

## **APPENDIX 6.5-D – DRAFT STORMWATER MANAGEMENT PLAN**

# Draft Storm Water Management Plan For Priority Projects (SWMP)

## ORANGE GROVE PROJECT



*Submitted by*

### **ORANGE GROVE ENERGY, L.P.**

1900 East Golf Road, Suite 1030  
Schaumburg, IL 60173

June 2008

## Storm Water Management Plan For Priority Projects (Major SWMP)

Project Name:	Orange Grove Project
Permit Number (Land Development Projects):	
Work Authorization Number (CIP):	
Applicant:	Orange Grove Energy, LP.
Applicant's Address:	1900 East Golf Road, Suite 1030, Schaumburg, IL 60173
Plan Prepare By ( <i>Leave blank if same as applicant</i> ):	Sega, 16041 Foster, P.O. Box 1000, Stilwell, KS, 65085
Date:	August 10, 2007
Revision Date (If applicable):	June 2008

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9424) requires all applications for a permit or approval associated with a Land Disturbance Activity must be accompanied by a Storm Water Management Plan (SWMP) (section 67.804.f). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality. Projects that meet the criteria for a priority project are required to prepare a Major SWMP.

Since the SWMP is a living document, revisions may be necessary during various stages of approval by the County. Please provide the approval information requested below.

Project Review Stage	Does the SWMP need revisions?		If YES, Provide Revision Date
	YES	NO	
DRAFT		X	

Instructions for a Major SWMP can be downloaded at <http://www.co.san-diego.ca.us/dpw/stormwater/susmp.html>.

Completion of the following checklist and attachments will fulfill the requirements of a Major SWMP for the project listed above.

### PROJECT DESCRIPTION

Please provide a brief description of the project in the following box. For example:

The 50-acre RC Ranch project is located on the south side of San Miguel Road in the County of San Diego (See Attachment 1). The project is approximately 1.0 mile east of the intersection of San Miguel Avenue and San Miguel Road and 1 mile south of the Sweetwater Reservoir. This project will consist of a planned residential community comprising of 45 single-family homes 72 and multi-unit dwellings.

The power plant site is located in north San Diego County, approximately 3.5 (air) miles
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of I-15 on SR-76, approximately two miles west of the community of Pala. The approximately 8.5 acre site is situated within an approximately 202-acre property owned by SDG&E. The site is located on disturbed lands formerly used as a citrus grove, but the grove has not been maintained in at least five years. The existing SDG&E Pala substation is located on a contiguous SDG&E parcel south of the site. The transmission line interconnection will be installed in a trench that will primarily be located within the roadbed or shoulder of Pala Del Norte Road and the paved driveway of the substation. The gas pipeline has been designed to minimize new ground disturbance to the extent practical. The pipeline will be approximately 2 miles long. The Orange Grove project objective is to respond to the SDG&E request for offers for new local electric capacity in an environmentally responsible and economically feasible manner. The purpose of this project is to assure reliable electric power for the public.

**PRIORITY PROJECT DETERMINATION**

Please check the box that best describes the project. Does the project meet one of the following criteria?

<b>PRIORITY PROJECT</b>	<b>YES</b>	<b>NO</b>
Redevelopment within the County Urban Area that creates or adds at least 5,000 net square feet of additional impervious surface area		X
Residential development of more than 10 units		X
Commercial developments with a land area for development of greater than 100,000 square feet		X
Automotive repair shops		X
Restaurants, where the land area for development is greater than 5,000 square feet		X
Hillside development, in an area with known erosive soil conditions, where there will be grading on any natural slope that is twenty-five percent or greater, if the development creates 5,000 square feet or more of impervious surface		X(1)
Environmentally Sensitive Areas: All development and redevelopment located within or directly adjacent to or discharging directly to an environmentally sensitive area (where discharges from the development or redevelopment will enter receiving waters within the environmentally sensitive area), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition.		X
Parking Lots 5,000 square feet or more or with 15 parking spaces or more and potentially exposed to urban runoff		X
Streets, roads, highways, and freeways which would create a new paved surface that is 5,000 square feet or greater		X

**Limited Exclusion:** Trenching and resurfacing work associated with utility projects are not considered priority projects. Parking lots, buildings and other structures associated with utility projects are subject to SUSMP requirements if one or more of the criteria above are met.

If you answered **NO** to all the questions, then **STOP**. Please complete a Minor SWMP for your project.

(1)The site slopes are 10% and the potential pollutants are similar to the selected hillside category.

If you answered **YES** to any of the questions, please continue.

The following questions provide a guide to collecting information relevant to project stormwater quality issues. Please provide a description of the findings in text box below.

	<b>QUESTIONS</b>	<b>COMPLETED</b>	<b>NA</b>
1.	Describe the topography of the project area.	x	
2.	Describe the local land use within the project area and adjacent areas.	x	
3.	Evaluate the presence of dry weather flow.	x	
4.	Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	x	
5.	For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	x	
6.	Determine if there are any High Risk Areas (municipal or domestic water supply reservoirs or groundwater percolation facilities) within the project limits.	x	
7.	Determine the Regional Board special requirements, including TMDLs, effluent limits, etc.	x	
8.	Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	x	
9.	If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	x	
10.	Determine contaminated or hazardous soils within the project area.	x	

Please provide a description of the findings in the following box. For example:

The project is located in the San Diego Hydrologic unit. The area is characterized by rolling grassy hills and shrubs. Runoff from the project drains into a MS4 that eventually drains to Los Coches Creek. Within the project limit there are no 303(d) impaired receiving water and no Regional Board special requirements.

<p>The site occurs on an alluvial fan surface that slopes southward at an average grade of approximately 10 percent. The project site will be constructed on lands that have already been disturbed by agriculture. The transmission line interconnection facilities for the project will also be located in areas that are already disturbed, so the result in no new ground disturbance. The gas pipeline will be installed in previously disturbed areas and undisturbed areas. The maximum (construction) project disturbance is approximately 37 acres. (CONTINUED ON PAGE 3A)</p>
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Complete the checklist below to determine if Treatment Best Management Practices (BMPs) are required for the project.

<b>No.</b>	<b>CRITERIA</b>	<b>YES</b>	<b>NO</b>	<b>INFORMATION</b>
1.	Is this an emergency project		x	If YES, go to 6. If NO, continue to 2.
2.	Have TMDLs been established		x	If YES, go to 5.

(CONTINUED FROM PAGE 3)

The Site area is relatively dry with precipitation mostly occurring between December and March. There are no dry weather flows on the property. Average annual rainfall within the Hydrologic Unit ranges from approximately 11 inches at low elevations near the coast, to more than 45 inches in the highest elevations of the headwaters. The Site is situated on a gentle, relatively featureless slope that has a small up-gradient watershed and dispersing sheet flow. Surface drainage from the power plant will flow to an onsite detention basin designed to contain storm water from storms with a recurrence interval of up to 100 years, and will thereby reduce erosion and sediment transport from the site compared to existing conditions. The discharge from the detention basin will be directed to sheet flow south off of the property. Surface drainage north of the site will be diverted around the site by a conveyance channel and discharge into the west drainage.

The San Luis Rey River runs south of SR 76. Near the Site, the San Luis Rey River was diverted southward by mining operations and is now confined to a diked channel located approximately 0.5 mile south of SR 76. In the project vicinity, flow in the San Luis Rey River is intermittent, responding to seasonal precipitation. The closest perennial surface waters to the Site are ponds that occur in the riverbed where past mining has exposed the water table in the alluvial aquifer.

There are no high risk areas, or known contaminated soil areas, or special Regional Board requirements within the project limits. The San Luis Rey River is down gradient of the site and is a 303(d) listed water body for Total Dissolved Solids and Chloride.

No.	CRITERIA	YES	NO	INFORMATION
	for surface waters within the project limit?			If NO, continue to 3.
3.	Will the project directly discharge to a 303(d) impaired receiving water body?		x	If YES, go to 5. If NO, continue to 4.
4.	Is this project within the urban and environmentally sensitive areas as defined on the maps in Appendix B of the <i>County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects</i> ?		x	If YES, continue to 5. If NO, go to 6.
5.	Consider approved Treatment BMPs for the project.	x		If YES, go to 7.
6.	Project is not required to consider Treatment BMPs			Document for Project Files by referencing this checklist.
7.	End	x		

Now that the need for a treatment BMPs has been determined, other information is needed to complete the SWMP.

### WATERSHED

Please check the watershed(s) for the project.

- |                                       |  |  |   |
|---------------------------------------|--|--|---|
| <input type="checkbox"/> San Juan     | <input type="checkbox"/> Santa Margarita | <input checked="" type="checkbox"/> San Luis Rey | <input type="checkbox"/> Carlsbad         |
| <input type="checkbox"/> San Dieguito | <input type="checkbox"/> Penasquitos     | <input type="checkbox"/> San Diego               | <input type="checkbox"/> Pueblo San Diego |
| <input type="checkbox"/> Sweetwater   | <input type="checkbox"/> Otay            | <input type="checkbox"/> Tijuana                 |   |

Please provide the hydrologic sub-area and number(s)

Number	Name
903.20	Monserate Hydrologic Area
3.21	Pala Hydrologic Sub Area

Please provide the beneficial uses for Inland Surface Waters and Ground Waters. Beneficial Uses can be obtained from the Water Quality Control Plan For The San Diego Basin, which is available at the Regional Board office or at <http://www.swrcb.ca.gov/rwqcb9/programs/basinplan.html>.

SURFACE WATERS	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	RECI	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
<b>Inland Surface Waters</b>	3.21	x	x	x					x	x		x	x	x		x
<b>Ground Waters</b>	3.21	x	x	x												

X Existing Beneficial Use  
 0 Potential Beneficial Use  
 \* Excepted from Municipal

### POLLUTANTS OF CONCERN

Using Table 1, identify pollutants that are anticipated to be generated from the proposed priority project categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

**Table 1. Anticipated and Potential Pollutants Generated by Land Use Type**

Priority Project Categories	General Pollutant Categories								
	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P <sup>(1)</sup>	P <sup>(2)</sup>	P	X
Commercial Development >100,000 ft <sup>2</sup>	P <sup>(1)</sup>	P <sup>(1)</sup>		P <sup>(2)</sup>	X	P <sup>(5)</sup>	X	P <sup>(3)</sup>	P <sup>(5)</sup>
Automotive Repair Shops			X	X <sup>(4)(5)</sup>	X		X		
Restaurants					X	X	X	X	
(1) Hillside Development >5,000 ft <sup>2</sup>	X	X			X	X	X		X

(1)The site slopes are 10% and the potential pollutants are similar to the selected hillside category.

	<i>General Pollutant Categories</i>								
<i>Priority Project Categories</i>	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Parking Lots	P <sup>(1)</sup>	P <sup>(1)</sup>	X		X	P <sup>(1)</sup>	X		P <sup>(1)</sup>
Streets, Highways & Freeways	X	P <sup>(1)</sup>	X	X <sup>(4)</sup>	X	P <sup>(5)</sup>	X		
X = anticipated P = potential (1) A potential pollutant if landscaping exists on-site. (2) A potential pollutant if the project includes uncovered parking areas. (3) A potential pollutant if land use involves food or animal waste products. (4) Including petroleum hydrocarbons. (5) Including solvents.									

**Note:** If other monitoring data that is relevant to the project is available. Please include as Attachment C.

### CONSTRUCTION BMPs

Please check the construction BMPs that may be used. The BMPs selected are those that will be implemented during construction of the project. The applicant is responsible for the placement and maintenance of the BMPs selected.

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Silt Fence   | <input checked="" type="checkbox"/> Desilting Basin               |
| <input checked="" type="checkbox"/> Fiber Rolls  | <input checked="" type="checkbox"/> Gravel Bag Berm               |
| <input type="checkbox"/> Street Sweeping and Vacuuming   | <input checked="" type="checkbox"/> Sandbag Barrier               |
| <input checked="" type="checkbox"/> Storm Drain Inlet Protection   | <input checked="" type="checkbox"/> Material Delivery and Storage |
| <input checked="" type="checkbox"/> Stockpile Management   | <input checked="" type="checkbox"/> Spill Prevention and Control  |
| <input checked="" type="checkbox"/> Solid Waste Management   | <input checked="" type="checkbox"/> Concrete Waste Management     |
| <input checked="" type="checkbox"/> Stabilized Construction Entrance/Exit  | <input checked="" type="checkbox"/> Water Conservation Practices  |
| <input type="checkbox"/> Dewatering Operations   | <input type="checkbox"/> Paving and Grinding Operations           |
| <input checked="" type="checkbox"/> Vehicle and Equipment Maintenance  |   |
| <input checked="" type="checkbox"/> Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval. |   |

### SITE DESIGN

To minimize stormwater impacts, site design measures must be addressed. The following checklist provides options for avoiding or reducing potential impacts during project planning. If

YES is checked, it is assumed that the measure was used for this project. If NO is checked, please provide a brief explanation why the option was not selected in the text box below.

	<b>OPTIONS</b>	<b>YES</b>	<b>NO</b>	<b>N/A</b>
1.	Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?		x	
2.	Can the project be designed to minimize impervious footprint?	x		
3.	Conserve natural areas where feasible?	x		
4.	Where landscape is proposed, can rooftops, impervious sidewalks, walkways, trails and patios be drained into adjacent landscaping?			x
5.	For roadway projects, can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	x		
6.	Can any of the following methods be utilized to minimize erosion from slopes:	x		
	6.a. Disturbing existing slopes only when necessary?	x		
	6.b. Minimize cut and fill areas to reduce slope lengths?	x		
	6.c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	x		
	6.d. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	x		
	6.e. Rounding and shaping slopes to reduce concentrated flow?	x		
	6.f. Collecting concentrated flows in stabilized drains and channels?	x		

Please provide a brief explanation for each option that was checked N/A or NO in the following box.

1.	NO - The project is sited to produce and supply power to a surrounding area during periods of high demand. The project site cannot be moved.
4.	N/A - This is an industrial facility and there is no proposed landscaping near the structures.

If the project includes work in channels, then complete the following checklist. Information shall be obtained from the project drainage report. N/A This project does not include work in channels.

<b>No.</b>	<b>CRITERIA</b>	<b>YES</b>	<b>NO</b>	<b>N/A</b>	<b>COMMENTS</b>
1.	Will the project increase velocity or volume of downstream flow?		x		If YES go to 5.
2.	Will the project discharge to unlined channels?		x		If YES go to 5.
3.	Will the project increase potential sediment load		x		If YES go to 5.

No.	CRITERIA	YES	NO	N/A	COMMENTS
	of downstream flow?				
4.	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect upstream and/or downstream channel stability?		x		If YES go to 7.
5.	Review channel lining materials and design for stream bank erosion.	x			Continue to 6.
6.	Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.	x			Continue to 7.
7.	Include, where appropriate, energy dissipation devices at culverts.	x			Continue to 8.
8.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.	x			Continue to 9.
9.	Include, if appropriate, detention facilities to reduce peak discharges.	x			
10.	“Hardening“ natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless pre-development conditions are determined to be so erosive that hardening would be required even in the absence of the proposed development.	x			Continue to 11.
11.	Provide other design principles that are comparable and equally effective.	x			Continue to 12.
12.	End	x			

## SOURCE CONTROL

Please complete the following checklist for Source Control BMPs. If the BMP is not applicable for this project, then check N/A only at the main category.

BMP		YES	NO	N/A
1.	<b>Provide Storm Drain System Stenciling and Signage</b>			
1.a.	All storm drain inlets and catch basins within the project area shall have a stencil or tile placed with prohibitive language (such as: “NO DUMPING – DRAINS TO _____”) and/or graphical icons to discourage illegal dumping.	x		
1.b.	Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the project area.	x		
2.	<b>Design Outdoors Material Storage Areas to Reduce Pollution Introduction</b>			
2.a.	This is a detached single-family residential project. Therefore, personal storage areas are exempt from this requirement.			x

<b>BMP</b>			<b>YES</b>	<b>NO</b>	<b>N/A</b>
	2.b.	Hazardous materials with the potential to contaminate urban runoff shall either be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with runoff or spillage to the storm water conveyance system; or (2) protected by secondary containment structures such as berms, dikes, or curbs.	x		
	2.c.	The storage area shall be paved and sufficiently impervious to contain leaks and spills.	x		
	2.d.	The storage area shall have a roof or awning to minimize direct precipitation within the secondary containment area.	x		
<b>3.</b>	<b>Design Trash Storage Areas to Reduce Pollution Introduction</b>				
	3.a.	Paved with an impervious surface, designed not to allow run-on from adjoining areas, screened or walled to prevent off-site transport of trash; or,	x		
	3.b.	Provide attached lids on all trash containers that exclude rain, or roof or awning to minimize direct precipitation.	x		
<b>4.</b>	<b>Use Efficient Irrigation Systems &amp; Landscape Design</b>				
	The following methods to reduce excessive irrigation runoff shall be considered, and incorporated and implemented where determined applicable and feasible.				
	4.a.	Employing rain shutoff devices to prevent irrigation after precipitation.	x		
	4.b.	Designing irrigation systems to each landscape area's specific water requirements.	x		
	4.c.	Using flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.	x		
	4.d.	Employing other comparable, equally effective, methods to reduce irrigation water runoff.	x		
<b>5.</b>	<b>Private Roads</b>				
	The design of private roadway drainage shall use at least one of the following				
	5.a.	Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.	x		
	5.b.	Urban curb/swale system: street slopes to curb, periodic swale inlets drain to vegetated swale/biofilter.			x
	5.c.	Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to storm water conveyance system.			x
	5.d.	Other methods that are comparable and equally effective within the project.	x		
<b>6.</b>	<b>Residential Driveways &amp; Guest Parking</b>				x
	The design of driveways and private residential parking areas shall use one at least of the following features.				
	6.a.	Design driveways with shared access, flared (single lane at street) or wheelstrips (paving only under tires); or, drain into landscaping prior to discharging to the storm water conveyance system.			
	6.b.	Uncovered temporary or guest parking on private residential lots may be: paved with a permeable surface; or, designed to drain into landscaping prior to discharging to the storm water conveyance system.			
	6.c.	Other features which are comparable and equally effective.			
<b>7.</b>	<b>Dock Areas</b>				x

<b>BMP</b>		<b>YES</b>	<b>NO</b>	<b>N/A</b>
	Loading/unloading dock areas shall include the following.			
7.a.	Cover loading dock areas, or design drainage to preclude urban run-on and runoff.			
7.b.	Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.			
7.c.	Other features which are comparable and equally effective.			
<b>8.</b>	<b>Maintenance Bays</b>			x
	Maintenance bays shall include the following.			
8.a.	Repair/maintenance bays shall be indoors; or, designed to preclude urban run-on and runoff.			
8.b.	Design a repair/maintenance bay drainage system to capture all wash water, leaks and spills. 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.			
8.c.	Other features which are comparable and equally effective.			
<b>9.</b>	<b>Vehicle Wash Areas</b>			x
	Priority projects that include areas for washing/steam cleaning of vehicles shall use the following.			
9.a.	Self-contained; or covered with a roof or overhang.			
9.b.	Equipped with a clarifier or other pretreatment facility.			
9.c.	Properly connected to a sanitary sewer.			
9.d.	Other features which are comparable and equally effective.			
<b>10.</b>	<b>Outdoor Processing Areas</b>			x
	Outdoor process equipment operations, such as rock grinding or crushing, painting or coating, grinding or sanding, degreasing or parts cleaning, waste piles, and wastewater and solid waste treatment and disposal, and other operations determined to be a potential threat to water quality by the County shall adhere to the following requirements.			
10.a.	Cover or enclose areas that would be the most significant source of pollutants; or, slope the area toward a dead-end sump; or, discharge to the sanitary sewer system following appropriate treatment in accordance with conditions established by the applicable sewer agency.			
10.b.	Grade or berm area to prevent run-on from surrounding areas.			
10.c.	Installation of storm drains in areas of equipment repair is prohibited.			
10.d.	Other features which are comparable or equally effective.			
<b>11.</b>	<b>Equipment Wash Areas</b>			x
	Outdoor equipment/accessory washing and steam cleaning activities shall be.			
11.a.	Be self-contained; or covered with a roof or overhang.			
11.b.	Be equipped with a clarifier, grease trap or other pretreatment facility, as appropriate			
11.c.	Be properly connected to a sanitary sewer.			
11.d.	Other features which are comparable or equally effective.			
<b>12.</b>	<b>Parking Areas</b>			
	The following design concepts shall be considered, and incorporated and implemented where determined applicable and feasible by the County.			
12.a.	Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.	x		

BMP			YES	NO	N/A
	12.b.	Overflow parking (parking stalls provided in excess of the County's minimum parking requirements) may be constructed with permeable paving.	x		
	12.c.	Other design concepts that are comparable and equally effective.	x		
13.	<b>Fueling Area</b>				x
	Non-retail fuel dispensing areas shall contain the following.				
	13.a.	Overhanging roof structure or canopy. The cover's minimum dimensions must be equal to or greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area shall drain to the project's treatment control BMP(s) prior to discharging to the storm water conveyance system.			
	13.b.	Paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited.			
	13.c.	Have an appropriate slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of urban runoff.			
	13.d.	At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.			

