

**APPENDIX F**

**DRAFT STORM WATER CONTROL PLAN**



---

*Draft Report*

# **Stormwater Control Plan for the Willow Pass Generating Station**

Prepared for  
**Mirant Corporation**

December 2008

**CH2MHILL**  
2525 Airpark Drive  
Redding, CA 96001



# Contents

---

	Page
<b>Acronyms and Abbreviations .....</b>	<b>iv</b>
<b>1.0 Stormwater Control Plan .....</b>	<b>1</b>
1.1 Project Setting .....	1
1.1.1 Project Description and Location .....	1
1.1.2 Existing Site Condition .....	2
1.1.3 Constraints and Opportunities for Stormwater Control .....	4
1.2 Measures to Limit Imperviousness .....	5
1.2.1 Measures to Protect Natural Resources .....	5
1.2.2 Measures to Limit Directly Connected Impervious Areas .....	6
1.2.3 Summary of Pervious and Self Retaining Areas .....	6
1.3 Preliminary Design of Treatment and Flow Control Facilities .....	7
1.3.1 Locations and Elevations.....	7
1.3.2 Sizing Calculations.....	7
1.3.3 Summary of Impervious Areas and Treatment/Flow-control Facilities .....	7
1.4 Source Control Measures .....	8
1.4.1 Description of Site Activities and Potential Sources of Pollutants .....	8
1.4.2 Potential Sources, Permanent Source Control and BMPs.....	8
1.5 Permitting and Code Compliance Issues .....	10
1.6 Facility Maintenance .....	11
1.6.1 Ownership and Responsibility for Maintenance .....	11
1.6.2 Summary of Maintenance Requirements.....	11
1.7 Construction Plan C.3 Checklist.....	11
1.8 Certification.....	13
1.9 Works Cited.....	13

## Appendices

A	Willow Pass Generating Station Preliminary Drainage Calculations
B	Willow Pass Plot Plan

## Tables

1	Source Control Best Management Practices .....	8
2	Construction Plan C.3 Checklist.....	12

# Contents, Continued

---

## Figures

- 1 Project Location Map
- 2 Site Plan
- 3 Demolition Area
- 4 Site Vicinity Map
- 5 Existing Site Topography
- 6 Existing Pittsburg Power Plant Drainage
- 7 Site Grading and Drainage Plan
- 8 Regional Hydrologic Setting
- 9 Surface Water Features
- 10 Soil Mapping Units in the Vicinity of the Pittsburg Power Plant
- 11 Construction Office, Parking, and Laydown

# Acronyms and Abbreviations

---

ac-ft	acre feet
BMP	best management practice(s)
DDSD	Delta Diablo Sanitation District
IPM	integrated pest management
msl	mean sea level
OWS	oil-water separator
PPP	Pittsburg Power Plant
WPGS	Willow Pass Generating Station



# 1.0 Stormwater Control Plan

---

## 1.1 Project Setting

### 1.1.1 Project Description and Location

The proposed Willow Pass Generating Station (WPGS) will consist of new natural-gas-fired generation facilities and ancillary systems. The proposed project consists of construction of new generating units that will become the WPGS; construction of electric and gas transmission lines adjacent to the WPGS facility; and construction of water supply and wastewater pipelines connecting to the Delta Diablo Sanitation District (DDSD) Wastewater Treatment Plant (WTP). Figure 1 shows the project location.

The WPGS will be located within the existing Pittsburg Power Plant (PPP) facility area located at 696 West 10th Street, Pittsburg, California, 94565, directly south of Suisun Bay and approximately 2 miles west of the centre of the City of Pittsburg. The WPGS site is located on Township 2 North, Range 1 East, on the U.S. Geological Survey (USGS) Honker Bay Topographic Quadrangle Map. The project includes no unique site features.

The WPGS will be constructed on an existing power plant site (existing conditions are at 95 percent impervious), within an area currently covered by PPP's retired Units 1 through 4, a tank, and paved areas. At completion of the project there will be a decrease in the amount of impervious area to 50 percent of site conditions, as described in the drainage calculations (Appendix A). Figure 2 shows the site plan for the proposed WPGS facilities. Many existing facilities within the site plan area will be demolished. Most of the 26-acre WPGS site will be cut and filled to an approximate elevation of 8 to 13 feet above mean sea level, from an existing elevation of approximately 7 to 9 feet. A portion of the WPGS site, containing an unused surface impoundment in the northeast corner, will not be graded and will be left in place. A second unused surface impoundment located west of Tank 1 (not on the WPGS site) will be demolished (Figure 3); this area will be used for construction parking and laydown. A series of five screening walls will be constructed on the PPP site between existing Tanks 1 through 6; the tanks and associated containment structures will remain intact.

The replacement facilities will impact a reduced amount of the property, resulting in a reduction of impervious area. Preliminary drainage calculations (Appendix A) indicate that approximately 95 percent of the site is currently impervious. At completion of project activities, only approximately 50 percent of the site will be impervious. In addition, onsite drainage efficiency will be improved. Because there will be no increase in impervious area at the project site, compliance with flow-control requirements is demonstrated by Option 1: No increase in impervious area (Contra Costa Clean Water Program, Stormwater C.3 Update, June 2006). A comparison of the project design to the pre-project condition is shown in several figures within this Stormwater Control Plan (SWCP or Plan). Many of the existing impervious areas will be demolished and new facilities will impact a significantly smaller footprint (an approximate 45 percent reduction of impervious facilities).

Clean stormwater 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, and collected stormwater will be conveyed to an onsite oil-water separator (OWS) prior to discharge. There will be no increase in the volume or rate of stormwater runoff from the WPGS facility. Project features designed to be protective of water quality include curbs around areas with potential oil or chemical contamination and secondary spill containment around chemical delivery and storage areas, and transformers. The site will be elevated above the floodplain.

Recycled water supply and wastewater pipelines 5 miles in length are proposed to bring recycled water from, and return wastewater to the DDSW WTP. Three of the five-mile-long route currently contain an unused fuel oil pipeline owned by Mirant Delta that will be replaced. The water pipeline alignment runs through the PPP site, crosses under Willow Pass Road/West 10th Street and BNSF railroad, and then turns east and runs adjacent to the UPRR. The alignment crosses beneath railroad tracks in several locations. The east section of the water pipeline alignment crosses under Pittsburg-Antioch Highway, runs along the north side of the Highway, and continues north on Arcy Lane to the DDSW WTP. Areas disturbed by pipeline installation will be restored to pre-construction conditions and will not significantly modify existing pervious or impervious site conditions.

### 1.1.2 Existing Site Condition

The WPGS site will be approximately 26 acres and will be separate from the existing PPP site. The new generating units will be located on the south 23.5 acres of the WPGS site. The north 2.5-acre portion of the WPGS site (adjacent to Suisun Bay) is included to preserve existing riparian water rights; no land disturbance will occur within this area. PG&E owns a 36-acre switchyard adjacent to the PPP site, directly southwest of the WPGS site (Figure 4).

The WPGS site is currently occupied by the existing retired power generation PPP Units 1 through 4, an unused surface impoundment, an administration building, hazardous materials and hazardous waste materials buildings, Tank 7, temporary buildings, and other ancillary facilities. The project includes the demolition of Units 1 through 4, the administration building, and Tank 7, which are on the WPGS site, as well as replacement of the hazardous materials and hazardous waste buildings. Other portions of the 26-acre site are either compacted soil or covered in asphalt pavement. The unused surface impoundment on the WPGS site will be left in place.

The existing PPP has a Stormwater Management Plan (SWMP), which includes a Stormwater Pollution Prevention Plan (SWPPP) and a Monitoring and Reporting Program, in accordance with National Pollutant Discharge Elimination System permit requirements for discharges associated with industrial activities.

#### 1.1.2.1 Topography

The preconstruction site topography is shown on Figure 5. Figure 6 shows the drainage pattern and discharge points for the existing PPP property near the WPGS. Stormwater runoff from the northern portion of the 26-acre WPGS site currently collects and drains via a storm drain system and then discharges to the bay via the existing discharge Outfall 001. Stormwater runoff from the southern portion of the WPGS site is discharged via existing

discharge Outfall 009, which discharges into Willow Creek and ultimately into Suisun Bay. Outfalls are shown on Figure 6.

The grading plan and post-construction drainage is shown on Figure 7. The drainage flows shown on Figure 7 are based on the maximum 24-hour, 25-year storm event.

### 1.1.2.2 Groundwater

There are two groundwater zones identified beneath the PPP site. These are a shallow perched groundwater zone and a deeper zone referred to as the Upper Aquifer (CDM, 1997). The perched zone is localized and occurs within a peat and clay deposit. Groundwater in this zone can be encountered near the surface (approximately 0.5 foot below ground surface [bgs]). The Upper Aquifer occurs within a sand and gravel deposit that ranges in thickness from approximately 26 to 50 feet. Depth to groundwater in this zone generally ranges from 7 to 10.5 feet bgs (CDM, 1997). The groundwater flow direction is generally north towards the bay, with the hydraulic gradient ranging from approximately 0.004 to 0.092 foot per foot (Fletcher Consultants, Inc., 2004).

As part of previous groundwater monitoring programs, 14 groundwater monitoring wells have been installed on the PPP site, with 3 installed within the perched groundwater zone and the remaining 11 wells installed within the Upper Aquifer. Four monitoring wells are within the portion of the area that will be regarded near the unused surface impoundment west of Tank 1 that will be removed.

### 1.1.2.3 Surface Water

The WPGS site will be situated along the southern shore of Suisun Bay just downstream of New York Slough and south of Chipps Island. Suisun Bay is the only natural perennial surface water feature within 1 mile of the site. The WPGS site is on the southern bank of the bay, approximately 2 miles west from the center of the City of Pittsburg in Contra Costa County, and approximately 7 miles downstream from the existing Contra Costa Power Plant. Willow Creek is located approximately 1,000 feet west of the western border of the 26-acre WPGS site. There are no surface water bodies on the WPGS site, although there is an unused surface impoundment at the northeast corner of the WPGS site. This surface impoundment will remain in place. Another unused surface impoundment is located immediately north of retired Units 1 through 4, west of Tank 1. This surface impoundment is not on the WPGS site, but is located on a construction laydown and parking area. This surface impoundment will be demolished as part of the project. Both surface impoundments were cleaned and closed in 2004, as acknowledged by the Department of Toxic Substances Control's closure certification letter dated April 28, 2005 (DTSC, 2005).

The WPGS site is located within the Willow Creek Sub-basin, as described in the *East Contra Costa County Habitat Conservation Plan Environmental Impact Statement*. In general, all surface water runoff flows north to Suisun Bay (see Figures 8 and 9). Willow Creek is the primary surface water feature within this approximately 16,000-acre watershed (Jones & Stokes, 2006). Willow Creek and its tributaries are ephemeral streams that collect storm flows, irrigation return water, and urban runoff. Portions of these creeks have been channelized or culverted. A portion of the water pipeline route between the WPGS site and the DDSD's facility will be within the Kirker Creek Sub-basin. Total drainage area of the Kirker Creek Sub-basin is approximately 9,500 acres (Jones & Stokes, 2006). While the upper portion of

Kirker Creek is mostly ephemeral, flowing from November through April, some of the lower reaches of the creek are perennial due to artificial inputs such as irrigation return water and urban runoff. The lower reaches of the creek and its tributaries have been culverted, concreted, and redirected in reaches to accommodate residential and industrial uses. Figure 8 shows the regional hydrologic setting with sub-basin boundaries.

### 1.1.3 Constraints and Opportunities for Stormwater Control

#### 1.1.3.1 Constraints

Although a significant portion of the existing facility will be demolished (footprint reduction of approximately 45 percent), the soils may be compacted in some of these areas such as tank sites or areas that would have compacted soils to support structures. Figure 10 shows the soil mapping units near the PPP.

Areas with shallow groundwater will need to be taken into consideration during design of any facilities. Operation and maintenance of the facility could potentially affect groundwater quality through inadvertent spills or discharge that could then infiltrate and percolate down to groundwater, as depth to groundwater at the site is relatively shallow (approximately 0.5 to 10.5 feet bgs). The facility SWMP provides guidance on spill prevention and control measures to prohibit discharge of chemicals to groundwater.

