

**Recirculated Final Environmental Impact Report
for the**

**SMUD Solano Wind Project
Phase 3**

SCH Number 2006012017

Prepared for:
Sacramento Municipal Utility District
P.O. Box 15830, MS0203
Sacramento, California 95852

Prepared by:
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, California 95833

Contact Person:
Ron Scott, Project Manager

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CHAPTER 1
INTRODUCTION

The Recirculated Final Environmental Impact Report (RFEIR), as required pursuant to California Environmental Quality Act (CEQA) Guidelines Sections 15088.5, 15089 and 15132, must include the Draft Environmental Impact Report (DEIR) or a revision thereof, comments and recommendations received on the DEIR, a list of persons, organizations and public agencies commenting on the DEIR and the responses of the Lead Agency to significant environmental points raised in the review and consultation process. A Mitigation Monitoring Program (MMP) must also be prepared and approved to ensure compliance during project implementation (Public Resources Code Section 21081.6, CEQA Guidelines Section 15097).

Relationship to the DEIR and RDEIR

The RFEIR, together with the September 2007 DEIR, the October 2009 RDEIR (as annotated herein), the MMP and the Findings constitute the environmental disclosure record that will serve as the basis for approval of the proposed project.

Public Review Summary

The EIR process typically consists of three parts: the Notice of Preparation (NOP), DEIR, and FEIR. The NOP for the proposed project was circulated in January 2006. The NOP was sent to 104 public agencies, property owners, and interested parties. The NOP was delivered to the State Clearinghouse on January 6, 2006, for a 30-day comment period. Copies of the NOP, the NOP distribution list, and comments received on the NOP are presented in Appendix A of the DEIR for the project.

A Scoping meeting was held on November 1, 2007, in Rio Vista, California. The scoping meeting was advertised in the Sacramento Bee and River News-Herald on October 3, 2007, as recommended in Section 15083 of the CEQA Guidelines to which all NOP and DEIR recipients were invited.

The Sacramento Municipal Utility District (SMUD), as the Lead Agency, circulated a DEIR for the Solano Wind Project from September 28 through November 13, 2007. Notices of Availability (NOA) for the DEIR were distributed directly to responsible agencies, trustee agencies, other interested parties, and local libraries. The DEIR was also made available on CD or by downloading from the SMUD Web site.

General public NOA of the DEIR 2007 was given by publication on October 3, 2007, in the Sacramento Bee and River News-Herald newspapers. As required by Public Resources Code Section 21091(d), SMUD accepted written comments through November 13, 2007. Eight letters were received during the comment period from agencies and individuals. The Final EIR (FEIR) 2007 was issued on December 28, 2007. Subsequent to that issuance, and prior to consideration by the SMUD Board, the Board decided to postpone a hearing and determination. SMUD received comment letters after issuance of the December 28, 2007, FEIR, from Solano County, Travis Air Force Base (AFB), and the California Department of Fish and Game (CDFG). The delayed hearing provided an opportunity for SMUD staff to meet with Solano County, Travis AFB, and CDFG staff, in an effort to further define the project and attempt to identify project changes that would reduce environmental impacts.

This RDEIR was released for circulation to appropriate resource agencies and interested parties on October 7, 2009. SMUD extended the public comment period through January 15, 2010. SMUD

required that reviewers limit their comments to the revised chapters/portions of the RDEIR pursuant to CEQA Section 15088.5 (f)(2). Eight letters, listed in Table 1-1, were received during the comment period from the agencies and individuals. Subsequent to the close of the public review period, an additional comment letter was received from the Department of the Air Force withdrawing the Air Force's previous letters regarding the Solano Wind Project Phase 3 EIR. The letters and responses are included in Section 3.0 of this RFEIR.

In accordance with the provisions of Public Resources Code Section 21092.5, SMUD has provided written responses to each commenting public agency no less than 10 days prior to the proposed date for consideration of certification of the RFEIR.

TABLE 1-1 LIST OF PERSONS, ORGANIZATIONS AND PUBLIC AGENCIES THAT COMMENTED ON RDEIR

	Agency	Commenter	Title
A	Department of the Air Force	Colonel James C. Vechery	Commander
B	Central Valley Flood Protection Board	James Herota	Staff Environmental Scientist
C	Solano County Department of Resource Management	Mike Yankovich	Program Manager
D	Tuleyome	Bob Schneider	Senior Policy Director
E	California Department of Fish and Game	Charles Armor	Regional Manager, Bay-Delta Region
F	Solano County Airport Land Use Commission	Lee Axelrad	Deputy County Counsel
G	Friends of the Swainson's Hawk	Jude Lemare	President
H	Property Owner	Albert G. Medvitz	

CHAPTER 2
RESPONSE TO COMMENTS

SMUD Solano Phase 3 Project Recirculated Final EIR Response to Comments

Comment	Response
<div style="text-align: center;">  <p>DEPARTMENT OF THE AIR FORCE HEADQUARTERS 60TH AIR MOBILITY WING (AMC)</p> <p style="font-size: 1.2em; font-weight: bold;">JAN 19 2010</p> <p>Colonel James C. Vechery Commander 400 Brennan Circle Travis AFB CA 94535-5049</p> <p>Mr. Lonn Maier Sacramento Municipal Utility District P.O. Box 15830 MS B203 Sacramento, CA 95852</p> <p>Dear Mr. Maier</p> <p style="text-indent: 2em;">Thank you for participating in the December 2009 Cooperative Research and Development Agreement (CRADA) with the United States Transportation Command. As you know, a principal goal of the CRADA was to assess the operational impact of the Shiloh III, Montezuma Wind and Solano Wind Project Phase 3 projects on the Travis AFB air traffic control areas. The CRADA facilitated the use of a Westslope Consulting simulation methodology to perform that assessment. The results were then subjected to independent government verification. We determined through the cooperative efforts of the CRADA that a minimum average probability of detection (Pd) over the Wind Resource Area (WRA) at the radar scope of 75.3% surface to 4000 feet and 79.2 % surface to 10,000 feet are the baseline values necessary to maintain aviation safety and efficiency of flight operations.</p> <p style="text-indent: 2em;">I am pleased to report that the interim results of the simulations indicate that the three proposed projects will not result in degradation of the average Pd over the WRA below these baseline values. As a result of these conclusions, we withdraw the comments we made in letters dated 6 November 2007, December 2007, 24 March 2008, 8 June 2009 and 12 November 2009, in response to SMUD's Solano Wind Project Phase 3 Draft Environmental Impact and Revised Draft Environmental Impact Reports.</p> <p style="text-indent: 2em;">We will continue to review the cumulative impacts of future proposed wind turbine projects on Travis' radar on a case by case basis against the 75.3% and 79.2% Pd baseline values indicated above. We have appreciated SMUD's thoughtful consideration of our comments throughout your environmental review process.</p> <p style="text-align: right; margin-right: 2em;">Sincerely,</p> <div style="text-align: right; margin-right: 2em;">  JAMES C. VECHERY, Colonel, USAF Commander </div> <p>cc: Solano County Planning Commission HQ AMC/JA/A3 USTRANSCOM TCCS-ORTA</p> </div> <div style="text-align: right; margin-top: 20px;"> A </div>	<p>A-1</p> <p>SMUD appreciates the comments received from the Department of the Air Force regarding the impact on Travis Air Force Base (AFB) air traffic control radar from the operation of wind turbine generators (WTGs) in the Collinsville-Montezuma Hills wind resource area (WRA). SMUD participated in the December 2009 Cooperative Research and Development Agreement (CRADA) with the United States Transportation Command. SMUD agrees with the commenter that the interim results of the simulations used to determine the operational impacts on the Travis AFB air traffic control area indicate that the three proposed wind turbine projects, including the Solano Wind Phase 3 project, will not result in degradation of the average probability of detection over the WRA to below the baseline values. As such, this report confirms the results of the analysis in the recirculated draft environmental impact report (RDEIR) that no significant individual or cumulative impacts would occur as a result of the project.</p> <p>A discussion of CRADA results has been incorporated into the relevant sections of the EIR, and no further changes to the EIR are required.</p> <div style="text-align: right; margin-top: 20px;"> } A-1 </div>

SMUD Solano Phase 3 Project Recirculated Final EIR Response to Comments

Comment	Response
<p style="font-size: small; margin: 0;">STATE OF CALIFORNIA – THE RESOURCES AGENCY CENTRAL VALLEY FLOOD PROTECTION BOARD 3310 El Camino Ave., Rm. LL40 SACRAMENTO, CA 95821 (916) 574-0609 FAX: (916) 574-0682 PERMITS: (916) 574-0685 FAX: (916) 574-0682</p> <p style="text-align: right; font-size: small; margin: 0;">ARNOLD SCHWARZENEGGER, GOVERNOR</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>November 16, 2009</p> <p>Lonn Maier Sacramento Municipal Utility District P.O. Box 15830 Sacramento, CA 95852</p> <p>Dear Mr. Maier:</p> <p>State Clearinghouse (SCH) Number: 2006012017 Solano Wind Project Phase 3 Draft EIR</p> <p>Staff for the Central Valley Flood Protection Board has reviewed the subject document and provides the following comments:</p> <p>The proposed project is located within the jurisdiction of the Central Valley Flood Protection Board (Formerly known as The Reclamation Board). The Board is required to enforce standards for the construction, maintenance and protection of adopted flood control plans that will protect public lands from floods. The jurisdiction of the Board includes the Central Valley, including all tributaries and distributaries of the Sacramento River and the San Joaquin River, and designated floodways (Title 23 California Code of Regulations (CCR), Section 2).</p> <p>A Board permit is required prior to starting the work within the Board's jurisdiction for the following:</p> <ul style="list-style-type: none"> • The placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduit, fence, projection, fill, embankment, building, structure, obstruction, encroachment, excavation, the planting, or removal of vegetation, and any repair or maintenance that involves cutting into the levee (CCR Section 6); • Existing structures that predate permitting or where it is necessary to establish the conditions normally imposed by permitting. The circumstances include those where responsibility for the encroachment has not been clearly established or ownership and use have been revised (CCR Section 6); • Vegetation plantings will require the submission of detailed design drawings; identification of vegetation type; plant and tree names (i.e. common name and scientific name); total number of each type of plant and tree; planting spacing and irrigation method that will be within the project area; a complete vegetative management plan for maintenance to prevent the interference with flood control, levee maintenance, inspection and flood fight procedures (Title 23, California Code of Regulations CCR Section 131). 	<div style="text-align: center; margin-bottom: 10px;"> B </div> <p>B-1 SMUD appreciates the Central Valley Flood Protection Board's (Board) comments and recognizes that the proposed Solano Wind Phase 3 project is located within the jurisdiction of the Board.</p> <p>B-2 The Solano Wind Project Phase 3 project does not involve the placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduit, fence, projection, fill, embankment, building, structure, obstruction, encroachment or works of any kind, including the planting, excavation, or removal of vegetation, and any repair or maintenance that involves cutting into a levee. No construction, structure removal, planting, or removal of vegetation will take place within a designated floodway or along a levee. No transmission lines will constructed across the nearby Sacramento River Deep Water Ship Channel.</p> <p>B-3 As stated on pages 2-9 and 4.5-10 of the RDEIR, the project area includes a number of abandoned structures that predate permitting by the Board. These structures are not along a levee and not within a designated floodway and, thus, not within the jurisdiction of the Board. These structures will not be removed as part of the proposed project.</p> <p>B-4 As stated above, SMUD does not anticipate any vegetation planting within a designated floodway or along a levee. Thus, Section 131 of Title 23 of the California Code of Regulations does not apply to SMUD's project.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>

SMUD Solano Phase 3 Project Recirculated Final EIR Response to Comments

Comment	Response
<p>Lonni Maier November 16, 2009 Page 2 of 2</p> <p>The permit application and Title 23 CCR can be found on the Central Valley Flood Protection Board's website at http://www.cvfpb.ca.gov/. Contact your local, federal and state agencies, as other permits may apply.</p> <p>If you have any questions please contact me at (916) 574-0651 or by email jherota@water.ca.gov.</p> <p>Sincerely,  James Herota Staff Environmental Scientist Floodway Protection Section</p> <p>cc: Governor's Office of Planning and Research State Clearinghouse 1400 Tenth Street, Room 121 Sacramento, CA 95814</p>	

SMUD Solano Phase 3 Project Recirculated Final EIR Response to Comments

Comment	Response
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>Department of Resource Management 675 TEXAS STREET, SUITE 5500 FAIRFIELD, CALIFORNIA 94533 www.solanocounty.com</p> </div> <div style="text-align: center;"> C </div> </div> <p style="font-size: small;">Planning Services (707) 784-6765 FAX (707) 784-4805</p> <p style="text-align: right; font-size: small;">Michael Yankovich Planning Manager</p> <p>January 13, 2010</p> <p>Mr. Jim Field Environmental Management Sacramento Municipal Utility District P.O. Box 15830 MS B355 Sacramento, CA 95852-1830</p> <p>Subject: SMUD-SOLANO WIND PROJECT PHASE 3 RDEIR – October 2009 SCH 2006012017</p> <p>The Solano County Department of Resource Management appreciates the extended opportunity to comment on the Recirculated Draft EIR for the Solano Wind Project Phase 3. Below for your consideration are the Department's comments that should be incorporated into the recirculated EIR to increase the accuracy, consistency, and adequacy of the document.</p> <ol style="list-style-type: none"> 1. Pages 1-4, 1-5 (Table 1-3) and 5-1, 5-2 (Table 5-1) – The correct total for existing wind facilities in the Montezuma Hills area is 833 wind turbines and a maximum production capacity of 624 MWs. An additional 112 to 178 wind turbines and up to 365 MWs of capacity are currently proposed, representing the various scenarios for Montezuma Wind, SMUD-Solano Phase 3, and the latest, Shiloh III - which should be referenced in the EIR. There are also two other speculative wind energy projects south of Highway 12, which should be useful in assessing cumulative impacts, Montezuma Wind II (up to 35 wind turbines) and Shiloh IV (79 wind turbines), both of which would involve replacement of many of the older enXco V wind turbines in addition to installation of new turbines where none presently exist. While the County has not received an application or any plans for either of the speculative projects, they are considered by the County as potential development projects under CEQA given that Montezuma Wind II has been discussed with Planning Division staff and resource agencies, and all but a few of the proposed Shiloh IV turbines have already received FAA "No Hazard" determinations. } C-1 2. Page 1-8 – Last paragraph – Reference to recent reports that would account for avian mortality at Shiloh II and Montezuma (Wind?) projects is incorrect, as no such post-construction mortality reports presently exist. } C-2 3. Page 2-1 – Paragraph no. 6 – Reference to a minimum WTG safety setback being incorporated for consistency with the County-approved Shiloh II EIR, equivalent to 1.25 times the maximum blade throw distance, is incomplete. The referenced setback was an alternate to the minimum baseline setback equivalent to three times (3x) the maximum wind turbine height, and was allowed provided that a setback waiver was obtained from adjacent landowners, and was limited to public road right-of-ways and overhead electrical transmission easements. } C-3 	<p>C-1 SMUD appreciates Solano County's comments on the RDEIR regarding the total number of existing wind turbines in the WRA. SMUD agrees that there are 833 existing WTGs with a maximum production capacity of 624 MWs, and up to 178 additional WTGs with a maximum production capacity of 365 MW planned to be installed in the WRA. Table 1-3, Table 5-1, and associated text Section 1.2 and Section 5.1 have been revised accordingly.</p> <p>SMUD disagrees that the RDEIR should include discussion of the two speculative wind energy projects referenced by Solano County. These projects have not yet advanced to a point meriting their consideration in the project's cumulative impacts analysis. A discussion of cumulative impacts generally requires discussion of "past, present, and <u>probable</u> future projects producing related or cumulative impacts." (14 C.C.R. § 15130.) Courts have made clear that a change which is speculative is not reasonably foreseeable and, therefore, need not be analyzed in an EIR. (See, e.g., <i>Save Round Valley Alliance v. County of Inyo</i> [2007] 157 Cal.App.4th 1437, 1449.) Generally, a development proposal is viewed as a probable future project once the environmental review process for the project is underway. (<i>San Franciscans for Reasonable Growth v. City & County of San Francisco</i> [1984] 151 Cal.App.3d 61.) The County acknowledges that it has not yet received an application or any plans for either of the projects it references. Because no applications have yet been filed for the two projects referenced by the County, the environmental review process has not yet begun, and the projects are too speculative at this point to be considered in the project's cumulative impacts analysis.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>C-2 The commenter is correct. No avian mortality reports for Shiloh II and Montezuma Wind Project exist. The statement should have referenced the analysis in the Shiloh I and High Winds Wind projects EIRs.</p>

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Comment	Response
<p>Mr. Jim Field Page 2 of 5</p>	
<p>4. Page 2-27 – Russell generation transformer modifications – Should any of the options involving expansion of the existing transformer facilities increase the views of such facilities from Montezuma Hills Road, an assessment of the potential visual impacts is suggested.</p>	C-4
<p>5. Pages 2-8, 2-10, and throughout the entire RDEIR – The County's Wind Turbine Siting Plan (1987) is no longer in effect and, as such, any and all references to it, including the boundaries of the former Collinsville-Montezuma Hills Wind Resource Area, are outdated and irrelevant. The 1987 Plan was replaced by the various provisions of the Solano County 2008 General Plan.</p>	C-5
<p>6. Page 2-10 - For clarification, WTG setbacks from public roads and transmission lines, as required by Solano County, are measured at the right-of-way and easement lines, respectively, not physical improvements.</p>	C-6
<p>7. Page 2-11 – Fourth and fifth paragraphs – Reported distances of WTGs and project boundaries from residences are repeatedly inconsistent throughout the EIR including Section 4.4.2.3 on page 4.4-6, the latter of which identifies the location of a residence approximately 1,200 feet from one of the proposed WTGs. The contradiction in the fourth paragraph states that no residences are located in the project area or within 3 times of the WTG height of any planned WTGs, and that the closest residence is 3,600 feet from the project boundary. Note that according to Table 2-3, which identifies each of the 8 potential WTG models under consideration, the range of setbacks that would be required based on 3 times the WTG height for each of the potential models is 1,257 to 1,485 feet and, as such, no matter which model is ultimately selected, the one residence referenced on p. 4.4-6 would be located closer than 3 times the WTG to the closest turbine. The other contradiction in the fifth paragraph states that the closest residence is more than one mile from the nearest project WTG site.</p>	C-7
<p>8. Page 2-11 – Distances from property boundaries (noise related) – As previously stated, the 1987 Wind Turbine Siting Plan is no longer in effect. Noise standards for wind turbines are currently based on the requirements of the Energy Resources and Conservation subsection of Chapter 4 (Resources) and the Noise subsection of Chapter 5 (Public Health and Safety) of the Solano County 2008 General Plan.</p>	C-8
<p>9. Figure 2-4, 4.10-1, and possibly other figures - According to the legends in these figures, alternative collection line route 2 has been eliminated and a new alternative route 4 has been introduced. Assuming these are simply mislabeled, corrections would be appropriate.</p>	C-9
<p>10. Figures 4.3-1, 4.5-2 and possibly other figures - Similar to the above, the legends in these figures identify that alternative collection line routes 2 and 3 will be either 34.5 or <u>230kV</u>, which is inconsistent with the narrative on p. 2-22.</p>	C-10
<p>11. Page 4.4-3 – The Air Quality section analysis is flawed, as it is based solely on the YSAQMD criterion. Regardless of the reason SMUD applied these standards, as cited in the EIR, the assessment should be based on the more appropriate BAAQMD criteria. The majority of the proposed wind turbines appear to be located within the BAAQMD jurisdiction, which is arguably more, not less, stringent than the YSAQMD criterion for construction emissions, in addition to operational-related GHG emissions, as discussed below.</p>	C-11
<p>12. Page 4.4-6 – The reference on this page (as well as p. 1-10) to the absence of "formally adopted quantitative CEQA thresholds of significance to address project-related GHG's," disregards the fact that the BAAQMD has been developing significance thresholds for some time and these are now scheduled for adoption prior to the scheduled certification of the subject EIR. The BAAQMD has released its Proposed Thresholds of Significance, which were</p>	C-12
	<p>The statement regarding bird and bat mortality has been amended to reflect the addition of the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California, Final Report, October 2009 (Curry and Kerlinger, 2009), to the analysis. Prior to production, notification, and distribution of the RDEIR the Shiloh I and High Winds Wind project EIRs were the most recent analysis of bird and bat mortality in the Montezuma Hills Wind Resource Area. SMUD received the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project after distribution of the Solano Wind Project, Phase 3 RDEIR for public review.</p> <p>C-3 As noted by the commenter, paragraph 6 to Section 2.0 has been revised as follows:</p> <p>6. <u>The recent County-approved Shiloh II EIR included an alternate setback to the minimum setback requirement of three times the WTG height for public road rights-of-way and overhead transmission line easements. To incorporate the latest Shiloh II EIR analysis, as approved by Solano County, the minimum safety setback for WTGs is revised to 1.25 times the calculated maximum blade throw distance. No WTGs would be sited closer than 3 times the WTG height from any public road right-of-way. All WTGs (including WTG blades) would be located outside of existing overhead transmission line rights-of-way. The minimum safety setback for WTGs adjacent to overhead electrical transmission lines on SMUD-owned or -controlled property would be 1.25 times the calculated maximum blade throw distance from the existing transmission lines and support structures.</u></p> <p>C-4 The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required. SMUD already assessed the potential visual impacts from the modification of the existing Russell generation transformer. The previous Final EIR (published December 2007) for the project discussed these potential impacts on pages 16-17.</p>

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Comment	Response
	<p>As stated in the 2007 Final EIR, the extent of modifications will be small (less than 20 percent) compared to the substantial development that exists at the site. The Russell Substation Step-Up Transformer covers approximately 0.2 acres, consisting of multiple transformers, breakers, switches, and busses that serve the regional renewable energy resources. The substation is not visible from Highways 12 or 113. It is located approximately 1,000 feet north of Montezuma Hills Road, within sight of the much larger PG&E Birds Landing Switchyard. The area was evaluated for potential visual and aesthetic impact in the Shiloh II EIR (Solano County, 2007b). That analysis defined the sensitive receptors as residents of Rio Vista, Collinsville, and Bird's Landing that drive Montezuma Hills Road and visitors to the Shiloh II Wind Power project. The analysis noted that the visual effects of the electrical facilities would be less than the effects of the proposed turbines. When a new facility is proposed and sited adjacent to other similar facilities (such as the Russell Step-Up Transformer), the visual contrast is weaker than that which would result from a new feature. The analysis concluded that the impact of the substation for Shiloh II would be less than significant and no mitigation would be required.</p> <p>As stated above, the existing Russell Generation Step-Up Transformer is located approximately 1,000 feet north of Montezuma Hills Road. The modifications of the Russell Transformer will be directly adjacent and south of the existing facility.</p> <p>The modifications would be briefly visible (for only a few seconds) by drivers from Montezuma Hills Road traveling eastbound. Transformer equipment (such as breakers, switches, and busses) would be located at a lower elevation, would be visually similar to existing structures in the area, and would not provide additional significant visual contrast in the area. As stated in the project description, the power collection system entering the transformer would be constructed below ground and would not be visible to the public.</p>

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Comment	Response
	<p>The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p> <p>C-5 SMUD agrees with the commenter that the 1987 Siting Plan has been folded into the 2008 General Plan. Nevertheless, SMUD believes the discussion of the 1987 Siting Plan in the RDEIR provided useful context regarding the siting of wind generation in Solano County. All references in the EIR to the 1987 Siting Plan have been clarified.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>C-6 SMUD agrees with the commenter that setbacks are generally measured from the property boundaries and public road rights-of-way and easement boundaries. Regarding transmission line setbacks on SMUD-owned or -controlled property, SMUD would utilize safety setbacks measured from the existing transmission lines and support structures. Section 2.4.4, paragraph 4 has been revised as follows:</p> <ul style="list-style-type: none"> <p>Distance from public roads. <u>The Solano County General Plan requires a minimum setback of 3 times the turbine height for any public roadway. WTG distance from public roads, transmission lines, and property boundaries is determined based on maintaining public safety.</u> The eastern-most end of Talbert Lane is the only public road adjacent to or near the proposed project WTG area. Only the most westerly WTG <u>siting area</u> closest to Talbert Lane is expected to be <u>potentially</u> within 3 times the WTG turbine <u>turbine</u> height from a public roadway. Otherwise, a <u>All of the Phase 3 WTGs are</u> would be <u>located to maintain a minimum setback from adjacent public roads rights-of-way, which is 3 times the WTG turbine height (for a 150-meter turbine height, this would be 450 meters or 1,476 feet), as specified by the Solano County Wind Turbine Siting Plan. If a setback of less than 3 times the WTG height is required to optimize the WTG siting, a minimum setback of 1.25 times the calculated maximum blade throw will be used. The calculation methodology shall be consistent with that used in the Final EIR (FEIR), Shiloh II Wind</u></p>