Please list other project specific Source Control BMPs in the following box. Write N/A if there are none and briefly explain.

<p>Diversion Trench - Trench install to divert run-on storm water around the plant site and away from industrial use areas.</p>
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## TREATMENT CONTROL

To select a structural treatment BMP using Treatment Control BMP Selection Matrix (Table 2), each priority project shall compare the list of pollutants for which the downstream receiving waters are impaired (if any), with the pollutants anticipated to be generated by the project (as identified in Table 1). Any pollutants identified by Table 1, which are also causing a Clean Water Act section 303(d) impairment of the receiving waters of the project, shall be considered primary pollutants of concern. Priority projects that are anticipated to generate a primary pollutant of concern shall select a single or combination of stormwater BMPs from Table 2, which **maximizes pollutant removal** for the particular primary pollutant(s) of concern.

Priority projects that are **not** anticipated to generate a pollutant for which the receiving water is Clean Water Act Section 303(d) impaired shall select a single or combination of stormwater BMPs from Table 2, which are effective for pollutant removal of the identified secondary pollutants of concern, consistent with the "maximum extent practicable" standard.

### Table 2. Treatment Control BMP Selection Matrix

Pollutant of Concern	Treatment Control BMP Categories						
	Biofilters	Detention Basins	Infiltration Basins <sup>(2)</sup>	Wet Ponds or Wetlands	Drainage Inserts	Filtration	Hydrodynamic Separator Systems <sup>(3)</sup>
Sediment	M	H	H	H	L	H	M
Nutrients	L	M	M	M	L	M	L
Heavy Metals	M	M	M	H	L	H	L
Organic Compounds	U	U	U	M	L	M	L
Trash & Debris	L	H	U	H	M	H	M
Oxygen Demanding Substances	L	M	M	M	L	M	L
Bacteria	U	U	H	H	L	M	L
Oil & Grease	M	M	U	U	L	H	L
Pesticides	U	U	U	L	L	U	L

(1) Copermitees are encouraged to periodically assess the performance characteristics of many of these BMPs to update this table.

(2) Including trenches and porous pavement.

(3) Also known as hydrodynamic devices and baffle boxes.

L: Low removal efficiency:  
M: Medium removal efficiency:  
H: High removal efficiency:  
U: Unknown removal efficiency

Sources: *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (1993), *National Stormwater Best Management Practices Database* (2001), *Guide for BMP Selection in Urban Developed Areas* (2001), and *Caltrans New Technology Report* (2001).

A Treatment BMP must address runoff from developed areas. Please provide the post-construction water quality values for the project. Label outfalls on the BMP map.  $Q_{WQ}$  is dependent on the type of treatment BMP selected for the project.

Outfall	Tributary Area (acres)	$Q_{100}$ (cfs)	$Q_{WQ}$ (cfs)
1	5.2	11.28	27.86
2	3.0	12.75	N/A

Detention basin

North drainage channel

Please check the box(s) that best describes the Treatment BMP(s) selected for this project.

**Biofilters**

- Grass swale
- Grass strip
- Wetland vegetation swale
- Bioretention

**Detention Basins**

- Extended/dry detention basin with grass lining
- Extended/dry detention basin with impervious lining

**Infiltration Basins**

- Infiltration basin
- Infiltration trench
- Porous asphalt
- Porous concrete
- Porous modular concrete block

**Wet Ponds or Wetlands**

- Wet pond/basin (permanent pool)
- Constructed wetland

**Drainage Inserts** (See note below)

- Oil/Water separator
- Catch basin insert
- Storm drain inserts
- Catch basin screens

**Filtration**

- Media filtration
- Sand filtration

**Hydrodynamic Separator Systems**

- Swirl Concentrator
- Cyclone Separator
- Baffle Separator
- Gross Solids Removal Device
- Linear Radial Device

**Note:** Catch basin inserts and storm drain inserts are excluded from use on County maintained right-of-way and easements.

Include Treatment Datasheet as Attachment E. The datasheet should include the following:	<b>COMPLETED</b>	<b>NO</b>
1. Description of how treatment BMP was designed. Provide a description for each type of treatment BMP.	x	
2. Engineering calculations for the BMP(s)	x	

Please describe why the selected treatment BMP(s) was selected for this project. For projects utilizing a low performing BMP, please provide a detailed explanation and justification.

The treatment BMP selected for this site is detention basin. The BMP was selected because it will provide high removal efficiency for sediment, which is the main pollutant of concern for the site, and will control downstream flow intensity. In addition, the BMP has been sized so that the structure will control the water discharge to below pre-construction flow up to a 100 year storm event. Surface drainage from north of the site will be directed to sheet flow in the east drainage. Discharge from the detention basin will be discharged as sheet flow over the east access road. Residual water retained in the detention basin will be evaporated or infiltrated into the soil.

**MAINTENANCE**

Please check the box that best describes the maintenance mechanism(s) for this project.

CATEGORY	SELECTED	
	YES	NO
First		X
Second	X	
Third		X
Fourth		X

Please briefly describe the long-term fiscal resources for the selected maintenance mechanism(s).

The owner of the power plant facility will be responsible for maintenance of the treatment BMP. The estimated cost for maintenance of the BMP is included in attachment F. Attachment E contains the specification information for the treatment BMP and the maintenance requirements.  
(CONTINUED ON PAGE 14A and 14B)

## ATTACHMENTS

Please include the following attachments.

	ATTACHMENT	COMPLETED	N/A
A	Project Location Map	X	
B	Site Map	X	
C	Relevant Monitoring Data	X	
D	Treatment BMP Location Map	X	
E	Treatment BMP Datasheets	X	
F	Operation and Maintenance Program for Treatment BMPs	X	
G	Engineer's Certification Sheet	X	

**Note:** Attachments A and B may be combined.

(CONTINUED FROM PAGE 14)

#### LONG-TERM FISCAL RESOURCES FOR MAINTENANCE

The following information is excerpted from the SUSMP manual to describe how the treatment BMP (detention basin) will be maintained through a financial mechanism that provides long term funding for the activities.

#### **SECOND CATEGORY:**

The County needs to assure ongoing maintenance. The nature of the proposed BMPs indicates that it is appropriate for property owners to be given primary responsibility for maintenance, on a perpetual basis (unless a stormwater utility is eventually formed). However, the County (in a “backup” role) needs to be able to step in and perform the maintenance if property owner fails, and needs to have security to provide funding for such backup maintenance. Security for “backup” maintenance after the interim period (5 years) would not be provided, however primary owner maintenance responsibility would remain. IF a stormwater utility or other permanent mechanism is put into place, it could assume either a primary or backup maintenance role.

#### Project BMP

- Detention Basin

#### **Mechanisms to Assure Maintenance:**

1. Stormwater Ordinance Requirement: The WPO requires this ongoing maintenance. In the event that the mechanisms below prove ineffective, or in addition to enforcing those mechanisms, civil action, criminal action or administrative citation could also be pursued for violations of the ordinance.
2. Public Nuisance Abatement: Under the WPO failure to maintain a BMP would constitute a public nuisance, which may be abated under the enforcement mechanism additional to the above, and would allow costs of maintenance to be billed to the owner, a lien placed on the property, and the tax collection process to be used.
3. Notice to Purchasers: Section 67.819(e) of the WPO requires developers to provide clear written notification to persons acquiring land upon which a BMP is located, or others assuming a BMP maintenance obligation, of the maintenance duty.
4. Conditions in Ongoing Land Use Permits: For those applications (listed in WPO Section 67.804) upon whose approval ongoing conditions may be imposed, a condition will be added which requires the owner of the land upon which the stormwater facility is located to maintain that facility in accordance with the requirements specified in the SMP. Failure to perform maintenance may then be addressed as a violation of the permit, under the ordinance governing that permit process.
5. Subdivision Public Report: Tentative Map and Tentative Parcel Map approvals will be conditioned to require that, prior to approval of a Final or Parcel Map, the subdivider shall provide evidence to the Director of Public Works, that the

subdivider has requested the California Department of Real Estate to include in the public report to be issued for the sales of lots within the subdivision, a notification regarding the maintenance requirement. (The requirement for this condition would not be applicable to subdivisions which are exempt from regulation under the Subdivided Lands Act, or for which no public report will be issued.)

6. BMP Maintenance Agreement with Easement and Covenant: An agreement will be entered into with the County, which will function three ways:
  - a. It will commit the land to being used only for purposed of the BMP;
  - b. It will include an agreement by the landowner, to maintain the facilities in accordance with the SMP(this obligation would be passed on to future purchasers or successors of the landowner, as a covenant); and
  - c. It will include an easement giving the County the right to enter onto the land (and any necessary adjacent land needed for access) to maintain the BMPs.

This would be required o all applications listed in WPO Section 67.804. In the case of subdivisions, this easement and covenant would be recorded on or prior to the Final or Parcel Map.

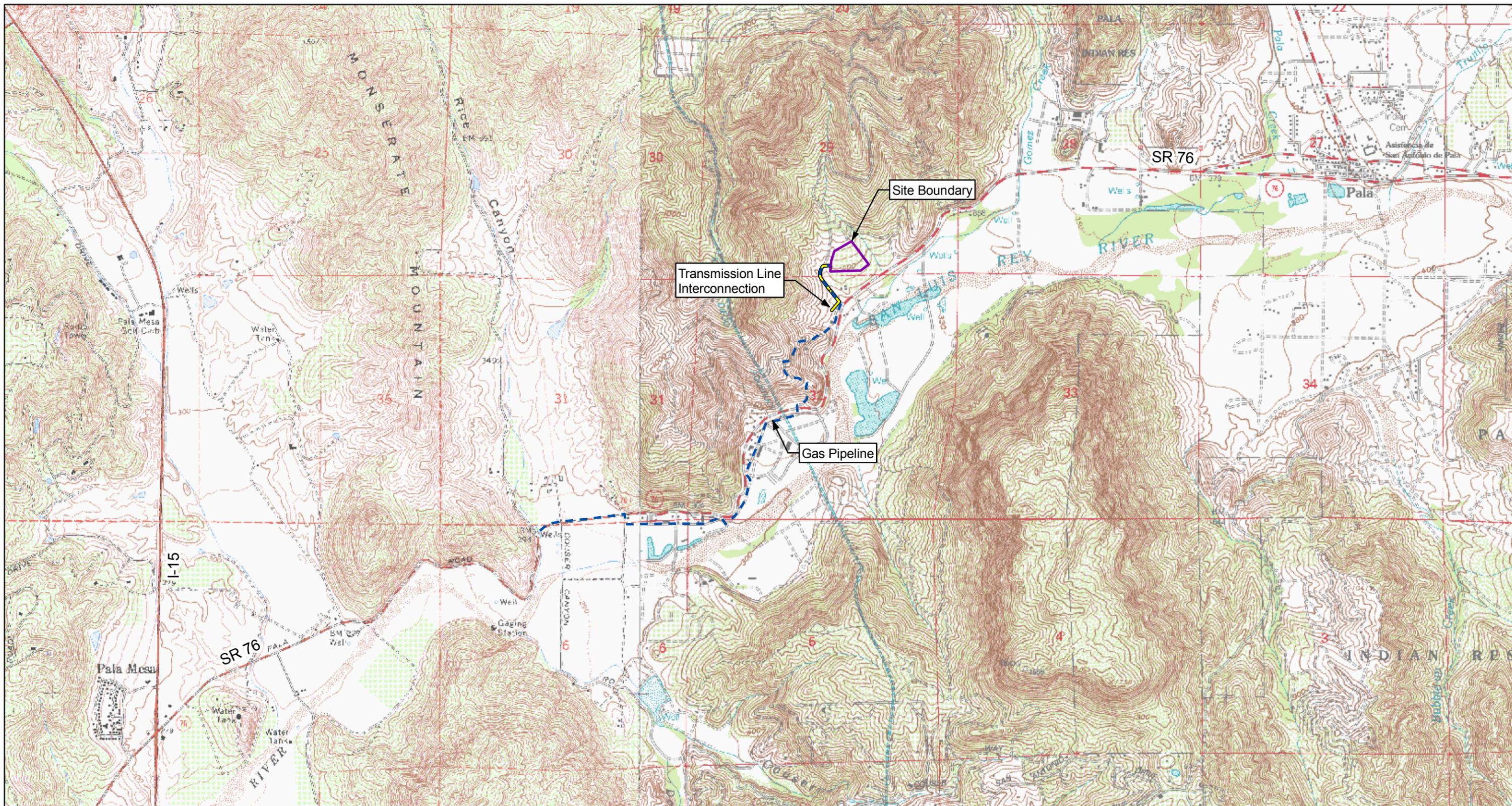
**Funding:**

Developer would provide the County with security to substantiate the maintenance agreement, which would remain in place for an interim period of 5 years. The amount of the security would equal the estimated cost of 2 years of maintenance activities. The security can be a Cash Deposit, Letter of Credit or other form acceptable to the County.

# **ATTACHMENT A**

## **LOCATION MAP**





G:\Orange\_Grove-125158\MXD\USGS for CEC.mxd



**Figure 2.2-2**  
Vicinity Map  
Orange Grove Project  
San Diego County, CA

1" = 2,000'

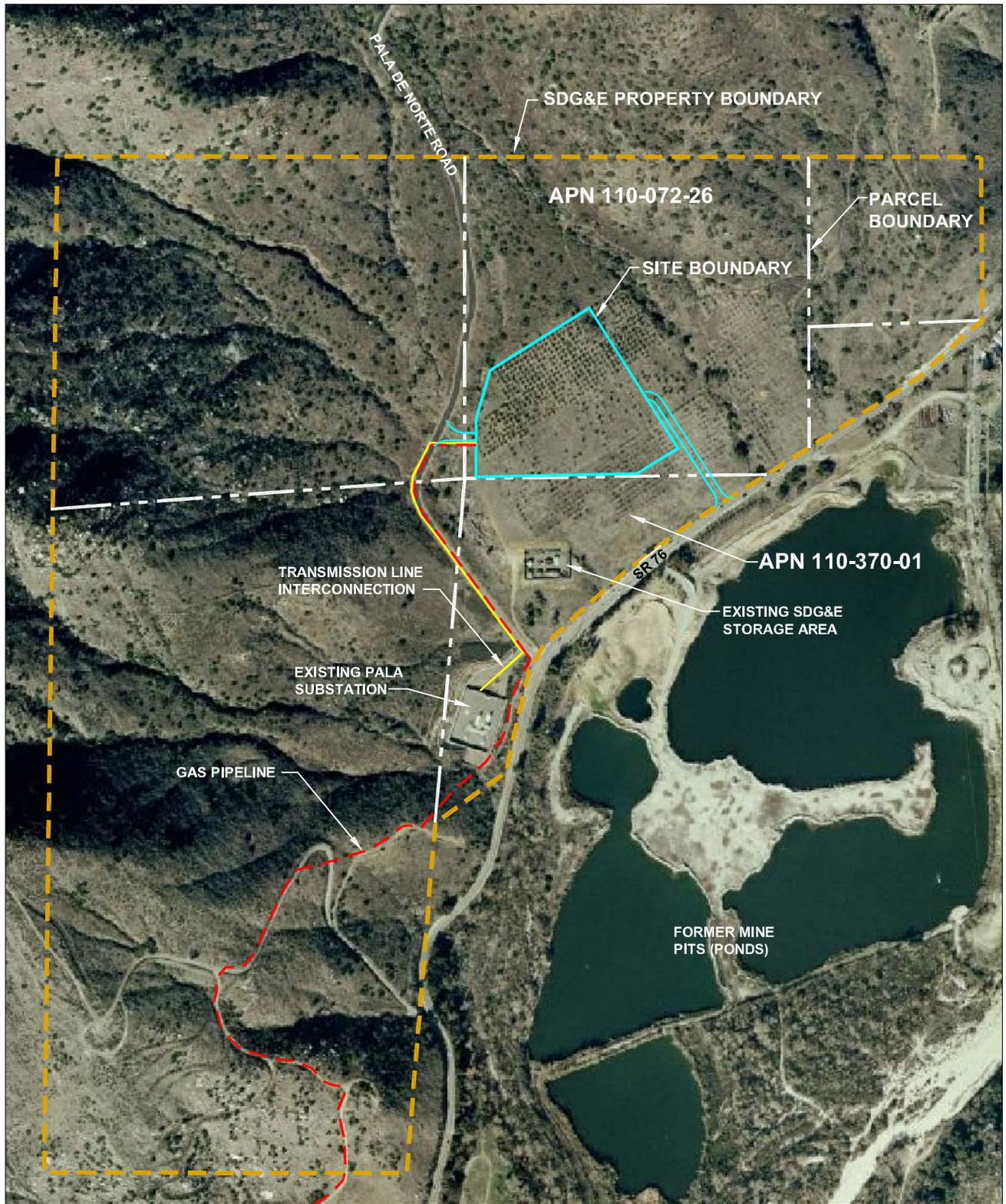


Source:  
USGS Topographical Quadrangles:  
Pala, Bonsall



**ATTACHMENT B**

**PROJECT SITE MAP**



SOURCE:

Virtual Earth, 2006.

APPROXIMATE SCALE (FEET)



P:\S=1:1 L:\Graphics\Projects\Number\29-xxxx\29-0319\AFC (125158)\AFC-SITE AERIAL.dwg May 01, 2008 - 4:41pm Rcollins



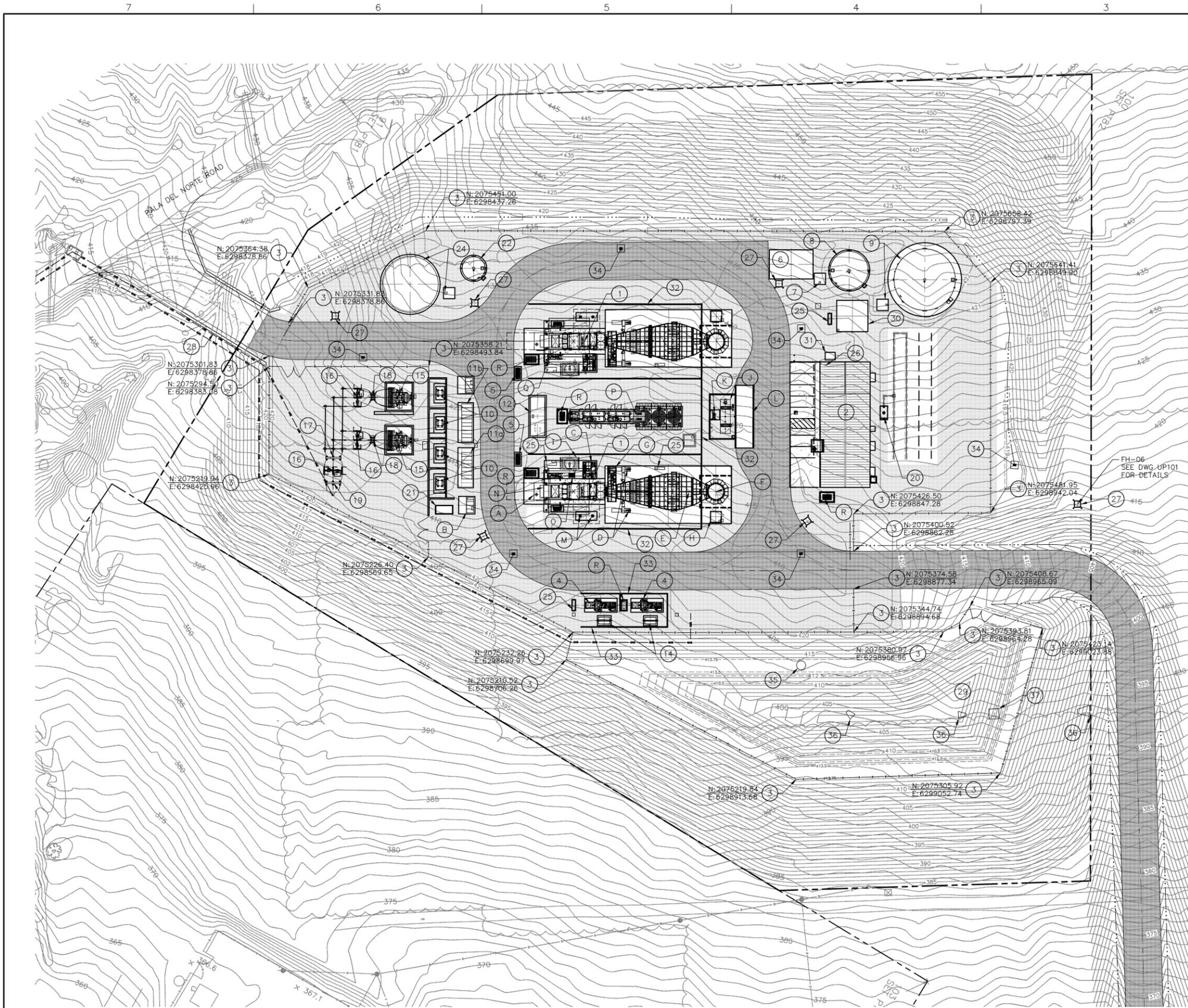
PROJECT: 125158

FACILITY:

