
10	USGS3125689	1/4 - 1/2 Mile South
11	USGS3125755	1/2 - 1 Mile West
12	USGS3125704	1/2 - 1 Mile SW
13	USGS3125724	1/2 - 1 Mile ESE
C14	USGS3125586	1/2 - 1 Mile WNW
C15	USGS3125585	1/2 - 1 Mile WNW
16	USGS3125683	1/2 - 1 Mile South
D17	USGS3125729	1/2 - 1 Mile West
D18	USGS3125721	1/2 - 1 Mile WSW
19	USGS3125783	1/2 - 1 Mile WNW
E20	USGS3125880	1/2 - 1 Mile SSW
E21	USGS3125875	1/2 - 1 Mile SSW
22	USGS3125737	1/2 - 1 Mile East
23	USGS3125881	1/2 - 1 Mile SE
F24	USGS3125890	1/2 - 1 Mile SW

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
G25	USGS3125866	1/2 - 1 Mile SSW
F26	USGS3125882	1/2 - 1 Mile SW
F27	USGS3125885	1/2 - 1 Mile SW
G28	USGS3125863	1/2 - 1 Mile SSW
H29	USGS3125592	1/2 - 1 Mile ENE
30	USGS3125710	1/2 - 1 Mile ESE
H31	USGS3125591	1/2 - 1 Mile ENE
32	USGS3125763	1/2 - 1 Mile West
33	USGS3125686	1/2 - 1 Mile ESE
34	USGS3125485	1/2 - 1 Mile NNW
35	USGS3125871	1/2 - 1 Mile SW
36	USGS3125883	1/2 - 1 Mile SW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

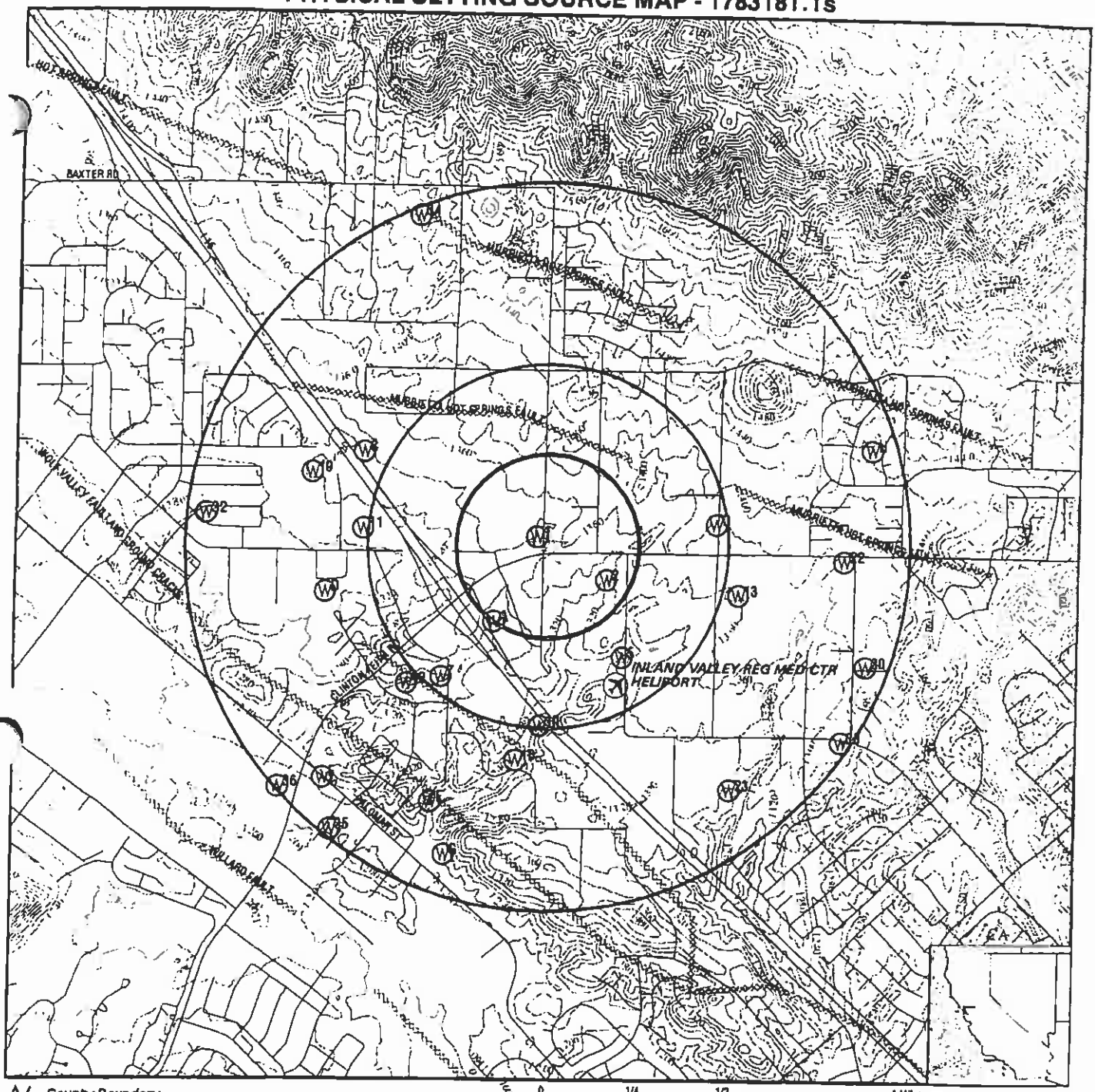
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 1783181.1s



County Boundary
Major Roads
Contour Lines
Earthquake Fault Lines
Airports
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location
HD Closest Hydrogeological Data
Oil, gas or related wells

SITE NAME: Zolfaghari Residence ADDRESS: Clinton Keith Road & George Avenue Murrieta CA 92595 LAT/LONG: 33.5980 / 117.2406	CLIENT: Engen Corporation CONTACT: Alayna Lesicko INQUIRY #: 1783181.1s DATE: October 25, 2006 5:34 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation	Database	EDR ID Number
1 NW 0 - 1/8 Mile Lower	FED USGS	USGS3125751

Agency cd:	USGS	Site no:	333554117142501
Site name:	006S004W36R001S		
Latitude:	333554		
Longitude:	1171425	Dec lat:	33.59835729
Dec lon:	-117.24114686	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1328.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	19610101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	132	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	37.00	

2 ESE 1/8 - 1/4 Mile Lower	FED USGS	USGS3125728

Agency cd:	USGS	Site no:	333548117141301
Site name:	007S003W06D001S		
Latitude:	333548		
Longitude:	1171413	Dec lat:	33.5966907
Dec lon:	-117.23781337	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported

Altitude:	1315.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	258	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-02-01	Ground water data end date:	1968-02-01
Ground water data count:	1		

Ground-water levels. Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-02-01	12.00	

A3
SW
1/4 - 1/2 Mile
Lower

FED USGS **USGS3125717**

Agency cd:	USGS	Site no:	333542117143201
Site name:	007S004W01A001S		
Latitude:	333542		
Longitude:	1171432	Dec lat:	33.59502403
Dec lon:	-117.24309136	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1298.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19490101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	187	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	1952-09-02
Water quality data end date:	1952-09-02	Water quality data count:	1
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	78.00	

A4
SW
1/4 - 1/2 Mile
Lower

FED USGS **USGS3125718**

Agency cd:	USGS	Site no:	333542117143202
Site name:	007S004W01A002S		
Latitude:	333542		
Longitude:	1171432	Dec lat:	33.59502403
Dec lon:	-117.24309136	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1298.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19510101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	167	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	79.00	

5
SE
1/4 - 1/2 Mile
Lower

FED USGS **USGS3125712**

Agency cd:	USGS	Site no:	333537117141001
Site name:	007S003W06E001S		
Latitude:	333537		
Longitude:	1171410	Dec lat:	33.59363523
Dec lon:	-117.23697998	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1290.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	San Jacinto. California. Area = 757 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	177	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-02-01	Ground water data end date:	1968-02-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-02-01	16.00	

B6
East
1/4 - 1/2 Mile
Higher

FED USGS **USGS3125750**

Agency cd:	USGS	Site no:	333554117135501
Site name:	006S003W31P001S		
Latitude:	333554		
Longitude:	1171355	Dec lat:	33.59835736
Dec lon:	-117.23281316	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1370.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	19520101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST

Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	24.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	1952-08-19
Water quality data end date:	1952-08-19	Water quality data count:	1
Ground water data begin date:	1968-04-01	Ground water data end date:	1968-04-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-04-01	10.00	

7
SW
1/4 - 1/2 Mile
Lower

FED USGS **USGS3125705**

Agency cd:	USGS	Site no:	333534117144101
Site name:	007S004W01G001S		
Latitude:	333534		
Longitude:	1171441	Dec lat:	33.59280184
Dec lon:	-117.24559145	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1270.00	Altitude method:	M
Altitude accuracy.	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	20.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK®- PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
B8 **East** **1/4 - 1/2 Mile** **Higher**		**FED USGS**	**USGS3125762**

Agency cd:	USGS	Site no:	333557117135401
Site name:	006S003W31P002S		
Latitude:	333557		
Longitude:	1171354	Dec lat:	33.59919067
Dec lon:	-117.23253538	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1430.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	Not Reported	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	0000-00-00	Ground water data end date:	0000-00-00
Ground water data count:	0		

Ground-water levels, Number of Measurements: 0

B9 **East** **1/4 - 1/2 Mile** **Higher**		**FED USGS**	**USGS3125761**

Agency cd:	USGS	Site no:	333557117135301
Site name:	006S003W31P003S		
Latitude:	333557		
Longitude:	1171353	Dec lat:	33.59919067
Dec lon:	-117.23225759	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1430.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST

Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	31.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-04-01	Ground water data end date:	1968-04-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-04-01	18.00	

10
South
1/4 - 1/2 Mile
Lower

FED USGS **USGS3125689**

Agency cd:	USGS	Site no:	333527117142401
Site name:	007S004W01H001S		
Latitude:	333527		
Longitude:	1171424	Dec lat:	33.59085749
Dec lon:	-117.24086901	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1270.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	268	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	5.00	

11
West
1/2 - 1 Mile
Lower

FED USGS **USGS3125755**

Agency cd:	USGS	Site no:	333555117145501
Site name:	006S004W36P001S		
Latitude:	333555		
Longitude:	1171455	Dec lat:	33.59863499
Dec lon:	-117.24948056	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1297.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19600101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	79.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	56.00	

12
SW
1/2 - 1 Mile
Lower

FED USGS **USGS3125704**

Agency cd:	USGS	Site no:	333533117144701
Site name:	007S004W01G002S		
Latitude:	333533		
Longitude:	1171447	Dec lat:	33.59252406
Dec lon:	-117.24725819	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1255.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	Not Reported	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

13
ESE
1/2 - 1 Mile
Higher

FED USGS **USGS3125724**

Agency cd:	USGS	Site no:	333546117135001
Site name:	007S003W06B001S		
Latitude:	333546		
Longitude:	1171350	Dec lat:	33.59613521
Dec lon:	-117.2314242	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1355.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	San Jacinto. California. Area = 757 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	35.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00

Peak flow data count: 0
Water quality data end date:0000-00-00
Ground water data begin date: 1968-02-01
Ground water data count: 1

Water quality data begin date: 0000-00-00
Water quality data count: 0
Ground water data end date: 1968-02-01

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-02-01	18.00	

C14
WNW
1/2 - 1 Mile
Lower

FED USGS **USGS3125586**

Agency cd:	USGS	Site no:	333606117145502
Site name:	006S004W36L002S		
Latitude:	333606		
Longitude:	1171455	Dec lat:	33.60169047
Dec lon:	-117.24948058	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1320.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	37.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	0000-00-00	Ground water data end date:	0000-00-00
Ground water data count:	0		

Ground-water levels, Number of Measurements: 0

C15
WNW
1/2 - 1 Mile
Lower

FED USGS **USGS3125585**

Agency cd:	USGS	Site no:	333606117145501
Site name:	006S004W36L001S		
Latitude:	333606		
Longitude:	1171455	Dec lat:	33.60169047
Dec lon:	-117.24948058	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1320.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date Inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	65.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	54.00	

16
South
1/2 - 1 Mile
Lower

FED USGS **USGS3125683**

Agency cd:	USGS	Site no:	333522117142801
Site name:	007S004W01Z001S		
Latitude:	333522		
Longitude:	1171428	Dec lat:	33.58946863
Dec lon:	-117.24198016	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1240.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	19610101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST

Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	436	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

D17
West
1/2 - 1 Mile
Lower

FED USGS **USGS3125729**

Agency cd:	USGS	Site no:	333548117150101
Site name:	007S004W01C001S		
Latitude:	333548		
Longitude:	1171501	Dec lat:	33.59669058
Dec lon:	-117.25114728	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1300.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	Not Reported	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

D18
WSW
1/2 - 1 Mile
Lower

FED USGS **USGS3125721**

Agency cd:	USGS	Site no:	333544117150201
Site name:	007S004W01C002S		
Latitude:	333544		
Longitude:	1171502	Dec lat:	33.5955795
Dec lon:	-117.25142506	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1280.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	90.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	15.00	

19
WNW
1/2 - 1 Mile
Lower

FED USGS **USGS3125783**

Agency cd:	USGS	Site no:	333603117150401
Site name:	006S004W36P002S		
Latitude:	333603		
Longitude:	1171504	Dec lat:	33.60085714
Dec lon:	-117.25198067	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1310.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19630101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST

Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	309	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	39.00	

E20
SSW
1/2 - 1 Mile
Lower

FED USGS · USGS3125880

Agency cd:	USGS	Site no:	333517117144401
Site name:	007S004W01K001S		
Latitude:	333517		
Longitude:	1171444	Dec lat:	33.58807974
Dec lon:	-117.24642479	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1310.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hilltop		
Site type:	Ground-water other than Spring	Date construction:	19570101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	125	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-04-01	Ground water data end date:	1968-04-01
Ground water data count:	1		

The EDR Aerial Photo Decade Package

Zolfaghari Residence
Clinton Keith Road & George Avenue
Murrieta, CA 92595

Inquiry Number: 1780105.5

October 23, 2006

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-04-01	78.00	

E21
SSW
1/2 - 1 Mile
Lower

FED USGS **USGS3125875**

Agency cd:	USGS	Site no:	333515117144101
Site name:	007S004W01K002S		
Latitude:	333515		
Longitude:	1171441	Dec lat:	33.58752421
Dec lon:	-117.24559142	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1200.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	19590101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	103	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	15.00	

22
East
1/2 - 1 Mile
Higher

FED USGS **USGS3125737**

Agency cd:	USGS	Site no:	333551117133201
Site name:	007S003W06A001S		
Latitude:	333551		
Longitude:	1171332	Dec lat:	33.5975241
Dec lon:	-117.22642399	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1380.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita, California, Area = 731 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	47.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-01-01	Ground water data end date:	1968-01-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-01-01	10.00	

23
SE
1/2 - 1 Mile
Lower

FED USGS **USGS3125881**

Agency cd:	USGS	Site no:	333518117135101
Site name:	007S003W06K001S		
Latitude:	333518		
Longitude:	1171351	Dec lat:	33.58835764
Dec lon:	-117.23170194	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1315.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita, California, Area = 731 sq.mi.		
Topographic:	Hilltop		
Site type:	Ground-water other than Spring	Date construction:	19530101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST

Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	156	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-02-01	Ground water data end date:	1968-02-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-02-01	43.00	

F24
SW
1/2 - 1 Mile
Lower

FED USGS **USGS3125890**

Agency cd:	USGS	Site no:	333521117150201
Site name:	007S004W01L001S		
Latitude:	333521		
Longitude:	1171502	Dec lat:	33.58919078
Dec lon:	-117.25142501	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1185.00	Altitude method:	L
Altitude accuracy:	.1	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita, California, Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19280101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	35.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation	Database	EDR ID Number
G25 **SSW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS3125866**

Agency cd:	USGS	Site no:	333509117144001
Site name:	007S004W01Q008S		
Latitude:	333509		
Longitude:	1171440	Dec lat:	33.58585759
Dec lon:	-117.24531361	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1205.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita, California, Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19580101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	65.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-04-01	Ground water data end date:	1968-04-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-04-01	14.00	

F26 **SW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS3125882**

Agency cd:	USGS	Site no:	333518117150001
Site name:	007S004W01L004S		
Latitude:	333518		
Longitude:	1171500	Dec lat:	33.58835747
Dec lon:	-117.25086943	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported

Altitude:	1200.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19600101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	68.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	36.00	

F27
SW
1/2 - 1 Mile
Lower

FED USGS **USGS3125885**

Agency cd:	USGS	Site no:	333519117150201
Site name:	007S004W01L002S		
Latitude:	333519		
Longitude:	1171502	Dec lat:	33.58863524
Dec lon:	-117.251425	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1203.00	Altitude method:	L
Altitude accuracy:	.1	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19280101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	75.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation	Database	EDR ID Number
G28 **SSW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS3125863**

Agency cd:	USGS	Site no:	333508117144001
Site name:	007S004W01Q006S		
Latitude:	333508		
Longitude:	1171440	Dec lat:	33.58557982
Dec lon:	-117.24531361	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1202.00	Altitude method:	L
Altitude accuracy:	.1	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	65.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-04-01	Ground water data end date:	1968-04-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-04-01	12.00	

H29 **ENE** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS3125592**

Agency cd:	USGS	Site no:	333607117132801
Site name:	006S003W31R001S		
Latitude:	333607		
Longitude:	1171328	Dec lat:	33.60196843
Dec lon:	-117.22531286	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported

Altitude:	1428.00	Altitude method:	M
Altitude accuracy:	Not Reported	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	19480101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	61.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	1952-08-17
Water quality data end date:	1952-08-17	Water quality data count:	1
Ground water data begin date:	1968-04-01	Ground water data end date:	1968-04-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-04-01	20.00	

30
ESE
1/2 - 1 Mile
Higher

FED USGS **USGS3125710**

Agency cd:	USGS	Site no:	333536117132801
Site name:	007S003W06H001S		
Latitude:	333536		
Longitude:	1171328	Dec lat:	33.59335756
Dec lon:	-117.2253128	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1360.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Hilltop		
Site type:	Ground-water other than Spring	Date construction:	19610101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	Not Reported	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation		Database	EDR ID Number
H31 **ENE** **1/2 - 1 Mile** Higher		**FED USGS**	**USGS3125591**

Agency cd:	USGS	Site no:	333607117132701
Site name:	006S003W31R002S		
Latitude:	333607		
Longitude:	1171327	Dec lat:	33.60196844
Dec lon:	-117.22503507	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1415.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	23.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-04-01	Ground water data end date:	1968-04-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-04-01	8.00	

32 **West** **1/2 - 1 Mile** Lower		**FED USGS**	**USGS3125763**

Agency cd:	USGS	Site no:	333557117152201
Site name:	006S004W36N001S		
Latitude:	333557		
Longitude:	1171522	Dec lat:	33.59919049
Dec lon:	-117.25698083	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported

Altitude:	1270.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19540101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	190	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	44.00	

33
ESE
1/2 - 1 Mile
Higher

FED USGS **USGS3125686**

Agency cd:	USGS	Site no:	333525117133201
Site name:	007S003W06J002S		
Latitude:	333525		
Longitude:	1171332	Dec lat:	33.59030208
Dec lon:	-117.22642394	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1350.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	48.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK®- PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
34 **NNW** **1/2 - 1 Mile** **Higher**		**FED USGS**	**USGS3125485**

Agency cd:	USGS	Site no:	333640117144601
Site name:	006S004W36B005S		
Latitude:	333640		
Longitude:	1171446	Dec lat:	33.61113468
Dec lon:	-117.24698054	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1460.00	Altitude method:	M
Altitude accuracy:	20	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita, California, Area = 731 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	19630101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	184	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	55.00	

35 **SW** **1/2 - 1 Mile** **Lower**		**FED USGS**	**USGS3125871**

Agency cd:	USGS	Site no:	333512117150001
Site name:	007S004W01P001S		
Latitude:	333512		
Longitude:	1171500	Dec lat:	33.58669085
Dec lon:	-117.25086941	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported

Altitude:	1187.00	Altitude method:	L
Altitude accuracy:	.1	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	Not Reported	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1968-03-01	24.00	

36
SW
1/2 - 1 Mile
Lower

FED USGS **USGS3125883**

Agency cd:	USGS	Site no:	333518117150901
Site name:	007S004W01L003S		
Latitude:	333518		
Longitude:	1171509	Dec lat:	33.58835746
Dec lon:	-117.25336951	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	065
Country:	US	Land net:	Not Reported
Location map:	Not Reported	Map scale:	Not Reported
Altitude:	1200 00	Altitude method:	L
Altitude accuracy:	.1	Altitude datum:	NGVD29
Hydrologic:	Santa Margarita. California. Area = 731 sq.mi.		
Topographic:	Undulating		
Site type:	Ground-water other than Spring	Date construction:	19270101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	55.0	Hole depth:	Not Reported
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1968-03-01	Ground water data end date:	1968-03-01
Ground water data count:	1		

EDR® Environmental Data Resources Inc

"Linking Technology with Tradition"®

Sanborn® Map Report

Ship To: Alayna Lesicko
Engen Corporation
25759 Jefferson Ave
Murrieta, CA 92562

Order Date: 10/20/2006 **Completion Date:** 10/20/2006
Inquiry #: 1780105.3
P.O. #: NA
Site Name: Zolfaghari Residence
Address: Clinton Keith Road & George Avenue
City/State: Murrieta, CA 92595
Cross Streets:

Customer Project: NA
1024251BAR 951-834-9000

This document reports that the largest and most complete collection of Sanborn fire insurance maps has been reviewed based on client supplied information, and fire insurance maps depicting the target property at the specified address were not identified.

NO COVERAGE

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APPENDIX E

REQUEST/ACKNOWLEDGEMENT LETTER

(DEPARTMENT OF ENVIRONMENTAL HEALTH, RIVERSIDE COUNTY)

COUNTY OF RIVERSIDE • COMMUNITY HEALTH AGENCY

DEPARTMENT OF ENVIRONMENTAL HEALTH

Request Acknowledgement Letter

October 31, 2006

Request No: 5279
Company No: 13375
Request Date: 10/27/2006
Reference: Project # M3951-EA1

Eric Davisson
Engen Corporation
25759 Jefferson Ave
Murrieta, CA 92562

We have received your request and a preliminary search of our computer files is being processed. A search of the physical files will be completed within four weeks. Once the physical search is completed, you will be contacted to schedule an appointment or to request copies. If records are not found, you will be contacted by mail.

The files for Hazardous Materials Management Division began in 1986. Requests for disclosure information for the cities of Banning (951) 922-3210, Corona (951) 279-3756, and Riverside (951) 826-5321need to be directed to the City Fire Department.

The cost of a file search is $67.00 per unique address. There is an additional charge for copies. If you are an out-of-state customer, payment is required before information can be released. Please direct any questions or correspondence to :

Department of Environmental Health
Hazardous Materials Management Division
4065 County Circle Drive, Room 104
P.O. Box 7489
Riverside, CA 92513-7489

Attention: Suzanne Cauffiel, Records Clerk

Telephone: (951) 358-5055

APPENDIX F

ENVIRONMENTAL PROFESSIONAL QUALIFICATIONS

EnGEN Corporation

ENVIRONMENTAL PROFESSIONAL QUALIFICATIONS / RESUMES

CHIEF EXECUTIVE OFFICER / CHIEF FINANCIAL OFFICER

H. Wayne Baimbridge - Chief Executive Officer

- **Education:** California State University, San Diego, California
  Bachelor of Science Degree, Engineering Geology, 1974
- **Professional Registration:** Registered Environmental Assessor: REA 4002, 1992
- **Professional Associations** Consulting Engineers and Land Surveyors
  California Geotechnical Engineers Association
  Environmental Engineers Technical Council
  Geologic Society of America
- **Experience:**
  Mr. Baimbridge is the founder and CEO of **EnGEN Corporation**. He has over 20 years experience in the environmental engineering, engineering geology and geotechnical fields. His range of work experience includes complete project responsibilities for governmental agencies, private sector commercial/industrial and residential developments.

