Data Request 63

DRAFT STORM WATER POLLUTION PREVENT PLAN FOR CONSTRUCTION

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National Pollutant Discharge Elimination System (NPDES)

WDID #

PICO POWER PROJECT

STORM WATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION ACTIVITIES

December 2002

Prepared for:

SILICON VALLEY POWER

850 Duane Ave.
Santa Clara, California 95054

Prepared by:

FOSTER WHEELER ENVIRONMENTAL CORPORATION

3947 Lennane Drive, Suite 200
Sacramento, California 95834

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ABBREVIATIONS AND ACRONYMS

AST	aboveground storage tank
BMP	Best Management Practice
CA	Construction Activity
CE	Civil Engineer
cfs	cubic feet per second
CWA	Clean Water Act
DWR	Department of Water Resources
ESC	Erosion and Sedimentation Control
FEMA	Federal Emergency Management Agency
°F	degrees Fahrenheit
HDPE	high density polyethylene
LLC	Limited Liability Company
MW	megawatt
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
P.E.	Professional Engineer
PG&E	Pacific Gas and Electric
PPP	Pico Power Project
RCP	reinforced concrete pipe
RWQCB	Regional Water Quality Control Board
SWM	Surface Water Management
SWPPP	Storm Water Pollution Prevention Plan
WRCC	Western Region Climate Center

FOREWORD

This plan has been prepared for Silicon Valley Power in order to comply with the National Pollutant Discharge Elimination System (NPDES) program, specifically, the Modified General Construction Activity Storm Water Permit program as set forth by the state of California Regional Water Quality Control Board (RWQCB). The August 1999 General Construction Activity Storm Water Permit program (99-08-DWQ) modification, changing the requirements to include small construction, was adopted in the December 2, 2002 board meeting. Regulated sites, including "site grading over 1 acres", are generally required to develop a Storm Water Pollution Prevention Plan (SWPPP) and a Storm Water Monitoring Sampling and Reporting Program.

This SWPPP for Construction Activities is for the General Construction Storm Water Permit Activities at the Pico Power Project located at 850 Duane Avenue in Santa Clara, California. Copies of the SWPPP will be retained at all times in the on-site office of Silicon Valley Power.

CERTIFICATION

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

For Silicon Valley Power

Name of Certifier: ______________________________

Signature of Certifier: ______________________________

Title of Certifier: ______________________________

Date of Certification: ______________________________

PICO POWER PROJECT - SWPPP

PROFESSIONAL CERTIFICATION

This Storm Water Pollution Prevention Plan (SWPPP) for Construction Activities was prepared by, or under the direct supervision of, the undersigned, a Registered Civil Engineer (CE-41963) in the state of California, with experience in storm water runoff, site drainage, and erosion control. The report contains information generated by the undersigned, as well as information from other sources, which the undersigned believes to be true and accurate.

Signed: ______________________________

Date: ______________________________

Revision	Date	Signature

1.0 INTRODUCTION

1.1 GENERAL

This Storm Water Pollution Prevention Plan (SWPPP) for Construction Activities presents the measures to be implemented to minimize sediment and other pollutants in storm water discharges during construction of the Pico Power Project site development in Santa Clara County, California. The Pico Power Project will be a 122 megawatt nominal net output, natural gas-fired, combined-cycle electrical generating facility, with the ability to peak-fire to 147 MW, connected to a 115-kilovolt switchyard. The PPP will be located on 2.86 acres at 850 Duane Avenue in the City of Santa Clara, in Santa Clara County. (Appendix A, Figure 1)

Facilities include two LM6000PC Sprint combustion turbine generators (CTGs) and associated equipment, and a compressor station. Additional construction areas include four construction laydown and off-site worker parking areas, the installation of new linear facilities and a gas metering station as discussed in Section 1.2.

This SWPPP has two major objectives: 1) to help identify the sources of sediment and other pollutants that affect the quality of storm water discharges and 2) to describe and ensure the implementation of practices to reduce sediment and other pollutants in storm water discharges during construction activities. The SWPPP includes Best Management Practices (BMPs) that address source reduction (Appendix B).

This SWPPP will be made available to the public for review under Section 308(b) of the Clean Water Act (CWA), and a copy will be provided or made available to the California Regional Water Quality Control Board (RWQCB) upon request.

Required elements of the SWPPP include:

- Site Description (Section 2.0)
- BMPs to be Implemented for Construction Activities (Section 3.0)
- BMPs to be Implemented for Erosion and Sedimentation Control (Section 4.0)
- Non-Storm Water Management (Section 5.0)
- Waste Management and Disposal (Section 6.0)
- Implementation of Other Approved Plans (Section 7.0)
- Post-Construction Controls (Section 8.0)
- Site Inspections and Monitoring (Section 9.0)
- Responsible Personnel (Section 10.0)
- Personnel Training (Section 11.0)
- Certification of Compliance (Section 12.0)
- SWPPP Review and Modifications (Section 13.0)

- Site Map and Plan (Appendix A)
- BMPs Details (Appendix B)
- Hydrology/Hydraulic Report (Appendix C)
- Site Inspection and Monitoring Forms (Appendix D)
- Notice of Intent/NPDES General Permit for Construction Activities/Notice of Termination (Appendix E)

The climate in the project area is Mediterranean (NOAA division CA-04: Central Coast) with moderate year-round temperatures and a winter rainy season. The SWPPP drainage system to be used during construction is designed to control greater than the 2-year, 6-hour rainstorm event. The permanent storm water drainage controls will accommodate runoff flows from the 10-year, 24-hour rainfall event. If a storm drain pump station becomes necessary, the drain system would be required to protect electrical equipment from major damage during the 100-year, 24-hour storm event.

1.2 PROJECT OVERVIEW

The Silicon Valley Power Pico Power Project (PPP) will be a 122 megawatt nominal net output, natural gas-fired, combined-cycle electrical generating facility, located on 2.86 acres at 850 Duane Avenue in the City of Santa Clara, in Santa Clara County.

A gas compressor station for the project will be located at the City of Santa Clara's maintenance yard, on a 0.26-acre parcel at the corner of Lafayette and Comstock Streets in Santa Clara. A gas metering station (GM-4) will be located on the northwest corner of Wilcox Avenue and Gianera Street. An area approximately 30 feet by 60 feet will be required for the gas metering facility.

A new 12-inch diameter pipeline, approximately 2.0 miles long, will supply natural gas to the Pico Power Project (PPP). The new pipeline will connect with PG&E's gas distribution pipeline, Line 132, near the corner of Gianera Street and Wilcox Avenue north of the project site in Santa Clara. The natural gas pipeline route will start at the gas metering site and proceed easterly beneath the UPRR tracks and proceed south down Lafayette Street. The centerline of the pipeline will be approximately 12 feet east of the western curb line (i.e., the pipeline will be located in the outside southbound lane of Lafayette Street). The alignment will proceed south on Lafayette Street to the intersection of Lafayette Street and Aldo Street. The pipeline will then proceed to the west across the UPRR tracks and south on Bassett Street. The railroad crossing will be by bored-and-jacked casing. At Bassett Street and Laurelwood Road, the pipeline will cross under Highway 101 through a bored and jacked casing. The casing will extend from Laurelwood Road to Duane Avenue. The pipeline will then proceed south to the Pico Power Plant site and cross Lafayette Street to the gas compressor station. In the vicinity of the Pico Power Plant, a lateral pipeline will branch off to feed the duct burners. A compressed gas pipeline will proceed from the compressor station to the Pico Power Plant. It is anticipated that the three pipelines crossings of Lafayette Street will be constructed in the same trench.

Approximately 900 feet of 18-inch diameter underground pipeline will convey the project's wastewater discharge from the PPP site south in Lafayette Avenue to a 27-inch waste water main in Central Expressway.

Four areas have been identified for construction laydown and off-site worker parking. These are:

1) The northern portion of the Scott Receiving station on Space Park Drive, approximately 001 miles west of the PPP. This area (0.4 acres) is entirely graveled, chip-sealed, or paved.

2) The southern portion of the Kifer Receiving Station adjacent to and immediately south of the project site, extending northward along the western receiving station fence and boundary. This area (1.5 acres) is entirely graveled, chip-sealed, or paved.

3) Vacant space at the City of Santa Clara maintenance yard at the corner of Lafayette and Comstock Streets, approximately 400 feet southeast of the PPP. This area (0.4 acres) is entirely paved.

4) A large vacant lot south of and adjacent to the Silicon Valley Power Brokaw Substation, located west of Brokaw Road, south of Coleman, and east of the De La Cruz Boulevard overpass to the Union Pacific railroad tracks. This area (1.9 acres) is entirely graveled, chip-sealed, or paved.

Use of these sites will not involve any soil disturbance. The City of Santa Clara owns each of these areas.

The electric power produced by the facility will be transmitted to Silicon Valley Power grid. Some power will be used on-site to power auxiliaries such as gas compressors, pumps and fans, control systems, and general facility loads, including lighting, heating, and air conditioning. Some will also be converted from alternating current (AC) to direct current (DC) for use as backup power for control systems and for other uses.

The cities of Santa Clara and San Jose will provide the industrial process water supply for the PPP through the South Bay Water Recycling Program. The cities will supply reclaimed tertiary treated water to meet cooling and process makeup requirements. Any backup water requirements will be met by installation of an industrial well installed by the City of Santa Clara on the project site.

Water required for domestic uses and fire fighting will be provided by the City of Santa Clara. A new connection would be made to the existing 12-inch potable water line that runs on site in the former PicoWay.

The PPP is expected to begin construction in June 2003 and complete construction by December 2004. The details of facility construction are presented in Section 2.5.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The site is located at 850 Duane Avenue in the city of Santa Clara, Santa Clara County, California (Appendix A, Figure 1). This 2.86-acre site will accommodate the generation facilities, control/administration building, switchyard, emission control equipment, storage tanks, and parking area. A gas compressor station will be located across Lafayette Street from the power plant, on City of Santa Clara property at the corner of Lafayette and Comstock streets. As discussed in Section 1.2, four additional areas are proposed for use as construction laydown and off-site worker parking areas.

The listed and mapped assessor's parcel numbers of the power plant site are 224-08-140 and 224-36-047. The City of Santa Clara owns these parcels. The parcel number of the gas compressor station site is 224-36-014.

2.2 CLIMATE AND PRECIPITATION

The climate in the project area is Mediterranean (NOAA division CA-04: Central Coast) with moderate year-round temperatures and a winter rainy season. The marine influence from the Pacific Ocean and the City of Santa Clara's proximity to San Francisco Bay have a substantial moderating influence on the local climate. Monthly average temperatures range from 46°F to 71°F. Temperatures exceeding 90°F occur on average only 16 days per year and temperatures below 32°F on average happen 5 days per year (FEMA 1999).

The San Jose International Airport is located less than one mile east of the PPP project site. Average annual temperature and precipitation data at the San Jose International Airport were obtained from 1990 through 2000 (with a break in the record for the year 1999, for which precipitation data were not available). During this period of record (excluding 1999), the mean average temperature was 61.42 °F. Average annual precipitation over this same period varied between 9.94 inches (1990) and 23.98 inches (1995) with a 10-year average annual precipitation of 17.19 inches (NCDC 2002). Table 2.1 lists the 10-year average rainfall amounts by month at the San Jose International Airport.

Table 2.1 Average 10-year average monthly precipitation at San Jose International Airport (inches).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3.84	3.83	2.75	0.78	0.98	0.24	0.06	0.10	0.11	0.56	1.20	2.74

Annual 10-year average (1990 to 2000, excluding 1999) =17.19 inches

Source: National Climatic Data Center, Annual Summary 2002

2.3 EXISTING STORM WATER CONVEYANCE SYSTEM

The existing site drains roughly north/south, with an indistinct ridge splitting the area west of Pico Way toward the neighboring (improved) sites located north and west of the property, and to the Kifer Receiving Station to the south. A localized high point also directs runoff to the northeast and east, toward Duane Avenue and the Pico easement (Pico Way). The wooded/grassed area east of the easement drains toward Duane Avenue and Lafayette Street.

A 54-inch diameter storm drain is located on Pico Way. A 12-inch diameter storm drain located on Duane Avenue feeds into the 54-inch line.

2.4 DEVELOPED STORM WATER CONVEYANCE SYSTEM

Under the developed conditions, the runoff that previously drained toward adjacent properties will be redirected on-site and collected. Two separate systems of underground drainage pipes aligned to the east/west will drain the majority of the site. Future site grading will approximately duplicate pre-development drainage patterns, with a central ridge splitting the center of the power plant site to the north and south, and a series of gentle ridges and valley further directing stormwater toward the proposed inlets. Stormwater collection inlets will be located at the curbline of the proposed twenty-foot wide perimeter plant roadway. The proposed drainage lines will intersect the existing fifty-four inch diameter Storm Drain located in Pico Way and a small discharge into an existing twelve inch diameter Storm Drain located in Duane Avenue that feeds into the fifty-four inch line. Manholes/inlets will be constructed to facilitate connection to the existing system.

Miscellaneous general plant drainage will consist of area washdown, stormwater drainage from within secondary containment areas, and drainage from facility equipment areas. Water from these areas will be collected into a process equipment drainage system of floor drains, sumps, and pipes within the PPP site and discharged to an oil/water separator. This system will be separate from the stormwater drainage system. The oil free discharge water will be sent to the 27-inch sanitary pipeline in Central Expressway. An average flow of 1 gpm and peak flow of 50 gpm is projected. The water will have essentially the same characteristics as the reclaimed water supplied to the PPP; consequently, no pretreatment of wastes is required. However, all discharge to the City of Santa Clara sanitary sewer system will occur in accordance with the "City Code, Rules and Regulations, Sewers and Sewage Disposal" (City of Santa Clara 1996).

2.5 CONSTRUCTION ACTIVITIES

For both the power plant and compressor station sites, the general site grading will establish a working surface for construction and plant operating areas, provide positive drainage from buildings and structures, and provide adequate ground coverage for subsurface utilities. Four areas for construction laydown and off-site worker parking have been identified, as discussed in Section 1.2. Use of the laydown and parking areas will not involve soil disturbance; therefore, BMPs for these areas are not included in this report.

Onsite drainage will be accomplished through gravity flow. The surface grading will direct stormwater runoff to the proposed collection system via overland flow at a minimum of 0.5 percent slope. The main plant complex area will be graded with moderate slopes (1 percent minimum preferred) for effective drainage. A storm water collection system of underground pipes and inlets rather than open channels will be provided due to site space constraints. Inlets will be constructed of cast-in-place or pre-cast concrete. The underground pipes will be sized to limit flow velocities to a maximum of 8 feet per second (fps) and a minimum, self-scouring velocity of 2 fps.

The buildings and structures will be located with the ground floor elevation a minimum of 6 inches above the finished grade. The preferred slope of the graded areas away from the structures will be one percent.

Construction work will consist of implementing the BMPs before any site grading operations. After the BMPs are in place, rough grading will begin, followed by site utilities and storm drain lines. Concrete pad foundation work will follow with equipment installation. Once all heavy equipment is in place, the access road and any finish grade work will be completed.

2.6 CONSTRUCTION SEQUENCE

The phased construction sequences will be provided by the contractor and approved by Silicon Valley Power.

A construction BMPs Plan, Appendix A, Figure 5, was developed for the grading phase of the project and will be updated as necessary to accommodate construction activities.

2.7 SOURCE IDENTIFICATION

2.7.1 Potential Pollutants During the Construction Phase

Hazardous materials used during construction will include gasoline, diesel fuel, motor oil, hydraulic fluid, certain non-chlorinated solvents, cleaners, sealant, welding flux, various lubricants, paint, and paint thinner. No acutely hazardous materials will be used or stored on site during construction. There are no feasible alternatives to motor fuels and oils for operating construction equipment. The types of paint required are dictated by the types of equipment and structures that will be coated and the manufacturer's requirements for coating. Additional materials that could impact Site storm water include lime within concrete and mortar and fertilizers used during landscaping of the Site.

There is only minimal potential for environmental impacts from hazardous material incidents during construction. Small volumes of hazardous materials will be temporarily stored on site inside fuel and lubrication service trucks. Fuel may be contained within aboveground storage tanks (ASTs); however, these tanks will require a security plan and will be located within secondary containment. Paints and solvents will be stored in flammable materials cabinets. Maintenance and service personnel will be trained to handle these materials.

The most likely incidents involving these hazardous materials would be associated with minor spills or drips. Impacts from such incidents will be mitigated by thoroughly cleaning up minor spills as soon as they occur. An incident involving a service vehicle or refueling truck release would present the worst-case scenario for release of hazardous materials. In the case of a large spill of hazardous material, the leak would be stopped if possible. The area would be immediately bermed/contained followed by blocking of the downgradient storm drain inlets to prevent off-site release. The hazardous constituents of the spilled material and the volume of the spill would be reviewed by the Project Manager/Project Engineer/Construction Manager to determine if regulatory agency notifications were necessary. A large spill or release cleanup would most likely involve excavation and storage of the impacted soil and/or materials in drums or roll-off bins for off-site disposal or recycle. The method for off-site disposal or recycle selected will depend on how the waste is classified.

3.0 BMPs TO BE IMPLEMENTED FOR CONSTRUCTION ACTIVITIES

BMPs for construction activities are described in the following sections. Detailed construction implementation descriptions of the BMPs are provided in Appendix B. Construction Activity reference numbers (for example, CA31) can be found in parentheses behind the BMPs indicated below. Additional BMPs may be developed as necessary prior to each construction phase. The BMPs for construction are shown in Appendix A, Figure 5, and focus on the following potential pollutant sources:

- sediment and fine-grained soil (silt) suspended in storm water runoff
- fuel, oil, and lubricant spills
- erosion of soil stockpiles
- concrete washout area
- construction bulk material handling

3.1 GOOD HOUSEKEEPING AND MAINTENANCE

Good housekeeping shall include elimination of weeds, brush, litter, or other items that may clog drainage devices or enter the storm water flow from the Site. Good housekeeping shall also include weed control as necessary to clear or mow unsightly nuisance vegetation. All construction waste shall be disposed in dumpsters, roll-off bins, or other similarly approved containers in designated areas located throughout the Site. In addition, sediment trapping/filtering devices and energy dissipaters (if utilized) will be maintained to ensure that sediment clogging does not take place and to ensure the required level of effectiveness.

3.2 VEHICLE FUELING (CA31) AND HEAVY EQUIPMENT MAINTENANCE (CA32)

3.2.1 Diesel Fuel

During construction activities, diesel fuel will either be stored on site or delivered and pumped directly into the equipment. If on-site diesel fuel storage is used, the ASTs will be located within bermed areas to prevent uncontrolled discharges or spills. The tank will require an approved security plan by the City with a list of available material and equipment for a major spill cleanup. Prior to storm water discharge drainage/pumping from the bermed AST areas, the liquid will be inspected for floating petroleum products. Accumulated storm water with petroleum products will be pumped from the bermed area on a regular basis using a vacuum truck and transferred off site to be treated. The bermed area will be provided with oil absorbent socks to remove floating petroleum products from accumulated storm water or minor spills. Large spills will be remedied using a commercial fuel recovery system. If diesel fuel is delivered and pumped directly into the heavy equipment, fueling will occur in designated areas which are located away from drainage courses to prevent the run-on of storm water and the runoff of spills. If a spill occurs during on-site fueling activities, the individual noting the spill will be responsible for contacting the Project

Engineer/Manager who is responsible for notifying regulatory authorities as necessary, and managing the cleanup and removal of contaminated soils in accordance with regulations.

3.2.2 Gasoline

Gasoline used for passenger vehicles and trucks will be obtained from off-site filling stations or on-site storage tanks. If on-site gasoline storage is utilized, the ASTs will be bermed and pumped as described above for the diesel fuel storage tanks. All site vehicles will be fueled at designated fueling areas.