ORANGE GROVE PROJECT  
SAN DIEGO COUNTY, CALIFORNIA

**SITE AND PROPERTY BOUNDARY**

**FIGURE 2.2-3**



**KEYNOTES:**

- 1 COMBUSTION TURBINE (CT), GENERATOR, AND AUXILIARY EQUIPMENT. (FOR EACH UNIT): (HEIGHT = 43' AT THE TOP OF VBV DUCT).
- A MAIN TURBINE GENERATOR SKID ENCLOSURE.
- B 13.8KV ELECTRICAL SWITCHGEAR.
- C CT AUXILIARY EQUIPMENT SKID.
- D TEMPERING AIR FANS (2).
- E EMISSION CONTROL SYSTEM-SCR (HEIGHT = ±33').
- F STACK (HEIGHT = 80').
- G AMMONIA VAPORIZATION SKID.
- H CEMS ENCLOSURE WITH TRANSFORMER AND CALIBRATION GAS STORAGE.
- I CT LUBE OIL COOLER.
- J AMMONIA STORAGE TANK (COMMON TO BOTH CT UNITS).
- K AMMONIA FORWARDING PUMP SKID (COMMON TO BOTH CT UNITS).
- L AMMONIA UNLOADING PAD, SPILL CONTAINMENT (COMMON TO BOTH CT UNITS).
- M TURBINE REMOVAL SUPPORTS.
- N AIR INLET FILTER (HEIGHT = 34').
- O SPRINT SKID.
- P INLET AIR CHILLER AND COOLING TOWER (COMMON TO BOTH CT UNITS) (HEIGHT = 30').
- Q WATER INJECTION SKID.
- R OILY DRAIN TANK.
- 2 SERVICE BUILDING FOR CONTROL ROOM, ELECTRICAL EQUIPMENT, FIRE PUMPS, COMPRESSED AIR. (HEIGHT = 18').
- 3 SITE SECURITY CHAINLINK FENCE AND GATES.
- 4 FUEL GAS COMPRESSORS.
- 5 GAS COALESCING FILTER SKID.
- 6 CONCRETE PAD FOR TEMPORARY WATER TREATMENT TRAILER.
- 7 DEMIN. WATER PUMP SKID AND RELATED EQUIPMENT.
- 8 DEMIN. WATER STORAGE TANK (HEIGHT = 24').
- 9 RAW WATER/FIREWATER STORAGE TANK & PUMP SKID (HEIGHT = 44').
- 10 AUXILIARY TRANSFORMERS.
- 11a 4160V ELECTRICAL SWITCHGEAR.
- 11b 480V ELECTRICAL SWITCHGEAR.
- 12 BLACKSTART GENERATOR.
- 13 NOT USED.
- 14 FUEL GAS COMPRESSOR RECYCLE FIN-FAN COOLER.
- 15 13.8KV-69KV GENERATOR STEP-UP TRANSFORMER (GSU).
- 16 69KV DISCONNECT SWITCH AND SUPPORTS.
- 17 69KV CT/VT METERING UNIT.
- 18 69KV CIRCUIT BREAKER.
- 19 69KV TRANSITION STRUCTURE & POHEAD.
- 20 UNDERGROUND SANITARY SYSTEM.
- 21 TRANSFORMER DELUGE VALVE ENCLOSURE.
- 22 WASTEWATER STORAGE TANK (HEIGHT = 24').
- 23 NOT USED.
- 24 COOLING TOWER MAKEUP TANK AND PUMP SKID (HEIGHT = 36').
- 25 480V MCC.
- 26 DIESEL FIRE PUMP ROOM.
- 27 YARD FIRE HYDRANTS WITH HYDRANT MOUNT FIRE MONITORS.
- 28 BRIDGE.
- 29 STORMWATER DETENTION BASIN.
- 30 RO WATER TREATMENT AREA.
- 31 DIESEL STORAGE TANK - DIESEL FIRE PUMP.
- 32 GAS TURBINE SOUND WALL (HEIGHT = 48').
- 33 GAS COMPRESSOR SOUND WALL (HEIGHT = 24').
- 34 AREA INLET.
- 35 STORM MANHOLE.
- 36 STORM END SECTION.
- 37 STORMWATER OUTLET CONTROL STRUCTURE.

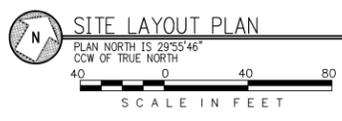
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B	10-30-07	ISSUED FOR REVIEW	BGG	WHR
C	11-8-07	ISSUED FOR WESTPOWER APPROVAL	BGG	WHR
D	11-19-07	ISSUED FOR AIR MODEL	BGG	WHR
E	11-29-07	RE-ISSUED FOR AIR MODEL	BGG	WHR
F	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
G	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	WHR
H	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
J	1-17-08	ISSUED PER FPP COMMENTS	BGG	MJB
K	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
L	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

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 Engineers - Architects - Technicians  
 Design - Construction - Field Service  
 16041 Foster  
 P.O. Box 1000  
 Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
 Schaumburg, IL  
  
**ORANGE GROVE POWER PLANT**  
  
 SITE LAYOUT PLAN

DESIGN BY: B. ROMINES	CHECKED BY: J. BONDANK
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. ICCC00101	SEGA PROJECT NO. 07-201
CADD FILE NAME: 07201-C100.dwg	
DRAWING NO. <b>C100</b>	REV. <b>L</b>



EMISSION COORDINATES SYMBOL		
DESCRIPTION	NORTHING	EASTING
COMBUSTION TURBINE #1 (NORTH)	2075491	6298683
COMBUSTION TURBINE #2 (SOUTH)	2075387	6298743
DIESEL FIRE PUMP (±2')	2075517	6298766
BLACK START GENERATOR (±2')	2075379	6298582

**KEYNOTES CONT.:**

- 36 STORM END SECTION.
- 37 STORMWATER OUTLET CONTROL STRUCTURE.

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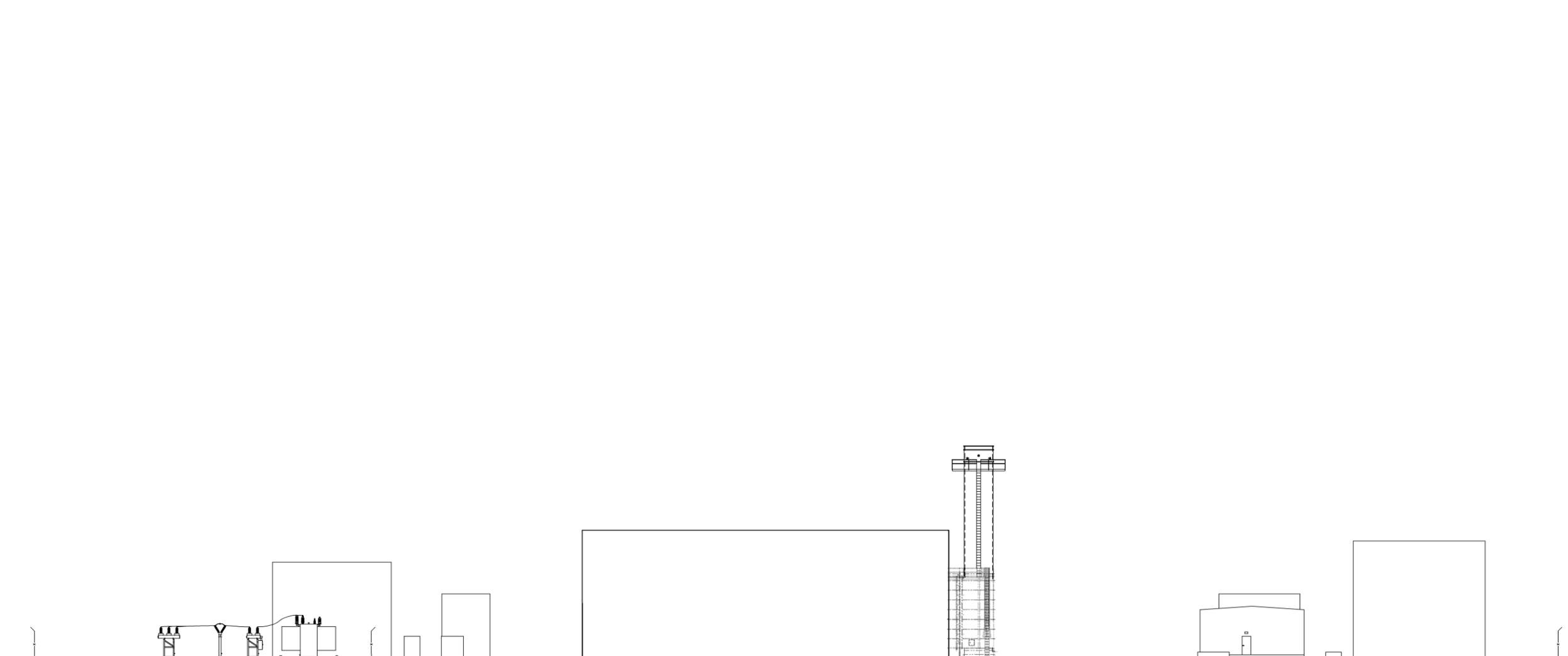
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1

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B	12-12-07	ISSUED FOR SPPE	RLK	JKB
C	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	JKB
D	2-29-08	FINAL ISSUE FOR APPROVAL	BGG	JKB
E	05-31-08	ISSUED FOR AFC PERMIT	BGG	MJB



D  
C  
B  
A

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 16041 Foster  
 P.O. Box 1000  
 Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

**ORANGE GROVE POWER PLANT**  
ELEVATION  
LOOKING NORTH

DESIGN BY: J. BONDANK	CHECKED BY: J. BONDANK
DRAWN BY: R. KUHN	DATE: 6-18-07
CLIENT I.D. IC000101	SEGA PROJECT NO. 07-201

CADD FILE NAME: 07201-GA100.dwg	DRAWING NO. <b>GA100</b>	REV. <b>E</b>
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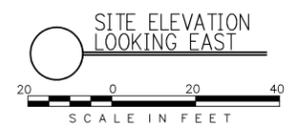
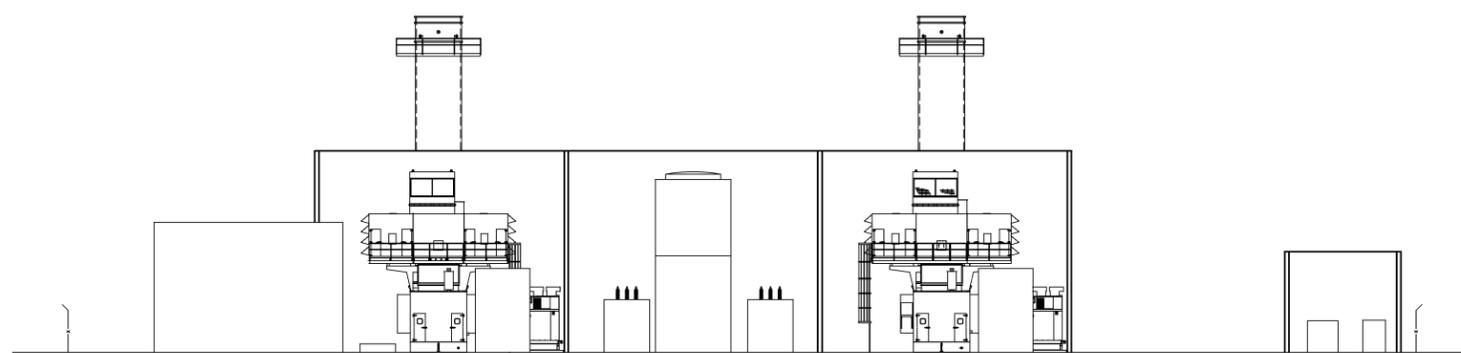
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REV.	DATE	DESCRIPTION	DWN	CHK
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B	12-12-07	ISSUED FOR SPPE	RLK	JKB
C	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	JKB
D	2-29-08	FINAL ISSUE FOR APPROVAL	BGG	JKB
E	05-31-08	ISSUED FOR AFC PERMIT	BGG	MJB



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 Design - Construction - Field Service  
 16041 Foster  
 P.O. Box 1000  
 Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
 Schaumburg, IL

**ORANGE GROVE POWER PLANT**

ELEVATION  
 LOOKING EAST

DESIGN BY: J. BONDANK	CHECKED BY: J. BONDANK
DRAWN BY: R. KUHNS	DATE: 6-18-07
CLIENT I.D. IC000101	SEGA PROJECT NO. 07-201

CADD FILE NAME: 07201-GA101.dwg

DRAWING NO. <b>GA101</b>	REV. <b>E</b>
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GENERAL NOTES:

1. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION IN ORDER TO PROVIDE FOR NON-INTERRUPTION OF SERVICE AND TO ENSURE PROPER CLEARANCES.
2. WHERE THE NEW IMPROVEMENTS ABUT EXISTING IMPROVEMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MATCHING THE ELEVATION OF THE EXISTING IMPROVEMENTS.
3. ALL CONSTRUCTION PERFORMED ON THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF SAN DIEGO COUNTY, CALIFORNIA, WHERE DISCREPANCIES EXIST BETWEEN THE PROJECT SPECIFICATIONS AND COUNTY STANDARDS, THE CONTRACTOR SHALL ABIDE BY THE GREATER OR MORE RESTRICTIVE REQUIREMENTS.
4. PLACEMENT OF CONCRETE AND REINFORCEMENT SHALL COMPLY WITH THE REQUIREMENTS OF ACI 301. DETAILING AND FABRICATION OF REINFORCEMENT SHALL COMPLY WITH THE CRSI MANUAL OF STANDARD PRACTICE, LATEST EDITION.
5. PRECAST AND CAST-IN-PLACE CONCRETE FOR PAVING AND SITE STRUCTURES SHALL BE CLASS II PORTLAND CEMENT CONCRETE, WITH THE FOLLOWING PROPERTIES:  

28-DAY COMPRESSIVE STRENGTH MIN.	MIN. 4,500 PSI
WATER/CEMENT RATIO	0.45
MAXIMUM AGGREGATE SIZE	0.75"
SLUMP	3" +/- 1"
6. ALL WELDED WIRE FABRIC (W.W.F.) SHALL CONFORM TO A185. NO ALUMINUM SHALL BE EMBEDDED IN ANY CONCRETE.
7. CONTRACTOR SHALL PROVIDE FOR CONTROL OF SURFACE EROSION DURING CONSTRUCTION AND UNTIL THE OWNER ACCEPTS THE WORK AS COMPLETE. THE CONTRACTOR SHALL PROVIDE BERM, SILT FENCE, STRAW BALES, SILT BASINS, OR OTHER MEANS TO PREVENT EROSION FROM REACHING THE PUBLIC RIGHT-OF-WAY OR ADJACENT PROPERTY. IN THE EVENT THE PREVENTION MEASURES ARE NOT EFFECTIVE, THE CONTRACTOR SHALL REMOVE ANY DEBRIS AND EROSION AND RESTORE THE RIGHT-OF-WAY AND ADJACENT PROPERTY TO ORIGINAL OR BETTER CONDITION.
8. CONTRACTOR SHALL, BY HIS OWN INVESTIGATION AND PRIOR TO COMMENCING WORK, SATISFY HIMSELF AS TO THE SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED.
9. A TOPOGRAPHIC SURVEY WAS PREPARED BY PSOMAS SURVEYING DATED OCTOBER 2007. THE ENGINEER WILL NOT BE RESPONSIBLE FOR THE COMPLETENESS OR ACCURACY OF THE DATA AND NO EXPRESSED OR IMPLIED GUARANTEE IS GIVEN OF THE INTERPRETATION THEREOF.
10. THE OWNER SHALL EMPLOY AN INDEPENDENT ENGINEERING TESTING AGENCY TO VERIFY SOIL COMPACTION AND PAVEMENT MATERIAL PROPERTIES. THE CONTRACTOR SHALL ALLOW THE TESTING AGENCY TO PERFORM TESTING AND RETESTING AS NECESSARY TO VERIFY COMPLIANCE WITH THE PROJECT SPECIFICATIONS.
11. REFERENCE IS MADE TO THE REVISED GEOTECHNICAL EXPLORATION REPORT BY PSI AND DATED DECEMBER 2007. NEITHER THE OWNER NOR THE ENGINEER WILL BE RESPONSIBLE FOR THE COMPLETENESS OR ACCURACY, NOR THE INTERPRETATION THEREOF. ALL SITE PREPARATION AND EARTHWORK CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE GEOTECHNICAL RECOMMENDATIONS AND THEIR "STANDARD GUIDELINES FOR GRADING PROJECTS."
12. FOUNDATION DESIGNS ARE BASED ON THE GEOTECHNICAL ENGINEERING REPORT. ALL FOOTINGS AND PIERS SHALL BEAR AT THE ELEVATIONS SHOWN ON THE PLANS, DETAILS, SECTIONS, AND SCHEDULES. ALL SITE PREPARATION, REQUIREMENTS FOR EXCAVATIONS AND SLOPE STABILITY, STRUCTURAL FILL AND TRENCH BACKFILL, FOUNDATIONS, AND SUBGRADE PREPARATION FOR BUILDING FLOOR SLABS SHALL BE IN ACCORDANCE WITH THE PSI GEOTECHNICAL ENGINEERING REPORT.
13. TOPSOIL AND ALL ORGANIC MATTER SHALL BE REMOVED FROM THE LOCATION OF PROPOSED IMPROVEMENTS. UNSTABLE OR SPONGY AREAS SHALL BE OVEREXCAVATED AND REPLACED WITH COMPACTED FILL IN ACCORDANCE WITH THE PSI GEOTECHNICAL REPORT.
14. SUBGRADE SHALL BE SCARIFIED A MINIMUM OF 12". MOISTURE CONDITIONED TO WITHIN ±2% OF OPTIMUM MOISTURE CONTENT (BASED ON ASTM D1557 TEST) AND ROLLED WITH A HEAVY ROLLER TO ACHIEVE A MINIMUM OF 95% RELATIVE COMPACTION PRIOR TO BACKFILLING.
15. COMPACTED FILL SHALL NOT CONTAIN ROCK LARGER THAN 3 INCHES. FILL SLOPES SHALL BE BENCHED INTO NATIVE MATERIAL OR AS REQUIRED BY THE PSI GEOTECHNICAL REPORT.
16. COMPACTED FILL SHALL BE PLACED IN NO GREATER THAN 8 INCH LOOSE LIFTS AND COMPACTED TO AT LEAST 95% OF MAXIMUM DRY DENSITY AT ± 2% OPTIMUM MOISTURE CONTENT (BASED ON ASTM D1557 TEST). FIELD DENSITY TESTS SHALL BE TAKEN AT A FREQUENCY OF AT LEAST ONE TEST FOR EACH 2500 SQUARE FEET OF FILL LIFT. IN PAVEMENT AREAS, THE TESTING FREQUENCY MAY BE ONE FIELD DENSITY TEST FOR EACH 5000 SQUARE FEET OF FILL LIFT, BUT NO LESS THAN 3 TESTS PER LIFT.
17. IF CUT/FILL TRANSITIONS ARE ENCOUNTERED ACROSS A PROPOSED STRUCTURE FOOT PRINT, THE ENTIRE CUT PORTION WITHIN THAT FOOT PRINT AND FIVE FEET OUT LATERALLY SHALL BE OVER-EXCAVATED TO A MINIMUM DEPTH OF TWO FEET BELOW THE BOTTOM OF THE DEEPEST PROPOSED FOUNDATION OR A MINIMUM OF ONE HALF THE DEPTH OF THE DEEPEST FILL IN THE STRUCTURE FOOT PRINT, WHICHEVER IS DEEPER. OVER-EXCAVATIONS SHALL EXTEND LATERALLY IN ALL DIRECTIONS A MINIMUM OF FIVE FEET FROM THE PROPOSED STRUCTURE FOOTPRINT.
18. SUBGRADE BELOW PROPOSED CRUSHED ROCK PAVEMENT SHALL BE OVER-EXCAVATED TO A MINIMUM DEPTH OF 24" MOISTURE CONDITIONED TO SLIGHTLY OVER OPTIMUM MOISTURE CONTENT, AND COMPACTED TO A MINIMUM OF 95% TO 98% OF RELATIVE COMPACTION (BASED ON ASTM D1557).
19. CRUSHED ROCK PAVEMENT (ALSO CALLED CRUSHED ROCK BASE OR CRUSHED ROCK SURFACE) SHALL BE COMPACTED WELL GRADED, CLASS II AGGREGATE ROAD BASE AND MEET THE REQUIREMENTS FOR THE COUNTY OF SAN DIEGO. IT SHALL BE PLACED IN LIFTS NO GREATER THAN 9" AND COMPACTED TO A MINIMUM 95% RELATIVE COMPACTION (BASED ON ASTM TEST METHOD D1557).
20. ALL SITE STRUCTURES SHALL BE DESIGNED FOR HS-20 LOADING.
21. ON ALL ELECTRICAL DRAWING LAYOUT PLANS, THE LOCATIONS OF SOME EQUIPMENT, GROUNDING, AND UNDERGROUND CONDUITS, AND DEVICES AT WHICH CONDUIT CIRCUITS TERMINATE ARE APPROXIMATE. THE CONTRACTOR SHALL INSTALL EACH CONDUIT CIRCUIT TO THE INTENDED EQUIPMENT TERMINATION POINT WITHOUT ADDITIONAL CHARGE TO THE OWNER, ALTHOUGH ITS FINAL LOCATION MAY SHIFT SOMEWHAT FROM THAT WHICH IS SHOWN.

