3.0 Description of Alternatives

This chapter describes:

- The development and screening process of alternatives to the proposed Mesa 500-kV Substation Project (proposed project) for purposes of analysis under the California Environmental Quality Act (CEQA).
- The methodology for screening alternatives, developed pursuant to CEQA.
- Alternatives evaluated in this Environmental Impact Report (EIR), including the No Project Alternative, and the reason for their evaluation.
- Alternatives eliminated from full EIR evaluation and the reason for their elimination.

The discussion in Chapter 5, "Comparison of Alternatives," compares the environmental advantages and disadvantages of the proposed project with those of the alternatives retained for consideration in this EIR. The environmentally superior alternative is selected in Chapter 5.

3.1 Alternatives Development and Screening Process

Development and consideration of alternatives are governed by CEQA and the CEQA Guidelines. The following provisions of the CEQA Guidelines (Section 15126.6) generally address the treatment of project alternatives in an EIR:

- There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.
- The range of potential alternatives to the proposed project shall include those 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. The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination.
- The specific alternative of "no project" shall also be evaluated, along with its impact. The purpose of describing and analyzing a No Project Alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project.
- The "no project" analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.
- An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

The alternatives screening process resulted in the screening of nine alternatives for potential evaluation in the EIR, as discussed below.

3.2 Alternatives Screening Methodology

Alternatives screening followed a three-step process:

1. Describe the proposed project to the extent needed to compare the impacts that would occur under each alternative.
2. Evaluate whether each alternative would meet the basic project objectives, would be legally and technically feasible, and would avoid or substantially lessen significant effects of the proposed project.
3. Determine whether each alternative is appropriate to bring forward for full analysis.

3.2.1 Accomplishment of Most of the Basic Project Objectives

The CEQA Guidelines allow for consideration of alternatives even if they "would impede to some degree the attainment of the project objectives . . ." (CEQA Guidelines § 15126.6(b)). Alternatives shall, however, "accomplish most of the basic objectives of the project . . ." (CEQA Guidelines § 15126.6(c)).

The basic objectives of the proposed project, as explained in Chapter 1, "Introduction," are:

1. Address anticipated violations of North American Electric Reliability Corporation (NERC) Standard TPL-001-04, Western Electricity Coordinating Council (WECC) Regional Business Practice TPL-001-WECC-RBP-2, and California Independent System Operator (CAISO) Planning Standards that would occur upon retirement by December 31, 2020, of generators that use Once-Through Cooling (OTC).
2. Avoid introduction of new violations of NERC, WECC, and CAISO standards.
3. Maintain electrical service by minimizing service interruptions during project implementation.

As discussed below, the California Public Utilities Commission (CPUC) has determined that, to be feasible, an alternative must meet both Objectives 1 and 2.

A transmission system model created in the PowerWorld Simulator was used to identify potential alternatives. The model was also used to test potential alternatives to determine if they would meet Objectives 1 and 2 (i.e., address all potential violations of reliability standards and whether they would avoid introduction of new violations of reliability standards). The transmission system model was created in the PowerWorld Simulator modelling program using the WECC transmission system database and data provided by Southern California Edison (SCE). The model was set up to mimic how the transmission system would function following retirement of OTC units. SCE provided a list of violations of reliability criteria ("Violation List") that would occur following retirement of OTC units (SCE 2015a, Appendix B). Possible violations include thermal overloads

and voltage performance issues for 90 contingencies[1]. The transmission system model informed whether a potential alternative met Objectives 1 and 2.

To determine whether an alternative met Objective 1, the model was applied to potentially feasible alternatives. The results of the model run were examined to determine whether the alternative addressed all violations in the Violation List (Appendix B). If an alternative did not address all violations on the Violation List, it was dismissed from further consideration. Meeting Objective 1 is considered a necessity, given that all contingencies listed in Appendix B are violations of transmission planning criteria.

If an alternative met Objective 1 by addressing all violations, additional analysis was conducted to determine if implementation of the alternative would create additional violations of reliability standards, i.e., whether the alternative could meet Objective 2. PowerWorld Simulator contains a contingency analysis that determines whether there are any contingencies resulting in reliability standard violations in the transmission system. This analysis was run for each alternative. Results were checked to identify whether any new contingencies were created as a result of implementing a particular alternative that did not exist prior to implementation of the alternative. Meeting Objective 2 is considered a necessity, given that a potential alternative would not be effective if it addressed all violations in Appendix B but introduced additional violations of reliability standards.

3.2.2 Potential Feasibility

An EIR must "consider a reasonable range of potentially feasible alternatives . . ." (CEQA Guidelines § 15126.6(a)). The Guidelines define *feasible* as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (CEQA Guidelines § 15364). The alternatives screening analysis focused on the following factors:

- **Legal:** Whether the alternative would require siting on lands with legal protection or would require activities that contradict laws or regulations.
- **Technological:** Whether the alternative can be implemented with available technology and given any space constraints.
- **Economic:** Whether the alternative is exceedingly costly such that implementation could not occur or that it would be impractical to proceed with the proposed project.
- **Environmental:** Whether the alternative would cause substantially greater environmental damage than the proposed project so that the alternative is clearly inferior from an environmental standpoint.

The Commission may take into account social and other factors in reaching its conclusion about feasibility of the considered alternatives.

[1] NERC defines a contingency as "[t]he unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element" (NERC 2016).

3.2.3 Potential to Avoid or Substantially Reduce a Significant Environmental Effect

Alternatives fully considered in an EIR must "avoid or substantially lessen any of the significant effects of the project" (CEQA Guidelines § 15126.6(a)). Alternatives that would not substantially reduce or avoid a significant effect of the proposed project are dismissed from further consideration. Table ES-2 contains a summary of potential significant impacts of the proposed project.

3.3 Summary of Screening Results

Table 3-1 summarizes screening results for all alternatives considered. It shows whether the alternative would meet basic project objectives, would be potentially feasible, and/or would reduce a significant impact. Details about alternatives carried forward for evaluation in the EIR are provided in Section 3.4, "Alternatives Evaluated in This EIR." Details about alternatives dismissed from evaluation in the EIR are provided in Section 3.5, "Alternatives Eliminated from Full EIR Evaluation."

3.4 Alternatives Evaluated in this EIR

This section describes alternatives retained for consideration in this EIR. The screening process determined that these alternatives would meet most of the basic objectives of the proposed project, are potentially feasible, and would avoid or substantially reduce a significant environmental effect of the proposed project.