Operation and maintenance of the project facility could affect surface water quality of Suisun Bay through inadvertent spills or discharges. Source controls at the facility would include best management practices at storm drain inlets to prevent surface water runoff contaminant from entering the bay consistent with the facility SWMP and Stormwater Facility Maintenance Plan (required prior to occupancy). Facility inspections and maintenance will incorporate verification that facilities are operated and maintained in good operating condition.

Because of previous site activities, there is potential for the presence of contaminated soils onsite. During equipment dismantling and removal, all machinery, tanks, pipelines, and appurtenances will be inspected for possible points of release. If it is determined that a release did occur, the impacted area will be investigated and notifications will be made to appropriate parties. Where necessary, materials that have been impacted by the release will be collected and analyzed to determine further action. All impacted materials will be removed and disposed of in licensed landfills.

#### 1.1.3.2 Opportunities

The stormwater system will be designed in accordance with the Contra Costa Countywide stormwater requirements. The existing points of discharge will be maintained and documented according to the Stormwater Facility Maintenance Plan. Stormwater will be collected in the plant site from areas not anticipated to have any oil contamination, using catch basins and a storm drain system. Stormwater runoff from open areas within the site will be discharged to Suisun Bay, either directly as sheet flow or via the existing PPP stormwater Outfalls E001 and E009 in accordance with NPDES General Industrial Permit requirements.

Stormwater from the new parking lots will be directed to the existing PPP OWS and then directed to the existing Outfall E001. Stormwater runoff from areas that collect miscible chemicals or volatile liquids and from process areas that could collect nonmiscible oil will be directed to a new OWS system. Oil leakage from equipment is expected to be minimal. Nonetheless, all equipment that has potential for leakage of oil or hazardous chemicals will be located within spill containment areas. After passing through the OWS, water from the clear effluent chambers will be discharged to the WWST, combined with the process wastewater and then conveyed via the new 10-inch-diameter process wastewater discharge pipeline to the DDSD WTP final effluent structure. The oil from the oil containment chambers of the existing PPP OWS and the new WPGS OWS will be collected and shipped offsite for recycling or proper disposal.

Other opportunities to minimize directly connected impervious areas include directing runoff from impervious areas to pervious areas in locations where soils permit (such as flat areas). Select permeable pavements and surface treatments such as crushed aggregate, turf block or pavers as a substitution for impervious concrete or asphalt pavement. Use drainage features such as grassy swales, vegetated buffers, landscape areas, and bioretention areas within the site and landscape design. Designed landscape areas can be utilized to detain or retain runoff. These opportunities will be considered throughout the design phase of the project.

## 1.2 Measures to Limit Imperviousness

### 1.2.1 Measures to Protect Natural Resources

#### 1.2.1.1 Pipelines

The new water supply and wastewater discharge pipelines between the DDSD WTP and the new WPGS plant will be installed in a trench using standard pipeline installation techniques and in accordance with the manufacturer's requirements for the installation of HDPE piping. To the extent possible, excavation spoils will be used for backfill. Where trenching spoils are not suitable, imported backfill will be used. Once backfilled, the surface will be restored to pre-existing conditions. The new water pipelines will cross several creeks, roads, and railroad tracks. With the exception of the overhead crossing at Harbor Street, the pipelines will be placed underground. Once the pipeline is installed, it is unlikely to cause a permanent stormwater management issue. Inspection and maintenance of the pipeline alignment will be addressed in the facility operations and management plans, including initial inspection to check for erosion.

#### 1.2.1.2 Best Management Practices

Impacts to surface water from erosion are expected to be minimal during construction. Erosion will be controlled in accordance with an approved Erosion Control Plan. In addition, all construction activities will be performed in accordance with the California NPDES General Permit for Stormwater Discharge Associated with Construction Activities (SWRCB, 1999), requiring the implementation of BMPs to control sediment and other pollutants mobilized from construction activities.

Permanent erosion control measures include drainage systems and gravel or paved surfaces. In accordance with this permit, an industrial SWPPP will be prepared for the project that will be similar to the SWPPP for the existing PPP. BMPs for the project would be similar to the BMPs currently being implemented to control pollutants in stormwater discharges for the PPP. BMPs will include refueling and maintenance of equipment only in designated lined and/or bermed areas, isolating hazardous materials from stormwater exposure, and preparing and implementing spill contingency plans in specified areas. Areas identified for BMPs are shown in Appendix B.

## 1.2.2 Measures to Limit Directly Connected Impervious Areas

### 1.2.2.1 Site Design Features

Current facility design indicates a conventional approach to stormwater management that will collect site drainage and convey it to facilities that retain, detain, or treat runoff. The proposed facilities will serve a mix of impervious, pervious, and partially pervious areas. It is understood that conventional facilities generally require frequent maintenance and this will be addressed in the facility operations and maintenance plan. As the project design moves forward, the final design may implement some low impact development technologies.

Measures that can be used to limit directly connected impervious areas include site design features, pervious pavements, and detention and drainage design. The following measures will be incorporated into the project to limit imperviousness and minimize stormwater related impacts (as shown in Appendix B):

- Site will use existing drainage features and discharge locations will be retained.
- Preserve existing vegetation.
- Development will be within the existing facility footprint and impact less area.
- Implement geotextiles and mats in identified areas.
- The perimeter of the project site will be landscaped or graveled to help retain runoff depending on soil conditions and suitable measures.
- Directly connected impervious areas will be minimized.
- Roof runoff will be directed to landscaped areas or other appropriate areas to minimize impacts.

### 1.2.3 Summary of Pervious and Self Retaining Areas

The project includes the following components that would be located outside the WPGS site but within the PPP site and the adjacent PG&E switchyard property:

- Approximately 21.5 acres of construction, laydown, parking, and office areas (Figure 11)
- Approximately 2,700 feet of new natural gas line which connects immediately upstream of the existing PPP gas meter station

- Approximately 1,600 feet of new transmission lines which connect to the PG&E switchyard
- A new hazardous material building and a new hazardous waste building, which will be located on the PPP site, west of existing Unit 7
- New screening walls, approximately 48 feet tall, which will be constructed between each of the existing Tanks 1 through 6, located on the eastern boundary of the PPP site

These features will be located on previously disturbed, graded, or paved areas of the PPP and adjacent PG&E switchyard property. Areas implementing BMPs are noted in Attachment B. Locations are identified that will preserve existing vegetation. Drainage boundaries are shown on Figure 7. Existing pervious and self retaining areas will be re-established or offset by the reduction in the facility footprint resulting in no net increase.

The project also includes an offsite component that extends beyond both the WPGS and PPP site boundaries consisting of 5-mile-long water supply and waste water discharge lines connecting the WPGS site to the DDSW WTP.

## 1.3 Preliminary Design of Treatment and Flow Control Facilities

### 1.3.1 Locations and Elevations

The WPGS equipment yard drainage was configured to mainly use existing drainage facilities. Land use within the site was categorized between pervious (landscape, open with gravel) and impervious (buildings, sidewalks, driveways, parking lots). Clean stormwater runoff will be conveyed to outfalls through storm drains and existing ditches. Figure 5 shows the site topographic survey with elevations. The water pollution control plan civil drawing shows locations of existing and proposed storm sewers (Appendix B).

### 1.3.2 Sizing Calculations

The proposed project will utilize existing facilities to manage stormwater runoff. Approximate drainage areas are identified in Figure 6. New facilities that may be implemented in addition to existing facilities in order to improve drainage will be sized based on a 25-year, 24 hour storm event. Sizing calculations will continue to be developed and improved during project design consistent with requirements.

### 1.3.3 Summary of Impervious Areas and Treatment/Flow-control Facilities

As previously discussed, impervious areas will be reduced from pre-existing conditions. Flow control facilities will be conventional. As the project design moves forward, more information will become available.

## 1.4 Source Control Measures

### 1.4.1 Description of Site Activities and Potential Sources of Pollutants

Site activities include daily operations by employees and delivery companies to operate an energy generation facility. Onsite equipment includes vehicles, back-up generators, dry waste dumpsters, chemical storage facilities, and transformers. All of the potential sources of pollutants will be identified and addressed in the facility Stormwater Management Plan. This plan will include structural and nonstructural measures for pollution prevention, good housekeeping practices, preventive maintenance, spill prevention and response, and training. Compliance reviews are conducted routinely.

### 1.4.2 Potential Sources, Permanent Source Control and BMPs

Table 1 lists the source control best management practices (BMPs) that would minimize the potential for pollutants generated by everyday activities entering stormwater.

TABLE 1  
Source Control Best Management Practices  
*Willow Pass Generating Station*

Potential Source	Permanent BMPs	Operational BMPs
Vehicle washing	All drainage from the bermed vehicle wash area will be routed to a concrete containment box. All accumulated wash- and rainwaters in the box are expected to evaporate; the box will be sized appropriately.	Sludge from the concrete containment box will be removed as needed and transported offsite by a licensed hauler for proper disposal.
Fuel storage	Fuel storage tanks will be housed within a concrete secondary containment feature.	Rainwater in the secondary containment area will be visually inspected for signs of contaminants before discharge. Absorbent pads will be used to remove petroleum hydrocarbon constituents, if any, in the ponded rainwater before discharge. Used absorbent materials will be stored in an appropriate container such designated and transported offsite for disposal by a licensed hauler.
Vehicle fueling	Fueling areas will have impermeable floors that are: a) graded at the minimum slope necessary to prevent ponding, and b) separated by a grade break that prevents run-on of stormwater to the maximum extent practicable.  Drainage from the fueling areas will first pass through a sump with a sand/oil separator prior to being pumped to the stormwater retention pond.	The fueling area will be dry-swept regularly.  Spill cleanup materials will be stored in fueling areas.  The sump and sand/oil separator will be regularly maintained.

**TABLE 1**  
 Source Control Best Management Practices  
*Willow Pass Generating Station*

<b>Potential Source</b>	<b>Permanent BMPs</b>	<b>Operational BMPs</b>
Future indoor and structural pest control	<p>Building design features that discourage entry of pests will be incorporated.</p> <p>Drainage will be routed to landscaped areas and ultimately to the stormwater retention pond.</p>	<p>Employees responsible for pest control will be encouraged to use Integrated Pest Management (IPM) measures.</p>
Future vector control at the stormwater retention pond	<p>The site will be inspected for signs of mosquito larvae.</p>	<p>Vector control management efforts will be coordinated with the Contra Costa Mosquito and Vector Control District.</p>
Landscape fertilizer/pesticide use	<p>Existing native trees, shrubs, and groundcover will be preserved to the maximum extent possible.</p> <p>Selection of landscaping materials will include pest-resistant plants (especially adjacent to hardscape) appropriate for local site conditions requiring minimal irrigation.</p> <p>Where landscaped materials are used to retain or detain stormwater, plants that are tolerant of saturated soil conditions will be selected.</p> <p>Runoff from landscape irrigation will be kept onsite.</p>	<p>Employees responsible for landscape maintenance will be encouraged to use IPM measures - landscaping will be maintained using minimum or no pesticides.</p>
Stormwater conveyance system	<p>Storm drain inlet protection (such as waddles or sand bags) will be placed and maintained to prevent contaminants from entering the bay.</p>	<p>Drainage channels will be maintained and inspected regularly to remove any accumulated debris, sediment, or dumped objects that could potentially block waters and create an overflow.</p>
Trash	<p>All drainage from trash enclosures will be properly managed so that it remains contained and onsite.</p> <p>Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.</p>	<p>Good housekeeping practices will be in effect.</p> <p>An adequate number of trash receptacles with covers will be provided; those receptacles in disrepair will be replaced.</p>
Shop/vehicle maintenance areas	<p>Equipment/vehicle repair and maintenance will be done indoors as practical. Any outdoor work area will be bermed (temporarily or permanently) to prevent run-on and runoff of stormwater.</p> <p>Interior of shop/maintenance buildings will not have floor drains.</p> <p>No sinks will be used for parts cleaning or rinsing.</p>	<p>Employees will receive annual training on the proper handling, storage, cleanup, and disposal of any hazardous materials onsite. New employees will receive this training as part of orientation.</p> <p>No person will leave unattended drip parts or other open containers containing vehicle fluids, unless such containers are in use or in an area of secondary containment.</p> <p>No hazardous materials will be disposed of in the onsite septic system or stormwater retention pond.</p> <p>Unloaded materials will be moved inside as soon as practical.</p>