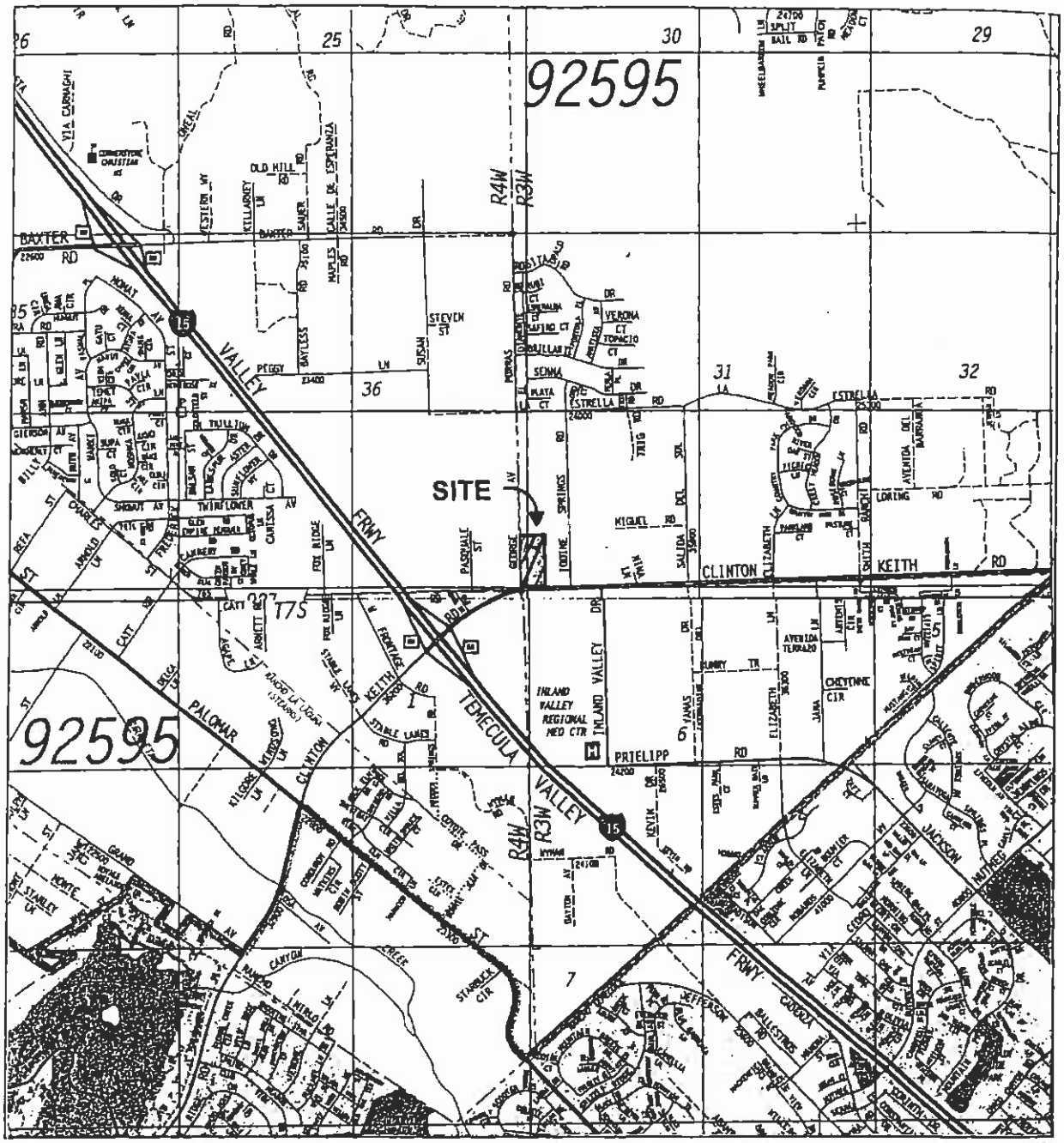
SENIOR STAFF GEOLOGIST

Eric Davisson, - PG, REA

- **Education:** San Diego State University
  Bachelor of Science Degree, Geological Sciences, 1997
- **Professional Registration:** California Professional Geologist, PG 8231
  Registered Environmental Assesor I, REA 1 8127
- **Certifications:** OSHA 40-Hour HAZWOPER / Site Supervisor
  CPN Radiation Safety Course;
- **Professional Associations** American Society for Testing and Materials (ASTM)
  National Ground Water Association (NGWA)
- **Experience:**
  With more than 9 years experience in the geotechnical / environmental fields, Mr. Davisson adds his knowledge of preliminary geotechnical studies, site assessments, fault and remediation to the EnGEN Corporation portfolio. His background includes practical field work, as well as project management and governmental interface experience

APPENDIX G

SITE RELATED MAP(S)

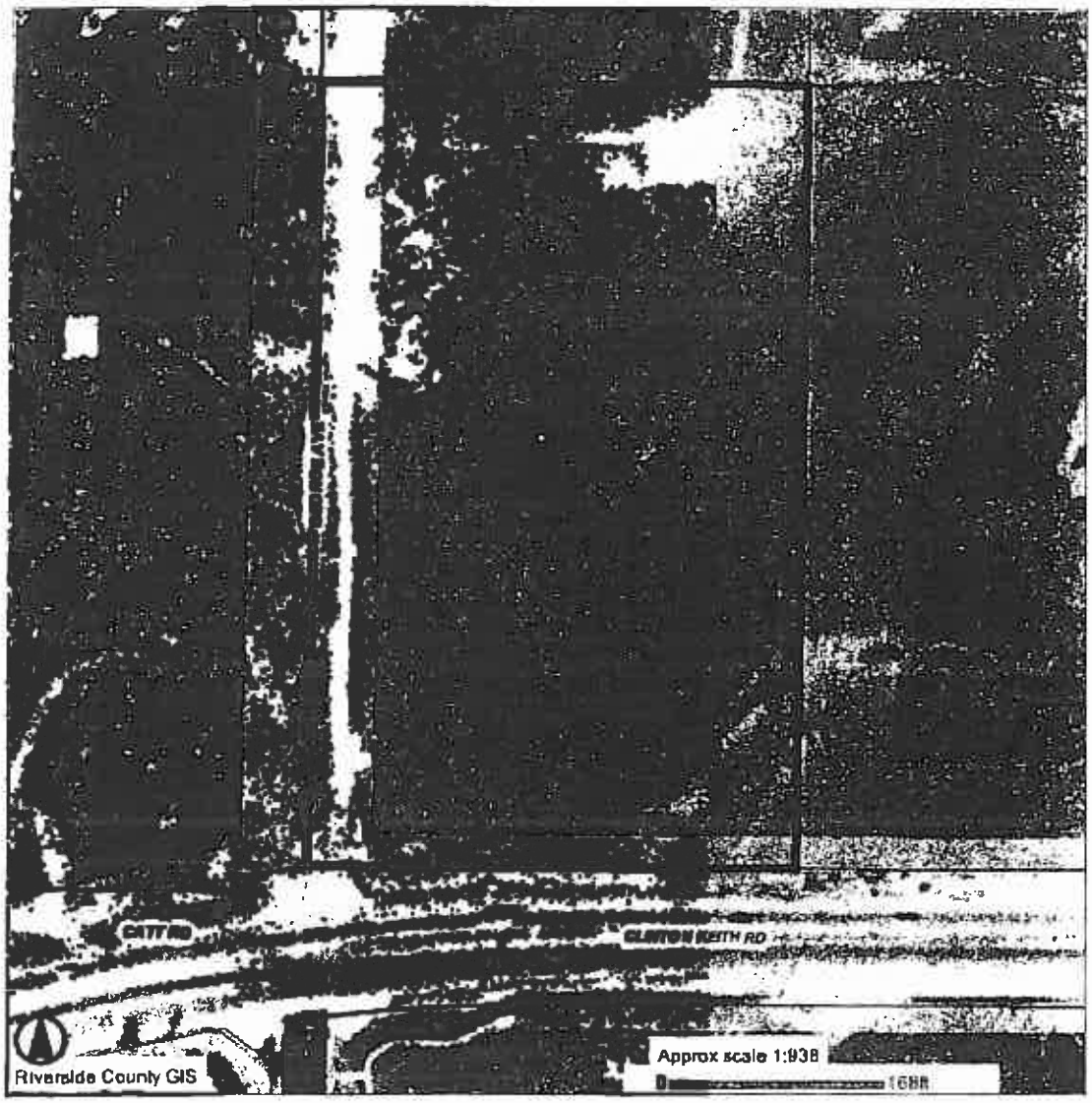


EnGEN Corporation Geotechnical Engineering | Engineering Geology | Special Inspection | Material Testing | Environmental Assessments

SITE LOCATION MAP			
PROJECT NUMBER:	M3551-EA1	LEGAL DESCRIPTION:	APN: 362-250-003
DATE: NOVEMBER 2006		SCALE: 1"=2400'	
CLIENT NAME:	Mr. Reza Zolfaghari	FIGURE:	1

BASE MAP: The Thomas Brothers, 2005, San Bernardino & Riverside Counties, 2005.

Figure 2 - Site Map



Selected parcel(s):
362-250-003

EnGEN Corporation Geotechnical Engineering | Engineering Geology | Special Inspection | Material Testing | Environmental Assessments

SITE PLAN			
PROJECT NUMBER:	M3651-EA1	LEGAL DESCRIPTION:	APN: 362-250-003
DATE: NOVEMBER 2006		SCALE: AS SHOWN	
CLIENT NAME:	Mr. Reza Zolfaghari	FIGURE:	2

Base Map: Riverside County Geographic Information System, Parcel:362-250-003, date of aerial photograph unknown, printed on November 6, 2006.

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Summary Of Mitigation Volumes and Peak Q's

Year Storm	duration Hours	Proposed Volume	Existing volume	delta Volume	BMP Volume	Detention Volume required	Peak Q Devloped	Peak Q Existing	Delta Q
2	3	15006	11109	3897	12916	0	4.07	3.6	0.47
5	3	22659	19495	3164	12916	0	5.94	5.4	0.54
10	3	27080	22763	4317	12916	0	7.02	6.44	0.58
					12916				
2	6	20489	13455	7034	12916	0	4.26	2.84	1.42
5	6	30129	22221	7908	12916	0	5.93	5.39	0.54
10	6	35950	27481	8469	12916	0	6.92	6.35	0.57
2	24	29997	27502	2495	12916	0	1.19	1.48	0
5	24	49924	46020	3904	12916	0	2.48	2.32	0.16
10	24	65070	60038	5032	12916	0	3.08	2.89	0.19

BMP TREATMENT VOLUME SUMMARY

Bioretention Basin No	Pervious Pavement No	BMP Volume Required	BRB Volume Supplied	PP Volume Supplied	Total Vbmp Supplied
1		1251	1784		1784
2		1534	1572		1572
3		839	903		903
4		751	1613		1613
5	5	991	684	1088	1772
6		683	792		792
7	7	1894	1066	1830	2896
8		268	648		648
9		814	936		936
Totals		9025	9998	2918	12916

BMP VOLUME CALCULATIONS

BRB No	Drainage Area	Area SF	Surface Type	If	C	CxArea	rain depth	BMP Volume
1	5A 5B	16988 22651	LS AC/Build	0.1 1	0.11 0.892	1868.68 20204.69		
					Total	22073.37	0.68	1250.8
2	2A 2B	4145 29832	LS AC/Build	0.1 1	0.11 0.892	455.95 26610.14		
					Total	27066.09	0.68	1533.7
3	7A 7B	7405 15682	LS AC/Build	0.1 1	0.11 0.892	814.55 13988.34		
					Total	14802.89	0.68	838.8
4	6A 6B	11386 13443	LS AC/Build	0.1 1	0.11 0.892	1252.46 11991.16		
					Total	13243.62	0.68	750.5
5	3A	19602	AC/Build	1	0.892	17484.98		
					Total	17484.98	0.68	990.8
6	9A	13504	AC/Build	1	0.892	12045.57		
					Total	12045.57	0.68	682.6
7	4A	37462	AC/Build	1	0.892	33416.1		
					Total	33416.1	0.68	1893.6
8	11A 11S	5893 4561	LS AC/Build	0.1 1	0.11 0.892	648.23 4068.412		
					Total	4716.642	0.68	267.3
9	8A	16117.2	AC/Build	1	0.892	14376.54 0		
					Total	14376.54	0.68	814.7

218671.2

Bioretention Facility - Design Procedure	BMP ID: BRB 1	Legend:	Required Entries / Calculated Cells
Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature — A_T = 0.91 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 1,251 ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 6.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.68 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 744 ft^2

Proposed Surface Area — A= 1,062 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 0 %

6" Check Dam Spacing — 0 feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID BRB 2	Legend:	Required Entries / Calculated Cells

Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	0.78	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	1,534	ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	24.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.77	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M=	867	ft^2
Proposed Surface Area	A=	888	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		0	%
6" Check Dam Spacing		0	feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID BRB3	Legend:	Required Entries / Calculated Cells
Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature A_T= 0.53 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 839 ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 8.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.71 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$ A_M = 490 ft^2

Proposed Surface Area A= 528 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID BRB 4	Legend:	Required Entries / Calculated Cells
Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature A_T= 0.57 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 751 ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 6.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.68 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$ A_M = 447 ft^2

Proposed Surface Area A= 960 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID BRB 5	Legend:	Required Entries / Calculated Cells
Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature A_T= 0.45 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 991 ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T= 4.0 ft

Total Effective Depth, d_E

$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$ d_E = 1.80 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$ A_M= 551 ft^2

Proposed Surface Area A= 380 ft^2

ERROR, the proposed surface area must be equal to or greater than the minimum surface area

Minimum Required Length of Bioretention Facility, L L = 137.8 ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Permeable Pavement - Design Procedure	BMP ID PP 5	Legend:	Required Entries / Calculated Cells

Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature A_T= 0.45 acres

Enter V_{BMP} determines from Section 2.1 of this Handbook V_{BMP}= 308 ft^3

Permeable Pavement Surface Area

Reservoir Layer Depth, b_{TH} b_{TH}= 12 inches

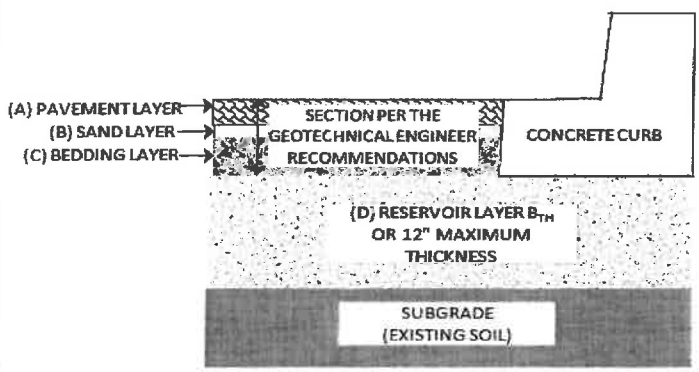
Minimum Surface Area Required, A_S

$$A_{S\,(ft)} = \frac{V_{BMP}\,(ft^3)}{(0.4 \times b_{TH}\,(in))\,/\,12(in/ft)}$$

A_S= 770 ft^2

Proposed Surface Area = 2,720 ft^2

Permeable Pavement Cross Section



Per the Geotechnical Engineer's Recommendations	(A)	4	in
	(B)	3	in
	(C)	4	in
Reservoir Layer	(D)	12	in
Total Permeable Pavement Section		23	in
Slope of Permeable Pavement		1	%

Sediment Control Provided? (Use pulldown) Yes

Geotechnical report attached? (Use pulldown) Yes

Describe Surrounding Vegetation:

Notes:

If the permeable pavement has been designed correctly, there should be no error messages on the spreadsheet.

Bioretention Facility - Design Procedure	BMP ID: BRB 6	Legend:	Required Entries / Calculated Cells
Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T= 0.31	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}= 683	ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S = 3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T= 4.0	ft
Total Effective Depth, d_E		
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E = 1.80	ft
Minimum Surface Area, A_m		
$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M= 380	ft^2
Proposed Surface Area	A= 440	ft^2
Minimum Required Length of Bioretention Facility, L	L = 95.0	ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z = 4	:1
Diameter of Underdrain	6	inches
Longitudinal Slope of Site (3% maximum)	0	%
6" Check Dam Spacing	0	feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID BRB 7	Legend:	Required Entries / Calculated Cells

Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature A_T= 0.86 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 1,894 ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 4.0 ft

Total Effective Depth, d_E

$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$ d_E = 1.80 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$ A_M = 1,053 ft^2

Proposed Surface Area A= 592 ft^2

ERROR, the proposed surface area must be equal to or greater than the minimum surface area

Minimum Required Length of Bioretention Facility, L L = 263.3 ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 1 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Permeable Pavement - Design Procedure	BMP ID PP 7	Legend:	Required Entries / Calculated Cells

Company Name: Pfeiler Associates — Date: 1/18/2016

Designed by: LJM — County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T= 0.86 acres

Enter V_{BMP} determines from Section 2.1 of this Handbook — V_{BMP}= 830 ft^3

Permeable Pavement Surface Area

Reservoir Layer Depth, b_{TH} — b_{TH}= 12 inches

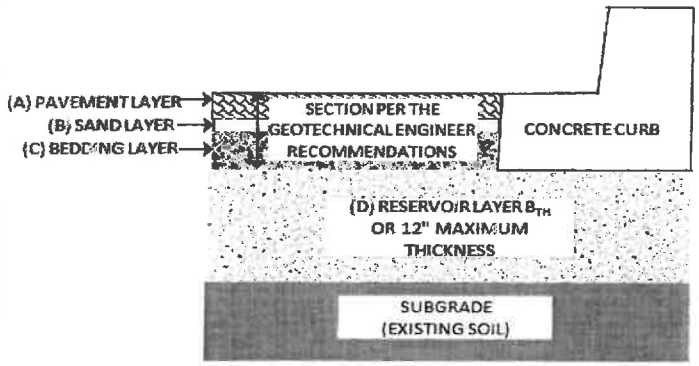
Minimum Surface Area Required, A_S

$$A_{S\,(ft)} = \frac{V_{BMP}\,(ft^3)}{(0.4 \times b_{TH}\,(in)) / 12(in/ft)}$$

A_S= 2,075 ft^2

Proposed Surface Area = 4,576 ft^2

Permeable Pavement Cross Section



Per the Geotechnical Engineer's Recommendations	(A)	4	in
	(B)	3	in
	(C)	4	in
Reservoir Layer	(D)	12	in
Total Permeable Pavement Section		23	in
Slope of Permeable Pavement		1	%

Sediment Control Provided? (Use pulldown) — Yes

Geotechnical report attached? (Use pulldown) — Yes

Describe Surrounding Vegetation:

Notes:

If the permeable pavement has been designed correctly, there should be no error messages on the spreadsheet.

Bioretention Facility - Design Procedure	BMP ID BRB 8	Legend:	Required Entries / Calculated Cells

Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T= 0.24	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}= 268	ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S = 3.0	ft
Top Width of Bioretention Facility, excluding curb	w_T = 4.0	ft
Total Effective Depth, d_E		
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E = 1.80	ft
Minimum Surface Area, A_m		
$A_M\ (ft^2) = \dfrac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M = 149	ft^2
Proposed Surface Area	A= 360	ft^2
Minimum Required Length of Bioretention Facility, L	L = 37.3	ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z = 1	:1
Diameter of Underdrain	6	inches
Longitudinal Slope of Site (3% maximum)	0	%
6" Check Dam Spacing	0	feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID BRB 9	Legend:	Required Entries / Calculated Cells
Company Name:	Pfeiler Associates	Date:	1/18/2016
Designed by:	LJM	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	0.37 acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	682 ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	3.0 ft
Top Width of Bioretention Facility, excluding curb	w_T =	4.0 ft
Total Effective Depth, d_E		
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.80 ft
Minimum Surface Area, A_m $A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$	A_M =	379 ft^2
Proposed Surface Area	A=	520 ft^2
Minimum Required Length of Bioretention Facility, L	L =	94.8 ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	1 :1
Diameter of Underdrain		6 inches
Longitudinal Slope of Site (3% maximum)		0 %
6" Check Dam Spacing		0 feet

Describe Vegetation:

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to compliance with the HMP Performance Standards

Summary Of Mitigation Volumes and Peak Q's

Year Storm	duration Hours	Proposed Volume	Existing volume	delta Volume	BMP Volume	Detention Volume required	Peak Q Devloped	Peak Q Existing	Delta Q
2	3	15006	11109	3897	12916	0	4.07	3.6	0.47
5	3	22659	19495	3164	12916	0	5.94	5.4	0.54
10	3	27080	22763	4317	12916	0	7.02	6.44	0.58
					12916				
2	6	20489	13455	7034	12916	0	4.26	2.84	1.42
5	6	30129	22221	7908	12916	0	5.93	5.39	0.54
10	6	35950	27481	8469	12916	0	6.92	6.35	0.57
2	24	29997	27502	2495	12916	0	1.19	1.48	0
5	24	49924	46020	3904	12916	0	2.48	2.32	0.16
10	24	65070	60038	5032	12916	0	3.08	2.89	0.19

RAINFALL PATTERNS IN PERCENT

3-HOUR STORM

TIME PERIOD	5-MIN PERIOD	10-MIN PERIOD	15-MIN PERIOD	30-MIN PERIOD
1	1.3	2.6	3.7	8.5
2	1.3	2.6	4.8	10.0
3	1.1	3.3	5.1	13.9
4	1.5	3.3	4.9	17.4
5	1.5	3.3	6.6	29.9
6	1.8	3.4	7.3	20.3
7	1.5	4.4	8.4	
8	1.8	4.2	9.0	
9	1.8	5.3	12.3	
10	1.5	5.1	17.6	
11	1.6	6.4	16.1	
12	1.8	5.9	4.2	
13	2.2	7.3		
14	2.2	8.5		
15	2.2	14.1		
16	2.0	14.1		
17	2.6	3.8		
18	2.7	2.4		
19	2.4			
20	2.7			
21	3.3			
22	3.1			
23	2.9			
24	3.0			
25	3.1			
26	4.2			
27	5.0			
28	3.5			
29	6.8			
30	7.3			
31	8.2			
32	5.9			
33	2.0			
34	1.8			
35	1.8			
36	.6			

6-HOUR STORM

TIME PERIOD	5-MIN PERIOD	10-MIN PERIOD	15-MIN PERIOD	30-MIN PERIOD
1	.5	1.1	1.7	3.6
2	.6	1.2	1.9	4.3
3	.6	1.3	2.1	4.8
4	.6	1.4	2.2	4.9
5	.6	1.4	2.4	5.3
6	.7	1.5	2.4	5.8
7	.7	1.6	2.4	6.8
8	.7	1.6	2.5	9.0
9	.7	1.6	2.6	11.6
10	.7	1.6	2.7	14.4
11	.7	1.6	2.8	25.1
12	.8	1.7	3.0	4.4
13	.8	1.7	3.2	
14	.8	1.8	3.6	
15	.8	1.8	4.3	
16	.8	1.8	4.7	
17	.8	2.0	5.4	
18	.8	2.0	6.2	
19	.8	2.1	6.9	
20	.8	2.2	7.5	
21	.8	2.5	10.6	
22	.8	2.8	14.5	
23	.8	3.0	3.4	
24	.9	3.2	1.0	
25	.8	3.5		
26	.9	3.9		
27	.9	4.2		
28	.9	4.5		
29	.9	4.8		
30	.9	5.1		
31	.9	6.7		
32	.9	8.1		
33	1.0	10.3		
34	1.0	2.8		
35	1.0	1.1		
36	1.0	.5		
37	1.0			
38	1.1			
39	1.1			
40	1.1			
41	1.2			
42	1.3			
43	1.4			
44	1.4			
45	1.5			
46	1.5			
47	1.6			
48	1.6			

TIME PERIOD	5-MIN PERIOD
49	1.7
50	1.8
51	1.9
52	2.0
53	2.1
54	2.1
55	2.2
56	2.3
57	2.4
58	2.4
59	2.5
60	2.6
61	3.1
62	3.6
63	3.9
64	4.2
65	4.7
66	5.6
67	1.9
68	.9
69	.6
70	.5
71	.3
72	.2