3.4.1 One-Transformer-Bank Substation

3.4.1.1 Description

This alternative would involve construction of the proposed 500-kilovolt (kV) substation using one 1600-megavolt ampere (MVA) 500/220-kV transformer with greater than 10 percent impedance. The substation footprint would be smaller than that of the proposed project due to a smaller 500-kV switchrack and a reduced number of transformers. The switchrack area would be slightly less than half the size of the proposed project's switchrack. The transformer bank area would also be slightly less than half the size of the transformer area of the proposed project. The substation layout would be oriented so that it would avoid gnatcatcher habitat to the southeast of the existing substation. The approximate substation footprint for this alternative is shown in Figure 3.4-1.

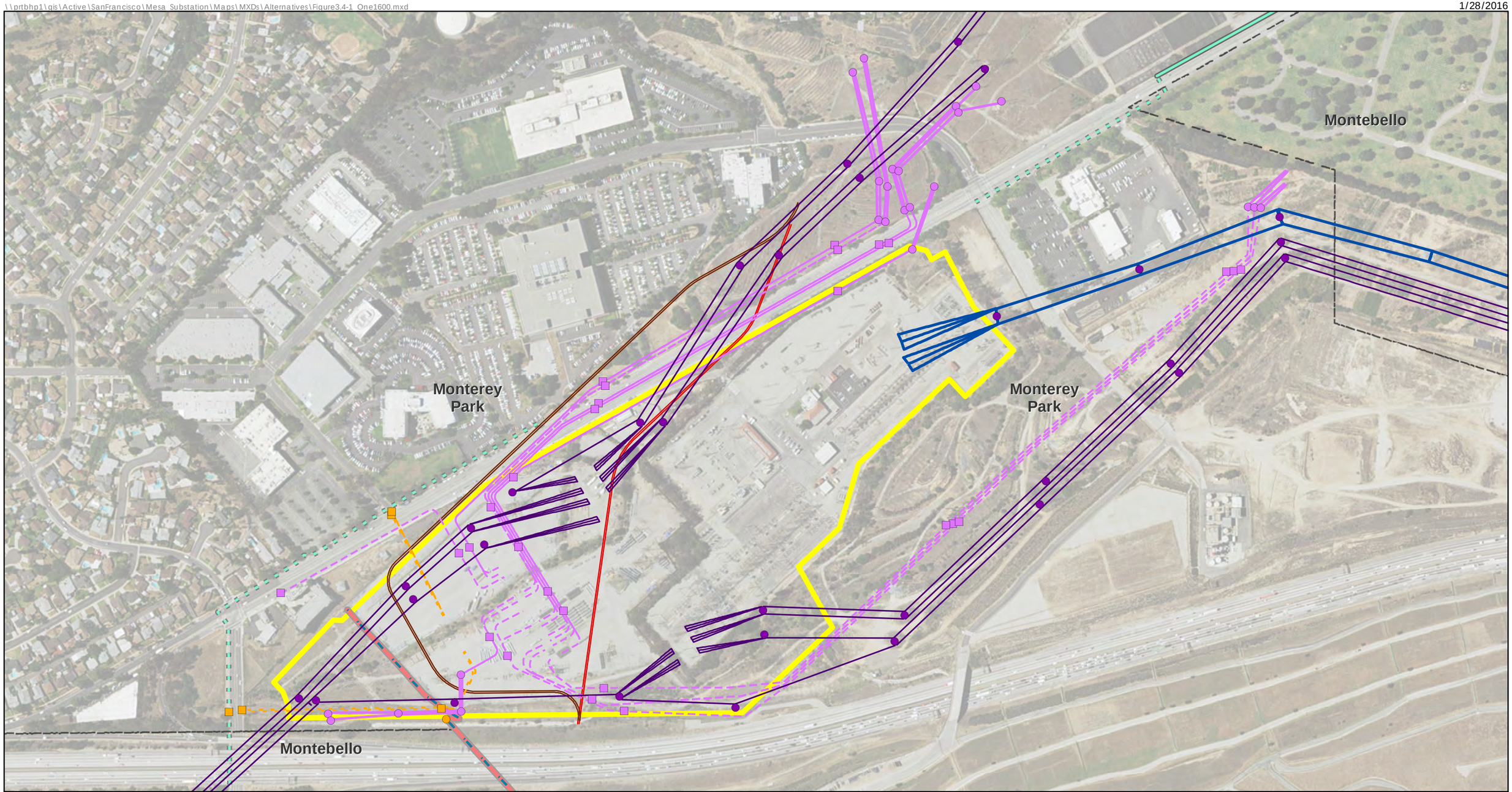
Table 3-1 Summary of Alternatives Screening Analysis

Alternative	Meet Most of the Basic Project Objectives	Be Potentially Feasible	Substantially Reduce or Avoid Significant Impact of Proposed Project	Conclusion
Passes Screening				
One-Transformer-Bank (1600-MVA) Substation	Would meet all basic project objectives	Potentially feasible	Substantially reduces impacts to traffic, air quality, and biological resources	Passes screening; evaluated further in Chapter 5 of EIR
Two-Transformer-Bank (1120-MVA) Substation	Would meet all basic project objectives	Potentially feasible	Substantially reduces impacts to traffic, air quality, and biological resources	Passes screening; evaluated further in Chapter 5 of EIR
Gas Insulated Substation	Would meet all basic project objectives	Potentially feasible	Substantially reduces impacts to traffic, air quality, and biological resources	Passes screening; evaluated further in Chapter 5 of EIR
Fails Screening				
500-kV Substation with One 1200-MVA Transformer Bank	Would not meet most of the basic project objectives	Potentially feasible	Substantially reduces impacts to traffic, air quality, and biological resources	Rejected; does not meet basic project objectives
500-kV Substation Adjacent to Existing Mesa 220-kV Substation	Would meet all of the basic project objectives	Infeasible	Substantially reduces impacts to traffic, air quality, and biological resources	Rejected; technically infeasible
Load Shedding in Los Angeles—Long Beach—Anaheim, San Diego, and or Riverside—San Bernardino	Would not meet most of the basic project objectives	Potentially feasible	Avoids all project environmental impacts	Rejected; does not meet most of the basic project objectives
Install Additional Reactive Support at other SCE Substations	Would not meet most of the basic project objectives	Infeasible	Avoids or substantially reduces all project environmental impacts	Rejected; does not meet most of the basic project objectives and is technically infeasible
Load Shedding and Reconductoring	Would not meet most of the basic project objectives	Potentially feasible	Avoids or substantially reduces impacts to traffic, air quality, and biological resources	Rejected; does not meet most of the basic project objectives

