8.0 ALTERNATIVES

8.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires consideration of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (14 California Code of Regulations [CCR] 15126.6(a)). Thus, the focus of an alternatives analysis should be on alternatives that "could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects" (14 CCR 15126.6(c)). The CEQA Guidelines further provide that "[a]mong the factors that may be used to eliminate alternatives from detailed consideration in an EIR [Environmental Impact Report] are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts" (14 CCR 15126.6(c)).

A range of reasonable alternatives that could feasibly attain most of the basic objectives of the proposed MLGS are identified and evaluated in this section. These include:

- The "No Project" alternative (that is, not developing a new power generation facility);
- Alternative site locations for constructing and operating the Marsh Landing Generation Station (MLGS) within the historic property boundaries of the Mirant Contra Costa Power Plant (CCPP) property; and
- Alternative generation technologies.

8.2 PROJECT OBJECTIVES

Mirant has identified several basic objectives for the development of a power project:

- Providing new dispatchable, operationally flexible resources to meet the electric needs of the State of California.
- Installing new generating capacity at an existing brownfield site owned by Mirant and avoiding the need for significant new electricity or gas infrastructure or rights-of-way.
- Generating electric power at a location near the electric load center, to increase reliability of the regional electricity grid, while satisfying local capacity requirements and reducing regional dependence on imported power.
- Producing quick-start electricity during times when renewable (e.g., wind) generation is not available (i.e., as backup generation for renewables).
- Safely producing electricity without creating significant environmental impacts.

8.3 NO PROJECT ALTERNATIVE

8.3.1 Description

If the No Project Alternative is selected, Mirant would not receive authorization to construct and operate a new power generation facility at this brownfield site. Electricity required for local reliability and peaking or intermediate load requirements that would have been produced by the MLGS would need to be generated by another source and/or imported to northern California. If the project is not constructed, other sources including older power generation facilities that may operate less efficiently than the proposed facility may be called upon to operate more frequently to serve the growing demand.

The State of California has projected a shortfall in peak load power supply for the Northern California region. The No Project Alternative would not assist the state in meeting this projected peak load demand.

8.3.2 Potential Effects of No Project Alternative

The No Project Alternative would result in the loss of a substantial new local property tax revenue source and other local economic benefits that would be created by the construction and operation of the MLGS. If the MLGS is not built, other projects may be constructed on greenfield sites to meet energy demands. In addition, the No Project Alternative could result in greater fuel consumption and air pollution if older, less-efficient plants with higher air emissions are used to meet future demand that could be provided by the proposed MLGS. Other less-than-significant environmental impacts, which may be attributed to the MLGS if constructed, would not occur with the No Project Alternative.

8.4 PROPOSED AND ALTERNATIVE SITES

8.4.1 Alternative Site Selection Criteria

The proposed MLGS project site is within the existing CCPP site and would be constructed south and west of the existing power generating facilities. The proposed site is currently occupied by several abandoned fuel oil tanks associated with prior uses at the CCPP facility. Five of these tanks will be removed by the project prior to construction of the MLGS. Construction of the new facility on the preferred site would capitalize on the close proximity to the existing PG&E Substation which is located adjacent to the site. Additionally, locating the MLGS within the boundaries of the existing CCPP site would allow the sharing of infrastructures such as the firewater system and access roads. Siting the MLGS in its present location would have the additional advantage of minimizing offsite linear facilities to the proposed water supply and discharge pipelines, which would be approximately one mile each along road rights-of-way. PG&E's gas transmission Line 400 runs adjacent to the property.

According to Public Resource Code 25540.6(b), evaluation of alternative sites is not required when a natural gas-fired thermal power plant is proposed for development at an existing industrial site and the project has a strong relationship to the existing industrial site. The MLGS is exactly the type of project that was envisioned by this code section; therefore, it is reasonable not to analyze alternative sites for the project. The MLGS would be owned by the same parent corporation, would be adjacent to the existing PG&E switchyard, and because of adjacent existing infrastructure would minimize the need for offsite linear features.

As such, evaluation of alternative sites outside the boundaries of the CCPP is not legally required. However, in order to provide some level of information to the California Energy Commission (CEC) Staff and in accordance with pre-filing guidance from CEC Staff, a description of some local industrial sites has been provided.