24-HOUR STORM

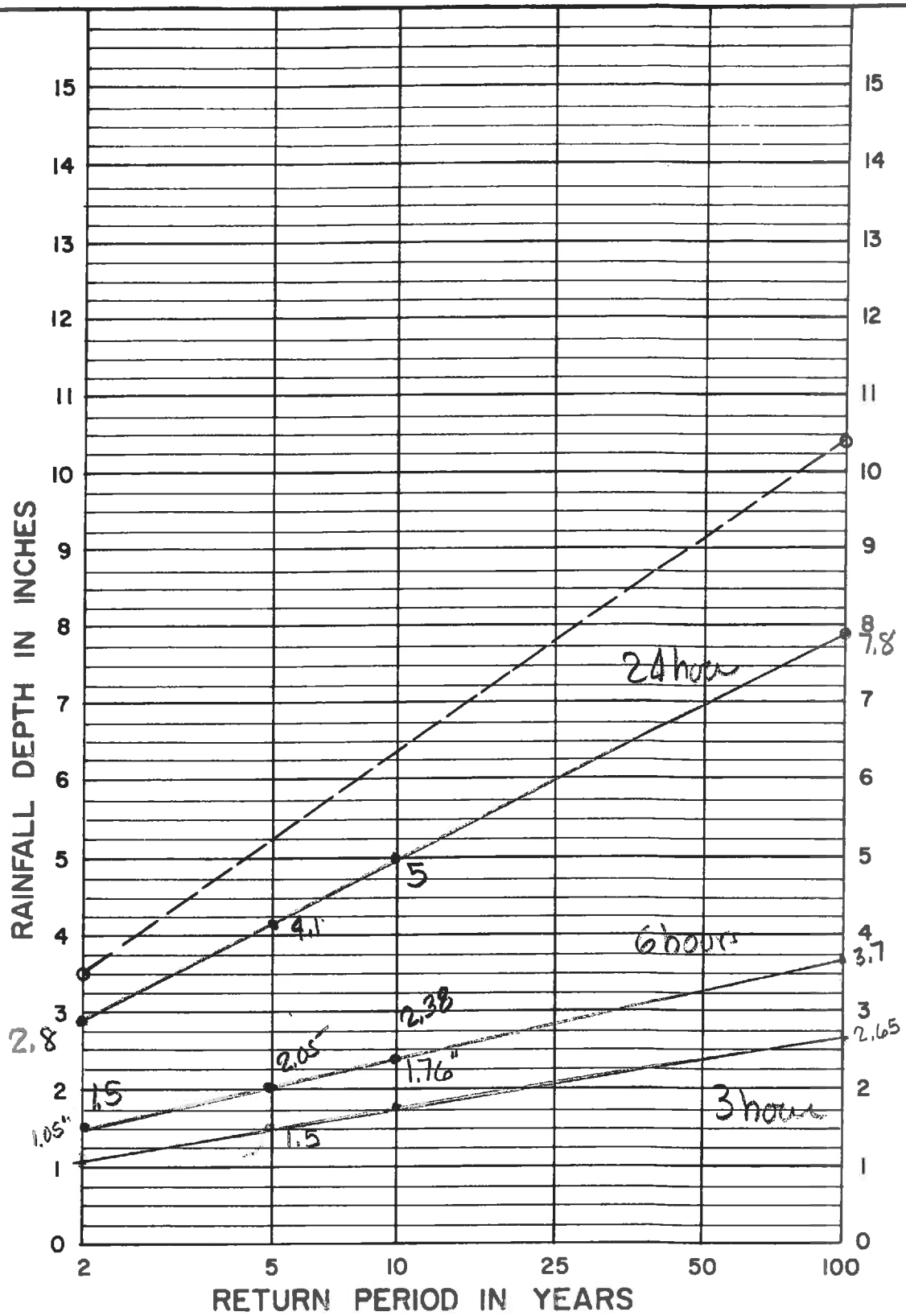
TIME PERIOD	15-MIN PERIOD	30-MIN PERIOD	60-MIN PERIOD
1	.2	.5	1.2
2	.3	.7	1.3
3	.3	.6	1.8
4	.4	.7	2.1
5	.3	.8	2.8
6	.3	1.0	2.9
7	.3	1.0	3.8
8	.4	1.1	4.6
9	.4	1.3	6.3
10	.4	1.5	8.2
11	.5	1.3	7.0
12	.5	1.6	7.3
13	.5	1.8	10.8
14	.5	2.0	11.4
15	.5	2.1	10.4
16	.6	2.5	8.5
17	.6	3.0	1.4
18	.7	3.3	1.9
19	.7	3.9	1.3
20	.8	4.3	1.2
21	.6	3.0	1.1
22	.7	4.0	1.0
23	.8	3.8	.9
24	.8	3.5	.8
25	.9	5.1	
26	.9	5.7	
27	1.0	6.8	
28	1.0	4.6	
29	1.0	5.3	
30	1.1	5.1	
31	1.2	4.7	
32	1.3	3.8	
33	1.5	.8	
34	1.5	.6	
35	1.6	1.0	
36	1.7	.9	
37	1.9	.8	
38	2.0	.5	
39	2.1	.7	
40	2.2	.5	
41	1.5	.6	
42	1.5	.5	
43	2.0	.5	
44	2.0	.5	
45	1.9	.5	
46	1.9	.4	
47	1.7	.4	
48	1.8	.4	

TIME PERIOD	15-MIN PERIOD
49	2.5
50	2.6
51	2.8
52	2.9
53	3.4
54	3.4
55	2.3
56	2.3
57	2.7
58	2.6
59	2.6
60	2.5
61	2.4
62	2.3
63	1.9
64	1.9
65	.4
66	.4
67	.3
68	.3
69	.5
70	.5
71	.5
72	.4
73	.4
74	.4
75	.3
76	.2
77	.3
78	.4
79	.3
80	.2
81	.3
82	.3
83	.3
84	.2
85	.3
86	.2
87	.3
88	.2
89	.3
90	.2
91	.2
92	.2
93	.2
94	.2
95	.2
96	.2

NOTES:

1. 3 and 6-hour patterns based on the Indio area thunderstorm of September 24,1939.
2. 24-hour patterns based on the general storm of March 2 & 3,1938.

RAINFALL PATTERNS IN PERCENT



NOTE:

1. For intermediate return periods plot 2-year and 100-year values from maps for a specific duration, then connect points and read value for desired return period. For example given 2-year 24-hour = 3.50" and 100-year 24-hour = 10.40", 25-year 24-hour = 7.80"

Reference: NOAA Atlas 2, Volume XI-California, 1973.

RCFC & WCD

HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

RAINFALL INTENSITY—INCHES PER HOUR

MIRA LOMA

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	2.84	4.48
6	2.58	4.07
7	2.37	3.75
8	2.21	3.49
9	2.08	3.28
10	1.96	3.10
11	1.87	2.95
12	1.78	2.82
13	1.71	2.70
14	1.64	2.60
15	1.58	2.50
16	1.53	2.42
17	1.48	2.34
18	1.44	2.27
19	1.40	2.21
20	1.36	2.15
22	1.29	2.04
24	1.24	1.95
26	1.18	1.87
28	1.14	1.80
30	1.10	1.73
32	1.06	1.67
34	1.03	1.62
36	1.00	1.57
38	.97	1.53
40	.94	1.49
45	.89	1.40
50	.84	1.32
55	.80	1.26
60	.76	1.20
65	.73	1.15
70	.70	1.11
75	.68	1.07
80	.65	1.03
85	.63	1.00

SLOPE = .530

MURRIETA - TEMECULA & RANCHO CALIFORNIA

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	3.45	5.10
6	3.12	4.61
7	2.87	4.24
8	2.67	3.94
9	2.50	3.69
10	2.36	3.48
11	2.24	3.30
12	2.13	3.15
13	2.04	3.01
14	1.96	2.89
15	1.89	2.79
16	1.82	2.69
17	1.76	2.60
18	1.71	2.52
19	1.66	2.45
20	1.61	2.38
22	1.53	2.26
24	1.46	2.15
26	1.39	2.06
28	1.34	1.98
30	1.29	1.90
32	1.24	1.84
34	1.20	1.78
36	1.17	1.72
38	1.13	1.67
40	1.10	1.62
45	1.03	1.52
50	.97	1.44
55	.92	1.36
60	.88	1.30
65	.84	1.24
70	.81	1.19
75	.78	1.15
80	.75	1.11
85	.73	1.07

SLOPE = .550

NORCO

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	2.77	4.16
6	2.53	3.79
7	2.34	3.51
8	2.19	3.29
9	2.07	3.10
10	1.96	2.94
11	1.87	2.80
12	1.79	2.68
13	1.72	2.58
14	1.66	2.48
15	1.60	2.40
16	1.55	2.32
17	1.50	2.25
18	1.46	2.19
19	1.42	2.13
20	1.39	2.08
22	1.32	1.98
24	1.26	1.90
26	1.22	1.82
28	1.17	1.76
30	1.13	1.70
32	1.10	1.64
34	1.06	1.59
36	1.03	1.55
38	1.01	1.51
40	.98	1.47
45	.92	1.39
50	.88	1.31
55	.84	1.25
60	.80	1.20
65	.77	1.15
70	.74	1.11
75	.72	1.07
80	.69	1.04
85	.67	1.01

SLOPE = .500

PALM SPRINGS

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	4.23	6.76
6	3.80	6.08
7	3.48	5.56
8	3.22	5.15
9	3.01	4.81
10	2.83	4.52
11	2.67	4.28
12	2.54	4.07
13	2.43	3.88
14	2.33	3.72
15	2.23	3.58
16	2.15	3.44
17	2.08	3.32
18	2.01	3.22
19	1.95	3.12
20	1.89	3.03
22	1.79	2.86
24	1.70	2.72
26	1.62	2.60
28	1.56	2.49
30	1.49	2.39
32	1.44	2.30
34	1.39	2.22
36	1.34	2.15
38	1.30	2.09
40	1.27	2.02
45	1.18	1.89
50	1.11	1.78
55	1.05	1.68
60	1.00	1.60
65	.95	1.53
70	.91	1.46
75	.88	1.41
80	.85	1.35
85	.82	1.31

SLOPE = .580

PERRIS VALLEY

DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	2.64	3.78
6	2.41	3.46
7	2.24	3.21
8	2.09	3.01
9	1.98	2.84
10	1.88	2.69
11	1.79	2.57
12	1.72	2.46
13	1.65	2.37
14	1.59	2.29
15	1.54	2.21
16	1.49	2.14
17	1.45	2.08
18	1.41	2.02
19	1.37	1.97
20	1.34	1.92
22	1.28	1.83
24	1.22	1.75
26	1.18	1.69
28	1.13	1.63
30	1.10	1.57
32	1.06	1.52
34	1.03	1.48
36	1.00	1.44
38	.98	1.40
40	.95	1.37
45	.90	1.29
50	.85	1.22
55	.81	1.17
60	.78	1.12
65	.75	1.08
70	.72	1.04
75	.70	1.00
80	.68	.97
85	.66	.94

SLOPE = .490

STANDARD INTENSITY-DURATION CURVES DATA

Synthetic Hydrograph						
total adjusted rain		1.05		total Area	4.73	
Unit time		10				
storm	2 year	3 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	2.6	0.1638	0.127		0.0368	0.17
2	2.6	0.1638	0.127		0.0368	0.17
3	3.3	0.2079	0.127		0.0809	0.38
4	3.3	0.2079	0.127		0.0809	0.38
5	3.3	0.2079	0.127		0.0809	0.38
6	4.4	0.2772	0.127		0.1502	0.71
7	4.2	0.2646	0.127		0.1376	0.65
8	5.3	0.3339	0.127		0.2069	0.98
9	5.1	0.3213	0.127		0.1943	0.92
10	6.4	0.4032	0.127		0.2762	1.31
11	5.9	0.3717	0.127		0.2447	1.16
12	7.3	0.4599	0.127		0.3329	1.57
13	8.5	0.5355	0.127		0.4085	1.93
14	14.1	0.8883	0.127		0.7613	3.60
15	14.1	0.8883	0.127		0.7613	3.60
16	3.6	0.2268	0.127		0.0998	0.47
17	2.4	0.1512	0.127		0.0242	0.11
						3.91
			Volume			2348.52

Synthetic Hydrograph						
total adjusted rain		1.5		total Area	4.73	
Unit time		10				
storm	5 year	3 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	2.6	0.234	0.127		0.107	0.51
2	2.6	0.234	0.127		0.107	0.51
3	3.3	0.297	0.127		0.17	0.80
4	3.3	0.297	0.127		0.17	0.80
5	3.3	0.297	0.127		0.17	0.80
6	4.4	0.396	0.127		0.269	1.27
7	4.2	0.378	0.127		0.251	1.19
8	5.3	0.477	0.127		0.35	1.66
9	5.1	0.459	0.127		0.332	1.57
10	6.4	0.576	0.127		0.449	2.12
11	5.9	0.531	0.127		0.404	1.91
12	7.3	0.657	0.127		0.53	2.51
13	8.5	0.765	0.127		0.638	3.02
14	14.1	1.269	0.127		1.142	5.40
15	14.1	1.269	0.127		1.142	5.40
16	3.6	0.324	0.127		0.197	0.93
17	2.4	0.216	0.127		0.089	0.42
						30.83
			Volume			18495.25

Synthetic Hydrograph						
total adjusted rain		1.76		total Area	4.73	
Unit time		10				
storm	10 year	3 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	2.6	0.27456	0.127		0.14756	0.70
2	2.6	0.27456	0.127		0.14756	0.70
3	3.3	0.34848	0.127		0.22148	1.05
4	3.3	0.34848	0.127		0.22148	1.05
5	3.3	0.34848	0.127		0.22148	1.05
6	4.4	0.46464	0.127		0.33764	1.60
7	4.2	0.44352	0.127		0.31652	1.50
8	5.3	0.55968	0.127		0.43268	2.05
9	5.1	0.53856	0.127		0.41156	1.95
10	6.4	0.67584	0.127		0.54884	2.60
11	5.9	0.62304	0.127		0.49604	2.35
12	7.3	0.77088	0.127		0.64388	3.05
13	8.5	0.8976	0.127		0.7706	3.64
14	14.1	1.48896	0.127		1.36196	6.44
15	14.1	1.48896	0.127		1.36196	6.44
16	3.6	0.38016	0.127		0.25316	1.20
17	2.4	0.25344	0.127		0.12644	0.60
					8.02	
			Volume		4812.504	

Synthetic Hydrograph						
total adjusted rain		1.5				
Unit time		10	total Area	4.73		
	2 year	6 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	1.1	0.099	0.127	0.0792	0.0198	0.093654
2	1.2	0.108	0.127	0.0864	0.0216	0.102168
3	1.3	0.117	0.127	0.0936	0.0234	0.110682
4	1.4	0.126	0.127	0.1008	0.0252	0.119196
5	1.4	0.126	0.127	0.1008	0.0252	0.119196
6	1.5	0.135	0.127	0.108	0.008	0.03784
7	1.6	0.144	0.127	0.1152	0.017	0.08041
8	1.6	0.144	0.127	0.1152	0.017	0.08041
9	1.6	0.144	0.127	0.1152	0.017	0.08041
10	1.6	0.144	0.127	0.1152	0.017	0.08041
11	1.6	0.144	0.127	0.1152	0.017	0.08041
12	1.7	0.153	0.127	0.1224	0.026	0.12298
13	1.7	0.153	0.127	0.1224	0.026	0.12298
14	1.8	0.162	0.127	0.1296	0.035	0.16555
15	1.8	0.162	0.127	0.1296	0.035	0.16555
16	1.8	0.162	0.127	0.1296	0.035	0.16555
17	2	0.18	0.127	0.144	0.053	0.25069
18	2	0.18	0.127	0.144	0.053	0.25069
19	2.1	0.189	0.127	0.1512	0.062	0.29326
20	2.2	0.198	0.127	0.1584	0.071	0.33583
21	2.5	0.225	0.127	0.18	0.098	0.46354
22	2.8	0.252	0.127	0.2016	0.125	0.59125
23	3	0.27	0.127	0.216	0.143	0.67639
24	3.2	0.288	0.127	0.2304	0.161	0.76153
25	3.5	0.315	0.127	0.252	0.188	0.88924
26	3.9	0.351	0.127	0.2808	0.224	1.05952
27	4.2	0.378	0.127	0.3024	0.251	1.18723
28	4.5	0.405	0.127	0.324	0.278	1.31494
29	4.8	0.432	0.127	0.3456	0.305	1.44265
30	5.1	0.459	0.127	0.3672	0.332	1.57036
31	6.7	0.603	0.127	0.4824	0.476	2.25148
32	8.1	0.729	0.127	0.5832	0.602	2.84746
33	10.3	0.927	0.127	0.7416	0.8	3.784
34	2.8	0.252	0.127	0.2016	0.125	0.59125
35	1.1	0.099	0.127	0.0792	0.0198	0.093654
36	0.5	0.045	0.127	0.036	0.009	0.04257
						22.42493
				Volume		13454.96

Synthetic Hydrograph						
total adjusted rain		2.05				
Unit time		10	total Area	4.73		
	5 year	6 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	1.1	0.1353	0.127	0.10824	0.02706	0.127994
2	1.2	0.1476	0.127	0.11808	0.02952	0.13963
3	1.3	0.1599	0.127	0.12792	0.03198	0.151265
4	1.4	0.1722	0.127	0.13776	0.03444	0.162901
5	1.4	0.1722	0.127	0.13776	0.03444	0.162901
6	1.5	0.1845	0.127	0.1476	0.0575	0.271975
7	1.6	0.1968	0.127	0.15744	0.0698	0.330154
8	1.6	0.1968	0.127	0.15744	0.0698	0.330154
9	1.6	0.1968	0.127	0.15744	0.0698	0.330154
10	1.6	0.1968	0.127	0.15744	0.0698	0.330154
11	1.6	0.1968	0.127	0.15744	0.0698	0.330154
12	1.7	0.2091	0.127	0.16728	0.0821	0.388333
13	1.7	0.2091	0.127	0.16728	0.0821	0.388333
14	1.8	0.2214	0.127	0.17712	0.0944	0.446512
15	1.8	0.2214	0.127	0.17712	0.0944	0.446512
16	1.8	0.2214	0.127	0.17712	0.0944	0.446512
17	2	0.246	0.127	0.1968	0.119	0.56287
18	2	0.246	0.127	0.1968	0.119	0.56287
19	2.1	0.2583	0.127	0.20664	0.1313	0.621049
20	2.2	0.2706	0.127	0.21648	0.1436	0.679228
21	2.5	0.3075	0.127	0.246	0.1805	0.853765
22	2.8	0.3444	0.127	0.27552	0.2174	1.028302
23	3	0.369	0.127	0.2952	0.242	1.14466
24	3.2	0.3936	0.127	0.31488	0.2666	1.261018
25	3.5	0.4305	0.127	0.3444	0.3035	1.435555
26	3.9	0.4797	0.127	0.38376	0.3527	1.668271
27	4.2	0.5166	0.127	0.41328	0.3896	1.842808
28	4.5	0.5535	0.127	0.4428	0.4265	2.017345
29	4.8	0.5904	0.127	0.47232	0.4634	2.191882
30	5.1	0.6273	0.127	0.50184	0.5003	2.366419
31	6.7	0.8241	0.127	0.65928	0.6971	3.297283
32	8.1	0.9963	0.127	0.79704	0.8693	4.111789
33	10.3	1.2669	0.127	1.01352	1.1399	5.391727
34	2.8	0.3444	0.127	0.27552	0.2174	1.028302
35	1.1	0.1353	0.127	0.10824	0.02706	0.127994
36	0.5	0.0615	0.127	0.0492	0.0123	0.058179
						37.03495
				Volume		22220.97

Synthetic Hydrograph						
total adjusted rain		2.38				
Unit time		10		4.73		
	10 year	6 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	1.1	0.15708	0.127	0.125664	0.031416	0.148598
2	1.2	0.17136	0.127	0.137088	0.034272	0.162107
3	1.3	0.18564	0.127	0.148512	0.037128	0.175615
4	1.4	0.19992	0.127	0.159936	0.039984	0.189124
5	1.4	0.19992	0.127	0.159936	0.039984	0.189124
6	1.5	0.2142	0.127	0.17136	0.0872	0.412456
7	1.6	0.22848	0.127	0.182784	0.10148	0.48
8	1.6	0.22848	0.127	0.182784	0.10148	0.48
9	1.6	0.22848	0.127	0.182784	0.10148	0.48
10	1.6	0.22848	0.127	0.182784	0.10148	0.48
11	1.6	0.22848	0.127	0.182784	0.10148	0.48
12	1.7	0.24276	0.127	0.194208	0.11576	0.547545
13	1.7	0.24276	0.127	0.194208	0.11576	0.547545
14	1.8	0.25704	0.127	0.205632	0.13004	0.615089
15	1.8	0.25704	0.127	0.205632	0.13004	0.615089
16	1.8	0.25704	0.127	0.205632	0.13004	0.615089
17	2	0.2856	0.127	0.22848	0.1586	0.750178
18	2	0.2856	0.127	0.22848	0.1586	0.750178
19	2.1	0.29988	0.127	0.239904	0.17288	0.817722
20	2.2	0.31416	0.127	0.251328	0.18716	0.885267
21	2.5	0.357	0.127	0.2856	0.23	1.0879
22	2.8	0.39984	0.127	0.319872	0.27284	1.290533
23	3	0.4284	0.127	0.34272	0.3014	1.425622
24	3.2	0.45696	0.127	0.365568	0.32996	1.560711
25	3.5	0.4998	0.127	0.39984	0.3728	1.763344
26	3.9	0.55692	0.127	0.445536	0.42992	2.033522
27	4.2	0.59976	0.127	0.479808	0.47276	2.236155
28	4.5	0.6426	0.127	0.51408	0.5156	2.438788
29	4.8	0.68544	0.127	0.548352	0.55844	2.641421
30	5.1	0.72828	0.127	0.582624	0.60128	2.844054
31	6.7	0.95676	0.127	0.765408	0.82976	3.924765
32	8.1	1.15668	0.127	0.925344	1.02968	4.870386
33	10.3	1.47084	0.127	1.176672	1.34384	6.356363
34	2.8	0.39984	0.127	0.319872	0.27284	1.290533
35	1.1	0.15708	0.127	0.125664	0.031416	0.148598
36	0.5	0.0714	0.127	0.05712	0.01428	0.067544
						45.80097
			total Volume			27480.58