REV.	DATE	DESCRIPTION	DWN	CHK
A	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
B	12-19-07	ISSUED FOR AMENDED SPE APPLICATION	BGG	WHR
C	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
D	1-17-08	ISSUED PER FPP COMMENTS	BGG	MJB
E	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
F	6-2-08	ISSUED FOR AFC PERMIT	BGG	WHR

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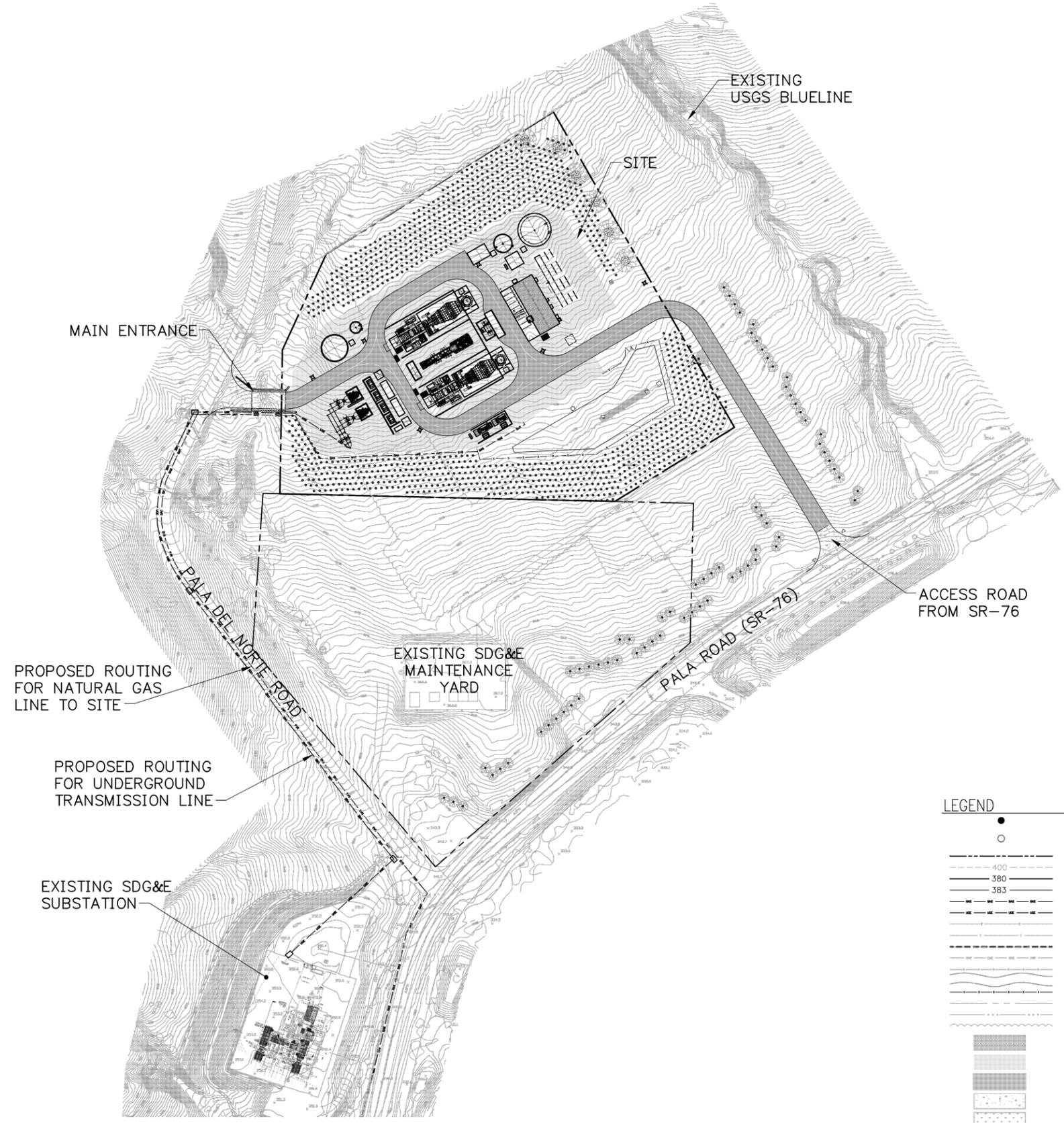
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 Engineers - Architects - Technicians  
 Design - Construction - Field Service  
 16041 Foster  
 P.O. Box 1000  
 Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

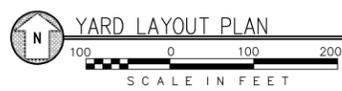
**ORANGE GROVE POWER PLANT**  
YARD LAYOUT PLAN

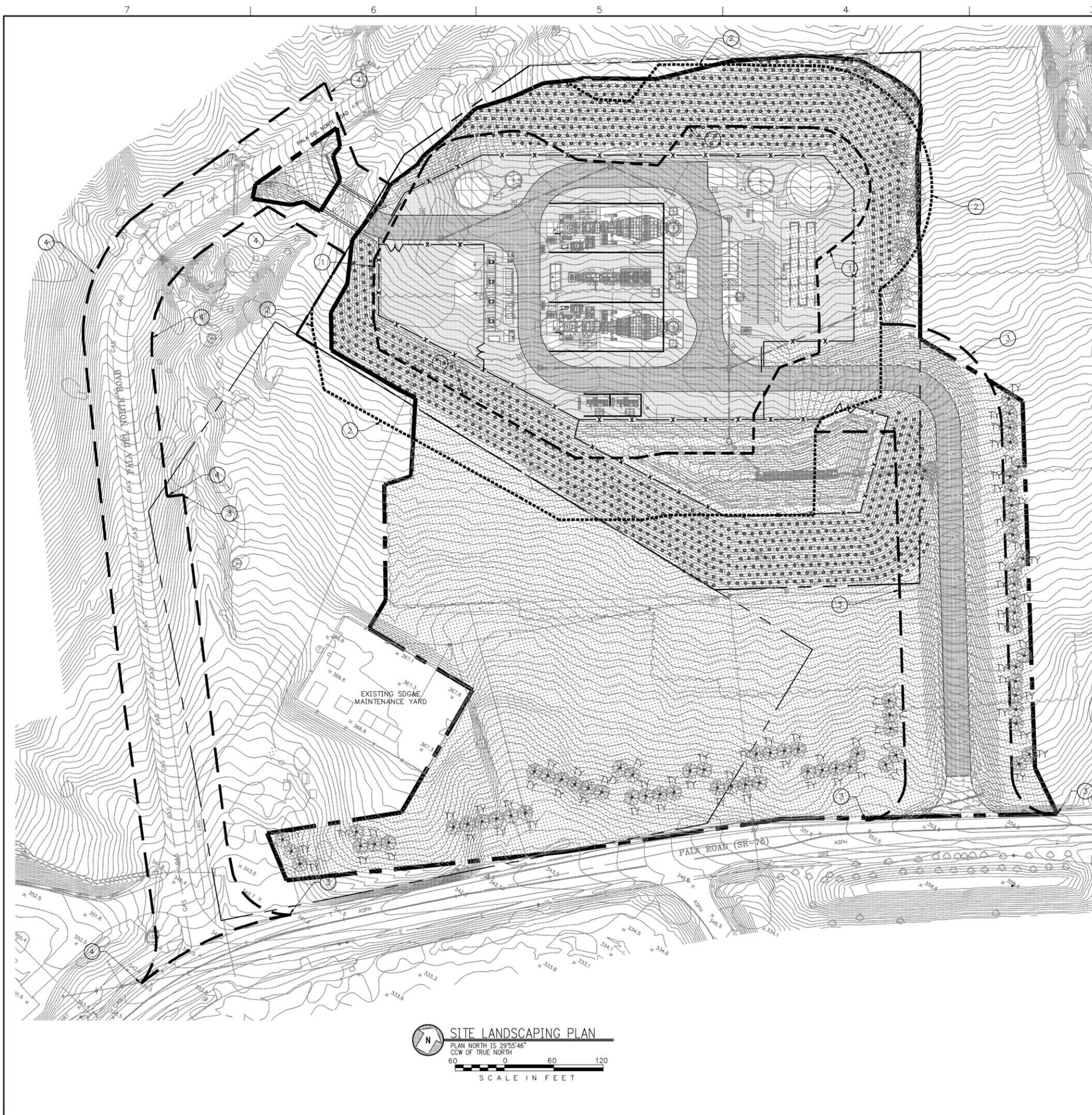
DESIGN BY: B. ROMINES	CHECKED BY: J. BONDANK
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. ICCC00101	SEGA PROJECT NO. 07-201
CADD FILE NAME: 07201-Y100.dwg	
DRAWING NO. Y100	REV. F



LEGEND

- FOUND MONUMENT AS NOTED
- SET 1" IRON PIPE WITH "PSOMAS" PLUG UNLESS NOTED OTHERWISE
- PROPERTY LINE
- 400 EXISTING CONTOUR
- 380 PROPOSED MAJOR CONTOUR
- 363 PROPOSED MINOR CONTOUR
- PROPOSED GAS LINE
- PROPOSED UNDERGROUND ELECTRICAL
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE (COMMUNICATIONS) LINE
- PROPOSED RCP STORMWATER PIPE
- EXISTING T&D LINE
- EXISTING FENCE
- EXISTING ROAD
- PROPOSED FENCE
- PARCEL LINE
- DRAINAGE PATH (FLOWLINE)
- EXISTING ORCHARD LINE
- PROPOSED RIPRAP
- PROPOSED CRUSHED ROCK SURFACE
- PROPOSED CRUSHED ROCK PAVEMENT
- PROPOSED CONCRETE
- PROPOSED NATIVE GROUND COVER
- PROPOSED LANDSCAPING
- EXISTING USGS BLUELINE





**KEYNOTES:**

- 1 FUEL MODIFICATION ZONE A (DEFENSIBLE SPACE): 50' AROUND ALL SIDES OF ALL EQUIPMENT OR STRUCTURES. PLEASE REFERENCE THE FIRE PROTECTION PLAN FOR DETAILS.
- 2 FUEL MODIFICATION ZONE B: 50' TO 125' AROUND ALL SIDES OF EQUIPMENT OR STRUCTURES EXCEPT FOR SPECIAL PROVISIONS AT WEST SIDE OF FACILITY AS NEEDED TO MINIMIZE DISTURBANCE TO SENSITIVE HABITAT. PLEASE REFERENCE THE FIRE PROTECTION PLAN FOR DETAILS.
- 3 ROADWAY FUEL MODIFICATION ZONE: FROM EDGE OF ROADWAY TO 50' OUTSIDE EDGE OF ROADWAYS. PLEASE REFERENCE THE FIRE PROTECTION PLAN FOR DETAILS.
- 4 ROADWAY FUEL MODIFICATION ZONE: FROM EDGE OF ROADWAY TO 30' OUTSIDE EDGE OF ROADWAYS. PLEASE REFERENCE THE FIRE PROTECTION PLAN FOR DETAILS.

**SITE SCREENING LEGEND:**

- COAST LIVE OAK  
POTENTIAL MATURE SIZE
- ENGELMANN OAK  
POTENTIAL MATURE SIZE
- TOYON  
POTENTIAL MATURE SIZE
- SHRUBS OF AT LEAST 1 GALLON MIN. SIZE OR TREES OF A 5 GALLON MIN. SIZE PER SECTION 87.417(B) OF THE COUNTY OF SAN DIEGO GRADING ORDINANCES.

**NOTES:**

1. THIS DRAWING IS A CONCEPTUAL LANDSCAPING PLAN. A CALIFORNIA REGISTERED LANDSCAPING ARCHITECT WILL PROVIDE A FINAL LANDSCAPING PLAN, BASED ON THE CONCEPTUAL LAYOUT. THE FINAL LANDSCAPING PLAN MAY INCLUDE ADDITIONAL USE OF CEC AND FIRE MARSHALL APPROVED NATIVE SPECIES FOR IMPROVED VISUAL SCREENING.

**LEGEND**

- FOUND MONUMENT AS NOTED
- SET 1" IRON PIPE WITH "PSOMAS" PLUG UNLESS NOTED OTHERWISE
- PROPERTY LINE
- 400 --- EXISTING CONTOUR
- 380 --- PROPOSED MAJOR CONTOUR
- 383 --- PROPOSED MINOR CONTOUR
- GAS --- PROPOSED GAS LINE
- UGE --- PROPOSED UNDERGROUND ELECTRICAL
- E --- EXISTING ELECTRIC LINE
- T --- EXISTING TELEPHONE (COMMUNICATIONS) LINE
- --- PROPOSED RCP STORMWATER PIPE
- OHE --- EXISTING T&D LINE
- X --- EXISTING FENCE
- X --- EXISTING ROAD
- X --- PROPOSED FENCE
- --- PARCEL LINE
- --- DRAINAGE PATH (FLOWLINE)
- --- EXISTING ORCHARD LINE
- PROPOSED RIPRAP
- PROPOSED CRUSHED ROCK SURFACE
- PROPOSED CRUSHED ROCK PAVEMENT
- PROPOSED CONCRETE
- PROPOSED NATIVE GROUND COVER
- --- FUEL MODIFICATION ZONE A
- --- FUEL MODIFICATION ZONE B
- --- ROADWAY FUEL MODIFICATION ZONE
- --- LIMIT OF DISTURBED AREA

REV.	DATE	DESCRIPTION	DWN	CHK
A	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
B	12-11-07	ISSUED FOR TRC COMMENTS	BGG	WHR
C	12-17-07	ISSUED FOR FPP	BGG	WHR
D	12-18-07	ISSUED PER TRC COMMENTS	BGG	MJB
E	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	WHR
F	12-20-07	RE-ISSUED FOR AMENDED SPPE APPLICATION	BGG	WHR
G	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
H	1-17-08	ISSUED PER FPP COMMENTS	BGG	MJB
J	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
K	5-9-08	ISSUED FOR REVIEW	BGG	MJB
L	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

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Engineers - Architects - Technicians  
 Design - Construction - Field Service  
 16041 Foster  
 P.O. Box 1000  
 Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

**ORANGE GROVE POWER PLANT**  
LANDSCAPING PLAN

DESIGN BY: M. BLAKE	CHECKED BY: B. ROMINES
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. ICCC00101	SEGA PROJECT NO. 07-201
CADD FILE NAME: 07201-L100.dwg	
DRAWING NO. <b>L100</b>	REV. <b>L</b>

# ATTACHMENT C

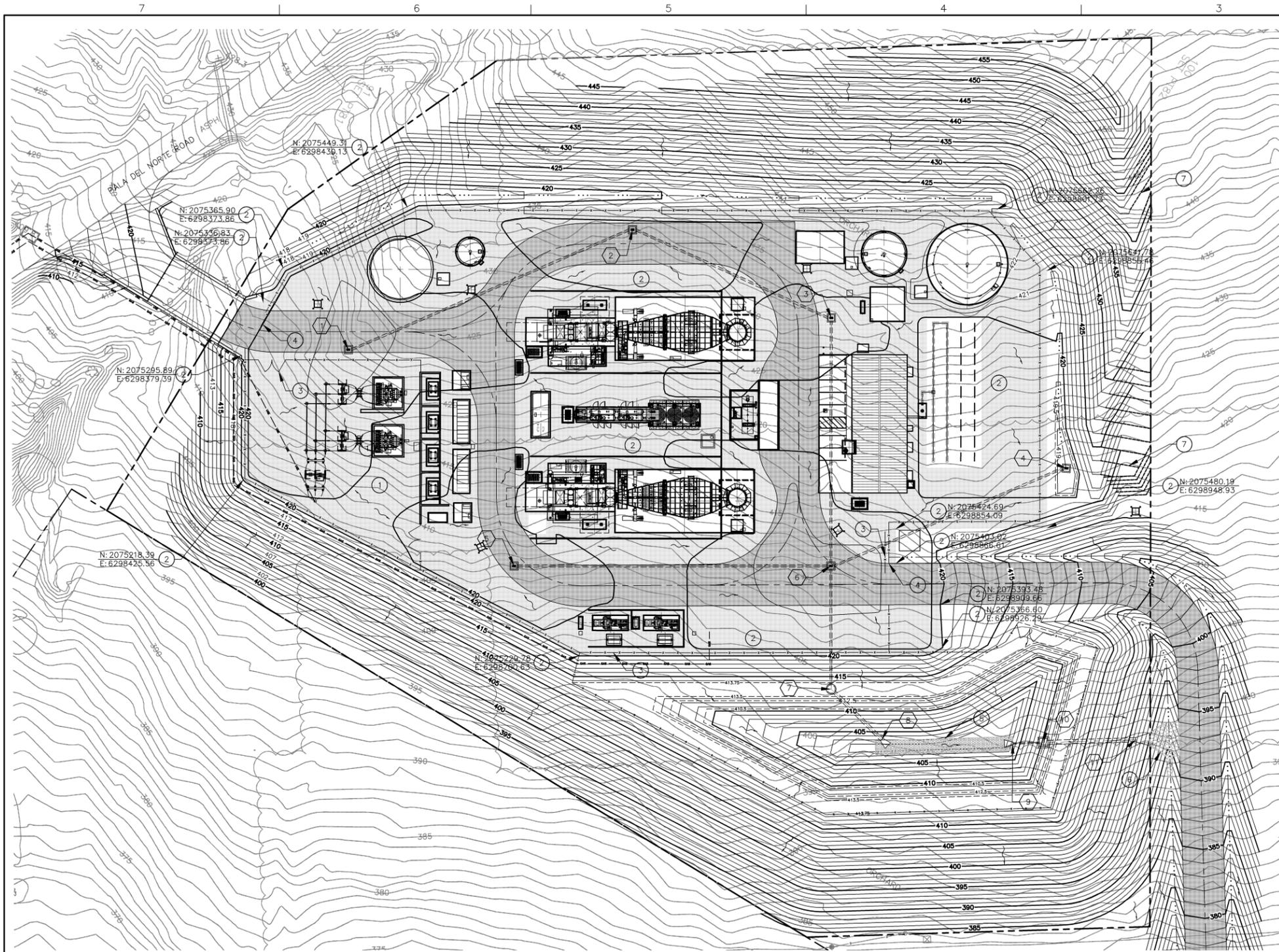
## RELEVANT MONITORING DATA

*(NOTE: PROVIDE RELEVANT WATER QUALITY MONITORING DATA IF AVAILABLE.)*

NO MONITORING DATA AVAILABLE

# **ATTACHMENT D**

## **TREATMENT BMP LOCATION MAP**

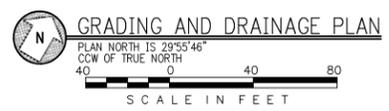


**STORM DRAINAGE NOTES:**

- 1 N:2075338.34  
E:6298444.48  
INSTALL 4X4 AREA INLET  
TOP EL. = 418.4'  
FLOWLINE OUT (N) = 412.4'  
INSTALL 220 L.F. 15" DIA.  
CLASS III RCP @ 0.5% SL.  
TO STRUCTURE 2
- 2 N:2075516.99  
E:6298579.87  
INSTALL 4X4 AREA INLET  
TOP EL. = 419.0'  
FLOWLINE IN (S) = 411.3'  
FLOWLINE OUT (E) = 410.8'  
INSTALL 154 L.F. 18" DIA.  
CLASS III RCP @ 0.5% SL.  
TO STRUCTURE 3
- 3 N:2075533.88  
E:6298737.01  
INSTALL 4X4 AREA INLET  
TOP EL. = 419.25'  
FLOWLINE IN (W) = 410.0'  
FLOWLINE OUT (SE) = 409.5'  
INSTALL 175 L.F. 18" DIA.  
CLASS III RCP @ 1.5% SL.  
TO STRUCTURE 6
- 4 N:2075524.83  
E:6298939.55  
INSTALL 4X4 AREA INLET  
TOP EL. = 418.75'  
FLOWLINE OUT (SW) = 412.25'  
INSTALL 181 L.F. 15" DIA.  
CLASS III RCP @ 0.5% SL.  
TO STRUCTURE 6
- 5 N:2075262.68  
E:6298627.25  
INSTALL 4X4 AREA INLET  
TOP EL. = 419.0'  
FLOWLINE OUT (NE) = 412.5'  
INSTALL 225 L.F. 15" DIA.  
CLASS III RCP @ 0.5% SL.  
TO STRUCTURE 6
- 6 N:2075377.85  
E:6298826.72  
INSTALL 4X4 AREA INLET  
TOP EL. = 418.25'  
FLOWLINE IN (W) = 411.35'  
FLOWLINE IN (NE) = 411.35'  
FLOWLINE IN (NW) = 406.85'  
FLOWLINE OUT (SE) = 406.35'  
INSTALL 84 L.F. 24" DIA.  
CLASS III RCP @ 2.0% SL.  
TO STRUCTURE 7
- 7 N:2075300.64  
E:6298871.50  
INSTALL STD. 6" DIA. MANHOLE TOP  
EL. 413.75'  
FLOWLINE IN (NW) = 404.6'  
FLOWLINE OUT (SE) = 404.0'  
INSTALL 49 L.F. 30" DIA  
CLASS III RCP @ 2.5% SL.  
TO STRUCTURE 8
- 8 N:2075287.29  
E:6298921.76  
INSTALL TO DETENTION BASIN  
CLASS III RCP FLARED END SECTION  
FLOWLINE OUT (SE) = 403.0'
- 9 N:2075332.50  
E:6299005.70  
INSTALL DETENTION BASIN OUTLET FLARED  
END SECTION  
FLOWLINE IN (E) = 403.0'  
INSTALL 20 L.F. 12" DIA  
CLASS III RCP @ 1.0% SL.  
TO STRUCTURE 10
- 10 N:2075344.26  
E:6299024.69  
INSTALL STORMWATER OUTLET  
CONTROL STRUCTURE TOP EL. 414.0'  
100 YR INLET EL. 412.5'  
FLOWLINE IN (E) = 402.80'  
FLOWLINE OUT (W) = 400.00'  
INSTALL 64 L.F. 36" DIA  
CLASS III RCP @ 1.0% SL.  
TO STRUCTURE 11
- 11 N:2075379.51  
E:6299081.66  
INSTALL CLASS III RCP FLARED END  
SECTION  
FLOWLINE OUT (W) = 398.35'