8.4.2 Onsite Alternative Configurations Considered

8.4.2.1 Proposed Configuration

The proposed configuration includes two Flex Plant 10 (FP10) units operated in combined-cycle mode to meet intermediate load demand and two combustion turbine units operated in simple-cycle mode to deliver additional power during times of peak electrical demand. The location of the MLGS as configured was dictated by space requirements. The identified location for the MLGS is the most efficient location within the CCPP boundaries that could support a facility of this configuration.

8.4.2.2 Repower Retired Units

Mirant considered repowering the retired units at the CCPP. Units 1, 2, and 3 were retired prior to Mirant acquiring CCPP in 1999 and Units 4 and 5 were retired at the end of 2007. These units have exceeded their design life and are not suitable candidates for repowering. Repowering of these units cannot achieve the objective of creating new efficient, reliable peaking or intermediate load generation to support future demand in the region. Additionally, this option is less economical and less efficient than the proposed configuration. Therefore this option was rejected.

8.4.2.3 Demolition of Retired Units and Replacement

Mirant considered demolishing the retired units in order to construct a new facility in the location currently occupied by Units 1 through 5. However, this configuration would place the new facility closer to the river and the marina. With the cost of demolition and space constraints included in the analysis this option was less economical than the proposed configuration. Therefore this option was rejected.

8.4.2.4 Replacement of Units 6 and 7

Mirant considered replacement of Units 6 and 7. The existing capacity of Units 6 and 7 is 674 MW (net). The units are contracted to PG&E under a Tolling Agreement. The loss of the capacity of Units 6 and 7, both during construction of a new replacement project and after, would result in a net loss of needed generation. This configuration would also result in a net loss in value of the existing assets. Therefore this configuration was rejected.

8.4.2.5 Conventional Combined-Cycle

Mirant also considered the feasibility of constructing conventional combined-cycle plants (e.g., 2×1 or 3×1) of comparable power output but this was rejected as being less dispatchable and operationally flexible than the project. Available space on the CCPP site could also be an issue with this alternative. This option could use either wet or dry cooling. Wet cooling towers would substantially increase water consumption and exceed available space. Dry-cooling with this configuration would not be feasible due to space constraints. Therefore, this configuration was rejected.

8.4.3 Offsite Industrial Sites Considered

Alternative properties were evaluated as possible locations for the project that would reduce or eliminate environmental effects associated with development on the preferred site. Four alternatives sites were identified based on parcel size, current land use (vacant or used for agriculture purposes), maximizing distance from residential uses, and minimizing distance to electrical and gas transmission lines. The four locations are shown on Figure 8–1 and evaluated below.

The first alternative site is an 80-acre property located on the north side of Wilbur Avenue adjacent to the western boundary of the CCPP. The site is currently undeveloped and zoned for heavy industry. Development of this site with energy facilities would be consistent with local land use plans and would site new facilities in proximity to existing heavy industrial development. However, Mirant does not currently own this site and development would require acquisition of the property. While acquisition and development could be feasible, this would not be consistent with the objectives of the project. In addition, this site is located approximately 530 feet from a residential area located south of the Burlington

Northern Santa Fe (BNSF) railroad, whereas the project boundary is approximately 1,000 feet from the nearest residence. Development of this site would require longer offsite connections to transmission, gas, and water lines than the project. Development of this site would result in types of environmental impacts (including visual impacts) similar to the project's and would not reduce any significant impacts associated with development on the preferred site, and therefore has no apparent advantages over the project site.

A second alternative site is a 29-acre property located south of the CCPP between Wilbur Avenue and the BNSF railroad. This site is currently used for agriculture but is zoned for heavy industrial uses. Development of this site with energy facilities would be consistent with local land use plans and would site new facilities in proximity to existing heavy industrial development. However, Mirant does not currently own this site and development would require acquisition of the property. While development and acquisition could be feasible, this would not be not consistent with the objectives of the project. This site is smaller than the project site and has transmission lines traversing it, as well as a railroad line, potentially limiting the feasibility of developing this site with a comparable amount of power generation as the project. This site is located approximately 1,200 feet from a residential area south of the BNSF railroad, which is a little bit farther than the project. Similar to the project, this site would require offsite connections to transmission, gas, and water lines. Development of this site would result in the loss of agriculture and potentially more significant environmental impacts than the project because the site has not been previously developed. While this site is zoned for heavy industrial development, development of this site would have potentially greater visual impacts because there are no structures of similar size south of Wilbur Avenue and this would change the visual character of the site. It has no apparent advantages over the project site, and would not reduce any significant impacts associated with development on the preferred site.