**TABLE 1**  
Source Control Best Management Practices  
*Willow Pass Generating Station*

Potential Source	Permanent BMPs	Operational BMPs
		Containers will be supplied for the proper storage and disposal of hazardous wastes.  Spill cleanup materials will be stored in shop and maintenance areas.
Roofing materials/equipment	All discharges of rooftops will be routed to landscaped areas and remain onsite.  Roofing materials/equipment will not be manufactured from unprotected metal that could leach into runoff.	
Storage of equipment or materials	The storage area of non-hazardous liquids will be covered with a roof and be contained within a secondary containment feature.  All hazardous materials will be stored indoors or within a secondary containment feature sized to accommodate the size of the largest container and rainfall.  Storage of hazardous materials and wastes will be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the project site.  Separate facilities (shop) are in place for the storage and use of hazardous materials.	A spill kit will be kept in material storage areas.  Employees will receive annual training on the proper handling, storage, cleanup, and disposal of any hazardous materials onsite. New employees will receive this training as part of orientation.  No hazardous materials will be disposed of in the onsite septic system or stormwater retention pond.  Unloaded materials will be moved inside as soon as practical.  Containers will be supplied for the proper storage and disposal of hazardous wastes.
Parking lots	All drainage from the parking lots will be routed to landscape or retention areas.	Paved areas will be swept regularly to prevent accumulation of litter and debris. Debris will not be allowed to enter the stormwater retention pond.
Miscellaneous drain or washwater	All onsite drainage will be routed appropriately.	

## 1.5 Permitting and Code Compliance Issues

There are no known conflicts between the proposed Storm Water Control Plan and Contra Costa County's or City of Pittsburg's ordinances or policies.

Stormwater runoff discharges from the PPP are permitted under the National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 (General Permit) Water Quality Order No. 97-03-DWQ Waste Discharge Requirements (WDR) for Discharge of Storm Water Associated with Industrial Activities Excluding Construction Activities and NPDES Permit Number CA0004880 for the PPP. Operation of the facility will be in

conformance with the California NPDES General Permit for Stormwater Discharge Associated with Industrial Activities (SWRCB, 1997).

Conflicts with codes or requirements or other obstacles to implementing the Stormwater Control Plan have been reviewed and none have been identified.

## 1.6 Facility Maintenance

### 1.6.1 Ownership and Responsibility for Maintenance

All the flow-control, treatment and source control measures will be funded, implemented and maintained by WPGS as part of its operations budget.

WPGS agrees to provide any necessary rights of entry to Contra Costa County or City of Pittsburg for access and inspection of stormwater BMPs. WPGS accepts responsibility for interim operation and maintenance of facilities.

A Draft Storm Water Control Operation and Maintenance Plan will be submitted during project final design. The final plan will be submitted as required by any regulatory agency.

### 1.6.2 Summary of Maintenance Requirements

Routine maintenance of the stormwater facilities will occur as needed and will be recorded on an inspection form. Routine facility inspections will occur annually at a minimum prior to the rainy season and any corrective actions necessary for stormwater conveyance will be taken. Because the entire site will be covered by either hardscape or gravel, erosion and subsequent deposition of silt in the stormwater facilities is expected to be minimal.

Routine maintenance of the stormwater conveyance system will consist of removing accumulated debris or sediment, if any.

Routine maintenance of the landscaped areas will consist of mowing, replenishing mulch, as needed, irrigating adequately, but not in excess, replacing dead vegetation, weeding, and ensuring adequate vegetative cover to prevent erosion. Erosion, if any, at inflows will be repaired.

Routine maintenance of the sump with a sand/oil separators will consist of removing sludge materials and cleaning/servicing the separator, as needed; waste materials will be transported offsite by a licensed hauler for appropriate disposal.

An annual employee training program to discuss issues such as IPM and spill prevention/cleanup response will be in effect. Adequate spill containment/cleanup materials will be stored onsite and accessible to the employees.

Paved areas will be swept regularly to remove trash and other debris.

## 1.7 Construction Plan C.3 Checklist

Table 2 lists the Construction Plan C.3 Checklist to facilitate plan review when plans are compared to the Stormwater Control Plan.

TABLE 2  
 Construction Plan C.3 Checklist  
*Willow Pass Generating Station*

Stormwater Control Plan Reference	BMP Description	Plan Sheet Number
Table 1, Appendix B NS-8	The designated vehicle cleaning area will incorporate appropriate containment technology to prevent pollutant runoff such as a concrete containment box for vehicle wash water.	
Table 1, Appendix B NS-9	Secondary containment for fuel storage tanks.	
Table 1, Appendix B NS-9	Fueling areas: impermeable floors, grade break, sump with a sand/oil separator.	
Table 1	Indoor and structural pest control: building design features to discourage entry of pests.	
Table 1	Spill kits: fueling areas, material storage areas, shop and maintenance areas.	
Table 1	Existing native trees, shrubs, and groundcover will be preserved to the maximum extent possible and will be called out on final construction drawings.	
Table 1	Selection of landscaping materials will include pest-resistant plants, appropriate for local site conditions requiring minimal irrigation.	
Table 1	Where landscaped materials are used to retain or detain stormwater, plants that are tolerant of saturated soil conditions will be selected.	
Table 1, Appendix B BMPs	Stormwater conveyance system.	
Table 1, Appendix B WM-8	Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	
Table 1, Appendix B NS-10	Equipment/vehicle repair and maintenance will be done indoors as practical.	
Table 1	Any outdoor maintenance work area will be bermed to prevent runoff and run-on of stormwater.	
Table 1	No sinks will be used for parts cleaning or rinsing.	
Table 1	Adequate number of trash receptacles with covers will be provided.	
Table 1	All discharge of rooftops will be routed to prevent runoff.	

TABLE 2  
Construction Plan C.3 Checklist  
*Willow Pass Generating Station*

Stormwater Control Plan Reference	BMP Description	Plan Sheet Number
Table 1	Roofing materials/equipment will not be manufactured from unprotected metal that could leach into runoff.	
Table 1	Covered storage with secondary containment feature for non-hazardous liquids.	
Table 1	All hazardous materials will be stored indoors or larger containers (e.g., fuel tanks) within a secondary containment feature sized to accommodate the size of the largest container and rainfall.	

The project developer's signed statement accepting responsibility for maintenance from the time the facilities are constructed until responsibility for operation and maintenance is legally transferred will be completed when a contractor is selected. The project has not gone out to bid.

## 1.8 Certification

The selection, sizing, and preliminary design of treatment BMPs and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order 97-03 DWQ and the Contra Costa Clean Water Program.

MWGS accepts responsibility for interim operation and maintenance of stormwater treatment and flow-control facilities until such time as this responsibility is formally transferred to a subsequent owner as noted and signed on the cover letter.

## 1.9 Works Cited

URS. 2008. *Application for Certification for Willow Pass Generating Station*.

CDM (Camp Dresser and McKee), 1997. Phase I Environmental Site Assessment, Pittsburg Power Plant, Pittsburg, California. October 1997.

Fletcher Consultants, Inc., 2004. Soil and Groundwater Assessment, RCRA Surface Impoundment Closure, Pittsburg Power Plant, 696 W. 10th Street, Pittsburg, CA 94565, EPA ID No. CAT 080011695. June.

CH2M HILL. 2008. *Preliminary Drainage Calculations*.

Contra Costa Clean Water Program. 2008. *Stormwater C.3 Guidebook*.

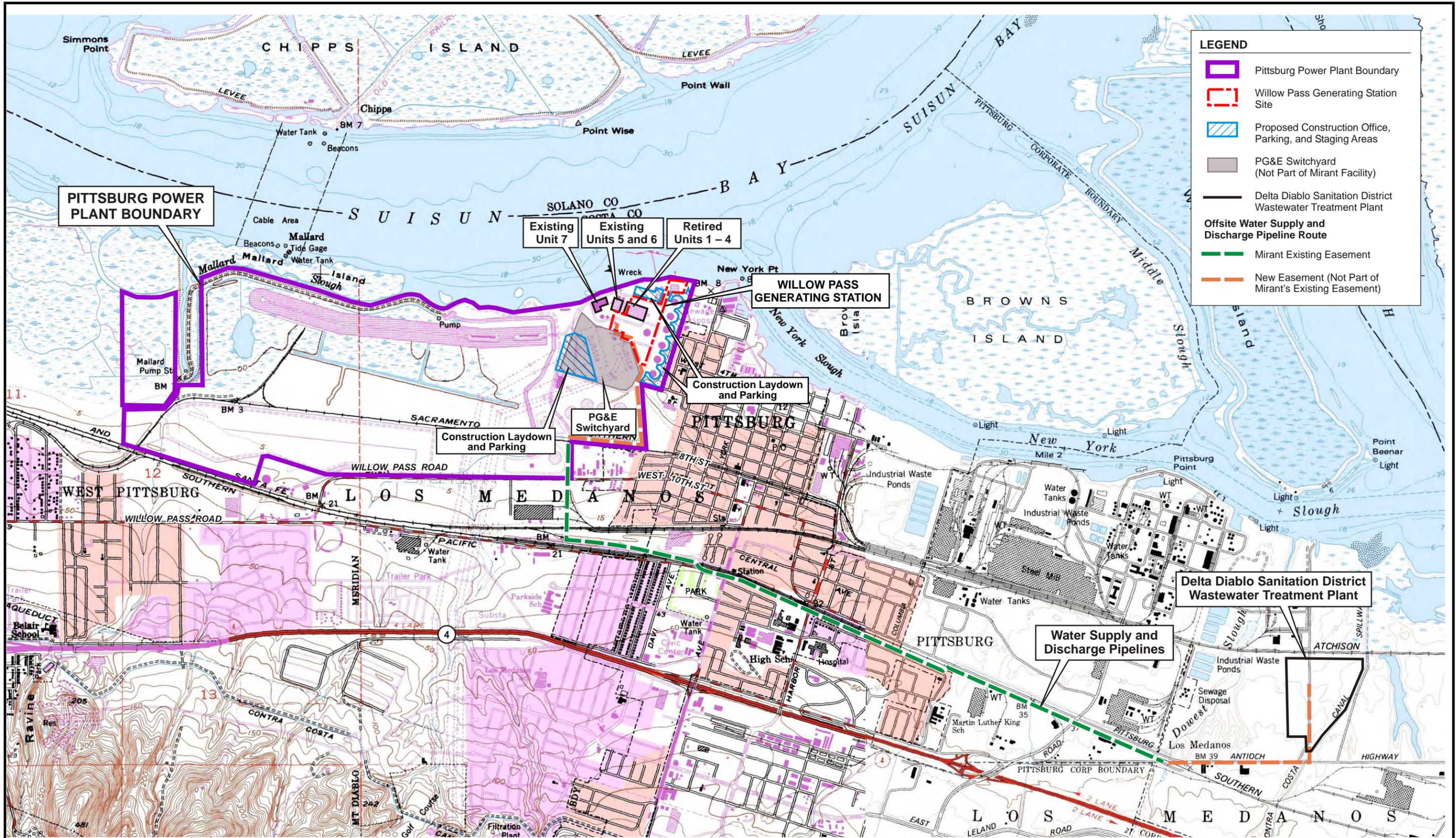
<http://www.cccleanwater.org/new-developmentc3/stormwater-c3-guidebook/>. Accessed on December 9, 2008.