If any spill occurs during on-site fueling activities, the fueler will be responsible for contacting the Project Manager and/or Project Engineer/Construction Manager and for the cleanup and removal of contaminated soils.

3.2.3 Heavy Equipment

All heavy equipment and Site vehicles are inspected at the beginning and end of each workday for oil and lubricant leaks and parked within a bermed area to prevent an uncontrolled oil leak discharge. Leaking equipment will be repaired or removed from service and small leaks will be cleaned up immediately. All major maintenance work shall be performed off site. Excessive greasing of components will be avoided and accumulated grease will be wiped off and the contaminated rags properly disposed off site. All oil and lubricant supplies will be securely stored in drums or bins in the heavy equipment parking and maintenance berm area to prevent an uncontrolled discharge of spilled materials. The BMP for Heavy Equipment and Vehicle Maintenance (CA32) will be utilized during on-site maintenance activities.

Heavy equipment minor/emergency maintenance may be conducted on site by operator/mechanics in the heavy equipment parking and maintenance berm area. Waste oil and oily material clean up would be placed into (labeled) 55-gallon drums and staged in the bermed equipment and maintenance area for collection by an oil recycler for delivery to an off-site reclamation facility. During staging, the 55-gallon drum of waste oil will have secondary containment such as being placed on a containment pallet or located inside a construction shed or storage container/Seatrain. Individuals conducting oil changes and oil pickup on site are responsible for spills and leaks, which must be cleaned up promptly. All heavy equipment maintenance activities will be performed in designated on-site areas, which are located away from drainage courses. In the event that a spill occurs, the Project Engineer/Construction Manager/Project Manager will be notified, the spill area will be excavated, and the material containerized and stored in the heavy equipment and maintenance area until proper off-site disposal.

3.2.4 Site Vehicles

Oil changes and maintenance for Site vehicles will normally be performed off site.

4.0 BMPS TO BE IMPLEMENTED FOR EROSION AND SEDIMENTATION CONTROL

BMPs for Erosion and Sediment Control can be found in Appendix B and will be referenced and implemented (as necessary) during construction activities. Erosion and sedimentation control reference numbers (such as, ESC1) can be found in parentheses behind the BMPs indicated below.

4.1 CONSTRUCTION SEQUENCE (ESC1)

Grading construction will be sequenced to minimize the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

4.2 PRESERVATION OF EXISTING VEGETATION (ESC2)

Vegetation mowing shall keep the site clean and clear of nuisance vegetation. Vegetation on site will be preserved until the time that maintenance operation or construction is expected to commence in that area. The preservation of existing vegetation shall be maximized where feasible. During construction, the limits of grading or disturbance will be clearly marked in order to segregate this area from areas of preserved vegetation. Irrigation and maintenance of vegetation will be the responsibility of the construction operation.

4.3 TRACKWALKING

During final subgrade soil grading activities in a particular area, a bulldozer and/or similar piece of heavy equipment will be utilized to trackwalk the soil (driving a bulldozer and/or similar piece of equipment up and down the drainage gradient slope). Trackwalking will be used to create tread marks parallel to gradient contours in order to slow storm water runoff velocity throughout the site and on the soil stockpile.

4.4 SEEDING AND MULCHING (ESC10)

Following final site grade development and utility easement grading in a particular area, the Site will be smoothed, dressed, and seeded/mulched as soon as possible with a seed and light fiber mulch mixture in areas that will not be paved or gravel covered. A temporary irrigation system may be used in localized areas to promote rapid germination of the seeding mixture and establishment of the vegetation during the first growing season following construction.

4.5 GEOSYNTHETICS (ESC20)

Geosynthetic materials may be used around the Site to temporarily, or permanently, stabilize soil, roads, and in temporary drainage swales during construction activity for flow line erosion protection.

4.6 DUST CONTROLS (ESC21)

Dust control measures will be used to stabilize soil from wind erosion and reduce dust generated from the following construction activities: clearing and grading, construction vehicle traffic on unpaved roads, sediment tracking onto paved roads, and areas of unstabilized soil stockpiles. Water trucks will be utilized for dust control. In addition to wet suppression (watering), preventive measures to be used for dust control include minimizing surface areas to be disturbed, limiting on-site vehicular traffic and speed, and controlling the number and activity of vehicles on the Site at a given time. When it is not actively being used, the stockpile will be covered with a 10-mil liner to prevent wind erosion. The Project Engineer/Construction Manager will be responsible for determining if conditions have become too windy to continue operations.

4.7 STABILIZED CONSTRUCTION ENTRANCE (ESC24)

The construction entrances will be stabilized to reduce the amount of sediment tracked off-site. These stabilized entrances will consist of a stabilized pad of aggregate material underlain with filter cloth. In addition, the streets will be periodically swept to prevent off-site tracking.

4.8 BORROW MATERIAL STOCKPILE AREAS

During grading activities, several areas may be used to stockpile soil. The soil will be stockpiled in a generally uncompacted condition prior to placement, and is, therefore, subject to erosion. In addressing stockpiling, BMPs will include a tarp cover (10 mil), diversion of drainage from the stockpile areas (ESC31), placement of additional sandbag desilting facilities (ESC52) and fiber rolls on the downgradient toe of the stockpile slope, and dust control (ESC21). In addition, large stockpiles will be sloped to encourage sheet flow and reduce infiltration of rainwater.

4.9 SANDBAGS, AND FIBER ROLLS (ESC52)

Sandbags, and fiber rolls will be used as sediment trapping/filtering devices downgradient of all disturbed areas where sheet flow occurs. Fiber rolls will be installed on a level contour receiving no more than 1 acre of runoff per 100 linear feet or 0.5 cubic feet per second (cfs) of concentrated flow draining to any point. Sandbags will be installed on level contours receiving drainage areas up to 5 acres. Fiber rolls will be used in conjunction with seeding, to further reduce sediment runoff. They will be installed on top of a concave trench and staked appropriately.

Sandbags will be placed around the perimeter of the gas metering station. Sandbags will also be placed at the downgradient side of trenches during pipeline construction and along catch basin inlets adjacent to trenching operations. Open trenches will be covered with a 10-mil tarp during rain events.

4.10 DRAINS (ESC54)

All inlets will be protected (ESC54) during construction through the use of sandbag berms. The location of the storm drain and inlets are identified in Appendix A, Figure 5.

4.11 SEDIMENT TRAP/SPILL CONTAINMENT (ESC55)

If sandbag berms, or fiber rolls do not provide adequate control of sediment-laden waters, as determined by the Project Engineer/Construction Manager or regulatory personnel, a temporary sediment trap basin will be constructed by excavation to provide detention volume of 100 cubic feet per acre of hydrology area as shown in Appendix A, Figure 5. The excavated slopes may be lined with riprap, geotextile, or sandbags to protect the slopes from erosion, if needed. The bottom of the basin does not require infiltration protection. All containers of hazardous materials and waste will be stored in secondary containment to prevent potential spills from impacting the environment.

5.0 NON-STORM WATER MANAGEMENT

Management of non-storm water discharges will be implemented as part of this SWPPP. In addition to wet/dry season observations, monthly inspections of the grading, vegetative cover, access roads, and storm water/erosion control structures (including secondary containment structures) will be conducted. Authorized or unauthorized non-storm water discharges, if observed, will be documented on the appropriate form in Appendix D. Discharges of non-storm water are authorized only where they do not cause or contribute to a violation of any water quality standard and are controlled through the implementation of appropriate BMPs. Because non-storm water discharges are not anticipated at the Site, they are not discussed in this SWPPP. If a non-storm water discharge is discovered, BMPs will be implemented to either prevent the discharge or control the discharge such that pollutants are not released. In addition, the SWPPP will be revised to address the non-storm water discharge. Authorized and unauthorized storm water discharges for construction activities are explained in the Special Provisions for Construction Activity located in the NPDES Permit for construction (Appendix E).

According to generally accepted engineering practice, surface pollution from vehicles and other sources is washed into the drainage system during the first 0.5 inches of rainfall from storms. The project drainage system will include oil-water separators that will receive stormwater runoff from areas that are subject to oil contamination, including parking lots and gravel areas. The separators will be underground vaults with baffles to collect oils and solids. Stormwater is routed through the baffles, allowing oils to rise to the surface and solids to settle to the bottom. The vault(s) will be pumped out each fall prior to the winter season. Oils will be removed using oil-absorbent pillows or other acceptable methods and transported to an approved disposal facility.

It should be noted that hazardous material containment areas (those areas with walls or dams built to contain spillage) will utilize an independent collection and treatment system that will eventually release treated effluent to the sanitary sewer system of the city. This system is separate from the stormwater collection and treatment described in the prior paragraph.

6.0 WASTE MANAGEMENT AND DISPOSAL

Residuals and wastes are generated by construction and Site operation activities. Waste handling will be performed in accordance with the site's waste management plan and health and safety plan. In general, waste management involves the following four steps:

1. Characterization
2. Handling and storage
3. Transportation
4. Disposal or recycle as appropriate

The most important step with regards to maintaining compliance with the SWPPP is the handling and storage step. In order to reduce the potential and severity of hazardous material spills, all materials and wastes will be stored within secondary containment. Portable spill pallets may be used for larger containers such as drums. Smaller containers should be placed within hazardous material storage cabinets with built-in secondary containment. All containers should be protected with a cover or roof to prevent contact with rain or full sun.

Although materials may be stored in larger containers, the smallest container that is appropriate for the task will be used to transfer the material from the storage area to the area where it will be used. This will help mitigate the potential for larger spills.

6.1 SPILL RESPONSE

If a spill or leak is discovered, it must be immediately cleaned up and the source of the leak repaired. The Project Manager and/or Project Engineer/Construction Manager will be notified of all spills and releases to determine if it is necessary to report the spill or release to regulatory agencies and to determine what additional BMPs will be implemented to prevent future spills. Specific measures for minor spills include the following.

- Contain the spread of the spill.
- If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (i.e., absorbent materials, cat litter, and/or rags).
- If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Excavate and properly dispose of contaminated soil.
- If the spill occurs during a rain event, cover the impacted area to avoid runoff.
- Record all steps taken to report, contain, and clean up the spill.

Major spills are those that are unlikely to be controlled by on-site personnel. On-site personnel should not attempt to control major spills until the appropriate, qualified emergency response staff has arrived at the site. In addition to local authorities, notify the following personnel:

- Governor's Office of Emergency Services Warning Center – (800) 852-7550

- National Response Center (for spills of federally-reportable quantities) – (800) 424-8802
- City of Santa Clara Fire Department, Hazardous Materials Division (for spills of all sizes) (408) 615-4960
- Santa Clara Fire Department – HazMat emergency “911”
- Chemtrec-Chemical Spill Response – (800) 424-9300
- Project Manager - TBD

If a spill occurs and threatens to contaminate any storm water generated at the Site, monitoring and sampling must be conducted as described in Section 9.0.

7.0 IMPLEMENTATION OF OTHER APPROVED PLANS

Several management plans approved by Silicon Valley Power will be implemented to provide a framework by which the construction and site operations are executed. These plans describe the methods that will be used to execute, integrate, and coordinate emergency response procedures, control quality, address safety and health, and generally perform the work in a sound manner.

The following is a list of plans relevant to environmental and construction management issues during the construction phase that will be implemented for this site:

- Traffic Control Plan
- Fugitive Dust Mitigation Plan
- Soil Management Work Plan
- Construction Waste Management Work Plan

8.0 POST-CONSTRUCTION CONTROLS

This SWPPP does not provide detailed descriptions of the post-construction surface water management (SWM) system. The SWM system will be described in the SWPPP for Industrial Activities once construction has been completed. The SWM system includes the following components:

- General grading
- Storm drain lines
- Installation of storm drain labels
- Paved access roadway
- Roadway curb and gutters
- Area catch basins (inlets) and curb catch basins (inlets)
- Oil/Sediment interceptor
- Swale drainage
- Landscape berms
- Erosion control aggregate surface and vegetative ground cover
- Discharge storm water monitoring point

9.0 SITE INSPECTIONS AND MONITORING

9.1 INSPECTIONS

All storm water pollution prevention measures and BMPs will be inspected prior to the rainy season and before (prediction of) and following (measurement of) each rain event of 0.25 inches/24 hours or more. During rain events, inspections shall be performed every 24-hours, including non-working weekends and holidays. The inspection will allow for evaluation of the implemented BMPs' ability to prevent the release of potential pollutants. All inspections shall be performed by trained personnel and the appropriate forms shall be filled out. These forms are provided in Appendix D. Inspections will include the date of the inspection, the individual(s) who performed the inspection, and the observations. Any BMP inadequacies shall be recorded, modified, and upgraded or repaired as soon as possible. All completed inspection forms shall be retained at the on-site Silicon Valley Power office for a period of at least 3 years.

9.2 MONITORING AND SAMPLING

A major feature of the NPDES General Permit is to develop and implement a monitoring program for storm water discharges which discharge either directly into sedimentation concern water bodies or may contain pollutants, which are not visually detectable in storm water. The Pico Power Project will discharge storm water initially into an existing 54-inch diameter storm drain line owned by the City of Santa Clara with storm water monitoring conducted at the catch basin inlets. Once final storm water structures have been constructed, Site storm water from the site will be redirected to the new inlet tying into an inline oil/water separator prior to connecting to the city's storm water system. Monitoring will be conducted at storm water monitoring point tees located immediately after the oil/water separator.

Sampling and analysis will be conducted to monitor the Site for effectiveness of the in-place BMPs by the Project Engineer/Construction Manager or designee during and after a storm event that produces runoff. In the event potential runoff pollutants, which are not visually detectable, may exist, samples of storm water discharge will be collected at the monitoring point shown in Appendix A, Figure 5, and sent to a certified state laboratory for analysis. The Project Engineer/Construction Manager or designee will record and document the evaluation. Analytical parameters should be reflective of the potential contaminants, such as sampling for oil and grease. Construction materials and compounds that are not stored in watertight containers under a watertight roof or inside a building are examples of materials for which the discharger may have to implement sampling and analysis procedures. The NPDES General Permit (Appendix E) leaves the choice of analytical constituents up to the individual discharger dependent on what types of contaminants could potentially be present on the Site. This may change throughout the course of construction, dependent on what types of chemicals are in use, or if there is reason to believe that a sedimentation BMP is not functioning adequately.

The goal of the sampling and analysis is to determine whether the BMPs employed and maintained on site are effective in preventing the potential pollutants from coming in contact with storm water and causing or contributing to an exceedance of water quality objectives in the receiving waters. Examples of construction sites that may require sampling and analysis include: sites that are known to have contaminants spilled or spread on the ground; sites where construction practices include the application of soil amendments, which can impact runoff; or sites having uncovered stockpiles of material exposed to storm water. Visual observations before, during, and after storm events may trigger the requirement to collect samples. Any breach, malfunction, leakage, or spill observed, which could result in the discharge of pollutants to surface waters that would not be visually detectable in stormwater shall trigger the collection of a sample of discharge. Samples shall be collected at all discharge locations which drain the areas identified by the visual observations and which can be safely accessed. Personnel trained in water quality sampling procedures shall collect storm water samples. A sufficiently large sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on site (uncontaminated sample) shall be collected for comparison with the discharge sample. Samples shall be collected during the first 2 hours of discharge from rain events that occur during daylight hours and which generate runoff.

Silicon Valley Power will report any instances of non-compliance with the terms of the General Permit and this SWPPP to the RWQCB. Non-compliance would include such actions as accidental spills or failures of structural controls. Any non-compliance incident will be recorded on the "Non-Compliance Events List" presented in Attachment D. Corrective measures shall be implemented immediately following discovery that water quality standards may have been compromised. The notification shall be submitted to the RWQCB within 30 days. The notification shall: identify the non-compliance event, including an initial assessment of any impact caused by the event; describe the actions necessary to achieve compliance; and include a time schedule (subject to modifications by the Regional Board) indicating when compliance will be achieved.

Records of all inspections, Compliance Certifications (Section 12.0), and Non-Compliance Reporting must be retained for a period of at least three (3) years from the date generated in the on-site Silicon Valley Power office.

10.0 RESPONSIBLE PERSONNEL

The responsible individuals for implementing and making any necessary revisions to this SWPPP are the following personnel, which comprise the Pollution Prevention Team:

Name	Title	Responsibility
M. Cowan, P.E.	Civil Engineer (CE)	Preparation of SWPPP and selection of BMPs. Revisions to the SWPPP.
TBD	Construction Engineer	Implementation of SWPPP for Construction Activities, maintaining inspection and monitoring records, reporting, and regulatory notifications.
TBD	Project Manager	Implementation of inspection and monitoring activities of the SWPPP, BMPs, and regulatory notifications.

11.0 PERSONNEL TRAINING

All personnel involved with the ongoing installation of BMPs, site inspection, or monitoring and maintenance of the storm water management system will attend an annual training class held by the Project Engineer/Construction Manager or designee, before the beginning of construction and before the rainy season (October 1 2004). The Project Engineer/Construction Manager will maintain a file of the training documentation. The SWPPP program will be reviewed as it relates to the various responsibilities for personnel implementation and awareness.

12.0 CERTIFICATION OF COMPLIANCE

Silicon Valley Power and subcontractors will implement and comply with the program set forth within this SWPPP. On an annual basis, for the duration of the construction, the Project Manager and Project Engineer/Construction Manager are required to certify that Site construction activities are in compliance with the requirements of the General Permit (Appendix E) and this SWPPP. This certification will be based on the site inspections conducted in accordance with Section 9.1. The certification must be completed by July 1 of each year and forwarded to the RWQCB. If the Project Manager and Project Engineer/Construction Manager are unable to certify compliance in the annual certification or have had instances of noncompliance, the RWQCB will be notified within 30 days in accordance with the requirements stated within the General Permit.

13.0 SWPPP REVIEW AND MODIFICATIONS

SVP will amend this SWPPP, if deemed necessary to address changes in the physical condition of the Site or to maintain compliance in areas where this SWPPP is inadequate. Changes to this SWPPP will be made with the concurrence of a P.E. registered in the state of California and the changes will be detailed in the Certification Section.

14.0 CONSTRUCTION PERMIT NOTICE OF TERMINATION

In order to terminate coverage under the NPDES General Permit, the attached NOT form (Appendix E) will be completed and sent to the RWQCB for approval.

It is expected that final construction activities will be completed by December 2004. A request for termination of the General NPDES Permit will be made upon establishment of adequate paving and/or vegetative ground cover or when stabilized erosion conditions are met and a post-construction storm water operation and management plan is completed. The Construction NOT and associated instructions are presented in Appendix E.

15.0 REFERENCES

Federal Emergency Management Agency (FEMA). 1999. City of Santa Clara, 1999. Flood Insurance Study, City of Santa Clara, California, Santa Clara County. Federal Emergency Management Agency Report, 1980. Revised: January 20, 1999. Community Number – 060350.

Foster Wheeler Environmental Corporation (FWENC). 2002. Application for Certification for the Pico Power Project, Santa Clara, California. October.

National Geographic. 2000. California Seamless USGS Topographic Maps on CD-ROM.

National Climate Data Center (NCDC). 2002. Website Precipitation Data. The National Climate Data Center, Ashville, North Carolina. Website address: (http://www.nws.mbay.net/cpm/rainfall/2001)

PB Power. 2002. SVP Pico Power Project Stormwater runoff Computation Sheet. December 12.

APPENDIX A

Site Maps, Plans, and Details

APPENDIX A

TABLE OF CONTENTS

Figures

APPENDIX B

Best Management Practices (BMPs) Details

This appendix will contain excerpts of applicable BMP details from the *California Stormwater Best Management Practice Handbook, Industrial/Commercial* published by the California Stormwater Quality Task Force, March 1993. These pages were left out of this preliminary draft to minimize bulk of the data request submittal, but will be provided upon request.