Table 3-1 Summary of Alternatives Screening Analysis

Alternative	Meet Most of the Basic Project Objectives	Be Potentially Feasible	Substantially Reduce or Avoid Significant Impact of Proposed Project	Conclusion
Connection to LADWP System at Alamitos Substation	May not meet most of the basic project objectives	Of uncertain feasibility	Substantially reduces impacts to traffic, air quality, and biological resources	Rejected; effect of alternative cannot be reasonably ascertained and implementation is remote and speculative

Key:
EIR Environmental Impact Report
kV kilovolt
LADWP Los Angeles Department of Water and Power
MVA megavolt amperes



- Transmission structure [modified for schematic]
- Subtransmission structure
- Subtransmission vault area
- Distribution structure
- Distribution vault
- MWD Middle Feeder pipeline
- Existing alignment
- Proposed alignment
- Transmission line: 220-kV (Overhead)
- Transmission line: 500-kV (Overhead) [modified for schematic]
- Subtransmission Line: 66-kV (Overhead)
- Subtransmission Line: 66-kV (Underground)
- Distrbution line (Underground)
- Substation area proposed boundary [modified for schematic]
- City boundary

Telecommunications
- Route 1 (Overhead)
- Route 1 (Underground)
- Route 2a (Overhead)
- Route 2a (Removed)

Sources: SCE 2015
Basemap: NAIP 2014

0 500 1,000
Feet

Figure 3.4-1
Rough Schematic of One 1600-MVA Transformer Alternative Footprint
Main Project Area -
Mesa Substation Site
Los Angeles County, CA

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In addition to building the reduced substation, this alternative would include implementing a remedial action scheme (RAS).[2] The RAS would be triggered during the N-1-1 contingency involving an initial outage of the Chino–Mira Loma 220-kV No. 1 Transmission Line followed by an outage of the Chino–Mira Loma 220-kV No. 2 Transmission Line, which would result in a thermal overload on the Chino–Mira Loma 220-kV No. 3 Transmission Line. Should this contingency occur, the RAS would cause the Lewis–Barre 220-kV Transmission Line and the Villa Park–Barre 220-kV Transmission Line to open (i.e., be removed from service) until the violation is resolved (i.e., when load decreases so there would no longer be a thermal overload on the Chino–Mira Loma 220-kV No. 3 Transmission Line or until either of the first two outages are resolved). It is anticipated that the lines would not remain open for longer than a few hours. Opening the two transmission lines would not result in outages. To allow the RAS to function, relays would be added at Lewis Substation and Villa Park Substation to allow for opening the Lewis–Barre 220-kV Transmission Line and the Villa Park–Barre 220-kV Transmission Line. A communications circuit could be needed between Villa Park and Barre Substations and between Lewis and Barre Substations.

3.4.1.2 Rationale for Full Analysis

Meet Most of the Basic Project Objectives

This alternative would meet all of the basic project objectives. With only the substation in place, the alternative would address all violations except the violation resulting from the N-1-1 contingency involving an initial outage of the Chino–Mira Loma 220-kV No. 1 Transmission Line followed by an outage of the Chino–Mira Loma 220-kV No. 2 Transmission Line, which would result in a thermal overload on the Chino–Mira Loma 220-kV No. 3 Transmission Line. Implementing the RAS in addition to building the one-transformer bank substation would address the thermal overload of the Chino–Mira Loma 220-kV No. 3 Transmission Line. All violations would be addressed under this alternative, and the alternative would therefore meet Objective 1.

This alternative would not create any new violations of reliability criteria and would therefore meet Objective 2. This alternative would meet Objective 3 because the alternative would minimize outages during project construction, since the existing substation would remain in service until the new 220-kV substation is constructed and put into service.

Potential Feasibility

This alternative is potentially feasible. It would cost less than the proposed project, would reduce overall environmental impacts, and would be legally and technically feasible. However, the RAS would need review and approval by the WECC Remedial Action Scheme Reliability Subcommittee.

Potential to Substantially Reduce or Avoid Significant Impacts

This alternative would substantially reduce several significant impacts, including:

- **Air Quality:** Criteria pollutant emissions during construction would be reduced since less ground disturbance and less grading would be required to accommodate the smaller substation footprint (reduces Impacts AQ-2, AQ-3, and AQ-4).

[2] An RAS is also known as a Special Protection System. It is "an automatic protection system designed to detect predetermined system conditions, and take corrective actions other than and/or in addition to the isolation of faulted components to maintain system reliability." A RAS is implemented to meet various objectives, including maintaining voltages and power flows (NERC 2016).

- **Biological Resources:** Gnatcatcher habitat and species impacts would be reduced since less activity would take place in gnatcatcher habitat (reduces Impacts BR-1, BR-2, and BR-4).
- **Traffic and Transportation:** With less equipment to deliver to the site and less grading (soil import and export), less traffic would be generated and traffic impacts would be reduced (reduces Impacts TT-1 and TT-2).

Additional reduction of impacts is discussed in Chapter 5, "Comparison of Alternatives."