## Figures

---





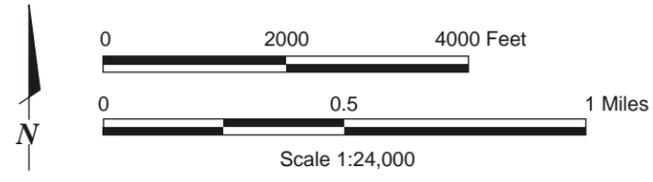
**LEGEND**

- Pittsburg Power Plant Boundary
- Willow Pass Generating Station Site
- Proposed Construction Office, Parking, and Staging Areas
- PG&E Switchyard (Not Part of Mirant Facility)
- Delta Diablo Sanitation District Wastewater Treatment Plant

**Offsite Water Supply and Discharge Pipeline Route**

- Mirant Existing Easement
- New Easement (Not Part of Mirant's Existing Easement)

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



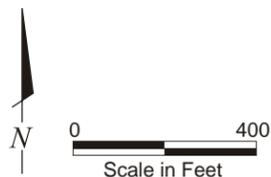
**FIGURE 1**  
**PROJECT LOCATION MAP**  
 STORMWATER CONTROL PLAN FOR THE  
 WILLOW PASS GENERATING STATION



**LEGEND**

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

Photo Source:  
DigitalGlobe; Airphoto USA 2007

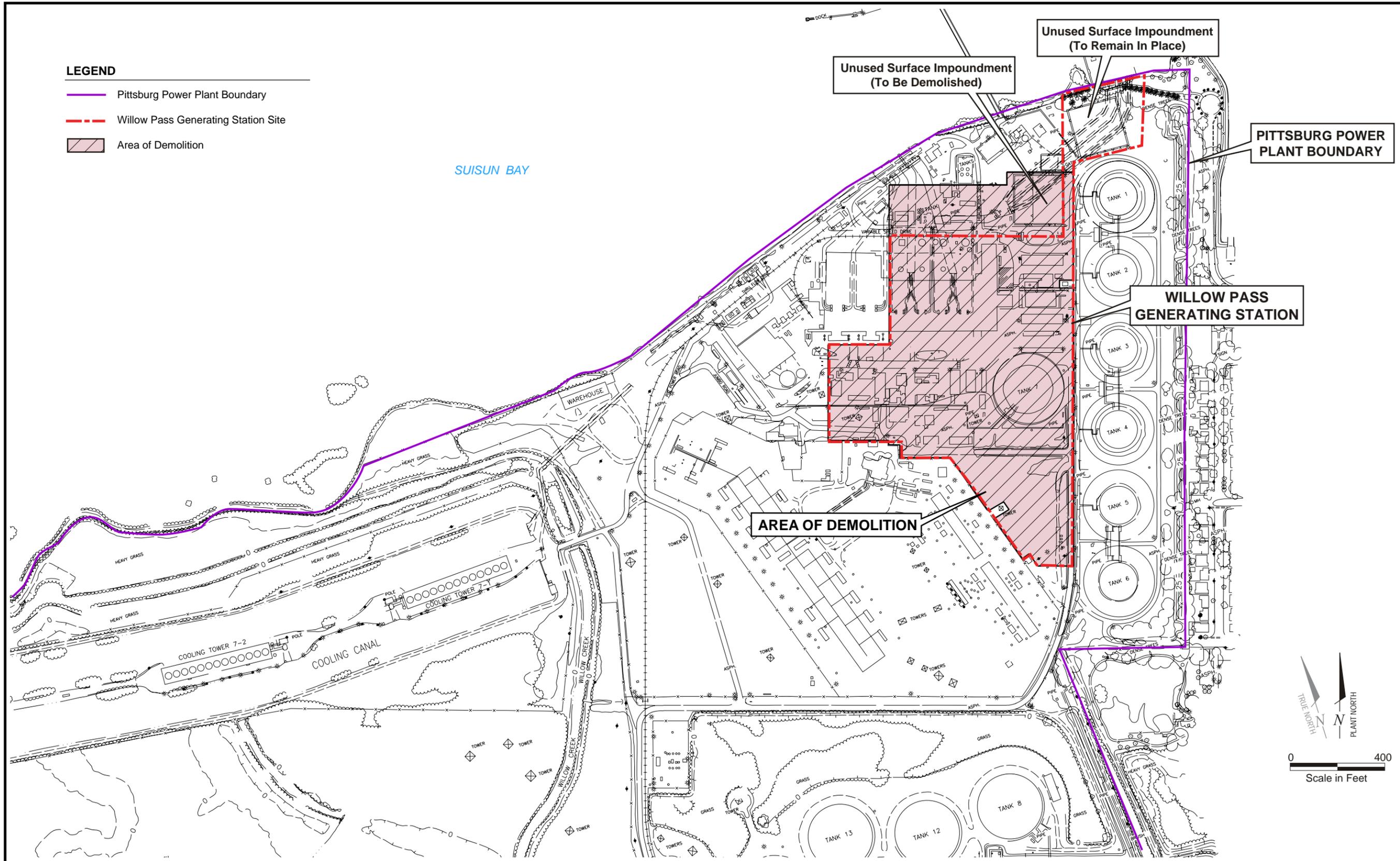


**FIGURE 2**  
**SITE PLAN**  
STORMWATER CONTROL PLAN FOR THE  
WILLOW PASS GENERATING STATION  
**CH2MHILL**

**LEGEND**

-  Pittsburg Power Plant Boundary
-  Willow Pass Generating Station Site
-  Area of Demolition

SUISUN BAY



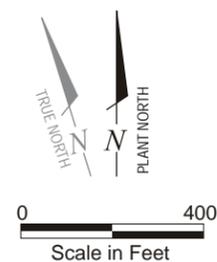
**AREA OF DEMOLITION**

**Unused Surface Impoundment  
(To Be Demolished)**

**Unused Surface Impoundment  
(To Remain In Place)**

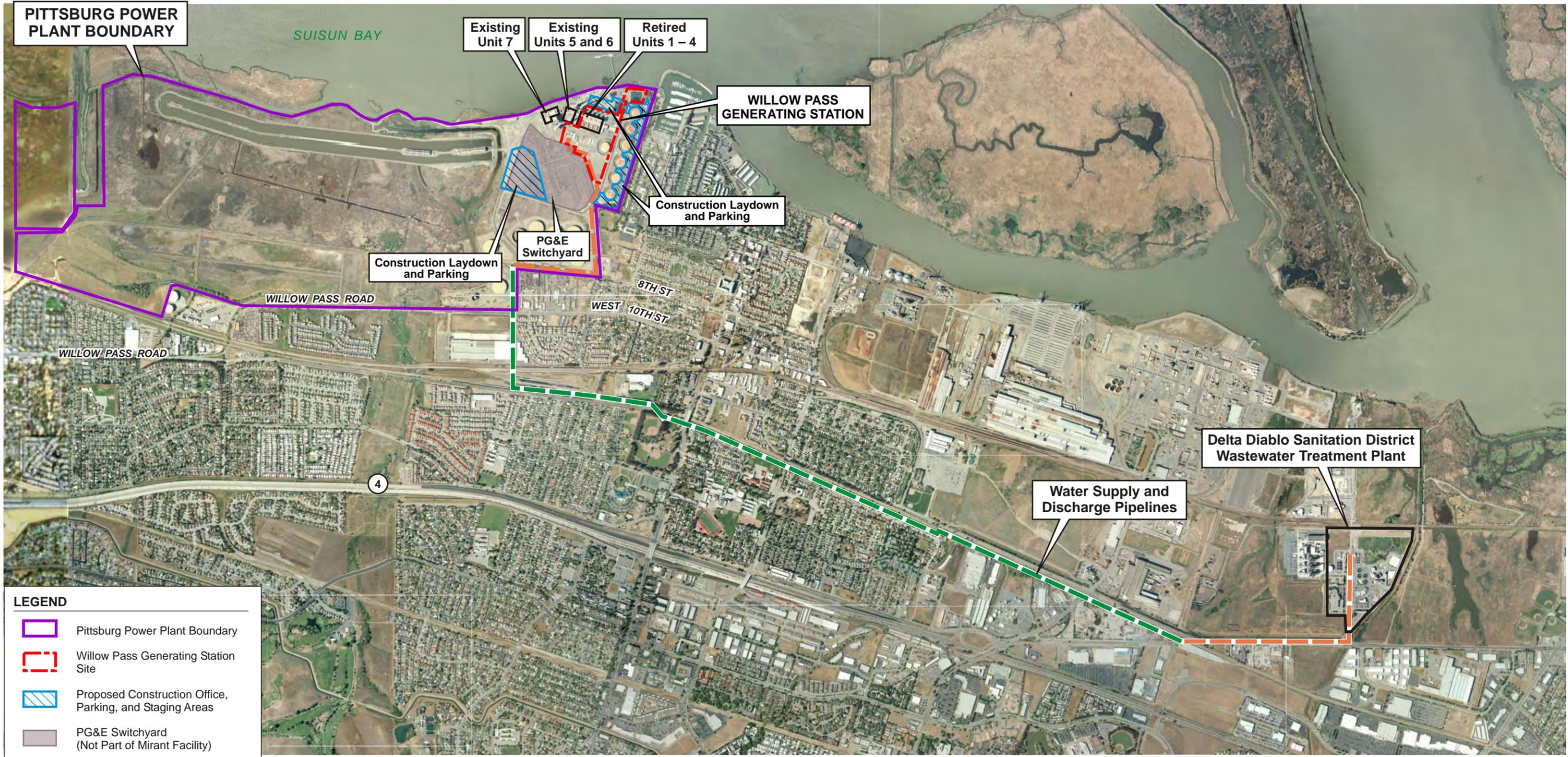
**PITTSBURG POWER  
PLANT BOUNDARY**

**WILLOW PASS  
GENERATING STATION**



Source:  
CH2MHill Lockwood Greene: General Arrangement Willow Pass Generating Station  
Demolition Drawing, Drawing No: MR-GA-PT-01-15 (Rev. C, 05/01/08)

**FIGURE 3**  
**DEMOLITION AREA**  
STORMWATER CONTROL PLAN FOR THE  
WILLOW PASS GENERATING STATION



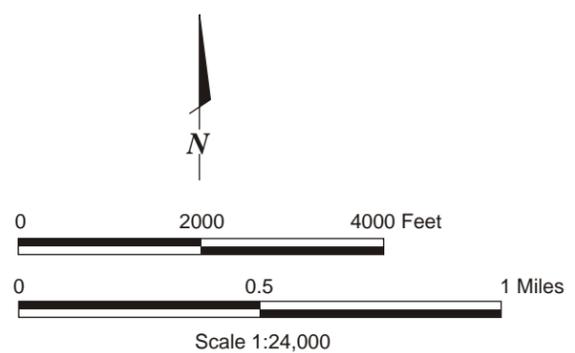
**LEGEND**

- Pittsburg Power Plant Boundary
- Willow Pass Generating Station Site
- Proposed Construction Office, Parking, and Staging Areas
- PG&E Switchyard (Not Part of Mirant Facility)
- Delta Diablo Sanitation District Wastewater Treatment Plant