Synthetic Hydrograph						
total adjusted rain		4.1		total Area	4.73	
Unit time		15				
	5 year	24 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	0.2	0.0328	0.079501	0.02624	0.00656	0.031029
2	0.3	0.0492	0.079241	0.03936	0.00984	0.046543
3	0.3	0.0492	0.078982	0.03936	0.00984	0.046543
4	0.4	0.0656	0.078725	0.05248	0.01312	0.062058
5	0.3	0.0492	0.078469	0.03936	0.00984	0.046543
6	0.3	0.0492	0.078215	0.03936	0.00984	0.046543
7	0.3	0.0492	0.077963	0.03936	0.00984	0.046543
8	0.4	0.0656	0.077711	0.05248	0.01312	0.062058
9	0.4	0.0656	0.077462	0.05248	0.01312	0.062058
10	0.4	0.0656	0.077214	0.05248	0.01312	0.062058
11	0.5	0.082	0.076968	0.0656	0.0164	0.077572
12	0.5	0.082	0.076723	0.0656	0.0164	0.077572
13	0.5	0.082	0.07648	0.0656	0.0164	0.077572
14	0.5	0.082	0.076238	0.0656	0.0164	0.077572
15	0.5	0.082	0.075998	0.0656	0.0164	0.077572
16	0.6	0.0984	0.07576	0.07872	0.02264	0.107089
17	0.6	0.0984	0.075523	0.07872	0.022877	0.108208
18	0.7	0.1148	0.075288	0.09184	0.039512	0.186892
19	0.7	0.1148	0.075054	0.09184	0.02296	0.108601
20	0.8	0.1312	0.074823	0.10496	0.056377	0.266665
21	0.6	0.0984	0.074593	0.07872	0.01968	0.093086
22	0.7	0.1148	0.074364	0.09184	0.040436	0.191261
23	0.8	0.1312	0.074137	0.10496	0.02624	0.124115
24	0.8	0.1312	0.073912	0.10496	0.057288	0.27097
25	0.9	0.1476	0.073689	0.11808	0.073911	0.349598
26	0.9	0.1476	0.073468	0.11808	0.074132	0.350646
27	1	0.164	0.073248	0.1312	0.090752	0.429258
28	1	0.164	0.07303	0.1312	0.09097	0.43029
29	1	0.164	0.072813	0.1312	0.091187	0.431313
30	1.1	0.1804	0.072599	0.14432	0.107801	0.5099
31	1.2	0.1968	0.072386	0.15744	0.124414	0.588478
32	1.3	0.2132	0.072175	0.17056	0.141025	0.667048
33	1.5	0.246	0.071966	0.1968	0.174034	0.823182
34	1.5	0.246	0.071758	0.1968	0.174242	0.824163
35	1.6	0.2624	0.071553	0.20992	0.190847	0.902707
36	1.7	0.2788	0.071349	0.22304	0.207451	0.981242
37	1.9	0.3116	0.071147	0.24928	0.240453	1.137341
38	2	0.328	0.070947	0.2624	0.257053	1.215859
39	2.1	0.3444	0.070749	0.27552	0.273651	1.294368
40	2.2	0.3608	0.070553	0.28864	0.290247	1.372868
41	1.5	0.246	0.070359	0.1968	0.175641	0.830783
42	1.5	0.246	0.070167	0.1968	0.175833	0.831692
43	2	0.328	0.069976	0.2624	0.258024	1.220453
44	2	0.328	0.069788	0.2624	0.258212	1.221344
45	1.9	0.3116	0.069601	0.24928	0.241999	1.144654
46	1.9	0.3116	0.069417	0.24928	0.242183	1.145526
47	1.7	0.2788	0.069234	0.22304	0.209566	0.991245
48	1.8	0.2952	0.069054	0.23616	0.226146	1.06967
49	2.5	0.41	0.068876	0.328	0.341124	1.613518
50	2.6	0.4264	0.0687	0.34112	0.3577	1.691923
51	2.8	0.4592	0.068525	0.36736	0.390675	1.847891
52	2.9	0.4756	0.068353	0.38048	0.407247	1.926277
53	3.4	0.5576	0.068183	0.44608	0.489417	2.31494
54	3.4	0.5576	0.068016	0.44608	0.489584	2.315734
55	2.3	0.3772	0.06785	0.30176	0.30935	1.463225
56	2.3	0.3772	0.067687	0.30176	0.309513	1.463997
57	2.7	0.4428	0.067526	0.35424	0.375274	1.775048
58	2.6	0.4264	0.067367	0.34112	0.359033	1.698227
59	2.6	0.4264	0.06721	0.34112	0.35919	1.698968
60	2.5	0.41	0.067056	0.328	0.342944	1.622125

61	2.4	0.3936	0.066904	0.31488	0.326696	1.545272
62	2.3	0.3772	0.066754	0.30176	0.310446	1.468407
63	1.9	0.3116	0.066607	0.24928	0.244993	1.158815
64	1.9	0.3116	0.066463	0.24928	0.245137	1.1595
65	0.4	0.0656	0.06632	0.05248	0.01312	0.062058
66	0.4	0.0656	0.066181	0.05248	0.01312	0.062058
67	0.3	0.0492	0.066043	0.03936	0.00984	0.046543
68	0.3	0.0492	0.065909	0.03936	0.00984	0.046543
69	0.5	0.082	0.065777	0.0656	0.016223	0.076736
70	0.5	0.082	0.065647	0.0656	0.016353	0.077348
71	0.5	0.082	0.065521	0.0656	0.016479	0.077947
72	0.4	0.0656	0.065397	0.05248	0.000203	0.000961
73	0.4	0.0656	0.065276	0.05248	0.000324	0.001534
74	0.4	0.0656	0.065157	0.05248	0.000443	0.002093
75	0.3	0.0492	0.065042	0.03936	0.00984	0.046543
76	0.2	0.0328	0.06493	0.02624	0.00656	0.031029
77	0.3	0.0492	0.064821	0.03936	0.00984	0.046543
78	0.4	0.0656	0.064714	0.05248	0.000886	0.004189
79	0.3	0.0492	0.064611	0.03936	0.00984	0.046543
80	0.2	0.0328	0.064512	0.02624	0.00656	0.031029
81	0.3	0.0492	0.064415	0.03936	0.00984	0.046543
82	0.3	0.0492	0.064323	0.03936	0.00984	0.046543
83	0.3	0.0492	0.064233	0.03936	0.00984	0.046543
84	0.2	0.0328	0.064148	0.02624	0.00656	0.031029
85	0.3	0.0492	0.064066	0.03936	0.00984	0.046543
86	0.2	0.0328	0.063988	0.02624	0.00656	0.031029
87	0.3	0.0492	0.063915	0.03936	0.00984	0.046543
88	0.2	0.0328	0.063846	0.02624	0.00656	0.031029
89	0.3	0.0492	0.063781	0.03936	0.00984	0.046543
90	0.2	0.0328	0.063721	0.02624	0.00656	0.031029
91	0.2	0.0328	0.063667	0.02624	0.00656	0.031029
92	0.2	0.0328	0.063618	0.02624	0.00656	0.031029
93	0.2	0.0328	0.063576	0.02624	0.00656	0.031029
94	0.2	0.0328	0.06354	0.02624	0.00656	0.031029
95	0.2	0.0328	0.063514	0.02624	0.00656	0.031029
96	0.2	0.0328	0.0635	0.02624	0.00656	0.031029
						51.13346
			total volume			46020.12

Synthetic Hydrograph						
	total adjusted rain		2.8		total Area	4.73
	Unit time		15			
	2 year	24 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	0.2	0.0224	0.079501	0.01792	0.00448	0.02119
2	0.3	0.0336	0.079241	0.02688	0.00672	0.031786
3	0.3	0.0336	0.078982	0.02688	0.00672	0.031786
4	0.4	0.0448	0.078725	0.03584	0.00896	0.042381
5	0.3	0.0336	0.078469	0.02688	0.00672	0.031786
6	0.3	0.0336	0.078215	0.02688	0.00672	0.031786
7	0.3	0.0336	0.077963	0.02688	0.00672	0.031786
8	0.4	0.0448	0.077711	0.03584	0.00896	0.042381
9	0.4	0.0448	0.077462	0.03584	0.00896	0.042381
10	0.4	0.0448	0.077214	0.03584	0.00896	0.042381
11	0.5	0.056	0.076968	0.0448	0.0112	0.052976
12	0.5	0.056	0.076723	0.0448	0.0112	0.052976
13	0.5	0.056	0.07648	0.0448	0.0112	0.052976
14	0.5	0.056	0.076238	0.0448	0.0112	0.052976
15	0.5	0.056	0.075998	0.0448	0.0112	0.052976
16	0.6	0.0672	0.07576	0.05376	0.01344	0.063571
17	0.6	0.0672	0.075523	0.05376	0.01344	0.063571
18	0.7	0.0784	0.075288	0.06272	0.01568	0.074166
19	0.7	0.0784	0.075054	0.06272	0.01568	0.074166
20	0.8	0.0896	0.074823	0.07168	0.01792	0.084762
21	0.6	0.0672	0.074593	0.05376	0.01344	0.063571
22	0.7	0.0784	0.074364	0.06272	0.01568	0.074166
23	0.8	0.0896	0.074137	0.07168	0.01792	0.084762
24	0.8	0.0896	0.073912	0.07168	0.015688	0.074202
25	0.9	0.1008	0.073689	0.08064	0.027111	0.128234
26	0.9	0.1008	0.073468	0.08064	0.027332	0.129282
27	1	0.112	0.073248	0.0896	0.038752	0.183298
28	1	0.112	0.07303	0.0896	0.03897	0.18433
29	1	0.112	0.072813	0.0896	0.039187	0.185353
30	1.1	0.1232	0.072599	0.09856	0.050601	0.239344
31	1.2	0.1344	0.072386	0.10752	0.062014	0.293326
32	1.3	0.1456	0.072175	0.11648	0.073425	0.3473
33	1.5	0.168	0.071966	0.1344	0.096034	0.454242
34	1.5	0.168	0.071758	0.1344	0.096242	0.455223
35	1.6	0.1792	0.071553	0.14336	0.107647	0.509171
36	1.7	0.1904	0.071349	0.15232	0.119051	0.56311
37	1.9	0.2128	0.071147	0.17024	0.141653	0.670017
38	2	0.224	0.070947	0.1792	0.153053	0.723939
39	2.1	0.2352	0.070749	0.18816	0.164451	0.777852
40	2.2	0.2464	0.070553	0.19712	0.175847	0.831756
41	1.5	0.168	0.070359	0.1344	0.097641	0.461843
42	1.5	0.168	0.070167	0.1344	0.097833	0.462752
43	2	0.224	0.069976	0.1792	0.154024	0.728533
44	2	0.224	0.069788	0.1792	0.154212	0.729424
45	1.9	0.2128	0.069601	0.17024	0.143199	0.67733
46	1.9	0.2128	0.069417	0.17024	0.143383	0.678202
47	1.7	0.1904	0.069234	0.15232	0.121166	0.573113
48	1.8	0.2016	0.069054	0.16128	0.132546	0.626942
49	2.5	0.28	0.068876	0.224	0.211124	0.998618
50	2.6	0.2912	0.0687	0.23296	0.2225	1.052427
51	2.8	0.3136	0.068525	0.25088	0.245075	1.159203
52	2.9	0.3248	0.068353	0.25984	0.256447	1.212993
53	3.4	0.3808	0.068183	0.30464	0.312617	1.478676
54	3.4	0.3808	0.068016	0.30464	0.312784	1.47947
55	2.3	0.2576	0.06785	0.20608	0.18975	0.897517
56	2.3	0.2576	0.067687	0.20608	0.189913	0.898289
57	2.7	0.3024	0.067526	0.24192	0.234874	1.110956
58	2.6	0.2912	0.067367	0.23296	0.223833	1.058731
59	2.6	0.2912	0.06721	0.23296	0.22399	1.059472
60	2.5	0.28	0.067056	0.224	0.212944	1.007225

61	2.4	0.2688	0.066904	0.21504	0.201896	0.954968
62	2.3	0.2576	0.066754	0.20608	0.190846	0.902699
63	1.9	0.2128	0.066607	0.17024	0.146193	0.691491
64	1.9	0.2128	0.066463	0.17024	0.146337	0.692176
65	0.4	0.0448	0.06632	0.03584	0.00896	0.042381
66	0.4	0.0448	0.066181	0.03584	0.00896	0.042381
67	0.3	0.0336	0.066043	0.02688	0.00672	0.031786
68	0.3	0.0336	0.065909	0.02688	0.00672	0.031786
69	0.5	0.056	0.065777	0.0448	0.0112	0.052976
70	0.5	0.056	0.065647	0.0448	0.0112	0.052976
71	0.5	0.056	0.065521	0.0448	0.0112	0.052976
72	0.4	0.0448	0.065397	0.03584	0.00896	0.042381
73	0.4	0.0448	0.065276	0.03584	0.00896	0.042381
74	0.4	0.0448	0.065157	0.03584	0.00896	0.042381
75	0.3	0.0336	0.065042	0.02688	0.00672	0.031786
76	0.2	0.0224	0.06493	0.01792	0.00448	0.02119
77	0.3	0.0336	0.064821	0.02688	0.00672	0.031786
78	0.4	0.0448	0.064714	0.03584	0.00896	0.042381
79	0.3	0.0336	0.064611	0.02688	0.00672	0.031786
80	0.2	0.0224	0.064512	0.01792	0.00448	0.02119
81	0.3	0.0336	0.064415	0.02688	0.00672	0.031786
82	0.3	0.0336	0.064323	0.02688	0.00672	0.031786
83	0.3	0.0336	0.064233	0.02688	0.00672	0.031786
84	0.2	0.0224	0.064148	0.01792	0.00448	0.02119
85	0.3	0.0336	0.064066	0.02688	0.00672	0.031786
86	0.2	0.0224	0.063988	0.01792	0.00448	0.02119
87	0.3	0.0336	0.063915	0.02688	0.00672	0.031786
88	0.2	0.0224	0.063846	0.01792	0.00448	0.02119
89	0.3	0.0336	0.063781	0.02688	0.00672	0.031786
90	0.2	0.0224	0.063721	0.01792	0.00448	0.02119
91	0.2	0.0224	0.063667	0.01792	0.00448	0.02119
92	0.2	0.0224	0.063618	0.01792	0.00448	0.02119
93	0.2	0.0224	0.063576	0.01792	0.00448	0.02119
94	0.2	0.0224	0.06354	0.01792	0.00448	0.02119
95	0.2	0.0224	0.063514	0.01792	0.00448	0.02119
96	0.2	0.0224	0.0635	0.01792	0.00448	0.02119
						30.55743
			total volume			27501.68

Synthetic Hydrograph						
total adjusted rain		5			4.73	
Unit time		15				
	10 year	24 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	0.2	0.04	0.079501	0.032	0.008	0.03784
2	0.3	0.06	0.079241	0.048	0.012	0.05676
3	0.3	0.06	0.078982	0.048	0.012	0.05676
4	0.4	0.08	0.078725	0.064	0.016	0.07568
5	0.3	0.06	0.078469	0.048	0.012	0.05676
6	0.3	0.06	0.078215	0.048	0.012	0.05676
7	0.3	0.06	0.077963	0.048	0.012	0.05676
8	0.4	0.08	0.077711	0.064	0.016	0.07568
9	0.4	0.08	0.077462	0.064	0.016	0.07568
10	0.4	0.08	0.077214	0.064	0.016	0.07568
11	0.5	0.1	0.076968	0.08	0.02	0.0946
12	0.5	0.1	0.076723	0.08	0.02	0.0946
13	0.5	0.1	0.07648	0.08	0.02	0.0946
14	0.5	0.1	0.076238	0.08	0.02	0.0946
15	0.5	0.1	0.075998	0.08	0.02	0.0946
16	0.6	0.12	0.07576	0.096	0.04424	0.209256798
17	0.6	0.12	0.075523	0.096	0.044477	0.21037645
18	0.7	0.14	0.075288	0.112	0.064712	0.306088334
19	0.7	0.14	0.075054	0.112	0.064946	0.307192405
20	0.8	0.16	0.074823	0.128	0.085177	0.402888618
21	0.6	0.12	0.074593	0.096	0.045407	0.214776926
22	0.7	0.14	0.074364	0.112	0.065636	0.310457283
23	0.8	0.16	0.074137	0.128	0.085863	0.406129639
24	0.8	0.16	0.073912	0.128	0.086088	0.407193946
25	0.9	0.18	0.073689	0.144	0.106311	0.502850153
26	0.9	0.18	0.073468	0.144	0.106532	0.503898211
27	1	0.2	0.073248	0.16	0.126752	0.599538065
28	1	0.2	0.07303	0.16	0.12697	0.600569664
29	1	0.2	0.072813	0.16	0.127187	0.601592952
30	1.1	0.22	0.072599	0.176	0.147401	0.697207874
31	1.2	0.24	0.072386	0.192	0.167614	0.792814373
32	1.3	0.26	0.072175	0.208	0.187825	0.888412392
33	1.5	0.3	0.071966	0.24	0.228034	1.07860187
34	1.5	0.3	0.071758	0.24	0.228242	1.079582748
35	1.6	0.32	0.071553	0.256	0.248447	1.175154962
36	1.7	0.34	0.071349	0.272	0.268651	1.27071845
37	1.9	0.38	0.071147	0.304	0.308853	1.460873145
38	2	0.4	0.070947	0.32	0.329053	1.556418982
39	2.1	0.42	0.070749	0.336	0.349251	1.651955892
40	2.2	0.44	0.070553	0.352	0.369447	1.747483805
41	1.5	0.3	0.070359	0.24	0.229641	1.086202648
42	1.5	0.3	0.070167	0.24	0.229833	1.087112349
43	2	0.4	0.069976	0.32	0.330024	1.56101283
44	2	0.4	0.069788	0.32	0.330212	1.561904015
45	1.9	0.38	0.069601	0.304	0.310399	1.468185823
46	1.9	0.38	0.069417	0.304	0.310583	1.469058173
47	1.7	0.34	0.069234	0.272	0.270766	1.280720978
48	1.8	0.36	0.069054	0.288	0.290946	1.376174153
49	2.5	0.5	0.068876	0.4	0.431124	2.039217607
50	2.6	0.52	0.0687	0.416	0.4513	2.134651247
51	2.8	0.56	0.068525	0.448	0.491475	2.324674979
52	2.9	0.58	0.068353	0.464	0.511647	2.420088704
53	3.4	0.68	0.068183	0.544	0.611817	2.89389232
54	3.4	0.68	0.068016	0.544	0.611984	2.894685722
55	2.3	0.46	0.06785	0.368	0.39215	1.854868802
56	2.3	0.46	0.067687	0.368	0.392313	1.855641445
57	2.7	0.54	0.067526	0.432	0.472474	2.234803537
58	2.6	0.52	0.067367	0.416	0.452633	2.140954957
59	2.6	0.52	0.06721	0.416	0.45279	2.141695577
60	2.5	0.5	0.067056	0.4	0.432944	2.047825269
61	2.4	0.48	0.066904	0.384	0.413096	1.953943897

62	2.3	0.46	0.066754	0.368	0.393246	1.860051319
63	1.9	0.38	0.066607	0.304	0.313393	1.482347388
64	1.9	0.38	0.066463	0.304	0.313537	1.483031951
65	0.4	0.08	0.06632	0.064	0.01368	0.064704848
66	0.4	0.08	0.066181	0.064	0.013819	0.065365909
67	0.3	0.06	0.066043	0.048	0.012	0.05676
68	0.3	0.06	0.065909	0.048	0.012	0.05676
69	0.5	0.1	0.065777	0.08	0.034223	0.161876282
70	0.5	0.1	0.065647	0.08	0.034353	0.162488154
71	0.5	0.1	0.065521	0.08	0.034479	0.163087217
72	0.4	0.08	0.065397	0.064	0.014603	0.069073241
73	0.4	0.08	0.065276	0.064	0.014724	0.069645986
74	0.4	0.08	0.065157	0.064	0.014843	0.070205194
75	0.3	0.06	0.065042	0.048	0.012	0.05676
76	0.2	0.04	0.06493	0.032	0.008	0.03784
77	0.3	0.06	0.064821	0.048	0.012	0.05676
78	0.4	0.08	0.064714	0.064	0.015286	0.072300893
79	0.3	0.06	0.064611	0.048	0.012	0.05676
80	0.2	0.04	0.064512	0.032	0.008	0.03784
81	0.3	0.06	0.064415	0.048	0.012	0.05676
82	0.3	0.06	0.064323	0.048	0.012	0.05676
83	0.3	0.06	0.064233	0.048	0.012	0.05676
84	0.2	0.04	0.064148	0.032	0.008	0.03784
85	0.3	0.06	0.064066	0.048	0.012	0.05676
86	0.2	0.04	0.063988	0.032	0.008	0.03784
87	0.3	0.06	0.063915	0.048	0.012	0.05676
88	0.2	0.04	0.063846	0.032	0.008	0.03784
89	0.3	0.06	0.063781	0.048	0.012	0.05676
90	0.2	0.04	0.063721	0.032	0.008	0.03784
91	0.2	0.04	0.063667	0.032	0.008	0.03784
92	0.2	0.04	0.063618	0.032	0.008	0.03784
93	0.2	0.04	0.063576	0.032	0.008	0.03784
94	0.2	0.04	0.06354	0.032	0.008	0.03784
95	0.2	0.04	0.063514	0.032	0.008	0.03784
96	0.2	0.04	0.0635	0.032	0.008	0.03784
						66.70932735
			total volume			60038.39462

2,5 and 10 year storms at 3, 6 and 24- hour duration hydrographs for developed site

January 16, 2016

JN 28049B

Synthetic Hydrograph					
total adjusted rain		1.05		total Area	4.9
Unit time		10			
storm	2 year	3 hour			
Unit time	Rain %	Storm Rain	Loss Rate	Effective Rain	Q
1	2.6	0.1638	0.057	0.1068	0.52
2	2.6	0.1638	0.057	0.1068	0.52
3	3.3	0.2079	0.057	0.1509	0.74
4	3.3	0.2079	0.057	0.1509	0.74
5	3.3	0.2079	0.057	0.1509	0.74
6	4.4	0.2772	0.057	0.2202	1.08
7	4.2	0.2646	0.057	0.2076	1.02
8	5.3	0.3339	0.057	0.2769	1.36
9	5.1	0.3213	0.057	0.2643	1.30
10	6.4	0.4032	0.057	0.3462	1.70
11	5.9	0.3717	0.057	0.3147	1.54
12	7.3	0.4599	0.057	0.4029	1.97
13	8.5	0.5355	0.057	0.4785	2.34
14	14.1	0.8883	0.057	0.8313	4.07
15	14.1	0.8883	0.057	0.8313	4.07
16	3.6	0.2268	0.057	0.1698	0.83
17	2.4	0.1512	0.057	0.0942	0.46
					25.01
			Volume		15006.35

Synthetic Hydrograph					
total adjusted rain		1.76		total Area	4.9
Unit time		10			
storm	5 year	3 hour			
Unit time	Rain %	Storm Rain	Loss Rate	Effective Rain	Q
1	2.6	0.27456	0.057	0.21756	1.07
2	2.6	0.27456	0.057	0.21756	1.07
3	3.3	0.34848	0.057	0.29148	1.43
4	3.3	0.34848	0.057	0.29148	1.43
5	3.3	0.34848	0.057	0.29148	1.43
6	4.4	0.46464	0.057	0.40764	2.00
7	4.2	0.44352	0.057	0.38652	1.89
8	5.3	0.55968	0.057	0.50268	2.46
9	5.1	0.53856	0.057	0.48156	2.36
10	6.4	0.67584	0.057	0.61884	3.03
11	5.9	0.62304	0.057	0.56604	2.77
12	7.3	0.77088	0.057	0.71388	3.50
13	8.5	0.8976	0.057	0.8406	4.12
14	14.1	1.48896	0.057	1.43196	7.02
15	14.1	1.48896	0.057	1.43196	7.02
16	3.6	0.38016	0.057	0.32316	1.58
17	2.4	0.25344	0.057	0.19644	0.96
					45.13
			Volume		27079.87

Synthetic Hydrograph						
total adjusted rain		1.5				
Unit time		10	total Area	4.9		
	2 year	6 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	1.1	0.099	0.057	0.0792	0.042	0.2058
2	1.2	0.108	0.057	0.0864	0.051	0.2499
3	1.3	0.117	0.057	0.0936	0.06	0.294
4	1.4	0.126	0.057	0.1008	0.069	0.3381
5	1.4	0.126	0.057	0.1008	0.069	0.3381
6	1.5	0.135	0.057	0.108	0.078	0.3822
7	1.6	0.144	0.057	0.1152	0.087	0.4263
8	1.6	0.144	0.057	0.1152	0.087	0.4263
9	1.6	0.144	0.057	0.1152	0.087	0.4263
10	1.6	0.144	0.057	0.1152	0.087	0.4263
11	1.6	0.144	0.057	0.1152	0.087	0.4263
12	1.7	0.153	0.057	0.1224	0.096	0.4704
13	1.7	0.153	0.057	0.1224	0.096	0.4704
14	1.8	0.162	0.057	0.1296	0.105	0.5145
15	1.8	0.162	0.057	0.1296	0.105	0.5145
16	1.8	0.162	0.057	0.1296	0.105	0.5145
17	2	0.18	0.057	0.144	0.123	0.6027
18	2	0.18	0.057	0.144	0.123	0.6027
19	2.1	0.189	0.057	0.1512	0.132	0.6468
20	2.2	0.198	0.057	0.1584	0.141	0.6909
21	2.5	0.225	0.057	0.18	0.168	0.8232
22	2.8	0.252	0.057	0.2016	0.195	0.9555
23	3	0.27	0.057	0.216	0.213	1.0437
24	3.2	0.288	0.057	0.2304	0.231	1.1319
25	3.5	0.315	0.057	0.252	0.258	1.2642
26	3.9	0.351	0.057	0.2808	0.294	1.4406
27	4.2	0.378	0.057	0.3024	0.321	1.5729
28	4.5	0.405	0.057	0.324	0.348	1.7052
29	4.8	0.432	0.057	0.3456	0.375	1.8375
30	5.1	0.459	0.057	0.3672	0.402	1.9698
31	6.7	0.603	0.057	0.4824	0.546	2.6754
32	8.1	0.729	0.057	0.5832	0.672	3.2928
33	10.3	0.927	0.057	0.7416	0.87	4.263
34	2.8	0.252	0.057	0.2016	0.195	0.9555
35	1.1	0.099	0.057	0.0792	0.042	0.2058
36	0.5	0.045	0.057	0.036	0.009	0.0441
						34.1481
			total Volume			20488.86

