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DOCKET	
08-AFC-6	
DATE	MAY 27 2009
RECD.	MAY 28 2009

May 27, 2009

Dockets Unit
California Energy Commission
1516 Ninth Street, MS 4
Sacramento, CA 95814

RE: Willow Pass Generating Station
Application for Certification 08-AFC-6

On behalf of Mirant Willow Pass, LLC, the applicant for the above-referenced Willow Pass Generating Station (WPGS) AFC, we hereby submit the enclosed documents:

1. **Responses to Data Requests 58-75.** Twelve print copies and twelve CDs of the responses.

2. **Updated System Impact Study: Appendix 10 (Complete Version).** Three CDs of Appendix 10 (Transient Stability Analysis). This Appendix was previously docketed with the CEC on March 4, 2009, but it was subsequently discovered that a portion of the transient stability analysis was inadvertently not included in the version provided to the CEC. Therefore, the enclosed version replaces Appendix 10 previously docketed with the CEC on March 4, 2009. Selected plots printed in large size and in color from this appendix were previously docketed with the CEC on May 26, 2009.

Please include these documents in the AFC record.

URS Corporation

Kathy Rushmore

Kathy Rushmore
Project Manager

Enclosures

CC: Felicia Miller

URS Corporation
221 Main Street, Suite 600
San Francisco, CA 94105
Tel: 415.896.5858
Fax: 415.882.9261
www.urscorp.com

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE **WILLOW PASS**
GENERATING STATION

Docket No. 08-AFC-6

PROOF OF SERVICE
(Revised 4/14/2009)

APPLICANT
Chuck Hicklin, Project Manager
Mirant Corporation
P.O. Box 192
Pittsburg, CA 94565
E-mail preferred
chuck.hicklin@mirant.com

Jonathan Sacks, Project Director
Steven Nickerson
Mirant Corporation
1155 Perimeter Center West
Atlanta, GA, 30338
E-mail preferred
jon.sacks@mirant.com
steve.nickerson@mirant.com

CONSULTANTS
Dale Shileikis
Kathy Rushmore
URS Corporation
221 Main Street, Suite 600
San Francisco, CA 94105-1917
E-mail preferred
Kathy_Rushmore@URSCorp.com
Dale_shileikis@URSCorp.com

COUNSEL FOR APPLICANT
Lisa Cottle
Karleen O'Connor
Winston & Strawn LLP
101 California Street
San Francisco, CA 94111-5802
E-mail preferred
lcottle@winston.com
koconnor@winston.com

INTERESTED AGENCIES
California ISO
e-recipient@caiso.com

Marc Grisham, City Manager
Garrett D. Evans
General Manager, Pittsburg Power Company
65 Civic Avenue
Pittsburg, CA 94565
MGrisham@ci.pittsburg.ca.us
gevans@ci.pittsburg.ca.us

Greggory L. Wheatland
Ellison, Schneider & Harris
2015 H Street
Sacramento, CA 95811-3109
glw@eslawfirm.com

INTERVENORS
California Unions for Reliable Energy ("CURE")
Gloria D. Smith & Marc D. Joseph
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, California 94080
gsmith@adamsbroadwell.com
mdjoseph@adamsbroadwell.com

ENERGY COMMISSION
KAREN DOUGLAS
Chair and Presiding Member
kldougla@energy.state.ca.us

JAMES D. BOYD
Vice Chair and Associate Member
jboyd@energy.state.ca.us

Paul Kramer
Hearing Officer
pkramer@energy.state.ca.us

***Felicia Miller**
Project Manager
fmiller@energy.state.ca.us

Dick Ratliff
Staff Counsel
dratliff@energy.state.ca.us

Elena Miller
Public Adviser
publicadviser@energy.state.ca.us

DECLARATION OF SERVICE

I, Kathy Rushmore, declare that on May 27, 2009, I served and filed copies of the attached (1) *Responses to CEC Data Requests (#58-75)* and (2) Appendix 10 (Complete Version) of the Updated System Impact Study. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/willowpass/index.html]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

___ sent electronically to all email addresses on the Proof of Service list;

_X_ by personal delivery or by depositing in the United States mail at San Francisco, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

___ **sending two original paper copies and one electronic copy, mailed to the address below:**

OR

__ X _ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-6
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Kathy Rushmore

Responses to CEC Data Requests (#58-75)

Application for Certification (08-AFC-6) for WILLOW PASS GENERATING STATION Pittsburg, California

May 2009

Prepared for:

MIRANT℠
WILLOW PASS, LLC

Prepared by:

URS

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LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

AAC	all aluminum conductor
ACSR	aluminum conductor steel reinforced
ACSS	aluminum conductor steel supported
CAISO	California Independent System Operator
CCSF	City and County of San Francisco
CD	compact disk
CEC	California Energy Commission
fps	feet per second
MVA	megavolt ampere
MVAR	megavolt-ampere reactive
MW	megawatt
NERC	North American Electric Reliability Council
PG&E	Pacific Gas & Electric Company
SIS	System Impact Study
WCA	worst case analysis
WECC	Western Electricity Coordinating Council
WPGS	Willow Pass Generating Station

Technical Area: Biological Resources
Author: Heather Blair

BACKGROUND

Emissions from the proposed Willow Pass Generating Station (WPGS), namely nitrogen oxides (NOx) and ammonia (NH_3), would result in nitrogen deposition from the atmosphere to the biosphere. Excessive nitrogen deposition can act as a fertilizer and promote the growth of non-native vegetation. The increased dominance and growth of invasive annual grasses is especially prevalent in low-biomass vegetation communities that are naturally nitrogen-limited, such as sand dunes. The Antioch Dunes National Wildlife Refuge (NWR), which is approximately five miles east of the WPGS site, comprises 67 acres of sand dunes that support the last known natural populations of the federally endangered Lange's metalmark butterfly, federally and state-endangered Antioch Dunes evening primrose, and federally and state-endangered Contra Costa wallflower. Major threats to these species include invasion of non-native vegetation and wildfire, which is exacerbated by the presence of non-native vegetation. Antioch Dunes evening primrose, Contra Costa wallflower, and naked buckwheat, the larval host plant of Lange's metalmark butterfly, require open sandy substrate for survival. Invasive non-native vegetation, which is enhanced by atmospheric nitrogen deposition, affects these species by outcompeting them for space, sunlight, moisture, and nutrients.

Nitrogen deposition and the resultant potential impacts to state and federally listed species at the Antioch Dunes NWR, is of concern to the Energy Commission staff, United States Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG). To assess impacts to nitrogen-sensitive biological resources, staff requires additional information on nitrogen deposition resulting from WPGS emissions.

DATA REQUESTS

58. Please quantify the existing baseline total nitrogen deposition rate in the vicinity of WPGS (encompassing the areas listed in DR #2) in kilograms per hectare per year (kg/ha/yr). Provide the complete citation for references used in determining this number.

59. Please provide an analysis of impacts due to total nitrogen deposition from operation of the WPGS. The analysis should specify the amount of total nitrogen deposition in kg/ha/yr at the Sardis Unit and Stamms Unit of the Antioch Dunes National Wildlife Refuge, the freshwater/brackish marsh habitat immediately west of the project area, and all other "Areas of Concern" (A through O) as illustrated in AFC Figure 7.2-1.

60. Please provide an isopleth graphic over USGS 7.5-minute maps (or equally detailed map) of the direct nitrogen deposition rates caused by the project that graphically depicts the results.

61. Please update the cumulative impact analysis (Tables 57-1 and 57-2) in Responses to Data Request Addendum Set #1A – Data Request #57 with nitrogen deposition values in kg/ha/yr. Provide an isopleth graphic over USGS 7.5-minute maps (or equally detailed map) of the direct nitrogen deposition values in the cumulative analysis.

RESPONSE TO DATA REQUESTS 58 THROUGH 61

As explained in Mirant Willow Pass, LLC's (Mirant Willow Pass) notification to the California Energy Commission (CEC) submitted on May 18, 2009, additional time is needed to complete the requested documentation and modeling analyses related to nitrogen deposition. This work is in progress and should be complete no later than the middle of June.

Technical Area: Socioeconomics
Author: Marie McLean

BACKGROUND

Section 7.8.2.5, "Fiscal Impacts," subsection "Property Taxes," applicant states: ". . . it is estimated that the project would generate approximately $25,000 in tax annually (8.25 percent sales tax on $300,000 worth of locally produced materials) during the first year of operation.

DATA REQUEST

62. Please estimate the sales tax for each year of the plant's operation.

RESPONSE

California sales tax is imposed on each California retailer. Each year that the WPGS is in operation, Mirant Willow Pass would purchase an estimated $300,000 worth of locally produced materials (i.e., produced within the Five-County Study Area) for the purpose of plant operation. As stated in the AFC, this spending would result in approximately $25,000 in sales tax[1]. Due to the April 1, 2009, increase in the sales tax rate in Contra Costa County from 8.25 percent to 9.25 percent (CBOE, 2009a), the sales tax estimate for these local purchases is now $27,750.

In addition to the spending in the Five-County Study Area, Mirant Willow Pass expects to spend approximately $2.5 million on electricity, chemicals and other supplies purchased within California, but outside of the Five-County Study Area. Of this, approximately $2 million would be spent by Mirant Willow Pass on electricity, which is exempt from sales tax (CBOE, 2009b). Therefore, the amount of spending within California (but outside the Five-County Study Area) subject to sales tax would be approximately $500,000, and the sales tax due each year of operation as a result of this spending would be approximately $46,250.

In total, sales tax due to plant operations from all purchases in California (including the Five-County Study Area) is expected to be approximately $74,000 each year of operation.

[1] The AFC states "Contra Costa County would receive a portion of use tax revenues due to purchases for project operations that occur (1) outside California; and (2) within California counties with sales and use tax rates lower than Contra Costa County's sales and use tax rate…" Note that this statement incorrectly identifies tax incurred outside the Five-County Study Area but within California as use tax. Tax generated from sales within California is a "sales tax." Tax generated from sales outside of California for use or consumption within California is a "use tax."

BACKGROUND

Applicant states in "Sales and Use Taxes," page 7.8-16, that Contra Costa County would receive a portion of use tax revenue from materials purchased outside of Contra Costa County. The applicant also states that $445 million in construction materials are to be purchased in the United States and would be subject to use tax.

DATA REQUEST

63. Please estimate the amount of use tax to be paid by the applicant for (1) the construction phase; and (2) each year of the plant's operation.

RESPONSE

1. Mirant Willow Pass would pay use tax to the State of California on purchases made outside California. Mirant Willow Pass expects to purchase an estimated $445 million worth of construction materials outside California. The use tax rate for WPGS construction materials would be 9.25 percent (the sales and use tax for Contra Costa County) because the materials would be installed or consumed in Contra Costa County. Therefore, Mirant Willow Pass would pay an estimated $41 million in use taxes on construction purchases. (Note: the AFC states that the sales and use tax in Contra Costa County is 8.25 percent. On April 1, 2009, the sales and use tax rate in Contra Costa County increased to 9.25 percent [CBOE 2009a]).

2. Use tax payments related to WPGS operations would primarily consist of tax on the long-term service agreement with the manufacturer for maintenance of equipment. For these services, Mirant Willow Pass expects annual use tax payments to range from $79,000 to $116,000 for each year of operation. The remaining non-local purchases during operations (occurring outside the Five-County Study Area) are expected to occur in California, therefore, these purchases would not be subject to use tax.

References

CBOE (California State Board of Equalization). 2009a. *California City and County Sales and Use Tax Rates.* http://www.boe.ca.gov/sutax/pam71.htm, accessed May 20, 2009.

CBOE (California State Board of Equalization). 2009b. *Sales and Use Taxes: Exemptions and Exclusions.* California Revenue and Taxation Code, Part 1, Division 2. http://www.boe.ca.gov/pdf/pub61.pdf, accessed May 20, 2009.

Technical Area: Soil and Water Resources
Author: Richard Latteri

BACKGROUND

The WPGS site is located in a special flood hazard area with a Base Flood Elevation (BFE) of 7.0 feet above mean sea level (amsl). The applicant proposes to elevate the WPGS site to approximately 8 to 13 feet amsl. To minimize the potential impacts to water and soil resources from site elevation activities and construction of the WPGS, the California Energy Commission will require a Drainage, Erosion, and Sediment Control Plan (DESCP) as a condition of certification.

DATA REQUEST

64. Please provide a draft DESCP containing elements A through I that describe the site and supports the selection of all erosion and sediment control best management practices (BMPs) that are to be implemented during site mobilization, site elevation, and WPGS foundation and recycled pipeline installation activities. The level of detail in the draft DESCP should be commensurate with the current level of planning for site mobilization, elevation, foundation excavation, and recycled water and return pipeline installation.

A. Vicinity Map – Provided map(s) at a minimum scale 1" = 100' indicating the location of all project elements (project site, lay down areas, transmission corridors, and pipeline corridors) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. Site Delineation –All WPGS construction areas subject to soil disturbance (project site, lay down areas, recycled water pipeline) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

C. Watercourses and Critical Areas – The draft DESCP shall contain water pollution control drawings (WPCD) at a minimum scale of 1" = 100' showing the location of all nearby watercourses including swales, storm drains, and drainage ditches. On the WPCDs Indicate the proximity of those features to the project construction, lay down, and pipeline construction corridor.

D. Drainage Map – The draft DESCP shall provide a topographic site map(s) at a minimum scale 1" = 100' showing existing, interim and proposed drainage systems and drainage area boundaries. On the map(s), spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended from the project site a minimum distance of 100 feet in flat terrain.

E. Drainage Narrative – The draft DESCP shall include a narrative of the storm water control measures to be implemented to protect the site and downstream facilities. The narrative shall state the watershed size in acres that is used to calculate storm water flows and volume. The narrative is to include the summary pages from the hydrology and hydraulic analyses to support the selection of BMPs and structural controls to divert on-site drainage around or through the project construction and laydown areas.

F. Clearing and Grading Plans – The draft DESCP shall provide a delineation of the proposed recycled water and brine return pipeline indicating all areas to be cleared of vegetation and areas to be preserved. The draft DESCP shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections or other means. The locations of all soil stockpile areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography.

G. Clearing and Grading Narrative – The draft DESCP shall include a mass balance diagram showing the volume of soil that is to be cut and filled to bring the site to its design elevation and a discussion of the types of soil to be used, the placement method, and the location of the borrow site where the fill will be obtained.

H. Best Management Practices Plan – The draft DESCP shall identify on the WPCDs the location of the BMPs to be employed during site mobilization, site elevation, and the foundation and pipeline installation phases of WPGS construction. BMPs shall include measures designed to prevent wind and water erosion in areas with existing soil contamination. Treatment control BMPs used during construction should enable testing of storm water runoff prior to discharge to the San Joaquin River.

I. Best Management Practices Narrative – On the WPCDs, the location (as identified in H above), timing, and maintenance schedule of all erosion and sediment control BMPs to be used during the site mobilization, site elevation, and foundation and pipeline installation phases are to be shown.

RESPONSE

The draft DESCP is attached as Appendix A.

BACKGROUND

The current understanding of the climate processes includes the expectation that California's mean temperature will rise from 2 to 6 degree C within the century. A sea level rise of up to 55 inches is expected and shoreline development along the Suisun Bay must plan for a revised Base Flood Elevation (BFE) of up to 10 feet amsl or higher.

DATA REQUEST

65. In the event that the FEMA designated 100-year BFE rises above 7.0 feet amsl, please provide a discussion of the methods to be employed to keep the WPGS site from flooding.

RESPONSE

Sea levels along California's coast have risen about seven inches over the past century (CEC, 2008 and 2009). The average sea level rose at a rate of approximately 0.07 inch per year from 1961 to 2003, with an accelerated average rate of about 0.12 inch per year during the last decade (CEC, 2009).

Studies that account for climate change as a result of global warming, predict that sea-level rise will accelerate and proceed at significantly higher rates than previously thought. The Intergovernmental Panel on Climate Change (IPCC) published projections on global sea level rise in 2001 and refined estimates in 2007 (IPCC; 2001, 2007). The projections considered thermosteric sea level change (expansion of sea water as it warms) and eustatic sea level changes due to increased fresh water inflows from melting sea and glacial ice, under a range of emission scenarios. These earlier studies had estimated that sea level would rise by as much as 20 inches by 2100 (IPCC, 2007), which corresponds to an average rate of approximately 0.2 inch per year or about twice the historical average rate.

Recent studies focus on two of the emission scenarios from the earlier studies and include adjustments that consider the effects of dams on sea level rise. These current studies predict that sea level rise may accelerate faster than the earlier IPCC studies had indicated (BCDC, 2009 and CEC, 2009). In addition, an Independent Science Board (ISB) contracted by the State of California has recommended that the State adopt conservative estimates for sea level rise to account for accelerating contributions from ice sheet melting and using the most conservative methodologies. Table 65-1 summarizes the emission scenarios and sea level rise estimates from the current studies and ISB's recommendations, as well as the IPCC's 2007 estimates. It should be noted that the ISB's recommendation of 55 inches by 2100 is more than 2.5 times IPCC's 2007 estimate and more than seven times the historical average rate.

The FEMA baseline flood elevation (BFE) in the vicinity of the WPGS site is currently 7 feet mean sea level. Based on the current sea level rise projections shown on Table 65-1, it is estimated that the BFE would range from approximately 7.9 to 8.5 feet by 2050. The WPGS site will be regraded to elevate the site to well above the current and predicted future BFE. After regrading, the elevations at the WPGS site will range from approximately 8 to 13 feet. All of the facilities within the power block areas will be at elevation 9 feet or higher. Therefore no additional measures would be required to protect the project site from the 100-year flood, even with the projected estimates of sea-level rise over the 30-year life of the project.

Table 65-1
Sea Level Rise Projections

Emissions Scenario	Temperature Change (F) Best Estimate	Temperature Change (F) Likely Range	Increase in Sea Level 2000-2050 (inches)	Increase in Sea Level 2000-2099 (inches)	IPCC's 2007 Temperature Change (F) Likely Range	IPCC's 2007 Increase in Sea Level 2000-2099 (inches)
Lower (B1)	3.2	2.0-5.2	12	20	1.1-2.9	7-15
Higher (A2)	6.1	3.6-9.72	17	55	2.0-5.4	9-20
ISB Recommendation	–	–	16	55	–	–

Source: BCDC, 2009 and IPCC, 2007

If one considers the projected sea level rise over the next 100 years, the BFE would be predicted to rise from the current 7 feet to approximately 8.9 to 11.6 feet by 2100, based on the current sea level rise estimates. As described above, the majority of the site would be regraded and the major equipment would be elevated. As necessary, berms or sea walls could be constructed to protect the WPGS facilities in the event that sea level rise is higher or occurs sooner than projected.

References:

BCDC (San Francisco Bay Conservation and Development Commission), 2009. Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline. Draft Staff Report. April 7.

CEC (California Energy Commission), 2009. Potential Impacts of Climate Change on California's Energy Infrastructure and Identification of Adaptation Measures. January.

CEC (California Energy Commission), 2008. The Future is Now: An Update on Climate Change Science, Impacts and Response Options for California. September.

IPCC (Intergovernmental Panel on Climate Change), 2001. Climate Change 2001: Synthesis Report. A Contribution of Working Groups I, II, and III to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Watson, R.T. and the Core Writing Team (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA, 398 pp.

IPCC, 2007. Climate Change 2007: The Physical Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H. L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA, 996 pp.

Technical Area: Transmission System Engineering
Author: Ajoy Guha, P.E., and Mark Hesters

INTRODUCTION

Staff needs to determine the system reliability impacts of the project interconnection and to identify the interconnection facilities including downstream facilities needed to support the reliable interconnection of the proposed Willow Pass Generating Station (WPGS) project. The interconnection must comply with the Utility Reliability and Planning Criteria, North American Electric Reliability Council (NERC) Planning Standards, NERC/Western Electricity Coordinating Council (WECC) Planning Standards, and California Independent System Operator (California ISO) Planning Standards. In addition the California Environmental Quality Act (CEQA) requires the identification and description of the "Direct and indirect significant effects of the project on the environment." For the compliance with planning and reliability standards and the identification of indirect or downstream transmission impacts, Energy Commission staff normally relies on the System Impact study (SIS) and Facilities study (FS) performed by interconnecting authority, California ISO or the interconnecting utility (in this case PG&E). The California ISO's generator interconnection process is transitioning from a queue or serial study process to a cluster window process and this transition has caused significant delays in the interconnection studies for many projects. The Energy Commission made the decision to allow applicants to file "third party" or non-California ISO or utility studies during the California ISO's transition period in order to allow the Application for Certification process to continue throughout the California ISO's transition. The third party SIS must be sufficient for the Energy Commission to determine whether or not a proposed project interconnection would comply with reliability LORS and in order to identify any additional or downstream facilities that might be required to ensure compliance with CEQA. When the studies determine that the project will cause the transmission to violate reliability requirements the potential mitigation or upgrades required to bring the system into compliance are identified. The mitigation measures often include modification and construction of downstream transmission facilities. The CEQA requires environmental analysis of any downstream facilities for potential indirect impacts of the proposed project.

BACKGROUND

The February, 2009 updated SIS summary report did not list all major assumptions used in the 2013 summer peak base case. The SIS report also did not identify the reliability planning criteria utilized to determine reliability criteria violations.

DATA REQUEST

66. Provide tables listing all major study assumptions used in the 2013 summer peak base case including major path flows (paths 66, 65, 26 & 15), Energy Commission certified generation projects (pending for construction), California ISO queue generation projects with the Large Generator Interconnection Procedures (LGIP) agreement (thermal and wind), a few major PG&E generation and PG&E total system load.

RESPONSE

Table 66-1 shows the major bulk path flow assumptions used in the 2013 summer peak base case for the Willow Pass Generating Station (WPGS) analysis.