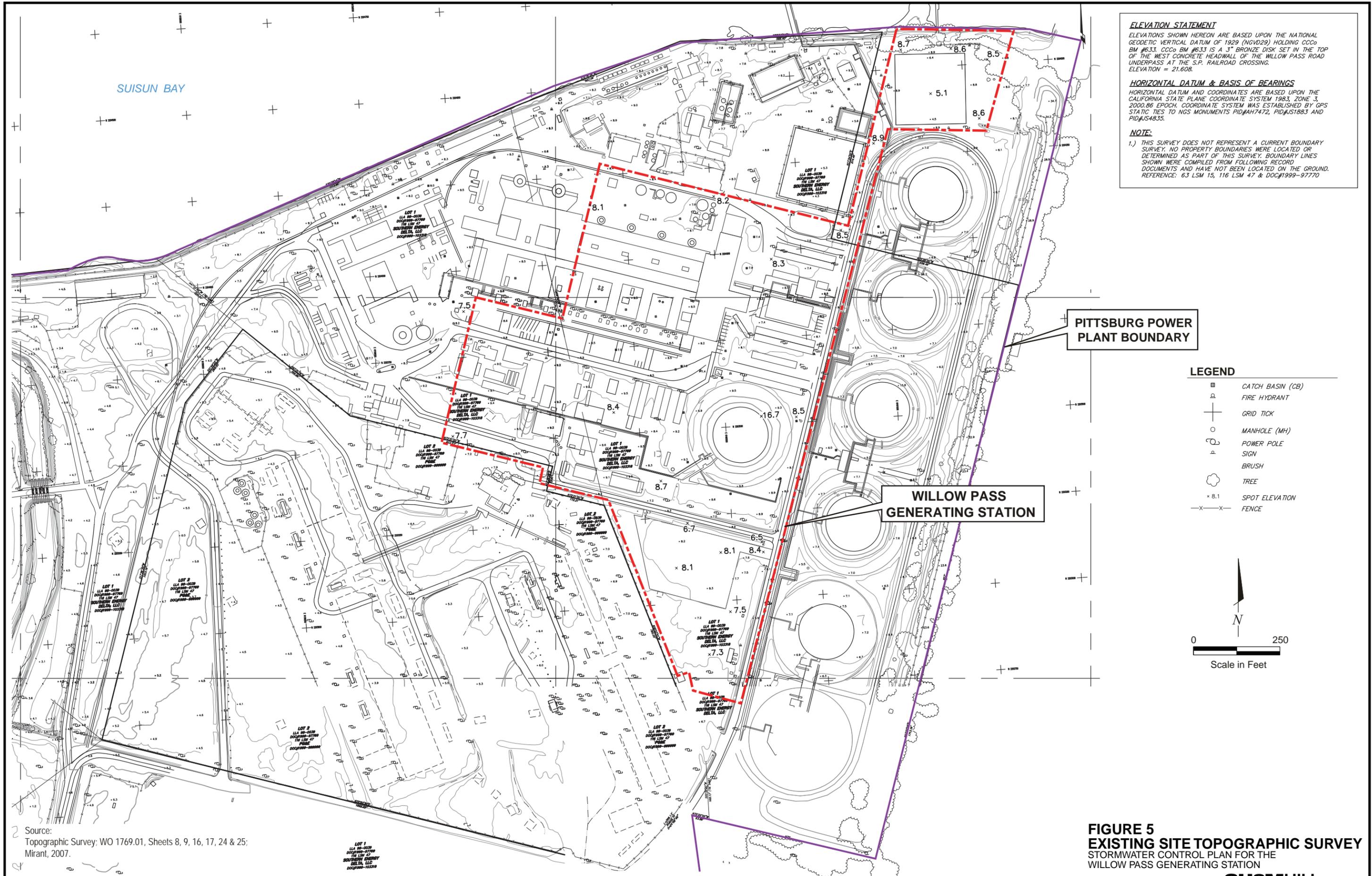
**Offsite Water Supply and Discharge Pipeline Route**

- Mirant Existing Easement
- New Easement (Not Part of Mirant's Existing Easement)

Photo Source:  
DigitalGlobe; Airphoto USA 2007



**FIGURE 4**  
**SITE VICINITY MAP**  
STORMWATER CONTROL PLAN FOR THE  
WILLOW PASS GENERATING STATION  
**CH2MHILL**

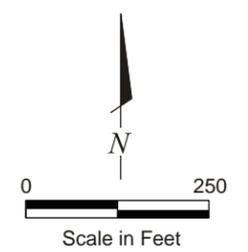


**ELEVATION STATEMENT**  
 ELEVATIONS SHOWN HEREON ARE BASED UPON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) HOLDING CCGO BM #633. CCGO BM #633 IS A 3" BRONZE DISK SET IN THE TOP OF THE WEST CONCRETE HEADWALL OF THE WILLOW PASS ROAD UNDERPASS AT THE S.P. RAILROAD CROSSING. ELEVATION = 21.608.

**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#J1883 AND PID#J54835.

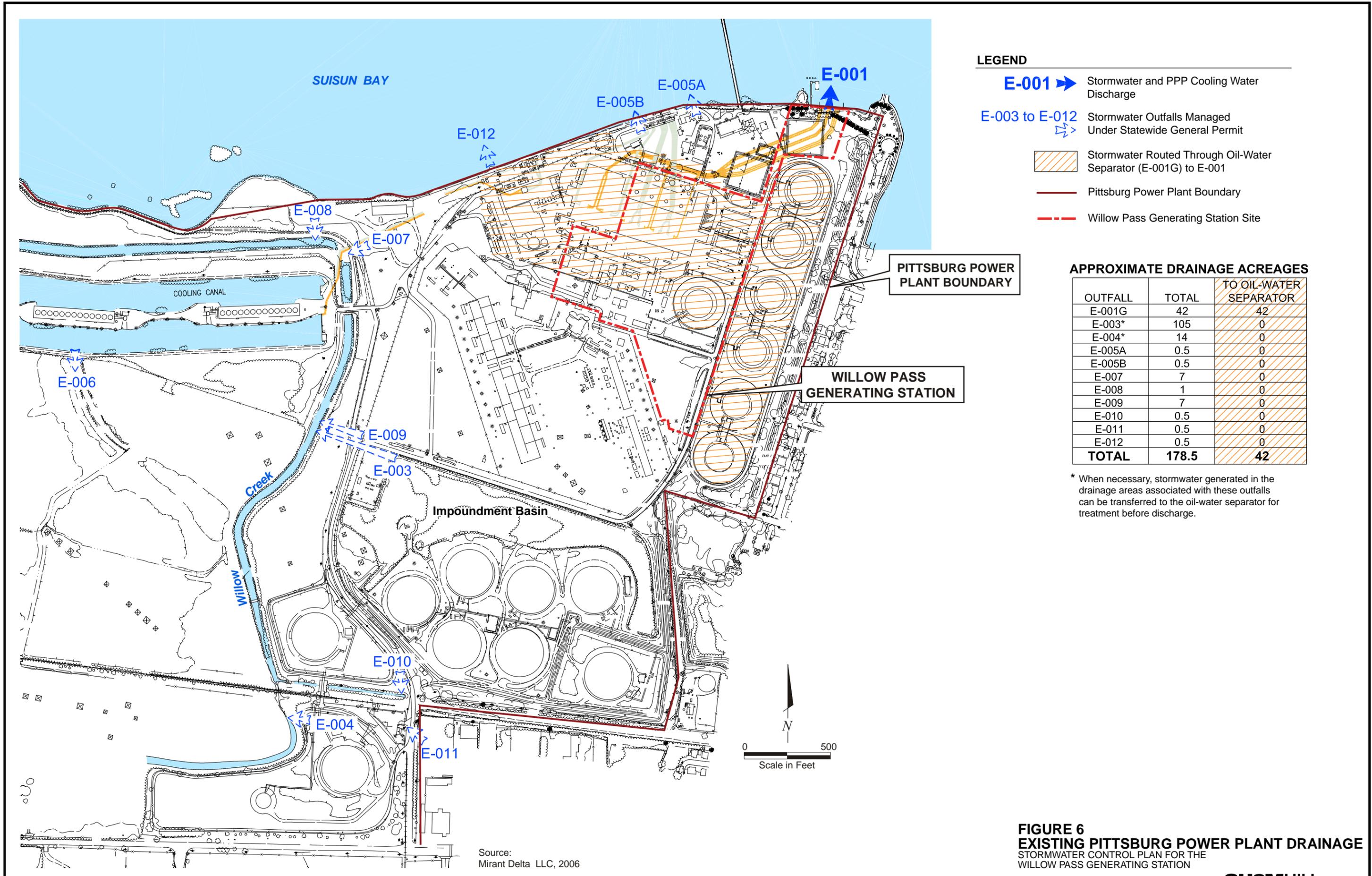
**NOTE:**  
 1.) THIS SURVEY DOES NOT REPRESENT A CURRENT BOUNDARY SURVEY. NO PROPERTY BOUNDARIES WERE LOCATED OR DETERMINED AS PART OF THIS SURVEY. BOUNDARY LINES SHOWN WERE COMPILED FROM FOLLOWING RECORD DOCUMENTS AND HAVE NOT BEEN LOCATED ON THE GROUND. REFERENCE: 63 LSM 15, 116 LSM 47 & DOC#1999-97770

- LEGEND**
- ▣ CATCH BASIN (CB)
  - ⊕ FIRE HYDRANT
  - ⊕ GRID TICK
  - MANHOLE (MH)
  - ⊕ POWER POLE SIGN
  - ⊕ BRUSH
  - ⊕ TREE
  - x 8.1 SPOT ELEVATION
  - x-x- FENCE

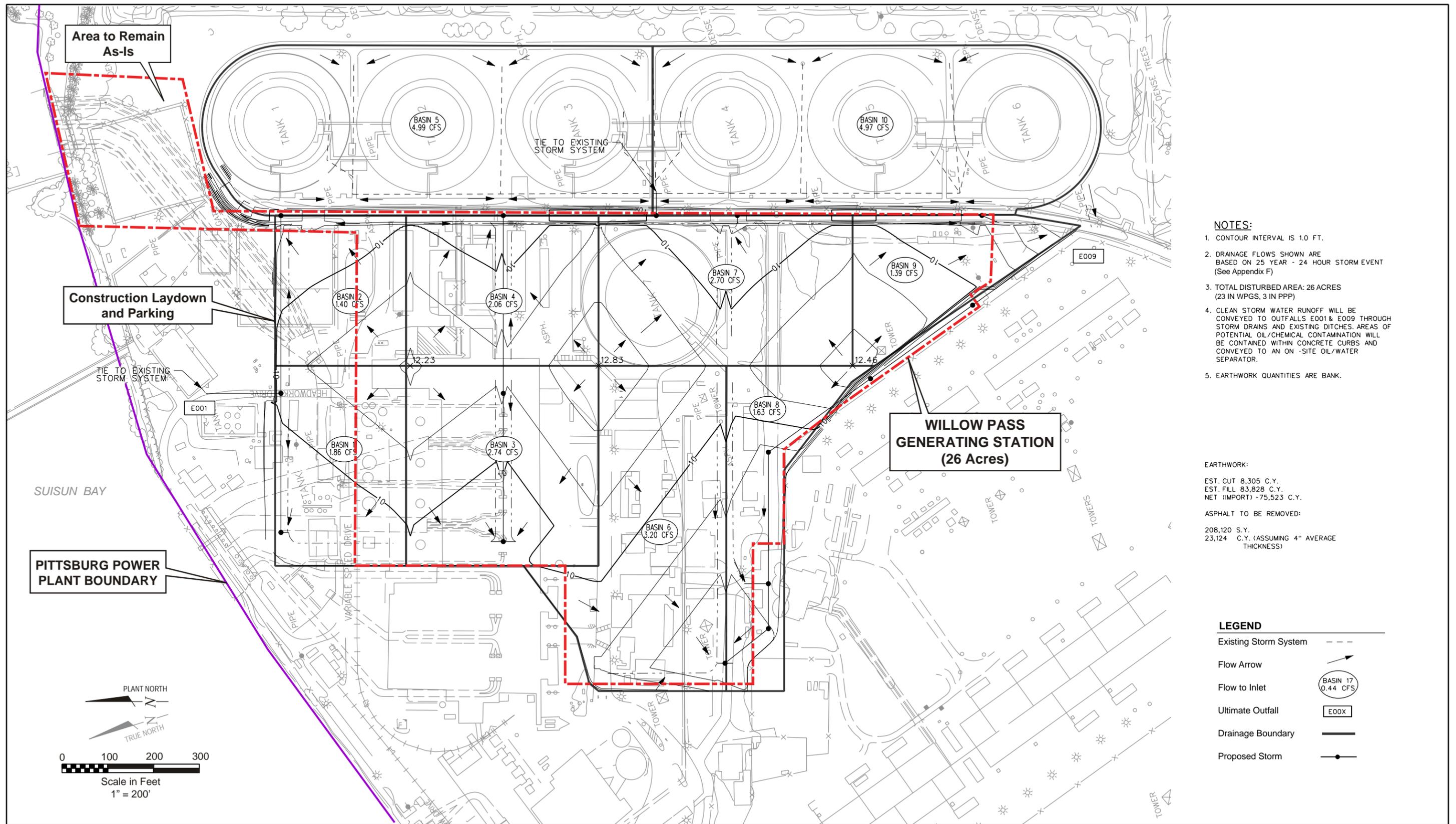


Source:  
 Topographic Survey; WO 1769.01, Sheets 8, 9, 16, 17, 24 & 25;  
 Mirant, 2007.