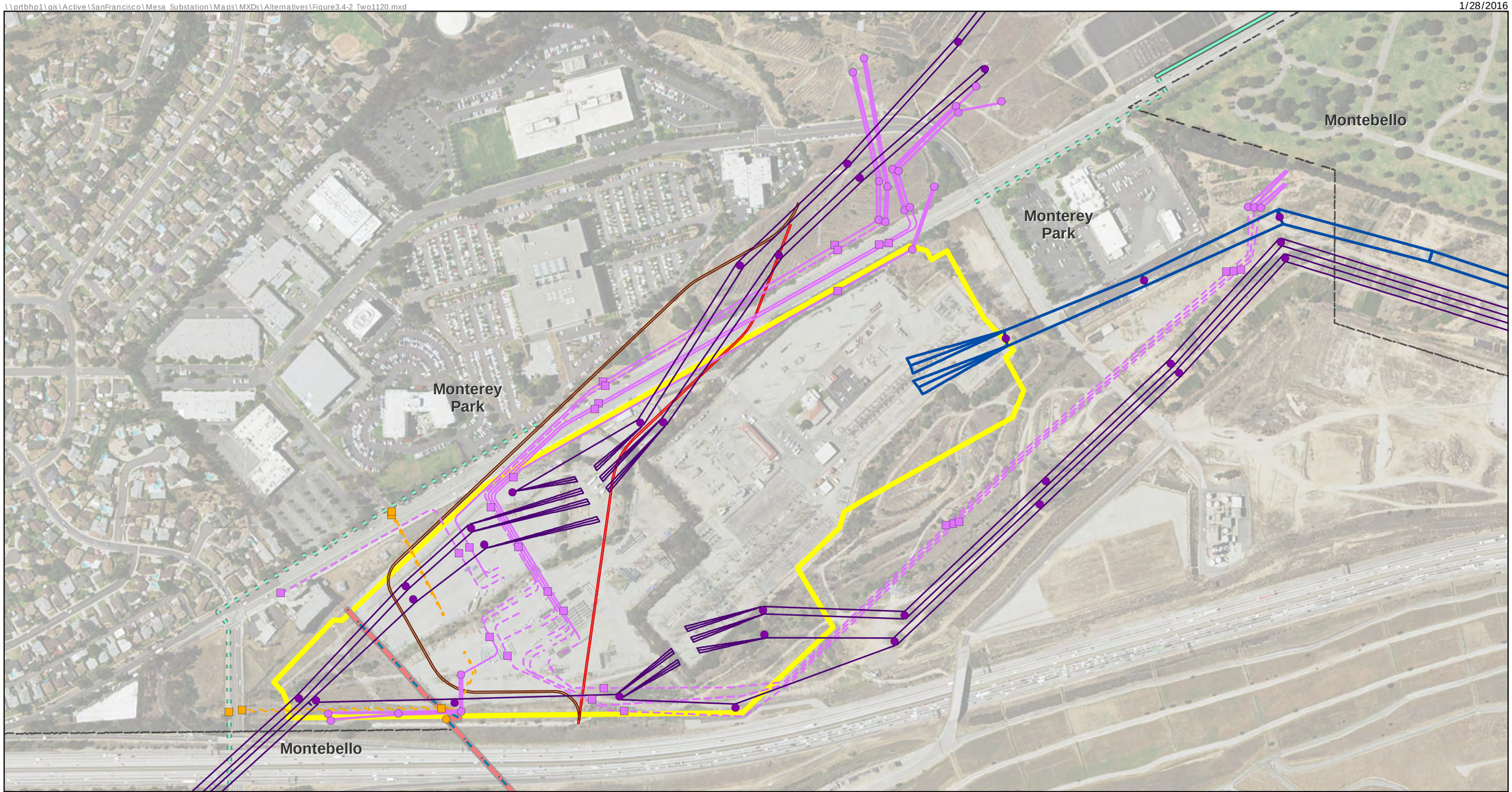
3.4.2 Two-Transformer-Bank Substation

3.4.2.1 Description

This alternative would involve construction of the proposed 500-kV substation using two 1120-MVA 500/220-kV transformer banks. The transformers would have an operating requirement wherein they would be connected in parallel and switched as one. In the event that one transformer bank failed, the other transformer would automatically go out of service. If both transformers were taken out of service due to failure of one bank, there would not be an outage. Instead, the grid would operate as if the substation were not in place. The substation footprint would be smaller than that of the proposed project due to a smaller switchrack and a reduced number of transformers. The switchrack area would be slightly more than about half the size of the proposed project's switchrack. The transformer bank area would also be about half the size of the transformer area of the proposed project. The substation layout would be oriented so that it would avoid gnatcatcher habitat to the southeast of the existing substation. The approximate substation footprint for this alternative is shown in Figure 3.4-2.

In addition to building the reduced substation, this alternative would include implementing an RAS.[3] The RAS would be triggered during the N-1-1 contingency involving an initial outage of the Chino–Mira Loma 220-kV No. 1 Transmission Line followed by an outage of the Chino–Mira Loma 220-kV No. 2 Transmission Line, which would result in a thermal overload on the Chino–Mira Loma 220-kV No. 3 Transmission Line. Should this contingency occur, the RAS would cause the Lewis–Barre 220-kV Transmission Line and the Villa Park–Barre 220-kV Transmission Line to open (i.e., be removed from service) until the violation is resolved (i.e., when load decreases so there would no longer be a thermal overload on the Chino–Mira Loma 220-kV No. 3 Transmission Line or until either of the first two outages are resolved). It is anticipated that the lines would not remain open for longer than a few hours. Opening the two transmission lines would not result in outages. To allow the RAS to function, relays would be added at the Lewis Substation and the Villa Park Substation to allow for opening the Lewis–Barre 220-kV transmission line and the Villa Park–Barre 220-kV transmission line. A communications circuit could be needed between Villa Park and Barre Substations and between Lewis and Barre Substations.

[3] An RAS is also known as a Special Protection System. It is a "scheme designed to detect predetermined System conditions and automatically take corrective actions that may include, but are not limited to, adjusting or tripping generation (MW and MVAR), tripping load, or reconfiguring a System(s)." An RAS is implemented to meet various objectives, including maintaining voltages and power flows (NERC 2015).



- Transmission structure [modified for schematic]
- Subtransmission structure
- Subtransmission vault area
- Distribution structure
- Distribution vault
- MWD Middle Feeder pipeline
- Existing alignment
- Proposed alignment
- Transmission line: 220-kV (Overhead)
- Transmission line: 500-kV (Overhead) [modified for schematic]
- Subtransmission Line: 66-kV (Overhead)
- Subtransmission Line: 66-kV (Underground)
- Distrbution line (Underground)
- Substation area proposed boundary [modified for schematic]
- City boundary

Telecommunications
- Route 1 (Overhead)
- Route 1 (Underground)
- Route 2a (Overhead)
- Route 2a (Removed)

Sources: SCE 2015
Basemap: NAIP 2014

0 500 1,000
Feet

Figure 3.4-2
Rough Schematic of Two 1120-MVA Transformer Alternative Footprint
Main Project Area -
Mesa Substation Site
Los Angeles County, CA

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3.4.2.2 Rationale for Full Analysis

Meet Most of the Basic Project Objectives

This alternative would meet all the basic project objectives. With only the substation in place, the alternative would address all violations except the violation resulting from the N-1-1 contingency involving an initial outage of the Chino–Mira Loma 220-kV No. 1 Transmission Line followed by an outage of the Chino–Mira Loma 220-kV No. 2 Transmission Line, which would result in a thermal overload on the Chino–Mira Loma 220-kV No. 3 Transmission Line. Implementing the RAS in addition to building the two-transformer bank substation would address the thermal overload of the Chino–Mira Loma 220-kV No. 3 Transmission Line. All violations would be addressed under this alternative, and the alternative would therefore meet Objective 1.