APPENDIX C

Site Hydrology/ Hydraulic Report

PB Power	Project 13586A	Page 1 of 7	C1
Pico Power Plant			
Computation Sheet		Made By: MG Date: 11 Dec 02 Checked By: SB Date: 12 Dec 02	
Subject: SVP Pico Power Project Stormwater runoff revised to include additional			

Grading and Drainage

The site grading and drainage will be designed to comply with all applicable federal, state and local regulations. The general site grading will establish a working surface for construction and plant operating areas, provide positive drainage from buildings and structures, and provide adequate ground coverage for subsurface utilities.

Onsite drainage will be accomplished through gravity flow. The surface grading will direct stormwater runoff to the proposed collection system via overland flow at a minimum of 0.5%. The main plant complex area will be graded with moderate slopes (1 percent minimum preferred) for effective drainage. A storm water collection system of underground pipes and inlets rather than open channels is provided due to site space constrictions. Inlets will be constructed of cast-in-place or pre-cast concrete. The underground pipes will be sized to limit flow velocities to a maximum of 8 feet per second (fps) and a minimum, self-scouring velocity of 2 fps.

The buildings and structures will be located with the ground floor elevation a minimum of 6 inches above the finished grade. The preferred slope of the graded areas away from the structures will be one percent.

In accordance with the latest City of Santa Clara Design Criteria, the Site drainage facilities will be designed to convey the 10-year storm event flow. If a storm drain pump station becomes necessary, the drain system would be required to convey the 100-year event flow.

According to generally accepted engineering practice, surface pollution from vehicles and other sources is washed into the drainage system during the first 0.5 inches of rainfall from storms. The project drainage system will include oil-water separators that will receive stormwater runoff from areas that are subject to oil contamination, including parking lots and gravel areas. The separators will be underground vaults with baffles to collect oils and solids. Stormwater is routed through the baffles, allowing oils to rise to the surface and solids to settle to the bottom. The vault(s) will be pumped out each fall prior to the winter season. Oils will be removed using oil-absorbent pillows or other acceptable methods and transported to an approved disposal facility.

It should be noted that hazardous material containment areas (those areas with walls or dams built to contain spillage) will utilize an independent collection and treatment system meant to eventually release treated effluent to the sanitary sewer system of the city. This system is separate from the stormwater collection and treatment described in the prior paragraph.

No drainage improvements are anticipated at the "compressor site" at the intersection of Comstock and Lafayette Streets. The site is entirely improved/paved in its current condition. The installation of additional power plan amenities will neither increase nor decrease the amount of stormwater runoff from the site. Further, the site is presently improved with catch basins and underground pipes which will remain in the post-construction condition.

Pre- and Post-Development Runoff Conditions

The peak flow associated with the 10 and 100 year storm events at the site prior to construction (pre-development) will be compared to the post-development (after construction) conditions. Calculations reveal that the post development runoff will slightly exceed the pre-development runoff conditions.

The runoff conditions prior to development have been determined utilizing the guidelines contained in the latest City of Santa Clara Design Criteria. The existing site drains roughly north/south, with an indistinct ridge splitting west of Pico Way toward the neighboring (improved) sites located north and west of the property, and to the Kifer Receiving Station to the south. A localized high point also directs runoff to the northeast and east, toward Duane Avenue and the Pico easement (Pico Way). The wooded/grassed area east of the easement drains toward Duane Avenue and Lafayette Street.

Under the developed conditions, the runoff that previously drained toward adjacent properties will be redirected on-site and collected. Two separate systems of underground drainage pipes aligned to the east/west are to drain the majority of the site. Future site grading will approximately duplicate pre-development drainage patterns, with a central ridge splitting the center of the Power Plant site to the north and south, and a series of gentle ridges and valley further directing stormwater toward the proposed inlets. Stormwater collection inlets are to be located, when possible, at the curbline of the proposed twenty foot wide perimeter plant roadway. The proposed drainage lines are to intersect the existing fifty-four inch diameter Storm Drain located in Pico Way and a small discharge into an existing twelve inch diameter Storm Drain located in Duane Avenue that feeds into the fifty-four inch line. Doghouse manholes/inlets are to be constructed to facilitate connection to the existing system.

Computation Sheet

Subject: SVP Pico Power Project Stormwater runoff revised to include additional

Preliminary Storm Drainage Calculations

Perform pre- and post-development calculations for the site(s) for the 10-year and 100-year storm events.

Storm Drainage Design

The rational formula shall be used to determine the peak runoff flow rate.

Q (cfs) = CIA

C = Runoff Coefficient
0.90 for impervious surfaces such as roads/roofs,
0.30 for gravel and open (lawn/earth) areas

I = rainfall intensity inches per hour (use rain intensity frequency curves per City of Santa Clara Design Standards)

A = tributary area in acres

- Assume minimum time of concentration duration is 10 minutes.
- Runoff resulting from rainfall shall be collected by sloping the tributary surface areas to gravel swales, overland, or the perimeter roadway which will direct the runoff to catch basins and from there the surface water shall be conveyed by reinforced concrete pipe to the existing stormwater system.
- The site drainage system shall be designed to function on the hydraulic gradient available between any two points along the system.
- The storm drain system shall be designed in accordance with the latest City of Santa Clara requirements. City of Santa Clara Standard Details shall be used wherever possible.

Hydraulic Design

The Manning formula shall be used to determine the flow of closed conduits.

$$Q = A\,\frac{1.486}{n}\,R^{2/3} S^{1/2} \text{ cfs}$$

A = cross sectional flow area in ft^2

n = for lined channels = .015
for earth channels = .030
for closed conduit = .013

Computation Sheet

Made By: MG
Date: 11 Dec 02
Checked By: SB
Date: 12 Dec 02

Subject: SVP Pico Power Project Stormwater runoff revised to include additional

R = hydraulic radius in ft

S = slope of gradient in ft/ft

Closed conduits shall be considered flowing full. Velocities shall range from 2 fps mm to 10 fps max.

Unlined open channel velocities shall not exceed 3 fps to avoid erosion of the bottom or sides of the ditch. For higher velocities, ditches shall be protected with concrete lining.

Pre-Developed Stormwater Runoff

Use Rational Method

Q (cfs) = CIA

A = Approximate area of construction disturbance = **3.23 acres**

0.94 acres = aggregate roadway/pavement = 29%
2.29 acres = loose, unpacked earth; poorly developed grass = 71%

Compute weighted Runoff Coefficient of C

0.90 for impervious surfaces such as roads/roofs = 29%
0.30 for gravel and open (lawn/earth) areas = 71%

C=0.47

I = Rainfall Intensity. Directly related to time of concentration. Assume minimum of 10 minutes for water to flow from most remote part of construction disturbance area to off-site.

For 10 minute peak duration of rainfall, **I = 1.61** for the 5-year storm event.

For 10 minute peak duration of rainfall, **I = 1.92** for the 10-year storm event.

For 10 minute peak duration of rainfall, **I = 2.31** for the 25-year storm event.

For 10 minute peak duration of rainfall, **I = 2.86** for the 100-year storm event.

Therefore Q=(C)(I)(A) = (0.47)(1.61)(3.23) = **2.44 cubic foot per second** (cfs) rate of runoff for the 5-year storm event.

Q=(C)(I)(A) = (0.47)(1.92)(3.23) = **2.91 cfs** for the 10-year event.

Q=(C)(I)(A) = (0.47)(2.31)(3.23) = **3.51 cfs** for the 25-year event.

Q=(C)(I)(A) = (0.47)(2.86)(3.23) = **4.34 cfs** for the 100-year event.

To compute runoff volumes associated with these rates, we assume a 24-hr. duration. The following Intensity Duration Frequencies are associated with a 24-hour event for the studied storms:

I = 0.09 for the 5-year storm event.
I = 0.11 for the 10-year storm event.
I = 0.13 for the 25-year storm event.
I = 0.16 for the 100-year storm event.

Therefore:

Q=(C)(I)(A) = (0.47)(0.09)(3.23) = 0.14 cfs for the 5 year storm event.
Volume = (0.14 cfs)(3,600 sec/hour)(24 hours) = 12,096 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.11)(3.23) = 0.17 cfs for the 5 year storm event.
Volume = (0.17 cfs)(3,600 sec/hour)(24 hours) = 14,688 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.13)(3.23) = 0.20 cfs for the 5 year storm event.
Volume = (0.20 cfs)(3,600 sec/hour)(24 hours) = 17,280 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.16)(3.23) = 0.24 cfs for the 5 year storm event.
Volume = (0.24 cfs)(3,600 sec/hour)(24 hours) = 20,736 cubic feet of runoff

Post-Developed Stormwater Runoff

Use Rational Method

Q (cfs) = CIA

A = Approximate area of construction disturbance = 3.23 acres **minus** 12,971 square feet (0.30 acres) of area in the post-developed scenario that capture stormwater in containment dikes to be treated and directed to the oil-water separator(s) or in the cooling tower..

Therefore, A = **2.93 acres**

1.25 acres = impervious surface/pavement = 43%
1.68 acres = gravel areas = 57%

Compute weighted Runoff Coefficient of C

0.90 for impervious surfaces such as roads/roofs = 43%
0.30 for gravel and open (lawn/earth) areas = 57%

C=0.56

I = Rainfall Intensity. Directly related to time of concentration. Assume 10 minutes (shorter under development conditions) for water to flow to outlet point.

For 10 minute peak duration of rainfall, **I = 1.61** for the 5-year storm event.

For 10 minute peak duration of rainfall, **I = 1.92** for the 10-year storm event.

For 10 minute peak duration of rainfall, **I = 2.31** for the 25-year storm event.

For 10 minute peak duration of rainfall, **I = 2.86** for the 100-year storm event.

Therefore Q=(C)(I)(A) = (0.56)(1.61)(2.93) = **2.64 cubic foot per second** (cfs) rate of runoff for the 5-year storm event.

Q=(C)(I)(A) = (0.56)(1.92)(2.93) = **3.15 cfs** for the 10-year event.

Q=(C)(I)(A) = (0.56)(2.31)(2.93) = **3.76 cfs** for the 25-year event.

Q=(C)(I)(A) = (0.56)(2.86)(2.93) = **4.69 cfs** for the 100-year event.

To compute runoff volumes associated with these rates, we assume a 24-hr. duration. The following Intensity Duration Frequencies are associated with a 24-hour event for the studied storms:

I = 0.09 for the 5-year storm event.
I = 0.11 for the 10-year storm event.

I = 0.13 for the 25-year storm event.
I = 0.16 for the 100-year storm event.

Therefore:

Q=(C)(I)(A) = (0.56)(0.09)(2.93) = 0.15 cfs for the 5 year storm event.
Volume = (0.15 cfs)(3,600 sec/hour)(24 hours) = 12,960 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.11)(2.93) = 0.18 cfs for the 5 year storm event.
Volume = (0.18 cfs)(3,600 sec/hour)(24 hours) = 15,552 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.13)(2.93) = 0.21 cfs for the 5 year storm event.
Volume = (0.21 cfs)(3,600 sec/hour)(24 hours) = 18,144 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.16)(2.93) = 0.26 cfs for the 5 year storm event.
Volume = (0.26 cfs)(3,600 sec/hour)(24 hours) = 22,464 cubic feet of runoff

Comparing the pre-developed to post-developed runoff rate conditions.

	5-yr.	*10-yr.*	*25-yr.*	*100-yr.*
Pre-Dev.	2.44 cfs	2.91 cfs	3.51 cfs	4.34 cfs
Post-Dev.	2.64 cfs	3.15 cfs	3.76 cfs	4.69 cfs

Comparing the pre-developed to post-developed 24-hour runoff volumes.

	5-yr.	*10-yr.*	*25-yr.*	*100-yr.*
Pre-Dev.	12,096 ft3	14,688 ft3	17,280 ft3	20,736 ft3
Post-Dev.	12,960 ft3	15,552 ft3	18,144 ft3	22,434 ft3

We would respectfully suggest that this is a negligible increase in the peak rate of stormwater runoff from the site for the major storm events.

Pico Power Plant

Computation Sheet

Subject: SVP Pico Power Project Stormwater runoff revised to include additional

Made By: MG

Date: 11 Dec 02

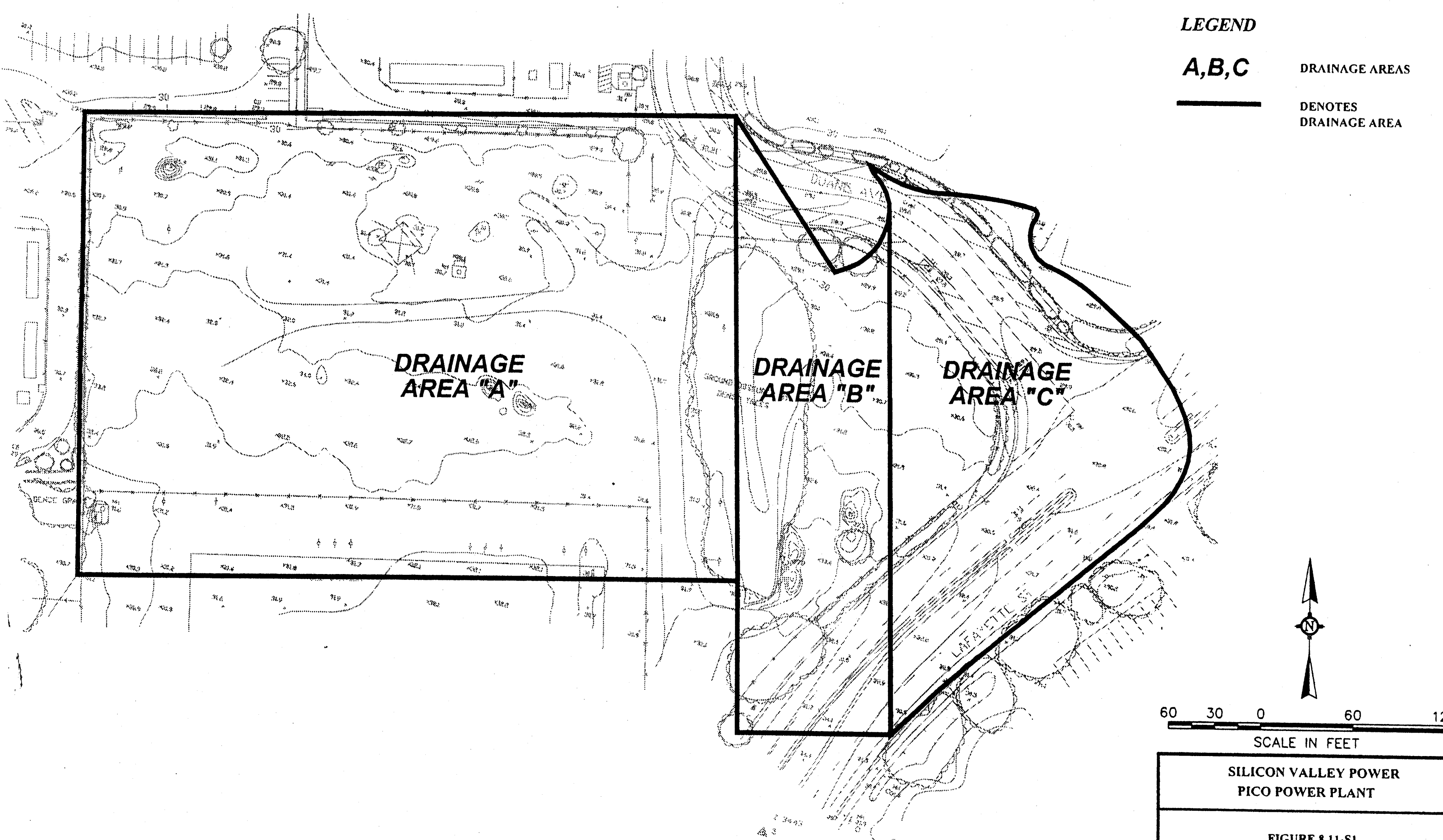
Checked By: SB

Date: 12 Dec 02

Expected distribution of stormwater between collection systems.

The distribution between the three collection systems is as follows:

Northern Collection System:	46%
Southern Collection System:	38%
Eastern Collection System	16%



SILICON VALLEY POWER
PICO POWER PLANT

FIGURE 8.11-S1
DRAINAGE AREAS – EXISTING CONDITIONS

I:\2663-PICO\SOILLOSS\DWG\FIG_1.DWG
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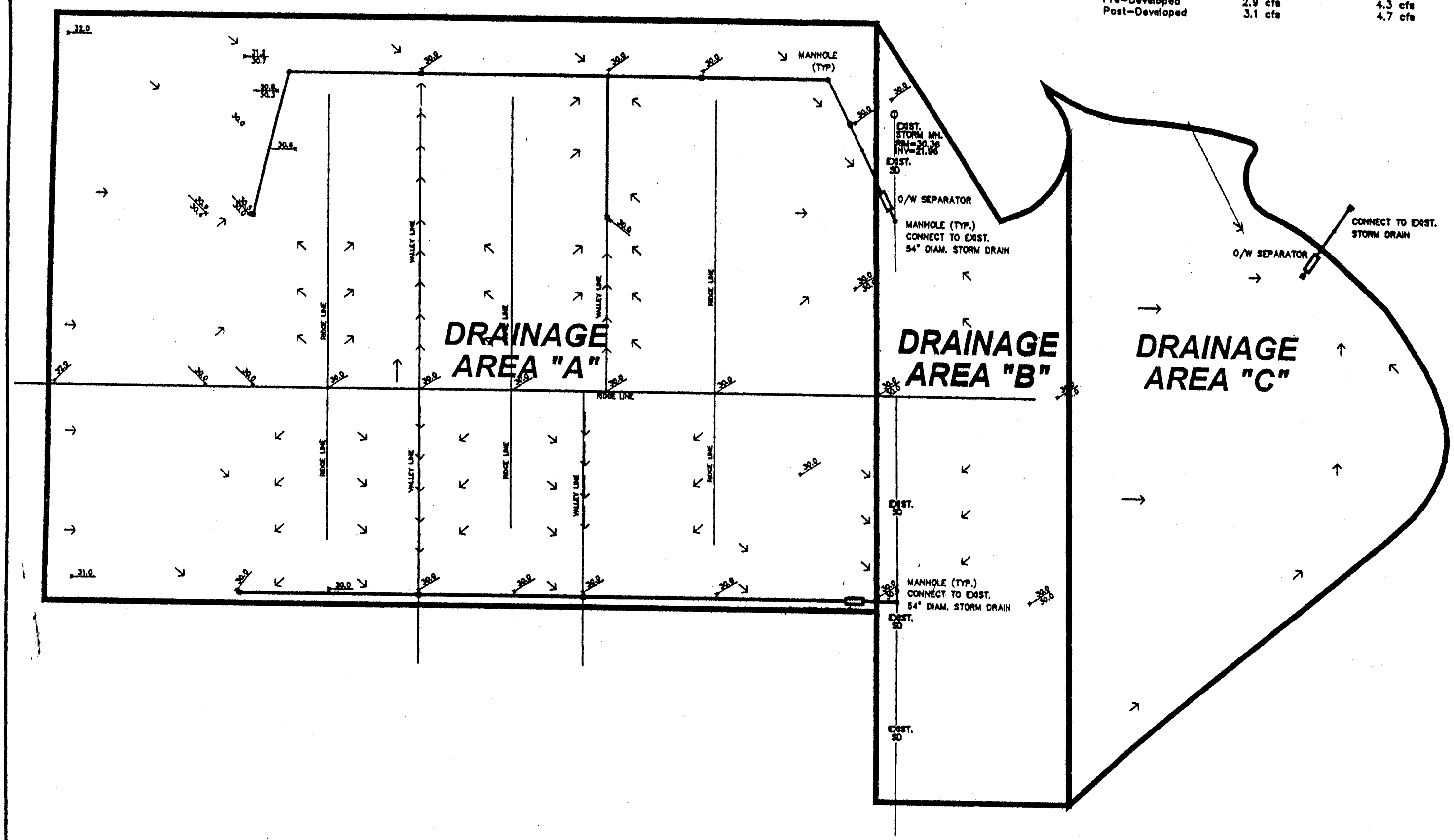