SMUD Solano Phase 3 Project Recirculated Final EIR Response to Comments

Comment	Response
	<p>Plant Project (Ecology and Environment, Inc., 2007). The WTGs analyzed in the Shiloh II EIR (the General Electric [GE] 1.5sl and the REpower MM92) are two of the WTGs within the range of WTGs analyzed in this EIR for the Phase 3 project. They are also typical of the size and rotational speed of the range of WTGs identified in this EIR for the Phase 3 project. Thus, if one of these WTG types were chosen for the project, the maximum blade throw and associated minimum setback distances for the Phase 3 project would be the same as those calculated and presented in the Shiloh II EIR (for the same tower height and base elevation relative to the potential impact zone). For example, the minimum safety setbacks for the GE 1.5sl and the REpower MM92 are 619 feet and 678 feet, respectively. If another WTG configuration, other than one of these two, is chosen (from within the parameters described and analyzed in this EIR) the calculated blade throw times a factor of 1.25 will be used as the minimum setback.</p> <p>Additionally, on page 2-11, paragraphs 1 and 2 have been revised as follows:</p> <ul style="list-style-type: none"> Distances from transmission lines (safety related). The WTGs are (including the blades) would be located to maintain <u>entirely outside of the transmission line easement and no closer than a minimum safety setback distance</u> from adjacent transmission lines <u>and support structures</u> that is 1.25 times the maximum blade throw distance. <u>The minimum safety setback calculation methodology shall be consistent with that used in the Final EIR (FEIR), Shiloh II Wind Plant Project (Ecology and Environment, Inc., 2007). The WTGs analyzed in the Shiloh II EIR (the General Electric [GE] 1.5sl and the REpower MM92) are two of the WTGs within the range of WTGs analyzed in this EIR for the Phase 3 project. They are also typical of the size and rotational speed of the range of WTGs identified in this EIR for the Phase 3 project. Thus, if one of these WTG types were chosen for the project, the maximum blade throw and associated minimum setback distances for the Phase 3 project would be the same as</u>

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	<p><u>those calculated and presented in the Shiloh II EIR (for the same tower height and base elevation relative to the potential transmission line or support structure's impact zone). For example, the minimum safety setbacks for the GE 1.5sl and the REpower MM92 are 619 feet and 678 feet, respectively. If another WTG configuration, other than one of these two, is chosen (from within the parameters described and analyzed in this EIR), the calculated blade throw times a factor of 1.25 will be used as the minimum setback. For a discussion of the calculation process, see the proceeding bullet point.</u></p> <ul style="list-style-type: none"> Distance from property boundaries (safety related). Except for the eastern-most project property boundary line, there are no residences or other sensitive land uses along any of the projects property boundary lines. The three WTG siting areas closest to the eastern-most property line have been removed from consideration in this EIR. The remaining WTG siting areas nearest to the eastern-most property line are <u>would be</u> more than 3 times the WTG turbine height from the property line. Elsewhere, because there are no residences or other sensitive land uses along any of the other projects' property boundary lines, WTGs are <u>would be</u> located to maintain a minimum setback from the property boundaries adjacent to the project boundary of 1.25 times the calculated maximum blade throw distance for the particular WTG selected. The calculation methodology would be the same as that described for public road overhead transmission line setbacks, above. <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>C-7 The nearest current residence is 5,331 feet from the nearest project WTG siting area and 2,817 feet from the project boundary. The distances stated in Chapter 2 and Chapter 4 have been revised to clarify the distances and address the comment.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>

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<p>last scheduled for adoption by the Air District's Board of Directors on January 6, 2010. In the event the standards were not adopted at the last Board meeting, the BAAQMD has typically recommended adherence to their recommended thresholds and, upon their adoption, will require compliance for any EIR that has not yet been certified.</p>	<p>C-8 SMUD agrees that the 2008 General Plan provides the current noise standards. As stated in response to comment C-5 above, all references in the EIR to the 1987 Siting Plan have been revised for clarity.</p>
<p>13. Page 4.4-10 – Midway on this page, the following statement, "There are no sensitive receptors in the immediate project area," is inconsistent with section 4.4.23 on page 4.4-6, which references the location of a residence approximately 1,200 feet from one of the proposed WTGs.</p>	<p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>
<p>14. Page 4.5-36 – Last paragraph – The statement indicating that the most recent information on bird and bat monitoring is only available in the Shiloh and Montezuma Wind EIRs is incorrect. The most recent and appropriate data, which has been available to SMUD, is from the three years of post-construction monitoring at the Shiloh I site, which should be incorporated into the EIR, either in place of, or in addition to, the data from High Winds.</p>	<p>C-9 Corrections have been made to Figures 2-4, 4.3-1, and 4.10-1, alternative 1, 2, and 3. These figures and provisions are now labeled correctly and reference to an Alternative 4 has been removed.</p>
<p>15. Page 4.5-39 thru -46 – The bird and bat mortality analyses, including future mortality predictions, are based on a combination of the earlier High Winds data and pre-construction predictions from the Montezuma Wind EIR that was not certified, and is, therefore, significantly outdated and/or substandard compared to the more recent data available from three years of post-construction monitoring at the Shiloh I site. As indicated in the third-year/final study for Shiloh I, higher bird carcasses and mortality rates were found at the Shiloh I, presumably due to greater searcher efficiency protocols followed and other factors.</p>	<p>C-10 Corrections have been made to Figures 4.3-1 and 4.5-2 to remove references to 230kV lines.</p>
<p>16. Page 4.5-45 – 2nd to last paragraph – The observance of the injured golden eagle, which was found at the non-operating Phase 2 site and ultimately euthanized, is important to assessing the full avian impacts and mitigation. A completion date and availability for the study where this injury and other avian mortality was observed should be identified in the EIR.</p>	<p>C-11 When the original air quality analysis was authored in 2007 for the SMUD Solano Phase 3 EIR, senior planners from YSAQMD and BAAQMD agreed that Phase 3 project fell under the jurisdiction of both YSAQMD and BAAQMD (Appendix I). With the agreement of the senior planners, the more stringent YSAQMD requirements were used for the air quality analysis. In January 2010, the BAAQMD Board elected to postpone consideration of the BAAQMD Draft Guidelines until June 2010. The current version of the Draft Guidelines contains thresholds of significance that are now more stringent than YSAQMD's requirements. Consistent with our previous practice of using the more stringent requirements, the air quality analysis section of the EIR is updated to reflect the more stringent draft BAAQMD thresholds of significance. Section 4.4 Air Quality has been updated to reflect these changes.</p>
<p>17. Page 4.5-49 and p. 4.5-61 – CTS – The EIR should disclose two confirmed CTS sitings recorded within the past several years at separate locations south of Highway 12 in the Montezuma Hills area, much closer to the project than the sitings reported in the EIR. One was a deceased adult and the other a living larvae. Both have been reported to the CNDDB.</p>	<p>C-12 As stated in response to comment C-11, the air quality analysis section of the EIR is updated to reflect the more stringent BAAQMD thresholds of significance. The updated analysis includes quantification of greenhouse gas (GHG) emissions in the context of BAAQMD's draft significance thresholds.</p>
<p>18. Page 4.5-55 – Proposed Mitigation BIO-5a (bird/bat mortality monitoring) – This mitigation measure should be amended to address the following:</p>	<p>C-13 As stated in response to comment C-7, the nearest current residence is 5,331 feet from the nearest project WTG siting area. The distances stated in Chapter 2 and Chapter 4, have been revised to clarify the distances and address the comment.</p>
<p>a) The frequency of proposed monitoring surveys for three years should be clarified so that they surveying occurs more than once annually, i.e., while the reporting may be annually, the actual surveying should be far more frequent for each year of monitoring.</p>	
<p>b) At the conclusion of each year of monitoring, an annual report should be furnished to the resource agencies and made available to the Department of Resource Management and Solano County TAC for public review.</p>	
<p>c) This mitigation measure, incorporating the modifications requested above, should be correctly reflected in the Mitigation Monitoring Plan.</p>	
<p>19. Page 4.5-56 – Last paragraph – As a correction, contrary to the statement in the last paragraph, the Department of Resource Management has repeatedly requested that SMUD undertake the three years of post-construction avian mortality monitoring studies, not one year.</p>	
<p>20. Page 4.5-57 – Proposed Mitigation BIO-5b, regarding offsite mitigation, should be amended to address the following:</p>	

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	<p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>
C-14	<p>The commenter is correct. The statement that “the most recent information on bird and bat monitoring is only available in the Shiloh and Montezuma Wind EIRs” has been changed to reflect the recently available data and analysis from Curry and Kerlinger, Inc., 2009 post-construction avian monitoring at the Shiloh I site, in addition to the data currently included in the RDEIR.</p>
C-15	<p>The bird and bat mortality analysis, including future mortality predictions, are based on a combination of the earlier High Winds Project data and preconstruction predictions from the Montezuma Wind Project and the Shiloh II EIRs. Prior to distribution of the SMUD Phase 3 RDEIR, the above documents represented the most up-to-date information regarding bird and bat mortality in the Montezuma Hills WRA. As previously noted, SMUD received the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project after distribution of the Solano Wind Project Phase 3 RDEIR. The information from the Shiloh I three-year post-construction avian monitoring study has been added to the analysis, including the future mortality predictions in Section 4.5.4, Impact BIO-5.</p>
C-16	<p>An explanation of the circumstances of Burleson Consulting, Inc.’s (Burleson) find and date of the incident are included in the following paragraph, which has been added to Impact BIO-5:</p> <p style="padding-left: 40px;"><u>The injured golden eagle (Aquila chrysaetos) was included in Burleson Consulting, Inc.’s Third and Fourth Quarter Summary for the Sacramento Municipal Utility District Avian and Bat Mortality Monitoring, Solano Wind Project, Solano County, California, dated August 19, 2009. The injured golden eagle was an incidental find by maintenance crews in late April 2009 and reported to SMUD. The SMUD’s Phase 2 project’s turbines were not operating from January through April 2009, due to the cable replacement and substation upgrades.</u></p>
C-17	<p>SMUD updated its search of the California Natural Diversity</p>

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	<p>Database (CNDDDB) for the nearest recorded locations of California tiger salamander (CTS) south of Highway 12 in the Montezuma Hills area. The results of the January 5, 2010, CNDDDB search are included in the RFEIR and show CTS locations south of Highway 12 in a roughly 10 plus-mile radius of the Phase 3 project boundary. This search revealed a total of 36 CTS sightings south of Highway 12 within the roughly 10-mile radius, and the nearest recorded occurrence of CTS to the south is 3.1 miles from the project boundary.</p> <p>C-18 Mitigation BIO-5a incorporates into text the following:</p> <p>C-18a SMUD considers the project area to fall within California Energy Commission (CEC) Category 1, which would require only one year of monitoring; however, this is not to say that additional years of study may not be warranted nor needed in the WRA, and future studies should be conducted by other wind developers. Nonetheless, revised Mitigation BIO-5a make clear that the project will include three years of avian mortality monitoring following commissioning of the project. Revised Mitigation BIO-5a in the RFEIR outlines the avian mortality monitoring program. These surveys will be conduct weekly. This is consistent with the monitoring plans for other projects in the area. Furthermore, SMUD will participate in a Technical Advisory Committee (TAC) as described on page 4.5-55 of the RDEIR. This TAC will involve representatives of the various environmental agencies and wind developers in the Montezuma Hills, with the goal of identifying trends in avian fatality and designing and implementing mitigation measures to reduce avian mortality.</p> <p>C-18b The RFEIR has been updated to reflect the request of the commenter. SMUD will distribute the annual avian monitoring report to the resource agencies and make the report available to the Department of Resource Management and the Solano County TAC at the conclusion of each year. The Avian Mortality Monitoring Study will follow the methodology of the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project Solano County, California Final Report, October 2009 (Curry and</p>

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<p>a) An explanation is missing as to how exactly the range of 68 to 107 acres of mitigation land was derived. While the mitigation ration (1:1) of land to total rotor swept area is clear, SMUD has not specified the varied quantities of turbines associated with each of the eight potential wind turbine models, which would enable independent verification of the stated range of potential mitigation acreages.</p>	<p>C-18c Kerlinger, LLC, 2009), consistent with the standardized guidelines outlined by the National Wind Coordinating Committee (Anderson et al., 1999).</p>
<p>b) The second paragraph seems to contradict the first paragraph on this page, regarding the proposed location of offsite mitigation land. As previously commented on the FEIR, based on direction from the resource agencies, the mitigation land must be provided outside of, but not immediately adjacent to, the WRA and must be located elsewhere within Solano County.</p>	<p>C-19 The mitigation measures above are correctly reflected and incorporated in the Mitigation Monitoring Plan.</p>
<p>c) The Department of Resource Management strongly objects to off-site mitigation that is anything less than permanent and non-revocable. The mitigation obligation should not be rescinded in the event that the project is decommissioned and removed.</p>	<p>Comment noted. The last paragraph of Mitigation BIO-5a has been corrected to read as follows: Based on these criteria, SMUD considers the project area to be Category 1a. <u>Although one year of post-construction monitoring is warranted as requested sufficient in light of requests from the Solano County Department of Resource Management, three years of bird and bat mortality studies will be performed.</u></p>
<p>d) This mitigation measure, incorporating the modifications requested above, should be correctly reflected in the Mitigation Monitoring Plan.</p>	<p>Mitigation BIO-5a in the RFEIR outlines the avian mortality monitoring program.</p>
<p>21. Page 4.8-20, Impact HAZ-6 (Radar interference) and page 4.13-11, Impact TRA-4 (impact to aviation patterns) –no such determination is possible until</p> <p>The RDEIR should disclose the Cooperative Research and Development Agreement (CRADA) currently underway between the U.S. Air Force and other federal agencies, SMUD and other wind developers. The CRADA was established specifically to determine the effects of the subject project together with the other two currently pending wind projects in the Montezuma Hills, Montezuma Wind and Shiloh III, on the Travis AFB radar systems and airspace safety. And, until the CRADA has been completed and its findings are both known and support SMUD's determination that impacts HAZ-6 and TRA-4 are less than significant, any such determination by SMUD is unsubstantiated. Therefore, the EIR should not be certified until the CRADA process verifies that radar issues at Travis AFB with respect to the subject project have been resolved to satisfaction of Travis AFB.</p>	<p>The commenter does not identify any new impact or mitigation for the projected, and no further change to the EIR is required.</p>
<p>22. Page 4.10-2 & 4.10-5 – General Plan, Zoning Ordinance, and Wind Turbine Siting Plan:</p> <p>a) Section 4.10.1.2 including Figure 4.10-1 incorrectly state that the land use designation for a portion of the subject property is "Extensive Agriculture." The correct designation is "Agricultural." The distinction between Intensive and Extensive Agricultural lands was eliminated with the 2008 General Plan. Also, to be clear, I-WD, which is referenced in this section as a General Plan designation is a zoning classification only; the name of the corresponding General Plan designation is Water Dependent Industrial (not I-WD).</p>	<p>C-20 Mitigation BIO-5b incorporates into text the following:</p>
<p>b) The referenced zoning classification for the property is incorrect. The property is zoned Exclusive Agricultural, A-160, not I-WD, except possibly for one parcel (APN 0090-180-050), which was previously identified as part of the project area according to Table 2-1 in the FEIR, but otherwise appears outside the current project boundaries identified in the RDEIR. Most of the project that was zoned I-WD comprised the 411 acres that was removed in accordance with the revised project description.</p>	<p>C-20a An explanation as to how the range of 68 to 107 acres of mitigation land was derived to enable independent verification of the stated range of potential mitigation acreages has been added as a third paragraph of Mitigation BIO-5b, as follows:</p>
<p>c) As previously commented, any reference to the Solano County Wind Turbine Siting Plan, including the setback discussion in this section, is outdated, as the Siting Plan was replaced by the 2008 General Plan and is no longer in effect.</p>	<p><u>To calculate the necessary mitigation acreage, SMUD identified eight types of turbines under consideration for potential project WTGs and the general range required for the build out of 128 MWs (112.5 MWs for the 1.5-MW units) of net generating capacity for the project. As specified on page 2-12, the build-out of net generating capacity for the project would require 75 units if the 1.5-MW units (the smallest WTGs being considered) would be installed or as few as 36 units if the 3.6-MW units (the largest WTGs being considered) would be installed. Table 2-3 Specification of Turbines, page 2-12, provides information on the representative sample of manufactures that can supply the quantity of WTGs required for the project. The MWs per turbine can be determined by dividing the kilowatts per turbine by 1,000</u></p>

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	<p><u>for each turbine type. This table also identifies the rotor swept area for each turbine type. The rotor swept area can be calculated by using the value for each turbine type and the number of turbines of each of the eight potential WTG model types.</u></p> <p><u>The range of acres of mitigation land represents the low of 68 acres using 1.5-MW WTGs and the high of 107 acres using 3.6-MW WTGs. SMUD's preference is to use larger WTGs, available from wind turbine manufactures such as Vestas, Siemens, or Clipper; however, actual selection will depend on responses to a forthcoming request for proposal for the project.</u></p> <p>This conservation land or easement will meet the following requirements.</p>
	<p>C-20b SMUD has clarified the location of mitigation land by the second sentence in paragraph two in Mitigation BIO-5b of the RDEIR. Mitigation land will be located outside of, but not immediately adjacent to, the WRA and will be located elsewhere in Solano County, and is reflected in the language used for Mitigation BIO-5b, Section 4.5.5.</p>
	<p>C-20c SMUD notes the Department of Resource Managements objection to off-site mitigation that is anything less than permanent and non-revocable. SMUD's RFEIR mitigation measures require off-site mitigation land to support and enhance raptor populations, based on those certified in the FEIR for the Shiloh II Project (2007) prepared for the Solano County Department of Resource Management, submitted by Ecology and Environment, Inc. (See Shiloh II FEIR (2007); see also section 4.5.5, Mitigation BIO-5b of the Solano Wind Phase 3 RFEIR.).</p>
	<p>C-20d Comment noted. Mitigation measures incorporating the modifications discussed above have been incorporated into the Mitigation Monitoring Plan for the RFEIR.</p>
	<p>C-21 As noted in response to comment A-1, the Department of the Air Force and Travis AFB have withdrawn the previous comments to the Solano Wind Phase 3 project RDEIR. A discussion of CRADA results has been incorporated into the relevant sections of the</p>

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	<p>RFEIR, and no further changes to the EIR are required.</p> <p>C-22a SMUD agrees that the predominant land use designation for the project area is “Agriculture.” However, a 1,300-acre parcel owned by Greenport Energy Park LLC within the project boundary is designated as Water Dependent Industrial (I-WD) in the 2008 General Plan. The zoning classification for all project lands is “Exclusive Agriculture” (A-160). No project lands are currently zoned I-WD. Section 4.10.1.2, paragraphs 2 and 4, have been revised as follows:</p> <p style="padding-left: 40px;">The Solano County General Plan identifies goals, policies, and implementation measures to guide the development and conservation of natural resources within the county on a long-term basis. The General Plan designates the project area as Extensive Agriculture and I-WD Water Dependent Industrial. The intent of the Extensive Agriculture designation is to protect productive agricultural land from the intrusion of non-agricultural development. The purpose of the I-WD Water Dependent Industrial designation is to accommodate industrial development along the Sacramento River as provided for in the Collinsville-Montezuma Hills Area Plan.</p> <p>And:</p> <p style="padding-left: 40px;">The Solano County Zoning Ordinance designates a 1,300-acre portion of the project area as being a I-WD District classifies the entire project area as “Exclusive Agriculture” (A-160) including a 1,300-acre parcel owned by Greenport Energy Park LLC. Wind energy development is a consistent use with the “Exclusive Agriculture” zoning classification. An adjacent 411-acre parcel owned by SMUD, but not included in the project, is currently zoned I-WD. The purpose of this district is to reserve waterfront lands for large-scale, water-dependent industries to ensure an that there is efficient use of waterfront industrial sites.</p> <p>Figure 4.10-1 has been revised accordingly.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>

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<p style="text-align: right;">Mr. Jim Field Page 5 of 5</p> <p>23. Page 4.12-8 – Mitigation PSU-2 (interference with microwave transmissions) - The referenced evaluation of WTG interference with existing microwave and fixed station RF transmission facilities should be cited and made available for public review. Conclusions by SMUD of a less than significant impact and no further mitigation requirements being needed cannot be corroborated in the absence of the requested citations or studies. } C-23</p> <p>24. Page 6-3 – Mitigation Monitoring Plan (Table 6-1):</p> <p>a) Mitigation BIO-5a in this table is inconsistent with the measure described in page 4.5-55. For instance, only one final bird mortality report is referenced, versus each of three years of annual monitoring reports. } C-24a</p> <p>b) Mitigation BIO-5b in this table is inconsistent with the same measure described in page 4.5-57. For instance, the document has not previously referenced that SMUD intends to convey the conservation land or easement to CDFG or other third party. } C-24b</p> <p>Thank you for the opportunity to comment on the RDEIR and we look forward to working with SMUD on the proposed project. If you have any questions regarding these comments, please contact me or contract planner Ken Solomon at 707-784-6765.</p> <p>Sincerely yours,</p>  <p>Michael Yankovich</p> <p>Cc: Birgitta Corsello</p>	<p>C-22b As stated in response to comment C-23a above, SMUD agrees that the land use designations for project lands are Agriculture and Water Dependant Industrial, and the zoning classification for all project lands is “Exclusive Agriculture.” The parcel identified as APN 0090-180-050 was identified as being associated with the project in the previous FEIR published in December 2007. However, APN 0090-180-050 is not part of the project site, and no Phase 3 WTGs will be constructed on this parcel. No parcels currently zoned I-WD are within the project boundaries.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p> <p>C-22c As stated in response to comment C-5, all references in the EIR to the 1987 Siting Plan have been clarified.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>C-23 Mitigation PSU-2 is revised to incorporate the requested references as follows:</p> <p>Mitigation PSU-2: Evaluate the potential for WTG interference with microwave transmissions.</p> <p>An evaluation of possible WTG interference with existing microwave and fixed station RF transmitting facilities was conducted (<u>Evans & Associates, 2007</u>). The study evaluated existing FCC licensed facilities, compared their locations to the planned WTG locations, and determined possible impacts to the signals. Additionally, SMUD contacted the NTIA regarding the project. The NTIA advised SMUD of U.S. Coast Guard concerns regarding possible WTG interference with one signal path. Based on this study and NTIA comments, WTGs will be sited to avoid the microwave and RF signal paths.</p> <p>Implementation of this mitigation measure will reduce potential impacts to microwave transmissions to a less than significant level. No further mitigation measures are required.</p> <p>Please note that Evans & Associates, 2007 reference has been corrected in the RDEIR Chapter 7 Summary of References/ Persons</p>

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	<p>and Agencies Contacted Revisions as follows:</p> <p>Evans & Associates, 2008. Evans Associates Report Recommendations, July 1, 2008</p> <p>Evans & Associates, 2007. Engineering Report Concerning the Effects Upon FCC Licensed RF Facilities Due to the Construction of the SMUD-Solano Phase 3 Wind Project in Solano County, California, September 21, 2007.</p> <p>The Evans & Associated 2007 report has been provided as Appendix J to the document.</p> <p>A memo updating the information provided in the 2007 Evans & Associated report written in January 2010 has been attached in Appendix J.</p>
	<p>C-24a The comment is addressed in revisions to Mitigation BIO 5a: Implements Bird and Bat Mortality Monitoring Program to determine if mortality is occurring in the RFEIR and the Mitigation Monitoring Plan has been updated to reflect annual reporting for each year for three consecutive years.</p>
	<p>C-24b Mitigation BIO-5b: Provide off-site mitigation land to support and enhance raptor populations, is now consistent with Table 6-1.</p>

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<div style="text-align: center;">  </div> <p>January 14, 2010</p> <p>Lonn Maier, Environmental Project Manager Sacramento Municipal Utility District P.O. Box 15830 MS B203 Sacramento, CA 95852 Phone: (916) 732-6566 Fax: (916) 732-6890 lmaier@smud.org</p> <p>Re: SMUD Solano Wind Development Phase 3 Project Recirculated Draft EIR 2009</p> <p>Dear Mr. Maier:</p> <p>Tuleyome is a regional not-for-profit conservation organization based in Woodland, CA, working to protect our wild heritage and our agricultural heritage in the Northern Inner Coast Range and Western Sacramento Valley for existing and future generations. We are supportive and appreciative of SMUD's efforts to increase their renewable energy portfolio, particularly when developed close to the SMUD service area. } D-1</p> <p>The Solano Wind Project Phase 3 consists of installing up to 75 wind-turbine generators and associated facilities in the Montezuma Hills region of southern Solano County, southwest of the town of Rio Vista. It will add an additional maximum of 128 Megawatts (MW) to Phase 1 and 2, totaling up to 230 MW of clean renewable power.</p> <p>Wind power has benefits and impacts, which are discussed in the Recirculated EIR. The major benefit is a renewable source of energy, obtained while lowering greenhouse gas emissions. Bird and bat kills are a major negative impact. We appreciate SMUD's efforts to minimize the impact and to mitigate. We support the proposal to provide significant on-going funding to the California Raptor Center at UC Davis for off-site mitigation. It is appropriate and needed. } D-2</p> <p>There have been issues with the Wind Development Project and the Travis Airbase radar system. We support the ongoing efforts necessary to resolve this problem. } D-3</p> <p>We thank SMUD for their commitment and leadership on renewable energy.</p> <p>Sincerely,</p>  <p>Bob Schneider Senior Policy Director 530-304-6215 bschneider@tuleyome.org</p> <div style="background-color: #4b618c; color: white; padding: 5px; font-size: small;"> 607 NORTH STREET WOODLAND, CA 95695 PHONE: (530) 350-2599 FAX: (530) 350-2729 WWW.TULEYOME.ORG </div>	<div style="text-align: center; font-size: 2em; border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 0 auto 20px auto;">D</div> <p>D-1 SMUD appreciates Tuleyome's comments on the Solano Wind Project Phase 3 RDEIR. SMUD looks forward to the commenter's continued support for SMUD's efforts to increase its renewable energy portfolio.</p> <p>D-2 SMUD analyzed the potential impacts to bat and bird species from the operation of wind turbines at pages 4.5-35 to 4.5-46 of the RDEIR. SMUD looks forward to providing funding to the California Raptor Center at University of California (UC) Davis to enhance raptor populations off site. The commenter has not identified any new impacts or mitigation for the project, and no further changes to the EIR are required.</p> <p>D-3 As noted in response to comment A-1, the Department of the Air Force and Travis AFB have withdrawn the previous comments to the Solano Wind Project Phase 3 RDEIR. A discussion of CRADA results has been incorporated into the relevant sections of the EIR, and no further changes to the EIR are required.</p>