**FIGURE 5**  
**EXISTING SITE TOPOGRAPHIC SURVEY**  
 STORMWATER CONTROL PLAN FOR THE  
 WILLOW PASS GENERATING STATION



**FIGURE 6**  
**EXISTING PITTSBURG POWER PLANT DRAINAGE**  
 STORMWATER CONTROL PLAN FOR THE  
 WILLOW PASS GENERATING STATION



**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:**

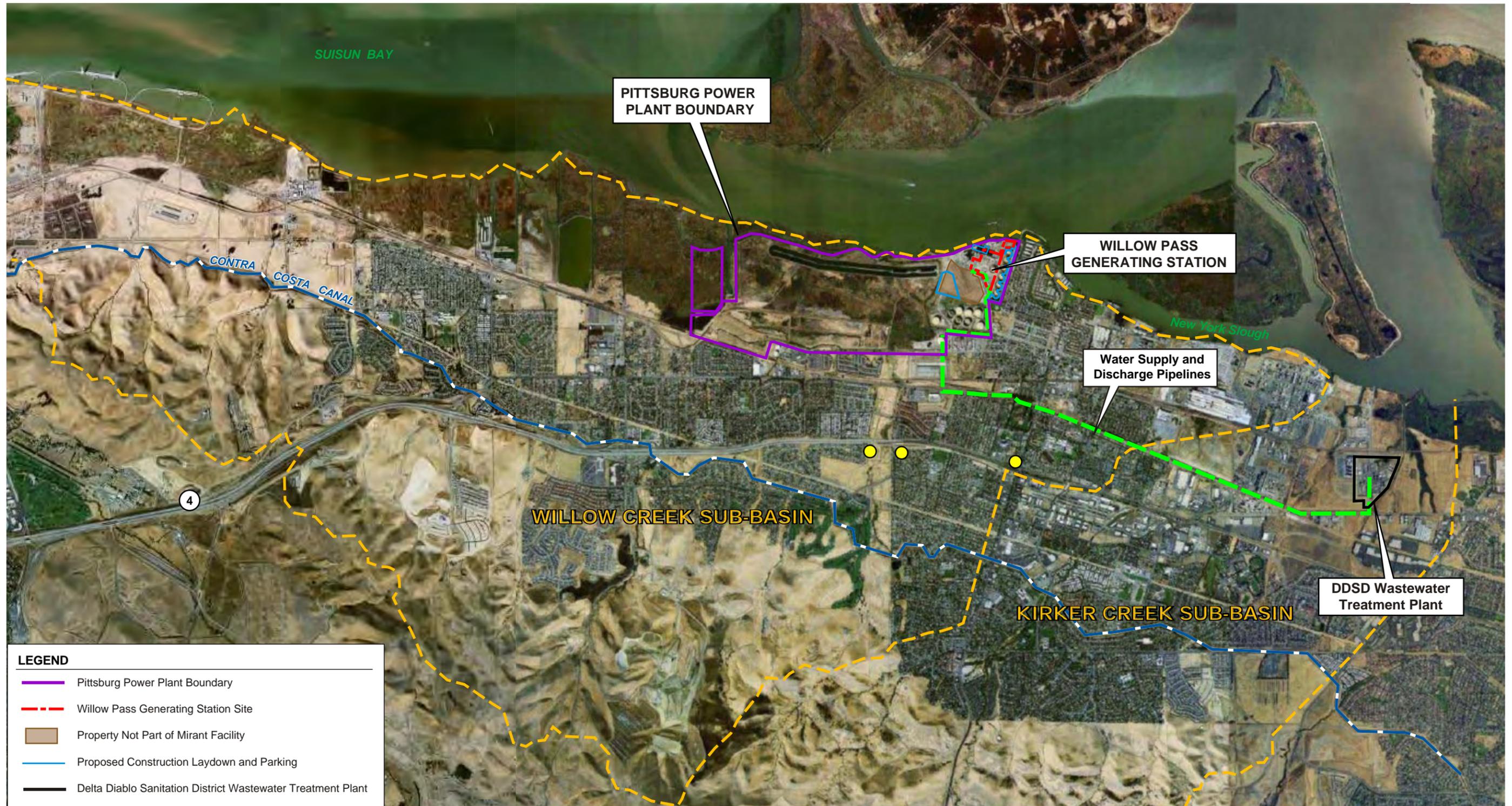
208,120 S.Y.  
 23,124 C.Y. (ASSUMING 4" AVERAGE THICKNESS)

**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)

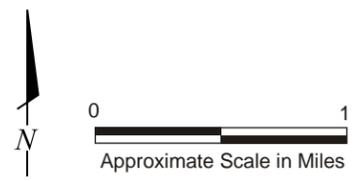
**FIGURE 7**  
**SITE GRADING AND DRAINAGE PLAN**  
 STORMWATER CONTROL PLAN FOR THE  
 WILLOW PASS GENERATING STATION



**LEGEND**

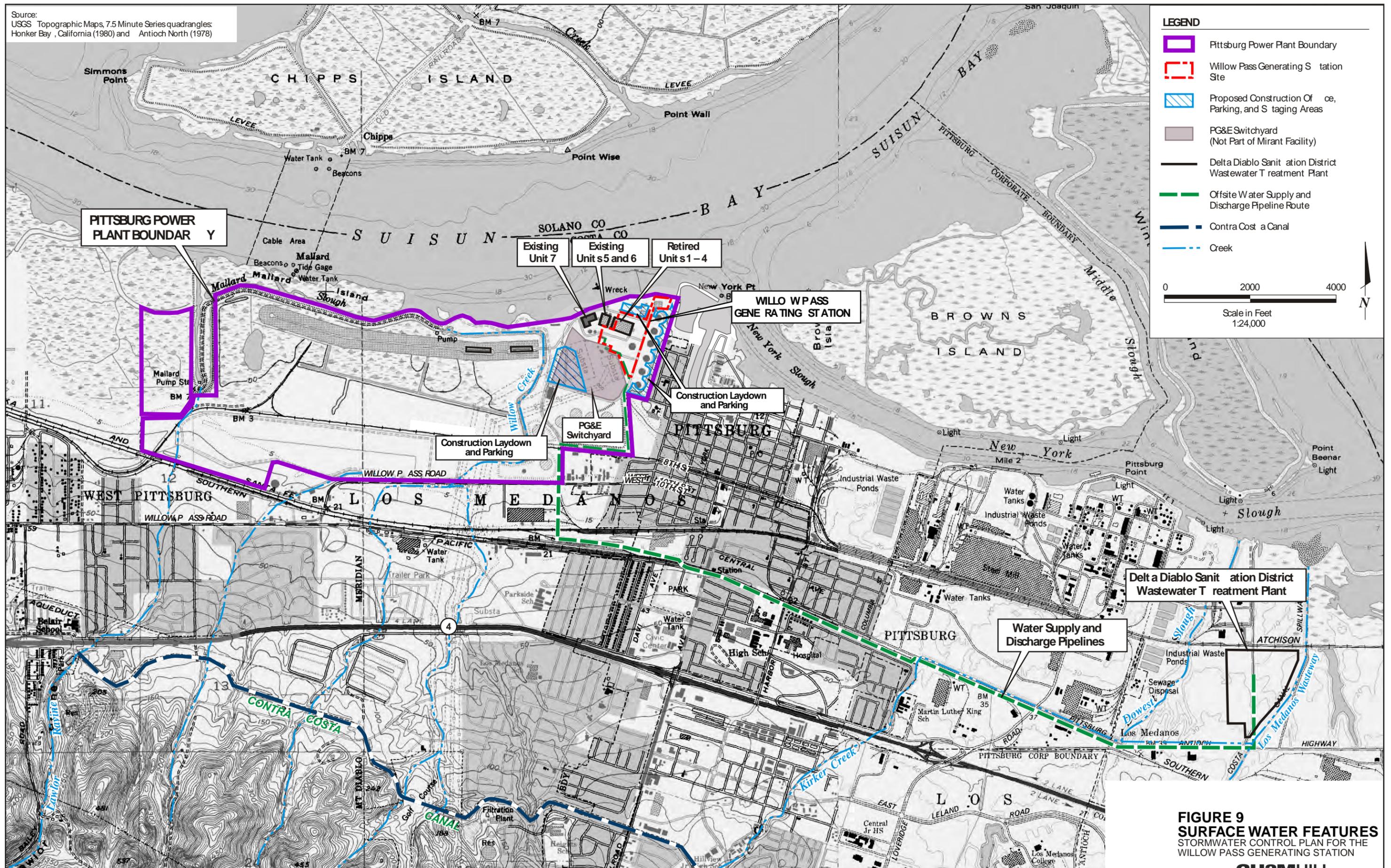
	Pittsburg Power Plant Boundary
	Willow Pass Generating Station Site
	Property Not Part of Mirant Facility
	Proposed Construction Laydown and Parking
	Delta Diablo Sanitation District Wastewater Treatment Plant
	Offsite Water Supply and Discharge Pipeline Route
	Contra Costa Canal
	Sub-Basin Boundary
	Municipal Well

Source:  
Google Earth 2007

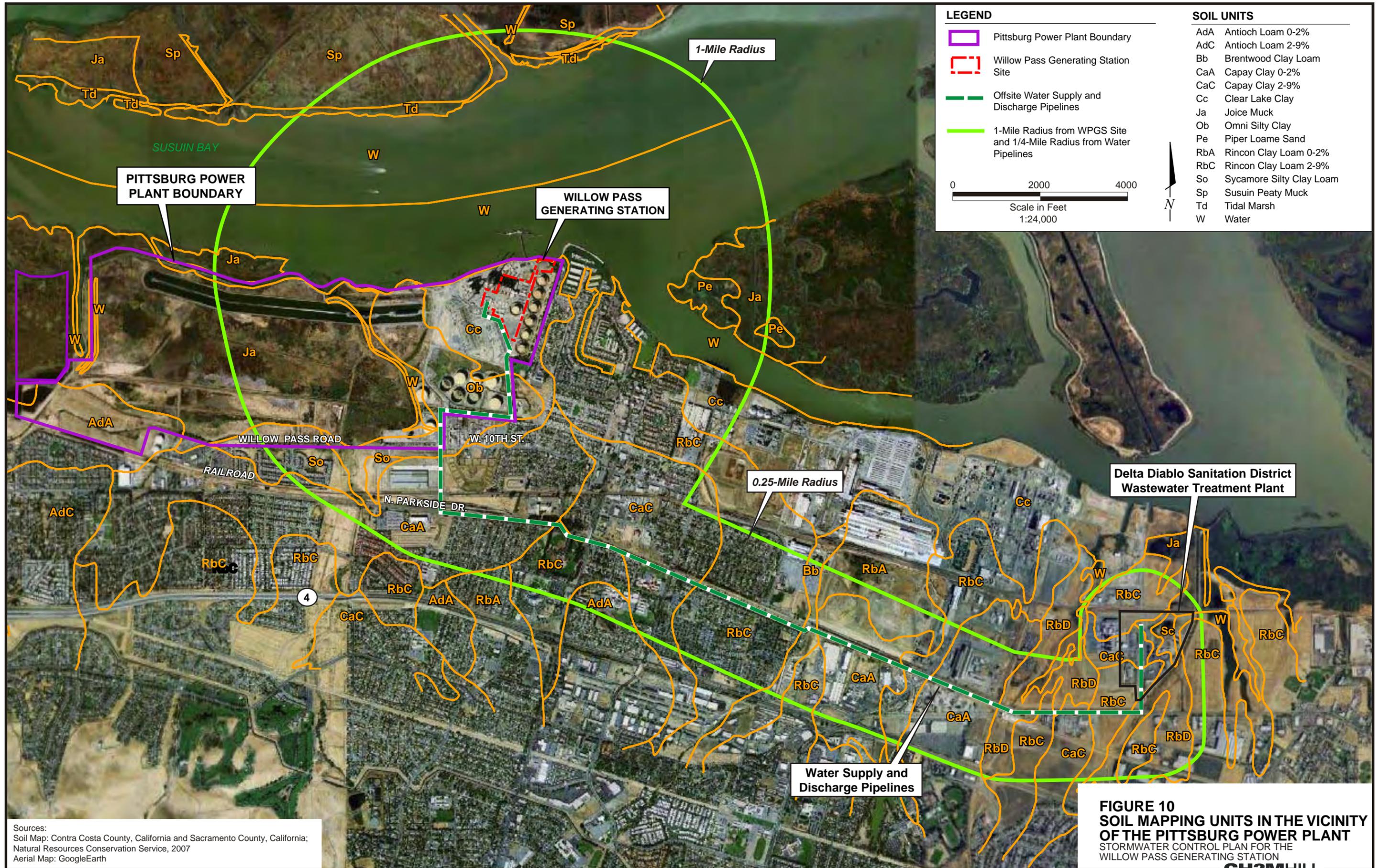


**FIGURE 8**  
**REGIONAL HYDROLOGIC SETTING**  
STORMWATER CONTROL PLAN FOR THE  
WILLOW PASS GENERATING STATION

Source:  
USGS Topographic Maps, 7.5 Minute Series quadrangles:  
Honker Bay, California (1980) and Antioch North (1978)