A third alternative site is located between the BNSF railroad and East 18th Street. This site comprises four properties with a total area of approximately 58 acres that could be reconfigured for the project. Reconfiguration would involve purchasing and combining parcels from several owners. A portion of the site is currently used for agriculture, and the remaining area is undeveloped or vacant. Located within the City of Antioch, the site is zoned for commercial and planned business center uses. Development of heavy industry in this area would be inconsistent with the City of Antioch's zoning ordinance and General Plan land use designations for the site, and would require zoning and general plan amendments. In addition, a residential area is located approximately 100 feet south of East 18th Street. Similar to the project, this site would require offsite connections to transmission, gas, and water lines. While the length of new water lines may be reduced, the distance of gas and transmission connections would be greater than for the project. Development of this site would result in the loss of agriculture and potentially more significant environmental impacts than the project because the site has not been previously developed. In addition, this development of this site would have significant visual impacts due to its proximity to residences and its location in a nonindustrial zone. It has no apparent advantages over the project site, and would not reduce any significant impacts associated with development on the preferred site.

A fourth alternative site is located east of Bridgehead Road in the City of Oakley. This site is a vacant portion of a 210-acre property that could be reconfigured for the project. Mirant does not currently own this site and development would require acquisition of the property. The site is currently zoned for heavy industrial uses and the City's General Plan designates it for Business Park/light Industrial use. Development of heavy industry in this area would be inconsistent with the City of Oakley's zoning ordinance and General Plan land use designations for the site and would require zoning and general plan amendments. Development of this site would require offsite connections to transmission, gas and water lines. While the length of new water lines may be reduced, the distance of gas and transmission connections would be significantly greater than for the project. In addition the transmission lines would need to cross a major highway (State Route 160). The site is also adjacent to designated open space/marshlands. Visual impacts would be greater for this site because it is not located within an existing power plant facility and is in a non-industrial zone. Development of this site would result in environmental impacts similar to or greater than for the project and would not reduce any significant impacts associated with development on the preferred site, and therefore has no apparent advantages over the project site.

All four of these sites could have potentially more significant environmental impacts because they would not be located within an existing power plant facility. All would require more offsite laterals than the project. There are no apparent environmental advantages to these alternatives, and several environmental disadvantages, as described above. For these reasons, these alternatives were rejected from further consideration.

8.5 WATER SUPPLY

The CEC studied use of water for power plant cooling in its 2003 Integrated Energy Policy Report proceeding. The proceeding produced the following policy:

> Consistent with the Board Policy[1] and the Warren-Alquist Act, the Energy Commission will approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative technologies are shown to be "environmentally undesirable" or "economically unsound" (CEC, 2003).

The MLGS would be a dry-cooled facility and would use very little water. The source of the process water would be recycled water from the local sanitation district, Delta Diablo Sanitation District. Since the MLGS would use dry cooling technology and reclaimed water, no alternative water supply analysis is required to demonstrate compliance with the policies identified in the 2003 IEPR.

The water line route proposed between BLS and MLGS is approximately 1 mile long and runs along Wilbur Avenue in a current right-of-way. No additional right-of-way needs to be acquired and the area impacted has been previously disturbed for the construction and placement of other pipelines in the right-of-way. The route selected is the most direct route with the least environmental impact.

Potable water would be provided by the City of Antioch, the local water supply purveyor. Since the project would use a small quantity of potable water and there is an existing water supply line on the CCPP property, no alternative potable water pipelines were considered.

8.6 WASTEWATER DISCHARGE

The MLGS would discharge both sanitary wastewater and process wastewater to DDSD's BLS along the same route as water delivered to the MLGS. As noted above for process water, the wastewater line route would run along Wilbur Avenue in a current right-of-way. No additional right-of-way needs to be acquired and the area impacted has been previously disturbed for the construction and placement of other pipelines in the right-of-way. The route selected is the most direct route with the least environmental impact.

The MLGS will use dry-cooling technology to reduce water consumption. The project is making use of recycled water that would otherwise be discharged by the DDSD. More than 65 percent of the recycled water delivered to the plant is consumed. Due to the project's use of recycled water, the benefits of a zero liquid discharge system are negligible.

[1] This reference is to SWRCB Policy 75-58.