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<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 45%;">  <p>State of California - Department of Fish and Game DEPARTMENT OF FISH AND GAME Bay Delta Region Post Office Box 47 Yountville, California 94599 (707) 944-5500 www.dfg.ca.gov</p> </div> <div style="width: 45%; text-align: right;">  <p>ARNOLD SCHWARZENEGGER, Governor JOHN MCCAMMAN, Acting Director</p> </div> </div> <div style="text-align: center; margin-top: 20px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 0 auto;"> E </div> </div> <p style="margin-top: 20px;">January 14, 2010</p> <p>Mr. James Field Sacramento Municipal Utility District Post Office Box 15830 MS B203 Sacramento, CA 95852 Fax: (916) 732-6890</p> <p>Dear Mr. Field:</p> <p>Subject: Solano Wind Project Phase 3, Recirculated Draft Environmental Impact Report, SCH #2006012017, City of Rio Vista/Community of Collinsville, Solano County</p> <p>The Solano Wind Project Phase 3 (Project) is located within the Collinsville-Montezuma Hills Wind Resource Area (WRA) in the southern portion of Solano County. The WRA is north of the confluence of the Sacramento and San Joaquin rivers, approximately 6 miles west of the City of Rio Vista, and 16 miles southeast of the City of Fairfield. The Project footprint has been reduced from the initial proposal of 4,655 acres to 4,244 acres of the WRA and is located south of Montezuma Hills Road and east of Stratton Lane. The Project is bordered to the south and southeast by the Sacramento River. The Montezuma Hills area consists of a series of gently rolling hills of similar size. The hills have a relatively constant crest elevation, generally between 150 and 250 feet above mean sea level. The Project area is designated for agricultural use (dry-land farming and grazing) and is sparsely populated.</p> <p>The Project Sponsor, Sacramento Metropolitan Utility District (Applicant), proposes to construct up to 75 wind turbine generators (WTG) on the Project site, reduced from a maximum of 84 WTG previously proposed. The Project includes the construction and operation of wind turbine generators, an associated underground collection system, access roads, two meteorological towers, an operation and maintenance building, and related facilities. These WTGs would be south of and adjacent to the previously constructed Phase 1 and 2 Solano Wind projects. The Project would have an energy-installed or production capacity of up to 128 megawatts (MW) and could be integrated with the ongoing Phase 1 and 2 projects, which presently are rated to potentially provide 102 MW. The individual WTGs would have a maximum height of 151 meters (495 feet), a maximum 105-meter (345-foot) tower, and a maximum rotor diameter of 107 meters (351 feet). The Project would expand the use of the renewable wind resource in the WRA to meet the City of Sacramento's energy needs and assist the Applicant in achieving their goal of supplying 23% of all retail load obligations with renewable resources by the year 2011.</p> <p>A Draft Environmental Impact Report (EIR) was circulated for this Project in 2007, followed by a Final Environmental Impact Report. This Recirculated Draft Environmental Impact Report (RDEIR) presents new available information and evaluates specific environmental impacts associated with air traffic and air traffic control radar elements to the Solano Wind</p> <p style="text-align: center;"><i>Conserving California's Wildlife Since 1870</i></p>	

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<p>Mr. James Field January 14, 2010 Page 2</p> <p>Project Phase 3. This RDEIR includes only the revised portions of the Draft EIR circulated in September 2007. Revised Project analysis or new information regarding potential impacts on biological resources provide the opportunity for the Department of Fish and Game (DFG) to comment on this RDEIR.</p> <p>DFG previously provided comments on both the Draft and Final EIRs for this Project in letters dated November 7, 2007, and January 10, 2008. Although it is not typical for DFG to provide comments on an FEIR, in this case DFG was compelled to provide such comments because the Applicant's responses to comments and subsequent changes to the Final EIR did not adequately address concerns expressed by DFG.</p> <p>The Applicant has incorporated some of DFG's previous recommendations into the RDEIR. Changes include the elimination of overhead collection lines, completing pre-construction surveys for California tiger salamander (CTS), and removing three turbines near the Solano Land Trust property. Other changes include providing up to three years post-construction monitoring and providing mitigation land at a ratio of 1:1 for a rotor swept area at a location removed from the Project site.</p> <p>Despite these changes, significant deficiencies remain in the impact analysis and minimization and mitigation proposal for the Project as described in the RDEIR.</p> <p>DFG is identified as a Trustee Agency pursuant to the California Environmental Quality Act (CEQA) Section 15386 and is responsible for the conservation, protection, and management of the State's biological resources. DFG supports the development of renewable energy resources for projects which are in compliance with existing State and Federal Laws and Acts and when measures are implemented which effectively avoid or minimize impacts to native species and their habitats and sufficiently mitigate for unavoidable impacts to ensure that they do not preclude conservation of these biological resources.</p> <p>PROJECT COMPONENTS Section 2.5 <i>2.5.1.1 Towers</i></p> <p>DFG previously requested that the Applicant specify what the density of turbines will be in the Project area. The current document continues to give a range of sizes and numbers of WTGs which may be installed. The impact analysis is based on net generating capacity, which fails to recognize the difference in effects between the installation of 75 smaller WTGs as compared to 36 larger WTGs. The RDEIR has failed to analyze the effects associated with installation and operation of these various numbers and sizes of WTGs. This information must be included in the public disclosure phase of Project review so that the efficacy of any proposed minimization and mitigation can be evaluated and recommendations made as necessary.</p> <p><i>2.5.1.5 Safety, Lighting, and Grounding</i></p> <p>DFG previously recommended that plans for lighting should balance Federal Aviation Administration (FAA) requirements with protection of birds and bats. These recommendations include:</p>	<p>E-1 SMUD thanks the California Department of Fish and Game (CDFG) for providing comments on the RDEIR and appreciates the opportunity to address their concerns and improve the final document.</p> <p>An explanation of the rationale for providing the range of sizes and numbers of WTGs installed and calculations providing the information requested is provided in response to comment C-20 above. SMUD has analyzed the potential effects associated with installation and operation of the range of numbers and sizes of WTGs. Although CEQA does not require an environmental impact report to conduct a "worst-case" analysis, this was in effect done for this project by encompassing the high and low ends of the range of potential impacts in the analysis.</p> <p>E-2 SMUD has noted CDFG's current and previous recommendations for lights on towers and with respect to protection of birds and bats. SMUD has no authority to circumvent the Federal Aviation Administration (FAA) statutory authority for operating federally mandated tower lights compatible with avian and bat protection.</p> <p>Curry and Kerlinger, LLC, 2009 noted in the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, as with most other turbines facilities across the United States, the fatality rate of night migrants was low at Shiloh I facility during the three years of study. The numbers were especially small in comparison with fatality rates of these birds at taller, guyed communication towers in the Midwestern and eastern United States where fatalities involving hundreds or even thousands of birds in a single night have occurred. Those towers are equipped with two types of FAA lighting (steady burning and flashing lights), multiple sets of guy wires, and are nearly 500 feet (152 m) tall.</p> <p>An examination of the fatality rates of night migrating birds (songbirds, rails, common moorhens, coots, and herons) and bat fatalities found during fall (August through November) and spring (mid-February through May) at turbines with red flashing FAA lights versus turbines without such red lights did not reveal significant difference. There was almost no difference in fatality</p>

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	<p>rates of night migrant species and non-night migrant species at lit towers versus unlit. Among the fatalities studied for 50 night migrating bird species (39 songbirds and water birds), 34% were found at turbines equipped with flashing red lights as opposed to 66% being found at turbines that did not have FAA lights. These percentages are similar to the percentages of towers with and without FAA lights (36% had FAA lights and 64% did not have lights). A Chi-square test revealed no deviation from expected numbers of night migrant fatalities at lit turbines compared to unlit turbines. If the red flashing lights attracted birds to turbines, a disproportionately greater number of these fatalities would have been found at turbines with lights, which is not the case (Curry & Kerlinger, LLC, 2009).</p> <p>A similar examination of the numbers of bat fatalities at turbines with FAA lights versus turbines without such lights reveals a similar pattern. Of all turbine-related bat fatalities which occurred during the fall or spring migrations, 38% were found at turbines with FAA lights and 62% were found at turbines without such lights. As for the birds discussed above, these proportions do not deviate from those expected if bats collided with towers randomly.</p> <p>As a more local example, the Shiloh I Wind Power Project Post-Construction Avian Monitoring Study concluded for both bats and birds, there is no evidence that FAA lighting in the form of L-864 and L-810 flashing red lights attracted birds to towers, and there is no evidence that the presence of those lights cause large scale fatality events at wind turbines.</p> <p>The fact that the Shiloh I and most other western turbines are 339.5 feet (103.5 m) in height, lack guy wires, and only have flashing red strobe-like lights may explain the low rate of night migrant fatalities at those turbines (Curry & Kerlinger, LLC, 2009). Gerhring et al. 2009 has recently demonstrated that flashing red, strobe-like lights (L-864) of the type recommended by the FAA and most often used on wind turbines do not appear to attract night migrants like the utilization of the same lights (L-864) in combination with L-810 steady burning red lights. In the Shiloh I project, the L-810 units</p>

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<p>Mr. James Field January 14, 2010 Page 3</p> <ul style="list-style-type: none"> • Use flashing lights with the minimum "on" period on turbines. • Keep lighting at both operation and maintenance facilities and substations to the minimum required to meet safety and security needs. • Use white lights with sensors and switches that keep the lights off when they are not required. • Lights should be hooded and directed to minimize backscatter, reflection, skyward illumination, and illumination of areas outside of the facility or substation. <p>The RDEIR continues to require only that lighting meet FAA requirements. DFG again recommends that language be added which requires the Applicant to incorporate specific measures which minimize effects of lighting on wildlife as compatible with FAA requirements.</p> <p>BIOLOGICAL RESOURCES Section 4.5 <u>Raptor Protection</u> Include language from Fish and Game Code Section 3503, which states that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes or their nest or eggs except as otherwise provided by Fish and Game Code or other adopted regulation.</p> <p><u>Fully Protected Species</u> Include golden eagle in the list of DFG fully protected species.</p> <p>Include a discussion of Lake or Streambed Alteration Agreements in the Regulatory Setting Section of the Biological Resources Section</p> <p><i>BIO-1, Impact and Mitigation, 4.5.3 Significance Criteria</i> The Summary of Biological Resources Revisions states that the RDEIR provides additional information to clarify the assertion that there will be no loss of foraging habitat and that the degradation of foraging habitat will not be significant. DFG continues to disagree with the assertions that foraging habitat will not be impacted, that roads are not a permanent impact, and that the restoration of "temporarily" disturbed areas does require mitigation beyond the remediation of the disturbed areas.</p> <p>The Project will impact mostly agricultural lands and non-native grasslands. The RDEIR states that these areas provide foraging and nesting habitats and then errantly concludes that because DFG does not consider agricultural lands and non-native grasslands to be sensitive natural community types, the development of these communities would not impact foraging habitat. The value of an area to native species for foraging, dispersal, and nesting does not depend on its designation as a sensitive natural community. It is a well known fact, supported by local agriculturalists, that these areas serve an important role in sustaining our native wildlife populations.</p> <p>As previously stated by DFG and confirmed in the RDEIR, foraging, nesting, and dispersal habitat will be impacted and adequate mitigation must be provided.</p>	<p>were modified from steady burning to blinking lights. These results continue to suggest that wind turbines in the western United States do not appear to kill large or significant numbers of night migrants (Curry & Kerlinger, LLC, 2009).</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>E-3 SMUD has incorporated language from Fish and Game Code Section 3503, regarding the prohibition against take, possession, or destruction of any birds in the orders Falconiformes or Stigiformes or their nests or eggs except where otherwise provided by Fish and Game Code or other adopted regulation, into Section 4.5.0, Summary of Biological Resources Revisions, and Section 4.5.1.2, State.</p> <p>E-4 Golden eagle has been added to the list of examples of <i>CDFG Fully Protected Species</i>, Section 4.5.1, Subsection 4.5.1.2. Note that golden eagle was identified as fully protected in Table 4.5-1.</p> <p>E-5 A discussion of Lake or Streambed Alteration in Section 4.5.1 Regulatory Setting, in the RFEIR has been added. Also note that such a discussion appeared in the original Draft EIR.</p> <p>E-6 The RDEIR states that project implementation would result in potentially significant impacts to agricultural land and grassland without the implementation of mitigation. Impacts are both permanent and temporary. Implementing the proposed mitigation will limit the permanent conversion of foraging habitat (agriculture and grassland) to project infrastructure (e.g. roads, WTG, staging areas, operations and maintenance (O&M) buildings etc) to approximately 95 acres. Within the context of the 4,244 acres of the project, and with the implementation of Mitigation BIO-1, the loss of 95 acres of foraging habitat (approximately 2% of the project area) is not a significant adverse impact. In addition, although mitigation for this impact is not required, Mitigation Measure BIO-5b requires dedication of off-site acreage to support breeding and foraging habitat for raptors, which will have the added benefit of helping to offset the less than significant impact to foraging habitat</p>
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<p>Mr. James Field January 14, 2010 Page 4</p> <p>DFG disagrees with the assertion that roads, once completed will not result in permanent degradation of the natural community and therefore should not be considered a permanent impact. As stated in previous letters, the development of gravel roads alters the habitat from productive agricultural/grassland to a non-productive, disturbed area. The biological value of these areas is clearly diminished by the construction, use, and maintenance of these roads.</p> <p>As previously stated by DFG, constructed gravel roads are permanent impacts. Mitigation must be provided to replace the loss of function in these areas.</p> <p>The document describes areas considered temporarily disturbed to include clearing and grading for staging areas, WTG foundations, underground cable burials, and other activities. The area classified as temporarily disturbed also includes constructed gravel roads.</p> <p>The document describes temporary impacts, totaling approximately 90 acres, as lasting approximately 18 months, not including the time for the area to recover following restoration. DFG does not agree with this definition of temporary impacts. A temporary impact must last less than one season from beginning of disturbance to restoration of biological function. Most of the Project impacts are not considered temporary by DFG. Only activities which meet these criteria should be defined as temporary. The type and severity of impact will determine the amount and type of mitigation required. All impacts, temporary and permanent, require mitigation. This mitigation should be specifically described in this CEQA document.</p> <p>It is difficult to determine exact acreages of impacts based on the information provided in the RDEIR, so the following acreages are estimates. There is an estimate of 95 acres impacted (including temporary and permanent as defined by the RDEIR, which DFG does not agree with).</p> <p>Unavoidable permanent impacts should be mitigated through conservation and enhancement of suitable habitat. The conservation area needs to provide habitat benefits to the affected species at a level which will offset the loss of the impacted area. For agricultural and non-native grasslands which are not known to support listed species, minimum conservation and enhancement should be provided at a ratio of 1:1 (conserved:impacted acres). For bird and bat species this mitigation must be accomplished in areas out of the WRA, as further described below. Areas such as gravel roads where functional value is permanently diminished, should require less mitigation than permanent impacts, such as WTG pads. Long-term temporary impacts (lasting more than one season) may also require less mitigation than permanent impacts. None of the impacts as described in the REIR are self-mitigating and compensation through permanent conservation, management and funding of habitat that is commensurate with their level of effect on the landscape should be provided. DFG recommends the permanent conservation of a minimum of 95 acres to offset the 95 acres of terrestrial impacts estimated in the RDEIR.</p> <p>An analysis of the effect on foraging activities and flight behaviors of birds and bats from the installation of up to 75 WTGs should also be provided. This information can be derived</p>	<p>identified here.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>E-7 Paragraph one of Section 4.5.4, Impact BIO-1, discussing agricultural lands and non-native grasslands, is amended as follows: Agricultural lands and non-native grasslands dominate the project area. These vegetative communities provide valuable habitat for several species. Agricultural lands provide foraging habitat for golden eagle, western burrowing owl, Swainson's hawk, white-tailed kite, and peregrine falcon, while grasslands provide nesting and foraging habitat for raptors and for migrating and wintering birds. CDFG does not consider either vegetative community a sensitive natural community and, therefore, the development of wind power would not impact foraging habitat. <u>Approximately 95 acres of agriculture and non-native grassland would be converted to project infrastructure. Within the context of the entire project area (4,244 acres), the impact is less than significant.</u> In addition, no wildlife nursery sites or non-avian migration corridors have been identified within the project area. Several wetlands and drainages occur in the project area; impacts on these sensitive communities are further described under Impact BIO-2: <u>Project construction and installation could result in adverse effects to wetlands and stream habitat.</u></p> <p>E-8 SMUD will follow the methodology used in the Montezuma Wind Project Draft EIR. Section 4.5.4, Impact BIO-1, paragraph 4 of the Solano Wind Phase 3 project RDEIR (discussing areas permanently removed from future habitat), are amended as follows: Areas permanently removed from future habitat would include land needed for construction of the WTG pads (0.4 acre), meteorological towers (0.1 acre), substation expansion (maximum 2.0 acres), and the O&M building (2.0 acres), totaling less than 5 acres. <u>As noted on page 4.3-7 of the RDEIR, installation of project infrastructure would permanently convert approximately 95 acres of agricultural land and non-native grasslands into the Solano Wind Phase 3 project infrastructure. The remaining disturbed acreage will either would be</u></p>
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	<p>temporarily disturbed (and returned to pre-project conditions following construction) or reduced in habitat value (e.g., roads). This amount of land represents approximately 2 percent (95/4,244 acres) of the project area being permanently changed from agricultural (and foraging) habitat. See also response to comment E-6 regarding Mitigation Measure BIO-5b.</p>
	<p>E-9 See response to comment E-8 above. SMUD has addressed this comment with revisions to Sections 4.5.4, Impact analysis, Impact BIO-1, and 4.5.5 Mitigation Measures, Mitigation BIO-1 above.</p>
	<p>E-10 SMUD has been unable to locate a regulatory source for CDFGs definition for temporary impacts as “impacts that last less than one season from the beginning of disturbance to restoration of biological function.” However, SMUD has followed the methodology used by other wind power project EIRs in the Collinsville-Montezuma Hills Wind Resource Area (CMHWRA) including the Montezuma Wind Project, and Shiloh I and II Wind Projects. The temporary and permanent impacts are further clarified in the RFEIR. Temporary impacts were mistakenly identified as 90 acres. As noted in Section 4.3 of the RDEIR, temporary impacts total 47 acres and permanent impacts total 95 acres. Impact and Mitigation BIO-1 in the RFEIR has been corrected. In addition, the 18-month timeframe referenced by the commenter does not mean that all the areas will be disturbed for the entire 18 months—just that portions will be temporarily disturbed over the 18-month period.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>
	<p>E-11 See response to comment C-20a for an explanation for the estimated range of acres impacted. The 95 acre figure is for permanent impacts, and temporary impacts could encompass an additional 47 acres. See page 4.3-7 of the RDEIR</p> <p>Project build-out will depend on responses to a forthcoming request for proposals from turbine manufacturers and the MW capacity of those turbines produced. Larger turbines, if available, produce higher energy output and would require fewer turbines to achieve</p>

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<p>Mr. James Field January 14, 2010 Page 5</p> <p>from pre- and post-construction surveys of avian and bat use on the site. If it is shown that the site or portions of the site are being avoided by birds and bats, the diminished value as foraging, nesting, and dispersal habitat must be acknowledged and mitigation provided through habitat conservation and enhancement outside of the WRA.</p>	<p>E-12 128 MW and, therefore, impact potentially less acreage. Smaller turbines with lower energy output would require more turbines to achieve similar MW levels and, therefore, impact more acreage.</p> <p>As stated in response to comment E-6, the loss of foraging habitat, and with implementation of Mitigation Measure BIO-1, is not a significant adverse impact. The CEQA Guidelines provide that “[m]itigation measures are not required for effects which are not found to be significant.” (14 C.C.R. § 15126.4(a)(4).) Therefore, further mitigation through conservation easements is not required. Nonetheless, as described in response to comment E-6, Mitigation Measure BIO-5b helps to offset this less than significant impact.</p>
<p>Areas around turbines and along roads that have been disturbed by construction and operation activities may provide habitat for prey species such as insects and small mammals. Increases in prey availability may in turn attract raptors, birds, and bats, putting them at increased risk of collision. Construction and management practices should incorporate measures to minimize activities that would unnaturally increase the number and availability of prey in the WRA.</p>	
<p>As stated in the RDEIR, any trees removed will be replaced with the same or compatible size and species. Removal of trees shall be mitigated at a 3:1 ratio. Success criteria for tree replanting shall include a minimum 80% survival rate at the end of a 5-year management and monitoring period. Trees shall be planted on the permanently conserved area for raptors so as not to provide attractive features in the WRA. In addition, priority should be given to acquisition of conservation areas that already support large, suitable nesting trees. As previously recommended by DFG in letters submitted for this Project and as stated in the RDEIR, the land permanently conserved to offset impacts to avian and bat species should be outside of, and not adjacent to, the WRA since operation of WTG’s is known to be detrimental to birds and bats.</p>	<p>E-13 Cont’d</p> <p>E-14</p> <p>E-15</p>
<p><i>BIO-2 Mitigation, Table 6-1</i> DFG recommends that if any streams are permanently filled or impacted, the loss shall be mitigated at a 3:1 ratio. Mitigation can be accomplished by permanently preserving and enhancing in-kind stream habitat on the property being conserved for raptor populations or at a mitigation bank in Solano County. Please update Table 6-1 to reflect the new language in the RDEIR.</p>	<p>E-13 The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>E-14 See response to comment C-20c for mitigation lands outside of, and not adjacent to the WRA. This land will be permanently conserved and enhanced to offset impacts to birds and bat species.</p>
<p><i>BIO-2 Mitigation, Table 6-1</i> DFG should also be included as a Responsible Agency if there are any impacts to Fish and Game Code Section 1600 jurisdictional waterways. For any activity that will divert or obstruct the natural flow of, or change or use any material from the bed, channel, or bank (which may include associated riparian resources) of any river, stream, or lake, DFG may require a Lake and Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the Applicant. Issuance of an LSAA is subject to CEQA. DFG, as a responsible agency under CEQA, will consider the local jurisdiction’s (lead agency) Environmental Impact Report for the project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement. A Notification Package for an LSAA and Section 1600 et seq. of the Fish and Game Code can be obtained at http://www.dfg.ca.gov/habcon/1600/ or by contacting the Regional Office at (707) 944-5520. Please update Table 6-1 to reflect the new language in the RDEIR.</p>	<p>E-14 Implementation of Mitigation BIO-1 would restore areas around the turbines and along roads to preconstruction conditions. Implementation of construction and management practices in Mitigation BIO-1 and BIO-2 incorporate measures to minimize activities that might otherwise increase the availability of prey. Operations of the turbines would not increase the number of avian species or bats (see response to comment E-2); thus there would not be an increase in the risk of collision. No additional mitigation measures are warranted.</p> <p>E-15 The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>See response to comment C-20c for mitigation lands outside of, and not adjacent to the WRA, permanently conserved and enhanced to offset impacts to birds and bat species. No trees are planned to be removed. However, in the event that they are, RDEIR, p. 4.5-50 requires SMUD to provide mitigation at a 3:1 ratio “or other method available to CDFG.” Mitigation BIO-5b includes management requirements for maintaining, enhancing, or protecting trees for</p>
	<p>E-16</p> <p>E-17</p>