This alternative would not create any new violations of reliability criteria. If the two transformer banks were not operated in parallel and switched as one, outage of a transformer bank would result in overloads of the second transformer bank under peak load conditions. However, when operated in parallel and switched as one, both transformers would be taken out of service upon failure of one transformer bank, and no additional reliability violations would occur. The transformers would remain out of service until the reason for the outage is addressed. Taking both transformers out of service when one fails would essentially revert the system back to a scenario with no Mesa Substation; there would be no outages as a result of taking both transformers out of service due to failure of one transformer. The alternative would therefore meet Objective 2.

This alternative would meet Objective 3 because it would minimize outages during project construction, since the existing substation would remain in service until the new 220-kV substation is constructed and put in service.

Potential Feasibility

This alternative is potentially feasible. It would cost less than the proposed project, would reduce overall environmental impacts, and would be legally and technically feasible. However, the RAS would need review and approval by the WECC Remedial Action Scheme Reliability Subcommittee.

Potential to Substantially Reduce or Avoid Significant Impacts

This alternative would substantially reduce several significant impacts, including:

- **Air Quality:** Criteria pollutant emissions during construction would be reduced since less ground disturbance and less grading would be required to accommodate the smaller substation footprint (reduces Impacts AQ-2, AQ-3, and AQ-4).
- **Biological Resources:** Gnatcatcher habitat and species impacts would be reduced since less activity would take place in gnatcatcher habitat (reduces Impacts BR-1, BR-2, and BR-4).
- **Traffic and Transportation:** With less equipment to deliver to the site and less grading (soil import and export), less traffic would be generated and traffic impacts would be reduced (reduces Impacts TT-1 and TT-2).

Additional reduction of impacts is discussed in Chapter 5, “Comparison of Alternatives.”

3.4.3 Gas Insulated Substation

3.4.3.1 Description

This alternative would involve construction of the project as proposed, except the substation would be built with gas-insulated equipment on switchracks rather than air-insulated equipment. The gas-insulated equipment would utilize sulfur hexafluoride and would require less space than air-insulated equipment. The switchrack areas would therefore be smaller than for the proposed project. The approximate substation footprint for this alternative is shown in Figure 3.4-3.

3.4.3.2 Rationale for Full Analysis

Meet Most of the Basic Project Objectives

This alternative would meet all three basic project objectives. It would have the same capacity as the proposed project substation and would be located in the same place in the grid as the proposed substation. It would therefore address all potential violations the proposed project is meant to address and would not introduce new violations. This alternative would therefore meet Objectives 1 and 2. This alternative would also meet the objective of minimizing outages during project construction, since the existing substation would remain in service until the new 220-kV substation is constructed and put in service. The alternative would therefore meet Objective 3.

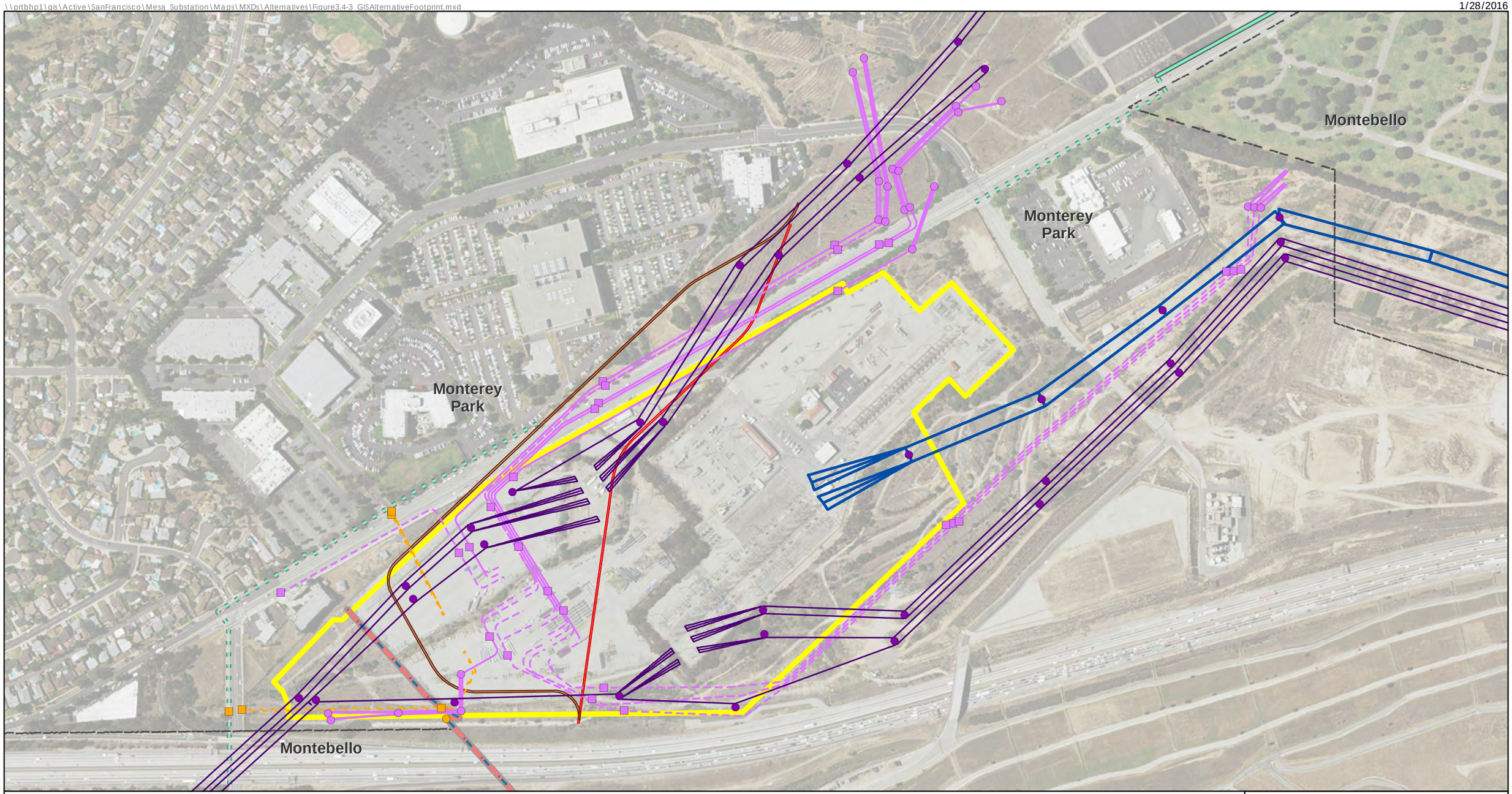
Potential Feasibility

This alternative is potentially feasible. The CPUC is not aware of any issues that would make the alternative legally or technically infeasible. The cost of constructing and maintaining this alternative would be greater than that of the proposed project due to use of gas insulated switchgear, but there is no evidence at this time that the cost would be prohibitive.