8.7 ELECTRIC TRANSMISSION LINES

The MLGS would interconnect at the existing PG&E switchyard, which is adjacent to the site. Since the MLGS transmission line would be very short and would connect directly into the PG&E switchyard without the construction of off site transmission lines.

8.8 NATURAL GAS SUPPLY LINE

Natural gas will be delivered to the MLGS by PG&E, which currently delivers natural gas to the CCPP site. Natural gas will be provided using a new 12-inch-diameter gas line connection from transmission Line 400 that runs just east of the GGS property. The connection line will continue generally westward to the new MLGS metering and compressor station on the MLGS site. Since the gas pipeline interconnection is short and runs through existing power generation facilities, no alternative gas pipeline routes were considered.

8.9 ALTERNATIVE AIR POLLUTION EMISSION CONTROL ANALYSIS

The project must comply with the requirements of the BAAQMD's permit regulations requiring the application of the Best Available Control Technology (BACT) to control air emissions. To comply with the BAAQMD's BACT requirements for oxides of nitrogen (NO_x), the project's design includes dry low NO_x combustion controls on the gas turbines and selective catalytic reduction (SCR) to control NO_x emissions. To comply with BAAQMD's BACT requirements for carbon monoxide (CO) and VOC, a CO catalyst would be employed.

The SCR system for each unit will operate with aqueous ammonia injected into the exhaust gas stream upstream of a catalyst bed to reduce NO_X to inert nitrogen and water. The SCR technology proposed for MLGS uses a 19 percent solution of ammonia to reduce NO_x emissions to elemental nitrogen, water, and a small quantity of unreacted ammonia. However, the use and storage of ammonia—even the less toxic aqueous ammonia proposed for the MLGS—would represent a potential risk to the public in the event of a catastrophic breach of the storage tank. The offsite consequence analysis (presented in Section 7.12, Hazardous Materials Handling) shows that the potential impacts associated with the project's use and storage of ammonia would not result in a significant public health impact.

To provide a comprehensive analysis of the alternative project configuration, the remainder of this section presents alternative NO_x emission control technologies considered for the project. The information presented below is based on the air quality analysis presented in Section 7.1, Air Quality.

Potential NO_x control technologies for combustion gas turbines include the following:

- Combustion controls
  - Dry combustion controls
  - Dry low-NO_x combustor design
  - Catalytic combustors (e.g., XONON)

- Post-combustion controls
  - Selective non-catalytic reduction (SNCR)
  - Non-selective catalytic reduction (NSCR)
  - SCONOx™

The technical feasibility of available NO_x control technologies are presented below.

8.9.1 Combustion Modifications

8.9.1.1 Dry Combustion Controls

Combustion modifications that lower NO_x emissions without wet injection include lean combustion, reduced combustor residence time, lean premixed combustion, and two-stage rich/lean combustion. Lean combustion uses excess air (greater than stoichiometric air-to-fuel ratio) in the combustor's primary combustion zone to cool the flame, thereby reducing the rate of thermal NO_x formation. Reduced combustor residence times are achieved by introducing dilution air between the combustor and the turbine sooner than with standard combustors. The combustion gases are at high temperatures for a shorter time, which also has the effect of reducing the rate of thermal NO_x formation. Dry low NO_x combustion would be used on the Siemens 5000F gas turbines for this project.

Catalytic combustors use a catalytic reactor bed mounted within the combustor to burn a very lean fuel-air mixture. This technology has been commercially demonstrated under the trade name XONON in a 1.5-MW natural gas-fired combustion turbine in Santa Clara, California. The technology has not been announced as being commercially available for the engines used at MLGS. No turbine vendor, other than Kawasaki, has indicated the commercial availability of catalytic combustion systems at the present time and the largest size is 18 MW; therefore, catalytic combustion controls are not commercially available in the size range for this specific project and are not discussed further.

8.9.1.2 Wet Combustion Controls

Steam or water injection directly into the turbine combustor is one of the most common NO_x control techniques. These wet injection techniques lower the peak flame temperature in the combustor, reducing the formation of thermal NO_x. The injected water or steam exits the turbine as part of the exhaust. Although the lower peak flame temperature has a beneficial effect on NO_x emissions, it can also reduce combustion efficiency and prevent complete combustion. As a result, emissions of carbon monoxide (CO) and volatile organic compounds (VOCs) increase as water/steam injection rates increase.