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<p>Mr. James Field January 14, 2010 Page 6</p> <p><i>BIO-4 Impact and Mitigation</i> As stated in the RDEIR, any active burrowing owl nests shall have a minimum 250-foot buffer from construction and staging areas from February 1 through August 31. If owls are to be passively relocated, it will occur outside of the nesting season. Burrows must be passively vacated and excavated between September 1 and January 31 only. In addition, the pre-construction surveys as described in the RDEIR have been found to be less than effective in avoiding project delays and direct impacts to burrowing owls and their nests. DFG recommends that the Project proponent coordinate with DFG for current pre-construction survey recommendations.</p> <p>DFG does not support the current proposal which requires mitigation only if less than 6.5 acres of habitat per relocated owl or pair of owls remain on the Project site. The RDEIR states that passively relocated owls will be encouraged to move to areas that are outside of the disturbance area and adjacent to a minimum of 6.5 acres of foraging habitat. It also states that all occupied burrows within a 50-meter buffer of activity will be closed.</p> <p>DFG recommends that mitigation for the loss of burrowing owl foraging and nesting habitat (grasslands) be provided off-site at a DFG-approved location on an acre-for-acre basis. We recommend that any site used for mitigation be conserved and managed for the benefit of this species in perpetuity. The RDEIR should require the mitigation site have owls or be adjacent to occupied habitat and support the natural landscape processes and fossorial mammals necessary for the site to provide breeding and foraging opportunities. Unprotected lands within the WRA will not be considered by DFG as sufficient mitigation for loss of habitat and loss of breeding opportunities due to temporary, recurring, or permanent disturbance. The RDEIR should require DFG approval of any owl eviction plan before implementation. Burrow closure in the buffer areas should be minimized in coordination with DFG.</p> <p><i>BIO-5 Impact</i> The description of impacts to special status species from WTG blades should list special-status bat species.</p> <p>It is not appropriate or accurate to compare bird strikes with buildings to bird strikes with wind turbines; the two are not analogous. In addition, the Applicant continues to compare the number of avian and bat fatalities to populations that are geographically large, suggesting that fatalities are diluted with respect to local populations. For this approach to be reasonable, the Applicant should also include an analysis of the impacts that are occurring in the same geographically-wide areas and, for that matter, within the entire Solano WRA.</p> <p>The RDEIR presents a progress report of avian use surveys in the Phase 3 Project area but does not include bat use surveys for the area. The California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (Guidelines) includes pre-permitting surveys for bat use in the Project area. These studies should be conducted, disclosed, and analyzed in the EIR.</p>	<p>restoring habitat.</p> <p>E-16 SMUD has not proposed any definite permanent stream crossings that will require fill of streams. Nonetheless, in the event that fill impacts to streams become necessary for placement of access roads or other project facilities, mitigation shall be provided at a 1:1 ratio for those stream areas permanently impacted. In response to CDFG's comments, the RDEIR has been revised to include the following mitigation requirements. BIO-2 Mitigation, Table 6-1. The following text has been added: <u>For any streams that are permanently filled or impacted, the loss shall be mitigated at a 1:1 ratio or as required in a project specific Lake or Streambed Alteration Agreement and will be reflected in the Mitigation Monitoring Plan (Chapter 6, Section 6.2.3 Plan Content, Table 6-1), as follows:</u> BIO-2 Mitigation. The following text has been added: <u>If any streams are permanently filled or impacted, the loss shall be mitigated at a 1:1 ratio or as required in a project specific Lake or Streambed Alteration Agreement.</u></p> <p>E-17 Table 6-1 was updated to reflect that CDFG is a Responsible Agency. If there is an impact to Fish and Game Code Section 1600 jurisdictional waterways, SMUD will complete the Notification Package for the Lake or Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, and obtain the permit prior to construction of the watercourse crossings. Table 6-1 has been updated to reflect the new language in the RFEIR concerning watercourse crossing impacts, mitigation measures and obtaining a LSAA before construction of watercourse crossings.</p> <p>E-18 Mitigation BIO-4a is revised to state: <u>Before construction begins, burrowing owl nesting season, winter season, and preconstruction surveys will be conducted according to the Burrowing Owl Survey Protocol and Mitigation Guidelines (California Burrowing Owl Consortium, 1993) and CDFG staff report on Burrowing Owl Mitigation (1995).</u> <u>Surveys will be conducted by qualified biologists: An area extending</u></p>
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	<p><u>500 feet from Phase 3 Potential WTG siting areas, locations of temporary and permanent roads, buried cable routes, O&M building(s), and collection line routes. A complete burrowing owl survey consists of four site visits repeated on four separate days. Site visit will be conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise.</u></p> <ul style="list-style-type: none"> • <u>Nesting season. Nesting season surveys should be conducted during the peak of breeding season, between April 15 and July 15.</u> • <u>Winter Surveys. Winter surveys should be conducted between December 1 and January 31.</u> • <u>Preconstruction surveys. Preconstruction surveys in all areas that may provide suitable nesting habitat within 500 feet of the construction corridor will be conducted no more than 30 days before the onset of ground disturbing activities. If occupied burrows are found, a qualified biologist in consultation with CDFG, will determine whether construction activities will impact occupied burrows or disrupt reproductive behavior. If it is determined that construction activities will not adversely affect occupied burrows or disrupt breeding behavior, construction can proceed without any restrictions or mitigation measures.</u>
E-19	<p>The comment misconstrues the current proposal as requiring mitigation only if less than 6.5 acres of habitat per relocated owl or pair of owls remain on the project site. Mitigation BIO-4b states “Avoidance also requires that a minimum of 6.5 acres of foraging habitat be preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single, unpaired resident bird.” Mitigation BIO-4c states “If the project will reduce suitable habitat on site below the threshold level of 6.5 acres per relocated pair or single bird, and the habitat cannot be replaced contiguously on-site, the habitat will be replaced off</p>

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	<p>site.”</p> <p>If off-site mitigation for burrowing owls is required, then SMUD will include this additional off-site acreage in the off-site acreage identified in Mitigation BIO-5b (68 to 107 acres) for supporting and enhancing raptor populations.</p> <p>E-20 Mitigation BIO-4c states that if the project will reduce suitable habitat on-site below the threshold level and the habit cannot be replaced contiguously on site, land will be purchased and/or placed in a conservation easement in perpetuity and managed to maintain suitable habitat. This will be done according to the Burrowing Owl Survey Protocol, and in consultation with CDFG. If needed, additional off-site land purchased for a conservation easement will be included in the total land purchased under Mitigation BIO-5b.</p> <p>E-21 Table 4.5-1, Special Status Wildlife Species Occurring in the Project Area, on pages 4.5-14 and 15 of the RDEIR, lists the bat species and their special status designations. Table 4.5-1 has been updated to add Western red bat between Great western bat and Long-eared myotis bat. Impact BIO-5, page 4.5-37 of the RDEIR, lists species that may occur within the Collinsville-Montezuma Hills WRA, including Western red bat and Pallid bat, both of which are CDFG Species of Special Concern. Western red bat is further discussed on pages 4.537 and 38 of the RDEIR. SMUD has updated the bulleted section at in Impact BIO-5 to include their special status designation and has corrected the designation of the Western red bat.</p> <p>The following correction to special status has been made to Impact BIO-5:</p> <p>According to the Montezuma Wind Project EIR (Ecology and Environment, Inc., 2006), the following bat species may occur within the Collinsville-Montezuma Hills WRA:</p> <ul style="list-style-type: none"> • Mexican free-tailed bat • Western red bat (CDFG:SSC) • Hoary bat • Silver-haired bat

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	<ul style="list-style-type: none"> • Pallid bat (<u>CDFG:SSC</u>) Western red bats⁴⁴ are a migratory species, distributed from southwestern British Columbia southward through the coastal zone and throughout Baja California. Little is known about the populations of these forest-dwelling bats except that they are widely distributed and relatively common through their range (Ecology and Environment, Inc., 2006a). The pallid bat²⁴ ranges from western Canada to central Mexico. Pallid bats have larger eyes than most other species of bats in North America and have pale, long, and wide ears; their fur is generally lightly colored. They average a total length of 92 to 135 millimeter (mm). <hr/> <p style="text-align: center;">⁴ CDFG species of special concern and USFS sensitive species.</p>
	<p>E-22 SMUD has followed the methodology used by other wind projects in California and in particular the Collinsville Montezuma Hills Wind Resource Area (Montezuma Wind Project, Shiloh I and II Wind Projects) in regards to comparing project mortality to birds and bats to other anthropogenic causes of bird and bat mortality, locally and regionally.</p>
	<p>E-23 Comment noted. The California Energy Commission (CEC) Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (2007) (Guidelines) includes pre-permitting surveys for bat use of the project area. These guidelines are approved by the CEC and endorsed by the CDFG as voluntary guidance. The recommendations and protocols discussed in this report are intended to be suggestions for local permitting agencies to use at their discretion. These guidelines are strictly voluntary and are not intended to implement, replace, duplicate, interpret, amend, or supplement any current statute or regulation. Adherence to these guidelines does not ensure compliance with any local, state, or federal statute or regulation nor does failure to follow these guidelines necessarily imply violation of CEQA (CEC and CDFG, 2007).</p>

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<p>Mr. James Field January 14, 2010 Page 7</p> <p><i>BIO-5a Mitigation</i></p> <p>The RDEIR states that post-construction surveys will be conducted for up to three years. Surveys for bird and bat mortality should be conducted for a minimum of three years from the onset of turbine operation. Impacts to a number of special-status species have been documented in the WRA. The Applicant's analysis predicts mortality rates similar to those reported for the High Winds Project, based on the proximity of that project. There are many variables which may affect actual mortality rates at the proposed Project, including placement of turbines and size and spacing of turbines. Therefore, monitoring is critical to field test this mortality rate assumption. The results of the first year of data should be critically assessed to determine which modifications, if any, are needed for the second and third year of study. For example, the second and third year of fatality monitoring may need to redirect survey efforts toward turbines or habitat types where impacts were higher than expected. First year monitoring results may also warrant a reallocation of study efforts to those seasons where more impacts were recorded.</p> <p>DFG recommends that the monitoring program be developed consistent with the Guidelines and the latest information known about avian and bat turbine interactions. Monitoring reports should be provided to DFG each month with a comprehensive report at the end of each calendar year. The annual report should be submitted 30 days after the end of each calendar year so that recommendations for operational changes can be implemented within the following monitoring year and the results analyzed in the next report. At the end of the second year of monitoring, the comprehensive report should include monitoring from Year 1. At the end of the third year of monitoring, the final comprehensive report for all 3 years should be submitted 90 days after the end of the calendar year.</p> <p>Data collected during the monitoring program should be submitted to DFG's Biogeographic Information and Observation System (BIOS) Program, www.dfg.ca.gov/biogeodata/bios. BIOS is a central online repository that can be viewed without specialized software and in conjunction with other data layers to accommodate larger planning efforts and help inform and improve management decisions.</p> <p>A three-year monitoring program may identify an unanticipated high level of mortalities associated with the Project. The adaptive management process recognizes the uncertainty in forecasting impacts to birds and bats and allows testing of options as experiments to achieve a goal and determine impact avoidance, minimization, and mitigation effectiveness. Options include maintenance activities or habitat modification to make the site less attractive to at-risk species and seasonal changes to operations. During the bat migratory period, limited and periodic feathering of wind turbines during low-wind nights may help avoid impacts to bats. During the raptor migration period, reducing operations has shown to greatly reduce raptor mortality. If the multi-year monitoring reports show higher levels of fatalities than anticipated and those higher levels persist despite implementation, removal of problem turbines or seasonal shutdowns of turbines may be options if other minimization measures are ineffective in reducing fatalities.</p> <p>Again, since the Applicant's analysis predicts mortality rates similar to those reported for the High Winds Project based on the proximity of that project and since there are many variables which may affect actual mortality rates at the proposed Project, including</p>	<p>Impact BIO-5 of the RDEIR utilized bat surveys that were previously performed in the nearby Collinsville-Montezuma Hills area (Post-construction Avian and Bat Fatality Monitoring Study for the High Winds Power Project, April 2009). The Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California, Final Report, October, 2009, has also been included in the Final REIR as a reference. In summary, the report found that bat incidents were nearly 7 times more numerous in areas north of Birds Landing Road than south. These surveys provide sufficient data, and additional bat surveys are not required. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>E-24 The BIO-5a Introduction and bullets are revised as follows:</p> <p>The Bird and Bat Mortality Monitoring Program will survey for bird mortality annually in the project area for <u>a period of three years, from the date of commercial operation of the project</u> as follows:</p> <ul style="list-style-type: none"> • Qualified <u>An independent USFWS-approved</u> biologists will monitor bird and bat mortality annually throughout the project area, including where any new overhead transmission lines have been installed within the project area. • Bird species, number, location, and distance from WTGs, availability of raptor prey species, and cause of bird and bat mortalities will be noted. All results will be transmitted to the Wildlife Response and Reporting System (WRRS) database. • SMUD will participate in the Solano County Avian Technical Advisory Committee (<u>TAC</u>) and will contribute to the efforts of the Committee <u>TAC</u> to develop mitigation measures to lessen potential impacts on raptors as a result of WTG operation. The Committee <u>TAC</u> is an interagency organization composed of biologists from CDFG, USFWS, the Solano County Department of Resource Management, and representatives from wind plant developers in the Collinsville-Montezuma Hills WRA. <u>The Avian Mortality Monitoring Study will follow the methodology of the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project Solano County, California Final Report,</u>
E-24	
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	<p><u>October 2009 (Curry and Kerlinger, LLC, 2009), and will be consistent with the standardized guidelines outlined by the California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Developments (CEC and CDFG, 2007). SMUD will prepare and provide reports from the monitoring to all TAC participants, and fully share the results of this research with the TAC.</u></p> <ul style="list-style-type: none"> • <u>Banding information obtained from the CDFG will be analyzed to assess the origin and population of red-tailed hawks, American kestrels, and other raptors.</u> • <u>Any disproportional mortality at individual WTGs will be analyzed. The avian mortality monitoring will be conducted by an independent USFWS-approved biologist, and reports shall contain sufficient information to allow evaluation of turbine design characteristics and location effects that contribute to mortality.</u> • <u>At the conclusion of the three year study period, An analysis will be made to validate, through comparison, that bird mortality from the project is not disproportionate to other wind projects (e.g., Shiloh I and II Wind Plant Project, Montezuma Wind Project, Solano County High Winds Project, and SMUD Solano Wind Project Phases 1 and 2B). Any disproportionate mortality at individual WTGs will be analyzed. Based on the results of the monitoring effort and analyses, and with coordinated input from the TAC, significantly disproportionate avian mortality will be addressed, and mitigation measures implemented, based on the available and feasible options (e.g. maintenance activities, habitat management, WTG shutdowns or other operational changes during migratory or other identified high risk periods).</u> • <u>If, based upon its review and consideration of the final Avian Mortality Monitoring Report, the TAC determines that the avian mortality resulting from operation of the Phase 3 project significantly exceeds the High Winds and</u>

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<p>Mr. James Field January 14, 2010 Page 8</p> <p>placement of turbines and size and spacing of turbines, then DFG may approve a change in the ongoing mitigation obligation of the wind operator as appropriate if monitoring results differ significantly from the predicted results. } E-28 Cont'd</p> <p>DFG recommends that the Applicant notify DFG at the time ground disturbance has begun and when the Project construction is complete. } E-29</p> <p><i>BIO-5b Mitigation</i></p> <p>The Applicant proposes to mitigate effects from operation of the Project through acquisition of off-site mitigation land which supports and enhances raptor populations prior to the start of operation of wind turbines. If ground disturbance begins before the mitigation land for listed species and species of special concern is secure, the Applicant should provide to DFG security in a form and amount acceptable to DFG to cover the estimated cost of land acquisition, enhancements, monitoring, and management of mitigation lands before ground disturbance occurs at the site. } E-30</p> <p>DFG does not consider the current proposal to provide mitigation at a 1:1 ratio for a rotor swept area as sufficient to reduce impacts to less-than-significant levels and to adequately or fully mitigate impacts to special status-species including those protected under the California Endangered Species Act. Also, the option to conserve mitigation lands only for the life of the Project is not considered adequate mitigation by DFG. Previously, DFG recommended a 2:1 ratio for rotor swept area. Since changes in aerial properties around the rotors as a result of WTG operation (wind disturbed area) negatively affect birds and bats, DFG now recommends off-site mitigation land be provided at a 2:1 ratio to support and enhance avian and bat populations impacted in the wind disturbed area. This ratio is for the area of designated mitigation land to wind disturbed area. Wind disturbed area is used by the wind companies during turbine siting planning. } E-31</p> <p>In addition to the impact of the initial loss of the wind disturbed areas as aerial habitat, operation of WTGs will result in ongoing impacts to avian and bat species. DFG recommends that mitigation be provided for these ongoing effects to the aerial environment that occur during operation of the Project. } E-32</p> <p>Discrete measurable impacts, such as loss of grassland to road construction or wind disturbed area associated with turbine operation, may be offset by the conservation, management, funding and monitoring of suitable habitat areas. Ongoing and variable impacts such as continued mortality of bats and birds as a result of WTG operations throughout the life of the Project would be best mitigated through conservation efforts, which also continue and possibly vary through the life of the Project. Although this recommendation for ongoing and possibly variable mitigation is a difficult and new concept, it is intended to offset cumulatively significant ongoing impacts that are anticipated to occur as the result of operating this Project. Pre- and post-project monitoring may be used to determine a fair and effective mitigation obligation for the life of the Project. Power production or installed capacity may be used as a surrogate to estimate mortality based on the initial survey data. } E-33</p>	<p><u>Shiloh I range of values presented herein, (expressed as thresholds in terms of mortalities per megawatt per year) for species of concern, SMUD will request that the TAC recommend a comprehensive set of biologically based, reasonable, and feasible management and/or mitigation measures to directly respond to the fatality threshold being exceeded. Within one year from receipt of the TAC's written recommendations, SMUD will initiate full implementation of these recommendations.</u></p> <p>E-25 See response to comment C-18. The voluntary CEC Guidelines (CEC, 2007) do not recommend submission of reports at the end of each month. SMUD will follow the methodology used by other wind projects in the WRA for monitoring and reporting. Reports will be furnished to the resources agencies and Solano County TAC at the end of each year of monitoring.</p> <p>E-26 Data collected during the monitoring program will be submitted to the Biogeographic Information and Observation System (BIOS) Program, in accordance with the CEC Guidelines, 2007.</p> <p>E-27 Refer to response to comment E-19. As set forth in Mitigation Bio-5a, SMUD will participate in the Solano County Avian TAC and will consider recommendations for refinement to operations of the WTGs to address avian monitoring information. This adaptive management process will recognize and allow for adjustments to focus activities and resources, assess impact avoidances, and optimize mitigation effectiveness.</p> <p>E-28 See response to comment E-27.</p> <p>E-29 SMUD will notify CDFG at the time ground disturbance has begun and when the project construction has been completed.</p> <p>E-30 SMUD recognizes that private wind development companies, often Limited Liability Companies, are required by the applicable lead agencies to provide security of the type suggested by CDFG. Given the potential for such a developer to become financially insolvent prior to implementation of the mitigation measure, SMUD sees this</p>

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<p>Mr. James Field January 14, 2010 Page 9</p> <p>In addition, pre- and post-project bird use data should be used to determine if bird and bat species are avoiding the Project area and, if so, the diminished value of the areas not accounted for during construction of the Project should be evaluated and off-site compensation provided. } E-34</p> <p><i>BIO-6 Mitigation</i> DFG supports the placement of transmission and collection lines underground unless burial of lines underground would result in greater biological impacts as stated in the RDEIR. In addition, DFG recommends that all new lines be placed in the right-of-way with existing above-ground power lines unless use of these areas would result in significant avoidable biological impacts. } E-35</p> <p>The RDEIR does not specify the length of transmission and collection lines that will need to be installed. This information should be discussed in the text. All impacts should be disclosed, analyzed, and mitigated for in the RDEIR, including ground disturbed areas associated with new transmission and/or collection lines. } E-36</p> <p>CHAPTER 6 Table 6-1 Update Table 6-1 to reflect the new language in the RDEIR.</p> <p>GENERAL COMMENTS AND SUMMARY OF MITIGATION RECOMMENDATIONS As detailed above, mitigation should be provided for all unavoidable impacts at a level commensurate with those impacts. The Project will affect terrestrial species and habitats and avian and bat species. Disturbance of and changes to terrestrial areas will reduce habitat for rare plants and foraging, breeding, estivation and dispersal opportunities for a wide variety of native wildlife species. Operation of WTGs will result in ongoing effects to avian and bat species. DFG recommends that compensatory land mitigation must be provided for 1) terrestrial impacts, 2) initial loss of wind disturbed area, 3) ongoing degradation of terrestrial foraging habitats, and 4) ongoing impacts to avian and bat species from Project operations. } E-37</p> <p>DFG recommends that survey results and specific mitigation measures be included in the document. CEQA states that surveys to be conducted at a later time, or mitigation measures to be identified at some future time, are not acceptable. It has been determined by court ruling that such studies and mitigation measures would be improperly exempted from the process of public and governmental scrutiny which is required under CEQA. DFG recommends that a document which requests future studies or future identification of mitigation should be considered inadequate. } E-38</p> <p>DFG recommends that all off-site mitigation land support and enhance populations of the affected species. All mitigation land for avian and bat species should be outside of, and not adjacent to, the WRA, as stated in the RDEIR and should be in-kind to the habitat impacted. DFG does not support conservation of habitat for raptors and bats in or adjacent to areas that allow incompatible uses that can result in a high rate of mortality to those species. Location of permanently conserved land should be coordinated with and approved by DFG. } E-39</p>	<p>condition as appropriate in those cases. However, SMUD is a fiscally sound municipal utility, the lead agency for this project, and fully capable of meeting its financial commitments. Therefore, SMUD does not believe it is necessary to provide the security requested by CDFG. Note that prior to issuance of the first buildings permit or grading permit for the project, whichever occurs first, SMUD shall establish an irrevocable letter of credit in favor of the County of Solano from a reputable bank with a branch in the United States in an amount approved by the County of Solano to ensure compliance with the conservation land or easement provisions.</p> <p>E-31 SMUD will follow the methodology used by other wind power projects in CMHWRA including the Montezuma Wind Project, and Shiloh I and II Wind Projects, and mitigate impacts to birds and bats in the rotor swept area, at a 1:1 ratio. The associated conservation easement would be in perpetuity. See response to comment E-24. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>E-32 Mitigation for rotor swept area at a rate of 1:1 has been deemed sufficient for other projects in the WRA. The land preservation required by Mitigation BIO-5b is designed to mitigate not only the initial impacts to avian habitat, but also the ongoing impacts to avian and bat species, as this land will be preserved in perpetuity.</p> <p>E-33 See response to comment C-20c for mitigation lands outside of, and not adjacent to the WRA, permanently conserved and enhanced to offset impacts to birds and bat species. As discussed above, SMUD will participate in a TAC as described in Mitigation BIO-5a of the RFEIR. The TAC is an interagency organization composed of biologists from CDFG, USFWS, the Solano County Department of Resource Management, and representatives from wind plant developers in the Collinsville-Montezuma Hills WRA. TAC consensus shall be used in addressing unanticipated impacts (see response to comment E-24).</p> <p>E-34 SMUD considers the avian use surveys and Mitigation BIO-5a, adequate to determine pre- and post-project bird and bat use. Mitigation BIO-5b has been clarified.</p>

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	<p>E-35 Underground transmission lines will reduce impacts to avian species, terrestrial species, common wildlife, fallow agricultural and annual grasslands, and reduce visual impacts. As stated in the EIR, the impacts of putting in transmission lines are: permanent and temporary impact to fallow agricultural areas and annual grasslands used as foraging and nesting habitat for ground nesting birds and migratory birds; potential loss of sensitive plant species, red-legged frog and California tiger salamander upland habitat; and disturbance of common wildlife in the proposed project area. These impacts have been mitigated to the extent feasible.</p> <p>SMUD believes that the environmental benefits of putting the transmission line underground exceed any potential negative impacts. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>
	<p>E-36 The acreage required for the installation of the underground collection system is detailed on page 4.3-8 of the RDEIR. Additionally, no above ground transmission lines would be installed as part of the project. The estimated acreage of the collection system as stated on page 4.3-8 of the RDEIR is calculated based upon the following approximate collection line alternative route lengths:</p> <p style="padding-left: 40px;">Collection Line Alternative Route 1 = 18,700 feet. Collection Line Alternative Route 2 = 14,600 feet. Collection Line Alternative Route 3 = 15,900 feet.</p> <p>Because these lines would be constructed underground, impacts from these lines would be temporary and do not require mitigation. The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p>
	<p>E-37 Section 15126 4, subd. (a)(1) of the CEQA Guidelines states “An EIR shall describe feasible measures which could minimize significant adverse impacts” and in (a)(4) “mitigation measures are not required for effects which are not found to be significant.” SMUD believes the RDEIR has properly analyzed the significant effects of the project and has developed mitigation that would</p>

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<p>Mr. James Field January 14, 2010 Page 10</p> <p>The conservation easement placed on the mitigation land to be conserved for raptor populations should include, but not be limited to, the following prohibited activities:</p> <ul style="list-style-type: none"> • No incompatible development on the property • No wind turbine development on the property • No incompatible crops such as vineyards and orchards <p>The habitat management plan for the mitigation land should be prepared and implemented prior to operation of wind turbines. The habitat management plan is part of mitigation for impacts to native species including raptors and bats, along with conservation of land, and should be provided prior to impacts occurring.</p> <p>DFG recommends that all funding for management and monitoring of mitigation lands be approved by DFG and be provided before site-disturbance begins.</p> <p>DFG also encourages the Applicant and Lead Agency to implement recommendations from the <i>California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development</i>, October 2007. DFG is available to discuss the site-specific applicability of these voluntary guidelines, which were developed cooperatively by DFG and the California Energy Commission.</p> <p>Reliance on wind energy requires the Applicant to provide back-up power generation. The development and use of this back-up power source should be analyzed in this RDEIR as an integral part of this Project.</p> <p>Thank you for the opportunity to comment on this RDEIR. If you have any questions, please contact Ms. Brenda Blinn, Environmental Scientist, at (707) 944-5541; or Mr. Liam Davis, Habitat Conservation Supervisor, at (707) 944-5529.</p> <p>Sincerely,</p>  <p>Charles Armor Regional Manager Bay Delta Region</p> <p>cc: State Clearinghouse Mr. Ken Soloman Solano County Department of Resource Management 675 Texas Street, Suite 5500 Fairfield, CA 94533</p> <p>Ms. Michelle Tovar U.S. Fish and Wildlife Service 2800 Cottage Way, W-2605 Sacramento, CA 95825</p> <p>Mr. William Guthrie U.S. Army Corp of Engineers 1325 J Street, Room 1480 Sacramento, CA 95814</p>	<p>minimize significant impacts to the extent feasible as required by CEQA.</p> <p>E-38 Section 15126 4, subd. (a)(1)(B) of the CEQA Guidelines states “Formulation of mitigation measures should not be deferred until some future time. However, measures may specify performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way.” Here, the analysis and mitigation in the RDEIR are based on available survey data, and as for most projects, additional surveys are performed prior to construction to pinpoint exact areas for avoidance and mitigation.</p> <p>E-39 See responses to comments C-20b and 20c.</p> <p>E-40 SMUD welcomes, and concurs with, CDFG’s suggested list of prohibited activities to add detail to clarify the management measures and enhancements already described in Mitigation BIO-5b.</p> <p>E-41 See response to comment C-20b and 20c. Mitigation Measure BIO-5b provides that an open space and habitat management plan will be prepared for the conserved area within three years after the first delivery of power. This plan will be developed in consultation with the resource agencies.</p> <p>E-42 SMUD notes the comment that all funding for management and monitoring of the mitigation lands be approved by CDFG and be provided before site disturbance begins. See responses to comments C-20c and E-30. However, SMUD reserves the right to provide funding for management and monitoring of the off-site conservation lands for the life of the project.</p> <p>E-43 SMUD has incorporated, in Mitigation BIO-5a, recommendations from the CEC Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development, October 2007.</p> <p>E-44 As stated in Section 4.4 and Section 5.4 of the RDEIR, the installation of up to 75 WTGs would offset or replace fossil-fuel generation from existing sources. New backup generation sources would not be constructed as a result of the project, as those sources already</p>

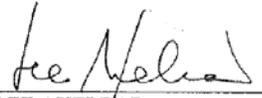
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	exist. Thus, the requested analysis is not required by CEQA. The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.