Potential to Substantially Reduce or Avoid Significant Environmental Impacts

As an approximate rule, gas-insulated substations are smaller than air-insulated substations because gas is a better insulator than air and therefore requires less space. The gas-insulated switchracks would be roughly one-tenth the size of air-insulated switchracks. The transformer banks and other equipment would not be reduced in size. The substation footprint would be about 54.5 acres under this alternative, rather than the 69.4 acres associated with the proposed project. As a result of the decreased ground disturbance, this alternative would substantially reduce the following significant impacts of the proposed project:

- **Air Quality:** Less grading would be required, reducing heavy equipment emissions. Fewer truck trips for soil import and export, equipment delivery, and materials delivery would reduce exhaust emissions (reduces Impacts AQ-2, AQ-3, and AQ-4).
- **Biological Resources:** Gnatcatcher habitat and species impacts would be reduced since less activity would take place in gnatcatcher habitat due to the size reduction of the 500-kV switchrack (reduces Impacts BR-1, BR-2, and BR-4).
- **Traffic and Transportation:** Less grading would be required and less equipment, soil, and materials would need to be brought to the site, reducing truck trips (reduces Impacts TT-1 and TT-2)



- Transmission structure [modified for schematic]
- Subtransmission structure
- Subtransmission vault area
- Distribution structure
- Distribution vault
- MWD Middle Feeder pipeline
- Existing alignment
- Proposed alignment
- Transmission line: 220-kV (Overhead)
- Transmission line: 500-kV (Overhead) [modified for schematic]
- Subtransmission Line: 66-kV (Overhead)
- Subtransmission Line: 66-kV (Underground)
- Distrbution line (Underground)
- Substation area proposed boundary [modified for schematic]
- City boundary

Telecommunications
- Route 1 (Overhead)
- Route 1 (Underground)
- Route 2a (Overhead)
- Route 2a (Removed)

Sources: SCE 2015
Basemap: NAIP 2014

0 500 1,000
Feet

Figure 3.4-3
Rough Schematic of GIS Alternative Footprint
Main Project Area -
Mesa Substation Site
Los Angeles County, CA

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3.4.4 No Project Alternative

3.4.4.1 CEQA Requirements

CEQA requires that a No Project Alternative "be evaluated along with its impact" (CEQA Guidelines Section 15126.6(e)(1)). The purpose of describing and analyzing a No Project Alternative is to allow decision-makers to compare the effects of approving the proposed project with the effects of not approving it. Because full consideration of a No Project Alternative is required by CEQA, the No Project Alternative is evaluated in this EIR, regardless of whether it meets the alternatives screening criteria previously described.

The No Project Alternative is the circumstance under which the proposed project does not proceed. According to CEQA Guidelines Section 15126.6(e), the No Project Alternative must include:

> *the existing conditions at the time the notice of preparation is published . . . as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.*

3.4.4.2 Reasonably Foreseeable Events or Actions if the Proposed Project Is Not Approved

Reasonably Foreseeable Actions

SCE has indicated that if the proposed project is not approved, it would implement a short-term load shed scheme or schemes to address needs in the short term while planning for alternative long-term solutions, which would include procurement of additional generation in the Western Los Angeles Basin and/or pursuing a transmission project. These options are described below:

- **Load shed scheme(s):** SCE would implement a short-term load shed scheme or schemes. SCE states that load shedding would be required in high density urban areas within the Western Los Angeles Basin. SCE would determine the amount (megawatts; MW) and specific location of load shed following retirement of OTC units by the end of 2020, given that parameters of load shed would be influenced by conditions following OTC generation retirement. The load shedding scheme(s) would need to be approved by the WECC Remedial Action Scheme Reliability Subcommittee and would be revised as conditions change in the Western Los Angeles Basin.

  As an example of a potential RAS if the proposed project is not implemented, it was found that an RAS involving the following, if feasible, may address all but one violation[4] listed in Appendix B: open Lewis–Barre No.1 220-kV Transmission Line and Villa Park–Barre No. 1 220-kV Transmission Line, shed load at Mission Viejo Substation, open the circuit overloaded by the contingency, bypass the overloaded transformer in the contingency, add 30 megavolt-ampere-reactive (MVAR) capacitors at Goodrich Substation, and change transformer taps at Mira Loma Substation.

[4] A Lugo–Rancho Vista 500-kV No.1 Transmission Line outage followed by a Mira Loma–Serrano 500-kV No. 2 Transmission Line outage, resulting in a thermal overload of the Mira Loma Substation No. 4 transformer bank.

- **Generation procurement in the Western Los Angeles Basin:** SCE would try to procure 617 MW of local generation to procure the maximum amount of generation authorized in the CPUC 2012 Long Term Procurement Plan.
- **Alternative transmission project:** SCE would likely pursue an alternative transmission project, which could include either a 100-mile 500-kV transmission line to connect the CAISO-controlled grid to the Comisión Federal de Electricidad grid in Mexico or a 90-mile 500-kV transmission line from Midway Substation to Devers Substation and a 35-mile 500-kV transmission line from Valley Substation to Inland Substation.

Environmental impacts of the No Project Alternative are discussed in Chapter 5, "Comparison of Alternatives."

Reasonably Foreseeable Events

Under the No Project Alternative, SCE would be in violation of the NERC, WECC, and CAISO reliability standards as shown in Appendix B. None of the contingencies, however, are considered a reasonably foreseeable event. For example:

- **500-kV N-1-1 contingency:** An outage would have to occur on the Eco–Miguel 500-kV Transmission Line. Another outage would have to occur on the Ocotillo–Suncrest 500-kV Transmission Line, which is located in a different right-of-way than the Eco–Miguel 500-kV Transmission Line. To replicate the 500-kV N-1-1 contingency, both outages would need to occur during the heavy summer loads, which occur for a few hours on a week day for a period of less than a week, every 10 years. Given that in a recent year-long period, the only outages on these lines were planned, it is extremely unlikely that the 500-kV N-1-1 contingency would occur. Therefore, it is extremely unlikely that there would be a voltage performance issue at Serrano Substation.
- **220-kV N-1-1 contingencies:** An outage would have to occur on the Lewis–Serrano No. 1 Transmission Line. Another outage would have to occur on either the Serrano–Villa Park No. 1 or Serrano–Villa Park No. 2 transmission line, both of which are located in a different right-of-wat than the Lewis–Serrano No. 1 Transmission Line. To replicate the 220-kV N-1-1 contingency, both outages would need to occur during the heavy summer loads, which occur for a few hours on a week day for a period of less than a week, every 10 years. Given that, in recent 5-year-long periods, the only outages on these lines were planned, it is extremely unlikely that either 220-kV N-1-1 contingency would occur. Therefore, it is extremely unlikely that there would be a thermal overload on either of the Serrano–Villa Park 220-kV Transmission Lines.