Water and steam injection have been in use on both oil- and gas-fired combustion turbines in all size ranges for many years, so these NO_x control technologies are generally considered technologically feasible and widely available. Since dry low NO_x combustion controls are used in the Siemens 5000F gas turbines and are more effective than water injection, water injection is not considered for this project.

8.9.1.3 Post-Combustion Controls

Selective catalytic reduction is a post-combustion technique that controls both thermal and fuel-bound NO_x emissions by reducing NO_x with a reagent (generally ammonia or urea) in the presence of a catalyst to form water and nitrogen. NO_x conversion is sensitive to exhaust gas temperature, and performance can be limited by contaminants in the exhaust gas that may mask the catalyst (sulfur compounds, particulates, heavy metals, and silica). SCR is used in numerous gas turbine installations throughout the United States, almost exclusively in conjunction with other wet or dry NO_x combustion controls. SCR requires the consumption of a reagent (ammonia or urea) and requires periodic catalyst replacement. Estimated levels of NO_x control are in excess of 90 percent. SCR would be used on this project in conjunction with the dry low NO_x combustion controls on the Siemens 5000F gas turbine.

Selective non-catalytic reduction (SNCR) involves injection of ammonia or urea with proprietary conditioners into the exhaust gas stream without a catalyst. SNCR technology requires gas temperatures in the range of 1,200°F to 2,000°F and is most commonly used in boilers. Some method of exhaust gas reheat, such as additional fuel combustion, would be required to achieve exhaust temperatures compatible with SNCR operations, and this requirement makes SNCR technologically infeasible for MLGS.

Nonselective catalytic reduction (NSCR) uses a catalyst without injected reagents to reduce NO_x emissions in an exhaust gas stream. NSCR is typically used in automobile exhaust and rich-burn stationary internal combustion (IC) engines, and employs a platinum/rhodium catalyst. NSCR is effective only in a stoichiometric or fuel-rich environment where the combustion gas is nearly depleted of oxygen, and this condition does not occur in turbine exhaust where the oxygen concentrations are typically between 14 and 16 percent. For this reason, NSCR is not technologically feasible for the MLGS.

SCONOx™ is a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO_x, CO, and VOC emissions. The catalyst is a monolithic design, made from a ceramic substrate with both a proprietary platinum-based oxidation catalyst and a potassium carbonate adsorption coating. The catalyst simultaneously oxidizes NO to NO_2, CO to CO_2, and VOCs to CO_2 and water, while NO_2 is adsorbed onto the catalyst surface where it is chemically converted to and stored as potassium nitrates and nitrites. The SCONOx potassium carbonate layer has a limited adsorption capability and requires regeneration approximately every 12 to 15 minutes in normal service (see Section 7.1, Air Quality, for details). Each regeneration cycle requires approximately 3 to 5 minutes. At any point in time, approximately 20 percent of the compartments in a SCONOx system would be in regeneration mode, and the remaining 80 percent of the compartments would be in oxidation/absorption mode.

There are serious questions about the probability of a successful application of the SCONOx technology for application to MLGS, as well as the levels of emission control that can be consistently achieved. Therefore, this technology is not considered feasible for MLGS. CEC staff has determined in other recent citing cases that SCONOx is not a preferable alternative, stating: "Applicant also reviewed alternative technologies for air pollution control and combustion modification, including: … SCONOx. None of the alternative pollution control technologies is more effective than that proposed for the project due to their lack of commercial viability in a scaled-up project and/or their technological infeasibility for a peaking unit. (…) Therefore, the evidence shows that none of the alternative fuels or technologies is a feasible option" (CEC, 2006).

8.9.2 Alternatives to Ammonia-Based Emission Control Systems

Over the last few years, several vendors have designed urea-based systems to generate ammonia on site, thereby eliminating the need to transport and store ammonia. These units are referred to as Ammonia on Demand and Urea to Ammonia (U2A) systems. The U2A system has limited commercial availability.

The U2A system generates ammonia from solid dry urea. The process starts by dissolving urea in deionized water to produce an aqueous urea solution. Steam is used in the U2A reactor to convert the urea solution into a gaseous mixture of ammonia, carbon dioxide, and water for use in the SCR system. The U2A technology has not been widely applied and accepted for use at simple-cycle or combined-cycle turbine facilities. Aqueous Ammonia is currently used at the CCPP site. Site personnel are trained and familiar with the safe handling and operation of the systems. Therefore, the U2A system is not considered for this project.