**LEGEND**

- FOUND MONUMENT AS NOTED
- SET 1" IRON PIPE WITH "PSOMAS" PLUG UNLESS NOTED OTHERWISE
- PROPERTY LINE
- 400 EXISTING CONTOUR
- 380 PROPOSED MAJOR CONTOUR
- 383 PROPOSED MINOR CONTOUR
- PROPOSED GAS LINE
- PROPOSED UNDERGROUND ELECTRICAL
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE (COMMUNICATIONS) LINE
- PROPOSED RCP STORMWATER PIPE
- EXISTING T&D LINE
- EXISTING FENCE
- EXISTING ROAD
- PROPOSED FENCE
- PARCEL LINE
- DRAINAGE PATH (FLOWLINE)
- EXISTING ORCHARD LINE
- PROPOSED RIPRAP
- PROPOSED CRUSHED ROCK SURFACE
- PROPOSED CRUSHED ROCK PAVEMENT
- PROPOSED CONCRETE
- PROPOSED NATIVE GROUND COVER
- PROPOSED LANDSCAPING
- DIRECTION OF FLOW
- EXISTING WINDMILL
- EXISTING OVERHEAD ELECTRICAL LINES



**CIVIL KEYNOTES:**

- 1 INSTALL 6" CRUSHED ROCK SURFACE INSIDE SUBSTATION FENCE.
- 2 INSTALL 6" CRUSHED ROCK SURFACE INSIDE COMBUSTION TURBINE AREA FENCE.
- 3 INSTALL SITE SECURITY CHAINLINK FENCE WITH 30' MANUAL SLIDE GATES, SEE SITE DETAILS DWG. C801.
- 4 INSTALL 30' SLIDE GATE WITH GATE OPERATOR AND LOOP DETECTOR. COORDINATE WITH OWNER'S SECURITY CONSULTANT.
- 5 INSTALL MIN. 2.3' 1/2 TON STONE RIPRAP.
- 6 INSTALL MIN. 3.0' 1 TON STONE RIPRAP.
- 7 FILL AREA EAST OF LANDSCAPING BERM FOR EXCESS CUT, MIN. 3' FROM PROPERTY LINE.

**GRADING NOTES:**

- 1. ALL CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE COUNTY OF SAN DIEGO, CALIFORNIA, LATEST EDITION.
- 2. ALL STORM SEWER LINES SHALL BE CLASS III RCP.
- 3. PIPE LENGTHS EXCLUDE END SECTIONS AND ARE MEASURED ALONG CENTERLINE OF PIPE FROM CENTER OF INSIDE FACE TO CENTER OF INSIDE FACE OF STRUCTURES.
- 4. MATCH GRADES AT EXISTING IMPROVEMENTS.
- 5. SLOPES SHALL BE MADE AT 3:1 MAXIMUM GRADE.
- 6. EROSION CONTROL STRUCTURES (SEE EROSION CONTROL PLAN DWGS. C500 & C502) SHALL BE CONSTRUCTED PRIOR TO GRADING ACTIVITIES.
- 7. DRAINAGE CHANNELS SHALL BE MINIMUM 3' FLAT BOTTOM AND SHALL HAVE 3:1 SIDE SLOPES.
- 8. NORTHING AND EASTING COORDINATES FOR MANHOLES, AREA INLETS, FIELD INLETS, AND JUNCTION BOXES ARE MEASURED TO CENTER OF STRUCTURE.
- 9. NORTHING AND EASTING COORDINATES FOR END SECTIONS ARE MEASURED TO FARTHEST EDGE OF THE END SECTION AT PIPE CENTERLINE.

REV.	DATE	DESCRIPTION	DWN	CHK
A	10-11-07	ISSUED PRELIMINARY TO PSWSI	BGG	WHR
B	10-19-07	ISSUED FOR REVIEW	BGG	WHR
C	11-26-07	RE-ISSUED FOR REVIEW	BGG	WHR
D	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
E	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	WHR
F	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
G	02-28-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
H	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

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 Engineers - Architects - Technicians  
 Design - Construction - Field Service  
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**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

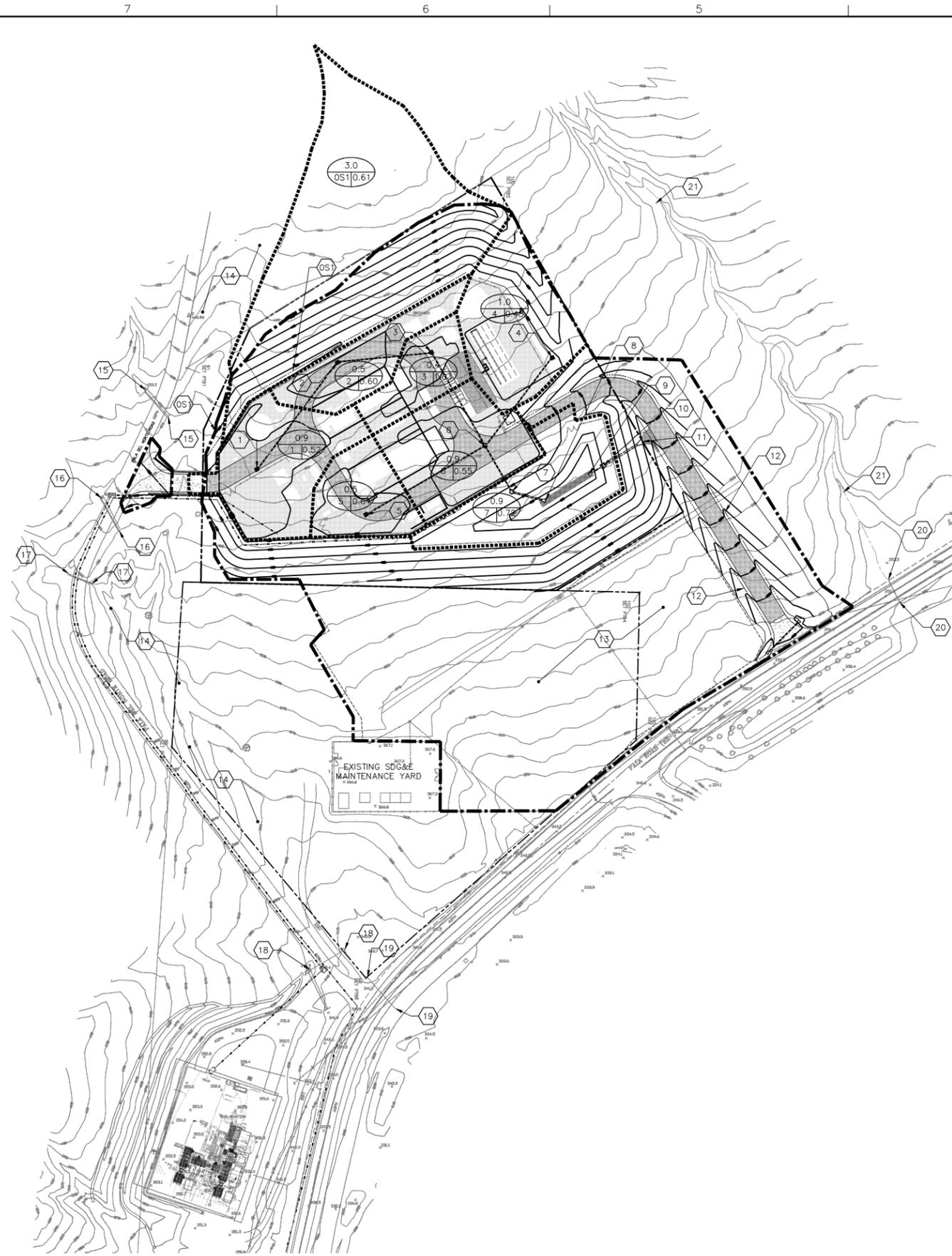
**ORANGE GROVE POWER PLANT**  
GRADING AND DRAINAGE PLAN

DESIGN BY: J. LANGEL	CHECKED BY: B. ROMINES
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. ICCC00101	SEGA PROJECT NO. 07-201
CADD FILE NAME: 07201-C300.dwg	
DRAWING NO. <b>C300</b>	REV. <b>H</b>

# ATTACHMENT E

## TREATMENT BMP DATASHEET

*(NOTE: POSSIBLE SOURCE FOR DATASHEETS CAN BE FOUND AT [WWW.CABMPHANDBOOKS.COM](http://WWW.CABMPHANDBOOKS.COM). INCLUDE ENGINEERING CALCULATIONS FOR SIZING THE TREATMENT BMP.)*



**DRAINAGE AREA MAP**  
SCALE IN FEET

**KEY:**

- (EX) - EXISTING STRUCTURES
- CI - CURB INLET
- SI - CURB INLET IN SUMP
- DI - SINGLE DROP INLET
- DI-2 - DOUBLE DROP INLET
- ES - PREFABRICATED END SECTION
- JB - JUNCTION BOX
- YI - YARD INLET
- AI - AREA INLET
- MH - MANHOLE
- R - REDUCER
- FI - FIELD INLET
- BEND - PREFABRICATED VERTICAL BEND
- T.D. - TRENCH DRAIN
- G.I. - GRATE INLET
- O.C. - DETENTION OUTLET CONTROL STRUCTURE
- RCP - REINFORCED CONCRETE PIPE
- CMP - CORRUGATED METAL PIPE (STEEL)
- CP - CULVERT PIPE

**DESIGN NOTES:**

- (a) TIME OF CONCENTRATION  
15 MINUTES MAX.  
5 MINUTES MIN.
- (b) PIPE LENGTHS EXCLUDE END SECTIONS AND ARE MEASURED ALONG CENTERLINE OF PIPE FROM CENTER OF INSIDE FACE TO CENTER OF INSIDE FACE OF STRUCTURES.
- (c) MANNING'S ROUGHNESS COEFFICIENT = 0.013 (CONCRETE)

**LEGEND**

- FOUND MONUMENT AS NOTED
- SET 1" IRON PIPE WITH "PSOMAS" PLUG UNLESS NOTED OTHERWISE
- 400 --- EXISTING CONTOUR
- 380 --- PROPOSED MAJOR CONTOUR
- 383 --- PROPOSED MINOR CONTOUR
- --- PROPOSED GAS LINE
- --- PROPOSED UNDERGROUND ELECTRICAL
- --- EXISTING ELECTRIC LINE
- --- EXISTING TELEPHONE (COMMUNICATIONS) LINE
- --- PROPOSED RCP STORMWATER PIPE
- --- EXISTING T&D LINE
- --- EXISTING FENCE
- --- EXISTING ROAD
- --- PROPOSED FENCE
- --- PARCEL LINE
- --- DRAINAGE PATH (FLOWLINE)
- --- EXISTING ORCHARD LINE
- --- PROPOSED RIPRAP
- --- PROPOSED CRUSHED ROCK SURFACE
- --- PROPOSED CRUSHED ROCK PAVEMENT
- --- PROPOSED CONCRETE
- --- PROPOSED NATIVE GROUND COVER
- --- PROPOSED LANDSCAPING
- A = AREA IN ACRES
- B = BASIN DESIGNATION
- C = COMPOSITE RUNOFF COEFFICIENT
- D = DESIGN POINT DESIGNATION
- --- DRAINAGE AREA LIMITS
- --- PROPOSED DISTURBED AREA
- --- EXISTING USGS BLUELINE

**DRAINAGE AREA NOTES:**

(OS) DRAINAGE WILL BE ROUTED AROUND SITE BY NORTH DITCH DRAINAGE CHANNEL.

OFF-SITE DRAINAGE-NORTH CHANNEL

DEVELOPMENT STAGE	50 YEAR DESIGN STORM				
	STORM DRAINAGE AREA (ACRES)	PEAK RUNOFF RATE Q (CFS)	RUNOFF COEF. C.	AVERAGE CHANNEL VELOCITY V (FT/S)	AVERAGE DEPTH ELEVATION (FT.)
PRE-DEV.	3.0	6.75	0.3	2.75	420.77
PRE-DEV.	3.0	11.25	0.5	3.10	420.95±
DEVELOPMENT STAGE	100 YEAR DESIGN STORM				
	STORM DRAINAGE AREA (ACRES)	PEAK RUNOFF RATE Q (CFS)	RUNOFF COEF. C.	AVERAGE CHANNEL VELOCITY V (FT/S)	AVERAGE DEPTH ELEVATION (FT.)
PRE-DEV.	3.0	7.65	0.3	2.87	420.16±
POST-DEV.	3.0	12.75	0.5	3.20	421.00±

- 1 INLET FOR DRAINAGE AREA.
- 2 INLET FOR DRAINAGE AREA.
- 3 INLET FOR DRAINAGE AREA.
- 4 INLET FOR DRAINAGE AREA.
- 5 INLET FOR DRAINAGE AREA.
- 6 INLET FOR DRAINAGE AREA. DRAINAGE FROM AREAS 1, 2, 3, 4, AND 5 WILL BE ROUTED VIA STORM DRAIN.
- 7 STORMWATER MANHOLE.
- 8 STORM DRAIN OUTLET AND DETENTION BASIN INLET STRUCTURE.
- 9 DETENTION BASIN OUTLET CONTROL STRUCTURE.
- 10 DETENTION BASIN EMERGENCY OUTLET STRUCTURE.
- 11 STORMWATER OUTLET.
- 12 SECONDARY ACCESS ROAD DITCHES.
- 13 AREAS SOUTH OF PARCEL LINE AND WITHIN "PROPOSED DISTURBED AREA" LINE ARE AREAS FOR "TEMPORARY CONSTRUCTION PARKING AND LAYDOWN."
- 14 EXISTING NATURAL WEST DRAINAGE CHANNEL.
- 15 EXISTING OFF-SITE CULVERT PIPES.
- 16 EXISTING OFF-SITE CULVERT PIPES.
- 17 EXISTING OFF-SITE CULVERT PIPES.
- 18 EXISTING OFF-SITE CULVERT PIPE.
- 19 EXISTING OFF-SITE CULVERT PIPE.
- 20 EXISTING OFF-SITE CULVERT PIPE.
- 21 EXISTING USGS BLUELINE OR NATURAL EAST DRAINAGE CHANNEL.

ON-SITE STORMWATER DETENTION BASIN

DEVELOPMENT STAGE	50 YEAR DESIGN STORM				
	STORM DRAINAGE AREA (ACRES)	PEAK RUNOFF RATE Q (CFS)	RUNOFF CURVE. C.	DETENTION VOLUME V (FT³)	DESIGNED WATER SURFACE VOLUME (FT³)
PRE-DEV.	5.2	11.00	N/A	N/A	N/A
POST-DEV.	5.2	24.58	N/A	85,700	76,300
DEVELOPMENT STAGE	100 YEAR DESIGN STORM				
	STORM DRAINAGE AREA (ACRES)	PEAK RUNOFF RATE Q (CFS)	RUNOFF CURVE. C.	DETENTION VOLUME V (FT³)	DESIGNED WATER SURFACE VOLUME (FT³)
PRE-DEV.	5.2	12.68	N/A	N/A	N/A
POST-DEV.	5.2	27.86	N/A	85,700	85,000

NOTE: WATER SURFACE VOLUME DOES NOT INCLUDE ONE FOOT OF FREEBOARD.