Although SCE would be in violation of reliability standards under this alternative, it is not reasonably foreseeable that contingencies would occur during peak loads or that there would be any voltage or overload issues if the No Project Alternative is implemented.

3.5 Alternatives Eliminated from Full EIR Evaluation

3.5.1 500-kV Substation with One 1120-MVA Transformer Bank

3.5.1.1 Description

This alternative would involve implementation of a reduced version of the proposed project. Under this alternative, SCE would install one 1120-MVA 500/220-kV transformer bank to the west of the existing 220-kV Mesa Substation, loop in the Mira Loma–Vincent 500-kV line, retain the existing 220-kV Mesa Substation, and upgrade the facility to loop in the existing Goodrich–Laguna Bell and Laguna Bell–Rio Hondo 220-kV Transmission Lines.

3.5.1.2 Rationale for Elimination

Meet Most of the Basic Project Objectives

One 1120 MVA 500/220-kV transformer bank at Mesa Substation would not address all violations of NERC, WECC, and CAISO reliability standards as listed in Appendix B. Therefore, this alternative would not meet project Objective 1. The alternative would also introduce a new violation of planning standards because the 1120-MVA 500/220-kV transformer bank would overload in normal (N-0) conditions. The alternative would meet basic project Objective 3 because the existing 220-kV Mesa Substation would remain in service during construction.

Potential Feasibility

This alternative would be technically and legally feasible because it is a reduced version of the proposed project built on the same site as the proposed project. It would substantially reduce environmental impacts of the proposed project and would cost less than the proposed project.

Potential to Substantially Reduce or Avoid Significant Environmental Impacts

This alternative would substantially reduce several significant impacts, including:

- **Air Quality:** less grading would be required, reducing heavy equipment emissions. Fewer truck trips for soil import and export, equipment delivery, and materials delivery would reduce exhaust emissions.
- **Biological Resources:** Gnatcatcher habitat and species impacts would be reduced since less activity would take place in gnatcatcher habitat
- **Traffic and Transportation:** less grading would be required and less equipment, soil, and materials would need to be brought to the site, reducing truck trips.

Conclusion

This alternative was eliminated from further consideration because it would not meet basic project Objective 1 or 2.

3.5.2 500-kV Substation Adjacent to Existing Mesa 220-kV Substation

3.5.2.1 Description

This alternative would involve constructing a 500-kV substation with the same characteristics as the proposed project, but the 500-kV substation would be built west of and adjacent to the existing Mesa 220-kV Substation on the currently unoccupied portion of the Mesa Substation parcel. The existing 220-kV substation would be retained. The existing substation and existing transmission lines would be reconfigured and upgraded as necessary so they could be looped into the 500-kV and 220-kV substations.

3.5.2.2 Rationale for Elimination

Meet Most of the Basic Project Objectives

This alternative would meet all three basic project objectives because it would function the same as the proposed project regarding the transmission system.

Potential Feasibility

This alternative would not be technically feasible. The 500-kV substation would be too large for the currently unoccupied area on the Mesa Substation parcel and therefore could not be constructed due to space constraints.

Potential to Substantially Reduce or Avoid Significant Environmental Impacts

This alternative would substantially reduce several significant impacts, including:

- **Air Quality:** Less grading would be required due to retention of the existing 220-kV substation, reducing heavy equipment emissions. Fewer truck trips for soil import and export, equipment delivery, and materials delivery would reduce exhaust emissions.
- **Biological Resources:** Gnatcatcher habitat and species impacts would be reduced since less activity would take place in gnatcatcher habitat.
- **Traffic and Transportation:** Less grading would be required and less equipment, soil, and materials would need to be brought to the site, reducing truck trips.

Conclusion

This alternative was eliminated from further consideration because it would not be technically feasible.

3.5.3 Load Shedding in Los Angeles—Long Beach—Anaheim, San Diego, and/or Riverside—San Bernardino

3.5.3.1 Description

This alternative would involve, as part of a RAS, SCE shedding load after the first line outage in an N-1-1 contingency in order to avoid the overloads caused by the second line outage in an N-1-1 contingency. Load shedding would be done in Los Angeles—Long Beach—Anaheim, San Diego, or

Riverside—San Bernardino. No portions of the proposed project would be built under this alternative.

3.5.3.2 Rationale for Elimination

Meet Most of the Basic Project Objectives

This alternative would not meet project Objective 2 because it would require violation of the CAISO Transmission Planning Standards. The CAISO Planning Standards (effective April 2015) do not allow non-consequential load shedding in high density urban areas for local area long-term planning as an alternative to "expanding transmission or local resources capability to mitigate NERC TPL-001-4 standard P1–P7 contingencies and impacts on the 115 kV or higher voltage systems" (CAISO 2015). A high density urban load area is a U.S. Census urbanized area that has a population of more than one million people (CAISO 2015). Los Angeles–Long Beach–Anaheim, San Diego, and Riverside–San Bernardino are high density urban areas. Load shedding in these high-density urban areas as a long-term solution to violation of TPL-003-0b would therefore not meet project Objective 2. This alternative would not meet project Objective 3 because it would require outages during load shedding.

Potential Feasibility

This alternative would be technically and legally feasible. However, the RAS would need review and approval by the WECC Remedial Action Scheme Reliability Subcommittee. It would avoid all environmental impacts of the proposed project and would cost substantially less to construct than the proposed project.

Potential to Substantially Reduce or Avoid Significant Environmental Impacts

This alternative would avoid all significant impacts of the proposed project because this alternative would not involve construction of any additional infrastructure.

Conclusion

This alternative was dismissed from further consideration because it would not meet most of the basic project objectives.

3.5.4 Install Additional Reactive Support at Barre Substation

3.5.4.1 Description

This alternative would involve installing additional reactive support at Barre Substation. One potential option for additional reactive support would be to install additional capacitors or a static var compensator at Barre Substation.