Synthetic Hydrograph						
total adjusted rain		2.05				
Unit time		10	total Area	4.9		
	5 year	6 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	1.1	0.1353	0.057	0.10824	0.0783	0.38367
2	1.2	0.1476	0.057	0.11808	0.0906	0.44394
3	1.3	0.1599	0.057	0.12792	0.1029	0.50421
4	1.4	0.1722	0.057	0.13776	0.1152	0.56448
5	1.4	0.1722	0.057	0.13776	0.1152	0.56448
6	1.5	0.1845	0.057	0.1476	0.1275	0.62475
7	1.6	0.1968	0.057	0.15744	0.1398	0.68502
8	1.6	0.1968	0.057	0.15744	0.1398	0.68502
9	1.6	0.1968	0.057	0.15744	0.1398	0.68502
10	1.6	0.1968	0.057	0.15744	0.1398	0.68502
11	1.6	0.1968	0.057	0.15744	0.1398	0.68502
12	1.7	0.2091	0.057	0.16728	0.1521	0.74529
13	1.7	0.2091	0.057	0.16728	0.1521	0.74529
14	1.8	0.2214	0.057	0.17712	0.1644	0.80556
15	1.8	0.2214	0.057	0.17712	0.1644	0.80556
16	1.8	0.2214	0.057	0.17712	0.1644	0.80556
17	2	0.246	0.057	0.1968	0.189	0.9261
18	2	0.246	0.057	0.1968	0.189	0.9261
19	2.1	0.2583	0.057	0.20664	0.2013	0.98637
20	2.2	0.2706	0.057	0.21648	0.2136	1.04664
21	2.5	0.3075	0.057	0.246	0.2505	1.22745
22	2.8	0.3444	0.057	0.27552	0.2874	1.40826
23	3	0.369	0.057	0.2952	0.312	1.5288
24	3.2	0.3936	0.057	0.31488	0.3366	1.64934
25	3.5	0.4305	0.057	0.3444	0.3735	1.83015
26	3.9	0.4797	0.057	0.38376	0.4227	2.07123
27	4.2	0.5166	0.057	0.41328	0.4596	2.25204
28	4.5	0.5535	0.057	0.4428	0.4965	2.43285
29	4.8	0.5904	0.057	0.47232	0.5334	2.61366
30	5.1	0.6273	0.057	0.50184	0.5703	2.79447
31	6.7	0.8241	0.057	0.65928	0.7671	3.75879
32	8.1	0.9963	0.057	0.79704	0.9393	4.60257
33	10.3	1.2669	0.057	1.01352	1.2099	5.92851
34	2.8	0.3444	0.057	0.27552	0.2874	1.40826
35	1.1	0.1353	0.057	0.10824	0.0783	0.38367
36	0.5	0.0615	0.057	0.0492	0.0045	0.02205
						50.2152
			total Volume			30129.12

Synthetic Hydrograph						
total adjusted rain		2.38				
Unit time		10		total Area	4.9	
	10 year	6 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	1.1	0.15708	0.057	0.125664	0.10008	0.490392
2	1.2	0.17136	0.057	0.137088	0.11436	0.560364
3	1.3	0.18564	0.057	0.148512	0.12864	0.630336
4	1.4	0.19992	0.057	0.159936	0.14292	0.700308
5	1.4	0.19992	0.057	0.159936	0.14292	0.700308
6	1.5	0.2142	0.057	0.17136	0.1572	0.77028
7	1.6	0.22848	0.057	0.182784	0.17148	0.840252
8	1.6	0.22848	0.057	0.182784	0.17148	0.840252
9	1.6	0.22848	0.057	0.182784	0.17148	0.840252
10	1.6	0.22848	0.057	0.182784	0.17148	0.840252
11	1.6	0.22848	0.057	0.182784	0.17148	0.840252
12	1.7	0.24276	0.057	0.194208	0.18576	0.910224
13	1.7	0.24276	0.057	0.194208	0.18576	0.910224
14	1.8	0.25704	0.057	0.205632	0.20004	0.980196
15	1.8	0.25704	0.057	0.205632	0.20004	0.980196
16	1.8	0.25704	0.057	0.205632	0.20004	0.980196
17	2	0.2856	0.057	0.22848	0.2286	1.12014
18	2	0.2856	0.057	0.22848	0.2286	1.12014
19	2.1	0.29988	0.057	0.239904	0.24288	1.190112
20	2.2	0.31416	0.057	0.251328	0.25716	1.260084
21	2.5	0.357	0.057	0.2856	0.3	1.47
22	2.8	0.39984	0.057	0.319872	0.34284	1.679916
23	3	0.4284	0.057	0.34272	0.3714	1.81986
24	3.2	0.45696	0.057	0.365568	0.39996	1.959804
25	3.5	0.4998	0.057	0.39984	0.4428	2.16972
26	3.9	0.55692	0.057	0.445536	0.49992	2.449608
27	4.2	0.59976	0.057	0.479808	0.54276	2.659524
28	4.5	0.6426	0.057	0.51408	0.5856	2.86944
29	4.8	0.68544	0.057	0.548352	0.62844	3.079356
30	5.1	0.72828	0.057	0.582624	0.67128	3.289272
31	6.7	0.95676	0.057	0.765408	0.89976	4.408824
32	8.1	1.15668	0.057	0.925344	1.09968	5.388432
33	10.3	1.47084	0.057	1.176672	1.41384	6.927816
34	2.8	0.39984	0.057	0.319872	0.34284	1.679916
35	1.1	0.15708	0.057	0.125664	0.10008	0.490392
36	0.5	0.0714	0.057	0.05712	0.0144	0.07056
						59.9172
			total Volume			35950.32

Synthetic Hydrograph						
total adjusted rain		2.8		total Area	4.9	
Unit time		15				
	2 year	24 hour				
Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	0.2	0.0224	0.106339	0.01792	0.00448	0.021952
2	0.3	0.0336	0.105104	0.02688	0.00672	0.032928
3	0.3	0.0336	0.103876	0.02688	0.00672	0.032928
4	0.4	0.0448	0.102655	0.03584	0.00896	0.043904
5	0.3	0.0336	0.101441	0.02688	0.00672	0.032928
6	0.3	0.0336	0.100235	0.02688	0.00672	0.032928
7	0.3	0.0336	0.099036	0.02688	0.00672	0.032928
8	0.4	0.0448	0.097844	0.03584	0.00896	0.043904
9	0.4	0.0448	0.09666	0.03584	0.00896	0.043904
10	0.4	0.0448	0.095483	0.03584	0.00896	0.043904
11	0.5	0.056	0.094314	0.0448	0.0112	0.05488
12	0.5	0.056	0.093152	0.0448	0.0112	0.05488
13	0.5	0.056	0.091998	0.0448	0.0112	0.05488
14	0.5	0.056	0.090851	0.0448	0.0112	0.05488
15	0.5	0.056	0.089713	0.0448	0.0112	0.05488
16	0.6	0.0672	0.088581	0.05376	0.01344	0.065856
17	0.6	0.0672	0.087458	0.05376	0.01344	0.065856
18	0.7	0.0784	0.086342	0.06272	0.01568	0.076832
19	0.7	0.0784	0.085235	0.06272	0.01568	0.076832
20	0.8	0.0896	0.084135	0.07168	0.01792	0.087808
21	0.6	0.0672	0.083043	0.05376	0.01344	0.065856
22	0.7	0.0784	0.081959	0.06272	0.01568	0.076832
23	0.8	0.0896	0.080883	0.07168	0.01792	0.087808
24	0.8	0.0896	0.079815	0.07168	0.009785	0.047946
25	0.9	0.1008	0.078755	0.08064	0.022045	0.108018
26	0.9	0.1008	0.077704	0.08064	0.023096	0.113171
27	1	0.112	0.076661	0.0896	0.035339	0.173163
28	1	0.112	0.075626	0.0896	0.036374	0.178235
29	1	0.112	0.074599	0.0896	0.037401	0.183266
30	1.1	0.1232	0.073581	0.09856	0.049619	0.243135
31	1.2	0.1344	0.072571	0.10752	0.061829	0.302964
32	1.3	0.1456	0.071569	0.11648	0.074031	0.36275
33	1.5	0.168	0.070577	0.1344	0.097423	0.477375
34	1.5	0.168	0.069592	0.1344	0.098408	0.482197
35	1.6	0.1792	0.068617	0.14336	0.110583	0.541857
36	1.7	0.1904	0.06765	0.15232	0.12275	0.601474
37	1.9	0.2128	0.066692	0.17024	0.146108	0.715927
38	2	0.224	0.065743	0.1792	0.158257	0.775457
39	2.1	0.2352	0.064803	0.18816	0.170397	0.834943
40	2.2	0.2464	0.063872	0.19712	0.182528	0.894385
41	1.5	0.168	0.06295	0.1344	0.10505	0.514743
42	1.5	0.168	0.062038	0.1344	0.105962	0.519215
43	2	0.224	0.061134	0.1792	0.162866	0.798042
44	2	0.224	0.06024	0.1792	0.16376	0.802424
45	1.9	0.2128	0.059355	0.17024	0.153445	0.751879
46	1.9	0.2128	0.05848	0.17024	0.15432	0.756168
47	1.7	0.1904	0.057614	0.15232	0.132786	0.650649
48	1.8	0.2016	0.056758	0.16128	0.144842	0.709724
49	2.5	0.28	0.055912	0.224	0.224088	1.098031
50	2.6	0.2912	0.055076	0.23296	0.236124	1.157009
51	2.8	0.3136	0.054249	0.25088	0.259351	1.270819
52	2.9	0.3248	0.053433	0.25984	0.271367	1.329699
53	3.4	0.3808	0.052627	0.30464	0.328173	1.60805
54	3.4	0.3808	0.05183	0.30464	0.32897	1.611951
55	2.3	0.2576	0.051045	0.20608	0.206555	1.012121
56	2.3	0.2576	0.05027	0.20608	0.20733	1.015919
57	2.7	0.3024	0.049505	0.24192	0.252895	1.239186
58	2.6	0.2912	0.048751	0.23296	0.242449	1.188
59	2.6	0.2912	0.048008	0.23296	0.243192	1.191641
60	2.5	0.28	0.047276	0.224	0.232724	1.140349
61	2.4	0.2688	0.046555	0.21504	0.222245	1.089002

62	2.3	0.2576	0.045845	0.20608	0.211755	1.0376
63	1.9	0.2128	0.045147	0.17024	0.167653	0.821502
64	1.9	0.2128	0.04446	0.17024	0.16834	0.824867
65	0.4	0.0448	0.043785	0.03584	0.001015	0.004975
66	0.4	0.0448	0.043121	0.03584	0.001679	0.008225
67	0.3	0.0336	0.04247	0.02688	0.00672	0.032928
68	0.3	0.0336	0.041831	0.02688	0.00672	0.032928
69	0.5	0.056	0.041205	0.0448	0.014795	0.072497
70	0.5	0.056	0.040591	0.0448	0.015409	0.075506
71	0.5	0.056	0.03999	0.0448	0.01601	0.078451
72	0.4	0.0448	0.039402	0.03584	0.005398	0.026452
73	0.4	0.0448	0.038827	0.03584	0.005973	0.029268
74	0.4	0.0448	0.038266	0.03584	0.006534	0.032017
75	0.3	0.0336	0.037719	0.02688	0.00672	0.032928
76	0.2	0.0224	0.037186	0.01792	0.00448	0.021952
77	0.3	0.0336	0.036667	0.02688	0.00672	0.032928
78	0.4	0.0448	0.036163	0.03584	0.008637	0.04232
79	0.3	0.0336	0.035675	0.02688	0.00672	0.032928
80	0.2	0.0224	0.035202	0.01792	0.00448	0.021952
81	0.3	0.0336	0.034744	0.02688	0.00672	0.032928
82	0.3	0.0336	0.034304	0.02688	0.00672	0.032928
83	0.3	0.0336	0.03388	0.02688	0.00672	0.032928
84	0.2	0.0224	0.033474	0.01792	0.00448	0.021952
85	0.3	0.0336	0.033086	0.02688	0.000514	0.002517
86	0.2	0.0224	0.032717	0.01792	0.00448	0.021952
87	0.3	0.0336	0.032368	0.02688	0.001232	0.006036
88	0.2	0.0224	0.03204	0.01792	0.00448	0.021952
89	0.3	0.0336	0.031733	0.02688	0.001867	0.009147
90	0.2	0.0224	0.03145	0.01792	0.00448	0.021952
91	0.2	0.0224	0.031191	0.01792	0.00448	0.021952
92	0.2	0.0224	0.03096	0.01792	0.00448	0.021952
93	0.2	0.0224	0.030759	0.01792	0.00448	0.021952
94	0.2	0.0224	0.030591	0.01792	0.00448	0.021952
95	0.2	0.0224	0.030465	0.01792	0.00448	0.021952
96	0.2	0.0224	0.0304	0.01792	0.00448	0.021952
						33.3294
				total volume		29996.46

Synthetic Hydrograph

total adjusted rain	4.1	total Area	4.9
Unit time	15		
5 year	24 hour		

Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	0.2	0.0328	0.106339	0.02624	0.00656	0.032144
2	0.3	0.0492	0.105104	0.03936	0.00984	0.048216
3	0.3	0.0492	0.103876	0.03936	0.00984	0.048216
4	0.4	0.0656	0.102655	0.05248	0.01312	0.064288
5	0.3	0.0492	0.101441	0.03936	0.00984	0.048216
6	0.3	0.0492	0.100235	0.03936	0.00984	0.048216
7	0.3	0.0492	0.099036	0.03936	0.00984	0.048216
8	0.4	0.0656	0.097844	0.05248	0.01312	0.064288
9	0.4	0.0656	0.09666	0.05248	0.01312	0.064288
10	0.4	0.0656	0.095483	0.05248	0.01312	0.064288
11	0.5	0.082	0.094314	0.0656	0.0164	0.08036
12	0.5	0.082	0.093152	0.0656	0.0164	0.08036
13	0.5	0.082	0.091998	0.0656	0.0164	0.08036
14	0.5	0.082	0.090851	0.0656	0.0164	0.08036
15	0.5	0.082	0.089713	0.0656	0.0164	0.08036
16	0.6	0.0984	0.088581	0.07872	0.009818553	0.048111
17	0.6	0.0984	0.087458	0.07872	0.010941936	0.053615
18	0.7	0.1148	0.086342	0.09184	0.028457525	0.139442
19	0.7	0.1148	0.085235	0.09184	0.02296	0.112504
20	0.8	0.1312	0.084135	0.10496	0.047065142	0.230619
21	0.6	0.0984	0.083043	0.07872	0.01968	0.096432
22	0.7	0.1148	0.081959	0.09184	0.032841033	0.160921
23	0.8	0.1312	0.080883	0.10496	0.02624	0.128576
24	0.8	0.1312	0.079815	0.10496	0.051384817	0.251786
25	0.9	0.1476	0.078755	0.11808	0.068844544	0.337338
26	0.9	0.1476	0.077704	0.11808	0.069896094	0.342491
27	1	0.164	0.076661	0.1312	0.087339414	0.427963
28	1	0.164	0.075626	0.1312	0.08837445	0.433035
29	1	0.164	0.074599	0.1312	0.089401148	0.438066
30	1.1	0.1804	0.073581	0.14432	0.106819453	0.523415
31	1.2	0.1968	0.072571	0.15744	0.124229306	0.608724
32	1.3	0.2132	0.071569	0.17056	0.141630651	0.69399
33	1.5	0.246	0.070577	0.1968	0.175423427	0.859575
34	1.5	0.246	0.069592	0.1968	0.176407573	0.864397
35	1.6	0.2624	0.068617	0.20992	0.193783027	0.949537
36	1.7	0.2788	0.06765	0.22304	0.211149725	1.034634
37	1.9	0.3116	0.066692	0.24928	0.244907603	1.200047
38	2	0.328	0.065743	0.2624	0.262256591	1.285057
39	2.1	0.3444	0.064803	0.27552	0.279596624	1.370023
40	2.2	0.3608	0.063872	0.28864	0.296927629	1.454945
41	1.5	0.246	0.06295	0.1968	0.183049534	0.896943
42	1.5	0.246	0.062038	0.1968	0.183962266	0.901415
43	2	0.328	0.061134	0.2624	0.266865749	1.307642
44	2	0.328	0.06024	0.2624	0.267759904	1.312024
45	1.9	0.3116	0.059355	0.24928	0.25224465	1.235999
46	1.9	0.3116	0.05848	0.24928	0.253119907	1.240288
47	1.7	0.2788	0.057614	0.22304	0.221185587	1.083809
48	1.8	0.2952	0.056758	0.23616	0.238441605	1.168364
49	2.5	0.41	0.055912	0.328	0.35408787	1.735031
50	2.6	0.4264	0.055076	0.34112	0.371324289	1.819489
51	2.8	0.4592	0.054249	0.36736	0.404950766	1.984259
52	2.9	0.4756	0.053433	0.38048	0.422167203	2.068619
53	3.4	0.5576	0.052627	0.44608	0.504973497	2.47437
54	3.4	0.5576	0.05183	0.44608	0.505769543	2.478271
55	2.3	0.3772	0.051045	0.30176	0.326155231	1.598161
56	2.3	0.3772	0.05027	0.30176	0.32693045	1.601959
57	2.7	0.4428	0.049505	0.35424	0.393295082	1.927146
58	2.6	0.4264	0.048751	0.34112	0.377649005	1.85048
59	2.6	0.4264	0.048008	0.34112	0.378392094	1.854121
60	2.5	0.41	0.047276	0.328	0.362724218	1.777349

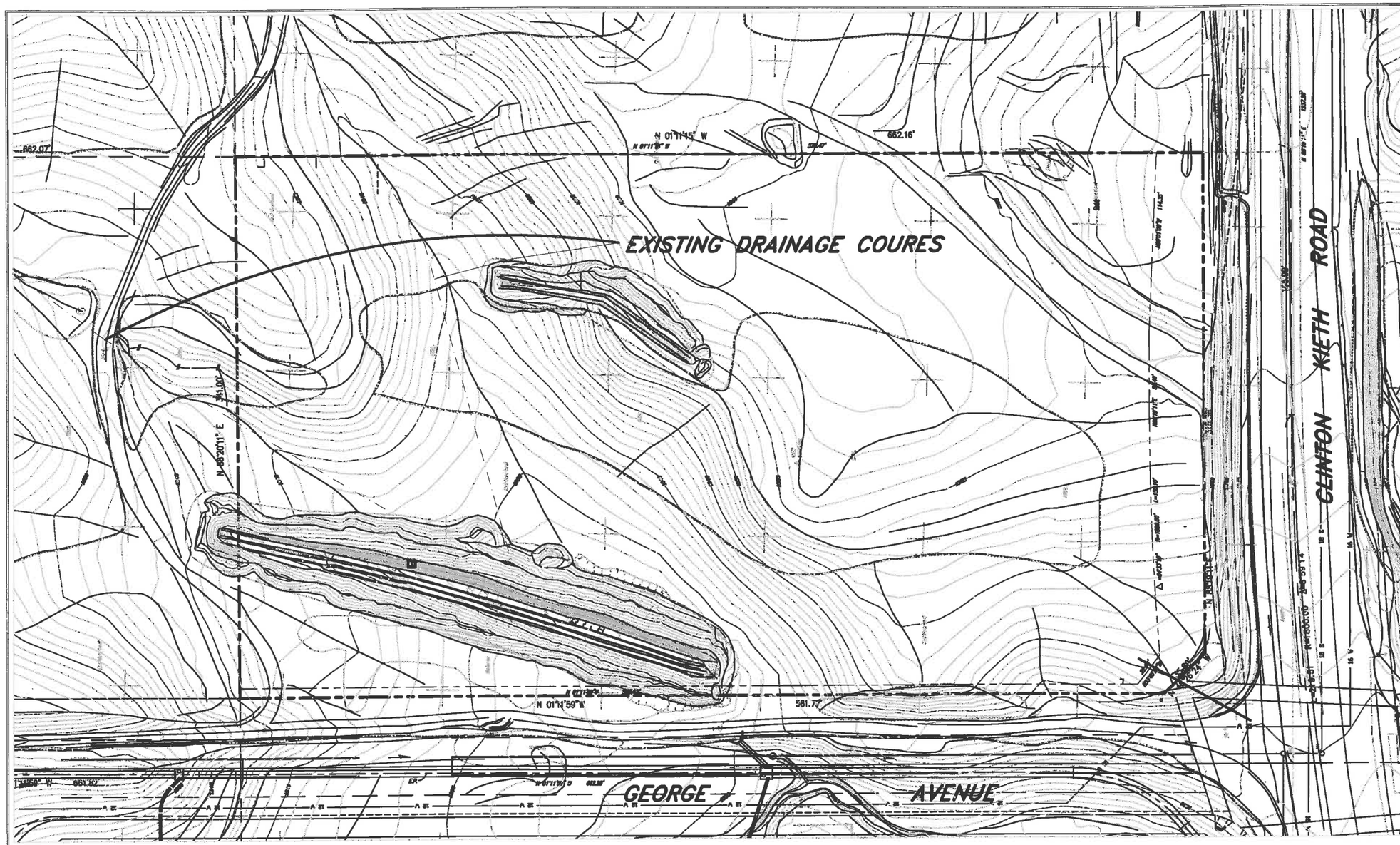
61	2.4	0.3936	0.046555	0.31488	0.34704524	1.700522
62	2.3	0.3772	0.045845	0.30176	0.33135502	1.62364
63	1.9	0.3116	0.045147	0.24928	0.266453409	1.305622
64	1.9	0.3116	0.04446	0.24928	0.267140253	1.308987
65	0.4	0.0656	0.043785	0.05248	0.021815392	0.106895
66	0.4	0.0656	0.043121	0.05248	0.022478656	0.110145
67	0.3	0.0492	0.04247	0.03936	0.00984	0.048216
68	0.3	0.0492	0.041831	0.03936	0.007368848	0.036107
69	0.5	0.082	0.041205	0.0656	0.040795395	0.199897
70	0.5	0.082	0.040591	0.0656	0.041409307	0.202906
71	0.5	0.082	0.03999	0.0656	0.042010366	0.205851
72	0.4	0.0656	0.039402	0.05248	0.026198343	0.128372
73	0.4	0.0656	0.038827	0.05248	0.026772996	0.131188
74	0.4	0.0656	0.038266	0.05248	0.027334068	0.133937
75	0.3	0.0492	0.037719	0.03936	0.011481283	0.056258
76	0.2	0.0328	0.037186	0.02624	0.00656	0.032144
77	0.3	0.0492	0.036667	0.03936	0.012532951	0.061411
78	0.4	0.0656	0.036163	0.05248	0.02943675	0.14424
79	0.3	0.0492	0.035675	0.03936	0.013525384	0.066274
80	0.2	0.0328	0.035202	0.02624	0.00656	0.032144
81	0.3	0.0492	0.034744	0.03936	0.014455533	0.070832
82	0.3	0.0492	0.034304	0.03936	0.014896147	0.072991
83	0.3	0.0492	0.03388	0.03936	0.00984	0.048216
84	0.2	0.0328	0.033474	0.02624	0.00656	0.032144
85	0.3	0.0492	0.033086	0.03936	0.016113705	0.078957
86	0.2	0.0328	0.032717	0.02624	8.26318E-05	0.000405
87	0.3	0.0492	0.032368	0.03936	0.016831792	0.082476
88	0.2	0.0328	0.03204	0.02624	0.000760224	0.003725
89	0.3	0.0492	0.031733	0.03936	0.017466795	0.085587
90	0.2	0.0328	0.03145	0.02624	0.001350145	0.006616
91	0.2	0.0328	0.031191	0.02624	0.001608595	0.007882
92	0.2	0.0328	0.03096	0.02624	0.00184	0.009016
93	0.2	0.0328	0.030759	0.02624	0.002041464	0.010003
94	0.2	0.0328	0.030591	0.02624	0.002208754	0.010823
95	0.2	0.0328	0.030465	0.02624	0.002334688	0.01144
96	0.2	0.0328	0.0304	0.02624	0.0024	0.01176
						55.47079
				total volume		49923.71