APPROXIMATE STORMWATER RUNOFF CONDITIONS

	10-yr. storm event	100-yr. storm event
Pre-Developed	2.9 cfs	4.3 cfs
Post-Developed	3.1 cfs	4.7 cfs

LEGEND

A,B,C DRAINAGE AREAS

DENOTES DRAINAGE AREA

600 300 0 600 1200
SCALE IN FEET

SILICON VALLEY POWER
PICO POWER PLANT

FIGURE 8.11-S2
DRAINAGE AREAS - POST DEVELOPMEN

I:\2663-PICO\SOILLOSS\DWG\FIG_2.DWG
PLOT/UPDATE: OCT 24 2002 14:43:28

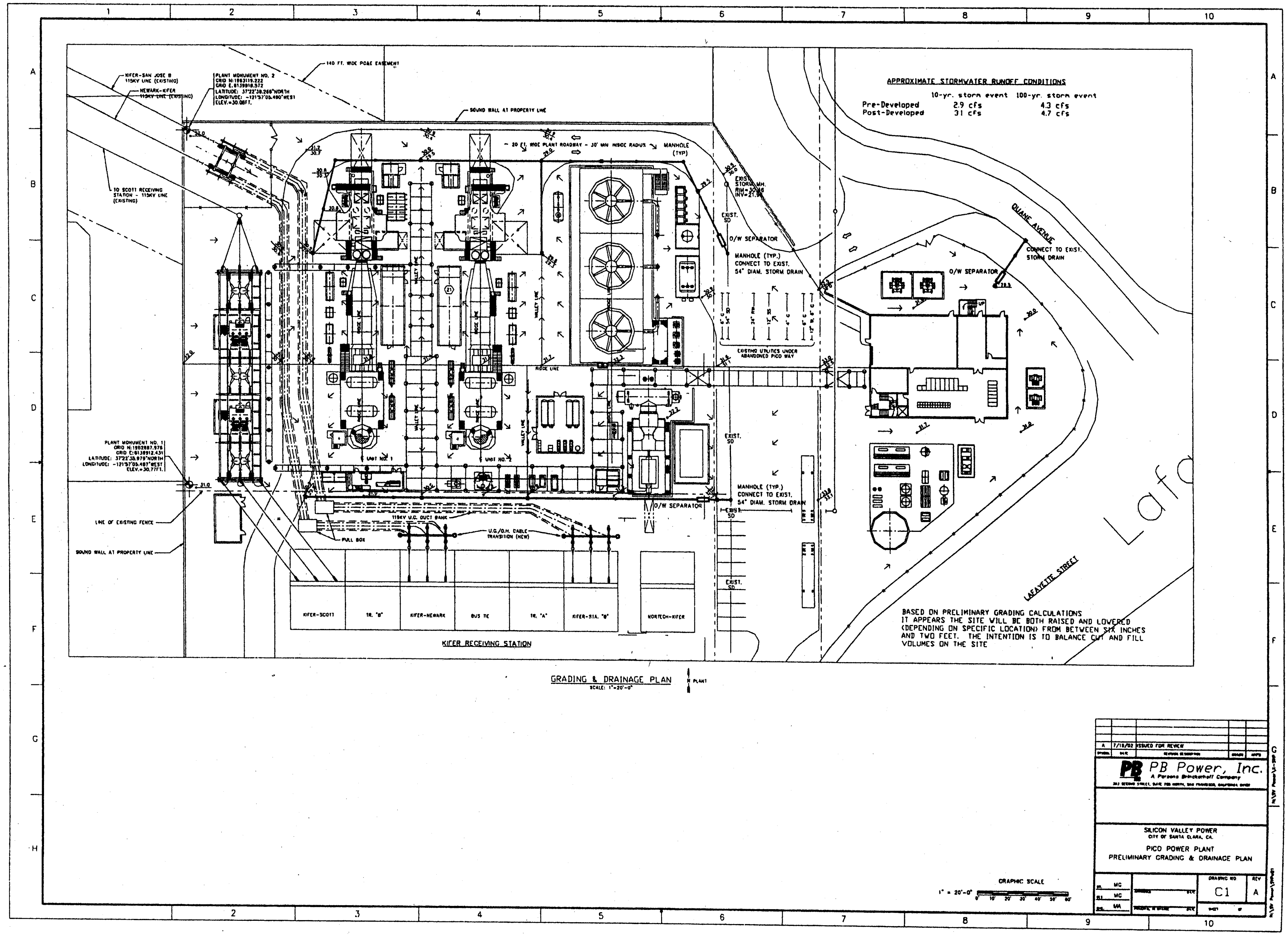
APPROXIMATE STORMWATER RUNOFF CONDITIONS
10-yr. storm event 100-yr. storm event
Pre-Developed 2.9 cfs 4.3 cfs
Post-Developed 31 cfs 4.7 cfs
QUANE AVENUE
CONNECT TO EXIST. STORM DRAIN
O/W SEPARATOR
MANHOLE (TYP.) CONNECT TO EXIST. 54" DIAM. STORM DRAIN
EXISTING UTILITIES UNDER ABANDONED PICO WAY
LAFAYETTE STREET
BASED ON PRELIMINARY GRADING CALCULATIONS IT APPEARS THE SITE WILL BE BOTH RAISED AND LOWERED (DEPENDING ON SPECIFIC LOCATION) FROM BETWEEN SIX INCHES AND TWO FEET. THE INTENTION IS TO BALANCE CUT AND FILL VOLUMES ON THE SITE
SOUND WALL AT PROPERTY LINE
140 FT. WIDE POLE EASEMENT
~ 20 FT. WIDE PLANT ROADWAY - 30' MIN INSIDE RADIUS
MANHOLE (TYP)
LINE OF EXISTING FENCE
115KV U.G. DUCT BANK
U.G./O.H. CABLE TRANSITION (NEW)
PULL BOX
KIFER-SCOTT
TR. "B"
KIFER-NEWARK
BUS TIE
TR. "A"
KIFER-STA. "B"
NORTECH-KIFER
KIFER RECEIVING STATION
GRADING & DRAINAGE PLAN
SCALE: 1"=20'-0"
GRAPHIC SCALE
1" = 20'-0"
PB Power, Inc.
A Parsons Brinckerhoff Company
A 7/18/02 ISSUED FOR REVIEW
SILICON VALLEY POWER
CITY OF SANTA CLARA, CA.
PICO POWER PLANT
PRELIMINARY GRADING & DRAINAGE PLAN
C1
A

Table 8.11-S3. Soil loss calculation for the PPP site, by subarea.

Sub-drainage Area ID*	Area (acres)	Soil Type	K	L (feet)	Fall (feet)	S (%)	m	LS	R	VM	Rate of Soil Loss (A) (t/acre/yr)	Soil Loss for the Sub Drainage Area (t/yr)
Pre-development Conditions:												
A (Dirt Cover)	2.62	Clay	0.29	48.8	1.2	2.46	0.4	0.18	33	0.65	1.14	3.0
B (Dirt Cover and Dense Vegetation)	0.6	Clay	0.29	41.7	0.9	2.16	0.37	0.16	33	0.35	0.52	0.3
C (Dirt Cover and Poor Grass)	1.0	Clay	0.29	38.3	0.7	1.83	0.35	0.14	33	0.45	0.58	0.6
Total soil loss - Pre development Conditions (t/year) =												3.9
Post-development Conditions												
A (Power Plant Area)	2.62	Gravel, Paving, Equip., Bldg	0.05	100	1	1.00	0.2	0.12	33	0.05	0.01	0.03
B (Parking and Easement Area)	0.6	Paved	0.05	100	1	1.00	0.2	0.12	33	0.01	0.002	0.001
C (Warehouse and Shop, and Equipment Storage)	1.0	Gravel, Paving, Equip., Bldg	0.05	100	1	1.00	0.2	0.12	33	0.05	0.01	0.010
Total soil loss - Post development Conditions (t/year) =												0.04

Soil loss is estimated using the Modified Universal Soil Loss Equation: A=(R)(K)(LS)(VM)

where:

A = average annual soil loss (tons/acre)
R = rainfall and runoff erosivity index (dimensionless)
K = soil erodibility factor, (tons/acre)
LS = slope length and steepness factor (dimensionless)
VM = vegetation constant (dimensionless) similar to (C) (P) in the Universal Soil Loss Equation
C = cover and management factor
P =support practice factor

* see Figures 1 and 2.

[1]Soil loss equation variables used above represent average values for each drainage area.

APPENDIX D

Site Inspection and Monitoring Reporting Forms

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION CHECKLIST

PICO POWER PROJECT – 850 Duane Ave, Santa Clara, California.

Name/Title of Inspector: ____________________

Date of Inspection: _______________ **Time of Inspection:** __:__ **AM/PM**

Type of Inspection: Pre-Precipitation/Post-Precipitation

Weather Conditions: ____

Start of Rainfall (Date/Time): __________________________

End of Rainfall (Date/Time): __________________________

Total Recorded Precipitation: ________________ **inches**

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1. **Description of Area Under Maintenance/Construction Contributing to Storm Water Runoff (include location of maintenance area; BMPs in place; type of maintenance activity; condition of storm water discharge structures):**

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2. **Describe changes to the Storm Water Control Structures, if different than the SWPPP (V-ditches, CMP inlets, culverts, etc.)**

____
____
____

3. **Are the Storm Water Control Structures free of debris?**

4. **Are there areas of erosion?**

5. **Are there areas of ponding?**

6. **Are drainage and erosion controls placed around any stockpiled areas?**

7. **Are the BMPs in place adequate, properly maintained, or implemented?**

8. **Are additional BMPs required to control storm water pollution runoff?**

9. **Recommended corrective actions for SWPPP/storm water control system:**

10. **Is a Corrective Action Plan required?**

11. **Comments:**

BMPS FOR PICO POWER PROJECT

Inspected by: ________________ *Y - YES N - NO* *Date:*____________

(REF. SWPPP FIGURE 5)

ITEMS	IN PLACE	CLEARED	ADEQUATE	NEEDS IMPROVEMENT
Discharge points				
Sandbags around discharge inlets				
Sandbag berms				
Straw/fiber rolls				
Stabilized construction entrance				
Concrete washout/ spill containment sump				
Bagged material and drum storage area				
Stockpile area covered				
Construction laydown area swale diversion				
Construction laydown area fiber rolls				
Off-site mud tracking concerns				
General grading to prevent ponding				
Areas of gully erosion				
Trackwalk and bare soil areas				
Grade to drain				
Adjacent property drainage/concerns				
Additional BMPs				

NON-COMPLIANCE EVENTS FOR PICO POWER PROJECT

Non-Compliance Event & Date*	Initial Assessment of Impact Caused by Event	Action(s) Necessary to Achieve Compliance	Compliance Timeframe

*Accidental spills, failure of structural controls, etc.

APPENDIX E

Notice of Intent, NPDES General Permit - Construction, Notice of Termination Reporting Form

Data Request 63

DRAFT STORM WATER POLLUTION PREVENT PLAN FOR OPERATION

- DRAFT -

National Pollutant Discharge Elimination System (NPDES)

PICO POWER PROJECT

STORM WATER POLLUTION PREVENTION PLAN FOR INDUSTRIAL ACTIVITIES

December 2002

Prepared for:

SILICON VALLEY POWER

850 Duane Ave.
Santa Clara, California 95054

Prepared by:

FOSTER WHEELER ENVIRONMENTAL CORPORATION
3947 Lennane Drive, Suite 200
Sacramento, California 95834

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APPENDICES

ABBREVIATIONS AND ACRONYMS

BCT	Best Conventional Pollution Control Technology
BMP	Best Management Practices
CAS	Chemical Abstract Service
CE	Civil Engineer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ESC	Erosion and Sedimentation Control
°F	Degrees Fahrenheit
HDPE	High Density Polyethylene
MW	Megawatt
MSDS	Material Safety Data Sheet
NEC	No Exposure Certification
NOAA	National Oceanic Atmospheric Administration
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
PPP	Pico Power Project
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SCR	Selective Catalytic Reduction
SRC	Sampling Reduction Certification
SWM	Surface Water Management
SWMSRP	Storm Water Monitoring, Sampling, and Reporting Plan

ABBREVIATIONS AND ACRONYMS
(Continued)

SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TPQ	Threshold Planning Quantity
WPCP	Water Pollution Control Plant
WRCC	Western Region Climate Center

FOREWORD

This SWPPP is for the operational activities addressed by the General Industrial Storm Water Permit for the Pico Power Project located at 850 Duane Avenue, Santa Clara, California. A copy of the SWPPP will be retained at all times in the Silicon Valley Power office.

PICO POWER PROJECT - SWPPP

CERTIFICATION

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

For Silicon Valley Power

Name of Certifier: ______________________________

Signature of Certifier: ______________________________

Title of Certifier: ______________________________

Date of Certification: ______________________________

PICO POWER PROJECT - SWPPP

PROFESSIONAL CERTIFICATION

This Storm Water Pollution Prevention Plan (SWPPP) for Operation was prepared by, or under the direct supervision of, the undersigned, a Registered Civil Engineer Michael D. Cowan P.E. (CE-41963) in the State of California, with experience in storm water runoff, site drainage, and erosion control. The report contains information generated by the undersigned, as well as information from other sources, which the undersigned believes to be true and accurate.

Signed: ______________________________

Date: ______________________________

Revision	Date	Modification	Signature

1.0 INTRODUCTION

1.1 GENERAL

This Storm Water Pollution Prevention Plan (SWPPP) for operational activities presents the measures to be implemented to minimize pollutants in storm water discharges during operation of the Pico Power Project (site) in Santa Clara, California. The Pico Power Project will be a 122 megawatt nominal net output, natural gas-fired, combined-cycle electrical generating facility, with the ability to peak-fire to 147 MW, connected to a 115-kilovolt switchyard. The PPP will be located on 2.86 acres at 850 Duane Avenue in the City of Santa Clara, in Santa Clara County.

This SWPPP has two major objectives: (1) to help identify the sources of pollutants that have the potential to affect the quality of storm water discharges and (2) to describe and facilitate the implementation of practices to reduce pollutants in storm water discharges during operations and maintenance activities. The elimination of unauthorized non-storm water discharges to the facility's storm drain system is a major element of the SWPPP. The SWPPP includes Best Conventional Pollution Control Technology (BCT) and Best Management Practices (BMPs) that address source reduction.

This SWPPP will be made available for review to the public under Section 308(b) of the Clean Water Act (CWA) and a copy will be provided to or made available to the Regional Water Quality Control Board (RWQCB) upon request. Records of all monitoring information, copies of all reports required by the General Industrial Permit, and records of all data used to complete the Notice Of Intent (NOI) will be retained for minimum of five (5) years from the date of measurements, report, or monitoring activity.

Required elements of the SWPPP include:

- Site Description (Section 2.0) including a description of industrial activities, pollutant sources, and a compliance activity schedule
- Operational Activities BMPs (Section 3.0)
- Erosion and Sediment Controls (Section 4.0)
- Non-Storm Water Management (Section 5.0)
- Waste Management and Disposal (Section 6.0)
- Implementation of Other Approved Plans (Section 7.0)
- Site Inspections and Monitoring (Section8.0)

The BCTs are engineered design controls to prevent potential pollution reduction systems. The BMP activities presented in this document provide measures and controls necessary to limit or mitigate potential pollutant sources. Supporting site maps, plans, details, and calculations, along with site-specific inspection and monitoring reporting forms, are provided in the appendices.

The climate in the project area is Mediterranean [National Oceanic Atmospheric Administration (NOAA) division CA-04: Central Coast] with moderate year-round temperatures and a winter rainy season. The SWPPP permanent site storm water drainage controls will accommodate runoff flows from the 25-year, 24-hour rainfall event and will protect electrical equipment from major damage during the 100-year, 24-hour storm event.

1.2 INDUSTRIAL ACTIVITIES OVERVIEW

The project will be a 122 MW nominal, natural gas-fired, combined-cycle generating plant with two General Electric LM-6000PC Sprint combustion turbine-generators (CTGs); a single condensing steam turbine generator (STG); a deaerating surface condenser; a mechanical draft plume-abated cooling tower; and associated support equipment. The PPP will be located on approximately 2.86 acres at 850 Duane Avenue in the City of Santa Clara, in Santa Clara County. A gas compressor station for the project will be located adjacent to the City of Santa Clara's maintenance yard, on a 0.26-acre parcel at the corner of Lafayette and Comstock Streets in Santa Clara (see Appendix A, Figure 1 for the site location). A gas metering station (GM-4) will be located on the northwest corner of Wilcox Avenue and Gianera Street.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The Site is located at 850 Duane Avenue in the city of Santa Clara, Santa Clara County, California. The 2.86-acre site will accommodate the generation facilities, control/administration building, switchyard, emission control equipment, storage tanks, and parking area. A gas compressor station will be located across Lafayette Street from the PPP site, on City of Santa Clara property at the corner of Lafayette and Comstock streets.

The listed and mapped assessor's parcel numbers of the power plant site are 224-08-140 and 224-36-047. The parcel number of the gas compressor station site is 224-36-014.

The site location and drainage control drawings are presented in Appendix A.

2.2 CLIMATE AND PRECIPITATION

The climate in the project area is Mediterranean (NOAA division CA-04: Central Coast) with moderate year-round temperatures and a winter rainy season. The marine influence from the Pacific Ocean and the City of Santa Clara's proximity to San Francisco Bay have a substantial moderating influence on the local climate. Monthly average temperatures range from 46°F to 71°F. Temperatures exceeding 90°F occur on average only 16 days per year and temperatures below 32°F on average happen 5 days per year (FEMA 1999).

The San Jose International Airport is located less than one mile east of the PPP project site. Average annual temperature and precipitation data at the San Jose International Airport were obtained from 1990 through 2000 (with a break in the record for the year 1999, for which precipitation data were not available). During this period of record (excluding 1999), the mean average temperature was 61.42 °F. Average annual precipitation over this same period varied between 9.94 inches (1990) and 23.98 inches (1995) with a 10-year average annual precipitation of 17.19 inches (NCDC 2002). Table 2.1 lists the 10-year average rainfall amounts by month at the San Jose International Airport.

Table 2.1 Average 10-year average monthly precipitation at San Jose International Airport (inches).

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3.84	3.83	2.75	0.78	0.98	0.24	0.06	0.10	0.11	0.56	1.20	2.74

Annual 10-year average (1990 to 2000, excluding 1999) =17.19 inches

Source: National Climatic Data Center, Annual Summary 2002

2.3 FACILITY STORM WATER MANAGEMENT SYSTEM

The Surface Water Management (SWM) system includes the following components:

- General grading
- Storm drains
- Roadway undercrossings drainline
- Catch basin box
- Concrete curb and gutter
- Center roadway swale drainage
- Drop inlets
- Drain line valve control
- Paved access roads
- Berms and double containment structures
- Sand/oil/water separators
- Erosion control aggregate surface and vegetative ground cover
- Discharge manhole and storm water monitoring structure

BCTs applied at the site include:

- Tank secondary containment structure
- Oil/water separator unit
- Cooling water treatment
- Process water pretreatment

The grading and drainage drawing, (Appendix A Figure 2) shows the proposed grading and drainage plan after development of the essentially flat site and consequently the watershed area is the project site area. Final site elevations and slopes will be developed during detail design based upon the amount of excavation required for foundations, etc. Expected ridges, valleys, catch basins, pipeline routes, and oil/water separators are shown on the drawing. The existing site is essentially flat and the watershed area is the project boundary. Due to the placement of sound walls on the north and west plant boundaries, no stormwater runoff will enter or leave the plant along those sides of the project site. The southern plant grading plan will be such that no stormwater runoff flows between the plant and the Kifer Receiving Station. The plant eastern boundary borders streets and the grading plan will be developed to catch plant stormwater runoff and connect with the city stormwater drain system.