Table 66-1 Major Bulk Path Flow Assumptions 2013 Summer Peak Base Case		
Path	**MW**	**Direction**
Path 66 (California Oregon Intertie)	4,800	North to South
Path 15	486	North to South
Path 26	4,000	North to South
Path 65 (Pacific DC Intertie)	3,100	North to South
Note: MW = megawatt		

The CEC-certified generation projects (pending construction) were modeled and were included in the Updated System Impact Study (SIS) Report submitted on February 12, 2009 (Updated SIS Report). As directed by CEC Staff (Staff), the power flow case used in this analysis assumes that the full output of all licensed generators located in the Bay Area are available, with the exception of the Pacific Gas & Electric Company (PG&E) Tesla Plant, which was modeled at 578 megawatts (MW) (Phase I). Based on discussions with Staff prior to commencement of modeling, the power flow case used in the analysis does not model California Independent System Operator (CAISO) queue generation projects. A table listing the projects included in the modeling can be found in Appendix 2, Notable Generator Projects Modeled in Study (see page 17 in the Updated SIS Report) and is reproduced below as Table 66-2. Additional details regarding the entire PG&E generation pattern can also be found in Appendix 3, Detailed PG&E (Area 30) Power Flow Case Generation Information (see pages 18 through 23 in the Updated SIS Report).

Table 66-2 Notable Generation Projects	
Notable Generation Projects Modeled in Study	**MW**
Gateway Power Plant	530
Los Esteros Critical Energy Facility Phase II (Combined-Cycle interconnected to 230 kV by two step-up transformer banks)	140
Russell City Energy Center	600
PG&E Tesla Generation (Phase I)	578
Notable Generation Projects <u>Not</u> Modeled in Study	
CCSF Peakers (Instead all existing generation at Potrero was modeled at full-output on-line)	
CAISO Queue Generation Projects	
Notes: CCSF = City and County of San Francisco kV = kilovolt MW = megawatt PG&E = Pacific Gas & Electric Company	

The total assumed 2013 summer peak PG&E system load (or PG&E Area 30) modeled in the base case is shown on Table 66-3.

Table 66-3
PG&E Area 30 Load

Load Modeled in Study	MW
PG&E Area 30 Load	28,916

Note:
MW = megawatt

BACKGROUND

In the updated SIS the reactive power deficiency analysis was incomplete and the post-transient voltage analysis was not performed. The transient stability analysis report does not include necessary information for staff's analysis as follows:

DATA REQUEST

67. For each analysis performed (power flow overloading and voltage criteria, short circuit, reactive power deficiency, post-transient voltage analysis), identify the reliability planning criteria used to determine reliable criteria violations.

RESPONSE

The reliability planning criteria used to determine reliability criteria violations for each analysis performed are summarized below.

Steady State Power Flow Analysis

General Criteria for Identifying Overloads. The steady state power flow analysis conducted for the WPGS considered the magnitude and number of both normal and emergency overloads to determine the potential impacts to overall transmission grid performance. The CAISO Controlled Grid Planning Standards, which incorporate the Western Electricity Coordinating Council (WECC) System Performance Criteria and the North American Electric Reliability Corporation (NERC) Standards, were used to evaluate the impact of the project on the CAISO Controlled Grid.

Steady State – Normal Overloads. Normal overloads are those that exceed 100 percent of normal ratings. It should be noted that normal ratings are used when analyzing the transmission grid with all lines in service under N-0 conditions or rather a non-contingency scenario. The CAISO Controlled Grid Planning Standards require the loading of all transmission system facilities to be within their normal ratings. The specific criteria used to assess steady state thermal performance are from Table 1, Transmission System Standards – Normal and Emergency Conditions, in the NERC Standard TPL-001-0, System Performance Under Normal (No Contingency) Conditions (Category A).

Emergency Overloads CAISO Category B and C Classifications. Emergency overloads are those that exceed 100 percent of emergency ratings. The emergency ratings are used during single (CAISO Category B) and multiple (CAISO Category C) contingencies. The CAISO Controlled Grid Planning Standards require the loading of all transmission system facilities to be within their emergency ratings under contingency conditions. The specific criteria used to assess steady state thermal performance are from Table 1, Transmission System Standards – Normal and Emergency Conditions, in the NERC Standards TPL-002-0, System Performance Following Loss of a Single Bulk Electric System Element (Category B) and TPL-003-0, System Performance Following Loss of Two or More Bulk Electric System Elements (Category C).

The single (CAISO Category B) and selected multiple (CAISO Category C) contingencies evaluated in this study are listed in Appendix 5 of the Updated SIS Report. These contingencies include the following types of outages:

- CAISO Category B
  - All single generator outages within the Bay Area.

  - All single transmission circuit outages within the Bay Area. This includes 500-kilovolt (kV), 230-kV, 115-kV, and 60-kV circuits.
  - All single transformer outages within the Bay Area.
  - Selected worst case simultaneous combinations of a transmission line and generator (L-1 and G-1).

- CAISO Category C
  - Outages of double-circuit tower lines (115 and 230 kV) within the Bay Area.
  - Outages of worst case scenario bus and bus section outages located in the Bay area.

General Voltage Assessment Methodology. The CAISO methodology was used to detect and classify voltage criteria violations.

A standard power flow model is reviewed under normal and stressed conditions with the addition of the new resource. If the interconnection does not cause bus voltage deviations greater than 5 percent or cause bus voltages to violate applicable voltage criteria (e.g., to be below 0.95 per unit for normal conditions or for Category B contingencies or below 0.90 per unit for Category C contingencies), then the new interconnection resource is deemed to have no negative impact on voltage and reactive margin and the analysis ends without further study.

If the new interconnection resource directly causes a voltage violation (i.e., bus voltage deviations greater than 5 percent or bus voltages less than applicable voltage criteria), then and only then a post-transient analysis is conducted, modeling the same contingency(s) that resulted in the bus voltage violation(s). In addition, reactive margin is monitored at key buses located in and around the area of study to determine potential voltage and reactive margin issues and to determine potential mitigation, if required.

Short Circuit Analysis

Three-phase fault duty studies were performed to determine the impact of adding the WPGS to PG&E's transmission system. Due to a lack of available sequence impedance data, only 3-phase fault duties were calculated before and after the addition of the WPGS. No criteria were applied in this analysis due to the lack of equipment ratings and available short circuit model impedance data (negative and zero sequence). The study assessed whether the addition of the project increased or decreased the 3-phase fault duty at specified buses in and around the Bay Area.

Reactive Power Deficiency Analysis

A reactive power deficiency analysis was performed using the criteria and methodology approved by both the CAISO and WECC. The specific criteria used for the reactive power deficiency analysis was Requirement WRS3 in the WECC System Performance Criteria. This analysis used the standard 5 percent and 2.5 percent tests described in WRS3.

To study the reactive power deficiency for the 2013 base case analysis, one set of power flow cases models Bay Area loads increased by 5 percent while a second set models loads increased by 2.5 percent.

If power flow solutions are obtained for all post-project cases, the addition of the project does not create any reactive margin problems for the transmission system. If a power flow case with scaled load solves for a particular contingency, then there is at least 0 megavolt-ampere reactive (MVAR) of reactive margin at every bus and the case fully meets both the WECC and CAISO reactive margin criteria described in Requirement WRS3 of the WECC System Performance Criteria.

Transient Stability Analysis

A transient stability analysis primarily consists of determining if the system will remain stable following a disturbance. The primary checks performed during this analysis are for transient voltage deviation violations, transient frequency deviation violations, and machine angular stability (the system should not oscillate excessively and generators should remain synchronized with one another). These checks should be performed for credible "emergency" conditions that the system might experience, such as the loss of a single or double circuit line, a transformer, or a combination of these facilities. Transient performance of the transmission system is measured against the WECC System Performance Criteria.

Table 67-1 and Figure 67-1 are excerpted from the WECC System Performance Criteria and comprise the transient stability criteria used in the analysis for WPGS.

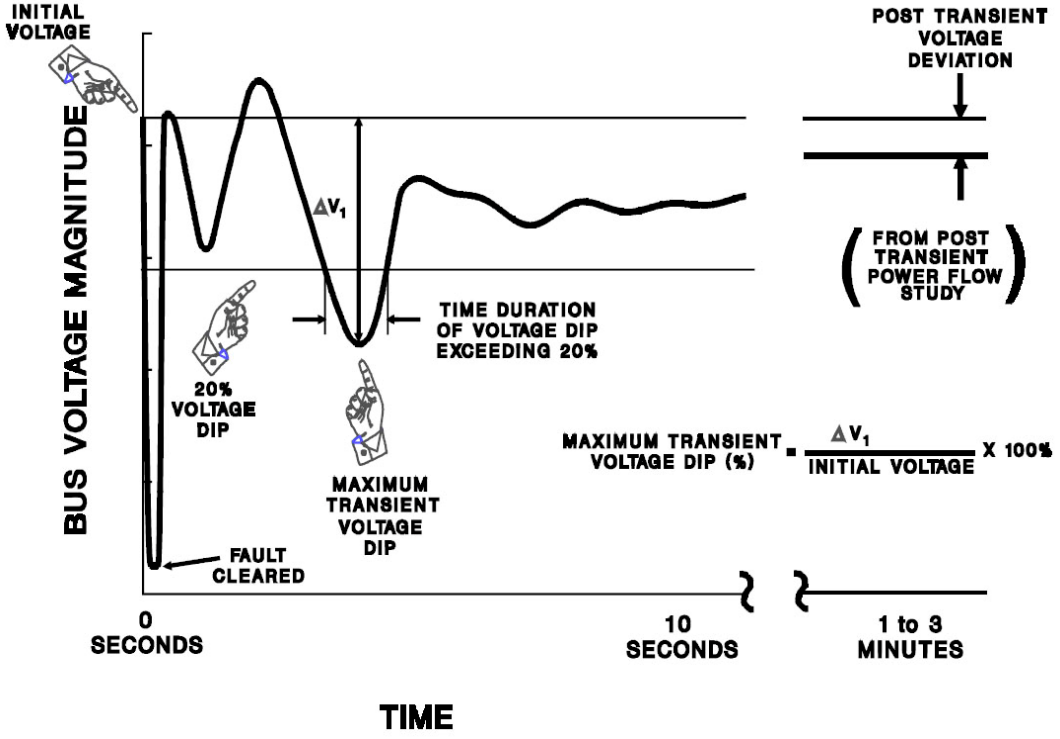
Table 67-1
WECC Disturbance-Performance Table of Allowable Effects on Other Systems

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (outage/year)	Transient Voltage Dip Standard	Minimum Transient Frequency Standard	Post Transient Voltage Deviation Standard[2]
A	Not Applicable	Nothing in addition to NERC		
B	≥ 0.33	Not to exceed 25% at load buses or 30% at non-load buses. Not to exceed 20% for more than 20 cycles at load buses.	Not below 59.6 Hz for 6 cycles or more at a load bus.	Not to exceed 5% at any bus.
C	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed 20% for more than 40 cycles at load buses.	Not below 59.0 Hz for 6 cycles or more at a load bus.	Not to exceed 10% at any bus.
D	<0.033	Nothing in addition to NERC		

Source: This table is from the WECC System Performance Criteria document approved by the Planning Coordination Committee at its March 6-7, 2008 meeting. Approved by the Board of Directors at its meeting of April 16 through 18, 2008.

Notes:
1. The WECC Disturbance-Performance Table applies equally to either a system with all elements in service, or a system with one element removed and the system adjusted.
2. As an example in applying the WECC Disturbance-Performance Table, a Category B disturbance in one system shall not cause a transient voltage dip in another system that is greater than 20% for more than 20 cycles at load buses, or exceed 25% at load buses or 30% at non-load buses at any time other than during the fault.
3. If it can be demonstrated that post transient voltage deviations that are less than the values in the table will result in voltage instability, the system in which the disturbance originated and the affected system(s) should cooperate in mutually resolving the problem.
4. Refer to Figure 67-1 for voltage performance parameters.
5. Load buses include generating unit auxiliary loads.
6. To reach the frequency categories shown in the WECC Disturbance-Performance Table for Category C disturbances, some planned and controlled islanding may occur. Under-frequency load shedding is expected to arrest this frequency decline and assure continued operation within the resulting islands.
7. For simulation test cases, the interconnected transmission system steady state loading conditions prior to a disturbance shall be appropriate to the case. Disturbances shall be simulated at locations on the system that result in maximum stress on other systems. Relay action, fault clearing time, and re-closing practice shall be represented in simulations according to the planning and operation of the actual or planned systems. When simulating post transient conditions, actions are limited to automatic devices and no manual action is to be assumed.

Figure 67-1
NERC/WECC Voltage Performance Parameters



Source: Illustration taken from the WECC System Performance Criteria document approved by the Planning Coordination Committee at its meeting of March 6 and 7, 2008. Approved by the Board of Directors at its meeting of April 16 through 18, 2008.

BACKGROUND

A. Switching files (*.swt) for the contingencies studied showing name of the faulted bus, type of fault, clearing time in cycles of the contingency etc.

B. Dynamic stability plot diagrams are too small and indistinct to be legible. Also the vertical axis scales of voltage, frequency etc., monitored quantities in a plot diagram are not adequately shown, thereby making it too hard to read and distinguish between several monitored quantities in a diagram.

For the new overload identified on the Dumbarton-Newark 115-kV line for category B (L-1 and G-1) contingency, the SIS report indicates that the WPGS is not responsible. But the report did not include any valid reasons.

In the power flow analysis summary results, transmission lines with identified new overloads were listed only. But transmission lines or elements (on which new overloads were identified) with worst pre and post-project contingency (Category B and C) overloads were not listed in the summary results.

All submitted power flow diagrams are not at all clear and legible, this is probably a problem associated with small text and a translation from color to black and white.

DATA REQUEST

68. A partial list of contingencies derived from the list of the contingencies studied in the transient stability analysis (Appendix 10 of the SIS, Attachment A) is attached herewith as <u>Attachment I</u>. For the contingencies listed in Attachment I, please submit the following for <u>post-project</u> transient stability analysis:

A. Copies of switching file (*.swt) for each contingency simulation showing name of the faulted bus, type of fault, clearing time in cycles of the contingency etc.

B. Larger and distinct dynamic plot diagrams with adequately marked legends and vertical axis scales for the monitored quantities (this is only for the contingencies listed in Attachment I). Printing one per page and using symbols instead of colors will make these easier to read.

ATTACHMENT I
PARTIAL LIST OF CONTINGENCIES STUDIED

B-101 N-1 TABLE MT-VACA-DIX 500 kV LINE
B-102 N-1 TABLE MT-TESLA 500 kV LINE
B-103 N-1 VACA-DIX-TESLA 500 kV LINE
B-107 N-1 TESLA-METCALF 500 kV LINE
B-108 N-1 TESLA-LOSBANOS 500 kV LINE

B-132 N-1 CONTRA COSTA – MORAGA 230 kV #1 LINE
B-134 N-1 CONTRA COSTA – BRENTWOOD 230 kV LINE
B-137 N-1 LONETREE – CONTRA COSTA 230 kV LINE
B-139 N-1 PITTSBURG – DEC PITTSBURG #1 230 kV LINE
B-145 N-1 PITTSBURG – EAST SHORE 230 kV LINE
B-146 N-1 PITTSBURG – TESLA C 230 kV #1 LINE

B-148 N-1 PITTSBURG – SAN MATEO 230 kV LINE
B-154 N-1 PITTSBURG – POTRERO D.C. LINE

B-403 T-1 VACA DIXION 500/230 kV #11 XFMR BANK
B-404 T-1 VACA DIXION 500/230 kV #12 XFMR BANK
B-405 T-1 TESLA 500/230 kV #2 XFMR BANK

B-498 G-1 DEC PLANT
B-502 G-1 LMEC PLANT
B-511 G-1 CONTRA COSTA #6
B-513 G-1 PITTSBURG #5
B-515 G-1 PITTSBURG #7

B-996 G-1 WILLOW PASS PLANT

C-111 N-2 COCO – BIRDS LANDING & CONTRA COSTA SUB – BIRDS LANDING 230 kV LINES
C-112 N-2 CONTRA COSTA SUB – COCO & BIRDS LANDING – CONTRA COSTA SUB 230 kV LINES
C-113 N-2 CONTRA COSTA – MORAGA 230 kV #1 & #2 LINES
C-118 N-2 PITTSBURG – SAN MATEO & PITTSBURG – EAST SHORE 230 kV LINES
C-119 N-2 PITTSBURG – TESLA #1 & #2 230 kV LINES
C-210 B-1 CONTRA COSTA SUB 230 kV BUS SECTION 1 OUTAGE
C-211 B-1 CONTRA COSTA SUB 230 kV BUS SECTION 2 OUTAGE
C-219 B-1 PITTSBURG 230 kV BUS SECTION 1 D OUTAGE
C-220 B-1 PITTSBURG 230 kV BUS SECTION 2 D OUTAGE
C-221 B-1 PITTSBURG 230 kV BUS SECTION 1 E OUTAGE
C-222 B-1 PITTSBURG 230 kV BUS SECTION 2 E OUTAGE

RESPONSE

A. Copies of the switching files were submitted to CEC Staff on April 14, 2009.

B. The stability plots were provided for the purpose of reviewing the wave forms of the various parameters being presented. These plots were not intended to be used to determine minimum values or to determine if criteria violations occurred. As part of this analysis, a complete worst case analysis (WCA) was performed on each transient simulation. The WCA checked each bus in the model for voltage and frequency violations. No criteria violations were identified during the WCA analysis. The graphs show that all transient oscillations are damped, typically damping to insignificance within 5 or 10 seconds.

Appendix 10 (Transient Stability Analysis) of the Updated SIS Report was submitted to CEC on March 4, 2009, and included over 630 pages of transient stability graphs. While the plots are small and the scales can be difficult to discern if looking at the paper copies, scalable electronic copies were provided on compact disk (CD) that show the plots in color and can be enlarged on a computer monitor to be legible. During the course of preparing these responses, it was discovered that some portion of the transient stability analysis were inadvertently not included in the copies of Appendix 10 previously submitted to the CEC. Therefore, the complete copy of Appendix 10 will be submitted to the CEC concurrently with these responses. For each contingency, there are 5 or 6 pages (for pre- and post-project, respectively) with six graphs plotted on each

page. Each graph displays six parameter responses. The legend for each graph is shown immediately below the graph. The Y-axis scale for each parameter is different. In the legend, the values in the far left column are the Y-minimum and the values in the far right column are the Y-maximum values. The X-axis for all graphs is the same (0 to 20 seconds).

To assist Staff with its review, Mirant has provided a set of selected graphs from Appendix 10 of the Updated SIS Report, printed in color on large format paper for the contingencies listed in Data Request 68, Attachment I. This set of graphs was provided to the CEC on May 26, 2009.

DATA REQUEST

69. Provide the following analyses for the addition of the proposed WPGS 550-MW power output by using the 2013 summer peak case:

A. Adequate reactive power deficiency analysis with output of pre and post-project MVAR data at a few monitored buses (500 and 230 kV) for a few critical 230 and 500 kV category B and C critical contingencies. Provide the list of contingencies studied.

B. Post-transient voltage analysis with governor power flow with pre and post-project voltages output monitored at a few critical buses (may be 2 to 4 buses) for a few selected critical single and double contingencies (may be the same contingencies as listed in Attachment A). Provide the list of contingencies.

C. Provide the study results of each analysis in a Table format with pre and post-project data. Provide a mitigation plan for any criteria violation.

RESPONSE

A. A thorough reactive deficiency analysis was performed and was submitted to the CEC as Appendix 9 to the Updated SIS Report. The criteria and methodology used for the analysis are described in the response to Data Request 67. A comprehensive set of Category B and C contingencies was modeled with and without the WPGS interconnection; the list of contingencies can be found in Appendix 4 in the Updated SIS Report. A power flow solution was obtained for all cases under study, both with and without the project. Because solutions were found for all post-project cases, the addition of the WPGS does not create any reactive margin problems for the transmission system.

As explained in the response to Data Request 67, if a power flow case with scaled load solves for a particular contingency, there is at least 0 MVAR of reactive margin at every bus; otherwise, the case would not solve. Because the load in all of these cases was scaled to either 5 percent or 2.5 percent beyond the maximum planned load for the study year, all of these cases have sufficient margin and fully meet both the WECC and CAISO reactive margin criteria. As such, it is therefore unnecessary to perform additional reactive margin analysis or to develop Q/V or P/V curves.

Because the reactive deficiency analysis showed no problems in obtaining a solution for any contingency, a full post-transient reactive margin analysis is not justified based on CAISO or WECC policies or laws, ordinances, regulations, and standards.

Table 69-1 summarizes the results of the reactive power deficiency analysis for selected Category B and C contingencies corresponding to those listed in Data Request 68, Attachment I. Results for both pre- and post-project conditions are shown.

B. Based on the results of the power flow contingency analyses and the reactive deficiency analyses already performed, the post-transient voltage analysis is unnecessary for the following reasons:

- The current CAISO policy uses a phased approach in evaluating the effects a new resource interconnection might have on voltage and reactive margin. The WPGS power flow analysis presented in the Updated SIS Report did not reveal

any bus voltage concerns, as indicated by the results of the power flow study (Appendix 6, Detailed Results of 2013 Summer Peak Power Flow Studies) and the reactive deficiency analysis (Appendix 9, Results of Reactive Power Deficiency Analysis), thereby obviating the need for additional voltage analysis under CAISO policy.

- The WPGS adds +396 MVARs of dynamic reactive MVAR boosting capability, while adding -198 MVARs of bucking capability. This additional dynamic reactive capability is significant, and it will ultimately provide the CAISO better control of both peak and off-peak Bay Area voltages.