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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>OFFICE OF COUNTY COUNSEL</p> <p>SOLANO COUNTY GOVERNMENT CENTER 675 TEXAS STREET, SUITE 6600 FAIRFIELD, CALIFORNIA 94533 (707) 784-6140 FAX (707) 784-6862</p> <p>DENNIS BUNTING COUNTY COUNSEL</p> <p>AZNIV DARBINIAN ASSISTANT COUNTY COUNSEL</p> </div> <div style="width: 10%; text-align: center;">  </div> <div style="width: 45%;"> <p>LEE AXELRAD JULIE A. BARGA REBA L. CARDOZA BERNADETTE S. CURRY CHASTINE FISH GASPAR KIMBERLEY G. GLOVER JAMES W. LAUGHLIN RAMONA M. MARGHERIO LORI A. MAZZELLA JO ANN IWASAKI PARKER CARRIE KEEFE SCARLATA DANIEL M. WOLK KIMBERLY ALEXANDER YARBOR DEPUTY COUNTY COUNSEL</p> </div> </div> <div style="text-align: center; margin-top: 20px;"> F </div> <p style="text-align: center; margin-top: 20px;">January 15, 2010</p> <p style="margin-top: 20px;"><u>SENT BY EMAIL and U.S. MAIL</u></p> <p>Mr. James J. Field Senior Project Manager, Power Generation Sacramento Municipal Utility District P.O. Box 15830 Sacramento, CA 95852-1830 Email: jfield@smud.org</p> <p>Re: Solano Wind Phase 3 Project – Draft Recirculated Environmental Impact Report</p> <p>Dear Mr. Field:</p> <p>On behalf of the Solano County Airport Land Use Commission (“ALUC”), I am writing regarding the Sacramento Municipal Utility District (“SMUD”) Solano Wind Project Phase 3 (“Project”) and its related Environmental Impact Report (Recirculated Draft October 2009)(“EIR”).</p> <p>As you know, SMUD is participating in a cooperative effort, alongside the Air Force and other wind developers, involving a Cooperative Research and Development Agreement (“CRADA”). This cooperative process is anticipated to generate information concerning Travis Air Force Base (“TAFB”) air traffic control radar in relation to the proposed construction of this Project and other projects.</p> <p>The EIR does not presently take account of or address the near-term outcome of the CRADA process. SMUD has indicated that it intends to close the public comment period for the EIR on January 15, 2010. The near-term results of the CRADA process are currently anticipated to be released on or about January 19, 2010.</p>	<p>F-1 As noted in response to comment A-1, the Department of the Air Force and Travis AFB have withdrawn their previous comments to the Solano Wind Phase 3 project RDEIR. A discussion of CRADA results has been incorporated into the relevant sections of the EIR, and no further changes to the EIR are required.</p> <p>F-2 SMUD has incorporated CRADA results in the relevant portions of the EIR. (See Revised Impact HAZ-6, Impact TRA-4, and Cumulative Impact Section 5.8 in the RFEIR.) The commenter has not identified any new impacts or mitigation for the project, and no</p>

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<p>Mr. James J. Field January 15, 2010 Page 2 of 2</p> <p style="margin-left: 40px;">The ALUC reserves the right to comment further on the EIR following the release of the near-term results of the CRADA process, as appropriate at that time. } F-3</p> <p style="margin-left: 100px;">Sincerely,</p> <p style="margin-left: 100px;">DENNIS BUNTING Solano County Counsel</p> <p style="margin-left: 100px;">By:  LEE AXELRAD Deputy County Counsel</p> <p>cc: Ray Schoch James Leland Lourdes Jimenez-Price</p>	<p>F-3 further changes to the EIR are required.</p> <p>As noted in response to comment F-1, CRADA results are incorporated into the EIR and have been made available to the ALUC. (See Revised Impact HAZ-6, Impact TRA-4, and Cumulative Impact Section 5.8 in the RFEIR.) On January 21, 2010, the ALUC formally provided its approval of the Solano Wind Phase 3 project, through Resolution No. 10-01 (Resolution Regarding Consistency of the Solano Wind Project Phase 3 with the Travis Air Force Base Land Use Compatibility Plan, and Rio Vista Municipal Airport Land Use Compatibility Plan).</p>

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<div style="text-align: right; margin-bottom: 10px;"> G </div>  <p>915 L Street, C-425 Sacramento, Ca. 95814 916-447-4956 www.swainsonshawk.org</p> <hr/> <p>January 15, 2010 Jim Field, Environmental Project Manager Sacramento Municipal Utility District P.O. Box 15830 MS B355 Sacramento, CA 95852-1830</p> <p>VIA EMAIL: lmaier@smud.org, jfield@smud.org</p> <p><u>Comments of Friends of the Swainson's Hawk regarding the Recirculated DEIR for the SMUD Solano Wind Project Phase 3.</u></p> <p>Dear Mr. Maier,</p> <p>Friends of the Swainson's Hawk (FOSH) is a non-profit charitable organization concerned with the conservation of wildlife, and particularly raptors, in California. We have reviewed your RDEIR for the Solano Wind Farm Phase 3 and prepared the comments below, with the assistance of our biological consultant, Melinda Dorin Bradbury, and our Legal Counsel, James P. Pachl. Please review our comments and notify us of the FEIR and future public hearings on the project.</p> <p>We have major concerns about well-documented substantial avian and bat mortality inflicted by dense concentrations of wind turbines at Montezuma Hills, and elsewhere.</p> <p>FOSH wants to support SMUD in providing the most beneficial clean, green energy portfolio Friends of the Swainson's Hawk ("FOSH") supports alternative energy development and recognizes the adverse impacts of natural gas power plants on the environment and their impacts on climate change. FOSH recognizes that wind development avoids the impacts created by fossil fuel and natural gas power plants. } G-1</p> <p>HOWEVER, wind power developers and operators, regulatory agencies, and society need to acknowledge that the characteristics which make a location favorable for wind power generation, such as steady winds, ridgetops, and passes, are the same characteristics which make these same locations instinctively attractive to avian species and bats for migratory routes and localized movement. High avian and bat mortality associated with wind turbine projects has repeatedly demonstrated that many avian species, especially raptors, and bats, do not have the instinctive ability to comprehend and avoid the dangers of lethal collision with operating wind turbines. } G-2</p>	<p>G-1 SMUD thanks Friends of the Swainson's Hawk (FOSH) for providing comments on the RDEIR and appreciates FOSH's support of green energy projects.</p> <p>G-2 SMUD acknowledges the FOSH's general concern for avian and bat mortality associated with wind turbine projects. The potential impacts to avian and bat species was analyzed in the RDEIR at pages 4.5-35 to 4.5-46. Mitigation Measures BIO 5a through 5d mitigate for potential impacts to avian and bat species to the extent feasible. (See response to comment E-24, E-27, E-31, and E-34.)</p>

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<p>As a public power agency with an excellent environmental record, we hope SMUD could take the lead in developing methods and technologies which would greatly reduce avian and bat mortality currently caused by wind turbine projects.</p>	<p>G-3 SMUD is committed to participating in the Solano County Avian Technical Advisory Committee (TAC) and will contribute to the efforts of the TAC to develop mitigation measures to lessen potential impacts on raptors as a result of WTG operation. The TAC is an interagency organization composed of biologists from CDFG, USFWS, the Solano County Department of Resource Management, and representatives from wind plant developers in the Collinsville-Montezuma Hills WRA.</p> <p>G-4 SMUD is currently engaged in initiatives to increase its renewable energy portfolio. These initiatives include the potential development of rooftop solar power generation within SMUD’s service territory. However, these initiatives are outside the scope of this EIR. The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p> <p>G-5 The potential impact to raptor mortality was thoroughly analyzed in Impact BIO-5. Mitigation measures BIO-5a through BIO-5d are proposed, which mitigate impacts to avian and bat species to the extent feasible. See Impact BIO-5 and Mitigation BIO-5a, as required in response to comment E-24, for information on avian impacts and mitigation measures.</p> <p>G-6 SMUD is nationally recognized as a leader in renewable resources and electric transportation, providing Earth-friendly energy. Minimizing impacts to flora and fauna, and reducing pollution is an important part of SMUD’s vision as a community-owned utility. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>G-7 SMUD notes FOSH’s objection to the statement regarding WTG being sited outside other natural features. Despite commenter’s disagreement with SMUD’s characterization of the placement of WTG’s, the potential impact to avian and bat species is adequately analyzed by the RDEIR. Mitigation Measures BIO-5a through BIO-5d, which include participation in the TAC and three years of monitoring (even though SMUD believes only one is necessary), mitigate the impact to avian and bat species to the extent feasible. (See response to comment E-24, E-27, E-31, and E-34.)</p>
<ul style="list-style-type: none"> FOSH urges SMUD to place more focus on developing urban solar power. Sacramento is known for its many sunny days. Solar power facilities placed on urban rooftops has the lowest footprint (no Greenfield development) and is sited in locations adjacent to users, which greatly reduces the cost of transmission facilities. This also reduces the energy lost from electricity traveling long distances over transmission lines from where it is generated to where it is used. 	
<ul style="list-style-type: none"> Previous studies commissioned by the California Energy Commission shows that the Montezuma Hills has high raptor use. The use of the area is actually higher than at the Altamont Pass Wind Area for certain species including red-tailed hawks and American kestrels. This creates the potential for major mortality of raptors due to wind energy turbines at Montezuma Hills. 	
<p>We know that SMUD customers value the green energy program and want to participate. We do not want to see develop a situation where SMUD’s green energy program becomes tarnished because of poor practices in reducing impacts and mitigating impacts on wildlife.</p>	
<p>Our specific comments on the environmental review of the RDEIR and proposed mitigation measures are as follows:</p> <p>SPECIFIC COMMENTS</p> <ul style="list-style-type: none"> Page 2-11 – section titled “Avoidance of Sensitive Biological Resources,” says that “WTGs are sited outside of drainage areas, raptor nesting areas, and other sensitive natural features.” The assertion that WTG’s are sited outside of “other sensitive natural features is not supported by substantial evidence and should be stricken. As stated above, WTG’s are sited in areas that have same characteristics which make these same locations instinctively attractive to avian species and bats for migratory routes and localized movement. High avian and bat mortality associated with wind turbine projects has repeatedly demonstrated that many avian species, especially raptors, and bats, do not have the instinctive ability to comprehend and avoid the dangers of lethal collision with operating wind turbines. This section states that SMUD has committed in the past to participating in the Technical Advisory Committee. Mitigation Measures for this project should include binding language that (1) SMUD will continue to participate in the TAC and (2) that SMUD shall implement those take avoidance and mitigation measures recommended by the Technical Advisory Committee 	
<ul style="list-style-type: none"> Section 2.5 & 2.6 – All roads and ground disturbing activities whether temporary or permanent have the potential of impacting California tiger salamander and should be surveyed following agency protocol prior to ground disturbance. 	
<ul style="list-style-type: none"> Section 4.5.1.2 – Taking of threatened, endangered, or candidate species without an Incidental Take Permit issued under Section 2081, and taking contrary to the provisions of an 	

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<p>Incidental Take Permit, is illegal. This project may cause the taking of threatened or endangered species. For that reason, it would be unlawful for this project to proceed without a Section 2081 Permit, which can be issued only if measures are adopted which minimize and fully mitigate the impacts of possible taking. It is unlawful to kill any bird of prey, (Fish and Game Code Sec. 3503.5) or migratory bird except as provided by State or Federal law or regulation.</p> <p>WTG projects cause the death of birds from collision of birds with the rotors. <u>Please disclose those Federal and State regulations and statutes which SMUD believes would exempt it from prosecution or civil or administrative liability for the unlawful killing of birds due to collision of the rotors of WTG's with birds.</u></p>	<p>G-8 Habitat for CTS is not likely found in the Phase 3 project area. However, Mitigation Measures BIO-8a and Bio-8b as modified in the Final REIR, reduce the impact to less than significant by requiring preconstruction site-assessments and locating facilities outside of suitable CTS habitat where feasible. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>
<p>• Section 4.5.2 – The RDEIR says that very few waterfowl were recorded during avian surveys, but there is no mention of when the surveys were conducted (time of day, frequency, time of year, summary of methodology) which fails to provide the level of information required by CEQA. The RDEIR's conclusion that birds from the Suisun March generally do not fly through the project area is not supported by substantial evidence. Recirculation of the RDEIR, with inclusion of the results of avian surveys throughout the entire year, is required by CEQA</p>	<p>G-9 Cont'd</p> <p>G-9 As stated in Mitigation BIO-5d, SMUD will obtain Incidental Take Permit(s) for impacts to federally or state-listed species, and Measure BIO-5d has been revised to include an Incidental Take permit under the Bald and Golden Eagle Protection Act as well, pursuant to 50 CFR Sections 22.6 and 22.7.</p>
<p>• The section titled "Invertebrates" (page 4.5-28) also includes discussions of avians (birds) and avian survey results. Birds are not invertebrates. Only 8 days of surveys were conducted between December 2006 and March 2007. This is prior to nesting season and prior to when many species return to the area. Surveys should be conducted for a complete year prior to impacts being fully assessed and analyzed and appropriate mitigation determined. Eight days of surveys for avian species between December and March fails to provide the level of information and analysis required by CEQA, provides no information about the presence of birds for most of the year, notably those species which are absent during that time, and exposes the RDEIR to possible legal challenge for violation of CEQA. Recirculation of the RDEIR, with inclusion information from avian surveys throughout the entire year, is required by CEQA.</p>	<p>G-10</p> <p>G-10 As discussed in Section 4.5, Impact BIO-5, as changed in the RFEIR, an Avian Monitoring Study and Risk Assessment for the Shiloh Wind Power Project was conducted by Kerlinger, et al, 2006. Data collection for the Shiloh Project pre-construction surveys covered the period from January 1, 2004, through December 31, 2004. The methods used in these studies are based on standard protocols discussed in <i>Studying Wind Energy/Bird Interactions: A Guidance Document – Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites</i> (Anderson et al., 1999). Four areas were evaluated: abundance and behavior (use), impact gradients, raptor nesting surveys, and comparisons with studies done for the nearby High Winds project.</p>
<p>• Impact Bio-1 draws conclusions not supported by fact or CEQA analysis. At first it states that the area provides foraging valuable habitat for certain species of birds, but and then concludes, without citing any supporting information, that because DFG does not consider agricultural lands or non-native grasslands as a sensitive natural community there would be no impacts foraging habitat for bird species using these areas. DFG regularly requires habitat compensation for loss of agriculture and non-native grasslands which provide foraging habitat for birds, including in the Solano County Water Agency MSHCP (which is cited by SMUD). Because these areas provide habitat to wildlife, including sensitive species, CEQA requires that the impacts on these species from disturbance or exclusion from habitat be mitigated to less than significant, or to the extent feasible mitigation (habitat compensation). CEQA requires mitigation of all impacts to wildlife, including bird species, to the extent feasible even if DFG did not require it. The discussion in this Section also asserts that because SMUD is developing the area as a wind project it is better than residential development and provides some value. The RDEIR also violates CEQA by failing to describe the baseline (pre-project) and the temporary and permanent impacts and provides no mitigation for the changes from baseline arising from the project.</p>	<p>G-11</p> <p>G-12 <i>Avian Abundance and Behavior (Use):</i> Seven sampling sites (observation points) were selected for observing birds outwards to a mile. The order observation points was rotated on a regular basis, ensuring that all observation points were given approximately equal coverage with respect to time of day and to reduce potential sampling bias. Generally, observations started at 0800 hours and continued until approximately 1530, corresponding with periods of raptor activity. Observation periods were 30 minutes in length at each observation</p>

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	<p>point. All observation points were sampled on the same day or on successive days whenever weather precluded a complete round of observations. A full survey consisted of 3.5 hours of viewing data collection and a similar amount of time moving between observation points. At the beginning of each survey, the starting time and standard weather information were recorded including: wind direction and approximate speed, temperature, percent cloud cover, precipitation, and range of visibility. The following behavioral information was collected: date, species identity, number of individuals, estimate of age, start/end time, flight height of the individual corresponding to the rotor swept height, direction of flight, and specific behavior.</p> <p><i>Impact Gradients – Perpendicular Transects</i></p> <p>Impact gradient surveys were conducted between March and July, 2004. Each impact gradient took approximately 45 minutes to complete. Surveys were conducted throughout the day. Transects were rotated to give equal amount of survey time throughout different times of the day. A total of 18 visits were conducted on 21 different days. This represents 13.5 hours per transect.</p> <p><i>Raptor Nesting</i></p> <p>Raptor nesting surveys were conducted between March and July, 2004. Searches were done via automobile, on foot and through regular avian survey observations. Sites known to have nests, due to previous studies, were searched. Most observations commenced in the morning hours. Information collected included: date, start/end time, species identity, estimate of age, number of individuals and specific behavior. If a nest was confirmed the following data was collected: tree height, tree species, nest height, nest material, and evidence of chicks/fledglings. If a golden eagle nest was observed to be active, more than one observation was made to determine if chicks were not only present but survived.</p> <p><i>Comparison of Avian Abundance Patterns at the Shiloh Project with the Nearby High Winds Project Site:</i></p> <p>Comparisons were made of abundance patterns found at a previously</p>

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	<p>constructed wind power facility adjacent to the project. The adjacent project is the High Winds Wind Power Project and is on lands within the Collinsville Montezuma Hills Wind Resource Area.</p> <p>Comparisons between these sites were done after a full year of data was collected at the Shiloh project.</p> <p>The study concluded that there were a very small number of birds moving between the areas. No raptors were observed moving between these two areas. Of the total of 2,731 non-raptor flight observations, 29 (1%) involved movement between the marsh and the project area. Of the total 29 observations, only 20% were within the projected rotor swept area, and the remaining 80% of the observations were in the area that will not be subject to rotor sweep. Seven of the 29 flight observations were waterfowl (Mallards) (Curry and Kerlinger, L.L.C., 2004).</p> <p>Four of the seven observation points in the study were set up along those portions of the proposed development area that are nearest to the Sacramento River and the Suisun Marsh Wildlife Management Area. To date, the data shows that only a small number of birds were observed moving from the marsh to the proposed project area and vice versa. In other words, a small number of birds seem to be using both areas. The most likely attraction in an adjacent area to a wildlife preserve would be a desired food supply. There is no indication that condition exists here. Neither is there any evidence to date that the proposed area is under any kind of established migratory pathway (Curry & Kerlinger, L.L.C., 2004).</p> <p>The third sentence of the third paragraph of Avian and Bat Mortality in Section 1.5 has been corrected to read:</p> <p>In other studies, including recent reports at Shiloh II and Montezuma, <u>Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California, Final Report, October 2009 (Curry and Kerlinger, 2009)</u> north of the project area, biologists have observed that while some birds are, in fact, killed by the WTG₂; the number of birds, including waterfowl, lost to this cause is not significant compared to other sources of mortality, such as</p>

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<p>The same discussion also asserts that there are no known wildlife nursery sites or non-avian migration corridors on the site. Avian species are wildlife. conclusion since avian surveys were stopped in March and were not conducted during the nesting season. It is also not stated whether surveys for other wildlife species were conducted. It is clear that the project relied heavily on CNDDDB records, which are notoriously incomplete. There is no mention of baseline surveys in the RDEIR, so it can be assumed that none were conducted.</p> <p>In summary, the analysis of biological conditions discussed in Impact Bio-1 fails to meet CEQA's requirement for detailed analysis using best available factual and scientific information.</p>	<p>collisions with buildings and vehicles and losses from predation.</p> <p>Additionally, the RDEIR's statement regarding the likelihood of birds from the Suisun Marsh traveling through the Solano Phase 3 Project area is supported by substantial evidence and there are no new significant facts requiring recirculation of the RDEIR.</p> <p>G-11 The first paragraph in the section titled "Invertebrates" has been moved to follow Figure 4.5-1.</p> <p>As discussed in response to comment G-10 above, portions of the avian surveys also took place between the months of March and July. Accordingly, the RDEIR's analysis accounts for seasonal variation in avian use patterns.</p> <p>G-12 See response to comment E-7 regarding the use of agricultural lands and non-native grasslands as foraging habitat. With regard to the scope of avian surveys, refer to responses to comments G-10 and G-11. Sensitive natural communities are those that are of special concern to resource agencies or are offered specific consideration through CEQA, Section 1602 of the California Fish and Game Code, Section 404 of the federal Clean Water Act, and the Porter-Cologne Act. Agriculture land and non-native grassland are not considered sensitive natural communities.</p> <p>The RDEIR states in the impact section of BIO-1, approximately 95 acres of agriculture and non-native grassland would be converted to project infrastructure. Within the context of 4,244 acres, the impact is less than significant.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>G-13 Published reports in scientific journals document white-tailed kites flying or hovering up to 200 feet above ground. Warner and Rudd (1975) report that kites typically hunted over open areas, hovering usually about 30 meters above ground and then dropping to 3 meters before striking. Duke (1995) reported foraging activities of white-tailed kites as almost exclusively hovering 5 to 25 meters high,</p>
<ul style="list-style-type: none"> Impact Bio-5 – The discussion of white-tailed kites states that collision would be unlikely because white-tails kites do not soar higher than 30 meters, but at least two white-tailed kites have been killed by wind turbines in Montezuma Hills wind area. The contributors to this comment letter have observed white-tailed kites flying considerably higher than 30 meters. The RDEIR cites only one 1975 article in support of its assertion that white tailed kites do not soar higher than 30 meters, which is clearly inadequate to support the conclusions that impacts to white tailed kites are less than significant. Again, the analysis of the RDEIR violates CEQA by failing to include the best available factual and scientific data. 	
<ul style="list-style-type: none"> Page 4.5-40 – The discussion of avian fatalities in the Collinsville Montezuma Wind Resource Area should include a discussion on the survey results for the SMUD Phase 1 and 2 projects. A thorough discussion is included for other wind projects in the area, but SMUD does not include the results for their own projects. 	
<ul style="list-style-type: none"> Page 4.5-45 – SMUD cites the Erickson article stating that mortality to birds is higher from other causes (such as collisions with buildings) but that is even more reason to address and reduce the impacts from wind turbines. Cumulatively wind projects add to mortality of birds and bats and can contribute to declines. The numbers of dead birds found at WTG sites shows that the impacts on birds using the area of WTG's is significant. 	
<ul style="list-style-type: none"> Impact Bio-6 – Deferring potential habitat and protocol level California red-legged frog surveys to the pre-construction time frame does not give SMUD time to conduct adequate surveys and complete a consultation without the pressure of construction crews needing to start. Surveys should be done in advance of the pre-construction phase to reduce the pressure on biologists and agencies so that they can do the appropriate work, complete mitigation measures if warranted, and to ensure that surveys are done at the correct time of year. 	
<ul style="list-style-type: none"> Impact Bio-8 – SMUD states that it will conduct a site assessment for California tiger salamander ("CTS") which is improper deferral of information needed to ascertain the impacts of the project to the California tiger salamander. The site assessment should be conducted and discussed as part of the RDEIR to avoid vulnerability to legal challenge for improper deferral of mitigation. Conducting the site assessment at a later date does not fully disclose all the potential impacts and improperly defers formulation of mitigation measures. The document states that surveys are to be conducted over two years, if the site assessment shows that CTS potentially occur at the site, but by then, according to the timeline stated in the RDEIR the project will be 	