Synthetic Hydrograph

total adjusted rain	5	total Area	4.9
Unit time	15		
10 year	24 hour		

Unit time	Rain %	Storm Rain	Loss Rate	low Loss	Effective Rain	Q
1	0.2	0.04	0.106339	0.032	0.008	0.0392
2	0.3	0.06	0.105104	0.048	0.012	0.0588
3	0.3	0.06	0.103876	0.048	0.012	0.0588
4	0.4	0.08	0.102655	0.064	0.016	0.0784
5	0.3	0.06	0.101441	0.048	0.012	0.0588
6	0.3	0.06	0.100235	0.048	0.012	0.0588
7	0.3	0.06	0.099036	0.048	0.012	0.0588
8	0.4	0.08	0.097844	0.064	0.016	0.0784
9	0.4	0.08	0.09666	0.064	0.016	0.0784
10	0.4	0.08	0.095483	0.064	0.016	0.0784
11	0.5	0.1	0.094314	0.08	0.02	0.098
12	0.5	0.1	0.093152	0.08	0.02	0.098
13	0.5	0.1	0.091998	0.08	0.02	0.098
14	0.5	0.1	0.090851	0.08	0.02	0.098
15	0.5	0.1	0.089713	0.08	0.02	0.098
16	0.6	0.12	0.088581	0.096	0.031418553	0.153951
17	0.6	0.12	0.087458	0.096	0.032541936	0.159455
18	0.7	0.14	0.086342	0.112	0.053657525	0.262922
19	0.7	0.14	0.085235	0.112	0.054765276	0.26835
20	0.8	0.16	0.084135	0.128	0.075865142	0.371739
21	0.6	0.12	0.083043	0.096	0.036957077	0.18109
22	0.7	0.14	0.081959	0.112	0.058041033	0.284401
23	0.8	0.16	0.080883	0.128	0.079116963	0.387673
24	0.8	0.16	0.079815	0.128	0.080184817	0.392906
25	0.9	0.18	0.078755	0.144	0.101244544	0.496098
26	0.9	0.18	0.077704	0.144	0.102296094	0.501251
27	1	0.2	0.076661	0.16	0.123339414	0.604363
28	1	0.2	0.075626	0.16	0.12437445	0.609435
29	1	0.2	0.074599	0.16	0.125401148	0.614466
30	1.1	0.22	0.073581	0.176	0.146419453	0.717455
31	1.2	0.24	0.072571	0.192	0.167429306	0.820404
32	1.3	0.26	0.071569	0.208	0.188430651	0.92331
33	1.5	0.3	0.070577	0.24	0.229423427	1.124175
34	1.5	0.3	0.069592	0.24	0.230407573	1.128997
35	1.6	0.32	0.068617	0.256	0.251383027	1.231777
36	1.7	0.34	0.06765	0.272	0.272349725	1.334514
37	1.9	0.38	0.066692	0.304	0.313307603	1.535207
38	2	0.4	0.065743	0.32	0.334256591	1.637857
39	2.1	0.42	0.064803	0.336	0.355196624	1.740463
40	2.2	0.44	0.063872	0.352	0.376127629	1.843025
41	1.5	0.3	0.06295	0.24	0.237049534	1.161543
42	1.5	0.3	0.062038	0.24	0.237962266	1.166015
43	2	0.4	0.061134	0.32	0.338865749	1.660442
44	2	0.4	0.06024	0.32	0.339759904	1.664824
45	1.9	0.38	0.059355	0.304	0.32064465	1.571159
46	1.9	0.38	0.05848	0.304	0.321519907	1.575448
47	1.7	0.34	0.057614	0.272	0.282385587	1.383689
48	1.8	0.36	0.056758	0.288	0.303241605	1.485884
49	2.5	0.5	0.055912	0.4	0.44408787	2.176031
50	2.6	0.52	0.055076	0.416	0.464924289	2.278129
51	2.8	0.56	0.054249	0.448	0.505750766	2.478179
52	2.9	0.58	0.053433	0.464	0.526567203	2.580179
53	3.4	0.68	0.052627	0.544	0.627373497	3.07413
54	3.4	0.68	0.05183	0.544	0.628169543	3.078031
55	2.3	0.46	0.051045	0.368	0.408955231	2.003881
56	2.3	0.46	0.05027	0.368	0.40973045	2.007679
57	2.7	0.54	0.049505	0.432	0.490495082	2.403426
58	2.6	0.52	0.048751	0.416	0.471249005	2.30912
59	2.6	0.52	0.048008	0.416	0.471992094	2.312761
60	2.5	0.5	0.047276	0.4	0.452724218	2.218349
61	2.4	0.48	0.046555	0.384	0.43344524	2.123882

62	2.3	0.46	0.045845	0.368	0.41415502	2.02936
63	1.9	0.38	0.045147	0.304	0.334853409	1.640782
64	1.9	0.38	0.04446	0.304	0.335540253	1.644147
65	0.4	0.08	0.043785	0.064	0.036215392	0.177455
66	0.4	0.08	0.043121	0.064	0.036878656	0.180705
67	0.3	0.06	0.04247	0.048	0.01752987	0.085896
68	0.3	0.06	0.041831	0.048	0.018168848	0.089027
69	0.5	0.1	0.041205	0.08	0.058795395	0.288097
70	0.5	0.1	0.040591	0.08	0.059409307	0.291106
71	0.5	0.1	0.03999	0.08	0.060010366	0.294051
72	0.4	0.08	0.039402	0.064	0.040598343	0.198932
73	0.4	0.08	0.038827	0.064	0.041172996	0.201748
74	0.4	0.08	0.038266	0.064	0.041734068	0.204497
75	0.3	0.06	0.037719	0.048	0.022281283	0.109178
76	0.2	0.04	0.037186	0.032	0.002814349	0.01379
77	0.3	0.06	0.036667	0.048	0.023332951	0.114331
78	0.4	0.08	0.036163	0.064	0.04383675	0.2148
79	0.3	0.06	0.035675	0.048	0.024325384	0.119194
80	0.2	0.04	0.035202	0.032	0.004798455	0.023512
81	0.3	0.06	0.034744	0.048	0.025255533	0.123752
82	0.3	0.06	0.034304	0.048	0.025696147	0.125911
83	0.3	0.06	0.03388	0.048	0.026119776	0.127987
84	0.2	0.04	0.033474	0.032	0.006525844	0.031977
85	0.3	0.06	0.033086	0.048	0.026913705	0.131877
86	0.2	0.04	0.032717	0.032	0.007282632	0.035685
87	0.3	0.06	0.032368	0.048	0.027631792	0.135396
88	0.2	0.04	0.03204	0.032	0.007960224	0.039005
89	0.3	0.06	0.031733	0.048	0.028266795	0.138507
90	0.2	0.04	0.03145	0.032	0.008550145	0.041896
91	0.2	0.04	0.031191	0.032	0.008808595	0.043162
92	0.2	0.04	0.03096	0.032	0.00904	0.044296
93	0.2	0.04	0.030759	0.032	0.009241464	0.045283
94	0.2	0.04	0.030591	0.032	0.009408754	0.046103
95	0.2	0.04	0.030465	0.032	0.009534688	0.04672
96	0.2	0.04	0.0304	0.032	0.0096	0.04704
						72.30007
			total volume			65070.06



SCALE: 1" = 30'

GRAPHIC SCALE

30 0 30 60 90

Underground Service Alert
Call: TOLL FREE
1-800
227-2600

MARK	BY	DATE		APPR.	DATE

SEAL-COUNTY

CITY OF WILDOMAR
TRANSPORTATION DEPARTMENT
APPROVED BY:

DATE

SEAL-ENGINEER

LYNN J. MUTCH No. 28817 EXP. 3-31-17

PFEILER & ASSOCIATES ENGINEERS, INC.
CIVIL ENGINEERING & LAND SURVEYING
909) 993-5801
22609 LA PALMA AVE., SUITE 202 YORBA LINDA, CA

LYNN J. MUTCH P.E.

BENCHMARK:

CITY OF WILDOMAR

EXISTING SITE DRAIANGE
CLINTON KEITH VILLAGE

SHEET NO.

OF ____ SHTS

FOR: ZOLFAGHARI

W.O.

CITY FILE NO.

28049B

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

EMPLOYEE TRAINING INFORMATION

TRAINING PROGRAM

Urban storm water runoff is rainwater, irrigation and or wash water that runs off land and into a natural watercourse (or through a system of storm drains thence into a natural water course, such as a river or lake). When urban storm water runoff travels through a commercial site it quite often picks up pollutants (gas and oils, fertilizers and pesticides, silt and debris) and transports them into the waterways.

This Water Quality Management Plan (WQMP) document provides an overview of efforts to be made (directly or indirectly through the direction given to others) to reduce or eliminate the runoff of pollutants from the site. Paramount to the resources in this WQMP document is the training program, which will assist the responsible party in not only directing the appropriate subcontractors (i.e. landscape maintenance), but also in teaching others who may be in a responsible position (i.e. assistant managers), to adhere to the guidelines in this WQMP document.

A training program is required to educate the property owner(s), store or shop managers and key personnel, property managers, and site maintenance staff (herein referred to as 'managers') about the importance of adhering to this WQMP stormwater mitigation program as a part of their ongoing responsibilities. These managers will also be responsible to instruct their employees (or their maintenance staff members) on good housekeeping measures, inspection, maintenance and repair of stormwater pollution prevention devices, record keeping and reporting procedures. It is the responsibility of the mangers to review this WQMP document and this training overview and become knowledgeable in its Best Management Practices (BMP) requirements.

Employee education and maintenance staff instruction entails a program that informs both employees and maintenance staff about storm water pollution prevention measures. Programs for employees and maintenance staff should be separate as the information and resources presented to each group will be different.

EMPLOYEE TRAINING

Employee training should include information about good housekeeping measures, activities that cause the potential to pollute storm water (i.e. gas or oil leaks, wash-down of debris, hazardous wastes). It should also inform them of actions they can take when they observe inappropriate disposal of wastes. In addition, employees should be encouraged to participate in their own ways (i.e. proper vehicle maintenance, car pooling). Employee training, like equipment maintenance, is not so much a Best Management Practice (BMP) as it is a method by which to implement BMPs. This section highlights the importance of training and integrating the elements of employee training from the individual source controls into a comprehensive training program as a part of the facilities management of pollution prevention efforts.

OBJECTIVES:

Employees should be trained based on four objectives:

- Promote a clear identification and understanding of the pollution problem, including activities with the potential to pollute stormwater.
- Identifying possible solutions (Best Management Practice – BMPs).
- Promote employees ownership of the problems and the solutions as part of the 'team' effort to control pollution.
- Integrate employee feedback into the training process and BMP implementation.

APPROACH:

- Integrate training regarding storm water quality management with any existing training programs that may be required for your business by other regulatory agencies.
- Businesses, particularly smaller ones that are not regulated, may use the information in this WQMP document to develop their own training program to reduce their potential to pollute.

The manager's understanding of the training process and subsequent employee training is a vital component of many of the individual – employee driven – efforts to implement the BMPs included in this WQMP document. Following is compilation of the training aspects:

NON-STORM WATER DISCHARGES INTO DRAINS

- Use the quick references on disposal alternatives to train employees in proper and consistent methods for disposal. Also read the manufacturers instructions on packaging for safe disposal means and methods.
- Consider posting a quick reference table at rear doors or near trash containers/trash compactors to reinforce training guidelines.

EQUIPMENT WASHING

- Train employees in standard – and safe – cleaning procedures and spill cleanup techniques. Refer to the equipment guidelines.
- Maintain spill rags nearby to quickly contain any spills away from floor sinks.

EQUIPMENT MAINTENANCE AND REPAIR

- Train employees in standard operating procedures and spill prevention.
- Train employees in safe cleanup techniques.
- Paint stencils and post notices to remind employees not to pour waste materials down storm drain inlets.
- Stress correct clothing and protective wear when performing maintenance and repair tasks.

OUT-DOOR LOADING AND UNLOADING OF MATERIALS

- Use a written operations plan that describes safe procedures for loading and unloading of materials.
- Have an emergency spill cleanup plan readily available.
- Employees trained in spill containment and cleanup should be present during loading and unloading operations.
- Make sure any forklift operators are properly trained and attired.

OUT-DOOR CONTAINER STORAGE OF LIQUIDS

- Employees trained in emergency spill cleanup procedures should be present when dangerous liquid waste, liquid chemicals or other liquids are handled. Outdoors storage should be temporary only and not encouraged.
- If required, specially trained professionals should be retained to provide safety checks to identify and correct potential problems with outdoor storage tanks and mechanical devices.

OUTDOOR PROCESSING EQUIPMENT OPERATIONS AND MAINTENACE

- Train employees in the collection and safe disposal of outdoor processing and maintenance wastes. Refer to the Educational Materials section for useful information. Supplement the Educational Materials section with new information collected during research and training seminars.
- The preferred and most economical action to reduce wastes generated from out-door processing equipment and maintenance thereof is to retain the services of a professional well versed in the potential hazardous wastes generated from the equipment – and how to properly deal with it.

WASTE HAULING AND DISPOSAL

- Train employees in the standard operating procedures and spill cleanup methods noted in this SUSMP report.
- Paint stencils and post notices to remind employees not to pour waste materials down storm drain inlets.
- Reinforce common good housekeeping practices and reward good behaviors.

CONTAMINATED OR ERODIBLE SURFACE AREAS

- Train employees to recognize when a spill contains potentially hazardous materials – by noting container labels, by observing signs or any reaction to the air or surface – and immediately take measures to protect employees and customers, call authorities, and contain the spill if safe to do so. Refer to the Spill Containment and Contingency Plan in Exhibit '9" and the Contacts list in Appendix 'II' for quick reference.

MAINTENACE STAFF TRAINING:

Maintenance staff training informs the personnel who do not normally come in contact with the customer base of the storm water pollution prevention efforts that they need to be concerned with. Implementation of the information in this WQMP document will help to minimize the potential for storm water pollution during routine site maintenance operations.

At a minimum, maintenance staff should be trained on proper spill containment procedures, facility inspection and cleanup, and good housekeeping measures. They should be invited to become an active part of the 'team' so that their efforts and input are duly recognized and viable suggestions implemented.

Maintenance staff members typically include, but are not limited to:

- Landscape maintenance
- Refuse haulers
- Building maintenance / custodial personnel
- Catch basin BMP inspection and maintenance company
- Grease interceptor waste haulers
- Repairmen, maintenance workers, painters
- Parking lot sweepers

GROUND MAINTENACE

- Personnel who use pesticides, fertilizers, and herbicides should be properly trained in the use of these chemicals. Verify that they have been certified by the governing agency.
- Observe that the placement of the chemicals contained is in the area intended and not 1) oversaturated 2) placed on paved areas or 3) dispersed near site catch basins.
- Require maintenance personnel to read and review Educational Materials provided to understand the "DO's" and "DON'T's" of chemical placement.
- Instruct refuse haulers to clean up any spills occurring during dumpster loading.
- Instruct grease interceptor waste haulers to maintain a clean area during and after his operations
- Schedule parking lot sweepers on a regular basis so that there is no buildup of site debris.
- Make sure landscape maintenance workers understand that they are NOT to sweep grass cuttings into the gutters or catch basins.
- Include appropriate language in contracts indicating the responsibilities required to implement these WQMP storm water pollution prevention measures.

BUILDING MAINTENACE

- Instruct custodians 1) not to empty dirty wash water down storm drains, 2) keep storage closets clean and clear of debris, 3) clearly label any hazardous cleaning materials.
- Include appropriate language in contracts indicating the responsibilities required to implement these WQMP storm water pollution prevention measures.

BUILDING REPAIR, REMODELING, CONSTRUCTION,

- Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained staff can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do – and not do.
- Include appropriate language and specifications in contracts indicating the responsibilities required to implement these WQMP storm water pollution prevention measures.
- Require collection and disposal of all waste materials to a lawful dumpsite. Encourage recycling of appropriate remaining materials.
- Post signs to indicate proper use of residual paints, rags, used oils and other potentially hazardous materials or fluids.
- Educate the workers on proper spill prevention and cleanup. Require good housekeeping of construction work areas.
- Screen work areas from non-involved areas to limit the spread of debris.

TRAINING IMPLEMENTATION:

Manager, employee and maintenance staff instruction in storm water pollution prevention BMPs entail ongoing education contained in this WQMP document and implementation of supplemental information as it becomes available. An effective means of implementation of this WQMP is the integration of storm water pollution prevention education into the employee's schedule. Following are suggested examples of WQMP related training:

1. At the time of new employee orientation.
2. At the time of implementation of new business programs.
3. An employee employment anniversary date.
4. On or about October 15th of every year, recognized as the beginning of the rainy season.
5. Whenever a spill has occurred – to reinforce the importance of pollution prevention.

TRAINING OVERSITE:

As owners and managers train key personnel, who in turn train other employees, it is important to remember that a single owner and/or manager is the ultimate party responsible for ongoing training and implementation of this WQMP. The owners and /or managers are required to renew their own training and WQMP document review on a timely basis.

CERTIFICATIONS:

The owner's and/or managers are responsible to keep all records of BMP inspection, maintenance and repair, and submit annual certifications to the Regional Water Quality Control Board denoting proper record keeping, WQMP implementation, and ongoing employee training.

TENANT / EMPLOYEE TRAINING RECORD

PROPERTY OWNER:	
PROPERTY ADDRESS:	
TYPE OF BUSINESS:	
REPRESENTATIVE PROVIDING TRAINING:	
DATE OF TRAINING:	
TRAINING INCLUDES:	TENANT/EMPLOYEE NAMES
REVIEW OF W.Q.M.P. REPORT INTENTIONS	
REVIEW OF EMPLOYEE RESPONSIBILITIES	
REVIEW OF PROPERTY MANAGER RESPONSIBILITIES	
REVIEW OF GOOD HOUSEKEEPING SECTION MATERIAL	
REVIEW OF INSPECTION SCHEDULE AND FORMS	
REVIEW OF SPILL CONTINGENCY PLAN	
REVIEW OF STORM TECH PRODUCT INFORMATION	
REVIEW OF STORMWATER MANAGEMENT PRODUCT INFO	
REVIEW OF EMPLOYEE TRAINING	
DISCUSS EMPLOYEE RESPONSIBILITIES & EFFORTS	
DISCUSS TENANT RESPONSIBILITIES & EFFORTS	
DISCUSS NEED FOR COMPLIANCE	
DISCUSS SCHEDULING	
TENANTS Q & A SESSION	

REFERENCES AND RESOURCES

SUGGESTED RESOURCES	HOW TO GET A COPY
Start at the Source (1999) by Bay Area Stormwater Management Agencies Association. Detailed discussion of permeable pavements and alternative driveway designs presented.	Bay Area Stormwater Management Agencies Association 437 Encina Ave. Menlo Park, CA 94025 (650) 365-8620
Design of Stormwater Filtering Systems (1996) by Richard A. Claytor and Thomas R. Schuler. Presents detailed engineering guidance on ten different storm water-filtering systems.	Center for Watershed Protection 8391 Main Street Ellicott City, MD 21043 410-461-8323
Better Site Design: A Handbook for Changing Development Rules in Your Community (1998). Presents guidance for different model development alternatives.	Center for Watershed Protection 8391 Main Street Ellicott City, MD 21043 410-461-8323
Design Manual for Use of Bio-retention in Stormwater Management (1993). Presents guidance for designing bio-retention facilities.	Prince George's County Watershed Protection Branch 9400 Peppercorn Place, Suite 600 Landover, MD 20785
Operation, Maintenance and Management of Stormwater Management (1997). Provides a thorough look at stormwater practices including, planning and design considerations, programmatic and regulatory aspects, maintenance considerations, and costs.	Watershed Management Institute, Inc. 410 White Oak Drive Crawfordville, FL 32327 850-926-5310
California Storm Water Best Management Practices Handbooks (1993) for Construction Activity, Municipal, and Industrial / Commercial. Presents a description of a large variety of Structural BMPs, Treatment Control, BMPs and Source Control BMPs.	Los Angeles County Department of Public Works Cashiers Office 900 S. Fremont Avenue Alhambra, CA 91803 626-458-6959
Caltrans Storm Water Quality Handbook: Planning and Design Staff Guide (Best Management Practices Handbooks) (1998). Presents guidance for design of storm water BMPs.	California Department of Transportation P.O. Box 942874 Sacramento, CA 94274-0001 916-653-2975 http://www.dot.ca.gov

SUGGESTED RESOURCES	HOW TO GET A COPY
Second Nature: Adapting LA's Landscape for Sustainable Living (1999) by Tree People. Detailed discussion of BMP designs presented to conserve water, improve water quality, and achieve flood protection.	Tree People 12601 Mulholland Drive Beverly Hills, CA 90210 818-753-4600
Florida Development Manual: A Guide to Sound Land and Water Management (1988). Presents detailed guidance for designing BMPs.	Florida Department of the Environment 2600 Blairstone Road, Mail Station 3570 Tallahassee, FL 32399 850-921-9472
Stormwater Management in Washington State (1999) Vols. 1-5. Presents detailed guidance on BMP design for new development and construction.	Department of Printing State of Washington Department of Ecology P.O. Box 798 Olympia, WA 98507-0798 360-407-7529
Maryland Stormwater Design Manual (1999). Presents guidance for designing storm water BMPs.	Maryland Department of the Environment 2500 Broening Highway Baltimore, MD 21224 410-631-3000
Texas Non-point Source Book-Online Module (1998). www.txnpsbook.org Presents BMP design and guidance information on-line.	Texas Statewide Storm Water Quality Task Force North Central Texas Council of Governments 616 Six Flags Drive Arlington, TX 76005 817-695-9150
Urban Storm Drainage, Criteria Manual – Volume 3, Best Management Practices (1999). Presents guidance for designing BMPS.	Urban Drainage and Flood Control District 2480 West 26th Avenue, Suite 156-B Denver, CO 80211 303-455-6277
Guidance Specifying Management Measures for Sources on Non-point Pollution in Coastal Waters (1993) Report No. EPA-840-B-92-002. Provides an overview of, planning and design considerations, programmatic and regulatory aspects, maintenance considerations, and costs.	National Technical Information Service U.S. Department of Commerce Springfield, VA 22161 800-553-6847
National Stormwater Best Management Practices (BMP) Database, Version 1.0. Provides data on performance and evaluation of storm water BMPs.	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191 703-296-6000

DEFINITIONS

BACKFILL
Earth refilling a trench or an excavation.

BERM
An earthen mound used to direct the flow of runoff around or through a structure.

BEST MANAGEMENT PRACTICES (BMPs)
Includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, waste disposal or drainage from raw materials storage.

BUFFER STRIP OR ZONE
A strip of erosion-resistant vegetation between a waterway and an area of more intensive land use.

CATCH BASIN
Box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavement.

CLEAN WATER ACT (CWA)
Federal Water Pollution Control Act enacted by Public Law 92-500 as amended by Public Laws 95-217, 95-576, 96-483 and 97-111 / 33 USC 1251 E. SEQ.

CONDUIT
Any pipe for collecting and directing the storm water.

CONVEYANCE SYSTEM
Any channel or pipe for collecting and directing the storm water.

CONSTRUCTION GENERAL PERMIT
A National Pollutant Discharge Elimination System (NPDES) permit issued by the State Water Resources Control Board for the discharge of storm water associated with construction activity from soil disturbance of one (1) acre or more.

CONTAMINATION
"An impairment of the quality of the waters of the state by the waste to a degree which creates a hazard to the public health through the spread of disease. Including any equivalent effect resulting from the disposal of waste, whether or not waters of the state area affected." (California Water Code Section 13050 (K).

CULVERT
A covered channel or a large-diameter pipe that directs water flow below the ground level.

DENUDED
Land stripped of vegetation or land that has had its vegetation worn down due to the impacts from the elements or humans.

DISCHARGE
The release of storm water or other substance from a conveyance system or storage container.

EROSION
The wearing away of land surface by wind or water. Erosion occurs naturally from weather or runoff but can be intensified by land-clearing practices related to farming, residential or industrial development, road building, or timber cutting.

EXCAVATION
The process of removing earth, stone, or other materials, usually by digging.