- A review of per unit voltages, both pre- and post-contingency and both pre- and post-project, was performed while post-processing the power flow results. Detailed information regarding voltages can be found in Appendix 6 of the Updated SIS Report, under the per unit voltage results section. The power flow studies of Category B and C contingencies indicate that the project does not cause any new voltage deviations of 5 percent or more. Furthermore, the addition of the project does not worsen the performance of any pre-project contingencies where the voltage deviation already exceeds 5 percent. Moreover, the addition of the WPGS project does not cause bus voltages to be below 0.95 per unit for Category B outages, nor does the project cause voltages to be below 0.90 per unit for Category C outages. Therefore, these studies show that the addition of the WPGS does not cause any of the relevant CAISO thresholds to be exceeded, thereby obviating the need to perform additional margin tests.

C. Complete study results for all contingencies for both pre- and post-project conditions have been provided in tabular format in Appendix 9 of the Updated SIS Report. No criteria violations were identified in this analysis; therefore, no mitigation plan is required.

Table 69-1
Selected Results from Reactive Power Deficiency Analysis for Willow Pass Generating Station

		Pre-Project Base Case					Post-Project Base Case				
Category B Contingency[1]		**Solution**	**P Swing[3]**	**Bus MISM**	**Mismatch**	**Unit MISM**	**Solution**	**P Swing[3]**	**Bus MISM**	**Mismatch**	**Unit MISM**
G-1	CONTRA COSTA #6	Solved	875.72	C.COSTA	-0.1631	MVAR	Solved	1056.25	C.COSTA	-0.0969	MVAR
G-1	DEC PLANT	Solved	1444.56	BRT360	0.1051	MVAR	Solved	1605.82	SYLMAR2	-0.3135	MW
G-1	LMEC PLANT	Solved	1054.88	LENZIE	0.089	MVAR	Solved	1226.41	CLARK E	0.0861	MVAR
G-1	PITTSBURG #5	Solved	878.21	TORTOLIT	0.1152	MVAR	Solved	1055.44	SYLMAR2	0.2709	MW
G-1	PITTSBURG #7	Solved	1265.49	BRT360	-0.1826	MVAR	Solved	1433.76	SYLMAR1	-0.2748	MW
N-1	C.COSTA – BRENTWOOD 230-kV LINE	Solved	565	ROCKYRH1	0.1149	MVAR	Solved	750.66	LENZIE	0.1011	MVAR
N-1	CONTRA COSTA – MORAGA 230kV #1 LINE	Solved	566.22	TORTOLIT	-0.0944	MVAR	Solved	749.59	MCNRY S2	0.1028	MVAR
N-1	LONETREE – C. COSTA 230-kV LINE	Solved	576.08	SYLMAR1	-0.2705	MW	Solved	761.06	MARYLKTP	-0.0788	MVAR
N-1	PITTSBURG – DEC PITTSBURG #1 230-kV LINE	Solved	562.13	BRT360	-0.0942	MVAR	Solved	746.81	BEAVERCK	-0.0794	MVAR
N-1	PITTSBURG – EAST SHORE 230-kV LINE	Solved	562.53	C.COSTA	0.1162	MVAR	Solved	748.93	OAKDLTID	0.0876	MVAR
N-1	PITTSBURG – POTRERO D.C. LINE	Solved	575.37	CLARK W	0.1032	MVAR	Solved	765.89	MCNRY S2	0.1192	MVAR
N-1	PITTSBURG – SAN MATEO 230-kV LINE	Solved	568.09	MAPLE VL	-0.0843	MVAR	Solved	755.88	C.COSTA	-0.071	MVAR
N-1	PITTSBURG – TESLA C 230kV #1 LINE	Solved	561.8	ANTELOPE	0.1317	MVAR	Solved	748.34	SYLMAR2	-0.3121	MW
N-1	TABLE MT-TESLA 500-kV LINE	Solved	631.59	BENFRNCH	-0.084	MVAR	Solved	817.74	BOUNDARY	-0.1153	MVAR
N-1	TABLE MT-VACA-DIX 500-kV LINE	Solved	644.66	SYLMAR2	0.318	MW	Solved	827.06	BIG EDDY	0.1207	MVAR
N-1	TESLA-LOS BANOS 500-kV LINE	Solved	564.67	MCKENZIN	0.1066	MVAR	Solved	753.06	HASSYAMP	-0.0951	MVAR
N-1	TESLA-METCALF 500-kV LINE	Solved	597.01	MAPLE VL	0.1362	MVAR	Solved	785.3	RVGTSO#	-0.0891	MVAR
N-1	VACA-DIX-TESLA 500-kV LINE	Solved	644.68	MAPLE VL	-0.1008	MVAR	Solved	829.44	SYLMAR2	0.3239	MW
T-1	TESLA 500/230kV #2 XFMR BANK	Solved	569.49	ROCKYRH2	0.1032	MVAR	Solved	753.55	SYLMAR2	0.3135	MW
T-1	VACA DIXION 500/230kV #11 XFMR BANK	Solved	559.54	MCNRY S2	-0.1531	MVAR	Solved	744.32	SYLMAR1	-0.2722	MW
T-1	VACA DIXION 500/230kV #12 XFMR BANK	Solved	559.49	C.COSTA	-0.1376	MVAR	Solved	744.25	RIVRGT A	0.1142	MVAR
Category C Contingency[2]											
B-1	CONTRA COSTA SUB 230-kV LUS SECTION 1 OUTAGE	Solved	271.55	MAPLE VL	-0.1289	MVAR	Solved	460.29	BOUNDARY	-0.1007	MVAR
B-1	CONTRA COSTA SUB 230-kV LUS SECTION 2 OUTAGE	Solved	257.75	MAPLE VL	-0.1121	MVAR	Solved	447.43	SYLMAR1	0.2805	MW
B-1	PITSBURG 230-kV LUS SECTION 1 D OUTAGE	Solved	336.18	SYLMAR2	0.3167	MW	Solved	529	MCNRY S2	0.0899	MVAR

Table 69-1
Selected Results from Reactive Power Deficiency Analysis for Willow Pass Generating Station

		Pre-Project Base Case					Post-Project Base Case				
Category C Contingency[2]		**Solution**	**P Swing[3]**	**Bus MISM**	**Mismatch**	**Unit MISM**	**Solution**	**P Swing[3]**	**Bus MISM**	**Mismatch**	**Unit MISM**
B-1	PITSBURG 230-kV LUS SECTION 1 E OUTAGE	Solved	1004.29	ROCKYRH2	-0.0977	MVAR	Solved	1179.65	OAKDLTID	0.1	MVAR
B-1	PITSBURG 230-kV LUS SECTION 2 D OUTAGE	Solved	334.38	CLARK E	0.0879	MVAR	Solved	526.03	SYLMAR1	0.277	MW
B-1	PITSBURG 230-kV LUS SECTION 2 E OUTAGE	Solved	949.53	LENZIE	-0.1362	MVAR	Solved	1128.34	MCNRY S2	-0.1109	MVAR
N-2	C.COSTA – MORAGA 230kV #1 & #2 LINES	Solved	274.05	COULEES2	0.0904	MVAR	Solved	459.09	TROJAN	-0.0805	MVAR
N-2	COCO – BIRDS LANDING – CONTRA COSTA SUB – BIRDS LANDING 230-kV LINES	Solved	343.54	SYLMAR2	-0.3195	MW	Solved	530.89	CELILO2	0.0897	MVAR
N-2	CONTRA COSTA SUB – COCO&BIRDS LANDING – CONTRA COSTA SUB 230-kV LINES	Solved	201.84	MAPLE VL	-0.1262	MVAR	Solved	391.51	BOUNDARY	-0.1233	MW
N-2	PITTSBURG – SAN MATEO & PITTSBURG – EAST SHORE 230-kV LINES	Solved	337.63	SYLMAR2	-0.3191	MW	Solved	531.95	BOUNDARY	-0.1032	MVAR
N-2	PITTSBURG – TESLA #1 & #2 230-kV LINES	Solved	328.24	DALREED	0.0953	MVAR	Solved	521.72	RIVRGT A	0.0868	MVAR

Notes:

1. The Category B Contingencies shown on this table are the same as those listed in DR 68, Attachment I. See Appendix 9 in the Updated SIS Report for results of all Category B Contingencies analyzed. For Category B Contingencies, Bay Area case load is scaled up by 5 percent.
2. The Category C Contingencies shown on this table are the same as those listed in DR 68, Attachment I. See Appendix 9 in the Updated SIS Report for results of all Category C Contingencies analyzed. For Category C Contingencies, Bay Area case load is scaled up by 2.5 percent.
3. P Swing is the actual generation level at the system swing bus, which in this study is Ormond in the SCE Balancing Authority Area.

DATA REQUEST

70. For the new overload identified on the Dumbarton-Newark 115-kV line for category B (L-1 and G-1) contingency, explain the conclusion, "This is an existing problem and is unrelated to the addition of the WPGS project". Provide any identified pre-project overload on this line exacerbated for the addition of the WPGS. Otherwise provide a mitigation plan for the overload.

RESPONSE

As explained in Mirant Willow Pass's notification to the California Energy Commission (CEC) submitted on May 18, 2009, additional time is needed to complete the response to Data Request 70. This data request asks for specific information regarding an existing transmission line owned by PG&E. Mirant Willow Pass's third party transmission consultant has contacted PG&E to request this information and PG&E has verbally agreed to provide it. Once PG&E provides the necessary information, the consultant will need some time to assemble it, analyze it, and prepare a response. Assuming that PG&E provides the necessary information by the end of May, Mirant Willow Pass should be able to submit its response to Data Request 70 by the middle of June. This date could be extended if PG&E does not provide the information on time and Mirant Willow Pass will inform Staff accordingly.

DATA REQUEST

71. Provide a table in the summary results showing a few worst contingency pre and post-project overloaded transmission elements, on which new post-project overloads (without any pre-project overloads) were also identified for other contingencies in the SIS summer results. List the overloaded element, its emergency ampere rating as well as the contingencies (Category B and C), and pre and post-project loadings.

RESPONSE

The tables requested are shown below. These tables list the outage description (contingencies), overloaded transmission element, transmission equipment emergency rating (in ampere (amps) for transmission lines and megavolt-ampere (MVA) for transformers) along with the pre- and post-project loadings. The worst-contingency driving the Category B overloads is listed in Tables 71-1 and the worst-case contingency driving the Category C overloads is listed in Table 71-2.

Table 71-1
Summary Results, Category B

Outage Description	Overloaded Element	Pre E Pct	Post E Pct	E Delta	E Rate	Unit	Element Type
G-1 Potrero 3 and N-1 East Shore – San Mateo 230-kV Line	Dumbarton-Newark D 115-kV Line	91.1	100.3	9.3	1,541	Amps	Line

Table 71-2
Summary Results, Category C

Outage Description	Overloaded Element	Pre E Pct	Post E Pct	E Delta	E Rate	Unit	Element Type
B-1 Sobrante 115-kV Bus Section 1 Outage	Alamtp1-Martinez D 115-kV Line	92.0	102.8	10.8	487	Amps	Line
N-2 Pittsburg – San Mateo and East Shore – San Mateo 230-kV Lines	Dumbarton-Newark D 115-kV Line	98.1	108.6	10.5	1,541	Amps	Line
B-1 Pittsburg 115-kV Bus Section 2 Outage	Kirktap1-Pittsburg 115-kV #3 Line	98.1	101.8	3.7	2,000	Amps	Line

DATA REQUEST

72. Since the submitted power flow diagrams are not legible, provide clear and legible power flow diagrams (units in MW, percentage loading and per unit voltage) for the following, these should be 11 × 17 and in color:

A. Diagrams for the pre and post-project 2013 summer peak study base cases.

B. Pre and post-project diagrams for all identified new overloads (not pre-project) or voltage criteria violations under normal system (N-0) or Category B and C contingency conditions.

C. Diagrams for a few identified pre and post-project worst overloads exacerbated by the addition of the WPGS (submit worst ones only as requested in Item 5 above).

D. The MW flows, percentage loadings and bus voltages along with the bus names must be clearly legible.

RESPONSE

In an effort to conserve paper, all of the 2,039 diagrams in Appendix 8 of the Updated SIS Report were provided in a scalable, color, electronic format to the CEC on CD in February 2009. However, a set of selected diagrams from Appendix 8 were printed in color on large-format paper as requested and were provided to Staff on May 26, 2009.

Technical Area: Waste Management
Author: Alvin Greenberg, Ph.D.

BACKGROUND

A Phase I Environmental Site Assessment (ESA) has been performed for the Willow Pass site. AFC pgs 7.13-1, -2 and -3 state that nine areas of the site contain Recognized Environmental Conditions (RECs). A Phase II ESA was conducted in 1998 by Fluor Daniel and showed that volatile organic chemicals, including 1,1,1-TCA and TCE, exist in soil and groundwater. Upon review of this data, both Energy Commission staff and DTSC agree that the presence of these VOCs warrant the collection and analysis of soil vapor samples. Furthermore, the 1998 Health Risk Assessment (HRA) is out-dated and inaccurate and cannot be used as a basis for determining site cleanup strategies, goals, or impacts to on-site receptors. Staff needs the results of soil vapor sampling and a revised HRA in order to properly assess the impacts on worker health posed by hazardous wastes present on this site.

DATA REQUEST

73. Please provide the results of soil vapor sampling at the site. Follow all DTSC guidance when collecting and analyzing samples and submit a workplan to the CEC prior to commencing sampling.

74. Please provide a revised HRA that includes the following:

- ***A. all COCs found on the WPGS above the Method Detection Limit unless present in <5% of the WPGS site samples analyzed;***
- ***B. use the UCL as suggested by the U.S. EPA ProUCL program as the exposure point concentration for each COC;***
- ***C. all appropriate exposure pathways;***
- ***D. only soil, groundwater, and soil gas data obtained from locations on the WPGS site itself; and***
- ***E. risks and hazards posed to the following receptors:***
  - ***the trenching and excavation worker during construction,***
  - ***other construction workers,***
  - ***the off-site public during construction,***
  - ***the on-site worker during operations,***
  - ***the off-site worker during operations, and***
  - ***the off-site public during operations.***

BACKGROUND

The Phase II ESA shows there is a plume of VOC contaminated groundwater that extends within approximately 650 feet of Suisun Bay. The groundwater in this area moves north towards the Bay and is influenced by tidal action in Suisun Bay.

DATA REQUEST

75. Please provide an Ecological Risk Screening Assessment using site-specific groundwater concentrations compared to SFBRWQCB ESLs (May 2008 Table F-1b. Groundwater Screening Levels: groundwater is not a current or potential drinking water resource).

RESPONSE TO DATA REQUESTS 73 THROUGH 75

As explained in Mirant Willow Pass's notification to the California Energy Commission (CEC) submitted on May 18, 2009, additional time is needed to complete the response to Data Requests 73 through 75. Preparing responses to Data Requests 73 through 75 requires the revision of the Human Health Risk Assessment (HHRA) that was prepared for the site in 1998 and the preparation of an Ecological Risk Screening Assessment (ERSA). To prepare the revised HHRA, Mirant Willow Pass must collect soil gas samples at the site and Staff has asked to review a workplan for this sampling before the work begins.. Additionally, an analysis will be performed to identify whether additional soil and groundwater sampling is necessary to address data needs for the HHRA and ERSA. This work is currently in progress, but due to the scope and complexity of the task and the request for staff review of the sampling workplan, it is not possible to submit responses by the 30-day deadline. Based on current projections, Mirant Willow Pass expects to submit a sampling workplan for Staff review by the beginning of June. Soil gas sampling as well as data analyses and verification will then be conducted in June and July. The HHRA and ERSA will be finalized and submitted as soon as possible following evaluation of the results.

APPENDIX A

DRAFT DESCP

Draft Drainage, Erosion, and Sedimentation Control Plan for the Willow Pass Generating Station Project

Prepared for

Mirant Willow Pass, LLC

May 2009

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

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Appendix

A Preliminary Drainage Calculations

Willow Pass Generating Station Project Drainage, Erosion, and Sedimentation Control Plan

Mirant Willow Pass, LLC (Mirant Willow Pass) is planning to develop and construct the Willow Pass Generating Station (WPGS) project. The WPGS will be a natural-gas–fired electric generating facility, with ancillary systems, rated at a nominal 550-megawatt (MW) and located at the site of the existing Pittsburg Power Plant (PPP) facility owned and operated by Mirant Delta, LLC (Mirant Delta) in California. The WPGS comprises the new WPGS facility and related linear facilities, including potable and makeup water lines, a wastewater discharge line, electric transmission line and a natural gas line. Plant process water and wastewater will be supplied and discharged via two new pipelines, approximately 5 miles in length, connecting the WPGS to the Delta Diablo Sanitation District Wastewater Treatment Plant (DDSD WTP). The WPGS will be constructed, owned, and operated by Mirant Willow Pass and will be an independent, stand-alone facility from the PPP.

Mirant Willow Pass has prepared this Drainage, Erosion and Sedimentation Control Plan (DESCP) for the WPGS project to demonstrate that construction activities associated with the project will not result in an increase in off-site flooding potential or sedimentation and that the project will meet all local, state, and federal regulatory requirements associated with the protection of water quality and soil resources. The DESCP includes the following elements:

- Vicinity Map: A site location map (Figure 1) and a vicinity map (Figure 2) showing the location of all project elements with depictions of all significant geographic features including swales, creeks, and sensitive areas
- Site Delineation: A site delineation (Figures 2 and 4) that includes the boundary lines of all construction areas and the location of existing and proposed structures, pipelines, roads, and drainage facilities
- Watercourses and Critical Areas: Figures 2 and 3 show the location of all nearby watercourses including swales, creeks, drainage ditches and other important surface water bodies
- Drainage Map: Topographic site maps (Figures 5, 6, 7 and 8) showing water courses, critical areas, and existing/proposed drainage systems
- Drainage Narrative: A description of the drainage measures to be taken to protect the site and downstream facilities, including site-specific Best Management Practices (BMPs) (Figure 9) to be implemented during construction, as well as a schedule of the timing and implementation of erosion and sediment control measures. This will include erosion control drawings and erosion and sedimentation control notes.

- Clearing and Grading Plans: A delineation of all areas to be cleared and areas to be preserved (Figure 7). Specific details of vegetation clearance and soil excavation and grading associated with the water supply and discharge pipelines will be developed as project design is advanced prior to construction.
- Clearing and Grading Narrative: An illustration of existing topography (Figure 5) and identification of the quantities of material excavated or filled for the site (Figure 7) and all project elements, including those materials removed from the site.
- Best Management Practices Plan: A figure showing the location of the BMPs to be implemented during project construction (Figure 9).
- Best Management Practices Narrative: A description of the location , timing, and maintenance schedule for the proposed BMPs.

A. Vicinity Map

Figures 1 and 2 show the project location in relation to the surrounding area. The WPGS site is located on Township 2 North, Range 1 East, on the U.S. Geological Survey Honker Bay Topographic Quadrangle Map. The WPGS site is located in the City of Pittsburg, within Contra Costa County, California. The WPGS will be situated within the existing PPP site directly south of Suisun Bay . The WPGS site will be located on a separate legal parcel to be created by adjusting the lot lines of two existing legal parcels at the PPP site, both of which are identified as Assessor's Parcel Number 085-010-014. Significant geographic features including water features and other sensitive areas are shown on Figures 2 and 3. Detailed vicinity maps indicating the location of all project elements at a 1"=100' scale will be provided in the final DESCP.

B Site Delineation

Figure 4 shows a site plan of the WPGS project site. Construction access to the site will be via the main PPP site entrance off West 10th Street. Construction will require construction staff vehicle and delivery truck access to the site. Construction materials such as concrete, pipe, wire and cable, fuels, reinforcing steel, and small tools and consumables will be delivered to the WPGS site by truck.

As part of the WPGS project, two new 5-mile-long parallel water pipelines will need to be constructed between the WPGS site and the DDSD WTP (Figure 2). One pipeline will be used to supply recycled water from DDSD to the WPGS, and one pipeline will be used to return wastewater from the WPGS to the DDSD WTP. The new water pipelines will be underground, except at the intersection of Harbor Street, where the pipeline will cross overhead adjacent to the railroad tracks. These water pipelines will connect directly to existing facilities at the DDSD WTP. As discussed further in Section C, construction of the pipelines will require eight crossings of either Kirker Creek, drainage channels, and/or the Union Pacific Railroad.

The WPGS site will be approximately 26 acres. Approximately 21.5 acres (within the PPP and adjacent Pacific Gas and Electric Company (PG&E) switchyard property) will be used

for construction laydown, offices, and parking for the WPGS project. There will be three separate areas, as shown on Figure 4 and listed below:

1. An 11.2-acre area southwest of the WPGS, partially located on the PPP site and partially located on the PG&E switchyard property;
2. A 6.8-acre area located along the eastern boundary of the PPP site. This area will be used primarily for parking and offices, and possibly some equipment laydown;
3. A 3.5-acre area located north of the WPGS site. The existing unused surface impoundment in this area will be demolished as part of the project.

The project also includes several components that will be located outside the WPGS site but within the PPP site and the adjacent PG&E switchyard property. These include a new natural gas line, new transmission lines and new hazardous waste/materials buildings, shown on Figure 4.

Demolition and construction of the WPGS is expected to take approximately 34 months. Construction is estimated to begin in the fourth quarter of 2009. Commercial operation is expected in July 2012.

Soil types at the WPGS site described below are based on information gathered from the USDA Natural Resources Conservation Service (NRCS) online mapping service, Web Soil Survey 2.0 (USDA NRCS 2007).

WPGS Project Site

Cc - Clear Lake Clay. The Clear Lake Clay soil component is found on basin floors with slopes of 0 to 2 percent. The parent material consists of alluvium. The natural drainage class is poorly drained, and water movement in the most restrictive layer is moderately low. Clear Lake Clay is occasionally flooded but is not ponded, and there is no zone of water saturation within a depth of 72 inches. Its shrink-swell potential is high.