**SUMMARY OF AREAS (ACRES):**

- 1. IMPERVIOUS AREA (INCLUDES CONCRETE ENTRANCE SECTION) - 1.00
- 2. CRUSHED ROCK SURFACE AREA (INCLUDES VEHICULAR AREA) - 3.22
- 3. DETENTION BASIN DRAINAGE AREA - 5.20
- 4. VEHICULAR AREA - 1.47
- 5. TEMPORARY CONSTRUCTION PARKING AREA AND LAYDOWN - 5.73
- 6. DISTURBED AREA - 14.83

STRUCTURE NO. (Area No.)	TYPE	50 YEAR DESIGN (PROPOSED CONSTRUCTION)					PIPE								
		AREA (acres) A	RUNOFF COEF. C	C x A	K	i (in/hr)	Q (cfs)	TOTAL Q (CFS)	PIPE NO.	PIPE SIZE DIA. (inches)	PIPE SLOPE %	PIPE LENGTH (LF)	PIPE CAP. (CFS)	VELOCITY (ft./sec)	DEPTH OF FLOW (inches)
1	AI	0.90	0.52	0.47	1.1	7.5	3.86								
2	AI	0.50	0.60	0.30	1.1	7.5	2.48	3.86	1	15	0.5	220	4.91	4.17	10.58
3	AI	0.46	0.59	0.27	1.1	7.5	2.24	6.34	2	18	0.5	154	7.99	4.72	12.79
4	AI	1.00	0.48	0.48	1.1	7.5	3.96	8.58	3	18	1.5	175	13.84	7.79	10.75
5	AI	0.52	0.61	0.32	1.1	7.5	2.62	3.96	4	15	0.5	160	4.91	4.19	10.79
6	AI	0.90	0.55	0.50	1.1	7.5	4.08	2.62	5	15	0.5	225	4.91	3.85	8.14
7	MH	NA	NA	NA	NA	NA	NA	19.24	6	24	2	84	34.41	10.65	13.42
8	OC	0.90	0.72	0.65	1.1	7.5	5.35	19.24	7	30	2.5	49	69.76	11.52	11.20
9	OC	NA	NA	NA	NA	NA	NA	24.58							
10	MH	NA	NA	NA	NA	NA	NA	12.68 MAX	10	12	0.5	52	11.65	14.83	FULL
11	MH	NA	NA	NA	NA	NA	NA	SEE D.C.	10	36	1.0	240	71.74	7.09	10.19
								SEE D.C.	12	36	1.0	280	71.74	7.09	10.19

REV.	DATE	DESCRIPTION	DWN	CHK
A	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
B	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
C	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
D	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

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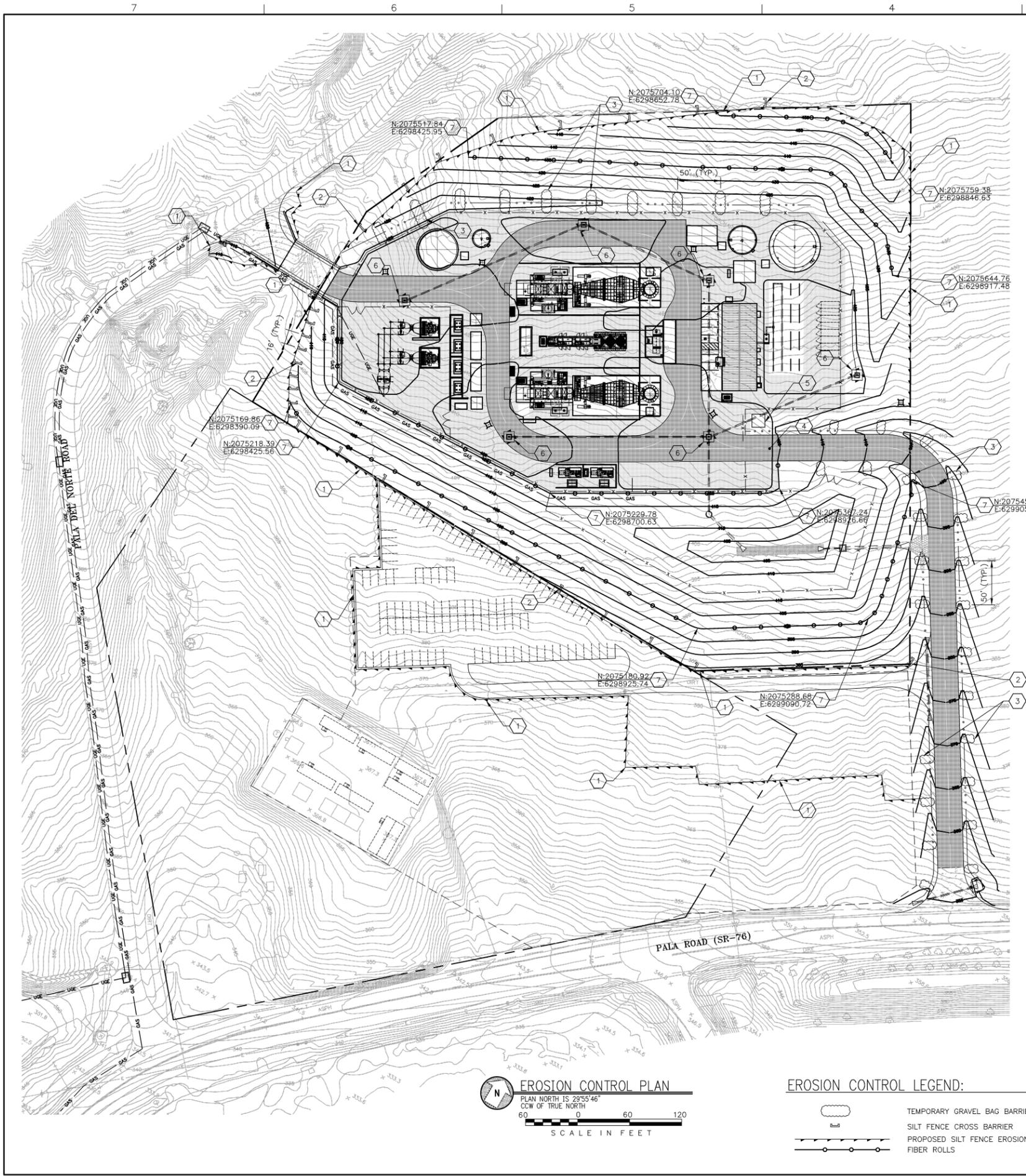
16041 Foster  
P.O. Box 1000  
Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

**ORANGE GROVE POWER PLANT**  
DRAINAGE AREA MAP

DESIGN BY: J. LANGEL	CHECKED BY: B. ROMINES
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. ICCC00101	SEGA PROJECT NO. 07-201

CADD FILE NAME: 07201-C400.dwg  
DRAWING NO. **C400** REV. **D**



**EROSION CONTROL KEYNOTES:**

- 1 INSTALL TEMPORARY LINEAR SEDIMENT BARRIER (TYP. SILT FENCE), SEE DETAIL DWG C501.
- 2 INSTALL CROSS BARRIER (SAND BAGS), SEE DETAIL DWG. C501
- 3 INSTALL TEMPORARY GRAVEL BAG BARRIER, SEE DETAIL DWG C501.
- 4 INSTALL TIRE WASH, SEE DETAIL DWG C501.
- 5 INSTALL CONCRETE WASHOUT FACILITY, SEE DETAIL DWG C502.
- 6 INSTALL DROP INLET PROTECTION, SEE DETAIL DWG C502.
- 7 INSTALL TEMPORARY FIBER ROLL, SEE DETAIL DWG C502.

**EROSION CONTROL NOTES:**

1. SILT FENCE SHALL BE CLEANED AND REPAIRED WHEN SILT BUILD-UP REACHES 1/3 SILT FENCE HEIGHT.
2. CLEARING AND GRUBBING WORK SHALL COMPLY WITH THE COUNTY OF SAN DIEGO, CALIFORNIA STANDARDS AND SPECIFICATIONS LATEST EDITION.
3. NO VEGETATION OR CONSTRUCTION DEBRIS SHALL BE BURIED ON SITE. NO BURNING PITS SHALL BE ALLOWED.
4. ALL DISTURBED AREAS THAT REMAIN ACTIVE FOR MORE THAN 21 DAYS SHALL BE STABILIZED BY SEEDING, SODDING, MULCHING, COVERING OR BY OTHER EQUIVALENT EROSION CONTROL MEASURES AS SOON AS PRACTICAL, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED.
5. PRIOR TO ANY GRADING, STRIPPING, EXCAVATING, FILLING OR ANY OTHER DISTURBANCE OF THE NATURAL GROUND COVER, THE CONTRACTOR SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES. THE CONTRACTOR SHALL MAINTAIN THESE DEVICES THROUGHOUT THE DURATION OF THE PROJECT AND UNTIL PERMANENT VEGETATION IS PROPERLY ESTABLISHED.
6. STOCKPILES SHALL BE LOCATED AWAY FROM SLOPES AND TRAFFIC ROUTES AND BE TEMPORARILY SEEDED AS SOON AS POSSIBLE, NO MORE THAN 30 WORKING DAYS OR 120 CALENDAR DAYS AFTER FORMATION OF THE STOCKPILE. SILT FENCE SHALL BE PLACED APPROPRIATELY AROUND THE STOCKPILE TO CONTROL EROSION.
7. THE SITE SHALL HAVE GRADED ROADS AND ACCESS DRIVES TO PARKING AREAS OF SUFFICIENT WIDTH AND LENGTH TO PREVENT SEDIMENT FROM BEING TRACKED ON TO PUBLIC ROADWAYS. ANY SEDIMENT REACHING A PUBLIC OR PRIVATE ROAD SHALL BE REMOVED. BULK CLEARING OF ACCUMULATED SEDIMENT SHALL BE RETURNED TO THE POINT OF LIKELY ORIGIN OR OTHER SUITABLE LOCATION BEFORE THE END OF EACH WORK DAY. CONSTRUCTION ENTRANCES SHALL BE ROCKED PRIOR TO ANY OTHER SITE WORK.
8. EROSION AND SEDIMENTATION CONTROLS AND SEEDING SHALL MEET THE STANDARDS AND SPECIFICATIONS OF SAN DIEGO COUNTY, CALIFORNIA.
9. PROPOSED MINOR GRADES ARE NOT SHOWN FOR CLARITY. PLEASE REFERENCE THE GRADING AND DRAINAGE PLAN FOR DETAILS.

**SAN DIEGO COUNTY EROSION CONTROL NOTES:**

1. ALL BUILDING PADS TO BE DIKED AND THE DIKES MAINTAINED TO PREVENT WATER FROM FLOWING FROM THE PAD UNTIL THE STREETS AND DRIVEWAYS ARE PAVED AND WATER CAN FLOW FROM THE PADS WITHOUT CAUSING EROSION, OR CONSTRUCT DRAINAGE FACILITIES TO THE SATISFACTION OF THE COUNTY DEPARTMENT OF PUBLIC WORKS THAT WILL ALLOW WATER TO DRAIN FROM THE PAD WITHOUT CAUSING EROSION.
2. TOPS OF ALL SLOPES TO BE DIKED OR TRENCHED TO PREVENT WATER FROM FLOWING OVER THE CREST OF SLOPES.
3. MANUFACTURED SLOPES AND PADS SHALL BE ROUNDED VERTICALLY AND HORIZONTALLY AS APPROPRIATE TO BLEND WITH THE SURROUNDING TOPOGRAPHY.
4. AS SOON AS CUTS OR EMBANKMENTS ARE COMPLETED, BUT NOT LATER THAN OCTOBER 1 ALL CUT AND FILL SLOPES SHALL BE STABILIZED WITH A HYDROMULCH MIXTURE OR AN EQUAL TREATMENT APPROVED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS BETWEEN OCTOBER 1 AND APRIL 15. APPROVED SLOPE PROTECTION MEASURES SHALL PROCEED IMMEDIATELY BEHIND THE EXPOSURE OF CUT SLOPES AND/OR THE CREATION OF EMBANKMENT SLOPES.
5. CATCH BASINS, DESILTING BASINS AND STORM DRAIN SYSTEM SHALL BE INSTALLED TO THE SATISFACTION OF SAN DIEGO COUNTY DEPARTMENT OF PUBLIC WORKS.
6. SAND BAG CHECK DAMS TO BE PLACED IN A MANNER APPROVED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS IN UNPAVED STREETS WITH GRADIENTS IN EXCESS OF 2% AND ON OR IN OTHER GRADED OR EXCAVATED AREAS AS REQUIRED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.
7. THE DEVELOPER TO MAINTAIN THE PLANTING AND EROSION CONTROL MEASURES DESCRIBED ABOVE UNTIL RELIEVED OF THE SAME BY THE COUNTY DEPARTMENT OF PUBLIC WORKS. THE DEVELOPER TO REMOVE ALL SOIL INTERCEPTED BY THE SAND BAGS, CATCH BASINS AND DESILTING BASINS AND KEEP THESE FACILITIES CLEAN AND FREE OF SILT AND SAND AS DIRECTED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS. THE DEVELOPER SHALL REPAIR ANY ERODED SLOPES AS DIRECTED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.

**LEGEND**

- FOUND MONUMENT AS NOTED
- SET 1" IRON PIPE WITH "PSOMAS" PLUG UNLESS NOTED OTHERWISE
- 400 --- PROPERTY LINE
- 380 --- EXISTING CONTOUR
- 383 --- PROPOSED MAJOR CONTOUR
- GAS --- PROPOSED GAS LINE
- USE --- PROPOSED UNDERGROUND ELECTRICAL
- T --- EXISTING TELEPHONE (COMMUNICATIONS) LINE
- E --- EXISTING ELECTRIC LINE
- RCP --- PROPOSED RCP STORMWATER PIPE
- T&D --- EXISTING T&D LINE
- FENCE --- EXISTING FENCE
- ROAD --- EXISTING ROAD
- FENCE --- PROPOSED FENCE
- PARCEL --- PARCEL LINE
- DRAINAGE --- DRAINAGE PATH (FLOWLINE)
- ORCHARD --- EXISTING ORCHARD LINE
- RIPRAP --- PROPOSED RIPRAP
- CRUSHED ROCK --- PROPOSED CRUSHED ROCK SURFACE
- CRUSHED ROCK PAVEMENT --- PROPOSED CRUSHED ROCK PAVEMENT
- CONCRETE --- PROPOSED CONCRETE
- NATIVE GROUND COVER --- PROPOSED NATIVE GROUND COVER
- LANDSCAPING --- PROPOSED LANDSCAPING
- STAGING AREA --- TEMPORARY CONSTRUCTION STAGING AREA

**EROSION CONTROL LEGEND:**

- TEMPORARY GRAVEL BAG BARRIER
- SILT FENCE CROSS BARRIER
- PROPOSED SILT FENCE EROSION CONTROL FIBER ROLLS

REV.	DATE	DESCRIPTION	DWN	CHK
A	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
B	12-19-07	ISSUED FOR AMENDED SPE APPLICATION	BGG	WHR
C	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
D	02-28-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
E	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

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 Engineers - Architects - Technicians  
 Design - Construction - Field Service  
  
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 Stilwell, Kansas 66085-1000

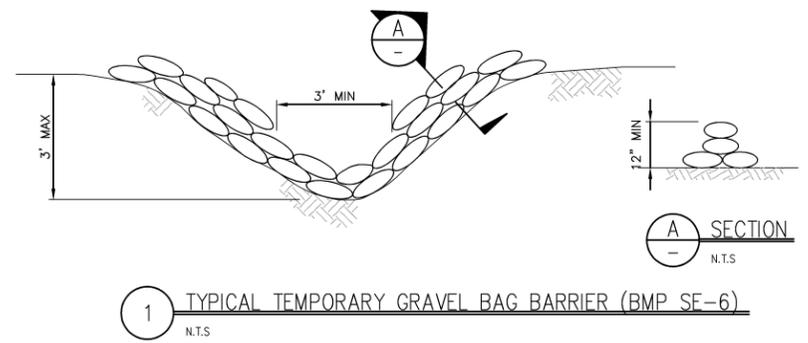
**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

**ORANGE GROVE POWER PLANT**

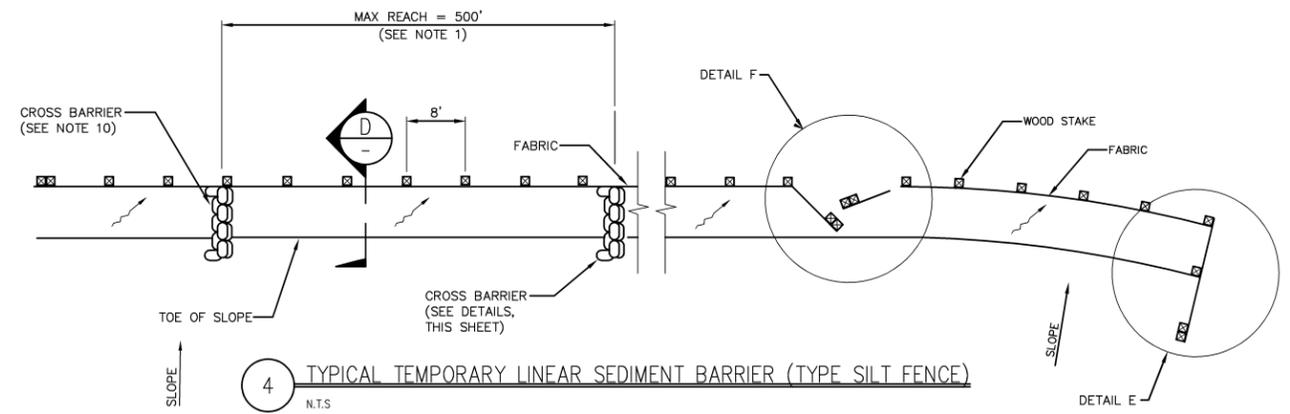
EROSION CONTROL PLAN

DESIGN BY: M. BLAKE	CHECKED BY: B. ROMINES
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. ICCC00101	SEGA PROJECT NO. 07-201
CADD FILE NAME: 07201-C500.dwg	
DRAWING NO. <b>C500</b>	REV. <b>E</b>

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B	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	WHR
C	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
D	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
E	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

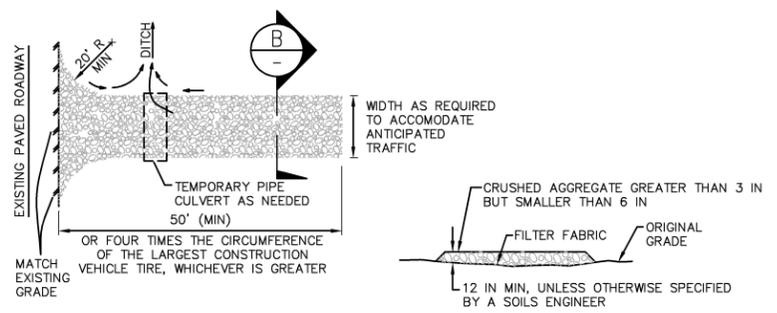


1 TYPICAL TEMPORARY GRAVEL BAG BARRIER (BMP SF-6)  
N.T.S.



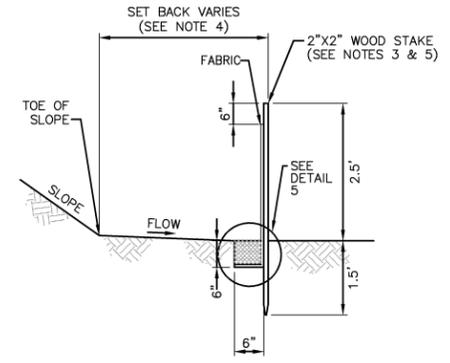
4 TYPICAL TEMPORARY LINEAR SEDIMENT BARRIER (TYPE SILT FENCE)  
N.T.S.

NOTE:  
CONSTRUCT SEDIMENT BARRIER  
AND CHANNELIZE RUNOFF TO  
SEDIMENT TRAPPING DEVICE

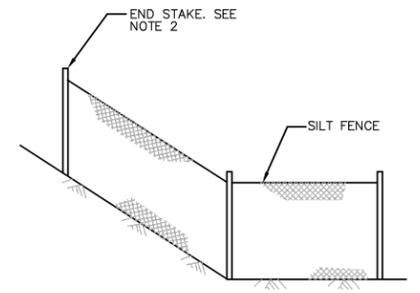


2 TYPICAL TIRE WASH (BMP TC-1)  
N.T.S.

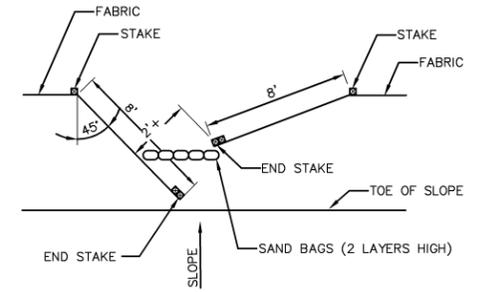
B SECTION  
N.T.S.



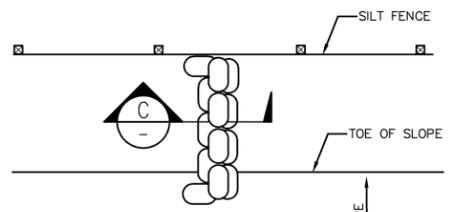
D SECTION  
N.T.S.



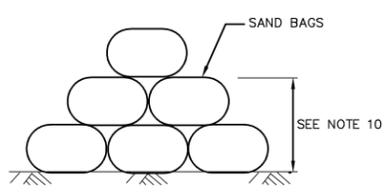
E END DETAIL  
N.T.S.



F OPTIONAL MAINTENANCE OPENING DETAIL  
N.T.S. (SEE NOTE 11)



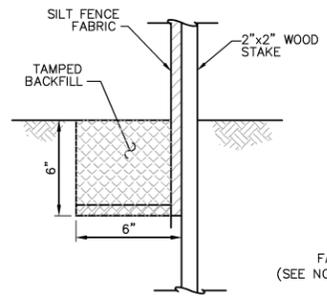
3 TYPICAL CROSS BARRIER DETAIL  
N.T.S.



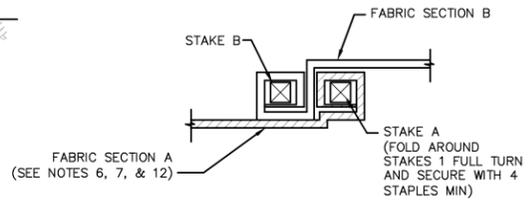
C SECTION  
N.T.S.