FILTER FABRIC
Textile of relatively small mesh or pore size that is used to (a) allow water to pass through while keeping sediment out (permeable), or (b) prevent both runoff and sediment from passing through (impermeable).

GRADING
The cutting and / or filling of the land surface to a desired slope or elevation.

HAZARDOUS SUBSTANCE
Any material that poses a threat to human health and / or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive.

Any substance named by EPA to be reported is a designated quantity of the substance is spilled in the waters of the United States or if otherwise emitted into the environment.

HAZARDOUS WASTE
By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (flammable, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

ILLEGAL DISCHARGE
Any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges authorized by and NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting and other miscellaneous activities.

INLET
An entrance into a ditch, storm drain, or other waterway.

LOCAL AGENCY
Any agency that is involved with review, approval, or oversight of the sites' (a) construction activity, (b) erosion and sediment controls, (c) storm water discharge. (Source: State of California Water Resources Control Board).

MATERIAL STORAGE AREAS
On site locations where raw materials, products, final products, by-products, or waste materials are stored.

NOTICE OF INTENT (NOI)
A formal notice to SWRCB submitted by the owner/developer that a construction project is about to begin. The NOI provides information on the owner, location, type of project, and certifies that the permittee will comply with the conditions of the construction general permit.

NOTICE OF TERMINATION (NOT)
Form to notify authorities when a construction project is complete.

NPDES PERMIT
An authorization, license, or equivalent control document issued by EPA or an approved State agency to implement the requirements of the NPDES program.

NUISANCE
"Anything which meets all of the following requirements: (1) is injurious to health or is indecent or offensive to the senses or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life and property' (2) affects at the same time an entire community or neighborhood or nay considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; (3) occurs during or as a result of the treatment or disposal of wastes". (California Water Code Section 13050 (M)).

OIL SHEEN
A thin, glistening layer of oil on water.

ORGANIC POLLUTANTS
Substances containing carbon, which may cause pollution problems in receiving waters.

ORGANIC SOLVENTS
Liquid organic compounds capable of dissolving solids, gases, or liquids.

OUTFALL
The point where storm water discharges from a pipe, channel, ditch, or other conveyance to a waterway.

PERMEABILITY
The quality of a soil that enables water or air to move through it. Usually expressed in inches/hour or inches/day.

POINT SOURCE
Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

POLLUTANT
Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

POLLUTION
"Man-made or man induced alterations of the chemical, physical, biological, and radiological integrity of water". (Clean Water Act Section 502 (19). Pollution also means "an alteration of the quality of the waters of the state by waste to a degree which unreasonable affects either...The waters for beneficial uses...Or facilities which serve these beneficial uses." (California Water Code Section 13050 (1)).

PRECIPITATION
Any form of rain or snow.

RETENTION
The storage of storm water to prevent it from leaving the development site; may be temporary or permanent.

RUNON
Off-site flows which, flows onto your site.

RUNOFF
Water originating from rainfall and other sources (e.g., sprinkler irrigation) that is found in drainage facilities, rivers, streams, seeps, ponds, lakes, wetlands, and shallow groundwater.

SCOUR
The erosive and digging action in watercourse by flowing water.

SECONDARY CONTAINMENT
Structures, usually dikes or berms, surrounding tanks or other storage containers and designed to catch spilled material from the storage containers.

SEDIMENTATION
The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

SEDIMENTS
Soil, sand, and minerals washed from land into water usually after rain, that pile up in reservoirs, rivers, and harbors, destroying fish-nesting areas and holes of water animals and clouding the water so that needed sunlight might not reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to be washed off the land after rainfalls.

SOURCE CONTROL BMPs
Everyday operational practices that prevent pollution by reducing potential pollutants at the source.

SPILL GUARD
A device used to prevent spills of liquid materials from storage containers.

SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN (SPCC)
Plan consisting of structures, such as curbing, and action plans to prevent and respond to spills of hazardous substances as defined on the Clean Water Act.

STORM DRAINS
Above and belowground structures for transporting storm water to streams or outfalls for flood control purposes.

LIST OF ACRONYMS

APWA	American Public Works Association
BMPs	Best Management Practices
CA	Contractor Activities
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Register
COE	U.S. Army Corps of Engineers
CWA	Clean Water Act (Federal Water Pollution Control Act of 1972 as amended in 1987)
DTSC	California Department of Toxic Substance Control
EIR	Environmental Impact Report
ESC	Erosion and Sedimentation Control
FHWA	Federal Highway Authority
Hazmat	Hazardous Material
O & M	Operations and Maintenance
MSDS	Material Safety Data Sheet
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PAHs	Polyaromatic Hydrocarbons
POTW	Publicly Owned Treatment Works
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SPCC	Spill Prevention Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TSS	Total Suspended Solids
UFC	Uniform Fire Code
USEPA	United States Environmental Protection Agency

SPILL CONTAINMENT & CONTINGENCY PLAN

The following measures are intended to facilitate the proper handling, cleanup and disposal of hazardous materials.

The owners and tenants shall be required to read the following information it its entirety and will follow all of the control measures and training requirements mandated herein.

The owners shall keep a copy of these measures within their premises.

These procedures will be updated periodically as new information becomes available.

I. GENERAL INFORMATION

The following measures are required to be provided to and (hereafter referred to as "materials") maintained by the tenant, for the purpose of control of any hazardous materials within the site.

Failure to follow any of the stipulations or prohibitions contained herein or to in any way alter the physical characteristics of the storage area as for spillage control is not allowed. The owners shall be solely responsible for all fines and repair bills resulting from such actions.

If any portion of the building storage area designed for spillage control is in any way damaged or otherwise rendered inoperative, it shall immediately be brought to the owner's attention.

II. CODE STANDARDS

In addition to the measures contained herein, the owner shall also comply with all code requirements as specified by the following:

UNIFORM FIRE CODE SECTION 79.201 (d)
FISH AND GAME CODE #5650
COUNTY INDUSTRIAL WASTE CODE (LATEST VERSION)
WATER CODE (PERTAINING TO CLEAN WATER)
STATE HEALTH AND SAFETY CODE (LATEST VERSION)
OSHA CODE 1910.20
CITY OF WILDOMAR MUNICIPAL CODE

III. PHYSICAL CHARACTERISTICS

The storage area for materials shall be designed so as to comply with local codes for proper construction and meet manufacturers requirements.

IV. OWNER/TENANT RESPONSIBILITIES

The owner/tenant shall abide by the following stipulations governing the use and cleanup of materials within their place of business.

1. Training
   Per OSHA code #1910.20 - The owner/tenant is responsible for providing training for all personnel in the proper use, handling and cleanup of all materials to be used while on the job.

2. Inventory List
   The owner/tenant shall prepare and have on file and inventory listing the name and quantities of all materials to be used and stored within the storage area. An additional copy is to be provided to the local fire agency.

3. Limits of Operation
   The owner/tenant shall limit his building operations to within the walls of the space. Under no circumstances shall work of any kind be performed outside.

4. Cleanup
   Cleanup of all material areas shall be accomplished with a mop and bucket only. HOSING OF ANY MATERIAL AREAS IS PROHIBITED.

   Under no circumstances shall wash water or spilled materials be washed beyond the confines of the storage space into the parking areas or into any other adjoining outside areas.

   The tenant shall be responsible for providing drums to be contained within the tenant space for disposal of all used materials and mop water. Each drum shall be clearly labeled as to its contents, e.g. - WASH WATER, TOXIC CHEMICALS, etc. All materials shall be cleaned up and properly deposited in the appropriate drum. When full, the drum(s) are to be disposed of in a proper legal manner by a company licensed for disposal of toxic materials.

   NOTE: Per the Uniform Fire Code, section 79.201 (d) - drums containing flammable materials shall not be stored near doorways nor in a location that would impede egress.

   No materials or mop water shall be dumped into the sanitary sewer system by way of sink, toilet, or any floor drains, if applicable. Additionally, no toxic materials shall be disposed of in any trash receptacle, planter area, parking area, or any other location outside of the tenant's premises.

5. Cleaning Materials
The owner/tenant shall keep on hand ample supplies of any materials necessary for the cleanup of spilled toxic materials. These shall include, but not limited to, absorbent paper or cloth towels, liquid absorbing material such as cat litter or similar product, cleaning fluids. The owner/tenant shall not dispose of any solid waste material if they still contain significant amounts of toxic materials. Prior to disposing of such containers in any trash receptacle, the remaining contents shall be drained into the appropriate drum. No unopened cans of materials shall be disposed of in any trash receptacles either within the tenant's premises or on the shopping center property.

6. Emergency Measures
In the event of a spill of any hazardous, flammable or combustible materials occurring outside the limits of operation as specified above and / or within the limits of operations but in quantities exceeding those allowed, the owner/tenant are advised to contact whichever emergency numbers are applicable.

City of Wildomar – Engineering Department	(951) 677-7751
Riverside County Fire Department (Wildomar station)	(951) 678-1661
Regional Water Quality Control Board (Santa Ana Region)	(951) 782-4130
EMERGENGY	9 1 1

Further, the owner/tenant shall have personnel trained in spill control measures to respond to any spills outside. In the event of such an occurrence, it is the owners/tenants responsibility to initiate emergency control measures to contain and clean up any such spill and report the incident to the proper authorities.

The owner shall also provide the tenant with a 24-hour emergency contact number for use in case of emergencies.

7. Conclusion
These measures are intended to protect the environment from the hazards resulting from the improper handling, cleanup and disposal of toxic materials. Careful adherence to these measures will help ensure that the health, safety and welfare of all those living and working in this neighborhood.

BEST MANAGEMENT PRACTICES
MAINTENANCE AND INSPECTION SCHEDULES

BMP OPERATIONS AND MAINTENANCE RESPONSIBILITIES

BMP	Implementation	Frequency	Start Date	Responsible Party
Employee training	Every new employee to be trained	Upon employment and annually thereafter	Prior to opening the store	Store Manager
Activity Restrictions	Ongoing inspections employee training	Daily and annually	Store opening	Store Manager and Property Manager
Spill Contingency Plan	updated yearly	ongoing requirement call emergency agency	in place at store opening	Store Manager
Sweeping of parking and drive thru lanes	Vacuum and sweeper truck	minimum of twice a year prior to rainy season Oct 1st and after April 30th	October 1st and April 30th after store opening	Property Manager
Inspection of catch basins and inlets	Visual Inspections and removal of trash	minimum of twice a year prior to rainy season Oct 1st and after April 30th	October 1st and April 30th after store opening	Property Manager
Landscaping and irrigation	Visual inspection of area by maintenance company and proper disposal of waste	Weekly	in place at store opening	Property Manager
Storm Drain Signage	Visual Inspection and repaired	Twice a year prior to rainy season Oct 1st and after rainy season April 30th	in place at store opening	Property Manager
Trash storage and litter control	Visual inspection and removal of litter	Daily of onsite litter trash removal per Agency schedule	At store opening	Store Manager and Property Manager
Retention basin	visual inspection for siltation, trash	minimum of twice a year prior to rainy season Oct 1st and after April 30th	October 1st or April 30th after store opening	Property Manager
Education of property owners	Review of WQMP contacting agencies for current regulations	annually	At store opening	Property Manager
Roof Controls	Inspection of roof drains to insure they are clean	Twice a year prior to rainy season Oct 1st and after rainy season April 30th	October 1st and April 30th after store opening	Store Manager
Efficient Irrigation	Visual inspection by Landscape Maintenance	Weekly	Store opening	Property Manager
Infiltration Trench	visual Inspection for siltation, trash	Twice a year prior to rainy season Oct 1st and after rainy season April 30th	October 1st and April 30th after store opening	Property Manager
Porous Pavement	Visual inspection and repaired, vacuum and sweeper truck	Twice a year prior to rainy season Oct 1st and after rainy season April 30th	October 1st and April 30th after store opening	Property Manager

RECORD OF MAINTENACE AND OR REPAIR

MAINTENANCE OR REPAIR REQUESTED BY:
REQUEST DATE:
MAINTENACE OR REPAIR COMPANY:
DAY/DATE/TIME OF MAINTEANCE OR REPAIR:
ITEM NEEDING REPAIR/AREA OF MAINTENACE:
DESCRIPTION OF MAINTENACE OR REPAIR PERFORMED:
COMPLETED MAINTENACE OR REPAIR MEASURES OBSERVED BY:

ATTACH COPY OF WORK ORDER OR INVOICE

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Good Housekeeping ☞ Best Management Practices

Implement these BMPs to control pollutant discharges. The following list describes some common-sens BMPs that require modest changes to routine operations or maintenance practices. The objectives are to 1) *keep pollutants from contacting rain* and 2) *keep pollutants from being dumped or poured into the stor drains*. The goal is "only rain in the storm drain."

Activities	Best Management Practices
Pavement Cleaning	• Sweep parking lots and other paved areas periodically to remove debris. Dispose of debris in the garbage. • If outdoor pavement cleaning with detergent is required, collect wash water and dispose in indoor sinks or drains for discharge to the sanitary sewer. Contact your local wastewater treatment agency.
Litter Control	• Provide an adequate number of trash receptacles for your customers and employees. This helps keep trash from overflowing receptacles. • Pick up litter and other wastes daily from outside areas including storm drain inlet grates.
Waste Disposal	• Inspect dumpsters and other waste containers periodically. Repair or replace leaky dumpsters and containers. • Cover dumpsters and other waste containers. • Never dispose of waste products in storm drain inlets. • Recycle wastes or dispose properly.
Materials Storage*	• Store materials such as grease, paints, detergents, metals, and raw materials in appropriate, labeled containers. • Make sure all outdoor storage containers have lids, and that the lids are adequately closed. • Store stock piled materials inside a building, under a roof, or covered with a tarp to prevent contact with rain.
Training	• Train employees regularly on good housekeeping practices. • Assign a person to be responsible for effective implementation of BMPs.
Equipment/Vehicle Cleaning	• Maintain equipment and vehicles regularly. Check for and fix leaks. • Use drip pans to collect leaks or spills during maintenance activities. • Wash equipment/vehicles in a designated and/or covered area where the wash water is collected to be recycled or discharged to the sanitary sewer. Contact your local wastewater treatment agency.

Some facilities will require structural control BMPs if simpler operational ones are not adequate for keeping pollutant discharges from the storm drains.

* Hazardous materials must comply with hazardous materials storage and disposal requirements.

REFERENCES:
California Industrial/Commercial Best Management Practice Handbook, March 1993
City of Richmond Storm Water Management Program "Your Business and the City of Richmond Partners in Protecting the Bay", 1993
Cities of Fremont, Newark, and Union City, "Source Controls for Storm Water Pollution Prevention", October 1993
ACCRCWP "Restaurants" flyer, January 1994
ACCRCWP Best Management Practices for Industrial Storm Water Pollution Control, March 1994

6. *MEASURING BMP PERFORMANCE*

INTRODUCTION

One of the final steps in the preparation of the Storm Water Pollution Prevention Plan (SWPPP) is to develop a program to monitor how well the BMPs work, and to evaluate whether additional BMPs are required. The construction general permit requires that a monitoring, inspection, and maintenance plan with the following objectives be a component of the SWPPP:

- To inspect BMPs annually, as well as prior to and after a storm event.
- To aid in implementation of the SWPPP.
- To measure the effectiveness of the BMPs.

To meet these objectives the monitoring effort has these elements:

- Site inspection
- Certification of compliance
- BMPs monitoring
- Record keeping
- SWPPP review and modifications

SITE INSPECTIONS

Inspections before and after a storm event are required by the construction general permit. At the onset of a construction project (e.g., clearing, grubbing, earth movement) it may be more appropriate to perform inspection of the BMPs on a regular basis instead of just before and after a storm. This will allow sufficient time for any corrections or improvements to be made in time before the storm. An inspector should be identified in the SWPPP. Inspection can usually be performed as part of a regular construction inspection program.

According to the general permit, a tracking or follow-up procedure must follow an inspection which discovers deficiencies in the BMPs.

The results of the inspection and assessment must be written. Include the date of the inspection, the person(s) who performed the inspection, and the observations. Inspection records must be retained for three years. A sample inspection form is provided at the end of this chapter.

It is possible that activities may have changed since the last inspection, by type or location. These should be noted. New BMPs and adjustments to the SWPPP may be necessary.

CERTIFICATION OF COMPLIANCE

You must certify, based on the annual inspection, that your facility is in compliance with the requirements of the general permit and the SWPPP. If the inspection indicates you are not in compliance, you are to notify your Regional Water Quality Control Board. The notification is to identify the type(s) of noncompliance, the actions identified to come into compliance, and a time schedule to achieve compliance.

BMPs MONITORING

The type of BMP monitoring depends on which BMP is implemented. In the case of contractor activity BMPs the monitoring consists of visual inspection to ensure that the BMP was implemented and maintained according to the SWPPP. Such inspection would include:

- looking for evidence of spills and resulting clean -up procedures (e.g., supplies of spill cleanup material);

- examining integrity of containment structures;
- verifying use of employees education programs for the various activities;
- noting the location of activity (e.g., outdoor vs. indoor, concrete vs. grass);
- verifying adequacy of trash receptacles;
- verifying waste disposal practices (e.g., recycle vs. hazardous waste bins);

Other inspection areas are described in the fact sheets found in Chapter 4.

In the case of sediment and erosion control BMPs, the monitoring program should consist of regular inspection to determine the following:

Are the BMPs installed effective?

The effectiveness of the BMP would be based on the presence of silt behind or within control devices, the presence of silt downstream of the site and signs of erosion in stabilized areas after a storm event. The system may be deemed ineffective if:

1. Silt is present outside of the control area;

2. Structural controls are breached or fail under storm events of minor (less than 2 year, 24 hour) intensity;

3. Rills and gullies are present in stabilized slopes;

4. Evidence of silt buildup in downstream storm drains and drainage ways is apparent; and

5. Controls are not maintained in accordance with design guidelines.

Have drainage patterns changed?

If the site has undergone significant grading operations, changing the drainage patterns, adjustments to the BMP controls will likely be required to address this change. The inspector shall determine the extent of the drainage pattern changes, if the changes are addressed in the SWPPP and if modifications to the erosion and sediment controls are required to address this change.

Are sediment and erosion BMPs installed properly?

The SWPPP BMPs should include details or references to allow for the proper construction of structural or vegetative erosion and sediment control devices. The inspector should insure that these systems are installed according to the SWPPP in the proper locations.

Are areas stabilized as quickly as possible after completion of construction activities in an area?

Active construction areas (inactive construction areas may be defined as areas in which no construction activity will occur for a period of 30 days or longer) which have been disturbed should be stabilized through the use of vegetation, mulch, erosion control matting or structural methods within 7 calendar days from the last construction activity in the area. If construction, climatological, or other site conditions do not allow stabilization within seven (7) days, the SWPPP should define alternative approaches (e.g., watering or chemicals for dust control).

Are the BMPs properly maintained?

Maintenance of the erosion and sediment contro devices is the most critical as well as the potentially most expensive erosion control plan. The inspector should inspect the site on a regular basis and after any storm of 0.5 inches or greater to determine maintenance requirements and general condition of the installed system. The local jurisdiction may also inspect the site on a typical bi-weekly basis to assess the maintenance performed on the systems. The following maintenance tasks should be performed on a regular basis. All maintenance related to a storm event should be completed within 48 hours of the storm event.

1. Removal of silt from barriers and sedimentation devices.

2. Replacement or repair of worn or damaged geotextile fabric.

3. Repair or replacement of damaged structural controls.

4. Seeding or mulching of damaged stabilized areas.

5. BMPs for any chemicals or fuels not addressed in the SWPPP must be developed.

6. Other control maintenance as defined in the BMP fact sheet of this handbook or part of the approved SWPPP.

RECORD KEEPING

Records of all inspections, compliance certifications, and noncompliance reporting are to be retained for at least three years by the owner/developer.

It is suggested that records of incidents such as spills, or other episodic releases be kept. Analyzing a history of this information can provide insight into modifying the BMPs. The history may suggest a predominance of spills in particular locations, from particular activities, and/or of particular materials. Efforts can be focused accordingly. Photographs may be useful. Also keep a record of maintenance activities or any other BMPs that are of an "action" nature. It is easy to demonstrate that a BMP that involves a physical change, such as berming or covering, has been accomplished. But actions that relate to good housekeeping can only be demonstrated by record keeping. Keeping a record of sediment trap cleaning, for example, also provides insight into how soon it takes for the trap to refill.

SWPPP REVIEW AND MODIFICATIONS

During the course of construction, unanticipated changes may occur which affects the SWPPP, such as schedule changes, phasing changes, staging area modifications, off-site drainage impacts and repeated failures of designed controls. These changes must be made known and SWPPP revised accordingly. During the preparation and review of the modified SWPPP, construction may continue with temporary modifications to the erosion and sediment control BMPs.

Revisions to the SWPPP are also required when the properly installed systems are ineffective in the prevention of silt transport off of the site. This may be due to unforseen site conditions or construction techniques which adversely affect the system as designed. Revisions to the SWPPP are also required if there is a new, deleted, or moved activity that could result in a significant amount of pollutants discharged in the storm water.

Best Management Practices for Cleaning Parking Lots

- Sweep parking lots frequently; at least weekly, daily is preferable. Small areas can be swept with a broom; larger areas may need a vacuum truck or mechanical sweeper. Dispose of sweepings properly.

- Post signs to control litter and prevent patrons from working with automobile fluids in your parking lot (changing oil, adding transmission fluid, etc.). You could be liable for their mess on your property!

- Use absorbent material to clean up automotive fluids on the parking lot. Dispose of absorbent properly.*

- Pick up litter daily; dispose of debris in the garbage.

- Keep dumpster areas free of litter and lids closed.

- Wash water from all cleaning operations must be discharged to the sanitary sewer.

- If cleaning with water and detergent is needed, use a mobile washing unit that is self-contained; do not allow the wash water (whether or not it is soapy) to discharge to the storm drain system.

- If using a self-contained mobile cleaner is not feasible, collect the wash water and dispose in indoor sinks or drains for discharge to the sanitary sewer. Contact your local wastewater treatment agency for approval.

- Stencil storm drain inlets with "No Dumping, Drains to Bay" message.

*Hazardous Materials must comply with hazardous materials storage and disposal requirements.

REFERENCES: ALGRC WP Best Management Practices for Industrial Storm Water Pollution Control Booklet

Preventing Spills and Discharges

Before and While Doing Your Job

Actions and Reminders

1. ***Can any liquids, solids, or spilled materials be discharged to the stormdrain?*** → ***Think*** . . . about what you are doing ***before*** you do your job.
   Remember: Nothing can be discharged to the storm drain except allowable discharges

2. ***Do I have the equipment, material and personnel to handle a spill or discharge?*** → ***Be Prepared*** . . . for any spill or discharge.
   Remember: Gather the right equipment and enough material

3. ***Is it safe for me to clean up spills and discharges?*** → ***Know*** . . . in advance, what you are handling and what to do.
   Remember: Your safety is paramount.

4. ***When do I begin to clean up spills and discharges?*** → ***Act*** . . . immediately, using known and safe procedures.
   Remember: Protect the storm drain

5. ***Do I report spills or discharges?*** → ***Communicate*** . . . the spill to your supervisor as soon as possible.
   Remember: Report all spills and discharges.

Personal Guide: Surface Water Protection and Spill Prevention

Surface Water Protection Questions . . . . . and Answers

Who** can help?* → ***You.

What** can go down the storm drain?* → ***Nothing but allowable discharges.

Where** can runoff go?* → ***Remember to check and verify storm drain location. Protect the storm drain from any unallowable spill or discharge. The storm drain is separate from the sanitary sewer.

When** can I use the storm drain for waste disposal?* → ***Never! Check with your supervisor or Environmenal Resources (714-567-6363) for proper disposal of materials and waste.