Water Pipeline Alignment

Soil components found along the water pipeline alignment from the WPGS site to the DDSD WTP include Clear Lake Clay (described above), Omni Salty Clay, Capay Clay, Rincon Clay Loam, and Brentwood Clay Loam.

CaA and CaC - Capay Clay. Two components of Capay Clay are found along the water pipeline alignment depending on slope (slopes of 0 to 2 percent or 2 to 9 percent). The parent material of both map units consists of alluvium derived from sedimentary rock. The natural drainage class is moderately well drained, and water movement in the most restrictive layer is moderately low. Capay Clay is not flooded and is not ponded, and its shrink-swell potential is high.

Ob - Omni Salty Clay. The Omni Salty Clay component is found on flood plains with slopes of 0 to 2 percent. The parent material consists of alluvium derived from sedimentary rock. The natural drainage class is poorly drained, and water movement in the most restrictive layer is moderately low. Omni Salty Clay is occasionally ponded; however, it is rarely flooded. Its shrink-swell potential is high.

RbC and RbD - Rincon Clay Loam. Two components of Rincon Clay Loam are found along the water pipeline alignment depending on slope (slopes of 2 to 9 percent or of 9 to 15

percent). The parent material of both map units consists of alluvium derived from sedimentary rock. The natural drainage class is well drained, and water movement in the most restrictive layer is moderately low. Rincon Clay Loam is not flooded and is not ponded, and its shrink-swell potential is moderate.

Bb - Brentwood Clay Loam. The Brentwood Clay Loam component is found on valley floors with slopes of 0 to 2 percent. The parent material consists of alluvium derived from sedimentary rock. The natural drainage class is well drained, and water movement in the most restrictive layer is moderately high. Brentwood Clay Loam is not flooded and is not ponded. Its shrink-swell potential is high.

Construction Laydown/Parking Areas

The proposed construction laydown and parking areas are covered by Clear Lake Clay and Omni Salty Clay soil components (both described above).

C. Watercourses and Critical Areas

The WPGS project site is approximately 2 miles west from the center of the City of Pittsburg in Contra Costa County (Figure 2) at an elevation of approximately 7 to 9 feet (above mean-sea-level; Figure 5). Average annual precipitation is approximately 13 inches, with more than 80 percent occurring between November and March. Based on the National Oceanic and Atmospheric Administration Atlas 2 (NOAA 1973), the 25-year, 24-hour, and the 100-year, 24-hour rainfall amounts for the project site are approximately 3.25 inches and 3.7 inches, respectively. The WPGS project site is situated along the southern shore of Suisun Bay just downstream of New York Slough and south of Chipps Island (Figure 2). Suisun Bay is part of the San Francisco Bay and the San Joaquin-Sacramento River Delta Estuary. Fresh water from the rivers and numerous smaller tributaries flows out through Suisun Bay to the Pacific Ocean. Suisun Bay is a shallow basin consisting of braided channels and shallow shoals.

WPGS Project Site

Suisun Bay is the only natural perennial surface water feature within 1 mile of the site. Willow Creek is located approximately 1,000 feet west of the western border of the 26-acre WPGS site (Figure 3). No surface water bodies are present on the WPGS site, although there is an unused surface impoundment at the northeast corner of the WPGS site, which will remain in place.

WPGS Vicinity

Within the PPP site, there is a cooling water canal located within the PPP, west of the WPGS site. There is also a large retention basin classified as a seasonally flooded, palustrine wetland (Figure 3). Just outside of and adjacent to the southeastern boundary of the PPP site lies a drainage channel that supports marsh vegetation (Figure 3).

Water Pipelines Alignment

The water pipelines alignment runs through the PPP site, crosses under Willow Pass Road/ West 10th Street and Burlington Northern Santa Fe Railroad, then turns east and runs adjacent

to the Union Pacific Railroad. The alignment crosses beneath railroad tracks in several locations. The east section of the water pipelines alignment crosses under Pittsburg-Antioch Highway, runs along the north side of the Highway, and continues north on Arcy Lane to the DDSD WTP.

South of the developed portion of the PPP site, within a railroad switchyard, the route crosses a constructed drainage ditch (Figure 3) that may be a jurisdictional wetland, depending on the vegetation it supports. Farther east of the railroad switchyard, the water pipelines alignment route crosses Kirker Creek, a seasonal stream that drains into New York Slough north of the water pipelines alignment. Within the local study area, Kirker Creek is a highly altered stream. Immediately south of the water pipelines alignment and approximately 2,500 feet west of Loveridge Road, the stream was recently modified and connected to a flood control retention basin (see Figure 3). Adjacent to the retention basin, the creek enters a long subterranean culvert and then emerges into the recently modified, open channel that carries it underneath the Union Pacific railroad tracks, to the location where the pipeline alignment crosses the creek. As the stream flows north, it enters a culvert under the Pittsburg-Antioch Highway. The channel then turns sharply to the east (Figure 3) and follows a deep, steep-banked trapezoidal channel along the north side of the Pittsburg-Antioch Highway to Arcy Lane. The creek now flows into New York Slough through the Los Medanos Wasteway, and at high flows Kirker Creek also drains into New York Slough via Dowest Slough.

The flood control retention basin associated with Kirker Creek, described above, likely contains some wetland vegetation and potential jurisdictional wetlands, just south of the water pipelines alignment and east of the creek (see "flood control retention basin" on Figure 3). The route also crosses an unnamed tributary of Kirker Creek, approximately 0.3 mile east of the flood control retention basin.

Further east, the water pipeline alignment runs adjacent to the south side of Kirker Creek. Although channelized, this section of Kirker Creek contains potential jurisdictional wetlands and waters of the United States. Kirker Creek is culverted under Arcy Lane immediately before its confluence with the Los Medanos Wasteway, which drains north to New York Slough. The water pipeline alignment route turns north toward the DDSD WTP at Arcy Lane, in the vicinity of these potential jurisdictional wetlands. At high flows, Kirker Creek also spills into Dowest Slough, a seasonal wetland located north of the Pittsburg-Antioch Highway and approximately 2,000 feet west of Arcy Lane.

The area south of the Pittsburg-Antioch Highway, west of where Arcy Lane meets the highway, contains at least two seasonal wetlands, one of which is a natural vernal pool.

The two 5-mile-long water pipelines will be constructed underground, with one overground crossing at Harbor Drive. Construction of the pipelines will require eight crossings of either drainage channels, creeks, and/or the Union-Pacific Railroad. Three of these crossings will require Streambed Alteration Agreements (SAAs) from the California Department of Fish and Game. These comprise one crossing of Kirker Creek (Creek Crossing 1), one crossing of an unnamed tributary of Kirker Creek (Creek Crossing 2), and one crossing of a drainage channel located in the rail switchyard (Drainage Channel Crossing 2; Figure 3). Potential wetlands occur in the vicinity of Drainage Channel Crossing 2. Although direct impacts to wetlands at this location will be avoided, indirect impacts could occur at this creek crossing if construction causes sediment or construction debris to enter the drainage channel. Because potential wetlands will be avoided, they have not been formally delineated. However, boundaries of

these potential wetlands were easily identified during reconnaissance-level surveys because the potential wetlands occur within defined channels (URS 2008). Details of proposed construction methods at these locations are provided in Section G.

The remaining five crossings, Creek Crossing 3 located at the intersection of the Pittsburg-Antioch Highway and Arcy Lane; Drainage Channel 1 located immediately south of the PPP site; and three crossings of the Union-Pacific Railroad, will not require SAAs. Details of proposed construction methods at these locations are provided in Section G.

D. Drainage Map

Figure 5 is the topographic map of the existing site. Figure 6 shows the existing site drainage and Figure 7 shows the site grading and drainage plan for the WPGS project.

E. Drainage Narrative

Approximately 23 acres of the 26-acre WPGS project site will be graded. In addition, approximately 3 acres on the PPP site will be graded for temporary construction laydown and parking. The existing retired power generation units, an administration building, one unused fuel oil storage tank, temporary buildings, an unused surface impoundment, and other ancillary facilities will be replaced with structures, pavement, or gravel as part of the WPGS project.

Currently, the amount of impervious area is 95 percent of the WPGS project site and after project construction approximately 50 percent of the site will be impervious surface. While the amount of impervious area will be reduced, the soil will be compacted to support the proposed facility, which will reduce the amount of infiltration that will occur during rain events. Overall, there will be no increase in impervious area or runoff due to the project.

Areas of the WPGS project site with the potential for stormwater contamination will be curbed, and runoff from these areas will be contained and then conveyed to a new oil-water separator (OWS) ultimately discharging to the wastewater discharge system to the DDSD WTP. Stormwater runoff from the remaining portions of the project site will be collected by the existing surface drainage system (ditches, swales, catch basins, and pipes) and then discharged to Suisun Bay via Outfall 001 or Outfall 009 (runoff from portions of the site, e.g., parking areas, will be routed through the PPP's existing OWS prior to discharge to the bay).

The stormwater management system will be designed in accordance with the EPA's guidance document entitled "Storm Water Management for Construction Activities—Developing Pollution Prevention Plans And Best Management Practices" (EPA 832-R-92-005, September 1992), the California Storm Water Best Management Practices Handbook, and the National Pollution Discharge Elimination System Industrial General Permit Requirements.

Preliminary drainage calculations have been prepared and are included as Appendix A. These preliminary calculations consider a tributary drainage area of 42.3 acres of which approximately 26 acres will be disturbed during project construction (CH2M HILL 2008). A summary of the preliminary drainage calculations is presented in Table 1. Figure 8 identifies the drainage subareas used in the preliminary drainage calculations.

TABLE 1
Summary of Preliminary Drainage Calculations

Total tributary area	Approximately 42.3 acres
Peak total flow for 25-year, 24-hour storm	27 cubic feet per second
Construction site area	Approximately 26 acres
Percentage impervious area before construction	95%
Percentage impervious area after construction	50%

Source: CH2M HILL 2008

F. Clearing and Grading Plans

Figure 7 shows the site grading plan for the WPGS site. Plans depicting specific details of soil excavation and grading associated with the water supply and discharge pipelines will be developed as project design is advanced prior to construction.

G. Clearing and Grading Narrative

The information provided in this section is preliminary and will be updated and expanded as project design is advanced prior to the start of construction for the WPGS project.

The project site will require earthwork to construct the WPGS and associated facilities. Soil disturbing activities will include grubbing and clearing, demolition, grading, excavating, filling, and final grading. For all areas where earthwork will be executed, materials suitable for compaction will be stockpiled in designated onsite locations. Materials not suitable for compaction will be stored in separate stockpiles and reused on the site, as appropriate. Any contaminated materials encountered during excavation will be disposed of in accordance with applicable laws, ordinances, regulations, and standards. Only licensed, commercial fill will be used for the project. Table 2 outlines the amount of cut and fill planned for the WPGS project site (excluding the water supply and discharge pipelines). Construction of the water pipelines will not result in a change in surface elevations and disturbed areas will be returned to pre-construction conditions.

TABLE 2
Clearing and Grading

Description	Total Cut (yd^3)	Total Fill (yd^3)	Net (Import) (yd^3)
WPGS project site (excluding water supply and discharge pipelines)	8,305	83,828	75,523

yd^3 = cubic yards

The following paragraphs provide a discussion of construction activities associated with the project.

WPGS Project Site

Several existing structures on the WPGS project site will be demolished as part of the project, including retired Units 1 through 4, an unused surface impoundment situated west of Tank 1, the administration building and unused #6 fuel oil storage Tank 7, as well as replacement of the existing hazardous materials and hazardous waste buildings. The unused surface impoundment on the far north end of the WPGS site (adjacent to Suisun Bay) and existing Tanks 1 through 6 (and associated containment areas around these tanks) will not be demolished and will be left in place.

Demolition site preparation work will include site grading and stormwater control. Crushed rock will be used for temporary roads, laydown, and work areas that are not currently paved.

Water Pipelines Alignment

The construction of the water supply and discharge pipelines will require a construction disturbance corridor, including laydown and staging, of a maximum width of 15 feet. This may be reduced to a minimum of 5 feet to avoid environmental resources or minimize traffic disruption during construction adjacent to the Pittsburg-Antioch Highway. The pipelines will be laid at an average depth of 5 feet. The water pipelines will be constructed primarily using a cut and cover trenching method, except where the pipelines cross environmentally sensitive areas, such as creeks, or cross under existing railroad tracks.

Where the pipeline alignment crosses such sensitive areas, appropriate underground pipeline installation methods will be used, including pipe ramming, auger boring, and microtunnelling, in order to avoid all direct impacts to the bed, channel, and banks of the water body and minimize disruption to railroad operations. These construction methods allow a pipeline to be constructed beneath streams, roads, railway tracks, and other obstacles without causing surface disturbance. Where these methods require the excavation of an entrance and exit pit at each end of the boring area, these will be located at least 10 feet from the stream channel to avoid disturbance to the stream bed or banks. Spoils will be reused as fill wherever possible.

Construction Laydown/Parking Areas

Site preparation work will include site grading and stormwater control. Crushed rock will be used for temporary roads, laydown, and work areas that are not currently paved. The construction laydown and parking areas will be graded (as necessary) and surfaced with 4 inches of crushed rock. The crushed rock surfacing will provide erosion protection. The laydown areas will be fenced around their perimeter. Gates will be provided for access control. At the end of construction, these areas will be cleaned up, but the crushed rock surfacing and fencing may remain in place. No additional restoration will be required at the end of construction.

H. Best Management Practices

Figure 9 shows the placement of the BMPs that will be utilized during project construction. Discussed below in the narrative is a list and description of all potential BMPs to be used during the construction of the WPGS, associated project components and water supply and

discharge pipelines. Prior to construction, a construction Stormwater Pollution Prevention Plan (SWPPP) will be prepared. This will include details for all of the BMPs. Updated BMP maps will be included in the SWPPP. As part of the SWPPP, a current set of the BMP drawings will be maintained in the project construction trailer and updated as needed to reflect modified or new BMPs that are being implemented on site.

Plans depicting specific details of BMPS to be utilized during construction of the water supply and discharge pipelines will be developed and provided as project design is advanced prior to construction.

I. Best Management Practices Narrative

The project construction schedule is provided in Table 3. An implementation and maintenance schedule for the drainage, erosion, and sediment control methods and practices that will be implemented at the WPGS project site are included in Table 4. Specific schedule details for the construction of the water supply and discharge pipelines will be developed and provided as project design is advanced prior to construction.

TABLE 3
Key Construction Events

Event Description	Estimated Start Dates
Date of Certification by CEC	TBD
Start of Rainy Season	October 15 (Typical)
End of Rainy Season	May 1 (Typical)
Start of Construction	October, 2009
Site Mobilization	October, 2009
Demolition	October, 2009
Site Preparation and Grading	November, 2009
Foundations	November, 2009
Installation of Components	August, 2010
Completion of Construction	May, 2012
Start of Operation	July, 2012

Source: CH2MHill, 2009

TABLE 4
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
EC-1 Scheduling	Prior to start of construction	Verify that work is progressing in accordance with the schedule.	Amend the schedule when changes are warranted; amend the schedule prior to the rainy season.
EC-2 Preservation of existing vegetation	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Restore damaged protection measures immediately.
EC-4 Hydroseeding	Two weeks prior to construction (avoid use of hydroseeding in areas where the BMP will be incompatible with future earthwork activities and will have to be removed)	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during non-rainy season	Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible; where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates.
Seeding	As soon possible after disturbance has permanently or temporarily ceased	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season (Monitored every May for the first three years following project completion)	Areas that do not meet revegetation criteria will be reseeded.
Permanent revegetation	As soon possible after disturbance has permanently or temporarily ceased	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season (Monitored every May for the first three years following project completion or until the site has been successfully revegetated to 75 percent coverage)	Areas that do not meet revegetation criteria will be reseeded.
EC-6 Straw, wood, organic mulch	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Reapply mulch when bare earth becomes visible.

TABLE 4
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
EC-7 Erosion control blankets (geotextiles)	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace/repair as necessary.
EC-9 Earth dikes/drainage swales & lined ditches	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Inspect and replace lost riprap, damaged linings or soil stabilizers as needed; inspect and remove debris and sediment and repair linings and embankments as needed.
NS-1 Water conservation practices	Prior to start of construction	Daily while non-stormwater discharges are occurring	Repair water equipment as needed to prevent unintended discharges.
NS-3 Paving and grinding operations	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Keep ample supplies of drip pans or absorbent materials onsite; inspect and maintain machinery regularly to minimize leaks and drips.
NS-6 Illicit connection/illegal discharge detection and reporting	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Inspect the site regularly to check for any illegal dumping or discharge; prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
NS-8 Vehicle and equipment cleaning	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Inspect sump regularly and remove liquids and sediment as needed.
NS-9 Vehicle and equipment fueling	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Keep ample supplies of clean up materials onsite; immediately clean up spills and properly dispose of contaminated soil and clean up materials.
NS-10 Vehicle and equipment maintenance	Place prior to the commencement of associated activities; dedicated maintenance area should be located at least 50 feet from downstream drainage facilities and watercourses.	Once a week during rainy season and bi-weekly during dry season	Keep ample supplies of clean up materials onsite; immediately clean up spills and properly dispose of contaminated waste, soil, and clean up materials.

TABLE 4
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
NS-11 Pile driving operations	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Inspect equipment every day at startup and repair equipment as needed (i.e., worn or damaged hoses, fittings, and gaskets); recheck equipment at shift changes or at the end of the day and scheduled repairs as needed.
NS-12 Concrete curing	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds; inspect cure containers and spraying equipment for leaks.
NS-13 Concrete finishing	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Sweep or vacuum up debris from sandblasting at the end of each shift; at the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
NS-14 Material over water	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Ensure that employees and subcontractors implement the appropriate measures for storage and use of materials and equipment; inspect and maintain all associated BMPs and perimeter controls to ensure continuous protection of the water courses.
NS-15 Demolition adjacent to water	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Any debris-catching devices shall be emptied regularly. Collected debris shall be removed and stored away from the watercourse and protected from run-on and runoff.
SE-1 Silt fence	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace torn sections, repair up-rooted sections, clean out collected soils when greater the 1/3 height of fence.

TABLE 4
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
SE-4 Check dams	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace missing or degraded rock, bags, and bales; remove accumulated sediment once the sediment accumulation reaches one-third of the barrier height.
SE-5 Fiber rolls	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace crushed sections, replace rotted sections, clean out collected soil when greater than 1/3 height of roll.
SE-6 Gravelbags	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Repair, reshape, replace bags as necessary, replace bags exposed to sunlight every 2 to 3 months, clean out collected soil when greater than 1/3 height of bag.
SE-7 Street sweeping, vacuuming	Once construction commences	Inspect before and after storm events (and once each 24-hour period during extended storm events), when actively in use, points of ingress and egress must be inspected daily, otherwise once a week	When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily; after sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.
SE-8 Sandbags	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Repair, reshape, replace bags as necessary, replace bags exposed to sunlight every 2 to 3 months, clean out collected soil when greater than 1/3 height of bag.
SE-10 Storm drain inlet protection	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Check fabric or gravel filters for clogs and replace if necessary; remove collected sediment periodically.

TABLE 4
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
TR-1 Stabilized construction entrance/exit	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Inspect local roads adjacent to the site daily, remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment, keep all temporary roadway ditches clear, check for damage and repair as needed, replace gravel material when surface voids are visible, remove all sediment deposited on paved roadways within 24 hours, remove gravel and filter fabric at completion of construction.
TR-2 Stabilized construction roadway	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Keep all temporary roadway ditches clear; periodically apply additional aggregate on gravel roads; active dirt construction roads are commonly watered three or more times per day during the dry season.
TR-3 Entrance/outlet tire wash	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Remove accumulated sediment in wash rack and/or sediment trap to maintain system performance; inspect routinely for damage and repair as needed.
WE-1 Wind erosion control	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Reapplication may be necessary daily or more often to be effective.
WM-1 Material delivery and storage	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Keep ample supplies of clean up materials onsite; keep storage areas clean and well organized; repair or replace perimeter controls or containment structures as needed.
WM-2 Material use	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Periodically spot check employees and subcontractors.
WM-3 Stockpile management	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
WM-4 Spill prevention and control	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Keep ample supplies of clean up materials onsite; update the spill prevention and control plan regularly.

TABLE 4
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
WM-5 Solid waste management	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Collect waste regularly.
WM-6 Hazardous waste management	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Collect hazardous waste regularly; keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored; replace perimeter controls, containment structures, covers, and liners as needed.
WM-8 Concrete waste management	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities; remove and dispose of hardened concrete; washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
WM-9 Sanitary/septic waste management	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Collect waste regularly; secure portable sanitary facilities with spikes or weights during wind events.

The following describes the BMPs that will be implemented as necessary during the pre-construction, construction, and post-construction phases of the project.

Soil Stabilization (Erosion Control)

Soil stabilization, also referred to as erosion control, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in storm water runoff. This project will implement the following practices for effective temporary and final soil stabilization:

- EC-1, Scheduling
- EC-2, Preservation of Existing Vegetation
- EC-6, Straw Mulch (with Tackifier)
- EC-7, Geotextiles, Plastic Covers & Erosion Control Blankets/Mats
- EC-9, Earth Dikes/Drainage Swales & Lined Ditches

Implementation of Soil Stabilization BMPs

- The WPCM will monitor weather using National Weather Service reports to track conditions and alert crews to the onset of rainfall events.
- Disturbed soil areas will be stabilized with temporary soil stabilization or with permanent erosion control as soon as possible after grading or construction is complete.
- During the rainy season, disturbed areas will be stabilized with temporary or permanent soil stabilization (erosion control) before rain events.
- During the rainy season, disturbed areas that are substantially complete will be stabilized with permanent soil stabilization (erosion control) and vegetation (if within seeding window for seed establishment).
- During the rainy season, prior to forecasted storm events, temporary soil stabilization BMPs will be deployed and inspected.
- During the non-rainy season, the project schedule will sequence construction activities with the installation of both soil stabilization and sediment control measures. The construction schedule will be arranged as much as practicable to leave existing vegetation undisturbed until immediately prior to grading.