Two separate systems of underground drainage pipes are to be aligned to the east/west drain the majority of the site. Future site grading will approximately duplicate pre-development drainage patterns, with a central ridge splitting the center of the PPP site to the north and south, and a series of gentle ridges and valley further directing stormwater toward the proposed inlets. Stormwater collection inlets are to be located at the curbline of the proposed twenty-foot wide perimeter roadway. The proposed drainage lines are to intersect the existing fifty-four inch diameter storm drain located in Pico Way and a small discharge into an existing twelve inch diameter storm drain located in Duane Avenue that feeds into the fifty-four inch line. Manholes/inlets are to be constructed to facilitate connection to the existing system.

The site will also be equipped with secondary containment dikes surrounding all chemical storage areas. Secondary containment will not discharged to the stormwater system. A visual inspection of the secondary containment is conducted to determine if there is a spill or release or sheen on the storm water. Non –contaminated water will be drained to the process equipment drainage system which is routed through a separate oil/water separator prior to being discharged to the sanitary wastewater system for treatment by the Waste Water Pollution Control Plant (WPCP). If there are signs of contamination in the water, the valve will remain closed and the water will be disposed of appropriately.

2.4 SOURCE IDENTIFICATION

2.4.1 Potential Pollutants During Operational Activities

Hazardous materials delivered to the site will be used and stored on site for the operation of the generating plant. Tables 2.4-1 and 2.4-2 provide a list of the types and quantities of material normally expected to be present at the site. Table 2.4-2 also provides the materials' hazardous characteristics, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA) Title III reportable quantities (RQs), La Follette Bill threshold planning quantities (TPQs), and Proposition 65 listing status. Proposition 65 chemicals are those known to the state of California to be carcinogenic or cause reproductive problems in humans. In addition to the chemicals noted in Table 2.4-1, small quantities (less than 5 gallons) of paints, oils, solvents, pesticides, and cleaners, typical of those purchased at a retail hardware store, may also be used at the facility. Natural gas will be continuously delivered to the power plant site through a pressurized natural gas pipeline.

A variety of hazardous chemicals will be utilized to treat cooling water for the gas turbine inlet chilling system and pretreatment water prior to its introduction into a higher quality water process. These chemicals will be stored in either tanks or totes depending on the treatment location. Measures to keep incompatible chemicals separated will include separate storage of incompatible chemicals, proper training of employees, and containment areas and/or berming. In order to help prevent stormwater contamination, all tanks will be located within secondary containment.

Material safety data sheets (MSDS) and employee training on the potential contact with these hazardous substances is addressed via Hazard Communications Training in accordance with 29 Code Federal Regulation (CFR) 1910.120.

2.4.2 Potential Source of Spills During Maintenance Activities

Hazardous materials used during maintenance include lubricating oils, hydraulic oils, and antifreeze. There are no feasible alternatives to lubricating and hydraulic oils for operating plant transformers, turbines, and compressors.

The site is proposed to begin operation in December 2004. In the event that toxic chemicals listed in 40 CFR 302 are discharged to storm water, or oil and hazardous substances in excess of reportable quantities as identified in 40 CFR 110, 117 and 302 are found, the following information will be recorded and kept current during the life of the permit: the type, characteristic, and approximate quantity of the material spilled or leaked; the cleanup or remedial actions that have occurred or are planned; the approximate remaining quantity of materials that have been exposed to storm water or non-storm water discharges, and the preventatives measures taken to ensure spills or leaks do not reoccur.

There is only minimal potential for environmental impacts from hazardous material incidents during operations. Table 2.4-1 identifies the storage location and use of hazardous materials used by the facility. Oil based chemicals will be stored/contained within the equipment that they are servicing. Acids will be stored outdoors, near the cooling tower, within secondary containment. Incompatible chemicals will be separated using separate containment areas or berms. Maintenance and service personnel will be trained to handle these materials.

The most likely incidents involving these hazardous materials would be associated with minor spills or drips. Impacts from such incidents will be mitigated by cleaning up minor spills as soon as they occur. An incident involving a service vehicle or tanker truck release would present the worst-case scenario for release of hazardous materials. Spills will be reviewed by the Plant Manager or Plant Engineer to determine if regulatory authorities need to be notified. Table 2.4-3 summarizes potential pollution sources and corresponding BMPs.

2.4.3 Spill Cleanup

There are three different types of spill situations that could potentially arise at the PPP. They include 1) a spill within secondary containment that does not result in a release to the environment, 2) a spill on a concrete or paved area of the facility, 3) or a spill which occurs on an unpaved surface (gravel or vegetated). If a spill should occur, site personnel are to refer to the Spill Prevention Control and Countermeasure Plan (SPCC) for required actions and notification requirements. A summary of the required actions is as follows.

If a spill should occur within a secondary containment structure, it will be cleaned up using absorbents. If the spill is large, it will be pumped directly into 55-gallon drums or other appropriate containers.

Activities such as moving drums of material, performing equipment maintenance, and tanker truck failure could result in a spill upon a concrete or paved area. If a spill occurs, the first step is to immediately shutoff the flow that is causing the material release. If the spill is small and has collected within the immediate area, the spill should be bermed/contained and cleaned up. If the spill is large and is flowing or has the potential to flow out of the immediate area, the storm water discharge gate will be closed to prevent an off-site release. The spill will then be cleaned up, by pumping the material from the area into 55-gallon drums. Following the removal of all spilled material, the absorbents will be containerized for disposal, and the spill area will be thoroughly cleaned to prevent a sheen on any storm water that may be generated in the future.

Areas which are unpaved, such as gravel or vegetated areas, also have the potential to be impacted by a spill occurring due to drum movement, performing equipment maintenance, or tanker truck failure. The same procedures as described for spills on concrete or paved areas will be followed for spills upon unpaved areas; however, additional action will be necessary to clean up oily gravel or soil. Any gravel, soil, or vegetation which has been impacted as a result of a spill will be removed, containerized, and disposed. The area will then be restored to the condition it was in prior to the occurrence of the spill (replacing soil or gravel and revegetating if necessary).

2.4.4 Spill History

EPA has defined significant spills to include releases within a 24-hour period of hazardous substances in excess of reportable quantities under Section 311 of the CWA and Section 102 of CERCLA. There have been neither significant spills nor significant leaks of toxic or hazardous materials that have occurred at the site.

Table 2.4-1. Locations, Use, and Generation of Hazardous Materials and Hazardous Waste

Chemical	Use	Storage Location
Aqueous Ammonia (19% NH_3 +81% H_2O)	Controls nitrogen oxides (NOx) emissions through selective catalytic reduction	Outdoors in the ammonia unloading/storage area
Sulfuric Acid (H_2SO_4) (93%)	Circulating water pH control (cooling water treatment)	Outdoors near cooling tower
Sodium Hypochlorite (NaOCL) (Industrial Bleach)	Circulating water biological control	Outdoors near cooling tower
Sodium Bromide NALCO 7342	Circulating water biological control	Outdoors near cooling tower
NALCO TRASAR 23263	Circulating water scale control	Outdoors near cooling tower
Sodium Tolyltriazole NALCO 8305+	Circulating water corrosion control	Outdoors near cooling tower
Tetrapotassium Pyrophosphate NALCO 7396	Circulating water corrosion control	Outdoors near cooling tower
Sodium Tolyltriazole NALCO 1336	Circulating water heat exchanger yellow metal corrosion control	Outdoors near cooling tower
Phosphate NALCO 7208	HRSG steam side pH and scale control	Outdoors near HRSG
NALCO ELIMIN-OX	Steam side oxygen scavenger for corrosion control	Outdoors near HRSG
Sodium Bisulfite	Oxygen scavenger upstream of reverse osmosis unit	Outdoors near HRSG
Lubricating oil (synthetic and mineral)	Rotating equipment	Contained within equipment and associated storage tanks
Mineral Insulating Oil	Step-up and auxiliary transformers	Contained within transformers
Propylene Glycol	Anti-freeze for chilled water and closed loop cooling water systems	Contained within cooling system piping

Table 2.4-2. Chemical Inventory

Trade Name	Chemical Name	CAS[1] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[2]	TPQ[3]	Prop 65
Hazardous Materials:							
Aqueous Ammonia (19% solution)	Ammonium Hydroxide	1336-21-6	10,000-gal.	Corrosive Volatile	1000 lb.		No
Sulfuric Acid	Sulfuric Acid	7664-93-9	2,000 gal.	Corrosive	1,000 lb.	1,000 lb.	No
Bleach	Sodium Hypochlorite	7681-52-9	400 gal.	Corrosive	100 lb.		No
NALCO 7342	Sodium bromide	7647-15-6	200 gal.	Corrosive	(4)		No
NALCO TRASAR 23263		None	400 gal.	Non-hazardous	(4)		No
NALCO 7208	Sodium Hydroxide	1310-73-2	400 gal.	Toxic	(4)		No
NALCO 8305+	Sodium Tolyltriazole	64665-57-2	800 gal.	Toxic	(4)		No
NALCO 7396	Tetrapotassium Pyrophosphate	7320-34-5	400 gal.	Corrosive	(4)		No
NALCO 1336	Sodium Tolyltriazole	64665-57-2	400 gal.	Corrosive	()		No
Hydrochloric Acid	Hydrochloric Acid	7647-01-0	4,000 lbs.	Corrosive	5,000 lb.		No
Citric Acid	Hydroxy-propionic-tricarboxylic Acid	77-92-9	50 lbs.	Corrosive	(4)		No
Hydroxyacetic Acid	Gyrolic Acid	79-14-1	400 lbs.	Corrosive	(4)		No
Formic Acid	Methanoic Acid	64-18-6	250 lbs.	Corrosive	5,000 lb.		No
ELIMIN-OX	Carbohydrazide	497-18-7	400 gal.	Non-Hazardous			No
Sodium Bisulfite	Sodium Bisulfite (90-100%)	7631-90-5	200 gal.	Corrosive	5,000 lb.		No
Mineral Insulating Oil	Oil	None	25,000 gal. (total)	Combustible	42 gal.[5]		Yes

Table 2.4-2. (continued).

Trade Name	Chemical Name	CAS[a] Number	Maximum Quantity Onsite	Hazardous Characteristics	RQ[b]	TPQ[c]	Prop 65
Lubrication Oil	Oil	None	2,800 gal. (all turbines)	Combustible	42 gal.[5]		Yes
Anti-freeze	Propylene glycol	57-55-6	20,000 gal.	Toxic	(4)		No
Detergents	Various	None	100 gal.	Toxic	(4)		--
Lab Reagents (liquid)	Various	None	10 gal.	Toxic	(4)		--
Lab Reagents (solid)	Various	None	50 lbs.	Toxic	(4)		--
Ammonium Bifluoride	Ammonium Bifluoride	1341-19-7	100 lbs.	Toxic, Corrosive	100		No
Sodium Carbonate	Sodium Carbonate	497-19-8	200 lbs.	Corrosive	(4)		No
Sodium Nitrate	Sodium Nitrate	7631-99-4	200 lbs.	Corrosive	(4)		No

1 Chemical Abstract Service.
2 Reportable Quantity per CERCLA. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.
3 Threshold Planning Quantity. For hazardous materials, the TPQ is 10,000 lb.
4 No reporting requirement.
5 Must report if does or will reach California state waters, or if quantity released is a "harmful quantity."

Table 2.4-3. Assessment of Potential Pollution Sources and Corresponding Best Management Practices Summary

Area	Activity	Pollutant Source	Pollutant	Best Management Practices
Outdoors in the ammonia unloading/storag e area	Selective catalytic reduction (SCR) - Air Pollution Control Equipment	Spills and leaks during delivery or charging of the SCR	Aqueous Ammonia (19% NH_3 +81% H_2O)	• Implement spill and overflow protection during (SCR) transfer • Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Conduct Employee training
Outdoors near cooling tower	Cooling tower pH control and reverse osmosis unit scale control	Spills and leaks during delivery storage, and/or metering of the sulfuric acid into the cooling tower	Sulfuric Acid (H_2SO_4) (93%)	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct Employee training
Outdoors near cooling tower	Cooling tower biological control and process water pretreatment	Spills and leaks during delivery, storage or metering of the sodium hypochlorite into the cooling tower and/or water pretreatment	Sodium Hypochlorite (NaOCL) (Industrial Bleach)	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct Employee training
Outdoors near cooling tower	biocide for condenser cooling water system	Spills and leaks during delivery, storage or metering into the cooling water system	Sodium Bromide NALCO 7342	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct Employee training

Table 2.4-3. Continued

Area	Activity	Pollutant Source	Pollutant	Best Management Practices
Outdoors near cooling tower	Boiler water pH and scale control	Spills and leaks during delivery, storage or metering into the boiler water	NALCO TRASAR 23263	• Use dry cleanup methods • Implement spill prevention • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Outdoors near cooling tower	Circulating water corrosion control	Spills and leaks during delivery, storage or metering into the circulating water	Sodium Tolyltriazole NALCO 8305+	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Outdoors near cooling tower	Circulating water corrosion control	Spills and leaks during delivery, storage or metering into the circulating water	Tetrapotassium Pyrophosphate NALCO 7396	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Outdoors near cooling tower	Circulating water heat exchanger yellow metal corrosion control	Spills and leaks during delivery, storage or metering into the circulating water heat exchanger	Sodium Tolyltriazole NALCO 1336	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training

Table 2.4-3. Continued

Area	Activity	Pollutant Source	Pollutant	Best Management Practices
Outdoors near HRSG	Boiler water pH and scale control	Spills and leaks during delivery, storage or metering into the boiler water	Phosphate NALCO 7208	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Outdoors near HRSG	Oxygen scavenger in process feedwater to HRSG	Spills and leaks during delivery, storage or metering into the process feedwater	NALCO ELIMIN-OX	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Outdoors near HRSG	Oxygen scavenger upstream of reverse osmosis unit	Spills and leaks during delivery, storage or metering of the sodium bisulfite into the cooling tower and/or water pretreatment	Sodium Bisulfite	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Contained within equipment and associated storage tanks	Rotating equipment	Leaks from equipment or while servicing	Lubricating oil (synthetic and mineral)	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training

Table 2.4-3. Continued

Area	Activity	Pollutant Source	Pollutant	Best Management Practices
Contained within transformers	Contained within transformers	Leaks from equipment or while servicing	Mineral Insulating Oil	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Contained within cooling system piping	Freeze protection within chilled water and closed loop cooling water systems	Leaks from equipment or while servicing	Propylene Glycol	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training
Contained within oil water separator	Separation of oil and water	Leaks from tank	Waste Oil	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Conduct employee training
Waste oil and wash water drain tank	Oil and water collection at turbine	Leaks from tanks	Waste Oil	• Use dry cleanup methods • Implement spill prevention program • Implement preventative maintenance program to prevent system leaks • Provide secondary containment • Conduct employee training

3.0 BMPS FOR OPERATIONS AND MAINTENANCE ACTIVITIES

BMPs for operations and maintenance activities are described in the following sections. Additional BMPs may be developed as necessary upon inspection of existing BMPs and an assessment of their effectiveness. The BMPs for operation and maintenance focus on the following potential pollutant sources:

- Good housekeeping
- Preventative Maintenance
- Fine-grained soil (silt) suspended in storm water runoff
- Hazardous materials spills, leak prevention, and control
- Bulk material handling spill control

Table 2.4-3 provides a summary of potential pollution sources and corresponding BMPs.

3.1 GOOD HOUSEKEEPING AND PREVENTATIVE MAINTENANCE

Good housekeeping shall include those activities necessary to maintain a clean and orderly facility. Particular attention will be give to the elimination of brush, litter or other items that may clog drainage devices or enter the storm water flow from the site. All general trash and maintenance waste shall be disposed of in dumpsters, rolloffs, or other similarly approved containers in designated areas located throughout the site. The site is covered with asphalt, concrete, or vegetation and will require maintenance to minimize erosion and sediment concerns.

Preventative maintenance includes the regular inspection and maintenance of structural storm water controls (including the storm drain covers, storm water collection sump, and oil/water separator).

3.2 SITE VEHICLES

Vehicle fueling, oil changes, and maintenance for site vehicles are performed off site. If during operation and maintenance activities, on-site fueling equipment activities are needed, they will be contracted to a fueler who will be responsible for any cleanup or removal of contaminants. All maintenance equipment will be inspected for leaks at the beginning and end of each workday.

Preventative maintenance will include scheduled equipment maintenance. Recyclable oils will be managed within secondary containment areas. Drip pans will be used to minimize the potential for uncontrolled spills or releases during maintenance activities.

3.3 MATERIAL DELIVERY AND STORAGE

Materials, which are delivered and stored on site for purposes of facility operations, are stored in tanks, totes, drums, and in small containers stored in hazardous materials cabinets. Secondary containment is provided for liquid hazardous materials via concrete containment structures, containment pallets, or hazardous materials storage cabinets. Materials such as hydraulic fluid, lubricating oils, and dielectric fluid are also utilized within compressors, pumps, major equipment, and facility equipment transformers mounted within secondary containment.

The general drainage control will prevent runoff of storm water from a clean area across a potential source of pollution area or into secondary containment areas.

4.0 BMPS FOR EROSION AND SEDIMENTATION CONTROL

BMPs for Erosion and Sediment Control can be found in Appendix B and will be referenced and implemented (as necessary) during operations and maintenance. Erosion and Sedimentation Control reference numbers (for example, ESC1) can be found in parentheses behind the BMPs indicated below.

4.1 PRESERVATION OF EXISTING VEGETATION (ESC2)

Vegetation on the site will be preserved to minimize erosion and sediment runoff from non-impervious areas. Irrigation and maintenance of the trees and vegetation will be the responsibility of the facility operations and maintenance personnel.

4.2 SEEDING AND MULCHING (ESC10)

Should vegetation replacement be required, seeding/mulching or sodding will be conducted. An irrigation system may be used in localized areas to promote rapid germination of the seeding mixture and re-establishment of the vegetation if necessary.

4.3 DUST CONTROLS (ESC21)

Dust control measures will be implemented to reduce dust created by maintenance activities. This goes hand in hand with facility housekeeping to prevent the build up of dirt, dust, and debris, which may become airborne in windy conditions. In addition to wet suppression (watering), preventative measures to be used for dust control include regular housekeeping (sweeping/vacuuming), limiting on-site vehicular traffic and speed, and containerizing all debris capable of being displaced by wind. It should be noted that dust suppression will never be conducted using chemical dust suppression methods.

4.4 ACCESS ROAD CURBS AND SWALES

Areas of the PPP site are accessed by the plant road. This road partially encircles the facility, including an equipment loading/unloading area and separates potential high pollutant areas from clean areas. The roads are constructed with curbs and drainage gutters, which collect storm water from the road surface. The storm water is redirected to the edges of the road, where it flows to the collection basin and discharging drain line.

4.5 SAND/OIL/WATER SEPARATORS

Three sand/oil/water separators are provided to minimize the potential for debris such as large particle sediments, leaves, and litter from entering the storm water drainage system, in addition to preventing floating oil products from leaving the sump. The inlets will be cleaned periodically to maintain effectiveness.

4.6 MONITORING POINTS

There are three storm water discharge points located on the eastern side of the facility (see Figure 2). These discharge monitoring points will allow for storm water samples to be collected that will represent the quality and quantity of the facility's storm water discharges from a storm event.

5.0 NON-STORM WATER MANAGEMENT

Management of non-storm water discharges will be implemented as part to this SWPPP. Examples of non-storm water discharges include any water used as process water, non-contact cooling water, and vehicle wash water. Unless they are permitted by a separate NPDES Permit, these discharges are illegal. Any unauthorized non-storm water discharges will be stopped immediately and recorded as required.