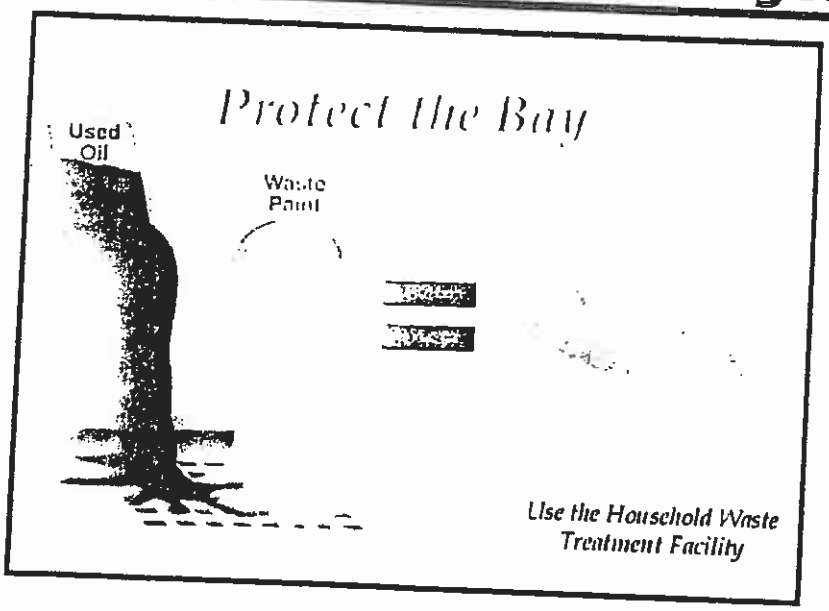
Why** can't I use the storm drain?* → ***It's the law and it affects the environment!

How** can I Help?* → ***Know your job; Know how to prevent pollutants from entering the storm drain system.

Personal Guide: Surface Water Protection and Spill Prevention

Non-Stormwater Discharges

SC-10



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

SQA
California Stormwater Quality Association

Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Drainage System

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Document and report annually the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention

- See SC11 Spill Prevention Control and Cleanup.

Other Considerations

- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)

- The primary cost is for staff time and depends on how aggressively a program is implemented.
- Cost for containment and disposal is borne by the discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Spill Prevention, Control & Cleanup SC-11

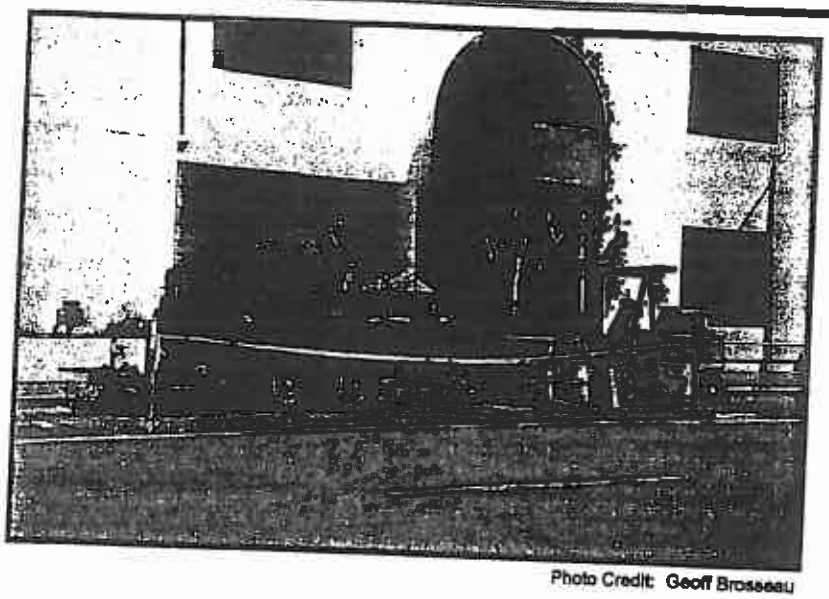


Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.
- If consistent illegal dumping is observed at the facility:
  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.
- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.
- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.
- Routine maintenance:
  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

- Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)

- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

Training

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills:
  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.
- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- A Spill Prevention Control and Countermeasure Plan (SPCC) is required for facilities that are subject to the oil pollution regulations specified in Part 112 of Title 40 of the Code of Federal Regulations or if they have a storage capacity of 10,000 gallons or more of petroleum. (Health and Safety Code 6.67)
- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.
- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.
- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from

tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off" of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

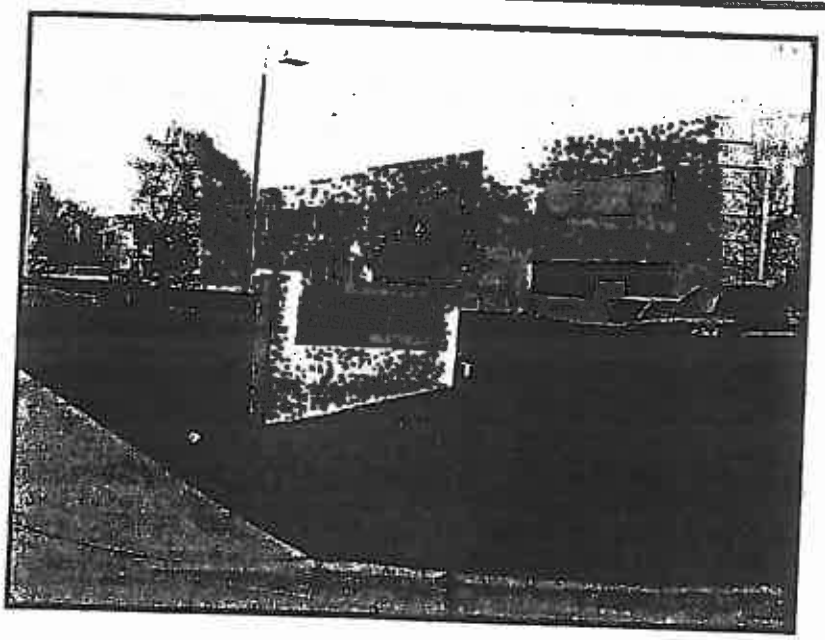
Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

Building & Grounds Maintenance SC-41



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

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- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

Other Considerations

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

Maintenance

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

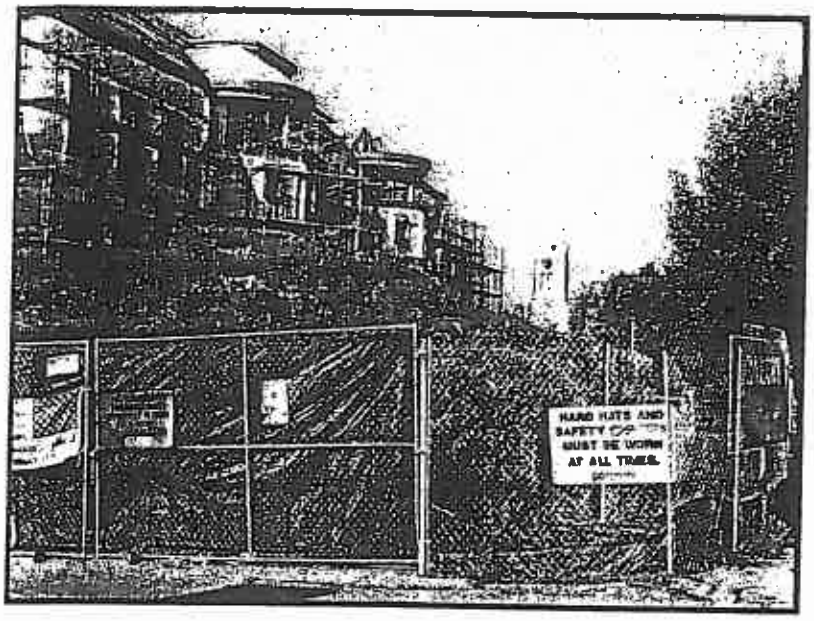
Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Building Repair and Construction SC-42



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Recycle

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Modifications are common particularly at large industrial sites. The activity may vary from minor and normal building repair to major remodeling, or the construction of new facilities. These activities can generate pollutants including solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos installation. Protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling, and construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

Approach

Pollution Prevention

- Recycle residual paints, solvents, lumber, and other materials to the maximum extent practical.
- Buy recycled products to the maximum extent practical.
- Inform on-site contractors of company policy on these matters and include appropriate provisions in their contract to ensure certain proper housekeeping and disposal practices are implemented.

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- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

Suggested Protocols

Repair & Remodeling

- Follow BMPs identified in Construction BMP Handbook.
- Maintain good housekeeping practices while work is underway.
- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Cover materials of particular concern that must be left outside, particularly during the rainy season.
- Do not dump waste liquids down the storm drain.
- Dispose of wash water, sweepings, and sediments properly.
- Store materials properly that are normally used in repair and remodeling such as paints and solvents.
- Sweep out the gutter or wash the gutter and trap the particles at the outlet of the downspout if when repairing roofs, small particles have accumulated in the gutter. A sock or geofabric placed over the outlet may effectively trap the materials. If the downspout is tight lined, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.
- Properly store and dispose waste materials generated from construction activities. See Construction BMP Handbook.
- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed.

Painting

- Enclose painting operations consistent with local air quality regulations and OSHA.
- Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect water quality.
- Develop paint handling procedures for proper use, storage, and disposal of paints.
- Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.
- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.
- Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100% effective.
- Transfer and load paint and hot thermoplastic away from storm drain inlets.

- Do not transfer or load paint near storm drain inlets.
- Plug nearby storm drain inlets prior to starting painting and remove plugs when job is complete when there is significant risk of a spill reaching storm drains.
- Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.
- Use a ground cloth to collect the chips if painting requires scraping or sand blasting of the existing surface. Dispose the residue properly.
- Cover or enclose painting operations properly to avoid drift.
- Clean the application equipment in a sink that is connected to the sanitary sewer if using water based paints.
- Capture all cleanup-water and dispose of properly.
- Dispose of paints containing lead or tributyl tin and considered a hazardous waste properly.
- Store leftover paints if they are to be kept for the next job properly, or dispose properly.
- Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

Training

Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employees can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately.
- Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

Limitations

- This BMP is for minor construction only. The State's General Construction Activity Stormwater Permit has more requirements for larger projects. The companion "Construction Best Management Practice Handbook" contains specific guidance and best management practices for larger-scale projects.
- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.

SC-42 Building Repair and Construction

Requirements

Costs

These BMPs are generally low to modest in cost.

Maintenance

N/A

Supplemental Information

Further Detail of the BMP

Soil/Erosion Control

If the work involves exposing large areas of soil, employ the appropriate soil erosion and control techniques. See the Construction Best Management Practice Handbook. If old buildings are being torn down and not replaced in the near future, stabilize the site using measures described in SC-40 Contaminated or Erodible Areas.

If a building is to be placed over an open area with a storm drainage system, make sure the storm inlets within the building are covered or removed, or the storm line is connected to the sanitary sewer. If because of the remodeling a new drainage system is to be installed or the existing system is to be modified, consider installing catch basins as they serve as effective "in-line" treatment devices. See Treatment Control Fact Sheet TC-20 Wet Pond/Basin in Section 5 of the New Development and Redevelopment Handbook regarding design criteria. Include in the catch basin a "turn-down" elbow or similar device to trap floatables.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

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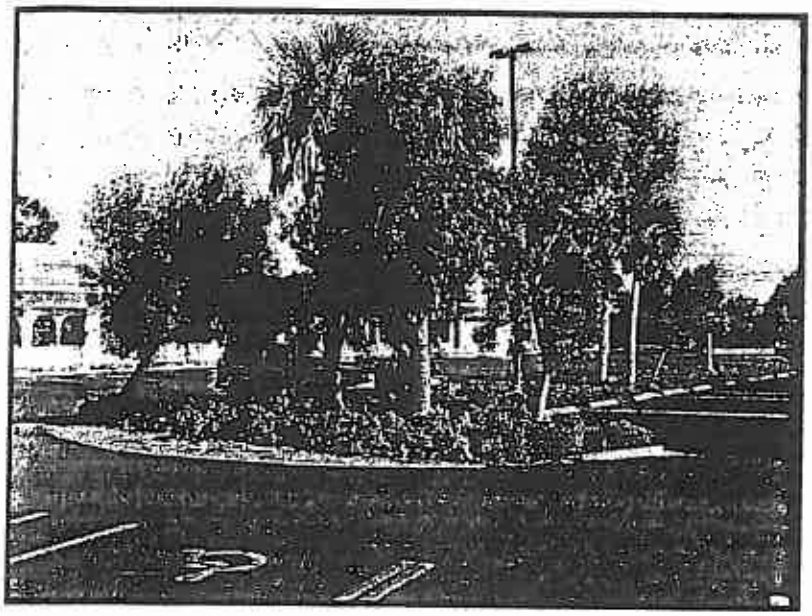
The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

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SC-43 Parking/Storage Area Maintenance

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

SC-43 Parking/Storage Area Maintenance

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

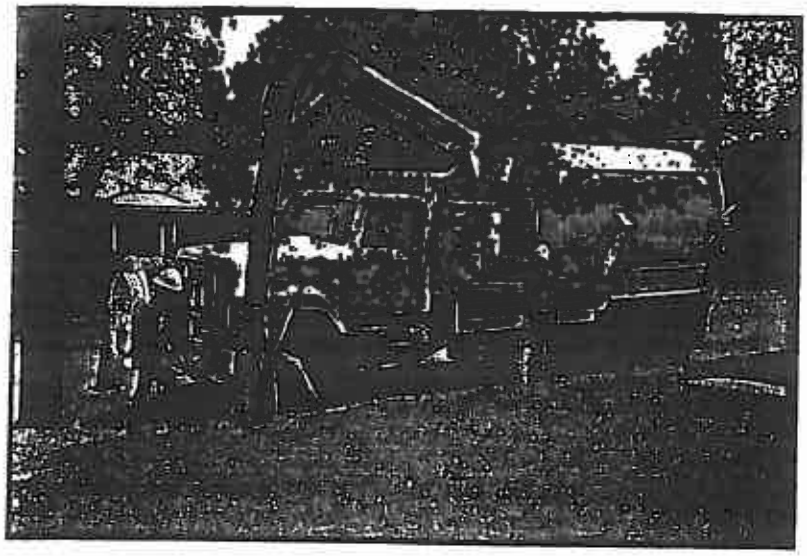
Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Drainage System Maintenance SC-44



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

SQA
California Stormwater Quality Association

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
  - Purchase and installation of signs.
  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

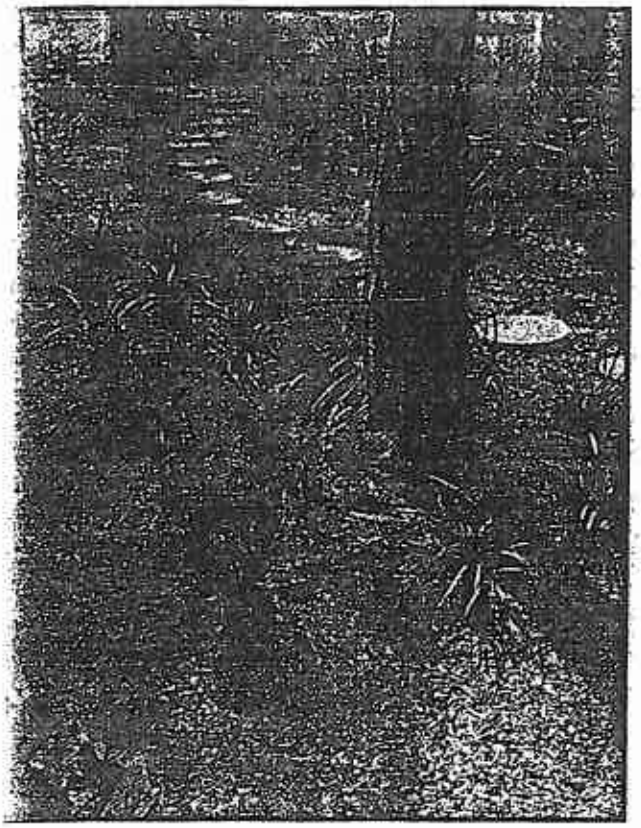
Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Site Design & Landscape Planning SD-10



Design Objectives

- ✓ Maximize Infiltration
- ✓ Provide Retention
- ✓ Slow Runoff
- ✓ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and [illegible] areas planned for [illegible]

[illegible]

[illegible]

SD-10 Site Design & Landscape Planning

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.

- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.

- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.

- Maximize trees and other vegetation at each site by planning additional vegetation [illegible] tree areas, and promoting the use of native and/or drought tolerant plants.

- [illegible] vegetation by [illegible] and other landscaped areas.

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redevelopment Guidelines

Various jurisdictional stormwater management and mitigation plans [illegible] define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of "redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "Design Principles" above should be followed.

SD-10 Site Design & Landscape Planning

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

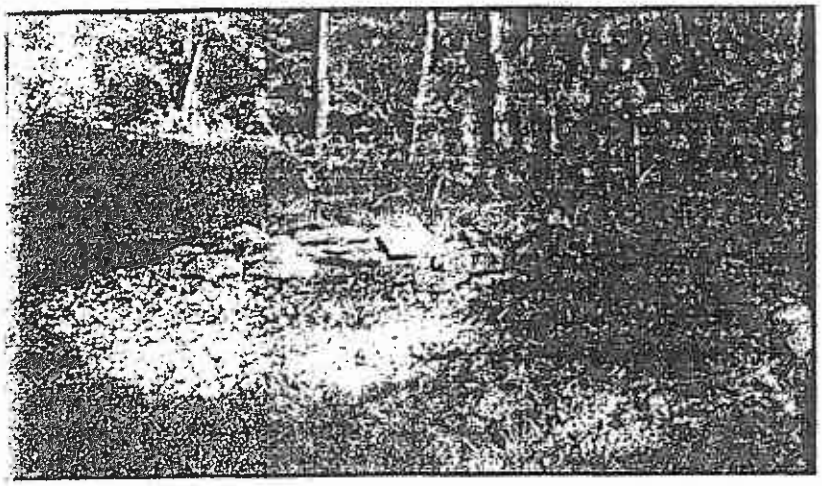
Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Roof Runoff Controls

SD-11



Rain Garden

Design Objectives

- ✓ Maximize Infiltration
- ✓ Provide Retention
- ✓ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ✓ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long narrow rock-filled trench which is used for [illegible] roof runoff. These are described under Pervious Controls.

Pop-up Drainage emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a sprinkler irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

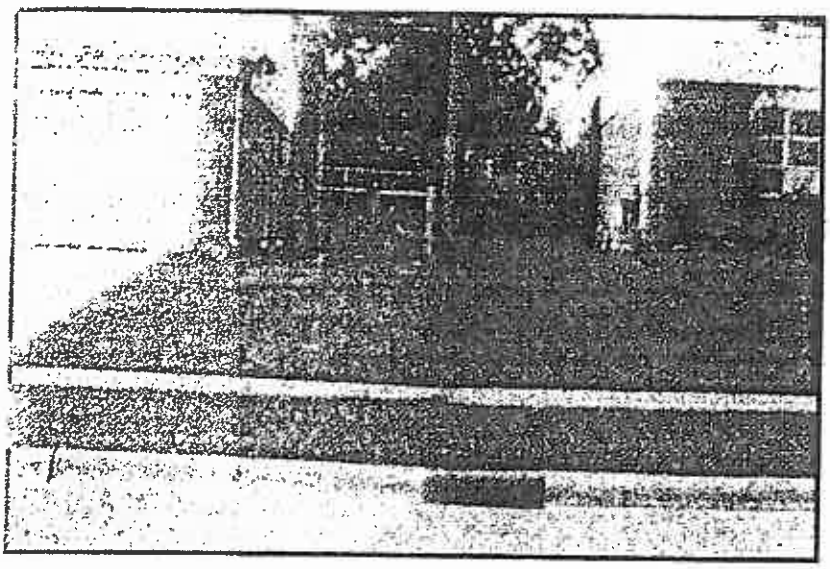
Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Efficient Irrigation

SD-12



Design Objectives

- ✓ Maximize Infiltration
- ✓ Provide Retention
- ✓ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- [illegible]
- [illegible]

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses. to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

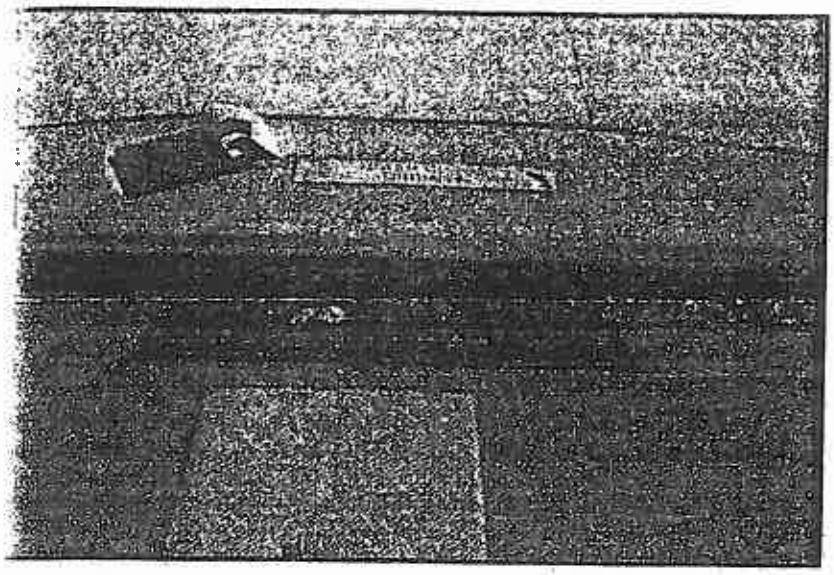
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works. May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County. February 14, 2002.

[illegible]

Storm Drain Signage

SD-13



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ✓ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.
- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

- Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County [illegible] Department of Public Works, May 2002.
- [illegible]

Maintenance Bays & Docks

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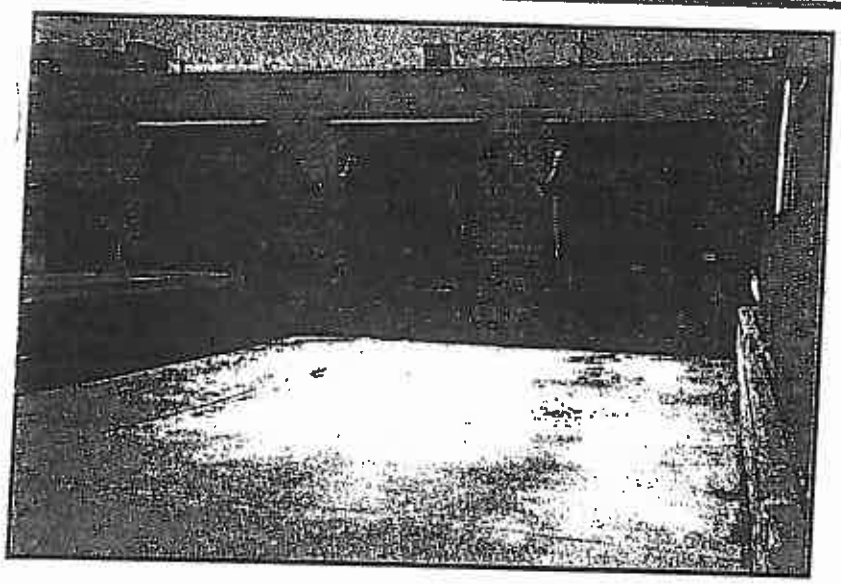

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ✓ Prohibit Dumping of Improper Materials
- ✓ Contain Pollutants
- Collect and Convey

Description

Several measures can be taken to prevent operations at maintenance bays and loading docks from contributing a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the stormwater conveyance system.

Approach

In designs for maintenance bays and loading docks, containment is encouraged. Preventative measures include overflow containment structures and dead-end sumps. However, in the case of loading docks from grocery stores and warehouse/distribution centers, engineered infiltration systems may be considered.

Suitable Applications

Appropriate applications include commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for vehicle maintenance and repair are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

Designing New Installations

Designs of maintenance bays should consider the following:

- Repair/maintenance bays and vehicle parts with fluids should be indoors; or designed to preclude urban run-on and runoff.
- Repair/maintenance floor areas should be paved with Portland cement concrete (or equivalent smooth impervious surface).

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- Repair/maintenance bays should be designed to capture all wash water leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters form entering the storm drain system. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.
- Other features may be comparable and equally effective.

The following designs of loading/unloading dock areas should be considered:

- Loading dock areas should be covered, or drainage should be designed to preclude urban run-on and runoff.
- Direct connections into storm drains from depressed loading docks (truck wells) are prohibited.
- Below-grade loading docks from grocery stores and warehouse/distribution centers of fresh food items should drain through water quality inlets, or to an engineered infiltration system, or an equally effective alternative. Pre-treatment may also be required.
- Other features may be comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Trash Storage Areas

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Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ✓ Contain Pollutants
- Collect and Convey

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

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