Sediment Control

Sediment controls are structural measures that are intended to complement and enhance the selected soil stabilization (erosion control) measures and reduce sediment discharges from construction areas. This project will implement the following practices for effective sediment control:

- SE-1, Silt fence
- SE-4, Check dams
- SE-5, Fiber rolls
- SE-7, Street Sweeping and Vacuuming
- SE-8, Sandbag barrier
- SE-10, Storm Drain Inlet Protection

Implementation of Temporary Sediment Controls

- During the rainy season, temporary sediment controls will be implemented at the draining perimeter of disturbed soil areas, at the toe of slopes, at storm drain inlets and at outfall areas at all times.
- During the non-rainy season, temporary sediment controls will be implemented at the draining perimeter of disturbed soil areas and at the storm drain downstream from disturbed areas before rain events.
- During the non-rainy season, in the event of a predicted storm, the following temporary sediment control materials will be maintained on-site: silt fence materials, sandbags for linear barriers, fiber rolls.

Tracking Control

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- SE-7, Street Sweeping and Vacuuming
- TR-1, Stabilized Construction Entrance/Exit

- TR-2, Stabilized Construction Roadway
- TR-3, Entrance/Outlet Tire Wash

Wind Erosion Control

The following BMP has been selected to control dust from the construction site:

- WE-1, Wind Erosion Control

Water Pipelines Alignment

The following BMPs have been selected for construction of the water supply and discharge pipelines:

- Avoid sensitive habitats and species during construction by developing construction exclusion zones and silt fencing in sensitive areas.
  - In general, disturbance to existing grades and vegetation will be limited to the actual site of the water pipeline alignment and 15-foot construction corridor. Where appropriate, this corridor may be reduced to 5 feet to avoid environmental resources and/or minimize traffic disruption. Information about environmentally sensitive areas will be shown on contract plans and discussed in the Special Provisions. Environmentally sensitive area provisions could include, but are not limited to, the use of temporary orange fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, or to delineate and exclude sensitive resources from potential construction impacts.
  - Contractor encroachment into environmentally sensitive areas will be restricted (including the staging/operation of heavy equipment or casting of excavation materials). Provisions for environmentally sensitive areas will be implemented as a first order of work, and will remain in place until all construction activities are complete; this includes any nest sites identified during preconstruction surveys.
  - Placement of all roads, staging areas, and other facilities will avoid disturbance to wetlands and other sensitive areas of habitat, except where unavoidable impacts have been identified and mitigation has been proposed. Existing ingress or egress points will be used. Equipment parking, project access, supply logistics, equipment maintenance, and other project-related activities will occur at a designated staging area.
  - Following completion of the work, the contours of the area will be returned to preconstruction conditions or better.
- Provide worker environmental awareness training for all construction personnel
  - Training will include the identification of any special-status biological resources and measures required to minimize project impacts during construction and operation.
- General avoidance of wetland/stream impacts
  - The launching and receiving pits for stream and drainage channel crossings will be located at least 10 feet back from the stream/drainage channel. No work will be conducted within Kirker Creek.
  - Regional Water Quality Control Board (RWQCB)-approved physical barriers adequate to prevent the flow or discharge of sediment into water systems will be constructed and maintained between working areas and streams, lakes, and wetlands. Erosion control and sediment retention devices (e.g., well-anchored

sandbag cofferdams, straw bales, or silt fences) will be incorporated into the project design and implemented at the time of construction. These devices will be in place during construction activities, and afterwards if necessary, to minimize sediment impacts to the wetlands and input to waters of the United States. These devices will be placed at all locations where sediment input is likely.
  - An emergency response plan will be prepared and submitted to appropriate agencies prior to the start of construction. The plan will identify actions that will be taken in the event of a spill of petroleum products or other material harmful to aquatic or plant life, and the emergency response materials that will be kept at the site to allow the rapid containment and cleanup of any spilled material.

- Revegetation and restoration of disturbed areas
  - Vegetation disturbed during the installation of the water supply and discharge pipelines will be replanted with appropriate native annual grassland species.
  - The topography will be restored after proposed construction activities have been completed.

- Measures to avoid and minimize potential for frac-outs (only possible with the microtunelling pipeline installation method) will include:

  - All tunneling activities will be conducted outside of wetland and riparian areas
  - All work will be performed during dry months.
  - Certified weed-free straw barriers and silt fences will be installed between the work area and any potential jurisdictional wetlands, if topography is such that runoff from the work area could enter any nearby potential jurisdictional wetlands.
  - A Frac-Out Contingency Plan will be prepared and implemented to minimize potential for frac-out during microtunneling. This plan will describe BMPs for dealing with a frac-out should one occur.
  - An on-call vacuum truck will be maintained in case a spill, seep, or frac-out occurs.
  - The microtunneling operation will be designed, pre-planned, and directed in such a way as to minimize the risk of spills of all types. Appropriate controls will be established to quickly seal any leakage that may occur and prevent spills from traveling outside the work area.
  - Biological monitor(s) will continuously monitor the microtunneling operation to ensure adequate protection controls have been installed. All field personnel will be briefed in their responsibility for timely reporting of frac-out releases to the monitor on site.
  - If a frac-out or spill into the drainage channel occurs, CDFG will be contacted immediately. With respect to Crossing 2, work activities will cease immediately, and will not resume until the CDFG determines that no biological resources are at risk.
  - Any sediment, including natural substrate, that enters the channel in a frac-out situation will be contained and removed from the channel as part of the cleanup procedure.

- Cap all open pipes

- Capping open pipes at the end of each day during construction will reduce the potential for wildlife to enter a pipe and become trapped.

Non-Storm Water Control

The following BMPs have been selected as non-storm water controls for the construction site:

- NS-1, Water Conservation Practices
- NS-3, Paving and Grinding Operations
- NS-6, Illicit Connection/Illegal Discharge Detection and Reporting
- NS-8, Vehicle and Equipment Cleaning
- NS-9, Vehicle and Equipment Fueling
- NS-10, Vehicle and Equipment Maintenance
- NS-11, Pile Driving Operations
- NS-12, Concrete Curing
- NS-13, Concrete Finishing
- NS-14, Material Over Water
- NS-15, Demolition Adjacent to Water
- WM-8, Concrete Waste Management

Waste Management and Materials Pollution Control

- WM-1, Material Delivery and Storage
- WM-2, Material Use
- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-6, Hazardous Waste Management
- WM-8, Concrete Waste Management

Petroleum Products. Construction equipment will require use of diesel fuel and oil on a regular basis. While a potential exists for spills or leaks, all onsite vehicles will be monitored for leaks and receive regular preventive maintenance to ensure proper operation and reduce the chance of leakage. No "topping off' of fuel tanks will be allowed to further reduce the possibility of spills.

Petroleum products will be stored in clearly labeled and tightly sealed containers or tanks. Any asphalt used onsite will be applied according to the manufacturer's recommendations. Any soil impacted by fuel or oil spills will be removed and disposed of by the Contractor at an approved disposal site. It will be the Contractor's responsibility to ensure that secondary containment around fuel/oil tanks (stationary or mobile) will meet the minimum requirements of the U.S. Environment Protection Agency (EPA) 40 CFR Part 112 with regard to secondary containment or more stringent state requirements, if applicable. Any spills will be contained and cleaned up immediately.

Sanitary Wastes. A licensed sanitary waste management contractor will collect all construction or temporary sanitary wastes from the portable units. The units will be maintained on a regular basis. Portable units will be placed on a flat area at least 50 feet

from streets or drain inlets. Portable units will be anchored to prevent blowing or tipping over and all leaks or spills will be reported immediately (sampling may be required).

Hazardous Wastes. Potentially hazardous waste associated with construction of the project will be limited to small quantities of liquids and solids such as lubricating oils, acids for equipment cleanup, concrete curing compounds, and waste paint. These wastes are typical of industrial construction activities and will be placed in containers onsite and disposed in accordance with applicable LORS and with the manufacturer's recommendations. Hazardous wastes will be either recycled or disposed of in a licensed Class I disposal facility, as appropriate. Waste oil and used oil filters will be recycled if the maintenance activities will take place onsite. Waste generated during each chemical cleaning operation will be temporarily stored onsite in portable tanks and disposed offsite by the chemical cleaning contractor at an appropriate disposal facility. Site personnel will be instructed of these procedures and the Contractor's Site Manager will be responsible for implementing these practices.

To prevent contact of hazardous wastes with stormwater runoff, secondary containment will be provided such as curbs and berms. As much as possible, all materials will be kept in a dry covered area.

Paints. All containers will be tightly sealed and properly stored to prevent leaks or spills. Excess paint will not be discharged to the stormwater system. Unused paints will be disposed in labeled original containers according to applicable local, state, and federal laws and regulations. Spray painting will not occur on windy or rainy days, and a drop cloth will be used to collect and dispose of drips associated with painting activities. All paints will be mixed indoors, in a containment area. If using water based paints, equipment will be cleaned in a sink that is connected to the sanitary sewer.

Concrete Trucks. Concrete trucks will not be allowed to discharge surplus concrete and drum wash at the site, unless these materials are fully contained in an engineered structure that can contain all free liquid until dry. Dried concrete shall then be removed and disposed of at an off site location. Alternatively, concrete washout will be taken off-site for disposal by the concrete contractor. No surplus concrete or drum wash water will be disposed of onto the ground surface.

Waste Materials. All construction waste material, trash, and construction debris will be collected and stored in a metal dumpster, leased from a licensed solid waste management contractor. The dumpster will meet all local and state solid waste management regulations. The dumpster will be emptied a minimum of twice per week or more often if necessary, and the trash will be hauled to the local dump. No construction waste will be buried onsite. All site personnel will be instructed regarding the correct procedure for waste disposal. The Site Manager will be responsible for seeing that these procedures are followed. All dumpsters will be covered, where possible.

Allowable Non-Stormwater Discharges. The following sources of non-stormwater discharges may be combined with stormwater discharges from project construction activities:

- Pavement wash waters and dust control water not containing toxic or hazardous substances.

- Uncontaminated dewatering discharges.
- Firefighting waters.
- Vegetation watering.
- Potable or spring water discharges.

Good Housekeeping. Good housekeeping practices are designed to maintain a clean and orderly work environment. The good housekeeping practices listed below will be followed to reduce the risk of potential pollutants entering stormwater discharges. All construction personnel will be responsible for monitoring and maintaining housekeeping tasks and reporting potential problems to the Contractor's Site Manager:

- Store only enough products required for doing the job.
- Store all materials in a neat and orderly manner in the appropriate containers. Materials that may adversely impact stormwater, such as: paint, oils, greases, sealers, etc., will be stored in covered areas such as temporary/permanent buildings or trailers, in accordance with the SWPPP.
- Keep products in the original container with the original manufacturer's label.
- Do not mix products unless recommended by the manufacturer.
- Use all of a product before disposing of the container.
- Use and dispose of products according to the Contractor's Site Manager's direction or manufacturer's recommendations.
- Perform regular inspections of the stormwater system and the material storage areas.
- When and where appropriate, use posters, bulletin boards, or meetings to remind and inform construction personnel of required procedures.
- Preventive maintenance includes regular inspection and maintenance of structural stormwater controls (catch basins, oil water separators, etc.) as well as other facility equipment and systems.

Storage areas for hazardous materials such as oils, greases, paints, fuels, and chemicals will be provided with secondary containment to ensure that spills in these areas do not reach stormwater. All hazardous chemical storage areas will be surrounded by curbs or dikes to contain the chemicals in the event of leaks or spills. The Contractor will establish contingencies for the proper disposal of contaminated soils (use of licensed hauler, approved landfill) early in the construction period. Secondary containment will be designed to hold the entire contents of the largest single storage container plus rainfall from a 50-year, 24-hour storm for all outdoor storage areas. Curbs and dikes will be provided around all chemical storage areas, hazardous waste products, areas with possibility of oil spill, and washout areas.

Spills and leaks are one of the largest potential sources of stormwater pollutants at industrial facilities. Chemicals will be stored in chemical storage facilities appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors in

aboveground storage tanks. Other chemicals will be stored and used in their delivery containers. All hazardous chemical storage areas will be surrounded by curbs or dikes to contain the chemicals in the event of leaks or spills. Secondary containment will be sized to hold the entire contents of the largest single storage tank. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains. Containment areas for bulk storage tanks will not be drained. Any chemical spills in these areas will be removed with portable equipment and reused or properly disposed. It is anticipated that all substances will be applied/dispensed at manufacturer's recommendations.

In addition to the housekeeping and hazardous materials storage procedures described above, spill prevention and cleanup practices will be as follows:

- The Mirant Willow Pass Site Manager or appointee is responsible for informing construction personnel of the manufacturer's recommended spill cleanup methods, and the location of that information and cleanup supplies.
- Materials and equipment for the cleanup of a relatively small spill will be kept in the materials storage area. These facilities may include brooms, rags, gloves, shovels, goggles, sand, sawdust, absorbent, plastic or metal trash containers, and protective clothing.
- All containers will be labeled, tightly sealed, and stacked or stored neatly and securely.

Spill response procedures will be as follows:

- Step 1: Upon discovery of a spill, stop the source of the spill.
- Step 2: Cease all spill material transfer until the release is stopped and waste removed from the spill site.
- Step 3: Initiate containment to prevent spill from reaching State waters.
- Step 4: Notify Supervisor and the Mirant Willow Pass Site Manager of the spill.
- Step 5: The Mirant Willow Pass Site Manager will immediately notify the Mirant Willow Pass emergency coordinator, and coordinate further cleanup activities
- Step 6: Any significant spill of hazardous material will be reported to the appropriate state and/or local agencies by Mirant Willow Pass personnel or qualified contractors. Table 5 lists the project's environmental emergency contacts.

TABLE 5
Environmental Emergency Telephone List

Company/Organization	Telephone Numbers
Mirant Willow Pass, LLC	
Primary Facility Emergency Coordinator:	TBD
Name, Manager	TBD
24-Hour Telephone Number: Mirant Willow Pass Dispatch	
Alternate Facility Emergency Coordinator:	TBD
Name, Principal Engineer	
Mirant Willow Pass Environmental Specialist: Name	TBD
Mirant Willow Pass Media Representative: Name	TBD
Mirant Willow Pass Headquarters Telephone Operator	TBD
Other Resources	
3E Company (MSDS by FAX):	(800) 451-8346
Chemtrec (emergency chemical information):	(800) 424-9300
Poison Control Center:	(800) 662-9886
Federal Agency	
U.S. Coast Guard/National Response Center:	(800) 424-8802
State Agencies	
California Office of Emergency Services (OES):	(800) 852-7550
California Department of Toxic Substances Control (DTSC)*:	(800) 852-7550
California Department of Fish and Game*:	(800) 852-7550
California State Lands Commission:	(562) 590-5201
Regional Water Quality Control Board (RWQCB)*:	(800) 852-7550
Local Contacts	
Administering Agency – Contra Costa Environmental Health Department:	(925)-692-2500
Fire – Contra Costa County Fire Protection District:	911 or (925) 757-1303
Sheriff – Pittsburg Police Department:	911 or (925) 252-4980
Hospital – Los Medanos Community Hospital:	911 or (925)432-2200
Ambulance/Paramedics:	911

* DTSC, RWQCB and California Department of Fish and Game have requested that emergency notifications to these offices be made through the OES 800 number.

- Step 7: Submit a Notice of Discharge Form within 7 days of the discharge event.
- Step 8: Review the construction stormwater pollution prevention plan and amend, if needed. Record a description of the spill, cause, and cleanup measures taken.

Inspection, Maintenance, and Recordkeeping Procedures. Site inspection and facility maintenance are important features of an effective stormwater management system. The Contractor's qualified personnel will inspect disturbed areas of the site that have not been stabilized, storage areas exposed to precipitation, all control measures, and site access areas to determine if the control measures and stormwater management system are effective in preventing significant impacts to receiving waters.

Inspections will be performed during the non-rainy season once every 2 weeks. Maintenance shall be performed as necessary.

Inspections will be performed before and after storm events and once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or design changes as soon as feasible depending on field conditions. The discharger will complete an inspection checklist, which will include the following information:

- Inspection date
- Weather conditions
- A description of any inadequate BMPs
- List of observations of all BMPs
- Corrective actions required, including any changes to DESCP
- Inspector name, title, and signature

Erosion and Sediment Controls. The following procedures will be used to maintain erosion and sedimentation controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- Sediment will be removed from the silt barriers when it has reached one-third of the height of the barrier.
- Silt barriers will be inspected for depth of accumulated sediment, tears, attachment to posts, and stability on a weekly basis.
- Aggregate-covered areas will be inspected for bare spots and washouts.
- The Mirant Willow Pass Site Manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from the Mirant Willow Pass Site Manager to properly inspect and maintain the controls in good working order.
- An Inspection Form will be completed after each inspection.
- The completed Inspection Forms will be retained onsite.

Non-Stormwater Controls. The following procedures will be used to maintain the non-stormwater controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- The designated inspector will visually observe all drainage areas for the presence of unauthorized non-stormwater discharges and their sources.
- If a spill occurs that cannot be cleaned up before the next rain event, or under other circumstances warranting sample collection, the designated inspector will collect stormwater samples during the first two hours (even including weekends or holidays) of

discharge. Similarly, if it appears that BMPs have failed or been damaged to the extent that they could result in discharge of pollutants in stormwater; and are discharging potentially impacted water, samples should be collected. Another instance that requires sampling is where stormwater comes in contact with exposed materials that could potentially contaminate stormwater runoff. The samples should be analyzed for visible and non-visible compounds with the analytical testing suite determined from the specific materials spilled or not contained properly, and for any constituents in the spill that occur in high enough concentrations to cause an impact to water quality.

- The Mirant Willow Pass Site Manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from the Willow Pass Site Manager to properly inspect and maintain the controls in good working order.
- An Inspection Form will be completed after each inspection.
- The completed Inspection Forms will be retained onsite.

Recordkeeping. Two inspection forms will be completed demonstrating that inspections and maintenance of the control measures are implemented: Erosion and Sedimentation Controls, and Non-stormwater Source Controls. All disturbed areas and materials storage areas require inspection at least every 1 day before and after storm events and once each 24-hour period during extended storm events. After each inspection, the inspector completes an inspection report and retains a copy of the report. Any maintenance required is initiated within 24 hours of the inspection.

A copy of this DESCP and any supporting materials must be maintained at the construction site from the date of CEC approval to the date of final stabilization. All records and supporting documents will be compiled in an orderly manner, and maintained onsite until final site stabilization is completed.

The generation of reports, as part of the construction process and inspection or amendment procedures, provides accurate records, which can be used to evaluate the effectiveness of this DESCP and document compliance. Changes in design or construction of the stormwater management system are documented and included with the DESCP to facilitate review or evaluation.

Post-construction Stormwater Management. Final erosion and sediment control measures for final stabilization or exposed soil will be in place prior to final sign off of improvements. Post-construction erosion and sediment control measures to be used at this construction site once all construction is complete may include:

- Seeding
- Hydroseeding
- Mulching
- Removal of debris from drain inlet bags
- Removal of temporary erosion sediment control measures
- Removal of temporary erosion and sediment control measures (if necessary)

J. References

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National Oceanic Atmospheric Administration (NOAA). 1973. Precipitation-Frequency Atlas of the Western (NOAA Atlas 2). Volume XI, California.

URS. 2008. Willow Pass Generating Station Application for Certification. Prepared for Mirant Willow Pass, LLC.

USDA NRCS (Natural Resources Conservation Service), 2007. Web Soil Survey 2.0, Natural Cooperative Soil Survey. Accessed online at: http://websoilsurvey.nrcs.usda.gov/app/. Accessed January 10, 2008, and May 16, 2008.