3.5.4.2 Rationale for Elimination

Consistency with Project Objectives

This alternative would potentially address the voltage issues occurring during an identified 500-kV N-1-1 contingency of the an N-1-1 outage of the Eco–Miguel 500 kV Transmission Line followed by the subsequent outage of the Ocotillo–Suncrest 500 kV Transmission Line. It is not likely, however, that this alternative would address thermal overloads during at least two identified 220-kV N-1-1

contingencies: an N-1-1 outage of the Lewis–Serrano No. 1 230 kV Transmission Line followed by an outage of the Serrano-Villa Park No. 2 220 kV Transmission Line, which would cause overloads on the Serrano-Villa Park No. 1 220 kV Transmission Line, and an N-1-1 outage of the Lewis-Serrano No. 1 220 kV Transmission Line followed by an outage of the Serrano-Villa Park No. 1 220 kV Transmission Line, which causes overloads on the Serrano-Villa Park No. 2 220 kV Transmission Line. Thus, this alternative would not meet project Objective 1.

Feasibility

This alternative would not be technically feasible. There are no available 220-kV positions at the Barre Substation. The 220-kV switchrack at the Barre Substation cannot be expanded to accommodate additional capacitors or a static var compensator due to the substation's layout. The 220-kV switchrack is adjacent to a street and the substation's 66-kV switchrack.

Potential to Substantially Reduce or Avoid Significant Environmental Impacts

This alternative would avoid or substantially reduce all significant impacts of the proposed project because it would involve addition of minimal equipment to an existing substation.

Conclusion

This alternative was dismissed from further consideration because it would meet only one basic project objective and would not be feasible.

3.5.5 Load Shedding and Reconductoring

3.5.5.1 Description

This alternative would involve load shedding in the Mission Viejo following the first outage in either of the following contingencies:

- **N-1-1 (outage):** Lewis–Serrano No. 1 220-kV Transmission Line outage followed by Serrano–Villa Park No. 1 220-kV Transmission Line outage would result in a thermal overload of the Serrano–Villa Park #2 220-kV line.
- **N-1-1 (outage):** Lewis–Serrano No. 1 220-kV Transmission Line outage followed by Serrano–Villa Park No. 2 220-kV Transmission Line outage would result in a thermal overload of the Serrano–Villa Park No.1 220-kV Transmission Line.

The Serrano–Villa Park No. 1 and Serrano–Villa Park No. 2 220-kV Transmission Lines would be reconductored and upgraded to increase their capacity ratings. It is probable that towers along these lines would need to be replaced in order to carry the higher capacity conductor. There are currently 14 lattice steel towers (LSTs) on the Serrano–Villa Park No. 1 Transmission Line and 14 LSTs on the Serrano–Villa Park No. 2 Transmission Line. Larger or more LSTs may be needed to support the higher-capacity conductor. It is assumed that work areas around LSTs to be removed and to be installed would be about 200 by 200 feet.

3.5.5.2 Rationale for Elimination

Consistency with Project Objectives

This alternative would not address all contingencies that would result in violation of reliability standards. At least two contingencies would remain:

- **N-1-1 (outage):** Barre–Villa Park 220-kV Transmission Line outage followed by Mira Loma–Olinda 220-kV Transmission Line outage would result in a thermal overload of the Barre–Lewis 220-kV Transmission Line.
- **N-1-1 (outage):** Barre–Lewis 220-kV Transmission Line outage followed by Mira Loma–Olinda 220-kV Transmission Line outage would result in a thermal overload of the Barre–Lewis 220-kV Transmission Line.

This alternative would therefore not meet project Objective 1. This alternative also would not address the objective of avoiding introduction of additional reliability violations. This alternative may result in overloads on the Barre–Lewis and Barre–Villa Park 220-kV Transmission Lines as a result of either contingency listed in 3.5.7.4, "Description." The alternative therefore would not meet project Objective 2.

Feasibility

This alternative is potentially feasible from legal and technical perspectives. It would reduce environmental impacts and would likely cost less to construct than the proposed project.

Potential to Substantially Reduce or Avoid Significant Impacts

This alternative would substantially reduce the following significant impacts of the proposed project:

- **Air Quality:** Less grading would be required, reducing heavy equipment emissions. Fewer truck trips for soil import and export, equipment delivery, and materials delivery would reduce exhaust emissions.
- **Biological Resources:** Gnatcatcher habitat and species impacts would be reduced since less activity would take place in gnatcatcher habitat.
- **Traffic and Transportation:** Less grading would be required. With installation of 28 LSTs and removal of 14 LSTs and no overlap of work areas, disturbance areas for LSTs would be about 1 acre. Access roads may result in an additional few acres. As a result of the greatly reduced impact area, less equipment, soil, and materials would need to be transported, reducing truck trips. The alternative would take less time to construct, limiting the time during which traffic would be increased over baseline.

Conclusion

This alternative was rejected from further consideration because it would not meet most of the basic project objectives.

3.5.6 Connection to Los Angeles Department of Water and Power System at Alamitos Substation

3.5.6.1 Description

Under this alternative, SCE would create a 220-kV connection to the Los Angeles Department of Water and Power (LADWP)-owned Haynes Generating Station through SCE's Alamitos 220/66-kV Substation.

3.5.6.2 Rationale for Elimination

Consistency with Project Objectives

This alternative would address the overload on the Serrano corridor caused by an N-1-1 outage on the Sunrise and Suncrest 500-kV Transmission Lines. It is uncertain whether it would meet other objectives.

Feasibility

It is uncertain whether this alternative would be feasible. The routing of a potential 220-kV connection is uncertain. It is unknown whether there is a vacant position at SCE's Alamitos 220/66-kV Substation and a feasible way to add another connection to the Haynes Generating Station. Costs are uncertain. It is likely that the alternative would have reduced environmental effects when compared to the proposed project.

Potential to Substantially Reduce or Avoid Significant Environmental Impacts

This alternative would likely substantially reduce or avoid significant environmental impacts. It is assumed that the connection between Haynes Generating Station and Alamitos 220/66-kV Substation would be short. Reduced impacts would likely include the following:

- **Air Quality:** Less ground disturbance would be required for this alternative, reducing exhaust emissions and fugitive dust emissions.
- **Biological Resources:** The vicinity of the intersection appears to consist of only minimal potential wildlife habitat than the Mesa Substation site, reducing impacts to wildlife habitat.
- **Traffic and Transportation:** Less grading would be required and less equipment, soil, and materials would need to be brought on site, reducing truck trips.

Conclusion

An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines section 15126.6(f)(3)). The effect of this alternative cannot be reasonably ascertained because the routing of this connection is uncertain and the feasibility is unknown. The implementation of this alternative is remote and speculative because SCE would need to reach an agreement with the LADWP about the connection; it cannot be assumed that LADWP and SCE would reach an agreement allowing for the connection. The alternative was therefore dismissed from further consideration.