8.10 ALTERNATIVE TECHNOLOGIES

Other generation technologies considered for the project are grouped according to the fuel used:

- Oil
- Coal
- Nuclear
- Hydroelectric
- Biomass

- Solar
- Wind

Alternative technologies were evaluated with respect to commercial availability, practicality and cost effectiveness.

8.10.1 Oil, Coal, and Conventional and Supercritical Boiler/Steam Turbine

These technologies are commercially available and could be implemented. However, because of relatively low efficiency, some of these fuels or technologies may emit a greater quantity of air pollutants per kilowatt-hour generated than technologies that are more efficient. Natural gas, with its lower sulfur dioxide and particulate emissions, is the preferable fossil fuel for use in California. Space requirements, water usage, and the cost of generation for these alternative technologies is relatively high compared to natural gas-fired technologies. Also, these technologies do not allow for the same operating flexibility that the natural gas-fired technologies provide.

8.10.2 Nuclear

California law prohibits new nuclear plants until the scientific and engineering feasibility of disposal of high-level radioactive waste has been demonstrated. To date, the California Energy Commission (CEC) is unable to make the findings of disposal feasibility required by law for this technology to be viable in California. This technology, therefore, is not possible at this time.

8.10.3 Water

These technologies use water as "fuel," and include hydroelectric, geothermal, and ocean energy conversion.

8.10.3.1 Hydroelectric

Most of the sites for hydroelectric facilities have already been developed in California, and the remaining potential sites face lengthy environmental licensing periods. It is doubtful that this technology could be implemented within 3 to 5 years, and the cost would probably be higher than the cost of a conventional simple-cycle combustion turbine. There are no hydroelectric sites within the project area.

8.10.3.2 Geothermal

Geothermal development is not viable at the project location because suitable thermal resources and strata are not present. Therefore, geothermal was eliminated from consideration.

8.10.4 Biomass

Biomass technology requires a reliable supply of biomass fuels. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing waste, and construction and urban wood wastes. The available supply, cost, and variability of these fuels, coupled with lower thermal conversion efficiencies, make this technology relatively more costly than combustion turbine technology. In addition, emissions from biomass units are typically higher than from gas-fired units. Biomass units may not be able to meet air quality requirements. Also, biomass technology is generally feasible only at sizes of less than 50 MW, which does not meet the project's capacity objectives. For these reasons, biomass technology was rejected.

8.10.5 Solar

Most solar technologies collect solar radiation, heat water to create steam, and use the steam to power a steam turbine/generator. Power is only available while the sun shines so the units may not be available to meet demand swings. Solar technology is typically used as a demand reduction technology, and does not provide quick-start generation capability. The cost of solar power is relatively high when compared to natural-gas-burning units. In addition, the amount of surface area required to generate modest quantities of energy make these technologies infeasible for the quantity of energy to be generated. Typical solar panels generate on the order of 100 watts per square meter of panel. At this rate approximately 6 square miles of panel would be required to generate 500 MW of energy and approximately 4 square miles would be required to generate 330 MW of energy to equate to the energy produced by the proposed FP10 combined-cycle and Simple Cycle units, respectively. Parabolic troughs typically require approximately 4 to 5 acres per megawatt output (CEC, 1996). In order to produce 500 MW, approximately 2,000 to 2,500 acres would be needed for a parabolic trough system. This type of system would need more than 45 times more land than the amount of land to be used by the project. Therefore, this technology was not considered to be a feasible technology for the project. The Bay Area is not considered a prime location for a solar facility of this type. Other areas, such as the Mohave Desert would be considered better suited and more competitive.

8.10.6 Wind Generation

Wind generation, like solar, is dependent on climatic conditions and may not be available to meet demand swings. The cost of generation is generally above the cost of Simple Cycle combustion turbine units burning natural gas. There is a large wind generation site north of the project site, across the San Joaquin River. The MLGS has been specifically designed to produce additional electricity during periods of high electricity demand when wind generation facilities, which rely on the presence of wind to produce electricity at any given time, may not be available. In addition, wind turbines are significantly smaller in size than thermal power producing technologies; therefore, an extensive amount of real estate would be required to generate an equivalent amount of energy to that produced by the proposed MLGS.

8.11 REFERENCES

CEC (California Energy Commission), 2006. San Francisco Electric Reliability Project Final Commission Decision, CEC-800-2006-007-CMF. October 2006.