Figures

Source:
Topo USA 5.0, 2004; www.delorme.com

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

28067343

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WB042009007RDD_Figure 1

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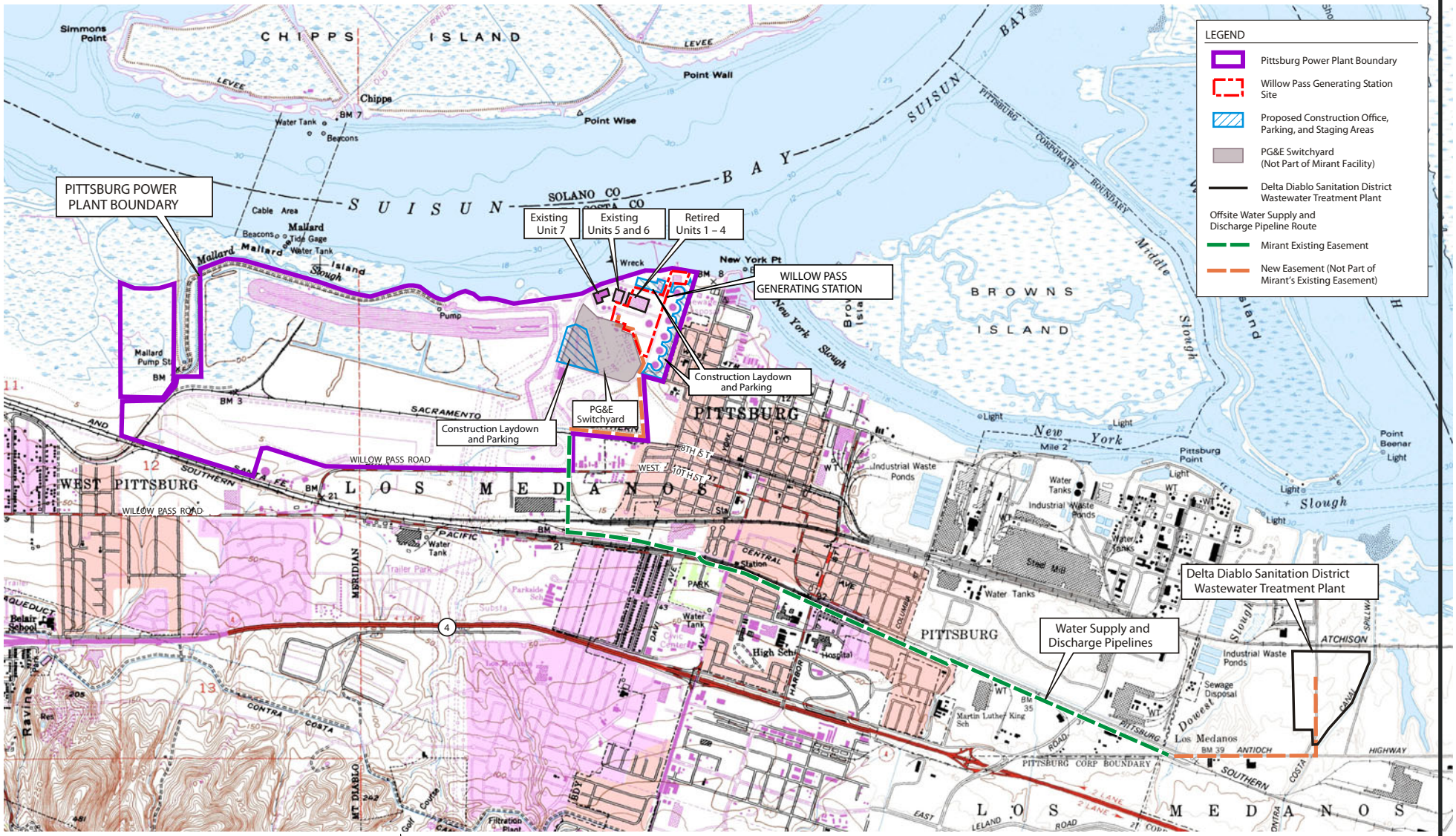
0 7
Scale in Miles

FIGURE 1
LOCATION MAP
DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN
FOR THE WILLOW PASS GENERATING STATION PROJECT

CH2MHILL



Source:
USGS Topographic Maps, 7.5 Minute Series:
Honker Bay, CA (Rev. 1980) and
Antioch North, CA (1978)

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

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0 2000 4000 Feet

0 0.5 1 Miles

Scale 1:24,000

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FIGURE 2
VICINITY MAP

DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN
FOR THE WILLOW PASS GENERATING STATION PROJECT

WB042009007RDD_Figure 2

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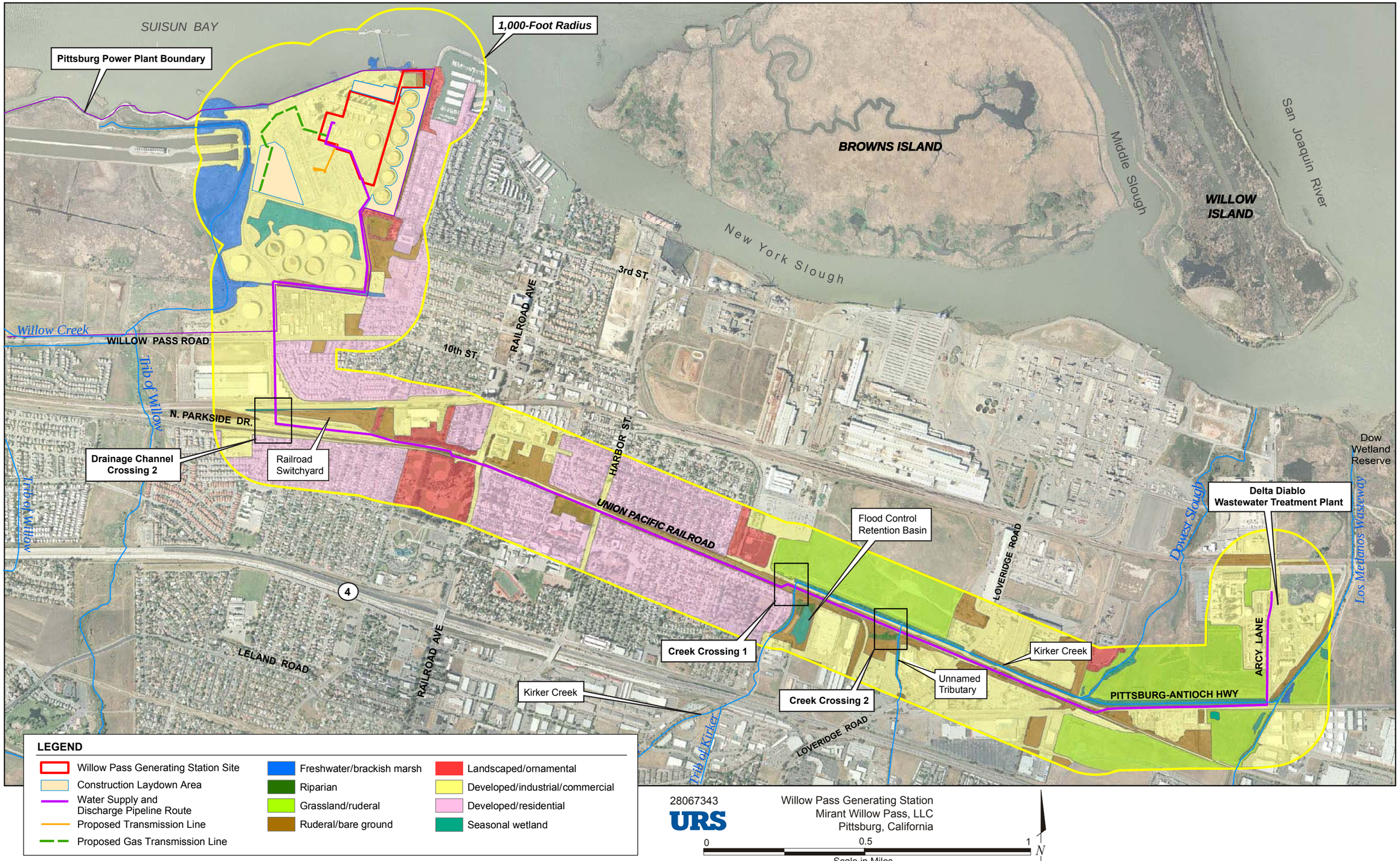

FIGURE 3
LINEAR FEATURES AND CROSSING LOCATIONS
DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN
FOR THE WILLOW PASS GENERATING STATION PROJECT

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WB042009007RDD_Figure 3

5/22/09 vsa...T:\Mirant Pittsburg\Willow Pass\Graphics\Data Request 58-75\Fig 3_Linear Features.ai

LEGEND

- Pittsburg Power Plant Boundary
- Willow Pass Generating Station Site
- Construction Laydown and Parking
- Proposed Screening Walls
- Proposed Gas Line
- Proposed Water Supply and Discharge Lines
- Proposed Transmission Line

N

0 400
Scale in Feet

Photo Source:
DigitalGlobe; Airphoto USA 2007

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

28067343

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WB042009007RDD_Figure 4

FIGURE 4
SITE PLAN

DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN FOR THE WILLOW PASS GENERATING STATION PROJECT

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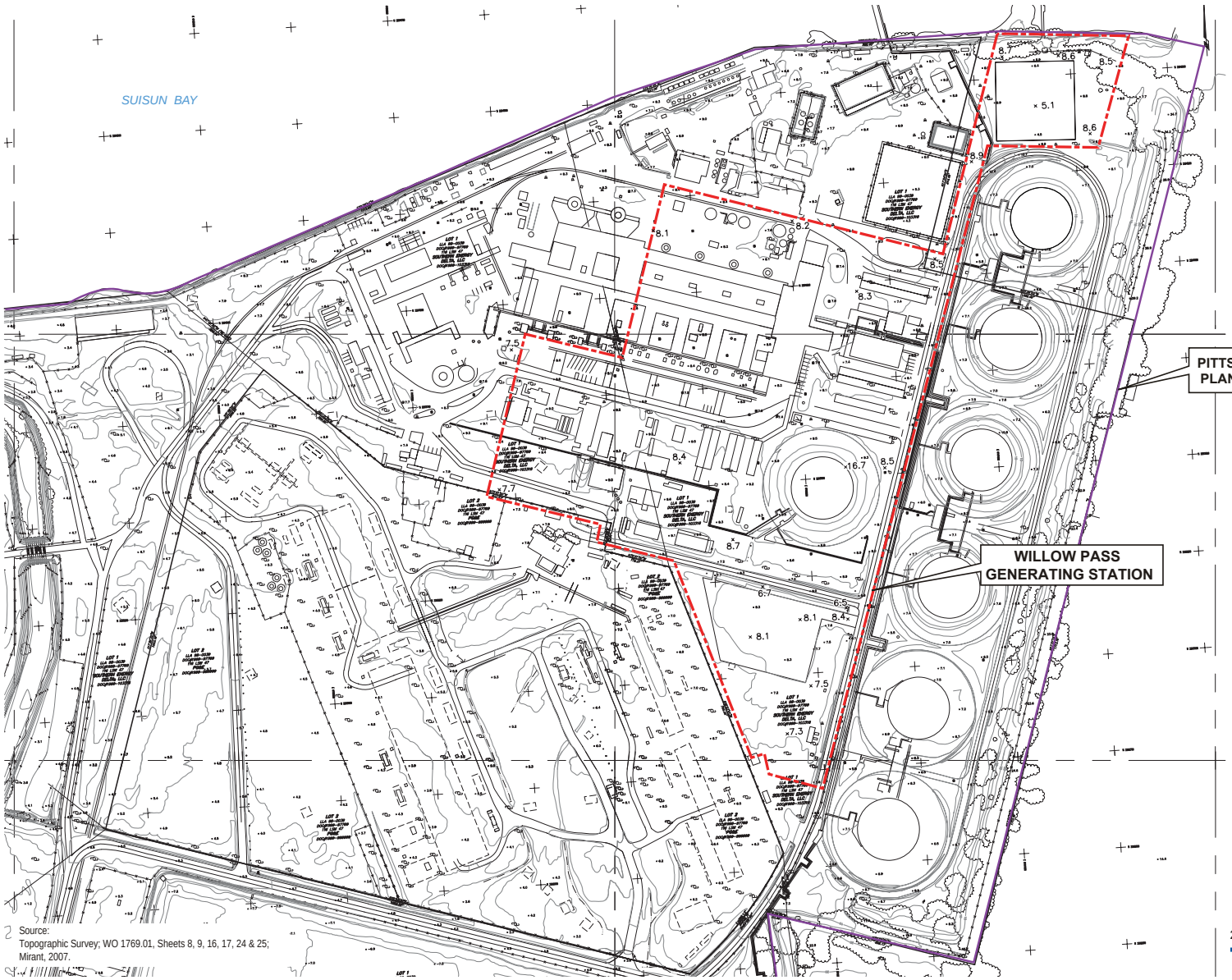
5/26/09 vsa... T:\Mirant Pittsburg-Willow Pass\Graphics\Data Request 58-75\Fig 4 Site Plan.ai



ELEVATION STATEMENT

ELEVATIONS SHOWN HEREON ARE BASED UPON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) HOLDING CCCo BM #633. CCCo BM #633 IS A 3" BRONZE DISK SET IN THE TOP OF THE WEST CONCRETE HEADWALL OF THE WILLOW PASS ROAD UNDERPASS AT THE S.P. RAILROAD CROSSING. ELEVATION = 21.608.

HORIZONTAL DATUM & BASIS OF BEARINGS

HORIZONTAL DATUM AND COORDINATES ARE BASED UPON THE CALIFORNIA STATE PLANE COORDINATE SYSTEM 1983, ZONE 3, 2000.86 EPOCH. COORDINATE SYSTEM WAS ESTABLISHED BY GPS STATIC TIES TO NGS MONUMENTS PID#AH7472, PID#JS1883 AND PID#JG4835.

NOTE:

1.) THIS SURVEY DOES NOT REPRESENT A CURRENT BOUNDARY SURVEY. NO PROPERTY BOUNDARIES WERE LOCATED OR DETERMINED AS PART OF THIS SURVEY. BOUNDARY LINES SHOWN WERE COMPILED FROM FOLLOWING RECORD DOCUMENTS AND HAVE NOT BEEN LOCATED ON THE GROUND. REFERENCE: 63 LSM 15, 116 LSM 47 & DOC#1999-97770

LEGEND

- CATCH BASIN (CB)
- FIRE HYDRANT
- GRID TICK
- MANHOLE (MH)
- POWER POLE
- SIGN
- BRUSH
- TREE
- × 8.1 SPOT ELEVATION
- —X—X— FENCE

N

0 250

Scale in Feet

Source:
Topographic Survey; WO 1769.01, Sheets 8, 9, 16, 17, 24 & 25; Mirant, 2007.

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

28067343

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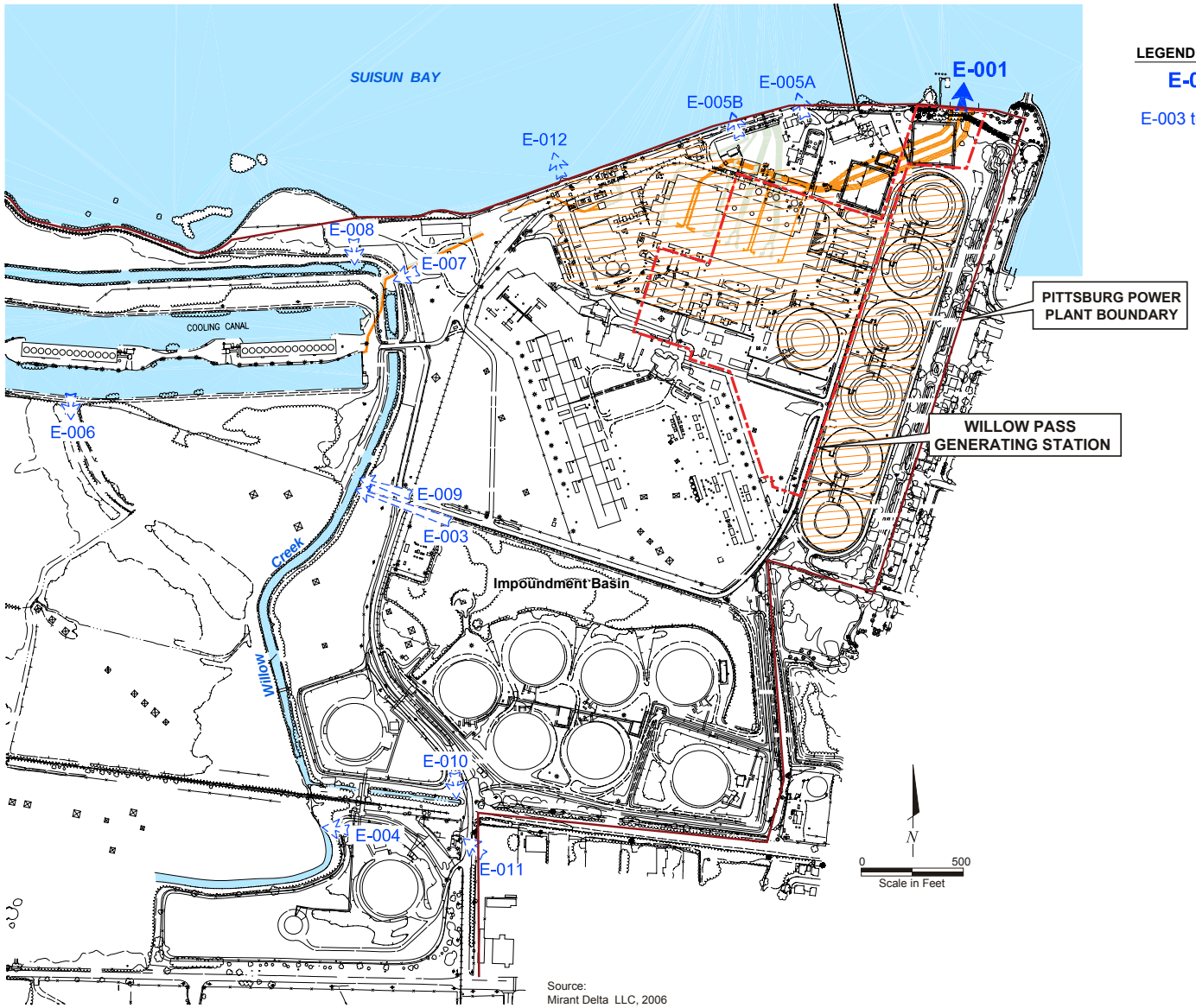
FIGURE 5
EXISTING SITE TOPOGRAPHY

DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN FOR THE WILLOW PASS GENERATING STATION PROJECT

CH2MHILL

WB042009007RDD_Figure 5

5/22/09 vsa...T:\Mirant Pittsburg-Willow Pass\Graphics\Data Request 58-75\Fig 5_Existing Site Topography.ai



Source:
Mirant Delta LLC, 2006

LEGEND

- **E-001** → Stormwater and PPP Cooling Water Discharge
- E-003 to E-012 — Stormwater Outfalls Managed Under Statewide General Permit
- Stormwater Routed Through Oil-Water Separator (E-001G) to E-001
- Pittsburg Power Plant Boundary
- Willow Pass Generating Station Site

APPROXIMATE DRAINAGE ACREAGES

OUTFALL	TOTAL	TO OIL-WATER SEPARATOR
E-001G	42	42
E-003*	105	0
E-004*	14	0
E-005A	0.5	0
E-005B	0.5	0
E-007	7	0
E-008	1	0
E-009	7	0
E-010	0.5	0
E-011	0.5	0
E-012	0.5	0
TOTAL	**178.5**	**42**

* When necessary, stormwater generated in the drainage areas associated with these outfalls can be transferred to the oil-water separator for treatment before discharge.

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

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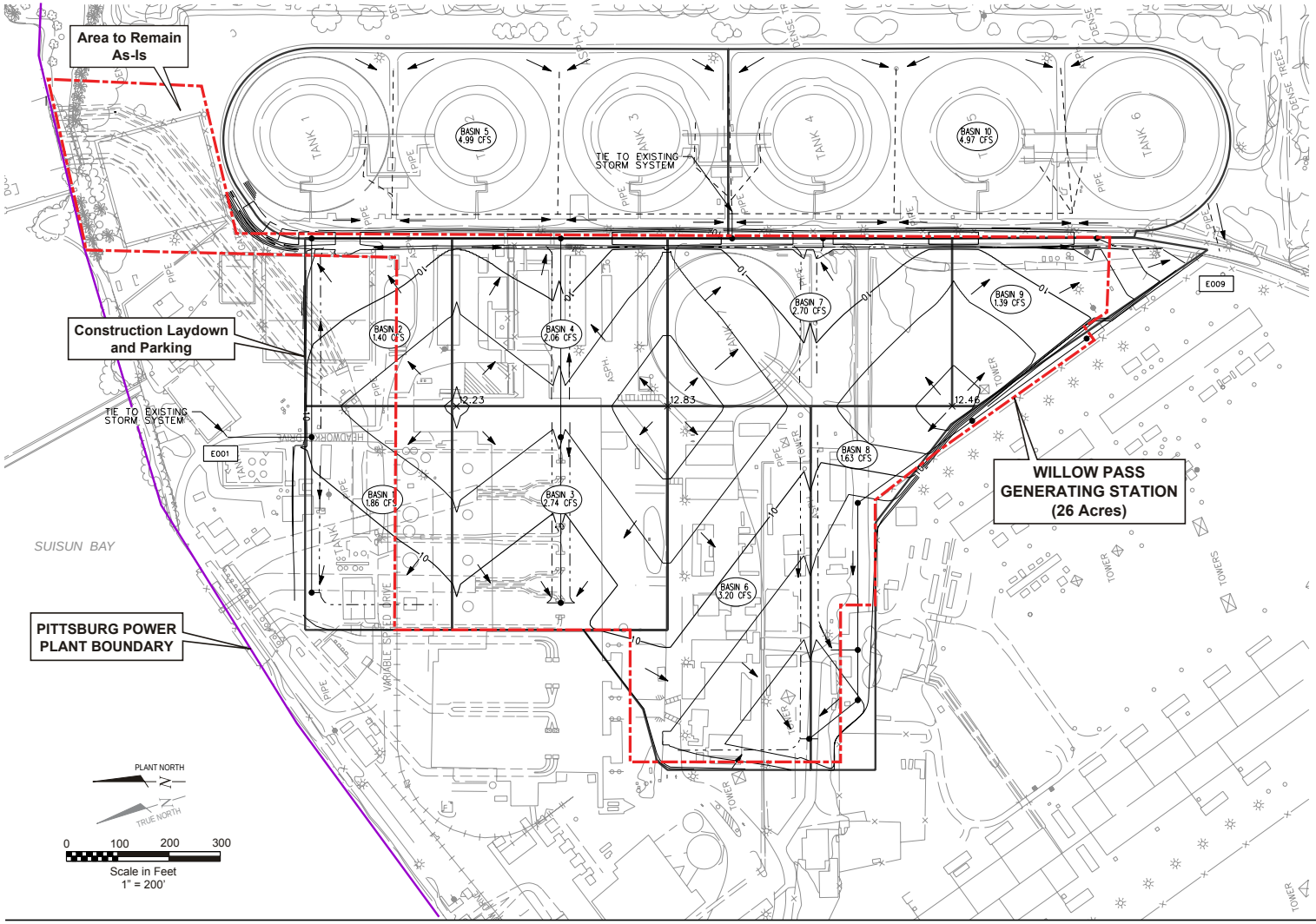
FIGURE 6
EXISTING SITE DRAINAGE

DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN FOR THE WILLOW PASS GENERATING STATION PROJECT

CH2MHILL

WB042009007RDD_Figure 6

5/22/09 vsa...T:\Mirant Pittsburg-Willow Pass\Graphics\Data Request 58-75\Fig 6_Existing Site Drainage.ai



NOTES:

1. CONTOUR INTERVAL IS 1.0 FT.
2. DRAINAGE FLOWS SHOWN ARE BASED ON 25 YEAR - 24 HOUR STORM EVENT (See Appendix F)
3. TOTAL DISTURBED AREA: 26 ACRES (23 IN WPGS, 3 IN PPP)
4. CLEAN STORM WATER RUNOFF WILL BE CONVEYED TO OUTFALLS E001 & E009 THROUGH STORM DRAINS AND EXISTING DITCHES. AREAS OF POTENTIAL OIL/CHEMICAL CONTAMINATION WILL BE CONTAINED WITHIN CONCRETE CURBS AND CONVEYED TO AN ON-SITE OIL/WATER SEPARATOR.
5. EARTHWORK QUANTITIES ARE BANK.