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	<p>facing the wind and scanning the ground. Dixon, et. al. (1957) reported white-tailed kites fly rather low and usually not more than 200 feet above the ground.</p> <p>Section 15064(b) of the CEQA Guidelines states “<i>The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data</i>”; and in Section 15151, “<i>disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among experts.</i>”</p> <p>The second paragraph of the RDEIR under Impact Bio-5 has been revised as follows:</p> <p style="padding-left: 40px;">White tailed-kite is present in the project area and has been observed flying over and foraging in the project area. However, white-tailed kites typically soar, glide, and hover less than 30 meters above the ground in search of prey. It hunts almost exclusively by hovering from 5 to 25 meters in height (Dixon et. al., 1957, Dunk, and 1995 and Warner and Rudd, 1975 [in Technology Associates, 2009]). <u>There may be anecdotal reports of white-tailed kites occasionally flying higher than 30 meters. However, there is substantial evidence that supports white-tailed kites soaring less than 30 meters above ground.</u></p> <p>G-14 The progress of the Avian Mortality Monitoring Study for the Solano Wind Project Phases 1 and 2 has been delayed by lengthy transmission outages caused by the reconductoring of the interconnected PG&E transmission line, as well as other project-related outages. As has been reported to the Solano County Avian Technical Advisory Committee (TAC), SMUD intends to complete the Phase 1 & 2 Avian Mortality Study and issue the report in the second quarter of 2010. Thus, the avian mortality monitoring reports referenced in the RDEIR and the RFEIR represent the most current, applicable, and complete documents available. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p>

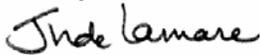
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	<p>G-15 Implementation of Mitigation BIO-5a, BIO-5b, and BIO-5c will reduce the avian mortality rate to the extent feasible. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>G-16 SMUD disagrees with FOSH’s assertion that the pressure of construction crews would obviate implementation of Mitigation BIO-6a. Mitigation Measures BIO-6a and 6b provide for site assessments and focused protocol-level surveys if necessary prior to construction, as well as measures to avoid the types of habitats usually considered suitable for red-legged frog habitat. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>G-17 As stated in Section 4.5 of the RDEIR, although CTS is unlikely to occur on the project site, wetland habitat is present in the project area. These areas were mapped using a conservative approach to identify all features that could be considered jurisdictional wetlands or waters most likely to support CTS in the unlikely event CTS is found on site. Please see the revised mitigation BIO-8a and Mitigation BIO-8b in the RFEIR.</p> <p>As stated in Section 4.5 of the RDEIR, although CTS is unlikely to occur on the project site, wetland habitat is present in the project area. These areas were mapped using a conservative approach to identify all features that could be considered jurisdictional wetlands or waters most likely to support CTS in the unlikely event CTS is found on site.</p> <p>SMUD will locate WTGs, transformers, roads, and other facilities outside of and away from the areas identified as suitable habitat. However, based on the Jones & Stokes surveys and the CNDDDB records search, the closest known occurrence of CTS is more than 3 miles away. In addition, SMUD believes that identifying areas of suitable habitat for CTS in accordance with the USFWS’ <i>Interim Guidance on Site Assessment and Field Surveys for Determining Presence of Negative Finding of the California Tiger Salamander, October 2003</i>, as stated in Mitigation BIO-8b combined with mitigation measures consistent with those in the Shiloh II DEIR,</p>

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<p>constructed, or in construction and close to operation. Surveys should be conducted prior to construction and prior to the FEIR so impacts and mitigation can be fully disclosed.</p>	<p>does not constitute deferred mitigation. A clarification of these mitigation measures has been added to Mitigation BIO-8b.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no further changes to the EIR is required.</p> <p>SMUD does not agree that a conservation easement around an alternate or artificial burrow is required to reduce the impact to less than significant. Mitigation BIO-4b and Mitigation BIO-4c are sufficient to fully mitigate impacts to less than significant. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>Mitigation Measures BIO-5a through BIO-5d mitigate the impacts to avian and bat species to the extent feasible. See response to comment E-24. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>SMUD notes FOSH’s objection to off-site mitigation that is anything less than permanent and non-revocable. Mitigation BIO-5b is based on the methodology used in the Final Environmental Impact Report, Shiloh II, 2007, prepared for the Solano County Department of Resource Management, submitted by Ecology and Environment, Inc., Section 4.5.5, Mitigation BIO-5c. SMUD considers a conservation easement an encumbrance or a transfer of a legally enforceable land preservation agreement between SMUD and a “land trust” agency.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p> <p>SMUD considers the implementation of Mitigation BIO-5c to go beyond what other wind energy developers have implemented in the WRA. SMUD’s one-time payment of \$50,000 to the UC Davis California Raptor Center is approximately 50 percent of the Raptor Center’s 2010 operating budget.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p>	
<ul style="list-style-type: none"> Mitigation Bio-4b & 4c – The mitigation measure says active nests will be avoided and then measure 4c discusses what happens when burrowing owl nests are not avoided. It should also be clarified that if habitat compensation is provided onsite there is a conservation easement recorded to ensure habitat is protected in perpetuity. It is implied, but the measures need to be clarified that during the breeding season burrowing owls will be avoided, and outside the breeding season there are certain steps that will be taken. It seems unlikely that habitat compensation will occur off-site because it is 6.5 acres of contiguous habitat, which seems feasible onsite. The RDEIR should specify 6.5 acres of contiguous habitat in a circle around the burrow. 		G-17 Cont'd
<ul style="list-style-type: none"> Mitigation Bio-5a – Bullet 5 – Not only should disproportionate mortality be analyzed, it should be addressed and reduced using measures such as seasonal shutdown, or stopping the free spin of the blades when power is not being generated. Bullet 6 – SMUD Phase 1 and 1a data should also be included in the analysis. There is a notable absence of discussion of specific measures that may be considered to reduce bird and bat mortality and lack of measures to implement measures to avoid mortality to birds and bats. CEQA requires that all possible measures to reduce mortality to birds and bats should be developed and considered using the best available scientific and factual information, and that feasible measures be adopted which would reduce mortality to birds and bats to less than significant. Such potential measures should be fully discussed in the RDEIR, including reasons why any of them may be rejected, and feasible mitigation measures adopted. CEQA’s requirement that mitigation measures be developed which avoid or reduce impacts to the maximum extent feasible has not been met. 		G-18
<ul style="list-style-type: none"> Mitigation Bio-5b – Conservation easements should be provided in perpetuity and not just for the life of the SMUD project. The latter option should be deleted from the proposed mitigation measure. A habitat and management plan should be provided when the land is conserved and the easement recorded, and prior to the time that the disturbance occurs. If a management plan is not developed for three years after power comes on line it will be years (construction time period, + three years + time lag for enhancing/restoring habitat) after the impact occurs before the mitigation will benefit the species impacted. Please explain why SMUD feels that a management plan cannot be adopted when the easement land is acquired. 		G-19
<ul style="list-style-type: none"> Mitigation Bio-5c – Instead of a one-time payment to the UC Davis Raptor Center SMUD should provide funds at the end of each year based on the number of injured birds taken to the Center from the project in the previous year. SMUD should provide the money for the actual cost of the rehabilitation over the life of the wind project. A payment of \$50,000 is grossly inadequate. Please explain why SMUD feels that a one-time payment of \$50,000 is adequate. 		G-20
<ul style="list-style-type: none"> Mitigation Bio-6a – A site assessment for suitable California red-legged frog habitat should be completed prior to a preconstruction survey. Waiting to determine suitable habitat and then conducting protocol level surveys until preconstruction creates a difficult timeline for the 		G-21
<ul style="list-style-type: none"> Mitigation Bio-6a – A site assessment for suitable California red-legged frog habitat should be completed prior to a preconstruction survey. Waiting to determine suitable habitat and then conducting protocol level surveys until preconstruction creates a difficult timeline for the 	G-22	

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<p>biologist to follow, and constitutes improper deferral of mitigation, which violates CEQA. Knowing ahead of time if there is suitable habitat, and then conducting suitable surveys allows for permits to be issued and any additional mitigation measures put in place prior to construction.</p> <p>• Mitigation Bio- 8a & b – It is unclear whether SMUD plans on avoiding all California tiger salamander breeding and aestivating habitat or whether habitat will be surveyed. The same comment is true for the California tiger salamander that is addressed in the comment above for California red-legged frog. Surveys should be done in advance of preconstruction surveys. In the paragraph it states mitigation will be provided in a 2:1 and then the bulleted items give a range. It should be clarified what SMUD proposes to mitigate at. The mitigation should also include a conservation easement in perpetuity whether on- or off-site.</p> <p>Sincerely,  Jude Lamare, President, Friends of the Swainson's Hawk</p>	<p style="text-align: center;">} G-22 Cont'd</p> <p style="text-align: center;">} G-23</p> <p>G-22 With the additional clarification of Mitigation Measure BIO-6a in the RFEIR, consistent with the USFWS' (2005) <i>Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog</i>, SMUD considers the implementation of Mitigation BIO-6b to be fully adequate to reduce impact to less than significant. Coordination with the USFWS Sacramento Fish and Wildlife Office regarding site assessment and field survey results will also determine if additional mitigation for re-legged frog will be required. The commenter does not identify any new impact or mitigation for the project, and no further change to the EIR is required.</p> <p>G-23 Refer to response to comment G-17. If California tiger salamander is present and SMUD cannot avoid disturbance of suitable habitat, then SMUD will seek incidental take authorization through Section 7 of the Endangered Species Act. SMUD agrees with commenter, if mitigation for California tiger salamander requires establishing a conservation easement, the easement will be created in perpetuity.</p>

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<p>Comment letter.</p> <p>From: Albert G Medvitz [mailto:amedvitz@frontiernet.net] Sent: Monday, January 18, 2010 2:22 PM To: Lonn Maier; Jon Bertolino; James Field; Michael Gianunzio; Patrick Durham Cc: Morgan Doran; Jeanne McCormack Subject: Comments on Windmills Phase 3</p> <p>Dear Smud Representatives:</p> <p>The following are points about the Phase three of the SMUD Windmill Project we conveyed to you at the Fairfield meeting last year and when you visited us on our property in December.</p> <ol style="list-style-type: none"> 1. Thank you very much for your openness to our concerns and for SMUD's new approach to dealing with its neighbors. We are particularly grateful for the change in the project which removes from your plan the machines originally proposed to be constructed near our property line. } H-1 2. We have grave concerns about SMUD's weed management. In particular, a monoculture of <i>Lepidium latifolium</i> (Pepper Weed) exists in the southeast quadrant of your property. We are continually battling the expansion of this invasive species on our property. <i>Lepidium latifolium</i> produces a very light seed and and the upwind location of the weed on your property continues to reseed on our property increase our costs and management difficulties. Any project must include a viable weed management strategy. } H-2 3. In the past SMUD did not provide sufficient financial support for its agricultural lessees to construct and maintain appropriate field fencing between our properties. Typical fencing for cattle does not prevent major predators from gaining easy access to our property from yours. The plan must include sufficient guarantees of proper fencing and shared responsibility in controlling predators not protected by the Endangered Species Act. } H-3 4. The cumulative effect of the presence of large numbers of synchronously blinking red lights atop the windmill structures has created a blight on our night environment. These are visible from as far away as Vacacille where friends have complained to us about them. The current wisdom is that these light are required by the FFA. I am told by local pilots that they are not necessary, certainly in the numbers that currently exist. They will most certainly have a negative economic impact on any hopes of tourism development in the region. There must be provisions for reducing their number and most certainly avoiding the synchrony of their operation. } H-4 5. In the past SMUD demolished important historical structure without public comment , most notably the Toland House. The plan must include strategies of historic preservation of structures and for as much of the landscape as possible. } H-5 <p>In conclusion, it has been a great pleasure meeting you and we hope we can continue in future our new cooperative relationship.</p> <p>Yours sincerely,</p> <p>Albert G. Medvitz P.O Box 565 Rio Vista, CA 94571 707-249-7589 (cell) 707-374-2957 (office) 707-374-6327 (fax) amedvitz@frontiernet.net</p>	<div style="text-align: right; margin-right: 10px;"> H </div> <p>H-1 SMUD appreciates the comments provided by Mr Medvitz in regards to the Solano Wind Phase 3 project RDEIR. SMUD looks forward to continued cooperative efforts with its neighbors in the Montezuma Hills.</p> <p>H-2 SMUD acknowledges the commenter's concerns regarding weed management issues in the area of the Solano Wind Phase 3 project. SMUD is currently developing management strategies to effectively control invasive weed species such as Pepper Weed. SMUD looks forward to working closely with its neighbors in the development of these management strategies. The commenter has not identified any new impacts or mitigation for the project, and no further changes to the EIR are required.</p> <p>H-3 SMUD acknowledges the commenter's concerns regarding providing and maintaining suitable fencing between neighboring properties. SMUD is currently developing management strategies to address this issue. SMUD looks forward to working closely with its neighbors in the development of these management strategies.</p> <p>H-4 SMUD is required to install safety lighting on the wind turbines in the manner and location specified by the FAA. The safety lighting would be in accordance with FAA Advisory Circular 70/7460-1K Obstruction Marking and Lighting. Aesthetic impacts were fully analyzed in Section 4.2 of the previously circulated DEIR. Although mitigation is proposed to reduce the visual impact of the tower lights, the impact was determined to be significant and unavoidable after implementation of mitigation. (Refer to Impact VIS-4 and Mitigation Measure VIS-4). The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p> <p>H-5 SMUD acknowledges the commenter's concerns regarding preservation of structures and landscapes. As noted in the EIR, several abandoned residential and agricultural structures exist on the project property. In 2009, SMUD commissioned a Historic Resources Inventory and Evaluation Report (JRP Historic, 2009) assessing these structures. The results indicate that no structures on</p>

SMUD Solano Phase 3 Project Recirculated Final EIR Response to Comments

Comment	Response
	<p>the property appear to be eligible for inclusion in the California Register of Historic Resources (CRHR) and, thus, are not historic resources for the purposes of CEQA. SMUD is currently developing management strategies for rehabilitation, maintenance, and/or demolition of the remaining structures on the property for safety-related issues and potential agricultural use.</p> <p>The commenter does not identify any new impact or mitigation for the project, and no change to the EIR is required.</p>

CHAPTER 3
RECIRCULATED DRAFT EIR DISTRIBUTION LIST, STATE
CLEARINGHOUSE CORRESPONDENCE AND PUBLIC NOTICING
OF RECIRCULATED DRAFT EIR

Recirculated DEIR Distribution List, State Clearinghouse Chapter 3 Correspondence and Public Noticing of Recirculated DEIR



NOTICE OF AVAILABILITY OF THE RECIRCULATED DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE SOLANO WIND PROJECT PHASE 3 STATE CLEARINGHOUSE NO. 2006012017

DATE: October 7, 2009

TO: INTERESTED PARTIES

FROM: SACRAMENTO MUNICIPAL UTILITY DISTRICT

RE: Recirculated Draft Environmental Impact Report for the SMUD Solano Wind Project Phase 3 for the proposed SMUD Solano Wind Project is available for public review beginning October 7, 2009.

In its continuing commitment to clean renewable power, Sacramento Municipal Utility District (SMUD) proposes to construct and operate the third phase of the Solano Wind Project. SMUD operates and maintains an existing wind project in Solano County (phases 1 and 2) which has installed 102 megawatts (MWs) of wind energy since 2007. Phase 3 will add an additional maximum of 128 MW, totaling up to 230 MWs of clean renewable power.

Project Location and Description: The project consists of installing up to 75 wind turbine generators and associated facilities in the Montezuma Hill region of southern Solano County, southwest of the town of Rio Vista (Figure 1).

The project is located in the southern portion of Solano County, California, north of the confluence of the Sacramento and San Joaquin Rivers, approximately 6 miles west of Rio Vista, and 16 miles southeast of Fairfield. The project area, defined as the 4,244-acre property and the corridors supporting the collection system, is south of Montezuma Hills Road and east of Stratton Lane. Primary access to the project area is from Montezuma Hills Road via Toland Lane. The project is bordered to the south and southeast by the Sacramento River. The property is owned by SMUD. The project includes the construction and operation of wind turbine generators, an associated underground collection system, access roads, two meteorological towers, an operation and maintenance building, and related facilities.

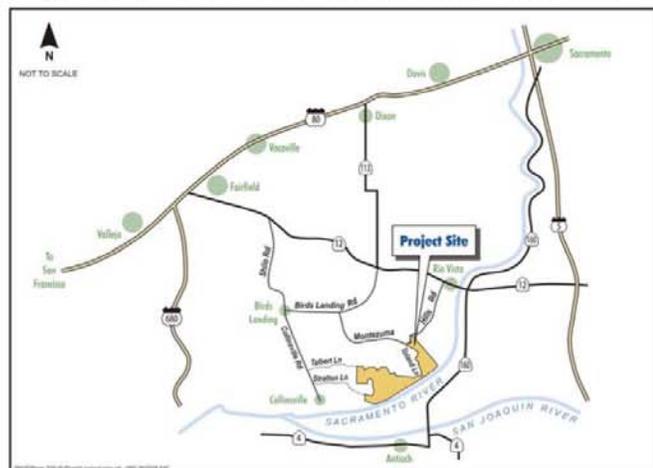


Figure 1. Location of SMUD Solano Wind Project.

Potential Environmental Effects: SMUD has prepared a draft Recirculated Environmental Impact Report (REIR) which identifies potentially significant unmitigated environmental impacts for aesthetics, air quality, and biological resources. All other potential impacts have been determined to be less than significant after mitigation.

Recirculated DEIR Distribution List, State Clearinghouse Chapter 3 Correspondence and Public Noticing of Recirculated DEIR

Document Review and Availability: The public comment period is from **October 7 through November 20, 2009**. The recirculated draft Environmental Impact Report is available for public review on SMUD's web page at <http://www.smud.org/about/reports-ceqa.html>. Hardcopies may be reviewed at the following locations:

- Sacramento Central Library, 828 I Street, Sacramento
- Rio Vista Public Library, 44 South Second Street, Rio Vista
- SMUD Headquarters Office, 6201 "S" Street, Sacramento

Comments may be submitted to:

Lonn Maier, Environmental Project Manager
Sacramento Municipal Utility District
P.O. Box 15830 MS B203
Sacramento, CA 95852
Phone: (916) 732-6566
Fax: (916) 732-6890
lmaier@smud.org

Mitigation measures are described in more detail in the Environmental Impacts section of the draft and in the Mitigation Monitoring Plan, which would be adopted concurrent with this REIR.

Comments received during the public review period (prior to November 20, 2009) will be addressed in the final REIR which will be issued mid-December 2009.

A public meeting will be held on **October 28, 2009** at the Solano County Administrative Center, 675 Texas Street, Fairfield. The meeting will be held from 6:00 p.m. to 7:30 p.m.

The SMUD Board of Directors will consider adoption of the final EIR for the project at two meetings at which the public may make verbal comments. These meetings will be held at SMUD on **Wednesday January 6, 2010** (Integrated Resources and Customer Services Committee) at 5:00 p.m. and **Thursday January 7, 2010** (SMUD Board meeting) at 6:00 p.m. at the SMUD HCC and Board auditorium respectively, both located at 6201 "S" Street in Sacramento.

We appreciate your time and effort to review the recirculated draft EIR. Your input to this project will be considered as part of future decisions to be made by SMUD. Please feel free to call me at (916) 732-6566 if you have any questions.



Lonn Maier
Environmental Management
Sacramento Municipal Utility District
PO Box 15830 MS B203
Sacramento, CA 95852
(916) 732-6566
lmaier@smud.org

Recirculated DEIR Distribution List, State Clearinghouse Chapter 3 Correspondence and Public Noticing of Recirculated DEIR

AGENCIES, COMPANIES AND INDIVIDUALS THAT RECEIVED THE DRAFT EIR NOTICE OF AVAILABILITY

Alan Freese, Birds Landing	Frank & Dorris Marianno, Fairfield
Albert Medvitz, Rio Vista	Fredrick Anderson, Rio Vista
Alfred A Hunt, Rio Vista	Gene Celli, Stockton
Alfred R Medders, Rio Vista	George Dierssen III, Clayton
Alyce N Shoji, San Jose	George Krenecki, Rio Vista
Annabel Lemon Laplant Elora, Fullerton	Harry & Joanne Hansen, Birds Landing
Anthony P Demattei, Antioch	Irwin E. Anderson, Rio Vista
Antone Myron Cabral, Rio Vista	James White, Oakland
B Moita Adelaide, Clayton	Jan Vick, Rio Vista
Bay Area Air Quality Management District	Jay Uhalt, Rio Vista
Benny R Venegas, Walnut Creek	Jeanne Anderson, Birds Landing
Brooks AFB	John Bennice, Rio Vista
Bruce E Davis, Granite Bay	Joseph Davi, Rio Vista
Bruce E Goble, Rio Vista	Joseph Huyssoon, Rio Vista
California Delta Chamber of Commerce and Visitors Bureau	Joseph Peterson, Rio Vista
California Delta Protection Commission	Julio Delchiaro, Antioch
California Department of Boating and Waterways	Ken Solomon, Pacifica
California Department of Conservation	Kenneth Krohncke, Rio Vista
California Department of Food and Agriculture	Knights Landing Community Services District
California Department of Forestry and Fire Protection	Knights Landing District /RD 730
California Department of Parks and Recreation	Larry Etherton, Rio Vista
California Department of Toxic Substances Control	Linday Gray, Martinez
California Department of Water Resources	Lisa Gail Peters, Rio Vista
California Dept. of Oil, Gas, and Geothermal Resources	Manases Gutierrez, Rio Vista
California Energy Commission	Montezuma Fire Protection District
California Governor's Office of Planning and Research	National Audubon Society
California Highway Patrol	NextEra
California Integrated Waste Management Board	Noack Betz, Rio Vista
California Native American Heritage Commission	Pacific Gas and Electric
California Office of Emergency Services	Paul Thayer, Sacramento
California Office of Historic Preservation	Philip Snodgrass, Rio Vista
California Public Utilities Commission	Richard Anderson, Rio Vista
California Reclamation Board	Richard Russell, Sacramento
California Regional Water Quality Control Board	Richard Silva, Rio Vista
California S.F. Bay Conservation & Dev't Comm.	Rio Vista Chamber of Commerce
California State Clearinghouse	Robert Jarrard, Yucca Valley
California State Lands Commission	Rodney Adams, Walnut Creek
	Ross Dibble, Rio Vista
Charles Mc Caslin, Rio Vista	Sacramento County Clerk's Office
Charles Streckfuss, Woodland	Scott AFB
Charles Upham, Rio Vista	Steve Giacoma, Isleton

**Recirculated DEIR Distribution List, State Clearinghouse
Chapter 3 Correspondence and Public Noticing of Recirculated DEIR**

**AGENCIES, COMPANIES AND INDIVIDUALS THAT RECEIVED
THE DRAFT EIR NOTICE OF AVAILABILITY**

Christopher Gulick, Rio Vista	Thomas McCormack, Rio Vista
City of Rio Vista	Tia Hamilton, Sacramento
Danny Bowers, Rio Vista	Tony Rosenthal, Brentwood
David Frye, Rio Vista	U.S. Army Corps of Engineers
Delta Protection Commission	U.S. Army Corps of Engineers
Dennis Del Chiaro, Rio Vista	U.S. Bureau of Reclamation
Department of Transportation	U.S. Department of Transportation
Dexter Mayhood III, Rio Vista	U.S. Environmental Protection Agency
Don Springer, Sacramento	USAF
E Riggio Agm Ludmila, Rio Vista	Victor Swanson, Rio Vista
Edward Lee Del Chiaro, Oakley	Virginia Hale, Rio Vista
Emigh Livestock	Walter Haines, Bay Point
Emigh Ltd.	Wayne Murphy, Rio Vista
enXco	Western Area Power Administration
Eric Fisher, Rio Vista	William Ciaramitaro, Rio Vista
Everett Anderson, Rio Vista	
Federal Aviation Administration	
Fontaine Dibble, Folsom	
FPL Energy LLC	

**AGENCIES AND COMPANIES THAT RECEIVED
THE RECIRCULATED DRAFT EIR**

California Department of Fish and Game	Solano County Department of Resource Management
Solano County AG Commissioner	Solano County Farm Bureau
Solano County Airport Land Use Committee	Solano County Resource Management
Solano County Airport Land Use Commission	Solano Economic Development Corporation
Solano County Board of Supervisors	Somach, Simmons & Dunn Attorneys At Law
Solano County Clerk	Travis AFB
Solano County Counsel	U.S. Fish and Wildlife Service

**Recirculated DEIR Distribution List, State Clearinghouse
Chapter 3 Correspondence and Public Noticing of Recirculated DEIR**



ARNOLD SCHWARZENEGGER
GOVERNOR

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT



CYNTHIA BRYANT
DIRECTOR

January 19, 2010

Lonn Maier
Sacramento Municipal Utility District
P.O. Box 15830
Sacramento, CA 95852

Subject: Solano Wind Project Phase 3
SCH#: 2006012017

Dear Lonn Maier:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on January 14, 2010, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

"A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Acting Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

PUBLIC NOTICE

Public Comment Period Extended SMUD Solano Wind Project Phase 3 Draft Recirculated Environmental Impact Report

Sacramento Municipal Utility District (SMUD) has prepared a draft Recirculated Environmental Impact Report (REIR) for the third phase of the proposed Solano Wind Project, located in southern Solano County near the town of Rio Vista. SMUD proposes to construct and operate the third phase of the Solano Wind Project, which will add up to 128 megawatts of clean reliable energy to SMUD's generation portfolio. This document has been prepared in compliance with the California Environmental Quality Act (CEQA). SMUD is the CEQA lead agency for the project.