NOTES

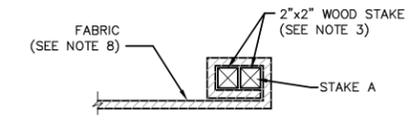
- CONSTRUCT THE LENGTH OF EACH REACH SO THAT THE CHANGE IN BASE ELEVATION ALONG THE REACH DOES NOT EXCEED 1/3 THE HEIGHT OF THE LINEAR BARRIER, IN NO CASE SHALL THE REACH LENGTH EXCEED 500 FEET.
- THE LAST 8 FEET OF FENCE SHALL BE TURNED UP SLOPE.
- STAKE DIMENSIONS ARE NOMINAL.
- DIMENSIONS MAY VARY TO FIT FIELD CONDITION.
- STAKES SHALL BE SPACED AT 8 FOOT MAXIMUM, AND SHALL BE POSITIONED ON DOWNSTREAM SIDE OF FENCE.
- STAKES TO OVERLAP AND FENCE FABRIC TO FOLD AROUND EACH STAKE ONE FULL TURN. SECURE TO STAKE WITH 4 STAPLES.
- STAKES SHALL BE DRIVEN TIGHTLY TOGETHER TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT. THE TOPS OF THE STAKES SHALL BE SECURED WITH WIRE.
- FOR END STAKES, FENCE FABRIC SHALL BE FOLDED AROUND TWO STAKES ONE FULL TURN AND SECURED WITH 4 STAPLES.
- MINIMUM 4 STAPLES PER STAKE. DIMENSIONS SHOWN ARE TYPICAL.
- CROSS BARRIERS SHALL BE A MINIMUM OF 1/3, AND A MAXIMUM OF 1/2 THE HEIGHT OF THE LINER BARRIER.
- MAINTENANCE OPENINGS SHALL BE CONSTRUCTED IN A MANNER TO ENSURE SEDIMENT REMAINS BEHIND SILT FENCE.
- JOINING SECTIONS SHALL NOT BE PLACED AT SUMP LOCATIONS.
- SANDBAG ROWS AND LAYERS SHALL BE OFFSET TO ELIMINATE GAPS.



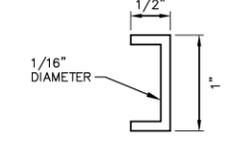
5 DETAIL  
N.T.S.



6 JOINING SECTION DETAIL (TOP VIEW)  
N.T.S.



7 END STAKE DETAIL (TOP VIEW)  
N.T.S.



8 STAPLE DETAIL (SEE NOTE 9)  
N.T.S.

LEGEND

- TAMPED BACKFILL
- SLOPE DIRECTION
- DIRECTION OF FLOW

TYPICAL TEMPORARY SILT FENCE (BMP SE-1)  
N.T.S.

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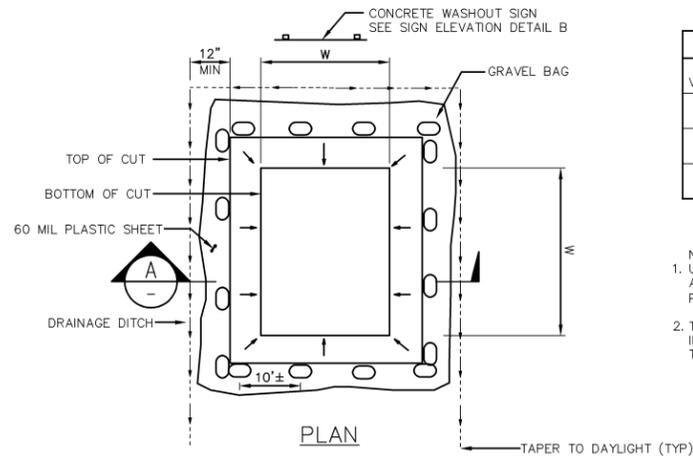
**Sega**  
Engineers - Architects - Technicians  
Design - Construction - Field Service  
16041 Foster  
P.O. Box 1000  
Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

**ORANGE GROVE POWER PLANT**  
EROSION CONTROL PLAN  
DETAILS

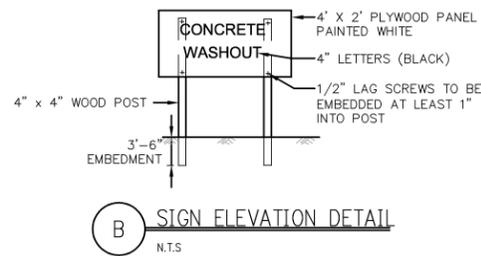
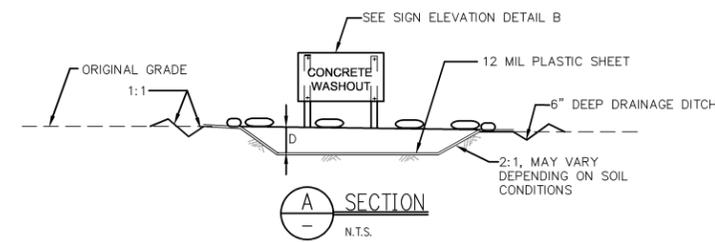
DESIGN BY: M. BLAKE	CHECKED BY: B. ROMINES
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. IC000101	SEGA PROJECT NO. 07-201
CADD FILE NAME: 07201-C501.dwg	
DRAWING NO. C501	REV. E

REV.	DATE	DESCRIPTION	DWN	CHK
A	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
B	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	WHR
C	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
D	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
E	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

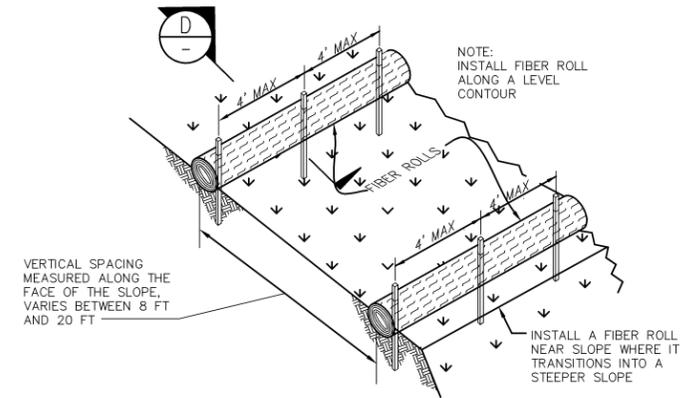


APPROX. VOLUME OF SPOILS	MIN. WIDTH (W)	DEPTH (D)
5 CY OR LESS	3'	1.0'
5 TO 20 CY	10'	1.0'
20 CY OR MORE	15'	1.5'

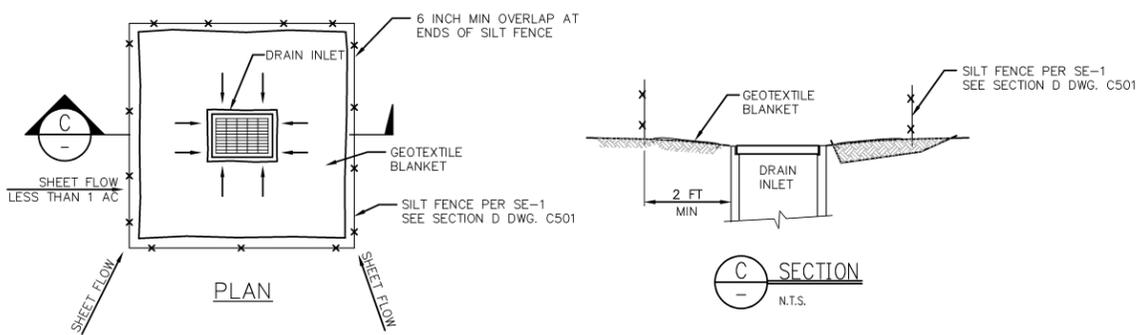
- NOTES:
1. ULTIMATE WASHOUT SIZE DETERMINED BY AMOUNT OF CONCRETE REQUIRED FOR PROJECT AREA AND/OR POUR LOCATION.
  2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 20 FEET OF THE TEMPORARY CONCRETE WASHOUT



1 TEMPORARY CONCRETE WASHOUT FACILITY (BMP WM-8)  
N.T.S.

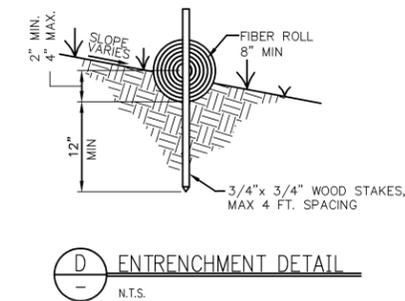


3 TYPICAL FIBER ROLL INSTALLATION (BMP SE-5)  
N.T.S.



2 TYPICAL DROP INLET PROTECTION DETAIL (BMP SE-10)  
N.T.S.

- NOTES:
1. FOR USE IN AREAS WHERE GRADING HAS BEEN COMPLETED AND FINAL SOIL STABILIZATION AND SEEDING ARE PENDING.
  2. NOT APPLICABLE IN PAVED AREAS.
  3. NOT APPLICABLE WITH CONCENTRATED FLOWS.



D ENTRENCHMENT DETAIL  
N.T.S.



Engineers - Architects - Technicians  
Design - Construction - Field Service

16041 Foster  
P.O. Box 1000  
Stilwell, Kansas 66085-1000

**ORANGE GROVE ENERGY L.P.**  
Schaumburg, IL

**ORANGE GROVE POWER PLANT**  
EROSION CONTROL PLAN  
DETAILS

DESIGN BY: M. BLAKE	CHECKED BY: B. ROMINES
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. IC000101	SEGA PROJECT NO. 07-201

CADD FILE NAME: 07201-C502.dwg

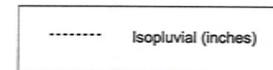
DRAWING NO. <b>C502</b>	REV. <b>E</b>
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# County of San Diego Hydrology Manual



## Rainfall Isopluvials

### 50 Year Rainfall Event - 24 Hours



ORANGE GROVE ENERGY L.P.

Schaumburg, IL

MUP 07-009

### ORANGE GROVE POWER PLANT PROJECT

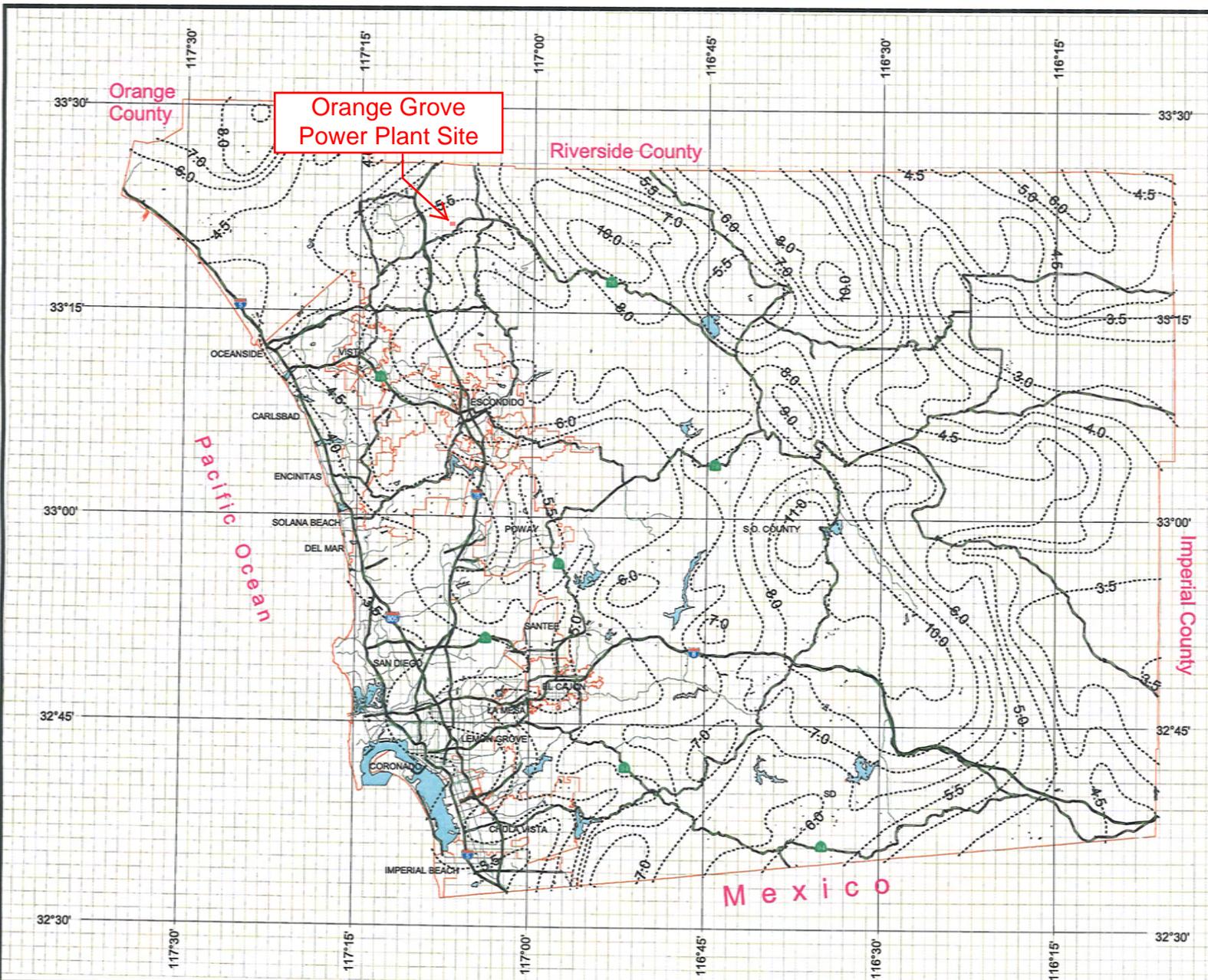


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3 0 3 Miles



# County of San Diego Hydrology Manual



## Rainfall Isophuvials

### 100 Year Rainfall Event - 24 Hours



### ORANGE GROVE ENERGY L.P.

Schaumburg, IL

MUP 07-009

### ORANGE GROVE POWER PLANT PROJECT

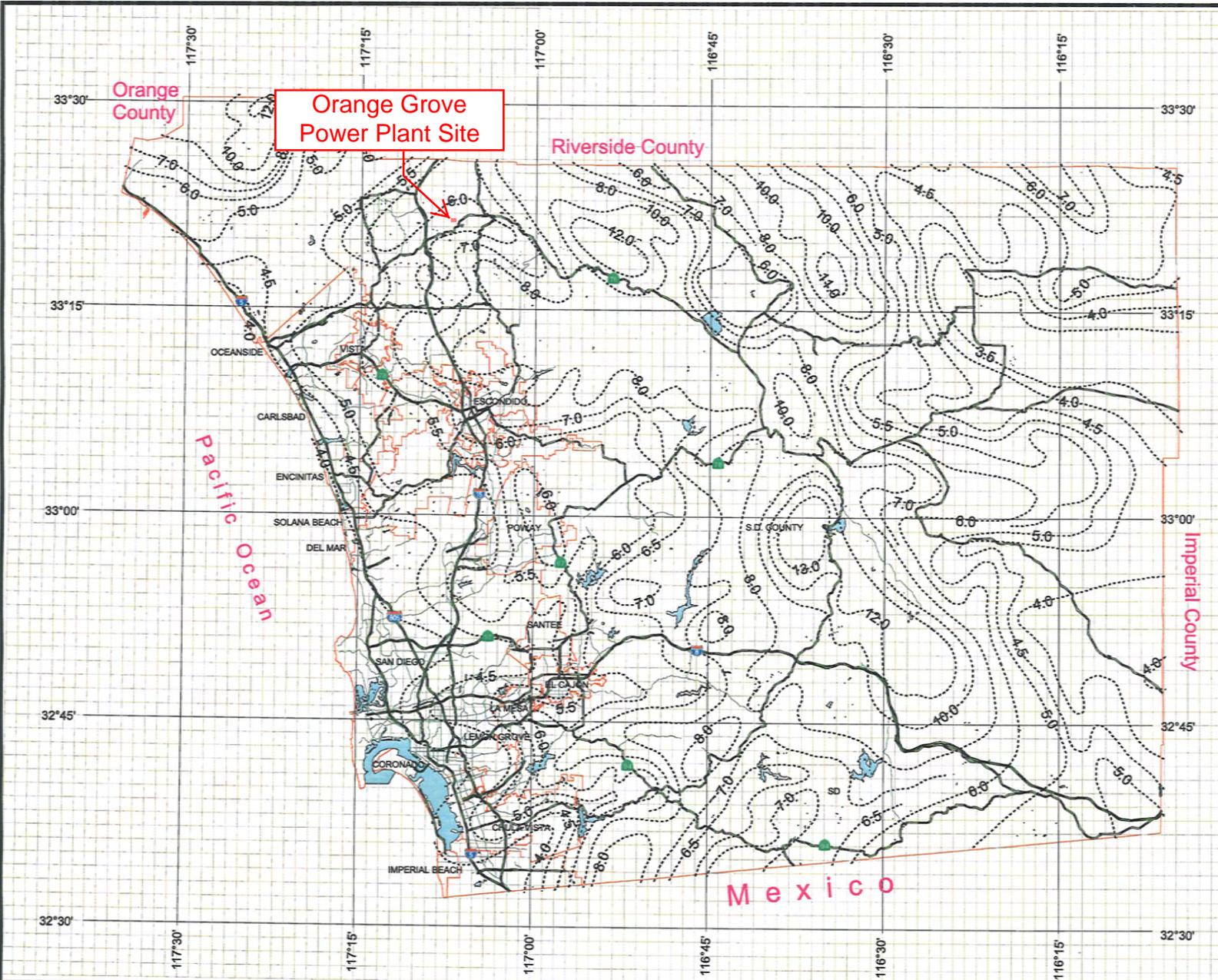


3 0 3 Miles

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**F.2 Detention Basins**

Detention devices are impoundments where the water quality volume is temporarily detained under quiescent conditions, allowing sediment and particulates to settle out. A conceptual schematic of a detention basin is shown in Figure 5.3.1.

Detention devices remove litter, settleable solids (debris), and total suspended solids (TSS). Pollutants, such as heavy metals, that are attached (adsorbed) to the settled particulate matter will also be removed.

**Appropriate Applications and Siting Constraints**

Detention devices should be considered for implementation wherever site conditions allow.

One important siting requirement is that sufficient head is available so that water stored in the device does not cause a backwater condition in the storm drain system, which would limit its capacity. A second siting requirement is that seasonally high groundwater is no higher than the bottom elevation of the device for reasons described below.

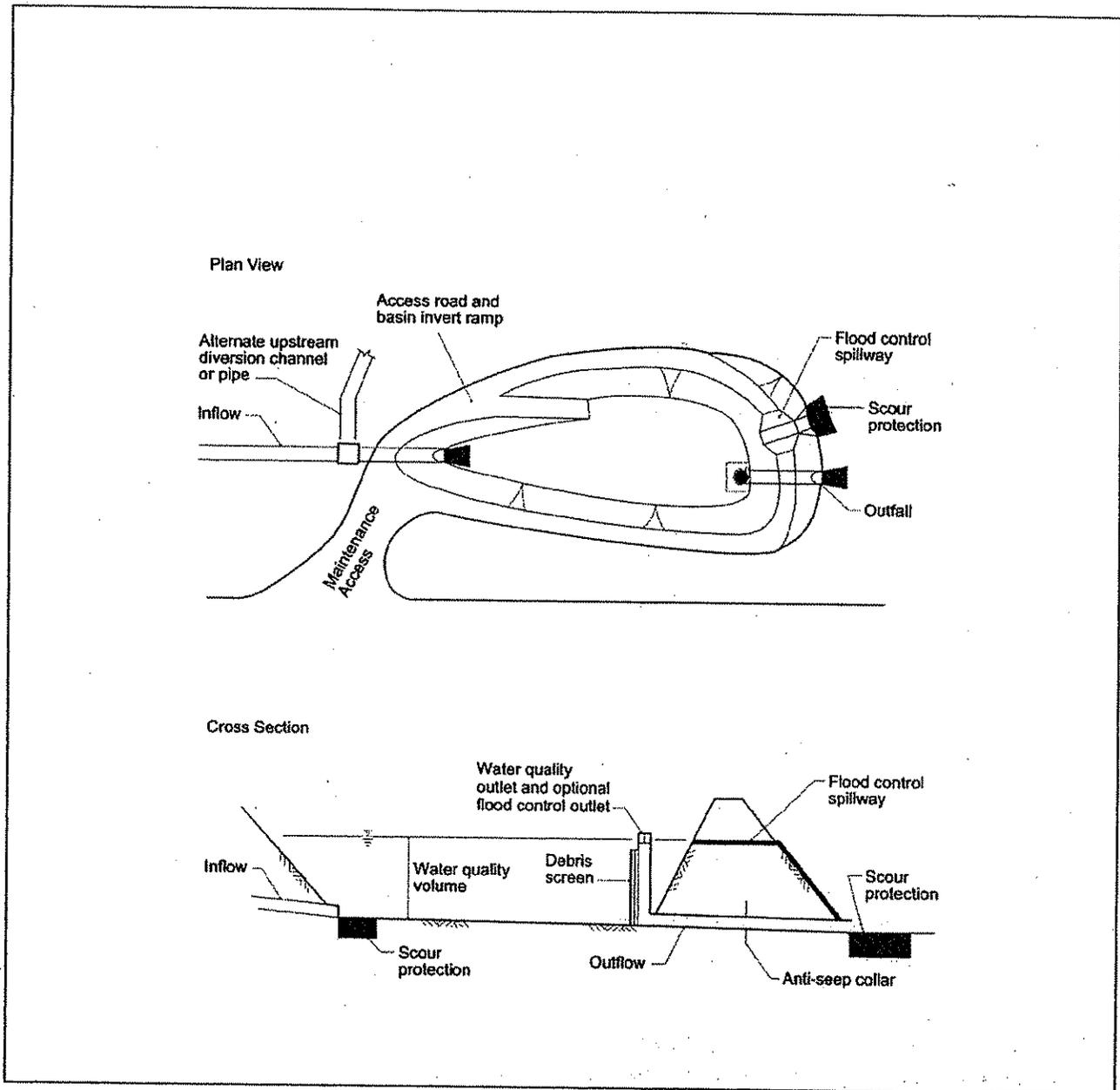


Figure F.2.1  
 Example of Extended Detention Basin Schematic  
 (Not a Standard Plan)

**FACTORS AFFECTING PRELIMINARY DESIGN:**

Detention devices should be designed to hold at least the 24-hour water quality volume. The maximum water level in the detention device should not cause groundwater to occur under the roadway within 0.2 m (8 inches) of the roadway subgrade. A flow-path-to-width ratio of at least 2:1 is recommended. Baffles or interior berms to accommodate the geometry of the site can accomplish this ratio.