6.0 WASTE MANAGEMENT AND DISPOSAL

Residuals and wastes are generated by maintenance and site operation activities. Waste management involves the following four steps:

1. Characterization
2. Handling and storage
3. Transportation
4. Disposal or recycle as appropriate

The site is a small quantity generator of Resource Conservation and Recovery Act (RCRA) hazardous waste. Most of the waste generated by the facility will be transported off site for recycle. Waste disposal quantities and handling are discussed in the Waste Management Plan.

7.0 IMPLEMENTATION OF OTHER APPROVED PLANS

Several management plans have been implemented to provide a framework by which the site operations and maintenance are executed. These plans describe the methods used to execute, integrate, and coordinate emergency response procedures including spill response, quality control, safety and health, and direction on how to perform the work in a sound manner. These plans include, but are not limited to, the Hazardous Materials Business Plan, Emergency Response Plan, and the Spill Prevention Control and Countermeasure Plan, and Waste Management Plan.

8.0 SITE INSPECTIONS AND MONITORING

All storm water pollution prevention BCT measures and BMPs will be inspected prior to the rainy season and before (prediction of) and following (measurement of) each rain event of 0.5 inches/24 hours or more. The inspection will allow for evaluation of the BCTs and/or BMPs implemented to prevent the release of potential pollutants. All inspections shall be done by trained personnel and the appropriate forms filled out. These forms are provided in the back of Appendix D, Storm Water Monitoring, Reporting, Sampling Plan (SWMRSP) with Site Inspection and Monitoring Reporting Forms. Inspections will include the date of the inspection, the individual(s) who performed the inspection, and the observations. Any BCT or BMP inadequacies shall be recorded and modified, upgraded, or repaired as soon as possible. All completed inspection forms shall be retained at the site office for a period of at least 3 years.

The General Industrial Storm Water Permit includes a sampling and analysis requirement for industrial activities. These requirements and the associated inspection forms are addressed in Appendix D, SWMRSP with site inspection and monitoring reporting forms. Three stormwater monitoring points are provided to facilitate sampling of discharges.

Samples shall also be taken should visual monitoring indicate that there has been a breach, malfunction, leak, or spill from a secondary containment structure, failure of a BCT/BMP which could result in the discharge of pollutants, or if storm water comes in contact with exposed materials and is allowed to be discharged.

Storm water samples will be taken in accordance with the General Permit requirements and conditions. The samples will be tested at a laboratory certified by the California Department of Health Services. The results of the tests will be documented in an annual storm water report that will be filed with the State Water Resources Control Board (SWRCB) by July 1 of each year.

9.0 RESPONSIBLE PERSONNEL

The responsible individuals for implementing and making necessary revisions to this SWPPP are the following personnel, which comprise the Pollution Prevention Team:

Name	Title	Responsibility
P.E. (Michael Cowan)	Civil Engineer (Foster Wheeler Environmental Corporation)	Preparation of SWPPP and selection of BMPs.
TBD	Plant Manager	Implementation of the SWPPP and SWMSRP, maintaining inspection and sampling records, annual reporting forms, and regulatory notification.
TBD	Plant Engineer	Inspection and monitoring of BMPs, implementation of SWPPP and SWMSRP, maintaining inspection and sampling records, annual reporting forms, and acting as Alternate to Plant Manager.

10.0 PERSONNEL TRAINING

All personnel involved with the ongoing monitoring and maintenance of the storm water management system will attend a yearly training class held by the Plant Manager, or his designee, before the beginning of the rainy season (October 1 of each year). The training will include a complete review of this SWPPP, including how and why each task has been implemented. The Plant Manager, or his designee, maintains a file of the training documentation. The SWPPP program will be reviewed as it relates to the various responsibilities for personnel implementation and awareness.

11.0 CERTIFICATION OF COMPLIANCE

The Pico Power Project will implement and comply with the program set forth above, and within 30 days of non-compliance intends to correct or submit a schedule for necessary corrections. Written certification that the corrections were undertaken will be issued to the RWQCB upon completion of the activities.

12.0 SWPPP REVIEW AND MODIFICATIONS

The Pico Power Project intends to amend this SWPPP, if deemed necessary, to address changes in the physical condition of the site or to maintain compliance in areas where this SWPPP is inadequate. The SWPPP will be revised within 90 days if it is determined that it is in violation of any of the requirements set forth in the General Permit.

The site will be formally assessed annually by the completion of the Comprehensive Site Compliance Evaluation. It will be informally assessed during the completion of the required monthly inspections.

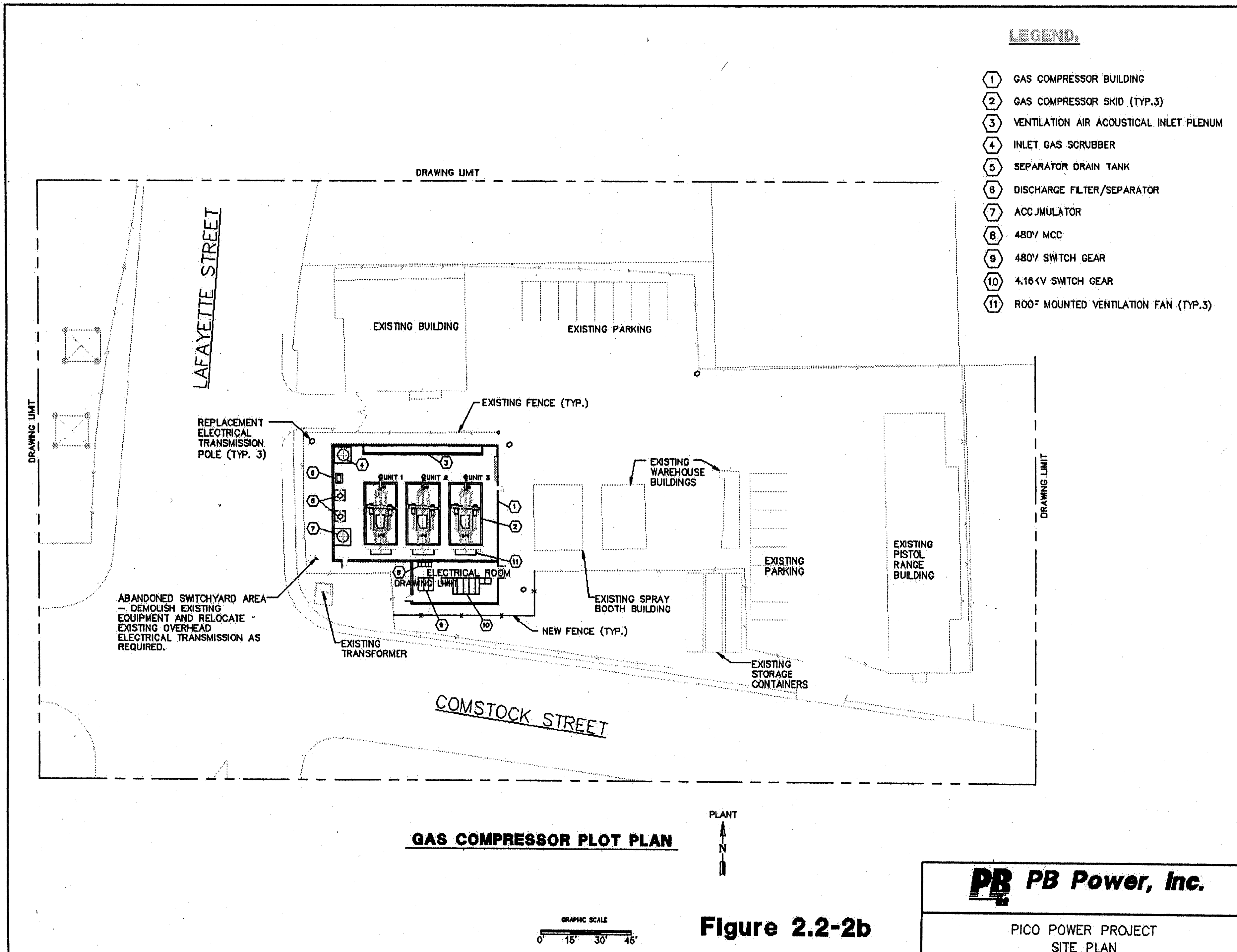
APPENDIX A

Site Maps, Plans, and Details (Figures 1-3)

APPENDIX A

TABLE OF CONTENTS

Figures



GAS COMPRESSOR PLOT PLAN

Figure 2.2-2b

PB Power, Inc.

PICO POWER PROJECT
SITE PLAN

N:\SV Power\JPG

APPENDIX B

Best Management Practices (BMPs) Details

This appendix will contain excerpts of applicable BMP details from the *California Stormwater Best Management Practice Handbook, Industrial/Commercial* published by the California Stormwater Quality Task Force, March 1993. These pages were left out of this preliminary draft to minimize bulk of the data request submittal, but will be provided upon request.

APPENDIX C

Site Hydrology and Hydraulic Calculations

Grading and Drainage

The site grading and drainage will be designed to comply with all applicable federal, state and local regulations. The general site grading will establish a working surface for construction and plant operating areas, provide positive drainage from buildings and structures, and provide adequate ground coverage for subsurface utilities.

Onsite drainage will be accomplished through gravity flow. The surface grading will direct stormwater runoff to the proposed collection system via overland flow at a minimum of 0.5%. The main plant complex area will be graded with moderate slopes (1 percent minimum preferred) for effective drainage. A storm water collection system of underground pipes and inlets rather than open channels is provided due to site space constrictions. Inlets will be constructed of cast-in-place or pre-cast concrete. The underground pipes will be sized to limit flow velocities to a maximum of 8 feet per second (fps) and a minimum, self-scouring velocity of 2 fps.

The buildings and structures will be located with the ground floor elevation a minimum of 6 inches above the finished grade. The preferred slope of the graded areas away from the structures will be one percent.

In accordance with the latest City of Santa Clara Design Criteria, the Site drainage facilities will be designed to convey the 10-year storm event flow. If a storm drain pump station becomes necessary, the drain system would be required to convey the 100-year event flow.

According to generally accepted engineering practice, surface pollution from vehicles and other sources is washed into the drainage system during the first 0.5 inches of rainfall from storms. The project drainage system will include oil-water separators that will receive stormwater runoff from areas that are subject to oil contamination, including parking lots and gravel areas. The separators will be underground vaults with baffles to collect oils and solids. Stormwater is routed through the baffles, allowing oils to rise to the surface and solids to settle to the bottom. The vault(s) will be pumped out each fall prior to the winter season. Oils will be removed using oil-absorbent pillows or other acceptable methods and transported to an approved disposal facility.

It should be noted that hazardous material containment areas (those areas with walls or dams built to contain spillage) will utilize an independent collection and treatment system meant to eventually release treated effluent to the sanitary sewer system of the city. This system is separate from the stormwater collection and treatment described in the prior paragraph.

No drainage improvements are anticipated at the "compressor site" at the intersection of Comstock and Lafayette Streets. The site is entirely improved/paved in its current condition. The installation of additional power plan amenities will neither increase nor decrease the amount of stormwater runoff from the site. Further, the site is presently improved with catch basins and underground pipes which will remain in the post-construction condition.

Pre- and Post-Development Runoff Conditions

The peak flow associated with the 10 and 100 year storm events at the site prior to construction (pre-development) will be compared to the post-development (after construction) conditions. Calculations reveal that the post development runoff will slightly exceed the pre-development runoff conditions.

The runoff conditions prior to development have been determined utilizing the guidelines contained in the latest City of Santa Clara Design Criteria. The existing site drains roughly north/south, ~~with~~ an indistinct ridge splitting

Computation Sheet

Made By: MG
Date: 11 Dec 02
Checked By: SB
Date: 12 Dec 02

Subject: SVP Pico Power Project Stormwater runoff revised to include additional

the area

west of Pico Way toward the neighboring (improved) sites located north and west of the property, and to the Kifer Receiving Station to the south. A localized high point also directs runoff to the northeast and east, toward Duane Avenue and the Pico easement (Pico Way). The wooded/grassed area east of the easement drains toward Duane Avenue and Lafayette Street.

Under the developed conditions, the runoff that previously drained toward adjacent properties will be redirected on-site and collected. Two separate systems of underground drainage pipes aligned to the east/west are to drain the majority of the site. Future site grading will approximately duplicate pre-development drainage patterns, with a central ridge splitting the center of the Power Plant site to the north and south, and a series of gentle ridges and valley further directing stormwater toward the proposed inlets. Stormwater collection inlets are to be located, when possible, at the curbline of the proposed twenty foot wide perimeter plant roadway. The proposed drainage lines are to intersect the existing fifty-four inch diameter Storm Drain located in Pico Way and a small discharge into an existing twelve inch diameter Storm Drain located in Duane Avenue that feeds into the fifty-four inch line. Doghouse manholes/inlets are to be constructed to facilitate connection to the existing system.

PB Power **Pico Power Plant**	**Project 13586A**	Page 3 of 7 — C1
Computation Sheet		Made By: MG Date: 11 Dec 02 Checked By: SB Date: 12 Dec 02
Subject: SVP Pico Power Project Stormwater runoff revised to include additional		

Preliminary Storm Drainage Calculations

Perform pre- and post-development calculations for the site(s) for the 10-year and 100-year storm events.

Storm Drainage Design

The rational formula shall be used to determine the peak runoff flow rate.

Q (cfs) = CIA

C = Runoff Coefficient
0.90 for impervious surfaces such as roads/roofs,
0.30 for gravel and open (lawn/earth) areas

I = rainfall intensity inches per hour (use rain intensity frequency curves per City of Santa Clara Design Standards)

A = tributary area in acres

- Assume minimum time of concentration duration is 10 minutes.
- Runoff resulting from rainfall shall be collected by sloping the tributary surface areas to gravel swales, overland, or the perimeter roadway which will direct the runoff to catch basins and from there the surface water shall be conveyed by reinforced concrete pipe to the existing stormwater system.
- The site drainage system shall be designed to function on the hydraulic gradient available between any two points along the system.
- The storm drain system shall be designed in accordance with the latest City of Santa Clara requirements. City of Santa Clara Standard Details shall be used wherever possible.

Hydraulic Design

The Manning formula shall be used to determine the flow of closed conduits.

$$Q = A \frac{1.486}{n} R^{2/3} S^{1/2} \text{ cfs}$$

A = cross sectional flow area in ft^2

n = for lined channels = .015
for earth channels = .030
for closed conduit = .013

R = hydraulic radius in ft

S = slope of gradient in ft/ft

Closed conduits shall be considered flowing full. Velocities shall range from 2 fps mm to 10 fps max.

Unlined open channel velocities shall not exceed 3 fps to avoid erosion of the bottom or sides of the ditch. For higher velocities, ditches shall be protected with concrete lining.

Pre-Developed Stormwater Runoff

Use Rational Method

Q (cfs) = CIA

A = Approximate area of construction disturbance = **3.23 acres**

0.94 acres = aggregate roadway/pavement = 29%
2.29 acres = loose, unpacked earth; poorly developed grass = 71%

Compute weighted Runoff Coefficient of C

0.90 for impervious surfaces such as roads/roofs = 29%
0.30 for gravel and open (lawn/earth) areas = 71%

C=0.47

I = Rainfall Intensity. Directly related to time of concentration. Assume minimum of 10 minutes for water to flow from most remote part of construction disturbance area to off-site.

For 10 minute peak duration of rainfall, **I = 1.61** for the 5-year storm event.

For 10 minute peak duration of rainfall, **I = 1.92** for the 10-year storm event.

For 10 minute peak duration of rainfall, **I = 2.31** for the 25-year storm event.

For 10 minute peak duration of rainfall, **I = 2.86** for the 100-year storm event.

Therefore Q=(C)(I)(A) = (0.47)(1.61)(3.23) = **2.44 cubic foot per second** (cfs) rate of runoff for the 5-year storm event.

Q=(C)(I)(A) = (0.47)(1.92)(3.23) = **2.91 cfs** for the 10-year event.

Q=(C)(I)(A) = (0.47)(2.31)(3.23) = **3.51 cfs** for the 25-year event.

Q=(C)(I)(A) = (0.47)(2.86)(3.23) = **4.34 cfs** for the 100-year event.

To compute runoff volumes associated with these rates, we assume a 24-hr. duration. The following Intensity Duration Frequencies are associated with a 24-hour event for the studied storms:

I = 0.09 for the 5-year storm event.
I = 0.11 for the 10-year storm event.
I = 0.13 for the 25-year storm event.
I = 0.16 for the 100-year storm event.

Therefore:

Q=(C)(I)(A) = (0.47)(0.09)(3.23) = 0.14 cfs for the 5 year storm event.
Volume = (0.14 cfs)(3,600 sec/hour)(24 hours) = 12,096 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.11)(3.23) = 0.17 cfs for the 5 year storm event.
Volume = (0.17 cfs)(3,600 sec/hour)(24 hours) = 14,688 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.13)(3.23) = 0.20 cfs for the 5 year storm event.
Volume = (0.20 cfs)(3,600 sec/hour)(24 hours) = 17,280 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.16)(3.23) = 0.24 cfs for the 5 year storm event.
Volume = (0.24 cfs)(3,600 sec/hour)(24 hours) = 20,736 cubic feet of runoff

Post-Developed Stormwater Runoff

Use Rational Method

Q (cfs) = CIA

A = Approximate area of construction disturbance = 3.23 acres **minus** 12,971 square feet (0.30 acres) of area in the post-developed scenario that capture stormwater in containment dikes to be treated and directed to the oil-water separator(s) or in the cooling tower..

Therefore, A = **2.93 acres**

Computation Sheet

Subject: SVP Pico Power Project Stormwater runoff revised to include additional

1.25 acres = impervious surface/pavement = 43%
1.68 acres = gravel areas = 57%

Compute weighted Runoff Coefficient of C

0.90 for impervious surfaces such as roads/roofs = 43%
0.30 for gravel and open (lawn/earth) areas = 57%

C=0.56

I = Rainfall Intensity. Directly related to time of concentration. Assume 10 minutes (shorter under development conditions) for water to flow to outlet point.

For 10 minute peak duration of rainfall, **I = 1.61** for the 5-year storm event.

For 10 minute peak duration of rainfall, **I = 1.92** for the 10-year storm event.

For 10 minute peak duration of rainfall, **I = 2.31** for the 25-year storm event.

For 10 minute peak duration of rainfall, **I = 2.86** for the 100-year storm event.

Therefore Q=(C)(I)(A) = (0.56)(1.61)(2.93) = **2.64 cubic foot per second** (cfs) rate of runoff for the 5-year storm event.

Q=(C)(I)(A) = (0.56)(1.92)(2.93) = **3.15 cfs** for the 10-year event.

Q=(C)(I)(A) = (0.56)(2.31)(2.93) = **3.76 cfs** for the 25-year event.

Q=(C)(I)(A) = (0.56)(2.86)(2.93) = **4.69 cfs** for the 100-year event.

To compute runoff volumes associated with these rates, we assume a 24-hr. duration. The following Intensity Duration Frequencies are associated with a 24-hour event for the studied storms:

I = 0.09 for the 5-year storm event.
I = 0.11 for the 10-year storm event.

I = 0.13 for the 25-year storm event.
I = 0.16 for the 100-year storm event.

Therefore:

Q=(C)(I)(A) = (0.56)(0.09)(2.93) = 0.15 cfs for the 5 year storm event.
Volume = (0.15 cfs)(3,600 sec/hour)(24 hours) = 12,960 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.11)(2.93) = 0.18 cfs for the 5 year storm event.
Volume = (0.18 cfs)(3,600 sec/hour)(24 hours) = 15,552 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.13)(2.93) = 0.21 cfs for the 5 year storm event.
Volume = (0.21 cfs)(3,600 sec/hour)(24 hours) = 18,144 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.16)(2.93) = 0.26 cfs for the 5 year storm event.
Volume = (0.26 cfs)(3,600 sec/hour)(24 hours) = 22,464 cubic feet of runoff

Comparing the pre-developed to post-developed runoff rate conditions.