EARTHWORK:

EST. CUT 8,305 C.Y.
EST. FILL 83,828 C.Y.
NET (IMPORT) -75,523 C.Y.

ASPHALT TO BE REMOVED:

208,120 S.Y.
23,124 C.Y. (ASSUMING 4" AVERAGE THICKNESS)

LEGEND

- Existing Storm System
- Flow Arrow
- Flow to Inlet (BASIN 17 0.44 CFS)
- Ultimate Outfall (E00X)
- Drainage Boundary
- Proposed Storm

Source:
CH2MHill Lockwood Greene; Civil Willow Pass Generating Station Drainage Plan Siemens Flex 10s Equipment Layout;
Drawing No: MR-CI-PT-00-01 (Rev. C, 05/13/08)

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

28067343

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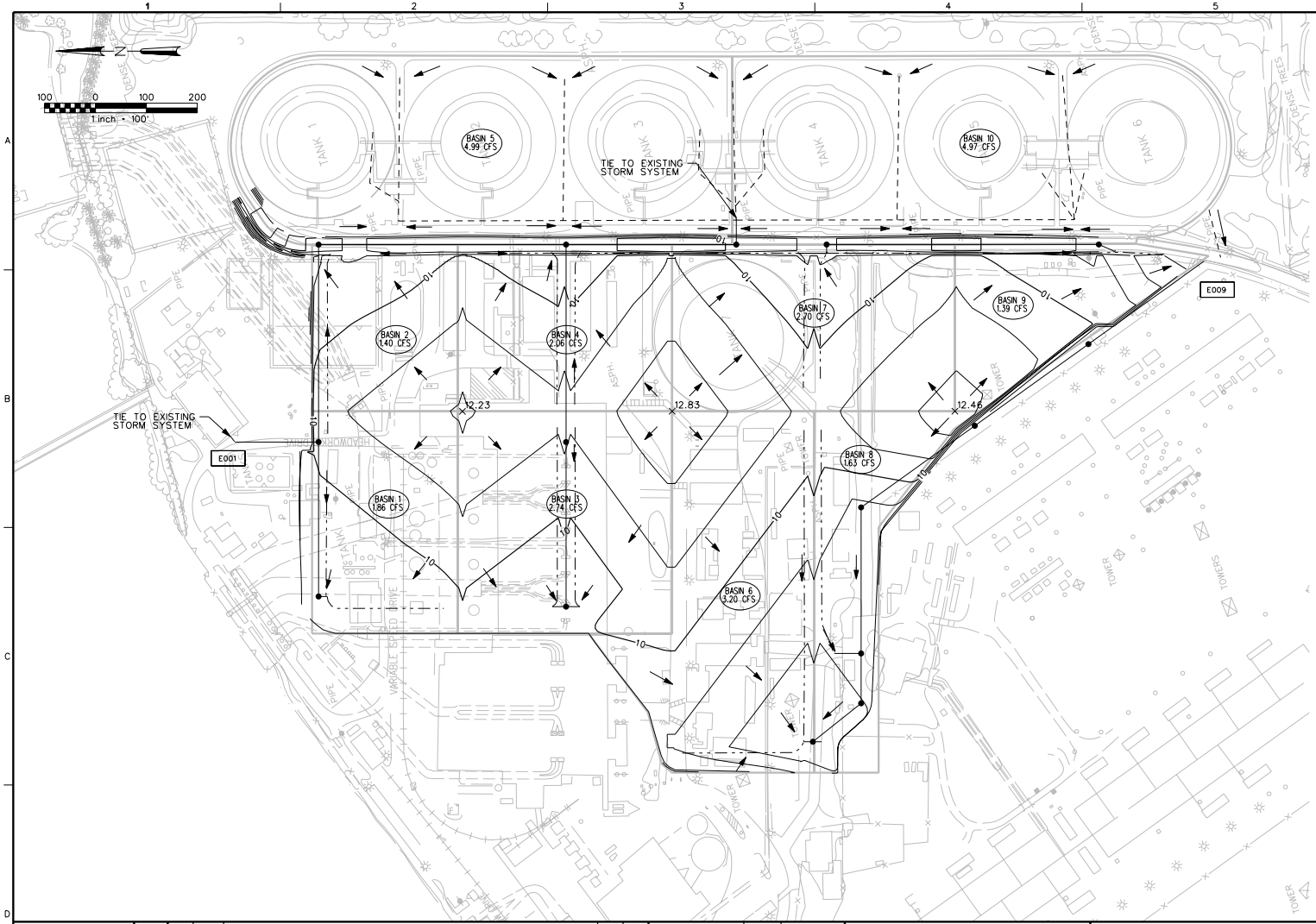
FIGURE 7
SITE GRADING AND DRAINAGE PLAN
DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN FOR THE WILLOW PASS GENERATING STATION PROJECT

CH2MHILL

5/22/09 vsa... T:\Mirant Pittsburg-Willow Pass\Graphics\Data Request 58-75\Fig 7_Site Grading and Drainage Plan.ai

WB042009007RDD_Figure 7



NOTES:

1. CONTOUR INTERVAL IS 1.0 FT.
2. DRAINAGE FLOWS SHOWN ARE BASED ON 25 YEAR - 24 HOUR STORM EVENT OF 2.9 INCHES.
3. TOTAL TRIBUTARY AREA: 43 ACRES
4. CLEAN STORM WATER RUNOFF WILL BE CONVEYED TO OUTFALLS E001 & E009 THROUGH STORM DRAINS AND EXISTING DITCHES. AREAS OF POTENTIAL OIL/CHEMICAL CONTAMINATION WILL BE CONTAINED WITHIN CONCRETE CURBS AND CONVEYED TO AN ON -SITE OIL/WATER SEPARATOR.
5. EARTHWORK QUANTITIES ARE BANK.

LEGEND:

EXISTING STORM SYSTEM — — —

FLOW ARROW

FLOW TO INLET — BASIN 17 0.44 CFS

ULTIMATE OUTFALL — E00X

DRAINAGE BOUNDARY

PROPOSED STORM

EARTHWORK:

EST. CUT 8,305 C.Y.
EST. FILL 83,828 C.Y.
NET (IMPORT) -75,523 C.Y.

ASPHALT TO BE REMOVED:

208,120 S.Y.
23,124 C.Y. (ASSUMING 4" AVERAGE THICKNESS)

NO	DATE	REVISION	BY	CHK
P1	/ /	ISSUED FOR REVIEW	XXX	YYY
B	5/05/08	ISSUED FOR REVIEW	TC	DH
C	5/13/08	ISSUED FOR REVIEW	TC	DH

REVISION APPROVAL		REV A	DATE 07/24/07
DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED
CIVIL		ELECTRICAL	
STRUCTURAL		INST & CONTROL	
MECHANICAL		ARCHITECTURAL	
PROCESS		ENVIRONMENTAL	
PIPING		GEN. ARRANG.	

STATUS					
ISSUED	REV	DATE	DM	SDE	PEM
PRELIMINARY	P1				
FOR REVIEW AND APPROVAL	C				
APPROVED FOR CONSTRUCTION					
REVISED & APPROVED FOR CONSTRUCTION					

RESPONSIBLE ENGINEER

SCALE 1"=100'

MIRANT CALIFORNIA
NEW GENERATION PROJECTS

PROJECT NO. 371583

CH2MHILL Lockwood Greene

CIVIL
WILLOW PASS GENERATING STATION

DWG NO MR-CI-PT-00-01 REV C

BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

6/19/08 vsa ..\T:\Mirant Pittsburg-Willow Pass\Graphics\Appx F\Drainage_MRCIPT0001RevC.ai

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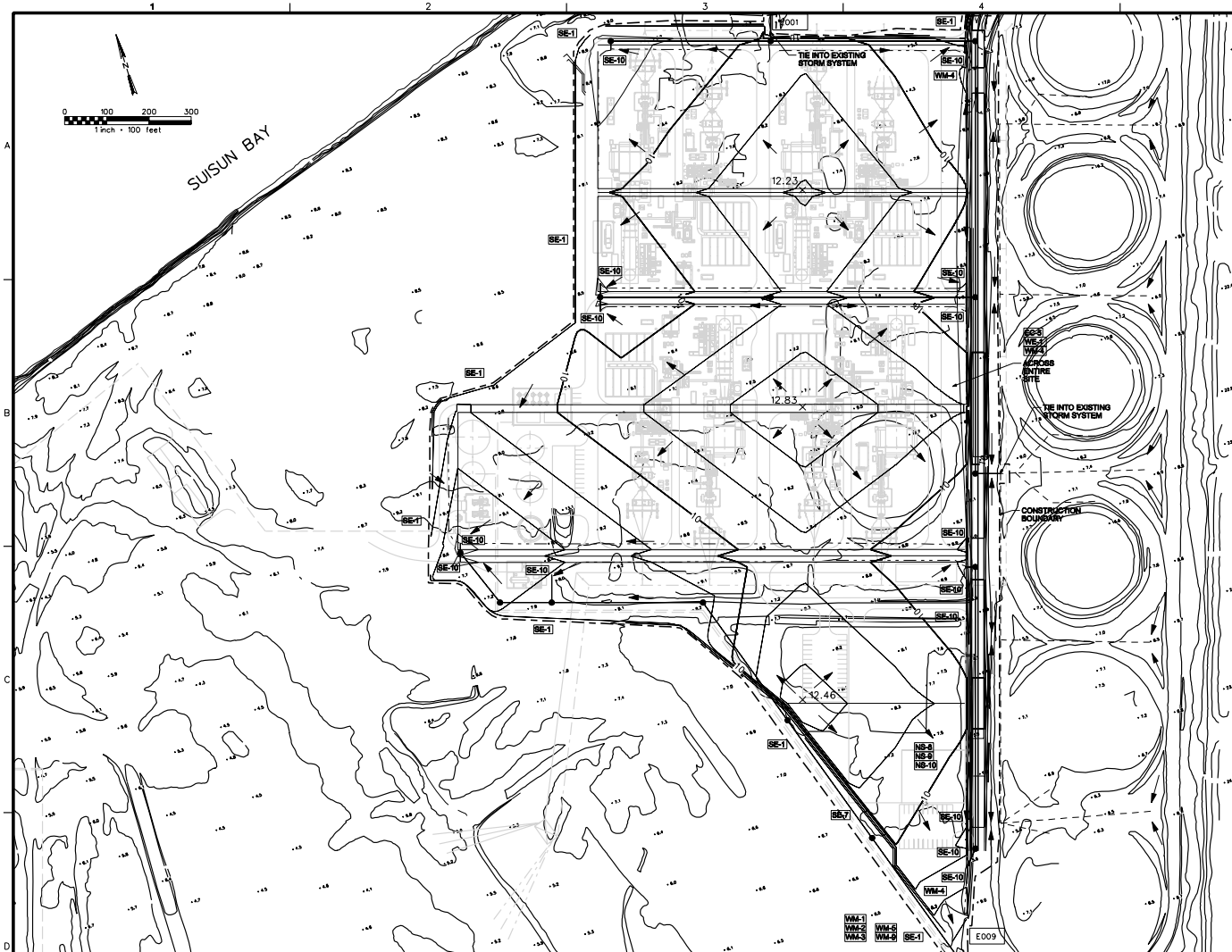
FIGURE 8
DRAINAGE SUBAREAS

DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN
FOR THE WILLOW PASS GENERATING STATION PROJECT

CH2MHILL

WB042009007RDD_Figure 8

5/22/09 vsa...T:\Mirant Pittsburg-Willow Pass\Graphics\Data Request 58-75\Fig 8_Drainage Subareas.ai



NOTES:

1. CONTOUR INTERVAL IS 1.0 FT.
2. TOTAL TRIBUTARY AREA: 42.3 ACRES.
3. CLEAN STORM WATER RUNOFF WILL BE CONVEYED TO OUTFALLS E001 AND E003. AREAS OF POTENTIAL OIL/CHEMICAL CONTAMINATION WILL BE CONTAINED WITHIN CONCRETE CURBS. STORM WATER CONTAINED WITHIN THE CONTAINMENT WILL BE CONVEYED TO AN ON-SITE OIL/WATER SEPARATOR.
4. TOTAL RUNOF FROM PROPOSED SITE 26.71 CFS.

LEGEND:

- PROPERTY BOUNDARY
- CONSTRUCTION SITE BOUNDARY
- PROPOSED STORM SEWER
- EXISTING STORM SEWER
- HDPE HIGH DENSITY POLYETHYLENE PIPE
- EXISTING CONTOURS
- FLOW ARROW
- E001 ULTIMATE OUTFALL

BEST MANAGEMENT PRACTICES (BMP'S)

EC-2	PRESERVE EXISTING VEGITATION
EC-5	SOIL BINDERS
EC-7	GEOTEXTILES AND MATS
NS-8	VEHICLE/EQUIPMENT CLEANING
NS-9	VEHICLE/EQUIPMENT FUELING
NS-10	VEHICLE/EQUIPMENT MAINTENANCE
SE-1	SILT FENCE
SE-7	STREET SWEEPING
SE-10	STORM DRAIN INLET PROTECTION
WE-1	WIND EROSION CONTROL
WM-1	MATERIAL DELIVERY/STORAGE
WM-2	MATERIAL USE
WM-3	STOCKPILE MANAGEMENT
WM-4	SPILL PREVENTION AND CONTROL
WM-5	SOLID WASTE MANAGEMENT
WM-9	SANITARY/SEPTIC WASTE MANAGEMENT

SEE URS DRAWING: "STORMWATER OUTFALLS, PITTSBURG NEW GENERATION PROJECT, MIRANT DELTA, LLC, DECEMBER 2007, FIGURE 7.14-2", FOR OUTFALL LOCATIONS E001 & E003.

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NO	DATE	REVISION	BY	CHK
P1	6/13/08	ISSUED FOR INFORMATION	DLH	JMP
P2	6/18/08	ISSUED FOR INFORMATION	DLH	JMP
P3	6/19/08	ISSUED FOR INFORMATION	DLH	JMP

RESPONSIBLE ENGINEER

REVISION APPROVAL		REV P3	DATE 6/19/08
DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED
CIVIL		ELECTRICAL	
STRUCTURAL		INST & CONTROL	
MECHANICAL		ARCHITECTURAL	
PROCESS		ENVIRONMENTAL	
PIPING		GEN. ARRANG.	

STATUS					
ISSUED	REV	DATE	DM	SDE	PEM
PRELIMINARY	P3	6/19/08			
FOR REVIEW AND APPROVAL	A				
APPROVED FOR CONSTRUCTION					
REVISED & APPROVED FOR CONSTRUCTION					

SCALE 1"=100'

MIRANT CALIFORNIA
NEW GENERATION PROJECTS

PROJECT NO. 361690

CH2MHILL Lockwood Greene

CIVIL
WILLOW PASS
FLEX 10 D
WATER POLLUTION CONTROL PLAN

DWG NO MR-CE-PT-00-02 REV P3

BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

FIGURE 9
WATER POLLUTION CONTROL PLAN
DRAINAGE, EROSION, AND SEDIMENTATION CONTROL PLAN FOR THE WILLOW PASS GENERATING STATION PROJECT

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5/26/09 vsa...T:\Mirant Pittsburg-Willow Pass\Graphics\Data Request 58-75\Fig 9_Water Pollution Control Plan.ai

WB042009007RDD_Figure 9

Appendix A: Preliminary Drainage Calculations

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CALCULATION SUMMARY & CONTROL SHEET

CALCULATION SET NO. 371583-CE-01

PRELIM.	FINAL	VOID	REVISION
X			B

Sheet 1 of 15

CLIENT: *DOMINION*

Discipline: *CIVIL*

PROJECT TITLE: *MIRANT - WILLOW PASS COMBINED CYCLE POWER PLANT*

Project No. *371583*

SUBJECT: *STORM DRAINAGE CALCULATIONS*

COMPLETED BY: *DAWN HATHAWAY* DATE: *5/5/2008*

CHECKED BY: *JOHN PURDY, P.E.* DATE: *5/7/08*

APPROVED BY: *MARIO SCACCO, P.E.* DATE: *5/7/08*

REVISION SUMMARY:
REVISED FOR NEW LAYOUT - SIEMENS FLEX 10 D

TOTAL NUMBER OF SHEETS IN THIS ISSUE:

SHEETS REVISED, ADDED, or DELETED:

PROBLEM STATEMENT: *PRELIMINARY DRAINAGE STUDY OF PEAK FLOWS TO STUCTURES FOR 25-YEAR AND 100-YEAR STORMS PER DESIGN BASIS CRITERIA.*

RESULTS & CONCLUSIONS: *SEE ATTACHMENTS FOR RESULTS.*

DESIGN BASIS & ASSUMPTIONS: *DRAINAGE DESIGN BASED ON 25-YEAR AND 100-YEAR STORM EVENTS*

UNVERIFIED ASSUMPTIONS/OPEN ITEMS:

REFERENCES: *NOAA ATLAS-2 VOLUME-XI ISOPLUVIALS OF 24 HOUR PRECIPITATION, FEMA FIRM #060025012B, USDA NRCS SOIL SURVEY*

ATTACHMENTS (Including number of pages):

COMPUTER PROGRAM DISCLOSURE INFORMATION:

Program Used *SCS (NRCS) TR-55* Rev No.: *1.00.08* Issue Date: *12/2/2004* CH2M Verified

X Yes

____ No

Calc_Sheet_Flex10d-RevB.xls

Willow Pass Drainage Calculation 6/19/08

The Willow Pass Generating Station Drainage Calculation considers a tributary drainage area of 42.3 acres. Of which 26 acres will be disturbed during project construction.

Existing site conditions consist of an industrial facility made up of approximately 95% impermeable surfacing.

The proposed power generating station finished site condition will approximately be 50% impervious.

Clean storm water shall be conveyed by a system of ditches, swales, catch basins and pipes to existing Outfalls E001 and E009. Areas of potential oil/chemical contamination will be contained within concrete curbs. Storm water contained within the containment will be conveyed to an on-site oil water separator.