The draft REIR was released for circulation to appropriate resource agencies and to interested parties on October 7, 2009 for a public review period that has been extended to January 15, 2010. The document is available on SMUD's web site at smud.org/about/reports/ceqa; hardcopies may be reviewed at the following locations:

- Sacramento Central Library, 828 I Street, Sacramento
- Rio Vista Public Library, 44 South Second Street, Rio Vista
- Sacramento Municipal Utility District Headquarters Office, 6201 "S" Street, Sacramento

Written comments should be submitted to Jim Field; SMUD; PO Box 15830, MS B355; Sacramento, CA 95852-1830 or at jfield@smud.org before 5 p.m., January 15, 2010. If you would like a copy of the environmental document or have questions, please call (916) 732-6319.

The SMUD Board of Directors will consider adoption of the final EIR at two meetings at which the public may make verbal comments. The Board will take no approval action at the first meeting, which is the Integrated Resources and Customer Service Committee meeting. Both meetings will be held at the SMUD Headquarters Building located at 6201 "S" Street in Sacramento.

SMUD's Integrated Resources and Customer Service Committee Meeting	SMUD Board of Directors Meeting
Wednesday, March 3, 2010; 5:00 p.m. in the HCC room	Thursday, March 4, 2010; 6:00 p.m. in the Auditorium

Accommodations are available for disabled individuals. If you need a hearing assistance device or other aid, or have other questions, please call (916) 732-6319.



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SMUD

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CHAPTER 4
ANNOTATED RECIRCULATED DRAFT EIR

According to CEQA Guidelines (14 CCR Section 15132), the FEIR must include the RDEIR or a revision of the draft. The FEIR in this case consists of the RDEIR, as amended by the following sections where changes have been made to provide additional clarification, corrections or changes to the RDEIR. The following sections list, in order of the document, effective changes to the RDEIR incorporated in the FEIR.

1.2 ENVIRONMENTAL IMPACTS AND MITIGATION

(p. 1-4)

Table 1-2. Continued

Impact	Mitigation	Significance After Mitigation
<p>Impact AIR-1: The project would cause a short-term increase in criteria air pollutants and precursor emissions from construction activities.</p>	<p>Mitigation AIR-1: Implement industry best management practices (BMPs) to reduce vehicle and equipment emissions and dust emissions pursuant to mitigation measures recommended by the Yolo/Solano <u>Bay Area</u> Air Quality Management District.</p>	<p>Significant</p>
<p>Impact BIO-5: WTG operation could result in mortality of avian species, causing a substantial adverse effect on species identified as sensitive or on special status species.</p>	<p>Mitigation BIO-5a: Implement a Bird and Bat Mortality Monitoring Program to determine if mortality is occurring.</p> <p>Mitigation BIO-5b: Provide off-site mitigation land to support and enhance raptor populations.</p> <p>Mitigation BIO-5c: Provide Funding for Raptor Rehabilitation.</p> <p>Mitigation BIO-5d: Obtain an Incidental Take Permit</p>	<p>Potentially significant</p>

SMUD = Sacramento Municipal Utility District

WTG = wind turbine generator

(p. 1-4)

1.3 CUMULATIVE IMPACTS

Solano County designated the Collinsville-Montezuma Hills WRA in 1987. Since this designation, several hundred WTGs have been installed there. Today, ~~853~~ 833 WTGs have a total energy production capacity of ~~694~~ 624 MW in the WRA. An additional 112 to 178 WTGs and up to 365 MWs of capacity are currently proposed, representing the various scenarios for Montezuma Wind,

Shiloh III, and SMUD Solano Wind Phase 3 projects. Two speculative projects, Montezuma Wind II and Shiloh IV, are currently being discussed with Solano County. (see Table 1-3).

(p. 1-5)

Table 1-3. Existing and Planned Wind Plants

Project	Number of Turbines	Turbine Rating	Total Megawatts	Status
SMUD				
Phase 1	23 Vestas V-47	660 kilowatts (kW)	15 MW	Built in 2004 and in current operation.
Phase 2A	8 Vestas V-90	3 MW	24 MW	In operation May 2006.
Phase 2B	21 Vestas V-90	3 MW	63 MW	Online 12/07 and currently operating.
Phase 3	36-75 WTG	1.5-2.6 MW	128 MW (net)	SMUD EIR Certification pending recirculation.
High Winds				
NextEra Energy (formerly FPL)	90 Vestas V-80	1.8 MW	162 MW	Built in 2003 and currently in operation.
enXco V (formerly U.S. Windpower)				
enXco	510 U.S. Windpower KCS-56-100	100 kW	51 MW	Built in 1989-1990 and currently in operation.
enXco RePowering	6 GE 1.5	1.5 MW	9 MW	Built in 2006 and currently in operation.
Shiloh I				
Iberdrola Energy (formerly PPM)	120 GE 1.5	1.5 MW	180 MW	Built in 2006 and currently in operation.
Shiloh II				
enXco	75 RePower MM92	2.0 MW	150 MW	Built in 2008 and currently in operation.
Montezuma Wind				
NextEra Energy (future)	31 Siemens	1.5 to 2.3 MW	34 to 37 MW	FEIR and Use Permit pending resolution of Travis AFB radar issues.
enXco V (formerly U.S. Windpower) Shiloh III				
Repowering (future Shiloh III) Shiloh Wind Partners L.L.C. (future)	Proposed replacement of 510 KCS-56-100 WTGs with GE 1.5 or similar WTG 60-80 WTGs (Replacement of KCS-56-100 WTGs)	— 1.8 to 2.5 MW	— Up to 200 MW	NOP has not yet been released. December 3, 2009.
Montezuma Wind II				

Project	Number of Turbines	Turbine Rating	Total Megawatts	Status
<u>NextEra Energy (future)</u>	<u>Up to 35 WTGs (Replacement of KCS-56-100 WTGs)</u>	—	—	<u>NOP has not yet been released.</u>
Shiloh IV				
<u>enXco (future)</u>	<u>79 WTG (Replacement of KCS-56-100 WTGs)</u>	—	—	<u>NOP has not yet been released.</u>

AFB = Air Force Base
 FEIR = Final Environmental Impact Report
 FPL = Florida Power and Light
 PPM = PPM Energy
 SCH = State Clearing House
 AFB = Travis Air Force Base
 WTGs = wind turbine generators

(p. 1-8)

Avian and Bat Mortality. Avian mortality from WTGs has been studied extensively nationally and internationally, with mixed results. At Altamont Pass in California, WTGs are responsible for several golden eagle deaths every year, and biologists have suggested that the local population cannot tolerate these annual losses and remain healthy. In other studies, including the recent report, at Shiloh II and Montezuma Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California, Final Report, October 2009 (Curry and Kerlinger, 2009), north of the project area, biologists have observed that while some birds are, in fact, killed in the area by the WTGs, the number of birds lost to this cause is not significant compared to other sources of mortality, such as collisions with buildings and vehicles and losses from predation. The subject continues to be controversial and is evaluated on a case-by-case basis.

(p. 1-11)

Table 1-1. Summary of Environmental Impacts and Mitigation Measures
 (For specific mitigation and detailed descriptions, please refer to individual chapters)

Potential Impact	Level of Significance Before Mitigation	Mitigation Measure	Mitigation Monitoring Program	Level of Significance After Mitigation
Air Quality				
Impact AIR-1: The project would cause a short-term increase in criteria air pollutants and precursor emissions from construction activities.	Significant	Mitigation AIR-1: Implement industry best management practices (BMPs) to reduce vehicle and equipment emissions and dust emissions pursuant to mitigation measures recommended by the Yolo/Solano Bay Area Air Quality Management District.	Yes	Significant

(p.2-1)

2.0 SUMMARY OF PROJECT DESCRIPTION REVISIONS

6. ~~To incorporate the latest Shiloh II EIR analysis, as approved by Solano County, the minimum safety setback for WTGs is revised to 1.25 times the calculated maximum blade throw distance. The recent County-approved Shiloh II EIR included an alternate setback to the minimum setback requirement of three times the WTG height for public road rights-of-way and overhead transmission line easements. To incorporate the latest Shiloh II EIR analysis, as approved by Solano County, the minimum safety setback for WTGs is revised to 1.25 times the calculated maximum blade throw distance. No WTGs would be sited closer than 3 times the WTG height from any public road right-of-way. All WTGs (including WTG blades) would be located outside of existing overhead transmission line rights-of-way. The minimum safety setback for WTGs adjacent to overhead electrical transmission lines on SMUD-owned or -controlled property would be 1.25 times the calculated maximum blade throw distance from the existing transmission lines and support structures.~~
-

(p. 2-9)

2.4.1 Collinsville-Montezuma Hills Wind Resource Area

The project would be located in the Collinsville-Montezuma Hills WRA. Solano County designated this area as suitable for wind energy development in its *Wind Turbine Siting Plan and Environmental Impact Report* (Siting Plan) (Solano County, 1987), based on wind energy monitoring and assessment studies that were prepared in the late 1970s and 1980s by the California Energy Commission (CEC), PG&E, and the Bureau of Reclamation (USBR). These studies determined that the WRA experienced enough strong and steady winds to support commercial wind plants. The Siting Plan indicates that one of the county's planning goals is to guide wind plant development in this area "in a manner which encourages use of wind as a renewable resource and also protects the county's natural resources and public health and safety." The Siting Plan has since been replaced by various provisions of the 2008 Solano County General Plan. (Solano County 2008)

(p. 2-10)

2.4.4 WTG Siting

- **Distance from public roads.** The Solano County General Plan requires a minimum setback of 3 times the turbine height for any public roadway. WTG distance from public roads, transmission lines, and property boundaries is determined based on maintaining public safety. The easternmost end of Talbert Lane is the only public road adjacent to or near the proposed project WTG area. Only the most westerly WTG siting area closest to Talbert Lane is ~~expected to be potentially within 3 times the WTG turbine height from a public roadway. Otherwise, a~~ All of the Phase 3 WTGs are would be located to maintain a minimum setback from adjacent public roads

rights-of-way, which is 3 times the WTG turbine height (for a 150-meter WTG turbine height, this would be 450 meters or 1,476 feet), as specified by the Solano County Wind Turbine Siting Plan. If a setback of less than 3 times the WTG height is required to optimize the WTG siting, a minimum setback of 1.25 times the calculated maximum blade throw will be used. The calculation methodology shall be consistent with that used in the Final EIR (FEIR), Shiloh II Wind Plant Project (Ecology and Environment, Inc., 2007). The WTGs analyzed in the Shiloh II EIR (the General Electric [GE] 1.5sl and the REpower MM92) are two of the WTGs within the range of WTGs analyzed in this EIR for the Phase 3 project. They are also typical of the size and rotational speed of the range of WTGs identified in this EIR for the Phase 3 project. Thus, if one of these WTG types were chosen for the project, the maximum blade throw and associated minimum setback distances for the Phase 3 project would be the same as those calculated and presented in the Shiloh II EIR (for the same tower height and base elevation relative to the potential impact zone). For example, the minimum safety setbacks for the GE 1.5sl and the REpower MM92 are 619 feet and 678 feet, respectively. If another WTG configuration, other than one of these two, is chosen (from within the parameters described and analyzed in this EIR) the calculated blade throw times a factor of 1.25 will be used as the minimum setback.

(p. 2-11)

- **Distances from transmission lines (safety related).** The WTGs are (including the blades) would be located to maintain entirely outside of the transmission line easement and no closer than a minimum safety setback distance from adjacent transmission lines and support structures that is 1.25 times the maximum blade throw distance. The minimum safety setback calculation methodology shall be consistent with that used in the Final EIR (FEIR), Shiloh II Wind Plant Project (Ecology and Environment, Inc., 2007). The WTGs analyzed in the Shiloh II EIR (the General Electric [GE] 1.5sl and the REpower MM92) are two of the WTGs within the range of WTGs analyzed in this EIR for the Phase 3 project. They are also typical of the size and rotational speed of the range of WTGs identified in this EIR for the Phase 3 project. Thus, if one of these WTG types were chosen for the project, the maximum blade throw and associated minimum setback distances for the Phase 3 project would be the same as those calculated and presented in the Shiloh II EIR (for the same tower height and base elevation relative to the potential transmission line or support structure's impact zone). For example, the minimum safety setbacks for the GE 1.5sl and the REpower MM92 are 619 feet and 678 feet, respectively. If another WTG configuration, other than one of these two, is chosen (from within the parameters described and analyzed in this EIR), the calculated blade throw times a factor of 1.25 will be used as the minimum setback. For a discussion of the calculation process, see the proceeding bullet point.
- **Distance from property boundaries (safety related).** Except for the eastern-most project property boundary line, there are no residences or other sensitive land uses along any of the projects property boundary lines. The three WTG siting areas closest to the eastern-most property line have been removed from consideration in this EIR. The remaining WTG siting areas nearest to the eastern-most property line are would be more than 3 times the WTG turbine height from the property line. Elsewhere, because there are no residences or other sensitive land uses along any of the other projects' property boundary lines, WTGs are would be located to maintain a minimum setback from the property boundaries adjacent to the project boundary of

1.25 times the calculated maximum blade throw distance for the particular WTG selected. The calculation methodology would be the same as that described for ~~public road~~ overhead transmission line setbacks, above.

- **Distance from railroads (safety related).** No railroads are in the project area. Therefore, no siting restrictions relative to railroads apply.
- **Distance from residences (safety related).** No residences are in the project area or within 3 times the WTG height of any planned WTGs. (~~Solano County, 1987.~~) The closest residence is ~~3,600~~ approximately 2800 feet from the project boundary. Therefore, no additional siting restrictions apply relative to residences.
- **Distances from property boundaries (noise related).** The ~~Wind Turbine Siting Plan~~ Solano County General Plan (Solano County, ~~1987~~ 2008) and Solano County zoning regulations pertaining to WTG permitting state that WTG noise must not exceed a community noise equivalent level (CNEL) value of 50 decibels A-scale (dBA) at any residential areas or individual dwelling units, or 60 dBA at any other property line. Additionally, no WTG are to be permitted within one mile of a residence. There are no residences in the project area. The closest residence is more than one mile from the nearest project WTG site.
- **Avoidance of sensitive biological resources.** To avoid impacts on waters of the United States (U.S.) and protected species to the extent feasible, WTGs are sited outside of drainage areas, raptor nesting areas, and other sensitive natural features. Environmental constraints relative to the various resources in the project area that were considered during the siting of the WTGs and other project infrastructure are described in each resource analysis section of this EIR. SMUD has committed in the past to participating in a Technical Advisory Committee comprising representatives of the various environmental agencies and wind developers in the Montezuma Hills, with the goal of identifying the trends in avian fatality and designing and implementing mitigation measures to reduce mortality. Implementation could consist of modifications in design or operations, or of acquisition, as a group, of additional mitigation land. SMUD expects to continue this commitment to the TAC as part of this project.
- **Visual impacts.** The ~~Wind Turbine Siting Plan~~ Solano County General Plan (Solano County, ~~1987~~ 2008) identifies setbacks to reduce visual impacts. In addition, the WTGs are to be painted in neutral, non-reflective tones to reduce contrast with the surroundings. The WTGs are to be lighted in accordance with Federal Aviation Administration (FAA) requirements and are not to be lighted for any other reason.

(p. 3.3-11)

3.3.2 Alternate Locations

Footnote - ¹ Solano County technically has two WRAs: Collinsville-Montezuma Hills and Cordelia Hills. However, the Solano County ~~wind turbine siting~~ General plan places restrictions on the development of the Cordelia Hills WRA and local land use is not agriculture. Residents in the area expressed strong opposition to the aesthetic impacts of a proposed wind project there in the 1990s. Based on these limitations, wind development in the Cordelia Hills WRA is considered to be infeasible at this time.

(p. 3.3-13)

Table 3-3. Project Alternatives
EIR Evaluated Alternative Comparisons

Potential Impact	Project	No Project	Alternate Locations	Reduced Scale
Significant Environmental Impacts After Mitigation and Areas of Controversy				
Air Quality	<ul style="list-style-type: none"> Short-term increase on site, in criteria air pollutants, precursor emissions, and CO₂ (approximately 2.3 <u>5.0</u> KMT) from construction activities. Significant long-term reduction in greenhouse gas (primarily CO₂) of 180 KMT per year CO₂ equivalent and criteria pollutant emissions from fossil fuel generation. 	<ul style="list-style-type: none"> No short-term increase on site during construction. Air quality impact due to fossil fuel consumption from existing or new replacement of power source or sources (increase of 180 KMT per year of CO₂). 	<ul style="list-style-type: none"> No short-term increase on site during construction. Temporary air quality impact relocated to different site. Transmission line electrical energy losses will decrease CO₂ benefit, unquantifiable. 	<ul style="list-style-type: none"> Reduced air quality impact short-term on site from construction activities. Air quality impact of 90 KMT per year of CO₂ equivalent and associated criteria pollutants over the long-term.

(p. 3.3-15)

Table 3-3 (Continued)

Potential Impact	Project	No Project	Alternate Locations	Reduced Scale
				•

- AFB = Air Force Base
- CO₂ = carbon dioxide
- KMT = ~~kele~~ kilo metric tons
- WRA = Wind Resource Area
- WTG = wind turbine generator

(p. 3.3-18)

Air Quality

Although reducing the number of turbines to be installed would reduce construction impacts on air quality for NO_x and PM₁₀ because the construction period would be shorter and less ground disturbance would occur, the reduction in emissions of these criteria pollutants would not be substantial enough to keep the overall proposed project construction activities emissions below significance thresholds for the ~~Yolo-Solano County~~ Bay Area Air Quality Management District. In addition, although the short-term air quality impact of fewer turbines would be reduced as compared to the proposed project, the Reduced Scale Alternative would reduce the long-term GHG-reduction benefits as compared to the proposed project. Additional Air Quality impacts would result from fossil-fuel combustion to generate replacement electricity.

(p. 4.3-3, 4.3-4)

~~Solano County Wind Turbine Siting Plan~~

~~The Solano County Wind Turbine Siting Plan and Environmental Impact Report (Solano County, 1987) (Siting Plan) provides guidance for siting WTGs in a way that encourages wind energy as a resource in the Collinsville Montezuma Hills WRA. At the same time, the Siting Plan supports General Plan policies to preserve, maintain, and enhance agricultural lands in the county. The Siting Plan requires all WTGs and associated facilities to be sited in specific locations to ensure land use compatibility and the protection of health and safety.~~

(The Air Quality Analysis section has been updated to reflect the more stringent BAAQMD Guidelines and to expand the discussion of PM2.5 as a subset of the impacts previously discussed for PM10, and is reproduced here in its entirety. P.4.4-1 to 4.4-18. These changes are merely clarifications the analysis in the RDEIR, and do not result in any new significant impacts or substantially more severe impacts. Therefore, recirculation of the RDEIR is not required.)

4.4 Air Quality

4.4.0 Summary of Air Quality Revisions

The following is a summary of the revisions made to this portion of the previously circulated DEIR 2007.

1. Section 4.4.2.4 Greenhouse Gas is added to provide Environmental Setting Information for greenhouse gas emissions.
2. The discussion of greenhouse gas emissions in Section 4.4.3 Significance Criteria is expanded to include a quantitative analysis of potential GHG emissions.

3. The discussion of best management practices (BMPs) under Mitigation AIR-1 is expanded and additional BMPs have been added.

4.4.1 Regulatory Setting

Responsibility for protecting air quality is given to federal, state, regional, and local governmental agencies.

4.4.1.1 Federal

The United States Environmental Protection Agency (EPA) is responsible at the federal level for implementing national air quality programs as established under the Clean Air Act (CAA). The EPA has developed primary and secondary National Ambient Air Quality Standards (NAAQS) for several problem air pollutants to protect human health and welfare. Primary standards protect human health, and secondary standards protect the public from non-health-related adverse effects, such as visibility reduction. Primary NAAQS have been established for the following six “criteria” pollutants:

- Ozone (O₃) – Ozone can cause coughing, wheezing and respiratory irritation, asthma, and lung diseases.
- Particulate matter (PM) less than or equal to 10 microns (PM₁₀) or 2.5 microns (PM_{2.5}) – PM can contribute to breathing and respiratory difficulties, including bronchitis and decreased lung function.
- Nitrogen dioxide (NO₂) – NO₂ exposure may decrease lung function and lead to long-term respiratory effects
- Carbon monoxide (CO) – CO is toxic at high concentrations. At low concentrations, it can cause dizziness and headaches.
- Sulfur dioxide (SO₂) – SO₂ causes respiratory irritation, enhances the effects of ozone, and even accelerates the corrosion of metals. SO₂ vapor can also result in damage to some plant species.
- Lead (Pb) – Lead has been associated with toxic effects on the nervous system resulting in problems such as slowed growth, hearing problems, headaches, and learning disabilities in humans.

The primary NAAQS are intended to protect (with a large margin of safety) those persons most susceptible to respiratory distress, such as those suffering from asthma or other illnesses, children, the elderly, or people engaged in strenuous exercise or work.

The EPA has designated all areas of the U.S. as having air quality either better than or worse than the NAAQS (defined as “attainment” or “non-attainment,” respectively). An area that is in non-attainment has exceeded the primary NAAQS more than 3 times in three years. The project area is part of the EPA’s designated San Francisco Bay Area Federal Ozone Non-Attainment Area. A state that is designated as being in non-attainment must develop a State Implementation Plan (SIP) to describe measures it will take to attain the NAAQS within specific deadlines imposed by the EPA. The California Air Resources Board (CARB), regional air districts, and other stakeholders are coordinating the development of local SIPs through a special working group. The EPA must approve

SIPs. Failure to obtain an approved SIP or to implement the plan within the mandated timelines can result in the application of federal sanctions to funding for transportation and stationary sources of air pollution in the air basin.

4.4.1.2 State

CARB is the state agency responsible for coordinating and overseeing state and local air pollution control programs in California. CARB also is responsible for implementing the California CAA, which was adopted in ~~1998~~ 1988 and amended in 1992. CARB has the primary responsibility to develop and implement the SIPs to achieve and maintain the NAAQS established by the EPA.

California also has established the California Ambient Air Quality Standards (CAAQS), which are more stringent than the NAAQS and include hydrogen sulfide, vinyl chloride, and visibility-reducing particulates, in addition to the six criteria pollutants. CARB is responsible for identifying and classifying each air basin in the state as attainment or non-attainment for each pollutant.

4.4.1.3 Regional

Air pollution does not adhere to political boundaries (i.e., counties); therefore, the California legislature has required CARB to divide the state into 15 separate air quality control regions or basins that have “similar geographical and meteorological conditions and considerations for political boundary lines whenever practicable” [Health and Safety Code section 39606(1)].

Air quality control districts are required to develop attainment plans for all non-attainment pollutant categories except particulate matter. The attainment plans are required to reduce non-attainment pollutants (or their precursors) by 5 percent per year, averaged over a three-year period, and to develop a program to maintain attainment once it is reached.

Air quality plans discuss current and future emissions inventories from motor vehicles, industry, and other sources, combined with air monitoring data and computer modeling simulations, to test various future strategies to reduce emissions to attain CAAQS.

The project is in Solano County, in the San Francisco Bay Area Air Basin, covering an area of the county where both the Yolo-Solano Air Quality Management District (YSAQMD) and Bay Area Air Quality Management District (BAAQMD) have jurisdictional authority for enforcing air quality policies. Most of the WTGs will be located within the BAAQMD jurisdiction. ~~The YSAQMD~~ Additionally, the BAAQMD has more stringent requirements for construction emissions, and therefore is used as the more conservative criterion throughout this EIR.

4.4.1.4 Local

Air quality within the ~~YSAQMD~~ BAAQMD exceeds the NAAQS for ozone and PM_{2.5} and the CAAQS for ozone, PM_{2.5}, and PM₁₀. ~~YSAQMD prepared the 1992 Air Quality Attainment Plan to address non-attainment for the CAAQS for ozone. The Plan discusses how YSAQMD~~ The BAAQMD in coordination with the Metropolitan Transportation Commission and the Association of Bay Area Governments prepared the 2009 Clean Air Plan to address non attainment of the national and state ozone standards. The Plan discusses how the BAAQMD will make progress toward

attaining the national and state ozone standard with control programs on stationary sources, transportation, and indirect sources of air pollution, as well as a vehicle/fuels program.

~~YSAQMD~~ BAAQMD also is non-attainment for PM₁₀ and PM_{2.5}. ~~YSAQMD~~ The BAAQMD is not required to develop a PM₁₀ and PM_{2.5} attainment plan; however, it is required to list particulate matter control measures it considers cost-effective and to develop a schedule for their implementation.

The CAA also requires that ~~YSAQMD~~ the BAAQMD assess its progress toward attaining the air quality standards every three years. ~~The 2003 Triennial Assessment and Plan Update (YSAQMD, 2003)~~ The BAAQMD, in cooperation with the Metropolitan Transportation Commissions and Association of Bay Area Governments, adopted the 2005 Ozone Strategy, the most recent triennial update to the regional ozone strategy. The Air District is beginning the process to update the Ozone Strategy. The Ozone Strategy reports the extent of air quality improvement and amounts of emission reductions achieved from the various control measures implemented. The report is also an update to the Air Quality Attainment Plan, incorporating new data and projections to mitigate ozone transport and to pursue the expeditious adoption of all feasible control measures.