Liners are not generally required for detention basins. Infiltration is permissible if the infiltrated water does not surface in an undesirable place off-site or threaten the stability of a slope or embankment down gradient of the basin. To protect groundwater quality and to ensure dry conditions for maintenance of unlined basins, the distance between the basin invert and seasonally high groundwater should be at least 2 m (6 ft). Where the groundwater is higher than this, the basin should be provided with an impermeable liner. In no case should the seasonally high groundwater be higher than the bottom elevation of the detention device to prevent uplift of tanks or liners.

Discharge should be accomplished through a water quality outlet. An example is shown in Figure 3.2.2. A rock pile or rock-filled gabions can serve as alternatives to the debris screen. The water quality outlet should be designed to empty the device within 24 to 72 hours. (The 24-hour limit is chosen to provide adequate settling time; the 72-hour limit is chosen to minimize the potential for mosquito breeding.) Because detention basins are not maintained for infiltration, water loss by infiltration should be disregarded when designing the hydraulic capacity of the outlet structure.

Public health and vector control authorities should be consulted to verify the acceptability of detention basins and the maximum drawdown time allowed to avoid mosquito problems.

The inlet structure of the basin should be designed to divert the peak hydraulic flow (calculated according to County procedures for flood routing and scour) when the basin is full. Alternatively, an overflow structure sized according to these criteria can be provided in one of the downstream walls or berms. A third alternative is to include a flood control outlet in the top of the water quality outlet. In this case, an additional outlet (riser or spillway) should be supplied to prevent overtopping of the walls or berms. Entering flows should be distributed uniformly at low velocity to prevent re-suspension of settled materials and to encourage quiescent conditions.

The site must have sufficient area for a perimeter maintenance road and safe access to and from the site from local roads. Basin side slopes must be shallow enough to permit tracked vehicles to access the basin bottom for maintenance. Alternatively, an access ramp should be provided. Preliminary design factors for detention basins are summarized in Table 3.2.1.

**Table F.2 Summary Of Extended Detention Basin Design Factors**

Description	Applications/Siting	Preliminary Design Factors
<p>Impoundments where the water quality volume is temporarily detained</p> <p>Treatment Mechanisms:</p> <ul style="list-style-type: none"> <li>• Sedimentation</li> <li>• Infiltration (if basin unlined)</li> </ul> <p>Pollutants removed:</p> <ul style="list-style-type: none"> <li>• Sediment and particulates</li> <li>• Litter</li> <li>• Sorbed pollutants (heavy metals, O&amp;G)</li> </ul>	<ul style="list-style-type: none"> <li>• Sufficient head to prevent backwater condition in the storm drain system</li> <li>• Seasonally high groundwater below basin invert</li> <li>• Consult public health and vector control authorities</li> </ul>	<ul style="list-style-type: none"> <li>• Size to capture the 24-hr water quality volume</li> <li>• Flow-path-to-width ratio of at least 2:1 recommended</li> <li>• Maximum water level should not cause groundwater to occur under the roadway within 0.2 m of the roadway subgrade</li> <li>• Basin invert <math>\geq 2</math> m above seasonally high groundwater or else a impermeable liner is required</li> <li>• Scour protection on inflow, outfall and spillway</li> <li>• Maintenance access (road around basin and ramp to basin invert)</li> <li>• Upstream diversion channel or pipe, downstream overflow structure or flood control outlet</li> <li>• Discharge through a water quality outlet with debris screen (or equivalent)</li> <li>• Outlet design to empty basin within 24 to 72 hrs</li> <li>• Flows should enter at low velocity</li> </ul>

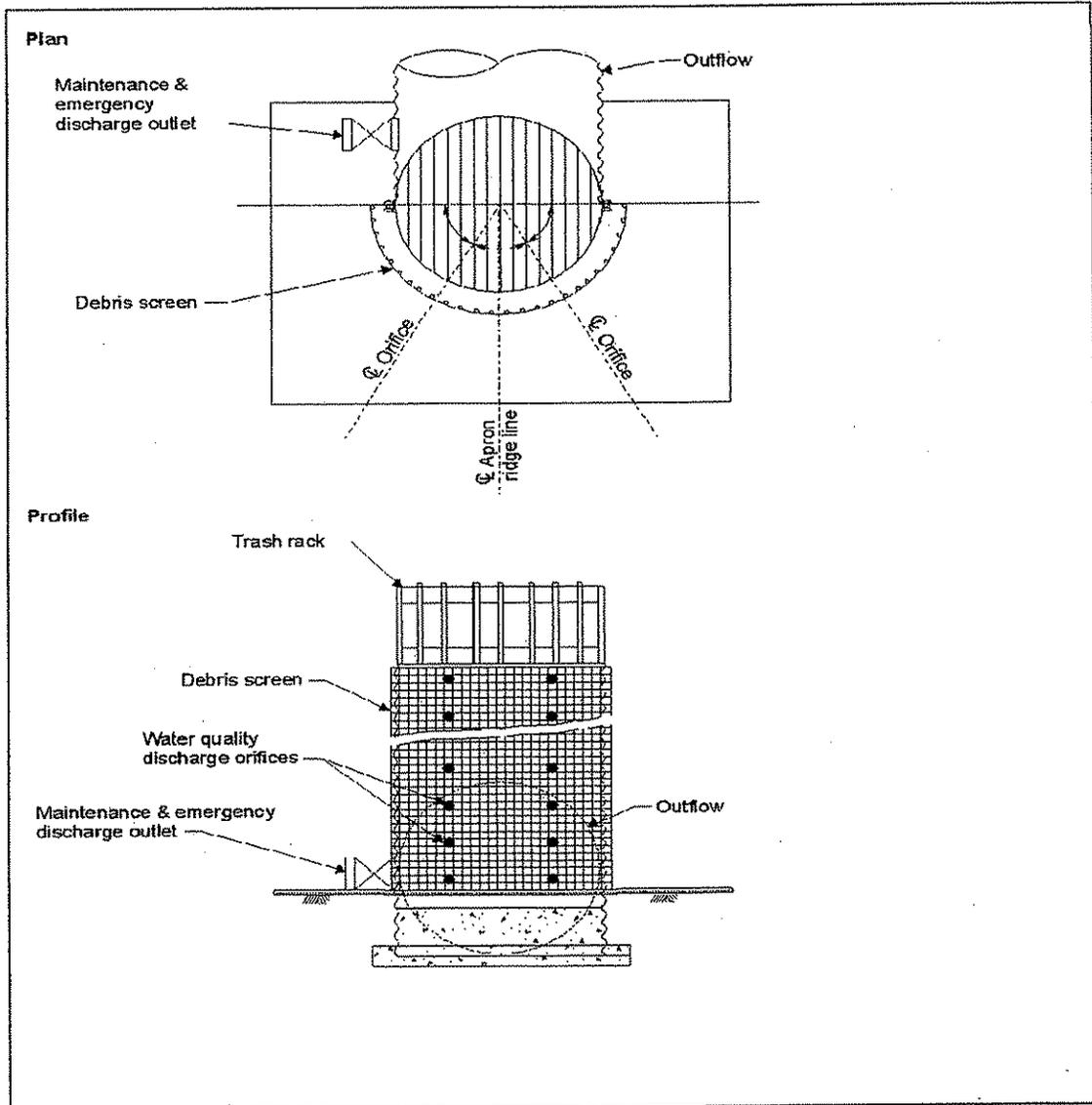


Figure F.2.2  
 Detention Basin Outlet Structure Schematic  
 (Not a Standard Plan)



## Maintenance Concerns, Objectives, and Goals

- Vector/Pest Control
- Sediment and Trash Removal
- Vegetation/Landscape Maintenance
- Re-suspension of settled material
- Clogging of the Outlet

## General Description

Dry extended detention ponds (a.k.a. dry ponds, extended detention basins, detention ponds, extended detention ponds) are basins whose outlets have been designed to detain the stormwater runoff from a water quality design storm for some minimum time (e.g., 72 hours) to allow particles and associated pollutants to settle. Unlike wet ponds, these facilities do not have a large permanent pool. They can also be used to provide flood control by including additional flood detention storage.

## Inspection/Maintenance Considerations

Inspections should be conducted semi-annually and after significant storm events to identify potential problems early. Most maintenance efforts will need to be directed toward vegetation management and vector control, which may focus on basic housekeeping practices such as removal of debris accumulations and vegetation management to ensure that the basin dewateres completely (recommended 72 hour residence time or less) to prevent creating mosquito and other vector habitats.

## Targeted Constituents

<input checked="" type="checkbox"/>	Sediment	▲
<input checked="" type="checkbox"/>	Nutrients	●
<input checked="" type="checkbox"/>	Trash	■
<input checked="" type="checkbox"/>	Metals	▲
<input checked="" type="checkbox"/>	Bacteria	▲
<input checked="" type="checkbox"/>	Oil and Grease	▲
<input checked="" type="checkbox"/>	Organics	▲
<input checked="" type="checkbox"/>	Oxygen Demanding	▲

### Legend (Removal Effectiveness)

- Low
- High
- ▲ Medium



Inspection Activities	Suggested Frequency
<ul style="list-style-type: none"> <li>■ Inspect after several storm events for bank stability, vegetation growth, and to determine if the desired residence time has been achieved.</li> <li>■ Inspect outlet structure for evidence of clogging or outflow release velocities that are greater than design flow.</li> </ul>	Post construction
<ul style="list-style-type: none"> <li>■ Inspect for the following issues: differential settlement, cracking; erosion of pond banks or bottom, leakage, or tree growth on the embankment; the condition of the riprap in the inlet, clogging of outlet and pilot channels; standing water, slope stability, presence of burrows; sediment accumulation in the basin, forebay, and outlet structures; trash and debris, and the vigor and density of the grass turf on the basin side slopes and floor.</li> </ul>	Semi-annual, after significant storms, or more frequent
<ul style="list-style-type: none"> <li>■ Inspect for the following issues: subsidence, damage to the emergency spillway; inadequacy of the inlet/outlet channel erosion control measures; changes in the condition of the pilot channel, accumulated sediment volume, and semi-annual inspection items.</li> </ul>	Annual
<ul style="list-style-type: none"> <li>■ During inspections, changes to the extended storage pond or the contributing watershed should be noted, as these may affect basin performance.</li> </ul>	Annual inspection
Maintenance Activities	Suggested Frequency
<ul style="list-style-type: none"> <li>■ If necessary, modify the outlet orifice to achieve design values if inspection indicates modifications are necessary.</li> <li>■ Repair undercut or eroded areas.</li> <li>■ Mow side slopes.</li> <li>■ Manage pesticide and nutrients.</li> <li>■ Remove litter and debris.</li> <li>■ Control vectors as necessary.</li> </ul>	As needed
<ul style="list-style-type: none"> <li>■ Remove accumulated trash and debris from the basin, around the riser pipe, side slopes, embankment, emergency spillway, and outflow trash racks. The frequency of this activity may be altered to meet specific site conditions.</li> <li>■ Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.</li> </ul>	Semi-annual, or more frequent, as needed
<ul style="list-style-type: none"> <li>■ Seed or sod to restore dead or damaged ground cover.</li> <li>■ Repair erosion to banks and bottom as required.</li> </ul>	Annual maintenance (as needed)
<ul style="list-style-type: none"> <li>■ Supplement wetland plants if a significant portion have not been established (at least 50% of the surface area).</li> <li>■ Remove nuisance plant species.</li> </ul>	Annual maintenance (if needed)
<ul style="list-style-type: none"> <li>■ Remove sediment from the forebay to reduce frequency of main basin cleaning.</li> </ul>	3- to 5-year maintenance
<ul style="list-style-type: none"> <li>■ Monitor sediment accumulation and remove accumulated sediment and regrade about every 10 years or when the accumulated sediment volume exceeds 10-20% of the basin volume, or when accumulation reaches 6 inches or if resuspension is observed. Clean in early spring so vegetation damaged during cleaning has time to re-establish.</li> </ul>	Every 10-25 years

## **Additional Information**

In most cases, sediment from extended detention basin does not contain toxins at levels posing a hazardous concern. Studies to date indicate that pond sediments are likely to meet toxicity limits and can be safely landfilled or disposed of onsite. Onsite sediment disposal is always preferable (if local authorities permit it) as long as the sediments are deposited away from the shoreline to prevent their re-entry into the pond.

Sediments should be tested for toxin in compliance with current disposal requirements if land uses in the catchment include commercial or industrial zones, or if visual or olfactory indications of pollution are noticed.

## **References**

Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: <http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm>

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: [cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp\\_files.cfm](http://cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm)

Ventura Countywide Stormwater Quality Management Program, Technical Guidance Manual for Stormwater Quality Control Measures. July, 2002.

# **ATTACHMENT F**

## **OPERATION AND MAINTENANCE PROGRAM FOR TREATMENT BMP**

*(NOTE: INFORMATION REGARDING OPERATION AND MAINTENANCE CAN BE OBTAINED*

*FROM THE FOLLOWING WEB SITE:*

*[HTTP://WWW.SDCOUNTY.CA.GOV/DPW/WATERSHEDS/LAND\\_DEV/SUSMP.HTML.](http://www.sdcounty.ca.gov/dpw/watersheds/land_dev/susmp.html))*

## APPENDIX H Estimated O & M Costs for BMP Project

Estimated values derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.

						Labor			Equipment			Materials		Total Cost	Comments	
						Per. Hrs	Rate	Cost	Type	Days	rate	Cost	Item			Cost
Annual renewal of medium	End of wet season, April 30	None	Annually, in May	Remove characterize, and properly dispose of media. Replace media before Oct 1	None	2	43.63	87.26	sedan	1	21.28	21.28	new adsorbent and testing & disposal costs	195	303.54	
<b>TOTAL DRAIN INLET INSERTS-STREAM GUARDS</b>																
<b>EXTENDED DETENTION BASINS</b>						6		261.78				21.28		195	478.06	
Preventive Maintenance and Routine inspections																
DESIGN CRITERIA,																
ROUTINE ACTIONS	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY	SITE-SPECIFIC REQUIREMENTS											
Basin side slope planted for erosion protection and planted invert	Average vegetation height greater than 12-inches, emergence of trees or woody vegetation.	Visual observation and random measurements through out the side slope area	Once during wet season, once during dry season.	Cut vegetation to an average height of 6-inches and remove trimmings. Remove any trees, or woody vegetation.		48	43.63	2094.24	one-ton truck	2	26.84	53.68	string trimmer, rake, fork, bags, safety equipment	50	2197.92	
Slope stability	Evidence of erosion	Visual observation	October each year	Reseed/revegetate barren spots prior to wet season.		0	43.63		one-ton truck & hydroseeder	0	48.15	0	seed	150	150	
				Contact environmental or landscape architect for appropriate seed mix.												
				Scarify surface if needed.												
				If after two applications (2 seasons) of reseeding/revegetating and growth is unsuccessful both times, an erosion blanket or equivalent protection will be installed over eroding areas. No erosion blanket will be installed in the basin invert.	NOT AN ANNUAL COST	0	43.63	0	one-ton truck	0	26.84	0	blanket	0	0	
Inspect for standing water.	Standing water for more than 72 hours	Visual observation	Annually, 72 hours after a target 2 storm (0.75 in) event	<input type="checkbox"/> Drain facility	None											
				<input type="checkbox"/> Check and unclog clogged orifice.	Should be Annual Mtce.											
				Notify engineer, if immediate solution is not evident.												
Inspection for trash and debris	Debris/trash present	Visual observation	During routine trashing, per Districts schedule.	Remove and dispose of trash and debris	None											
Inspection for sediment management and characterization of sediment for removal	<input type="checkbox"/> Sediment depth exceeds marker on staff gage	<input type="checkbox"/> Measure depth at apparent maximum and minimum accumulation of sediment. Calculate average depth	Annually	Remove and properly dispose of sediment. Regrade if necessary.		15	43.63	698.05	4-yd dump truck, backhoe & trailer, one-ton truck & hydroseeder	0.4	176.5	70.6	testing and disposal	460	1228.65	once every 5 years

## APPENDIX H Estimated O & M Costs for BMP Project

Estimated values derived from Caltrans Pilot BMP Study. This spreadsheet will change as additional data becomes available.						Labor			Equipment			Materials		Total	Comments	
						Per. Hrs	Rate	Cost	Type	Days	rate	Cost	Item	Cost	Cost	
Inspect for burrows	Burrows, holes, mounds	Visual observation	Annually and after vegetation trimming.	<input type="checkbox"/> Where burrows cause seepage, erosion and leakage, backfill firmly.												
General Maintenance Inspection	Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, emergence of trees or woody vegetation, graffiti or vandalism, fence damage, etc.	Visual observation	Semi-Annually, late wet season and late dry season Monthly	Corrective action prior to wet season. Consult engineers if immediate solution is not evident.	None	16	43.63	698.08	one-ton truck	2	26.84	53.68			751.76	
<b>TOTAL EXTENDED BASIN</b>						80		3490.4				177.88		660	4328.36	
<b>INFILTRATION BASINS</b>																
Preventive Maintenance and Routine Inspections																
DESIGN CRITERIA																
<b>ROUTINE ACTIONS</b>	<b>MAINTENANCE INDICATOR</b>	<b>FIELD MEASUREMENT</b>	<b>MEASUREMENT FREQUENCY</b>	<b>MAINTENANCE ACTIVITY</b>	<b>SITE-SPECIFIC REQUIREMENTS</b>											
Vegetation of basin invert and side slopes	Vegetation height exceeds 12 inches, emergence of trees or woody vegetation.	Visual observation and random measurements through out the side slope and invert area	Once during wet season, once during dry season.	Cut vegetation to an average height of 6-inches. Remove any trees, or woody vegetation.	None	48	43.63	2094.24	two-ton truck	2	50	100	string trimmer, rake, fork, bags, safety equipment	50	2244.24	
Inspect for standing water.	Standing water for more than 72 hours	Visual observation	Annually, 72 hours after a target 2 storm (0.75 in) event.	<input type="checkbox"/> Drain facility, if possible. <input type="checkbox"/> Notify engineer to consider:  <input type="checkbox"/> Remove sediment, scarify invert, and regrade if necessary.		16	43.63	698.08	one-ton truck	4	26.84	107.36			805.44	
				<input type="checkbox"/> If unable to achieve acceptable infiltration rate or implement alternative solution then move to decommission				0				0			0	covered under sediment removal
				<input type="checkbox"/> If standing water can not be removed then notify VCD.	None			0				0			0	
Inspection for trash and debris at inlet structures	Debris/trash present	Visual observation	During routine trashing, per Districts schedule.	Remove and dispose of trash and debris	None											
Inspection for sediment accumulation	Sediment depth exceeds marker on staff gage.	Measure depth at apparent maximum and minimum accumulation of sediment. Calculate average depth	Annually	Remove, characterize and properly dispose of sediment. Regrade and revegetate bare areas.	None	4	43.63	174.52	4-yd dump truck, loader & trailer, grader, sedan, one-ton truck & hydroseeder	0.5	256.94	128.47	seed, testing & disposal	150	452.99	once every 10 years
Slope stability	Evidence of erosion.	Visual observation	October each year.	Reseed/revegetate barren spots by Nov. Scarify surface if needed.		20	43.63	872.6	one-ton truck & hydroseeder	1	48.15	48.15	seed	275	1195.75	