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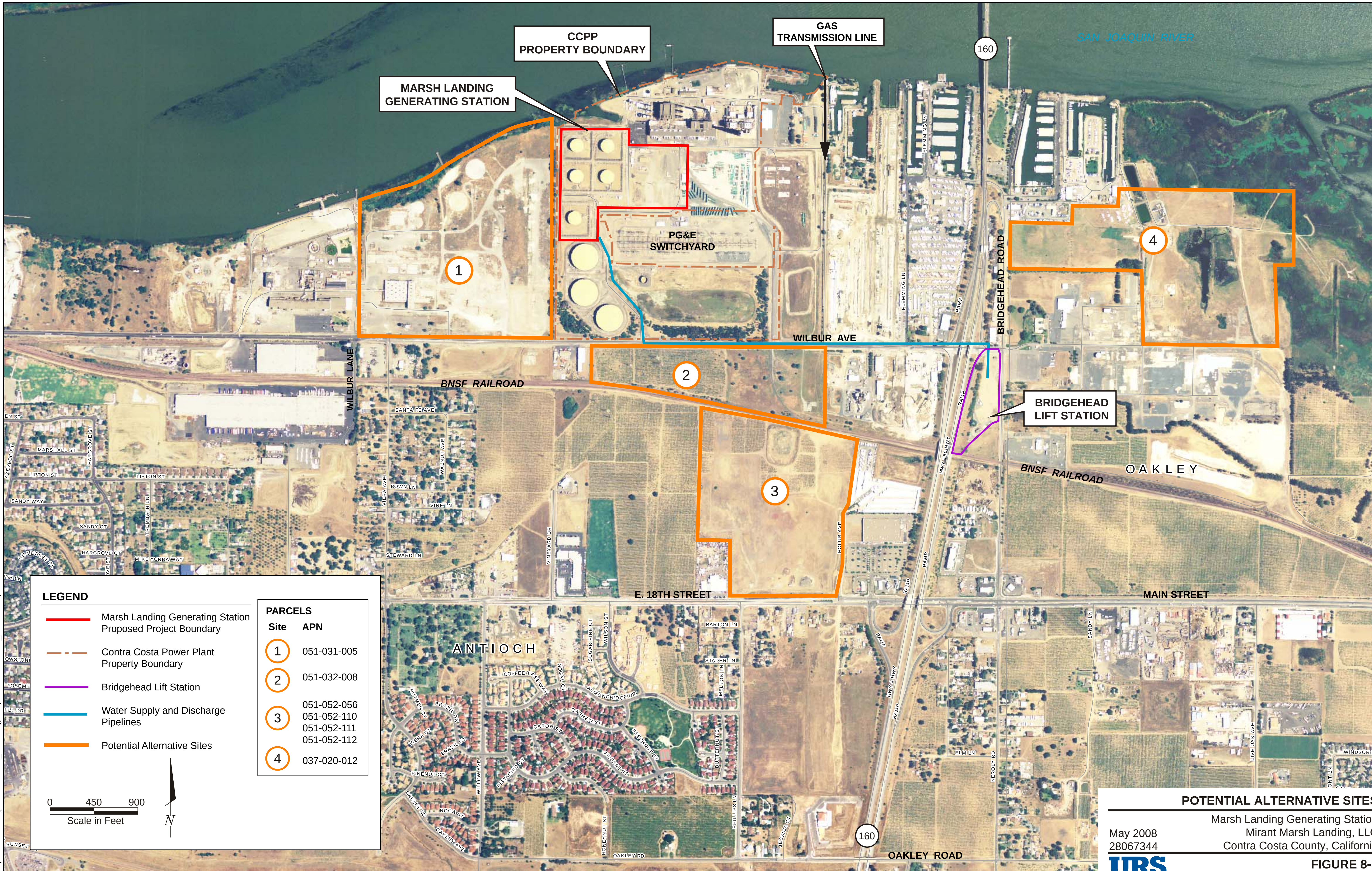

POTENTIAL ALTERNATIVE SITES

Marsh Landing Generating Station
Mirant Marsh Landing, LLC
Contra Costa County, California

May 2008
28067344

URS

FIGURE 8-1

Map Document: (U:\GIS\Mirant_Pittsburg\Projects\contracosta_aerial.mxd) 11/9/2007 -- 8:41:20 AM KLawrence

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