Calculation Assumptions as follows:

- Calculation Method – SCS TR-55
- Total Tributary Area – 42.3 Acres
- Rainfall Distribution Type – Type 1A
- Hydrologic Soil Group – D (see NRCS Soil Map attached)
- Curve Number – 93 (Urban Industrial)

MIRANT

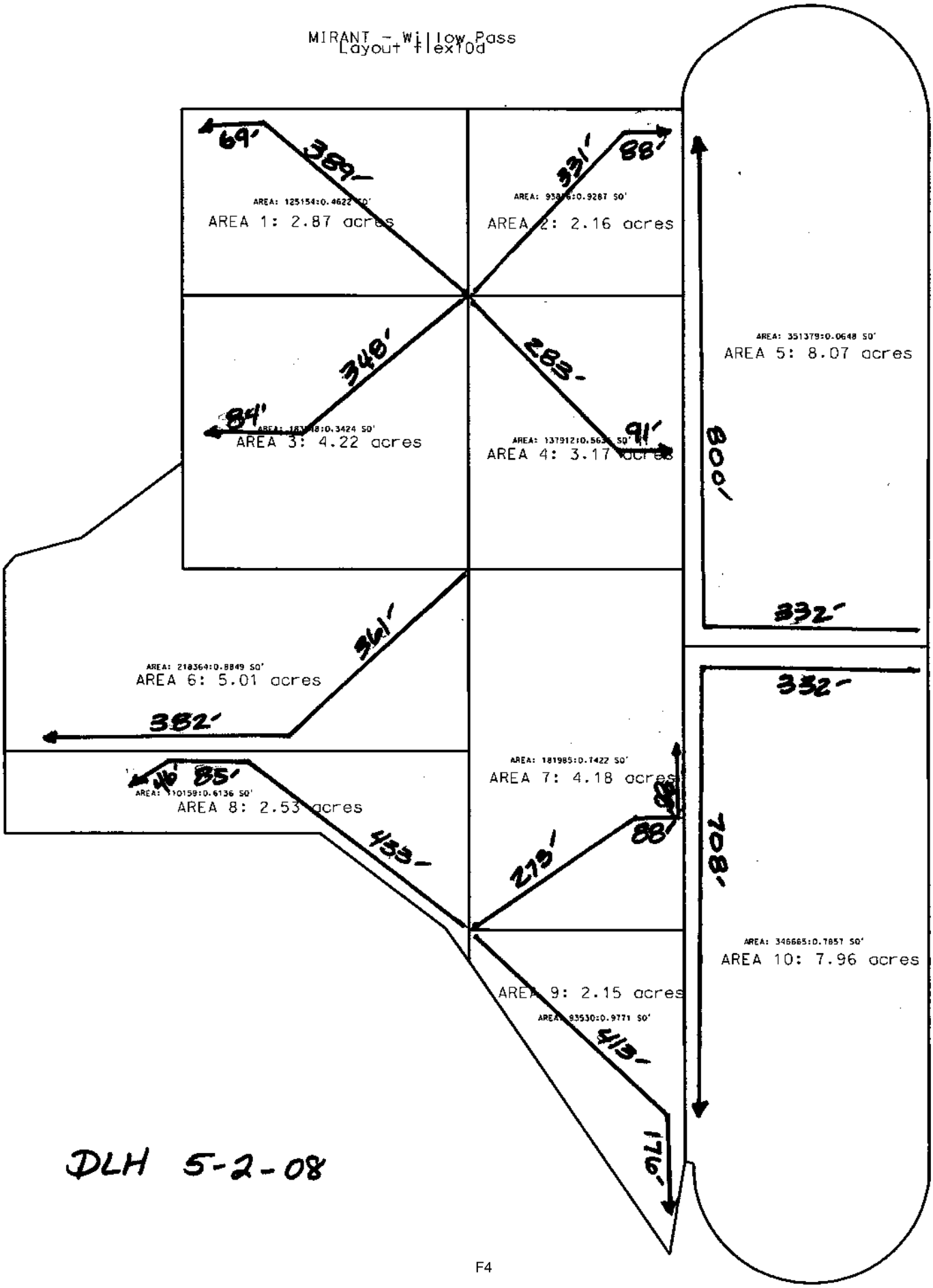
Willow Pass Generating Station Site (Pittsburg) Rev C

25yr-24hr Storm

SUB-AREA	FLOW (cfs)
BASIN 1	1.86
BASIN 2	1.40
BASIN 3	2.74
BASIN 4	2.06
BASIN 5	4.99
BASIN 6	3.20
BASIN 7	2.70
BASIN 8	1.63
BASIN 9	1.39
BASIN 10	4.97

TOTAL AREA	TOTAL FLOW
42.3 acres	26.71 cfs

MIRANT - Willow Pass
Layout flexfod



DLH 5-2-08

WinTR-55 Current Data Description

--- Identification Data ---

User: CH2MHILL
Project: MIRANT - 371583
SubTitle: Willow Pass Flex10d
State: California
County: Contra Costa
Filename: N:\Mirant\Structural\Civil\Pittsburg\Calcs\Willow Pass Flex10d.w55

Date: 5/2/2008
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
P1	north-north-east	Outlet	2.87	93	.156
P2	norht-north	Outlet	2.16	93	.152
P3	north-east	Outlet	4.22	93	.153
P4	north	Outlet	3.17	93	.146
P5	north-west	Outlet	8.07	93	.326
P6	south-east	Outlet	5.01	93	.228
P7	south	Outlet	4.18	93	.166
P8	south-south-east	Outlet	2.53	93	.176
P9	south-south	Outlet	2.15	93	.185
P10	south-west	Outlet	7.96	93	.303

Total area: 42.32 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.7	2.25	2.6	3.25	3.5	3.7	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type IA
Dimensionless Unit Hydrograph: <standard>

CH2MHILL

MIRANT - 371583
Willow Pass Flex10d
Contra Costa County, California

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)
SUBAREAS						
P1	0.75	1.14	1.39	1.86	2.04	2.19
P2	0.56	0.86	1.05	1.40	1.54	1.65
P3	1.10	1.67	2.04	2.74	3.00	3.22
P4	0.83	1.26	1.54	2.06	2.26	2.42
P5	1.99	3.04	3.72	4.99	5.48	5.87
P6	1.29	1.95	2.39	3.20	3.51	3.76
P7	1.09	1.65	2.02	2.70	2.97	3.18
P8	0.66	1.00	1.22	1.63	1.79	1.92
P9	0.56	0.85	1.03	1.39	1.52	1.63
P10	1.99	3.03	3.70	4.97	5.45	5.84
REACHES						
OUTLET	10.73	16.32	19.94	26.71	29.32	31.40

MIRANT - 371583
Willow Pass Flex10d
Contra Costa County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
P1							
SHEET	100	0.0166	0.050				0.100
SHALLOW	289	0.0166	1.7				0.039
SHALLOW	69	0.0050	1.7				0.017
					Time of Concentration		.156
P2							
SHEET	100	0.0166	0.050				0.100
SHALLOW	231	0.0166	1.7				0.031
SHALLOW	88	0.0050	1.7				0.021
					Time of Concentration		.152
P3							
SHEET	100	0.0166	0.050				0.100
SHALLOW	248	0.0166	1.7				0.033
SHALLOW	84	0.0050	1.7				0.020
					Time of Concentration		.153
P4							
SHEET	100	0.0166	0.050				0.100
SHALLOW	183	0.0166	1.7				0.024
SHALLOW	91	0.0050	1.7				0.022
					Time of Concentration		.146
P5							
SHEET	100	0.0166	0.050				0.100
SHALLOW	232	0.0166	1.7				0.031

MIRANT - 371583
Willow Pass Flex10d
Contra Costa County, California

Sub-Area Time of Concentration Details (continued)

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
SHALLOW	800	0.0050	1.7				0.195
					Time of Concentration		.326
P6							
SHEET	100	0.0166	0.050				0.100
SHALLOW	261	0.0166	1.7				0.035
SHALLOW	382	0.0050	1.7				0.093
					Time of Concentration		.228
P7							
SHEET	100	0.0166	0.050				0.100
SHALLOW	173	0.0166	1.7				0.023
SHALLOW	176	0.0050	1.7				0.043
					Time of Concentration		.166
P8							
SHEET	100	0.0166	0.050				0.100
SHALLOW	333	0.0166	1.7				0.044
SHALLOW	131	0.0050	1.7				0.032
					Time of Concentration		.176
P9							
SHEET	100	0.0166	0.050				0.100
SHALLOW	313	0.0166	1.7				0.042
SHALLOW	176	0.0050	1.7				0.043
					Time of Concentration		.185

MIRANT - 371583
Willow Pass Flex10d
Contra Costa County, California

Sub-Area Time of Concentration Details (continued)

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
P10							
SHEET	100	0.0166	0.050				0.100
SHALLOW	232	0.0166	1.7				0.031
SHALLOW	708	0.0050	1.7				0.172
					Time of Concentration		.303

MIRANT - 371583
Willow Pass Flex10d
Contra Costa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
P1	Industrial	D	2.87	93
	Total Area / Weighted Curve Number		2.87	93
			====	==
P2	Industrial	D	2.16	93
	Total Area / Weighted Curve Number		2.16	93
			====	==
P3	Industrial	D	4.22	93
	Total Area / Weighted Curve Number		4.22	93
			====	==
P4	Industrial	D	3.17	93
	Total Area / Weighted Curve Number		3.17	93
			====	==
P5	Industrial	D	8.07	93
	Total Area / Weighted Curve Number		8.07	93
			====	==
P6	Industrial	D	5.01	93
	Total Area / Weighted Curve Number		5.01	93
			====	==
P7	Industrial	D	4.18	93
	Total Area / Weighted Curve Number		4.18	93
			====	==
P8	Industrial	D	2.53	93

MIRANT - 371583
Willow Pass Flex10d
Contra Costa County, California

Sub-Area Land Use and Curve Number Details (continued)

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
	Total Area / Weighted Curve Number		2.53	93
P9	Industrial	D	2.15	93
	Total Area / Weighted Curve Number		2.15	93
P10	Industrial	D	7.96	93
	Total Area / Weighted Curve Number		7.96	93

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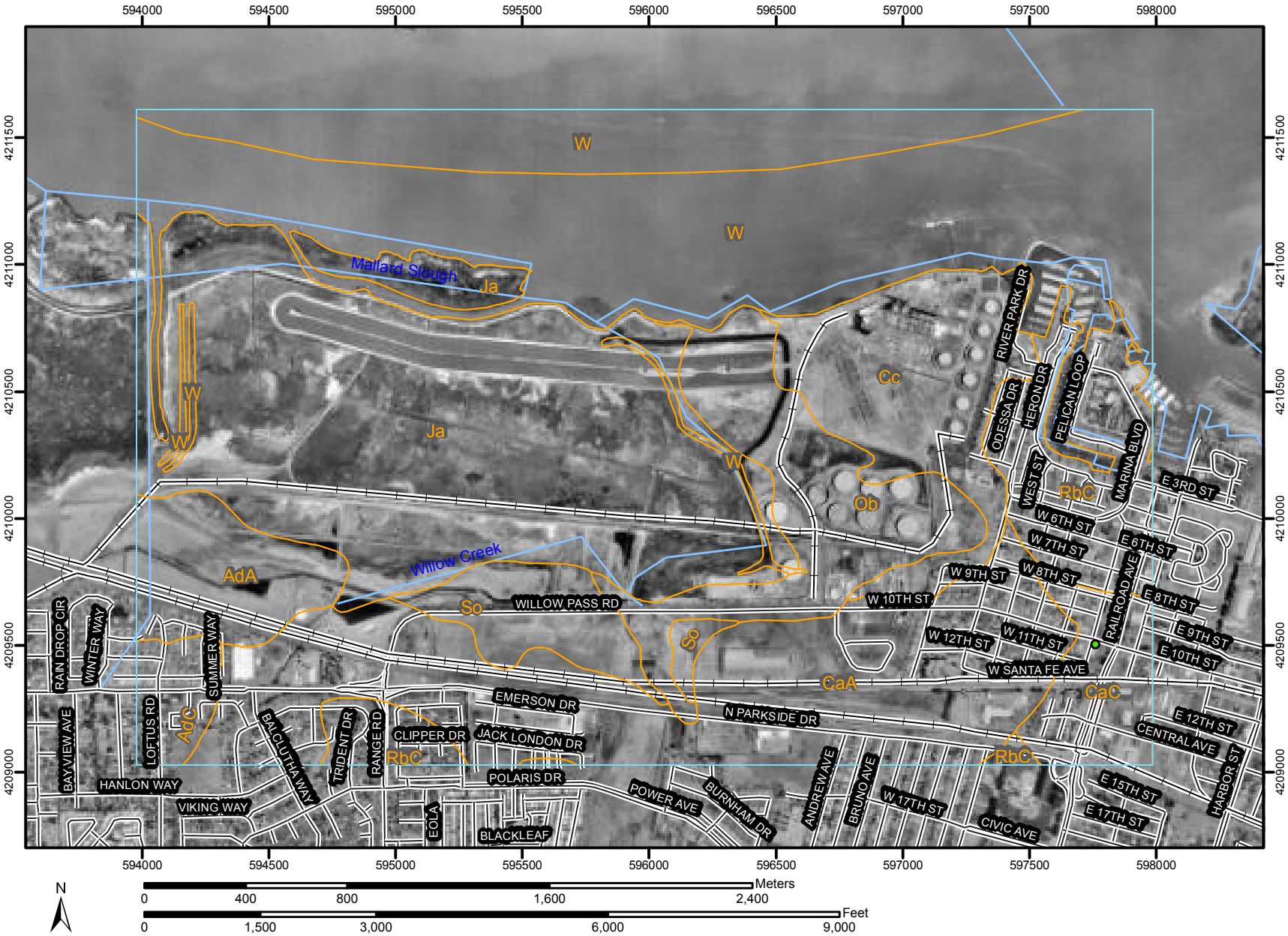
MIRANT - 371583
Willow Pass Flex10d
Contra Costa County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs) (hr)	5-Yr (cfs) (hr)	10-Yr (cfs) (hr)	25-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)
SUBAREAS						
P1	0.75	1.14	1.39	1.86	2.04	2.19
	7.97	7.95	7.94	7.94	7.94	7.94
P2	0.56	0.86	1.05	1.40	1.54	1.65
	7.96	7.95	7.94	7.94	7.93	7.93
P3	1.10	1.67	2.04	2.74	3.00	3.22
	7.96	7.95	7.94	7.94	7.93	7.93
P4	0.83	1.26	1.54	2.06	2.26	2.42
	7.96	7.94	7.94	7.94	7.93	7.93
P5	1.99	3.04	3.72	4.99	5.48	5.87
	8.07	8.05	8.06	8.04	8.05	8.03
P6	1.29	1.95	2.39	3.20	3.51	3.76
	8.02	8.00	7.99	8.00	7.99	7.98
P7	1.09	1.65	2.02	2.70	2.97	3.18
	7.97	7.96	7.95	7.95	7.94	7.94
P8	0.66	1.00	1.22	1.63	1.79	1.92
	7.99	7.96	7.96	7.95	7.95	7.95
P9	0.56	0.85	1.03	1.39	1.52	1.63
	8.00	7.97	7.96	7.95	7.96	7.95
P10	1.99	3.03	3.70	4.97	5.45	5.84
	8.05	8.04	8.03	8.04	8.03	8.03
REACHES						
OUTLET	10.73	16.32	19.94	26.71	29.32	31.40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CaC
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RbC
RIVER PARK DR
ODESSA DR
HERON DR
PELICAN LOOP
MARINA BLVD
WEST ST
E 3RD ST
W 6TH ST
W 7TH ST
E 6TH ST
W 8TH ST
W 9TH ST
E 8TH ST
RAILROAD AVE
E 9TH ST
E 10TH ST
W 10TH ST
W 11TH ST
W 12TH ST
W SANTA FE AVE
WILLOW PASS RD
RAIN DROP CIR
WINTER WAY
SUMMER WAY
EMERSON DR
N PARKSIDE DR
E 12TH ST
CENTRAL AVE
HARBOR ST
BAY VIEW AVE
LOFTUS RD
BALCLUTHA WAY
TRIDENT DR
RANGE RD
CLIPPER DR
JACK LONDON DR
POLARIS DR
HANLON WAY
VIKING WAY
EOLA
BLACKLEAF
POWER AVE
BURNHAM DR
ANDREW AVE
BRUNO AVE
W 17TH ST
CIVIC AVE
E 15TH ST
E 17TH ST
N
Meters
0
400
800
1,600
2,400
Feet
0
1,500
3,000
6,000
9,000

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Municipalities

Cities

Urban Areas

Water Features

Oceans

Streams and Canals

Transportation

Rails

Roads

Interstate Highways

US Routes

State Highways

Local Roads

Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Contra Costa County, California
Survey Area Data: Version 7, Dec 6, 2007

Soil Survey Area: Solano County, California
Survey Area Data: Version 5, Dec 12, 2007

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/16/1993; 7/11/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Contra Costa County, California (CA013)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
AdA	ANTIOCH LOAM, 0 TO 2 PERCENT SLOPES	90.5	3.5%
AdC	ANTIOCH LOAM, 2 TO 9 PERCENT SLOPES	36.3	1.4%
CaA	CAPAY CLAY, 0 TO 2 PERCENT SLOPES	417.6	16.3%
CaC	CAPAY CLAY, 2 TO 9 PERCENT SLOPES	71.1	2.8%
Cc	CLEAR LAKE CLAY	174.9	6.8%
Ja	JOICE MUCK	640.8	25.0%
Ob	OMNI SILTY CLAY	174.4	6.8%
RbC	RINCON CLAY LOAM, 2 TO 9 PERCENT SLOPES	162.7	6.3%
So	SYCAMORE SILTY CLAY LOAM	75.8	3.0%
W	WATER	549.5	21.4%

Solano County, California (CA095)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
W	Water	169.7	6.6%

Totals for Area of Interest (AOI)	2,563.4	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

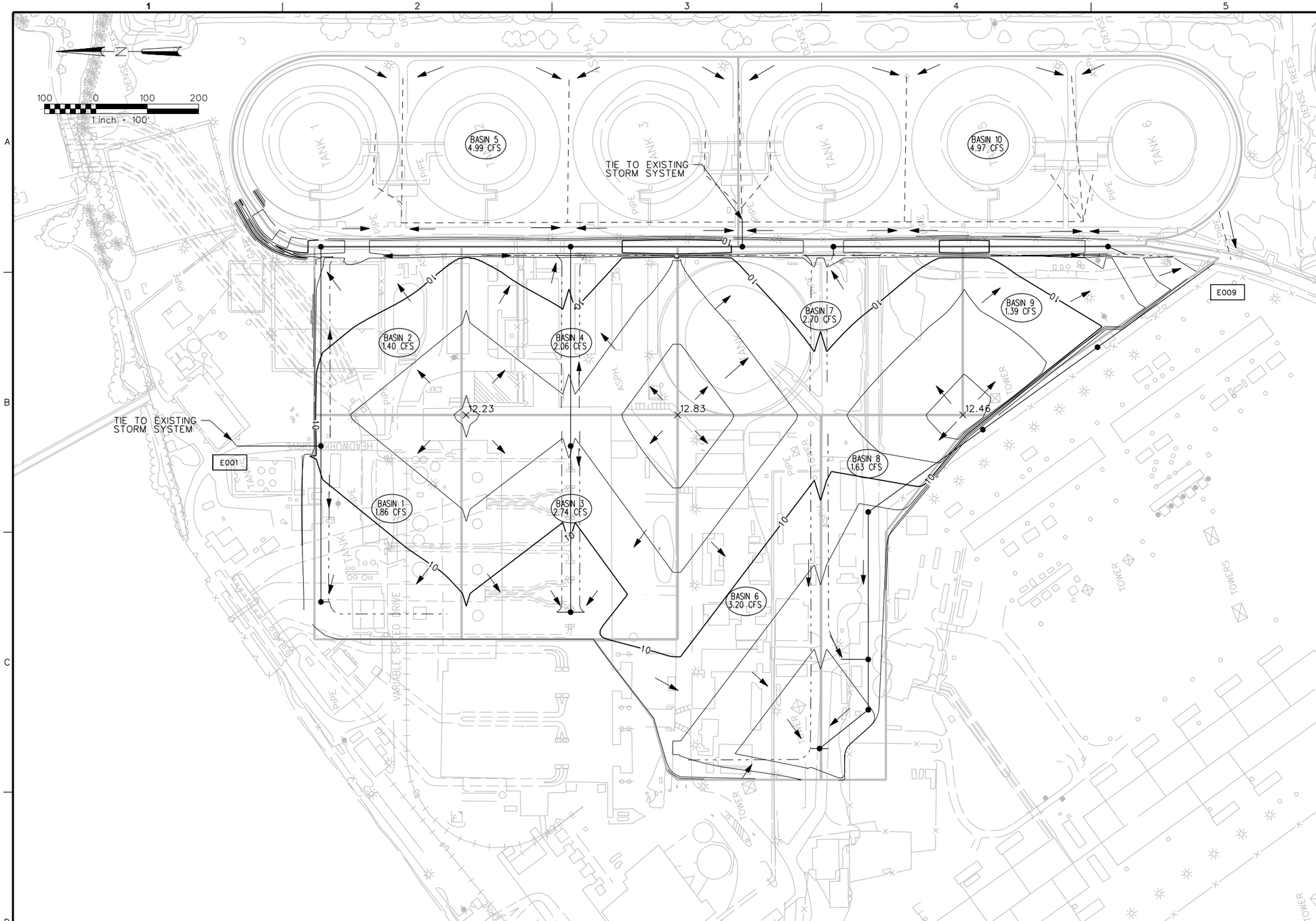
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower



NOTES:

1. CONTOUR INTERVAL IS 1.0 FT.
2. DRAINAGE FLOWS SHOWN ARE BASED ON 25 YEAR - 24 HOUR STORM EVENT OF 2.9 INCHES.
3. TOTAL TRIBUTARY AREA: 43 ACRES
4. CLEAN STORM WATER RUNOFF WILL BE CONVEYED TO OUTFALLS E001 & E009 THROUGH STORM DRAINS AND EXISTING DITCHES. AREAS OF POTENTIAL OIL/CHEMICAL CONTAMINATION WILL BE CONTAINED WITHIN CONCRETE CURBS AND CONVEYED TO AN ON -SITE OIL/WATER SEPARATOR.
5. EARTHWORK QUANTITIES ARE BANK.

LEGEND:

EXISTING STORM SYSTEM — — —

FLOW ARROW

FLOW TO INLET — BASIN 17 0.44 CFS

ULTIMATE OUTFALL — E00X

DRAINAGE BOUNDARY

PROPOSED STORM

EARTHWORK:

EST. CUT 8,305 C.Y.
EST. FILL 83,828 C.Y.
NET (IMPORT) -75,523 C.Y.

ASPHALT TO BE REMOVED:

208,120 S.Y.
23,124 C.Y. (ASSUMING 4" AVERAGE THICKNESS)

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RESPONSIBLE ENGINEER — PE

NO	DATE	REVISION	BY	CHK
P1	/ /	ISSUED FOR REVIEW	XXX	YYY
B	5/05/08	ISSUED FOR REVIEW	TC	DH
C	5/13/08	ISSUED FOR REVIEW	TC	DH

REVISION APPROVAL		REV A	DATE 07/24/07
DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED
CIVIL		ELECTRICAL	
STRUCTURAL		INST & CONTROL	
MECHANICAL		ARCHITECTURAL	
PROCESS		ENVIRONMENTAL	
PIPING		GEN. ARRANG.	

F17

STATUS					
ISSUED	REV	DATE	DM	SDE	PEM
PRELIMINARY	P1				
FOR REVIEW AND APPROVAL	C				
APPROVED FOR CONSTRUCTION					
REVISED & APPROVED FOR CONSTRUCTION					

SCALE 1"=100'

MIRANT CALIFORNIA
NEW GENERATION PROJECTS

PROJECT NO. 371583

CH2MHILL
Lockwood Greene

CIVIL
WILLOW PASS GENERATING STATION
DRAINAGE PLAN
SIEMENS FLEX 10S EQUIPMENT LAYOUT

DWG NO MR-CI-PT-00-01 REV C

BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

6/19/08 vsa ..\T:\Mirant Pittsburg-Willow Pass\Graphics\Appx F\Drainage_MRCIPT0001RevC.ai