	5-yr.	*10-yr.*	*25-yr.*	*100-yr.*
Pre-Dev.	2.44 cfs	2.91 cfs	3.51 cfs	4.34 cfs
Post-Dev.	2.64 cfs	3.15 cfs	3.76 cfs	4.69 cfs

Comparing the pre-developed to post-developed 24-hour runoff volumes.

	5-yr.	*10-yr.*	*25-yr.*	*100-yr.*
Pre-Dev.	12,096 ft3	14,688 ft3	17,280 ft3	20,736 ft3
Post-Dev.	12,960 ft3	15,552 ft3	18,144 ft3	22,434 ft3

We would respectfully suggest that this is a negligible increase in the peak rate of stormwater runoff from the site for the major storm events.

Pico Power Plant

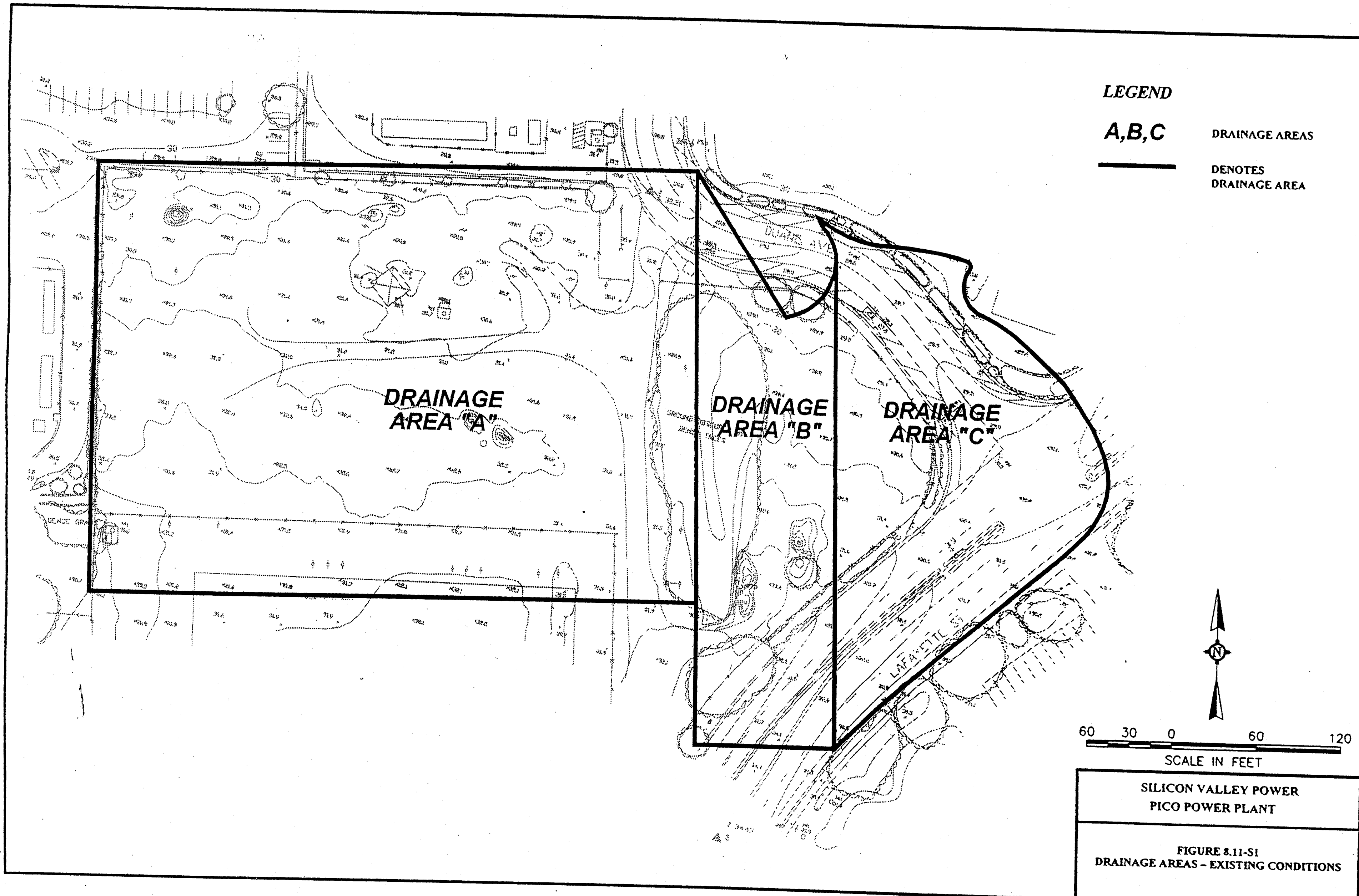
Computation Sheet

Subject: SVP Pico Power Project Stormwater runoff revised to include additional	Made By: MG Date: 11 Dec 02 Checked By: SB Date: 12 Dec 02

Expected distribution of stormwater between collection systems.

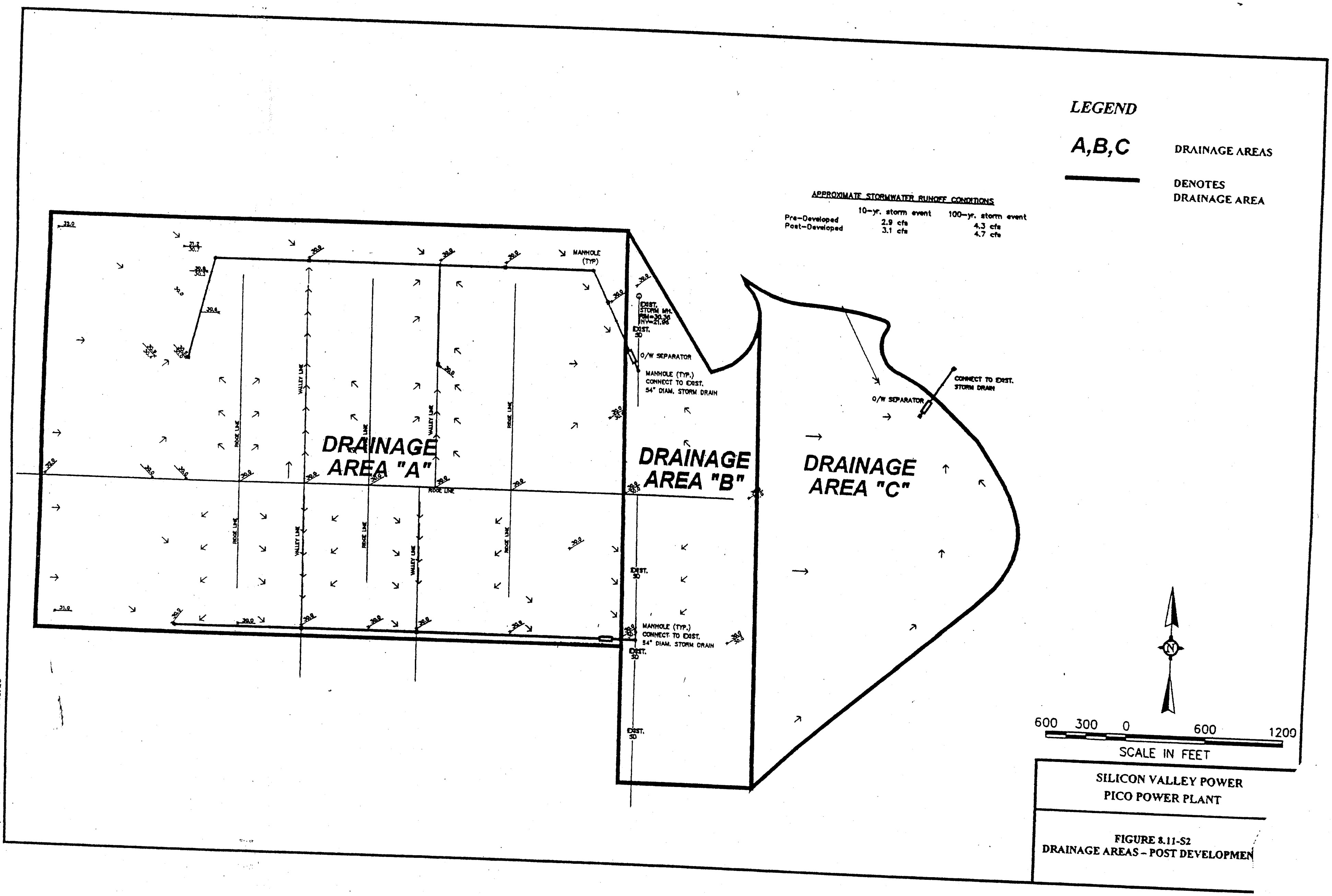
The distribution between the three collection systems is as follows:

Northern Collection System:	46%
Southern Collection System:	38%
Eastern Collection System	16%



SILICON VALLEY POWER
PICO POWER PLANT

FIGURE 8.11-S1
DRAINAGE AREAS – EXISTING CONDITIONS



SILICON VALLEY POWER
PICO POWER PLANT

FIGURE 8.11-S2
DRAINAGE AREAS – POST DEVELOPMEN

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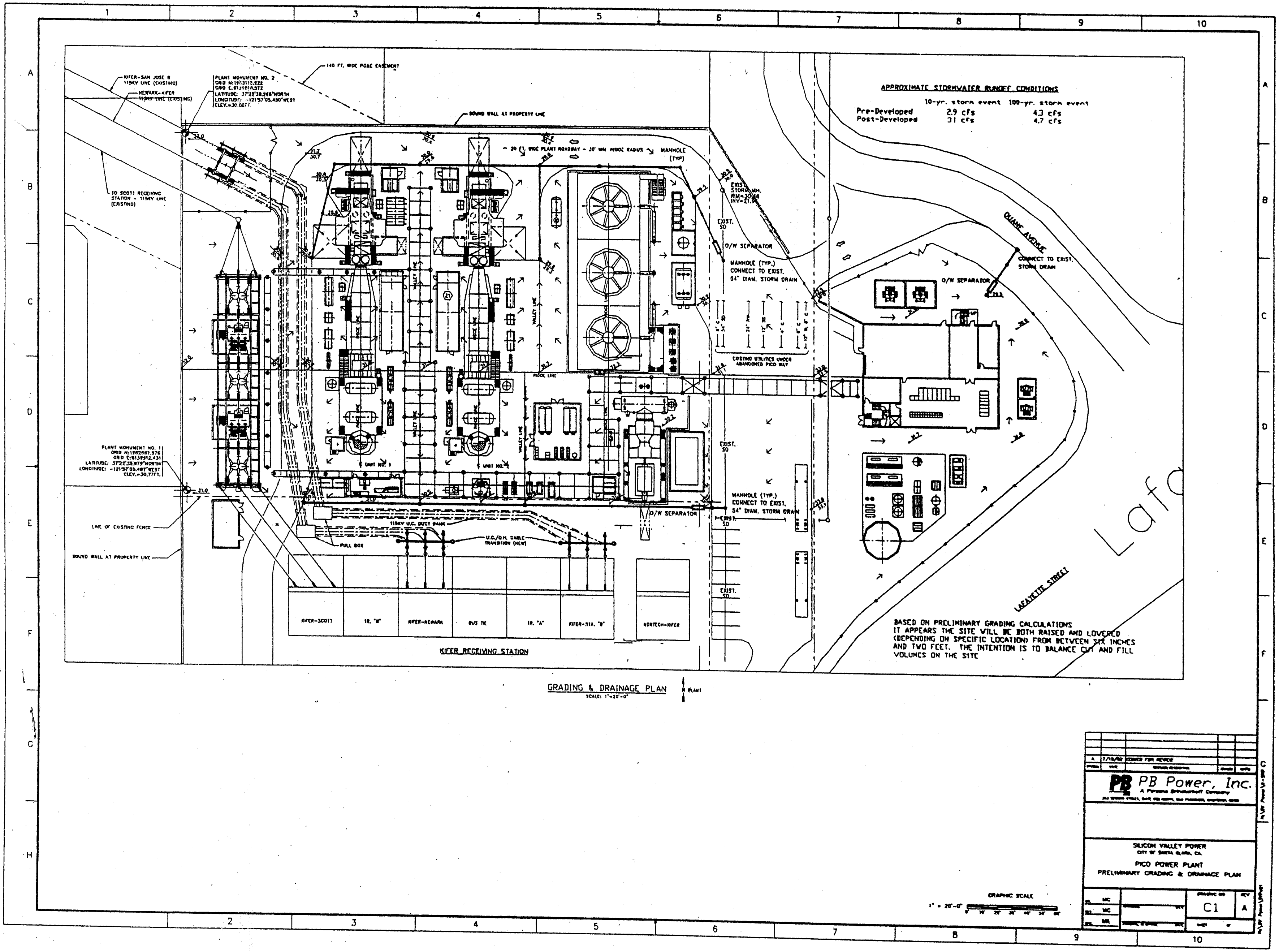
PLOT/UPDATE: OCT 24 2002 14:43:28



APPROXIMATE STORMWATER RUNOFF CONDITIONS
10-yr. storm event 100-yr. storm event
Pre-Developed 2.9 cfs 4.3 cfs
Post-Developed 3.1 cfs 4.7 cfs
140 FT. WIDE PGE EASEMENT
SOUND WALL AT PROPERTY LINE
KIFER-SAN JOSE B 115KV LINE (EXISTING)
NEWARK-KIFER 115KV LINE (EXISTING)
TO SCOTT RECEIVING STATION - 115KV LINE (EXISTING)
PLANT MONUMENT NO. 2
PLANT MONUMENT NO. 1
LINE OF EXISTING FENCE
SOUND WALL AT PROPERTY LINE
MANHOLE (TYP)
EXIST. STORM MH.
O/W SEPARATOR
MANHOLE (TYP.) CONNECT TO EXIST. 54" DIAM. STORM DRAIN
EXISTING UTILITIES UNDER ABANDONED PICO WAY
EXIST. SD
QUANE AVENUE
CONNECT TO EXIST. STORM DRAIN
LAFAYETTE STREET
UNIT NO. 1
UNIT NO. 2
PULL BOX
115KV U.G. DUCT BANK
U.G./O.H. CABLE TRANSITION (NEW)
KIFER-SCOTT
BUS TIE
KIFER-NEWARK
KIFER-STA. "B"
NORTECH-KIFER
KIFER RECEIVING STATION
BASED ON PRELIMINARY GRADING CALCULATIONS IT APPEARS THE SITE WILL BE BOTH RAISED AND LOWERED (DEPENDING ON SPECIFIC LOCATION) FROM BETWEEN SIX INCHES AND TWO FEET. THE INTENTION IS TO BALANCE CUT AND FILL VOLUMES ON THE SITE
GRADING & DRAINAGE PLAN
SCALE: 1"=20'-0"
GRAPHIC SCALE
1" = 20'-0"
ISSUED FOR REVIEW
PB Power, Inc.
A Parsons Brinckerhoff Company
SILICON VALLEY POWER
CITY OF SANTA CLARA, CA.
PICO POWER PLANT
PRELIMINARY GRADING & DRAINAGE PLAN
C1
A

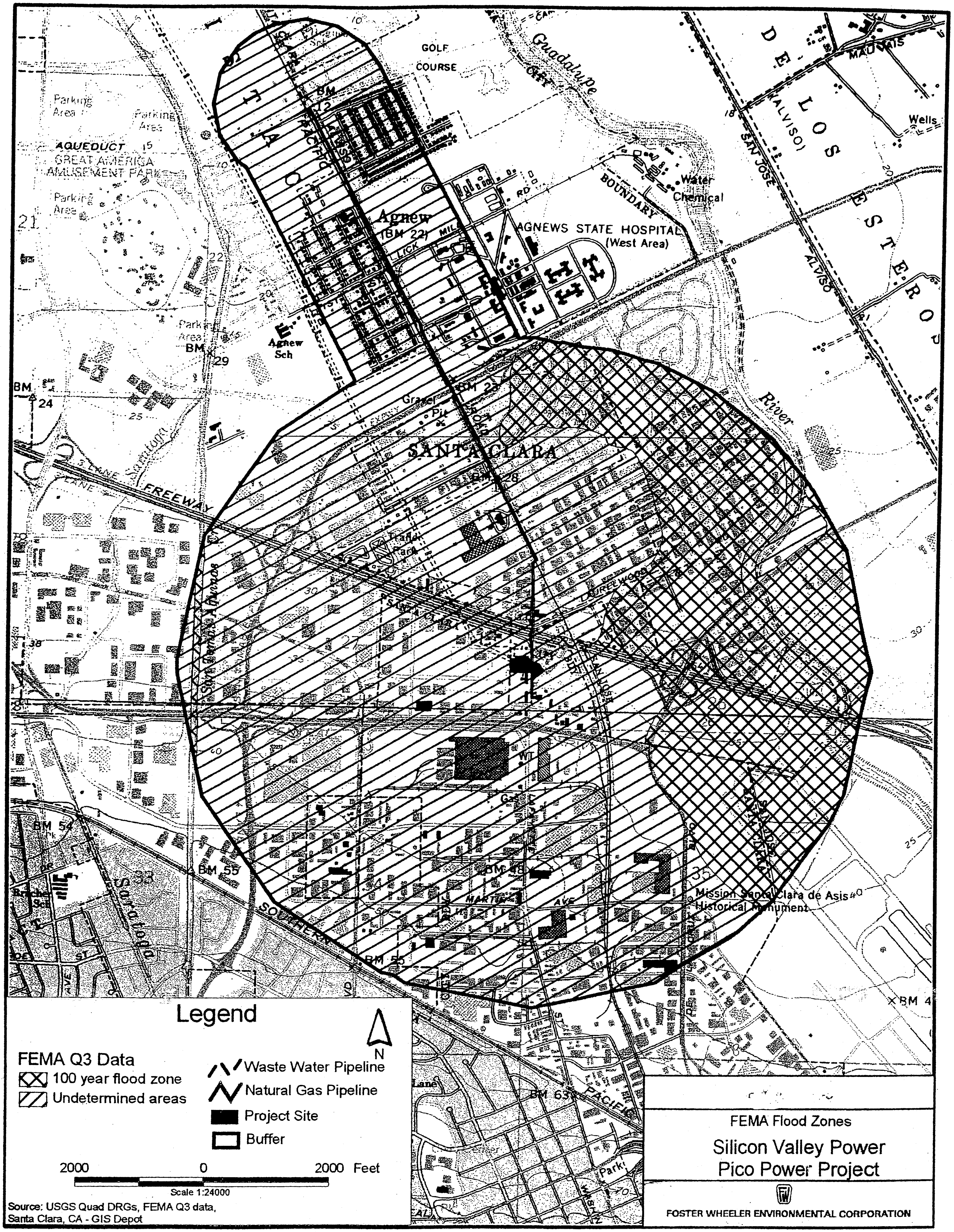

GOLF
COURSE
Parking
Area
AQUEDUCT
GREAT AMERICA
AMUSEMENT PARK
Agnew
(BM 22)
Agnew
Sch
AGNEWS STATE HOSPITAL
(West Area)
BOUNDARY
Water
Chemical
Wells
Guadalupe
River
SAN JOSE
ALVISO
SANTA CLARA
FREEWAY
LAUREL WOOD
Mission Santa Clara de Asis
Historical Monument
SOUTHERN
Saratoga
Legend
N
FEMA Q3 Data
100 year flood zone
Undetermined areas
Waste Water Pipeline
Natural Gas Pipeline
Project Site
Buffer
2000
0
2000 Feet
Scale 1:24000
Source: USGS Quad DRGs, FEMA Q3 data,
Santa Clara, CA - GIS Depot
FEMA Flood Zones
Silicon Valley Power
Pico Power Project
FOSTER WHEELER ENVIRONMENTAL CORPORATION

Table 8.11-S3. Soil loss calculation for the PPP site, by subarea.