**FIGURE 9**  
**SURFACE WATER FEATURES**  
STORMWATER CONTROL PLAN FOR THE  
WILLOW PASS GENERATING STATION



**LEGEND**

- Pittsburg Power Plant Boundary
- Willow Pass Generating Station Site
- Offsite Water Supply and Discharge Pipelines
- 1-Mile Radius from WPGS Site and 1/4-Mile Radius from Water Pipelines

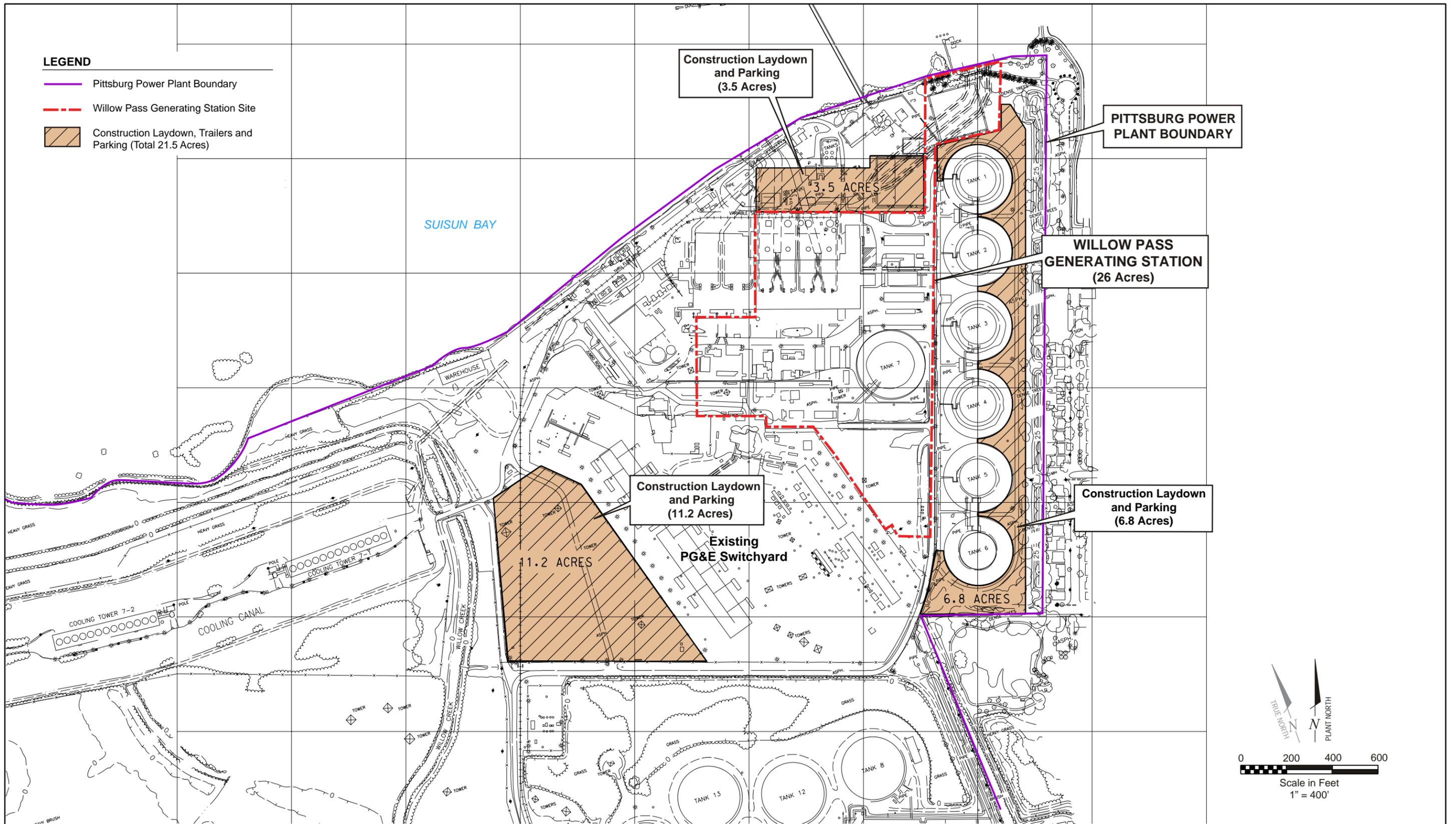
0      2000      4000  
 Scale in Feet  
 1:24,000

**SOIL UNITS**

AdA	Antioch Loam 0-2%
AdC	Antioch Loam 2-9%
Bb	Brentwood Clay Loam
CaA	Capay Clay 0-2%
CaC	Capay Clay 2-9%
Cc	Clear Lake Clay
Ja	Joice Muck
Ob	Omni Silty Clay
Pe	Piper Loame Sand
RbA	Rincon Clay Loam 0-2%
RbC	Rincon Clay Loam 2-9%
So	Sycamore Silty Clay Loam
Sp	Susuin Peaty Muck
Td	Tidal Marsh
W	Water

Sources:  
 Soil Map: Contra Costa County, California and Sacramento County, California;  
 Natural Resources Conservation Service, 2007  
 Aerial Map: GoogleEarth

**FIGURE 10**  
**SOIL MAPPING UNITS IN THE VICINITY**  
**OF THE PITTSBURG POWER PLANT**  
 STORMWATER CONTROL PLAN FOR THE  
 WILLOW PASS GENERATING STATION



Source:  
 CH2MHill Lockwood Greene; General Arrangement Willow Pass Generating Station  
 Construction Laydown and Parking Layout:  
 Drawing No: MR-GA-PT-01-16 (Rev. A, 06/04/08)

**FIGURE 11**  
**CONSTRUCTION OFFICE,**  
**PARKING, AND LAYDOWN AREAS**  
 STORMWATER CONTROL PLAN FOR THE  
 WILLOW PASS GENERATING STATION  
**CH2MHILL**



**Appendix A**  
**Willow Pass Generating Station Preliminary**  
**Drainage Calculations**

---





**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 *DH*

DATE: 5/5/2008

CHECKED BY: JOHN PURDY, P.E. *J Purdy*

DATE: 5/7/08

APPROVED BY: MARIO SCACCO, P.E. *M Scacco*

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 STRUCTURES 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 CH2M Verified  
Issue Date: 12/2/2004  
 Yes  
 No

## 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.

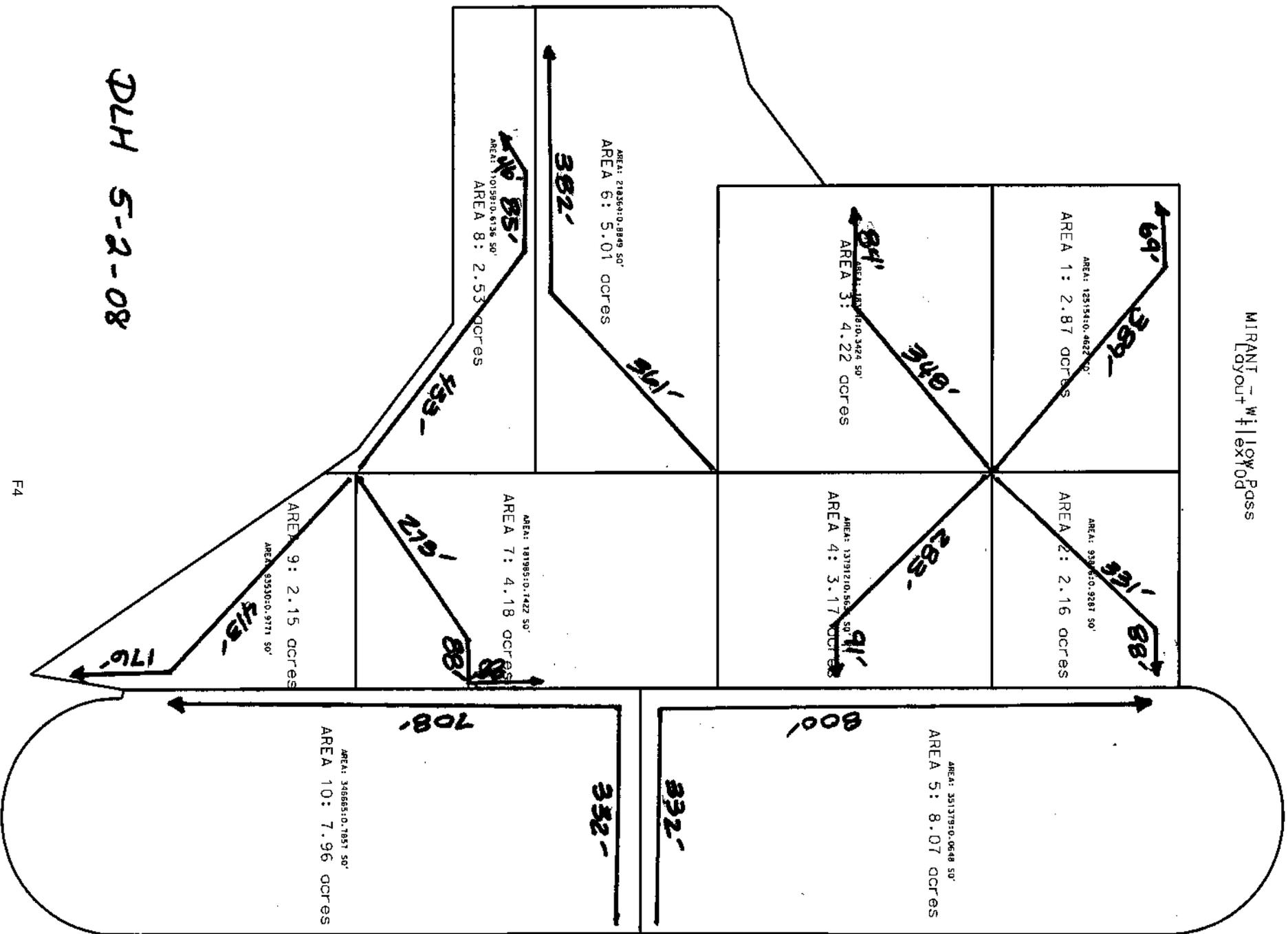
Calculation Assumptions as follows:

- 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**

<u>SUB-AREA</u>	<u>FLOW (cfs)</u>
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
<u>TOTAL AREA</u>	<u>TOTAL FLOW</u>
42.3 acres	26.71 cfs