Sub-drainage Area ID*	Area (acres)	Soil Type	K	L (feet)	Fall (feet)	S (%)	m	LS	R	VM	Rate of Soil Loss (A) (t/acre/yr)	Soil Loss for the Sub Drainage Area (t/yr)
Pre-development Conditions:												
A (Dirt Cover)	2.62	Clay	0.29	48.8	1.2	2.46	0.4	0.18	33	0.65	1.14	3.0
B (Dirt Cover and Dense Vegetation)	0.6	Clay	0.29	41.7	0.9	2.16	0.37	0.16	33	0.35	0.52	0.3
C (Dirt Cover and Poor Grass)	1.0	Clay	0.29	38.3	0.7	1.83	0.35	0.14	33	0.45	0.58	0.6
Total soil loss - Pre development Conditions (t/year) =												3.9
Post-development Conditions												
A (Power Plant Area)	2.62	Gravel, Paving, Equip., Bldg	0.05	100	1	1.00	0.2	0.12	33	0.05	0.01	0.03
B (Parking and Easement Area)	0.6	Paved	0.05	100	1	1.00	0.2	0.12	33	0.01	0.002	0.001
C (Warehouse and Shop, and Equipment Storage)	1.0	Gravel, Paving, Equip., Bldg	0.05	100	1	1.00	0.2	0.12	33	0.05	0.01	0.010
Total soil loss - Post development Conditions (t/year) =												0.04

Soil loss is estimated using the Modified Universal Soil Loss Equation: A=(R)(K)(LS)(VM)

where:

A = average annual soil loss (tons/acre)
R = rainfall and runoff erosivity index (dimensionless)
K = soil erodibility factor, (tons/acre)
LS = slope length and steepness factor (dimensionless)
VM = vegetation constant (dimensionless) similar to (C) (P) in the Universal Soil Loss Equation
C = cover and management factor
P =support practice factor

* see Figures 1 and 2.

[1]Soil loss equation variables used above represent average values for each drainage area.

APPENDIX D

Storm Water Monitoring, Reporting, and Sampling Plan

[To be developed]

APPENDIX E

Site Inspection and Monitoring Reporting Forms

MONTHLY WET/DRY SEASON INSPECTION REPORT

All discharge points must be inspected. Answer "Y" for Yes, "N" for No, and "N/A" for Not Applicable. Provide comments as needed.

Date: ______________________ Inspector Name: ______________________

Time: ______________________ Inspector Signature: ______________________

Reason for Inspection:

- ❑ Monthly Wet Season
- ❑ Monthly Dry Season
- ❑ Discharge Sampling
- ❑ Before Storm Event of > 0.5 inches
- ❑ Following Storm Event of > 0.5 inches

Description of Discharge, if present

Location of observations.	
Was any discharge noted?	
If yes, describe discharge (odor, color, suspended solids, etc.)	
Are any new or revised BMPs required? If yes, provide new or revised implementation date.	

BMPs and Condition of Site Controls

Are sediment traps clean?	
Are secondary containment structures free of liquids and debris?	
Are storm drain covers free of debris?	
Are hazardous material loading / unloading and usage areas free of leaks or spills?	
Are drainage swales, curbs, and gutters free of liquid and debris.	
Is the oil water separator in proper working order with appropriate capacity?	
Is the discharge collection sump in proper working order	
Is the discharge point free of debris?	
Is the valve on the collection sump in good working condition?	

Comments

QUARTERLY VISUAL OBSERVATIONS INSPECTION REPORT – PART I

This inspection report is designed to monitor authorized and unauthorized non-storm water discharges (NSWDs). Use "Y" for Yes, "N" for No, and "N/A" for Not Applicable. NSWD Inspections must be conducted Quarterly.

Date: ______________________ Inspector Name: ______________________

Time: ______________________ Inspector Signature: ______________________

	Q1 (Jan to March)	Q2 (April to June)	Q3 (July to Sept)	Q4 (Oct-Dec)
Have any authorized non-stormwater discharges (NSWD) occurred at the facility? If yes, then fill out Part II of this report.				
Did you visually observe all authorized NSWDs and their sources during the entire quarter? If no, explain on Part II of this report.				
Did you visually observe all drainage areas to detect the presence of unauthorized NSWDs?				
Have any unauthorized NSWDs occurred at the facility? If yes, then fill out part II of this report.				
If there was an unauthorized NSWD, was it eliminated or permitted. Explain on Part II of this report.				

QUARTERLY VISUAL OBSERVATIONS INSPECTION REPORT – PART II

Fill in the appropriate quarter number (1, 2, 3, or 4) and answer the questions as necessary. If multiple NSWDs were noted during a quarter, use additional copies of this form. Use the comments section to provide additional information.

QUARTER ______

FOR AUTHORIZED NSWDs

Name of authorized NSWD	
Date and time of authorized NSWD observed	
Source / location of authorized NSWD	
Characteristics of discharge at the source and at its discharge location	
Name, title, and signature of observer	
Any new or revised BMPs necessary to reduce or prevent pollutants in authorized NSWDs – if yes, provide implementation date:	

FOR UNAUTHORIZED NSWDs

Name of unauthorized NSWD	
Date and time of unauthorized NSWD	
Source and location of each unauthorized NSWD	
Characteristics of the discharge at the source and at its discharge location	
Name, title, and signature of the observer	
Any corrective actions necessary to eliminate the source of each unauthorized NSWD and to clean impacted drainage areas. Provide date that the unauthorized NSWD was eliminated.	

COMMENTS

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION CHECKLIST

PICO POWER PROJECT – 850 Duane Avenue, Santa Clara, CA 95054

Name/Title of Inspector: ____________________

Date of Inspection: ______________ **Time of Inspection:** __:__ **AM/PM**

Type of Inspection: Pre-Precipitation/Post-Precipitation

Weather Conditions: ____

Start of Rainfall (Date/Time): _________________________

End of Rainfall (Date/Time): _________________________

Total Recorded Precipitation: ________________ **inches**

---

1. **Description of Area Under Maintenance Contributing to Storm Water Runoff (include location of maintenance area; BMPs in place; type of maintenance activity; condition of storm water discharge structures):**

____
____
____
____
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____

2. **Describe changes to the Storm Water Control Structures, if different than the SWPPP (V-ditches, CMP inlets, culverts, etc.)**

____
____
____

3. **Are the Storm Water Control Structures free of debris?**

____
____

4. **Are there areas of erosion?**

____
____

5. **Are the secondary containment structures free of storm water and debris?**

____
____

6. **Are drainage and erosion controls placed around materials management areas?**

____
____

7. **Are the BMPs in place adequate, properly maintained, or implemented?**

____
____
____
____

8. **Are additional BMPs required to control storm water pollution runoff?**

____
____
____

9. **Recommended corrective actions for SWPPP/storm water control system:**

____
____
____

10. **Is a Corrective Action Plan required?**

____

11. **Comments:**

____
____
____
____

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION CHECKLIST

PICO POWER PROJECT – 850 Duane Avenue, Santa Clara, CA 95054

Name/Title of Inspector: ____________________

Date of Inspection: _______________ Time of Inspection: __:__ AM/PM

Operations Manager or Designee:____________________________

✓- YES X - NO

ITEMS	IN PLACE	CLEARED	ADEQUATE	NEEDS IMPROVEMENT
Discharge Point				
Sediment Trap				
Secondary containment structures free of liquids and debris				
Storm drain covers are free of debris				
Hazardous materials unloading areas are free of leaks or spills				
Drainage swales, curbs and gutters free of liquid and debris				
Hazardous materials management areas are free of leaks or spills				
Equipment is maintained to prevent leaks				
Adjacent Property Drainage/Concerns				
Oil water separator is in property working order with appropriate capacity				
Spill containment sump is in proper working order with appropriate capacity				
Additional BMPs:				

APPENDIX F

Notice of Intent, Notice of Termination, and General Permit

Data Request 64

DRAINAGE AND GRADING DESIGN
CONCEPT DESCRIPTION AND CALCULATION SHEETS

PB Power Pico Power Plant	Project 13586A	Page 1 of 7	C1
Computation Sheet		Made By: MG Date: 11 Dec 02 Checked By: SB Date: 12 Dec 02	
Subject: SVP Pico Power Project Stormwater runoff revised to include additional			

Grading and Drainage

The site grading and drainage will be designed to comply with all applicable federal, state and local regulations. The general site grading will establish a working surface for construction and plant operating areas, provide positive drainage from buildings and structures, and provide adequate ground coverage for subsurface utilities.

Onsite drainage will be accomplished through gravity flow. The surface grading will direct stormwater runoff to the proposed collection system via overland flow at a minimum of 0.5%. The main plant complex area will be graded with moderate slopes (1 percent minimum preferred) for effective drainage. A storm water collection system of underground pipes and inlets rather than open channels is provided due to site space constrictions. Inlets will be constructed of cast-in-place or pre-cast concrete. The underground pipes will be sized to limit flow velocities to a maximum of 8 feet per second (fps) and a minimum, self-scouring velocity of 2 fps.

The buildings and structures will be located with the ground floor elevation a minimum of 6 inches above the finished grade. The preferred slope of the graded areas away from the structures will be one percent.

In accordance with the latest City of Santa Clara Design Criteria, the Site drainage facilities will be designed to convey the 10-year storm event flow. If a storm drain pump station becomes necessary, the drain system would be required to convey the 100-year event flow.

According to generally accepted engineering practice, surface pollution from vehicles and other sources is washed into the drainage system during the first 0.5 inches of rainfall from storms. The project drainage system will include oil-water separators that will receive stormwater runoff from areas that are subject to oil contamination, including parking lots and gravel areas. The separators will be underground vaults with baffles to collect oils and solids. Stormwater is routed through the baffles, allowing oils to rise to the surface and solids to settle to the bottom. The vault(s) will be pumped out each fall prior to the winter season. Oils will be removed using oil-absorbent pillows or other acceptable methods and transported to an approved disposal facility.

It should be noted that hazardous material containment areas (those areas with walls or dams built to contain spillage) will utilize an independent collection and treatment system meant to eventually release treated effluent to the sanitary sewer system of the city. This system is separate from the stormwater collection and treatment described in the prior paragraph.

No drainage improvements are anticipated at the "compressor site" at the intersection of Comstock and Lafayette Streets. The site is entirely improved/paved in its current condition. The installation of additional power plan amenities will neither increase nor decrease the amount of stormwater runoff from the site. Further, the site is presently improved with catch basins and underground pipes which will remain in the post-construction condition.

Pre- and Post-Development Runoff Conditions

The peak flow associated with the 10 and 100 year storm events at the site prior to construction (pre-development) will be compared to the post-development (after construction) conditions. Calculations reveal that the post development runoff will slightly exceed the pre-development runoff conditions.

The runoff conditions prior to development have been determined utilizing the guidelines contained in the latest City of Santa Clara Design Criteria. The existing site drains roughly north/south, with an indistinct ridge splitting

Computation Sheet

Made By: MG

Date: 11 Dec 02

Checked By: SB

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Subject: SVP Pico Power Project Stormwater runoff revised to include additional

the area

west of Pico Way toward the neighboring (improved) sites located north and west of the property, and to the Kifer Receiving Station to the south. A localized high point also directs runoff to the northeast and east, toward Duane Avenue and the Pico easement (Pico Way). The wooded/grassed area east of the easement drains toward Duane Avenue and Lafayette Street.

Under the developed conditions, the runoff that previously drained toward adjacent properties will be redirected on-site and collected. Two separate systems of underground drainage pipes aligned to the east/west are to drain the majority of the site. Future site grading will approximately duplicate pre-development drainage patterns, with a central ridge splitting the center of the Power Plant site to the north and south, and a series of gentle ridges and valley further directing stormwater toward the proposed inlets. Stormwater collection inlets are to be located, when possible, at the curbline of the proposed twenty foot wide perimeter plant roadway. The proposed drainage lines are to intersect the existing fifty-four inch diameter Storm Drain located in Pico Way and a small discharge into an existing twelve inch diameter Storm Drain located in Duane Avenue that feeds into the fifty-four inch line. Doghouse manholes/inlets are to be constructed to facilitate connection to the existing system.

Preliminary Storm Drainage Calculations

Perform pre- and post-development calculations for the site(s) for the 10-year and 100-year storm events.

Storm Drainage Design

The rational formula shall be used to determine the peak runoff flow rate.

Q (cfs) = CIA

C = Runoff Coefficient
0.90 for impervious surfaces such as roads/roofs,
0.30 for gravel and open (lawn/earth) areas

I = rainfall intensity inches per hour (use rain intensity frequency curves per City of Santa Clara Design Standards)

A = tributary area in acres

- Assume minimum time of concentration duration is 10 minutes.
- Runoff resulting from rainfall shall be collected by sloping the tributary surface areas to gravel swales, overland, or the perimeter roadway which will direct the runoff to catch basins and from there the surface water shall be conveyed by reinforced concrete pipe to the existing stormwater system.
- The site drainage system shall be designed to function on the hydraulic gradient available between any two points along the system.
- The storm drain system shall be designed in accordance with the latest City of Santa Clara requirements. City of Santa Clara Standard Details shall be used wherever possible.

Hydraulic Design

The Manning formula shall be used to determine the flow of closed conduits.

$$Q = A \frac{1.486}{n} R^{2/3} S^{1/2} \text{ cfs}$$

A = cross sectional flow area in ft^2

n = for lined channels = .015
for earth channels = .030
for closed conduit = .013

R = hydraulic radius in ft

S = slope of gradient in ft/ft

Closed conduits shall be considered flowing full. Velocities shall range from 2 fps mm to 10 fps max.

Unlined open channel velocities shall not exceed 3 fps to avoid erosion of the bottom or sides of the ditch. For higher velocities, ditches shall be protected with concrete lining.

Pre-Developed Stormwater Runoff

Use Rational Method

Q (cfs) = CIA

A = Approximate area of construction disturbance = **3.23 acres**

0.94 acres = aggregate roadway/pavement = 29%
2.29 acres = loose, unpacked earth; poorly developed grass = 71%

Compute weighted Runoff Coefficient of C

0.90 for impervious surfaces such as roads/roofs = 29%
0.30 for gravel and open (lawn/earth) areas = 71%

C=0.47

I = Rainfall Intensity. Directly related to time of concentration. Assume minimum of 10 minutes for water to flow from most remote part of construction disturbance area to off-site.

For 10 minute peak duration of rainfall, **I = 1.61** for the 5-year storm event.

For 10 minute peak duration of rainfall, **I = 1.92** for the 10-year storm event.

For 10 minute peak duration of rainfall, **I = 2.31** for the 25-year storm event.

For 10 minute peak duration of rainfall, **I = 2.86** for the 100-year storm event.

Therefore Q=(C)(I)(A) = (0.47)(1.61)(3.23) = **2.44 cubic foot per second** (cfs) rate of runoff for the 5-year storm event.

Q=(C)(I)(A) = (0.47)(1.92)(3.23) = **2.91 cfs** for the 10-year event.

Q=(C)(I)(A) = (0.47)(2.31)(3.23) = **3.51 cfs** for the 25-year event.

Q=(C)(I)(A) = (0.47)(2.86)(3.23) = **4.34 cfs** for the 100-year event.

To compute runoff volumes associated with these rates, we assume a 24-hr. duration. The following Intensity Duration Frequencies are associated with a 24-hour event for the studied storms:

I = 0.09 for the 5-year storm event.
I = 0.11 for the 10-year storm event.
I = 0.13 for the 25-year storm event.
I = 0.16 for the 100-year storm event.

Therefore:

Q=(C)(I)(A) = (0.47)(0.09)(3.23) = 0.14 cfs for the 5 year storm event.
Volume = (0.14 cfs)(3,600 sec/hour)(24 hours) = 12,096 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.11)(3.23) = 0.17 cfs for the 5 year storm event.
Volume = (0.17 cfs)(3,600 sec/hour)(24 hours) = 14,688 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.13)(3.23) = 0.20 cfs for the 5 year storm event.
Volume = (0.20 cfs)(3,600 sec/hour)(24 hours) = 17,280 cubic feet of runoff

Q=(C)(I)(A) = (0.47)(0.16)(3.23) = 0.24 cfs for the 5 year storm event.
Volume = (0.24 cfs)(3,600 sec/hour)(24 hours) = 20,736 cubic feet of runoff

Post-Developed Stormwater Runoff

Use Rational Method

Q (cfs) = CIA

A = Approximate area of construction disturbance = 3.23 acres **minus** 12,971 square feet (0.30 acres) of area in the post-developed scenario that capture stormwater in containment dikes to be treated and directed to the oil-water separator(s) or in the cooling tower..

Therefore, A = **2.93 acres**

Computation Sheet

Subject: SVP Pico Power Project Stormwater runoff revised to include additional

1.25 acres = impervious surface/pavement = 43%
1.68 acres = gravel areas = 57%

Compute weighted Runoff Coefficient of C

0.90 for impervious surfaces such as roads/roofs = 43%
0.30 for gravel and open (lawn/earth) areas = 57%

C=0.56

I = Rainfall Intensity. Directly related to time of concentration. Assume 10 minutes (shorter under development conditions) for water to flow to outlet point.

For 10 minute peak duration of rainfall, **I = 1.61** for the 5-year storm event.

For 10 minute peak duration of rainfall, **I = 1.92** for the 10-year storm event.

For 10 minute peak duration of rainfall, **I = 2.31** for the 25-year storm event.

For 10 minute peak duration of rainfall, **I = 2.86** for the 100-year storm event.

Therefore Q=(C)(I)(A) = (0.56)(1.61)(2.93) = **2.64 cubic foot per second** (cfs) rate of runoff for the 5-year storm event.

Q=(C)(I)(A) = (0.56)(1.92)(2.93) = **3.15 cfs** for the 10-year event.

Q=(C)(I)(A) = (0.56)(2.31)(2.93) = **3.76 cfs** for the 25-year event.

Q=(C)(I)(A) = (0.56)(2.86)(2.93) = **4.69 cfs** for the 100-year event.

To compute runoff volumes associated with these rates, we assume a 24-hr. duration. The following Intensity Duration Frequencies are associated with a 24-hour event for the studied storms:

I = 0.09 for the 5-year storm event.
I = 0.11 for the 10-year storm event.

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I = 0.13 for the 25-year storm event.
I = 0.16 for the 100-year storm event.

Therefore:

Q=(C)(I)(A) = (0.56)(0.09)(2.93) = 0.15 cfs for the 5 year storm event.
Volume = (0.15 cfs)(3,600 sec/hour)(24 hours) = 12,960 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.11)(2.93) = 0.18 cfs for the 5 year storm event.
Volume = (0.18 cfs)(3,600 sec/hour)(24 hours) = 15,552 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.13)(2.93) = 0.21 cfs for the 5 year storm event.
Volume = (0.21 cfs)(3,600 sec/hour)(24 hours) = 18,144 cubic feet of runoff

Q=(C)(I)(A) = (0.56)(0.16)(2.93) = 0.26 cfs for the 5 year storm event.
Volume = (0.26 cfs)(3,600 sec/hour)(24 hours) = 22,464 cubic feet of runoff

<u>Comparing the pre-developed to post-developed runoff rate conditions.</u>

	5-yr.	*10-yr.*	*25-yr.*	*100-yr.*
Pre-Dev.	2.44 cfs	2.91 cfs	3.51 cfs	4.34 cfs
Post-Dev.	2.64 cfs	3.15 cfs	3.76 cfs	4.69 cfs

<u>Comparing the pre-developed to post-developed 24-hour runoff volumes.</u>

	5-yr.	*10-yr.*	*25-yr.*	*100-yr.*
Pre-Dev.	12,096 ft3	14,688 ft3	17,280 ft3	20,736 ft3
Post-Dev.	12,960 ft3	15,552 ft3	18,144 ft3	22,434 ft3

We would respectfully suggest that this is a negligible increase in the peak rate of stormwater runoff from the site for the major storm events.

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Expected distribution of stormwater between collection systems.

The distribution between the three collection systems is as follows:

Northern Collection System:	46%
Southern Collection System:	38%
Eastern Collection System	16%