MIRANT Willow Pass  
Layout Flex 10d



DLH 5-2-08

WinTR-55 Current Data Description

--- Identification Data ---

User: CH2MHILL Date: 5/2/2008  
 Project: MIRANT - 371583 Units: English  
 SubTitle: Willow Pass Flex10d Areal Units: Acres  
 State: California  
 County: Contra Costa  
 Filename: N:\Mirant\Structural\Civil\Pittsburg\Calcs\Willow Pass Flex10d.w55

--- 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>

ES

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

18

CH2MHILL

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

F7

CH2MHILL

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

18



CH2MHILL

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

F10

CH2MHILL

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 ==

FIN

CH2MHILL

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)
<b>SUBAREAS</b>						
P1	0.75 7.97	1.14 7.95	1.39 7.94	1.86 7.94	2.04 7.94	2.19 7.94
P2	0.56 7.96	0.86 7.95	1.05 7.94	1.40 7.94	1.54 7.93	1.65 7.93
P3	1.10 7.96	1.67 7.95	2.04 7.94	2.74 7.94	3.00 7.93	3.22 7.93
P4	0.83 7.96	1.26 7.94	1.54 7.94	2.06 7.94	2.26 7.93	2.42 7.93
P5	1.99 8.07	3.04 8.05	3.72 8.06	4.99 8.04	5.48 8.05	5.87 8.03
P6	1.29 8.02	1.95 8.00	2.39 7.99	3.20 8.00	3.51 7.99	3.76 7.98
P7	1.09 7.97	1.65 7.96	2.02 7.95	2.70 7.95	2.97 7.94	3.18 7.94
P8	0.66 7.99	1.00 7.96	1.22 7.96	1.63 7.95	1.79 7.95	1.92 7.95
P9	0.56 8.00	0.85 7.97	1.03 7.96	1.39 7.95	1.52 7.96	1.63 7.95
P10	1.99 8.05	3.03 8.04	3.70 8.03	4.97 8.04	5.45 8.03	5.84 8.03
<b>REACHES</b>						
OUTLET	10.73	16.32	19.94	26.71	29.32	31.40

F12

Soil Map—Contra Costa County, California, and Solano County, California  
(MIRANT - Pittsburg Power Plant)





## 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.

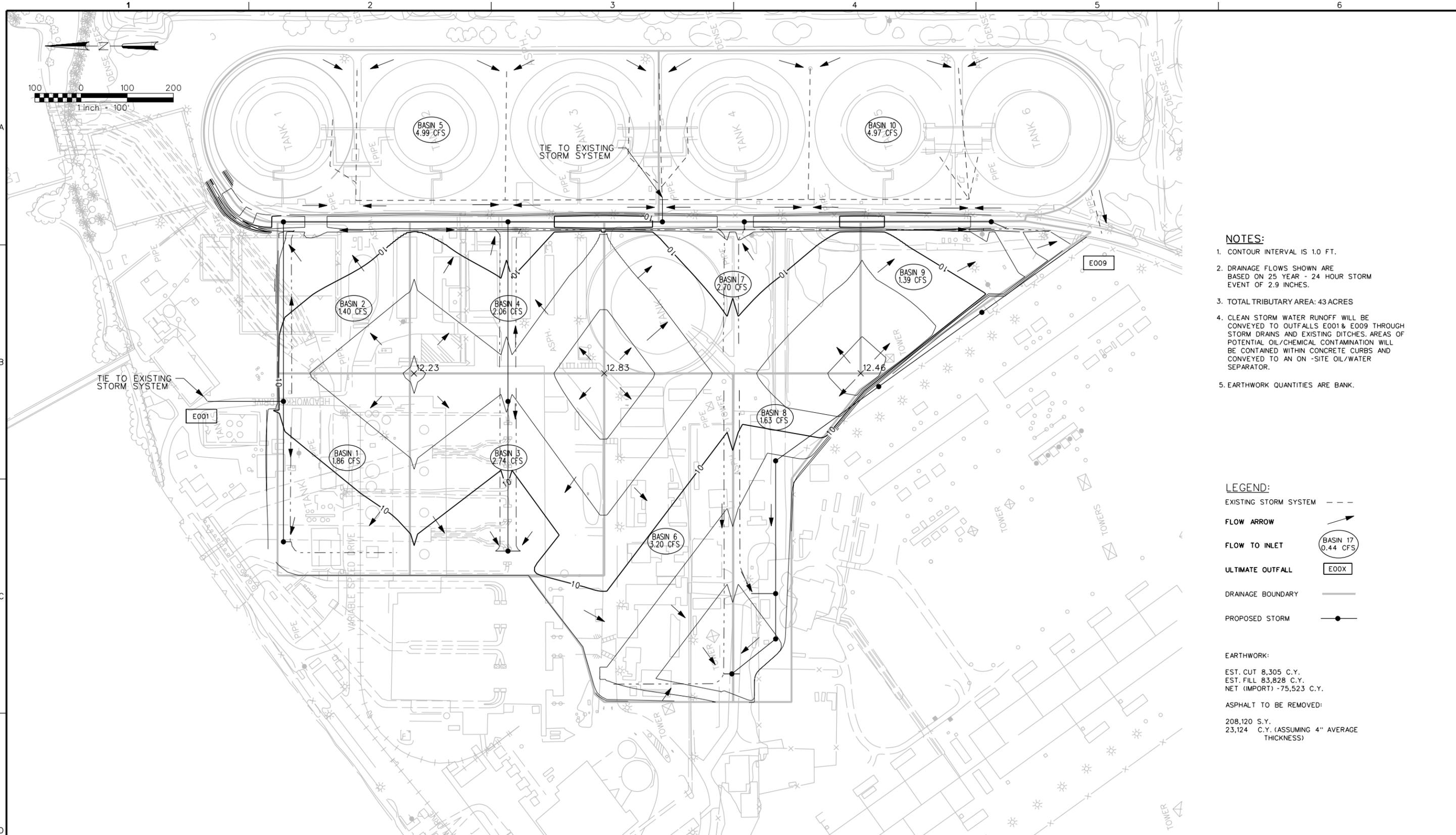
## Rating Options

*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)

NO	DATE	REVISION	BY	CHK	REVISION APPROVAL		REV A		STATUS						
					DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED	ISSUED	REV	DATE	DM	SDE	PEM	
P1	/ /	ISSUED FOR REVIEW	XXX	YYY											
B	5/05/08	ISSUED FOR REVIEW	TC	DH	CIVIL		ELECTRICAL		PRELIMINARY	P1					
C	5/13/08	ISSUED FOR REVIEW	TC	DH	STRUCTURAL		INST & CONTROL		FOR REVIEW AND APPROVAL	C					
					MECHANICAL		ARCHITECTURAL		APPROVED FOR CONSTRUCTION						
					PROCESS		ENVIRONMENTAL		REVISED & APPROVED FOR CONSTRUCTION						
					PIPING		GEN. ARRANG.								
								F47							

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

PROJECT NO. 371583

**CH2MHILL  
 Lockwood Greene**

DWG NO MR-CI-PT-00-01    REV C

REUSE OF DOCUMENTS: THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN AS AN INSTRUMENT OF PROFESSIONAL SERVICE IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2MHILL. ©CH2M HILL



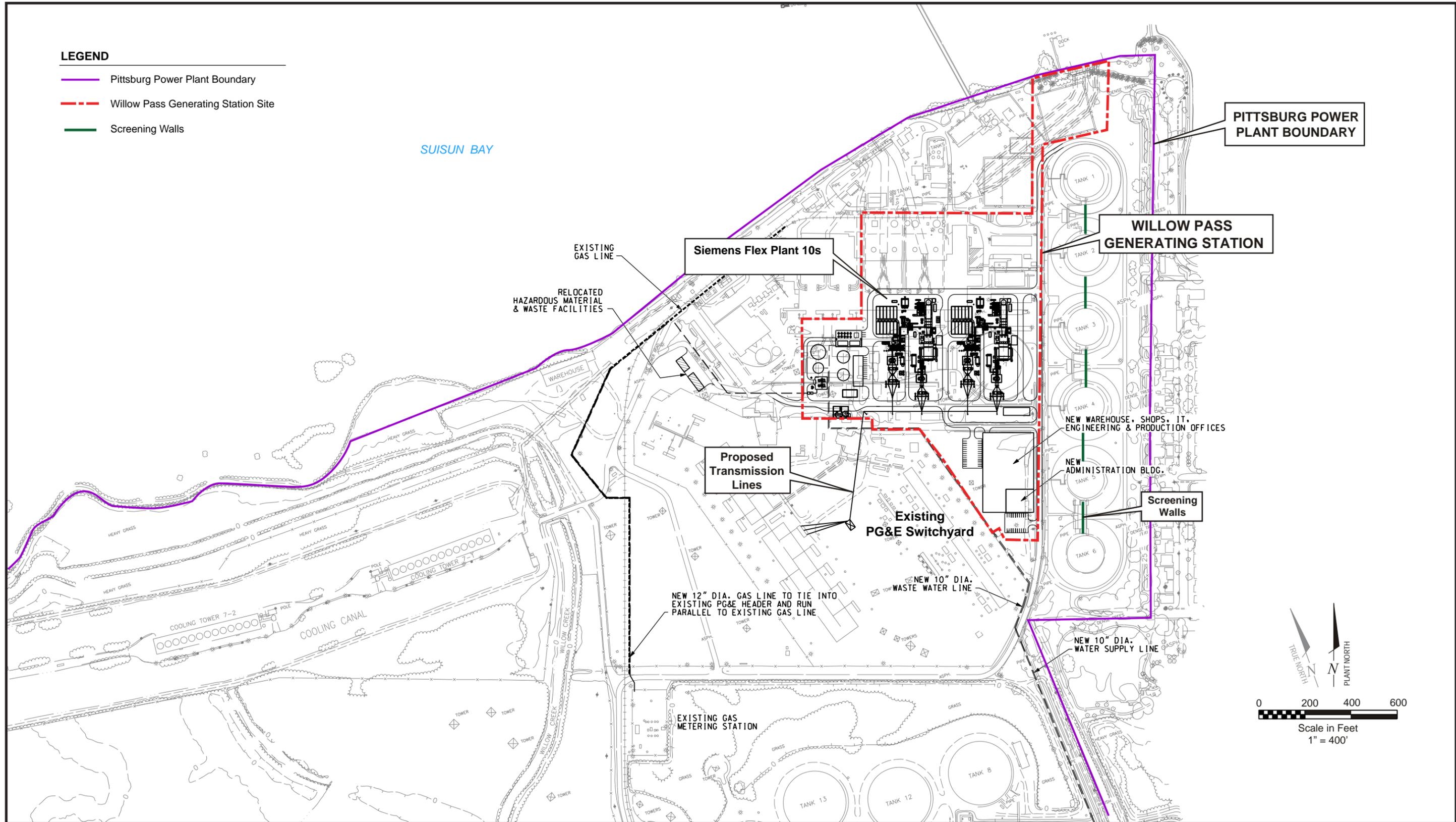
**Appendix B**  
**Willow Pass Plot Plan**

---



**LEGEND**

- Pittsburg Power Plant Boundary
- - - Willow Pass Generating Station Site
- Screening Walls



PITTSBURG POWER PLANT BOUNDARY

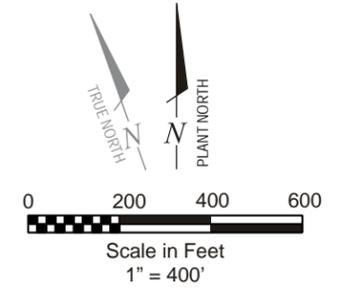
WILLOW PASS GENERATING STATION

Siemens Flex Plant 10s

Proposed Transmission Lines

Existing PG&E Switchyard

Screening Walls



Source:  
CH2MHill Lockwood Greene: General Arrangement Willow Pass Plot Plan  
Combined-Cycle Siemens Flex 10s;  
Drawing No: MR-GA-PT-01-12 (Rev. E, 06/20/08)

**APPENDIX B  
PLOT PLAN**  
STORMWATER CONTROL PLAN FOR THE  
WILLOW PASS GENERATING STATION