~~YSAQMD~~ staff developed the Handbook for Assessing and Mitigating Air Quality Impacts (YSAQMD, 2007) BAAQMD staff have developed Draft CEQA Air Quality Guidelines (BAAQMD, 2009) as an advisory document to assist lead agencies, consultants, and project applicants with procedures for addressing air quality impacts in environmental documents under CEQA.

4.4.2 Environmental Setting

4.4.2.1 Climate

The climate in the project area is influenced by cool air that flows from the Pacific Ocean and San Francisco Bay through the Carquinez Strait gap, in the surrounding hills, to the lower areas in the Sacramento Valley, where it mixes with the warmer valley air. The temperature and atmospheric surface pressure differences result in high winds in the project area. In addition to predominant high winds, the climatic transition also results in hot dry summers and cool rainy winters, which are typical of most of California.

4.4.2.2 Existing Air Quality

Table 4.4-1 summarizes the CAAQS, the NAAQS, and the attainment status for each pollutant for the project area. The project is in a non-attainment area for the federal and state ozone ~~standard~~ and ~~for the state~~ PM₁₀ standard, and the state PM_{2.5} standard.

The primary pollutants of concern are ozone, ~~and~~ PM₁₀, and PM_{2.5}. Ozone is not emitted directly to the atmosphere; it is formed through a series of complex chemical reactions of ozone precursors that are emitted directly. The ozone precursors are reactive organic gases (ROGs) and oxides of nitrogen (NO_x). Therefore, any activities associated with the project that would contribute to increases in these compounds would be of concern.

The following ~~YSAQMD~~ BAAQMD regulations may apply to the project:

Rule	Name
2.11	Particulate Matter
2.14	Architectural Coatings
2.16	Fuel Burning Heat or Power Generators
2.19	Particulate Matter Process Emissions
2.21	Organic Liquid Storage and Transfer
2.22	Gasoline Dispensing Facilities
2.23	Fugitive Hydrocarbon Emissions
2.25	Metal Parts and Products Coating Operation
2.31	Surface Preparation and Cleanup
2.31	Stationary Internal Combustion Engines

Rule	Name
<u>Reg 6, Rule 1</u>	<u>Particulate Matter</u>
<u>Reg 8, Rule 3</u>	<u>Architectural Coatings</u>
<u>Reg 8, Rule 4</u>	<u>General Solvent and Surface Coating Operations</u>
<u>Reg 8, Rule 5</u>	<u>Storage of Organic Liquid</u>
<u>Reg 8, Rule 7</u>	<u>Gasoline Dispensing Facilities</u>
<u>Reg 8, Rule 15</u>	<u>Emulsified and Liquid Asphalts</u>
<u>Reg 8, Rule 19</u>	<u>Surface Preparation and Coating of Miscellaneous Metal Parts and Products</u>
<u>Reg 9, Rule 8</u>	<u>Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines</u>
<u>Reg 12, Rule 4</u>	<u>Sandblasting</u>

For the project, ROG_s and NO_x are criteria pollutants that would be emitted primarily from fuel combustion in diesel and gasoline engines. Small amounts of toxic air contaminants (TACs) and SO₂ also could be released from fuel combustion. PM₁₀ and PM_{2.5} would be emitted from construction activities, such as excavation, roadway grading and cleanup, from driving on dirt roads, and from diesel exhaust.

The proposed project's installation of up to 75 WTGs (up to 128 MW net) would potentially offset the need for fossil-fuel generation. Equivalent fossil-fueled generation would emit up to 20 pounds per hour of NO_x¹. This is consistent with SMUD's goals for clean power generation.

¹ Based upon SMUD simple-cycle gas-fired turbine co-generation facilities emissions that have been scaled for the size of the proposed project.

Table 4.4-1. Ambient Air Quality Standards and Attainment Status

Pollutant	Unit of Measure	California ^a Standards	Attainment Status	National ^a Standards	Attainment Status
Ozone	1 Hour	0.09 ppm ^b	Nonattainment (serious)	0.12 ppm ^c (Applies only in limited areas)	N/A
	8 Hours	0.07 ppm ^b	Nonattainment	0.08 ppm ^d	Nonattainment
Carbon Monoxide	1-Hour	20.0 ppm ^b	Attainment	35.0 ppm ^e	Unclassified Attainment
	8 Hours	9.0 ppm ^b	Attainment	9.0 ppm ^e	Unclassified Attainment
Nitrogen Dioxide	1 Hour	0.25 0.18 ppm ^b	Attainment	N/A	N/A
	Annual	N/A 0.03 ppm	Unclassified-N/A	0.053 ppm	Attainment
Sulfur Dioxide	1 Hour	0.25 ppm ^b	Attainment	N/A	N/A
	24 Hours	0.05 0.04 ppm	Attainment	0.14 ppm ^e	Attainment
	Annual	N/A	N/A	0.03 ppm	Attainment
Fine Particulate Matter (PM _{2.5})	24 Hours	N/A	N/A	35 µg/m ^{3f}	<u>Nonattainment</u> <u>Unclassified</u>
	Annual Average	12 µg/m ³	<u>Nonattainment</u> <u>N/A</u>	15 µg/m ^{3g}	<u>Attainment</u> <u>Unclassified</u>
Coarse Particulate Matter (PM ₁₀)	24 Hours	50 µg/m ^{3b}	Nonattainment	150 µg/m ^{3e}	Unclassified
	Annual Average	20 µg/m ^{3e}	Nonattainment	Revoked ^h	N/A
Sulfates	24 Hours	25 µg/m ^{3b}	Attainment	N/A	N/A
Lead	30-Day Average	1.5 µg/m ^{3b}	Attainment	N/A	N/A
	Calendar Quarter	N/A	N/A	1.5 µg/m ³	Attainment
Hydrogen Sulfide	1 Hour	0.03 ppm	Attainment	N/A	N/A
Vinyl Chloride	24 Hours	0.010 ppm	<u>Attainment</u> <u>Unclassified</u>	N/A	N/A
Visibility-Reducing Particles	8 Hours	^{Footnote}	<u>Attainment</u> <u>Unclassified</u>	N/A	N/A

^a Only the primary standards are established to protect the public health; primary standards are the most stringent federal standards.

^b Not to be exceeded.

^c (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than 1.

(b) As of June 15, 2005, EPA revoked the 1-hour ozone standard in all areas except the 14 8-hour ozone nonattainment Early Action Compact Areas.

^d Not to be exceeded based on the fourth highest concentration average over three years.

^e Not to be exceeded more than once per year on average over three years.

^f To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³.

^g To attain this standard, the three-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

^h Given a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM₁₀ standard in 2006. (EPA final rulemaking for CFR 40 Part 50.7, National Primary and Secondary Ambient Air Quality Standards, at http://epa.gov/pm/pdfs/20060921_rule.pdf.)

ⁱ Insufficient amount to produce an extinction coefficient of 0.23 per kilometer from particles when the relative humidity is less than 70 percent.

CFR = Code of Federal Regulations

EPA = United States Environmental Protection Agency

N/A = not applicable, state or federal standard does not exist for the combination of pollutant and averaging time. Unclassified areas are those for which air monitoring has not been conducted, but which are assumed to be in attainment.

PM = particulate matter

ppm = parts per million

µg/m³ = micrograms per cubic meter

Sources: California Air Resources Board and State and National Area Designation Maps (www.arb.ca.gov/design/adm.htm)

BAAGMD Draft CEQA Guideline (2009), BAAQMD.gov.

4.4.2.3 Sensitive Receptors

For CEQA purposes, sensitive receptors are individuals in facilities that house, for at least a portion of the day, the very young, the elderly, and those individuals who may have illnesses or disabilities that may worsen as a result of being exposed to significant and/or excessive levels of air pollution emissions. Typical sensitive receptors are found in hospitals, convalescent homes, schools, daycare centers, and residences. There are no sensitive receptors in the project area. A few rural residences are located outside of the project area along rural roads that would be used to bring materials to the project site. In addition, a residence is located approximately ~~1,200~~ 5,331 feet away from ~~one~~ specific the nearest proposed WTG siting area.

4.4.2.4 Greenhouse Gas

Some scientists have concluded that climate change (“global warming”) is a regional as well as global concern that may be caused in large part by human activity. Many believe that it may have serious and potentially damaging effects in the decades ahead. Greenhouse gas (GHG) emissions, primarily carbon dioxide (CO₂), from cars, power plants, and other human activities, are believed to be the primary cause of contemporary climate change/global warming, due largely to the combustion of fossil fuels, atmospheric concentrations of CO₂, the principal GHG, are at elevated levels. Nitrous oxide (N₂O) and free methane (CH₄) are also believed to be contributors in small amounts. GHGs from human activities are believed to trap more of the sun’s heat in the earth’s atmosphere, resulting in warming.

Currently there are no formally adopted quantitative CEQA thresholds of significance to address project-related GHGs. In 2008, the Office of the California Attorney General issued “The California Environmental Quality Act – Addressing Global Warming Impacts at the Local Agency Level” (Office of California Attorney General, 2008). This document provides information that may be helpful to local agencies in carrying out their duties under CEQA as they relate to global warming. Included in this document are various measures that may help to reduce the global warming-related impacts of a project. As appropriate, the measures can be included as design features of a project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees). The list of measures is not exhaustive. Moreover, the measures cited may not be appropriate for every project. The decision of whether to approve a project—as proposed or with required changes or mitigation—is for the local agency, exercising its informed judgment in compliance with the law and balancing a variety of public objectives.

The Attorney General’s document presents feasible mitigation measures for seven specific areas:

- Energy efficiency
- Renewable energy
- Water conservation and efficiency
- Solid waste measures
- Land use measures
- Transportation and motor vehicles
- Off-site mitigation

The suggested mitigation measures consist of a wide variety of methods, practices, and products to reduce thermal and electric energy use and thus reduce activities that contribute to the formation of GHG. A discussion of GHG studies and regulations follows.

Federal Framework

The U.S. Environmental Protection Administration (EPA) prepared a national GHG inventory report, which presents estimates of U.S. GHG emissions and sinks for the years 1990 through 2009 (EPA, 2009). This report discusses the methods and data used to calculate the emission estimates. The purpose of the inventory is to track the national trend in emissions and removals since 1990. The national GHG inventory was submitted to the United Nations in accordance with the Framework Convention on Climate Change. On March 10, 2009, in response to the Consolidated Appropriations Act of 2008 (House of Representatives [H.R.] 2764; Public Law 110–161), EPA proposed a rule (EPA Docket ID. No. EPA-HQ-OAR-2008-0508, 40 Code of Federal Register [CFR] Parts 86, 87, 89, et al.) that requires mandatory reporting of GHG emissions from large sources in the United States. The proposed rule would collect accurate and comprehensive emissions data to inform future policy decisions. The public comment period for this rule is open until June 9, 2009.

On April 17, 2009, EPA began the process of creating a comprehensive regulatory program aimed at climate change by releasing a proposed finding that GHGs in the atmosphere endanger public health and welfare. The EPA also proposed a finding that GHG emissions from new motor vehicles are contributing to these atmospheric GHG levels. If finalized, it is likely that regulations addressing GHG emissions from new motor vehicles will be forthcoming. Legislation is also in process that may take the form of a cap-and-trade program that would require emitters of CO₂ and other GHGs to buy emission permits.

State Framework

The California Global Warming Solutions Act of 2006 (California Assembly Bill [AB] 32) recognizes the serious threat to the “economic wellbeing, public health, natural resources, and the environment of California” resulting from global warming. To counter such effects, AB 32 requires the State to reduce its carbon emissions by approximately 25 percent by the year 2020 (Cyberregs, 2009). AB 32 requires the CARB to adopt a scoping plan and regulations to reduce emissions, establish a statewide GHG emissions cap, require monitoring and reporting protocols for GHG emission sources, and account for GHG emissions.

The CARB has issued a preliminary draft staff proposal for setting interim significance thresholds for GHGs for public review (CARB, 2008). CARB describes the document as a “first step toward developing recommended statewide interim thresholds of significance for GHGs that may be adopted by local agencies for their own use,” and has solicited feedback, in the form of public comment.

CARB believes that different GHG thresholds of significance may apply to projects in different sectors. They are currently developing interim threshold concepts for sectors such as residential, commercial, transportation projects, large dairies, and electricity generation. CARB is in favor of a threshold that allows small projects to be considered insignificant. CARB used existing data for the industrial sector to derive a “proposed hybrid threshold” of 7,000 metric tons (MT) of CO₂

equivalent (CO₂e) per year (7,000 MT CO₂e/year) for operational emissions for a project, and performance standards for construction and transportation emissions.

California law (Senate Bill [SB] 97, Chapter 185, 2007) states GHG emissions and the effects of GHG emissions are subject to the California Environmental Quality Act (CEQA). Pursuant to this law, the Governor's Office of Planning and Research (OPR) ~~has recently proposed~~ submitted amendments to Public Resources Code, Sections 21083.05 and 21097, the state CEQA Guidelines for GHG emissions "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions" (OPR, 2009) to the Secretary for Natural Resources. These proposed CEQA Guideline amendments provided guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The Natural Resources Agency conducted formal rulemaking, prior to certifying and adopting the amendments on December 30, 2009, as required by SB 97.

Under the ~~proposed~~ amendments, a lead agency should make a good faith effort to determine the significance of GHG emissions based on available information and describe, calculate, or estimate the amount of GHG emissions. The lead agency ~~would have the~~ has discretion to use a model or methodology to quantify the GHG emissions or rely on a qualitative analysis or performance-based standards. The lead agency ~~may~~ should consider the following:

- 1) The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- 2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
- 3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such ~~regulations or~~ requirements must be adopted by the relevant public agency through a public review process and must ~~include specific requirements that~~ reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The ~~proposed~~ amendments state that lead agencies shall consider mitigation measures to reduce GHG emissions from an existing plan, implementation of project features and designs, off-site measures, including offsets, measures to sequester GHG, and under an adopted plan or ordinance identification of specific measures on a project-by-project basis. ~~The Natural Resources Agency must certify and adopt the guidelines on or before January 1, 2010.~~

Local Framework

The BAAQMD has established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy all of which assist in reducing emissions of GHG.

A quantitative analysis of potential greenhouse gas reductions that would occur through implementation of this project is provided in this section.

4.4.3 Significance Criteria

With respect to determining the significance of the anticipated changes under CEQA, the air quality changes associated with the project were evaluated in terms of the criteria provided by the CEQA Guidelines. Appendices G and I of the guidelines indicate that a project will have a significant effect on the environment if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Exceed any air quality standard or contribute substantially to an existing or projected air quality exceedance;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project is non-attainment under applicable federal or state ambient air quality standards (including releasing emissions, which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

In addition to these criteria, ~~YSAQMD~~ the BAAQMD has established thresholds for emissions of several of the criteria pollutants. Emissions above these thresholds would be considered significant and would require mitigation to reduce the level of impact. ~~YSAQMD's Handbook for Assessing and Mitigating Air Quality Impacts (YSAQMD, 2007)~~ The 2009 BAAQMD Draft CEQA Air Quality Guidelines lists the following thresholds of significance that apply to construction and operational impacts:

<u>Pollutant</u>	<u>Construction Related Average Daily Emissions (lb/day)</u>	<u>Operational Related Average Daily Emissions (lb/day)</u>	<u>Operational Related Maximum Annual Emissions (tpy)</u>
ROG	<u>54</u>	<u>54</u>	<u>10</u>
NOx	<u>54</u>	<u>54</u>	<u>10</u>
PM10 (exhaust)	<u>82</u>	<u>82</u>	<u>15</u>
PM2.5 (exhaust)	<u>54</u>	<u>54</u>	<u>10</u>
PM10/PM2.5 (fugitive dust)	<u>Best Management Practices</u>	<u>None</u>	<u>None</u>
CO	<u>None</u>	<u>9.0 ppm (8 hr avg), 20 ppm (1 hr avg)</u>	<u>9.0 ppm (8 hr avg), 20 ppm (1 hr avg)</u>
GHGs (stationary sources)	<u>None</u>		<u>10,000 MT/yr</u>

avg = average

CO = carbon monoxide

GHGs = greenhouse gases

hr = hour

lbs/day = pounds per day

MT/yr = metric ton per year

NOx = oxides of nitrogen

PM₁₀ = particulate matter less than or equal to 10 microns

PM_{2.5} = particulate matter less than or equal to 2.5 microns

ppm = part per million

ROG = reactive organic gases

tpy = ton per year

- ROG: 10 tons per year;
- NO_x: 10 tons per year;
- PM₁₀: 80 pounds per day; and
- CO: Exceedence of a state ambient air quality standard for CO.

~~YSAQMD~~ The BAAQMD has adopted several other thresholds for toxics, odors, and cumulative impacts. The toxics threshold is based on health risk assessment (HRA) results and is applicable only to stationary sources, not to mobile sources (e.g., vehicles). The odor threshold is based on ~~YSAQMD's general nuisance rule (District Rule 2.5)~~ screening level distances for specific source types and complaint history.

The BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions. However, they still recommend that Lead Agencies quantify and disclose GHG emissions from construction activities. The Roadway Construction model (version 6.3.2) used to quantify emissions of criteria pollutants also quantifies GHG emissions.

In regard to the cumulative impact threshold, ~~YSAQMD~~ the BAAQMD specifies that any project that individually would have a significant air quality impact would also be considered to have a significant cumulative impact. However, the impact is short-term (construction) and actual operations do not produce adverse air quality impacts. The Impact Analysis section that follows describes impacts the project might have in these criteria areas. The Impact Analysis section will not further analyze criteria for which no impacts have been identified. **No impacts have been identified for the following criteria.**

- Result in project-generated ROG, NO_x, ~~and~~ PM₁₀, and PM_{2.5} emissions, during long-term project operation, that would exceed the applicable BAAQMD ~~YSAQMD~~ thresholds of significance.

There would not be significant criteria pollutant or fugitive dust emissions from mobile sources, such as vehicles and equipment, because of the limited maintenance and operational activities associated with the project.

Air permits are required from ~~BAAQMD~~YSAQMD for stationary sources that have operational emissions of criteria pollutants greater than 2 pounds per day (lb/day). Internal combustion engines, such as standby emergency generators, with a rating of 50 horsepower (hp) or more, also require an air permit from BAAQMD~~YSAQMD~~. The project, as currently planned, would not involve stockpiling of dirt or materials that could generate dust during operation, in excess of the 2 lb/day threshold, or require the use of emergency generator or other equipment in excess of 50 hp engines. If, during the life of the project, processes or equipment were introduced that could exceed the 2 lb/day threshold for criteria pollutants, or if an internal combustion engine greater than 50 hp were used, SMUD would comply with the applicable BAAQMD~~YSAQMD~~ regulations, including obtaining the necessary permits and adhering to any associated permit conditions, thus ensuring that the long-term potential impacts would be less than significant.

- Expose sensitive receptors to substantial TAC concentrations during short-term construction or long-term project operation.

Project construction would result in short-term diesel exhaust emissions from heavy-duty on- and off-road equipment. CARB identified diesel exhaust PM as a TAC in 1998. Three primary factors would reduce the impacts to sensitive receptors to less than significant.

- There are no sensitive receptors in the immediate project area.
- Pursuant to EPA and CARB rulemaking, engine manufacturers are required to meet exhaust standards for NO_x and PM₁₀, starting in 2011, that are more than 90 percent lower than current levels. Emissions from off-road engines would be reduced to levels that equal levels from on-road heavy-duty diesel engines.
- In 2005 CARB identified that concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet.
- The duration of exposure would be short. The dose a specific receptor would receive ~~would be~~ is a function of the concentration of a substance and the duration of exposure to the substance. HRAs, which are used to determine the exposure of sensitive receptors to TAC emissions, are typically based on a 70-year exposure period. However, for the purposes of this analysis, an HRA is limited to the duration of activities associated with the project.

Given that the use of off-road construction equipment would be temporary, that diesel PM has highly dispersive properties, that future exhaust emissions would be reduced, and that no sensitive receptors are near the project site, short-term construction activities would not result in sensitive receptors being exposed to significant TAC emissions. Long-term operation and maintenance activities would be minimal and would generate less than significant amounts of TAC emissions.

- Expose sensitive receptors to substantial odor emissions during short-term construction and long-term operation.

The project is not the type known to produce objectionable odors (e.g., landfill, rendering plant, wastewater treatment plant). Diesel exhaust from construction activities would be temporary and would disperse rapidly from any potential receptors adjacent to the project location. In addition, and as already discussed, there are no sensitive receptors in the immediate project area.

- Result in a substantial increase in greenhouse gas emissions compared to existing conditions, or interfere with state greenhouse gas reduction goals.

CEQA requires public agencies to identify the potentially significant effects on the environment of projects they intend to carry out or approve, and to mitigate significant effects whenever it is feasible to do so. While AB 32 did not amend CEQA to require new analytic processes to account for the environmental impacts of GHG emissions from projects subject to CEQA, it does acknowledge that such emissions cause significant adverse impacts to human health and the environment.

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. ~~It directs~~ Pursuant to the law, the Governor's Office of Planning and Research (OPR) proposed amendments to develop draft the CEQA Guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions" to the Secretary of the Resources Agency. by July 1, 2009,

~~and directs the~~ The Resources Agency ~~to certify~~ certified and adopted the CEQA Guidelines by ~~January 1, 2010~~ December 30, 2009. The new guidelines issued on ~~June 19, 2008~~, by OPR ~~made~~ make the following recommendation:

~~Lead agencies should make a good-faith effort, based on available information, to calculate, model, or estimate the amount of CO₂ and other GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of GHG emissions resulting from a project.~~

Based on total emitting generation resources in SMUD's 2008 electric generation resource mix (Table 4.4-2), the Solano Wind Project is projected to displace 180,000 metric tons of CO₂-equivalent greenhouse gas emissions per year (PUC, 2009).

Potential short-term sources of GHG emissions include construction equipment needed for the wind turbine generators, meteorological towers, new access roads, a power collection system, and an operation and maintenance building and related facilities. Construction activities are estimated to take approximately 18 months. Approximately 70 people would be employed with 15 full-time contractors. These GHG emissions would only occur during the construction phase. Ongoing sources of GHG emissions would include service vehicles conducting 40 to 50 hour of maintenance per year on the towers and WTGs. Using the Roadway Construction model (version 6.3.2), SMUD estimates total short term GHG emissions to be ~~2,269~~ 5,020 metric tons of CO₂ equivalent during the 18-month construction period (see Table 4.4-3 below). These minor amounts of GHG emissions associated with construction and maintenance will be offset by the GHG emissions displaced by energy generation using non-carbon emitting turbines. Based on the data contained in Table 4.4-2 below, the entire period of construction emissions will be offset by approximately 10.2 days of project operation.

Table 4.4-2. Analysis of the Greenhouse Gas Reduction Impact of the SMUD Phase 3 Solano Wind Project

Generation Mix	Annual Sales or Production (GWh)	Generation % of Load in 2008			Avg Emission Rate (MMT CO ₂ e Per 1000 GWh)	Annual Emissions or Displaced (MMT CO ₂ e)
		Nat Gas	Non-emitting Sources	Other		
SMUD: Total 2008	11,887	47.7%	26.3%	25.9%	0.32	3.80
SMUD: 2008 Emitting Total	8,404				0.45	3.80
California Average/Total	300,408				0.35	106.64
Solano Wind Project Phase 3 (128 MW at 35% CF) **	392				0.45	0.18

* Source: California Public Utilities Commission, Agenda ID #7922. Proposed Decision of Commissioner Peevey; Final Opinion on Greenhouse Gas Regulatory Strategies, mailed 9/12/2008.

** Conclusion: Based on SMUD's 2008 non-emitting resource mix, the Phase 3 Solano Wind Project is projected to displace 180,000 metric tons of CO₂ equivalent greenhouse gas emissions per year.

The proposed project would potentially offset the need for fossil-fuel generation and does not result in any atmospheric emissions of criteria air pollutants or other hazardous materials that can

adversely affect air quality. The installation and operation of up to 75 WTGs (up to 128 MW net) under the proposed project will, on average, result in the annual generation of 392,400 MWh of non-carbon-emission generating energy (assuming 35 percent capacity factor). It is estimated that the same energy, if generated from SMUD's emitting resources, would produce 180,000 metric tons of carbon emissions annually. This is based upon information provided by SMUD on greenhouse gas emissions that would not be generated from SMUD's proposed pumped storage facility at Iowa Hill, and have been scaled to the size of the proposed project (UARP Preliminary Draft Environmental Assessment, 2005).

Thus, the proposed project would have a beneficial effect toward statewide GHG reduction goals and would not result in a substantial increase in GHG emissions as compared to existing conditions.

4.4.4 Impact Analysis

The project has the potential to cause the following significant impacts to air quality. Proposed mitigation measures to reduce impacts are provided following the impacts discussion.

Impact AIR-1: The project would cause a short-term increase in criteria air pollutants and precursor emissions from construction activities.

The project construction activities can be divided into two phases:

- The excavation, roadway grading, and cleanup phase, during which most of the earthwork would take place. This would include the grading and construction of several miles of gravel roads, the expansion of the Russell generation step-up transformer, construction of a new collector substation at one of three locations, and construction of a new O&M building. It is estimated that this phase of the construction would take approximately 18 months.
- The installation of up to 75 WTGs, power collection lines, and two new meteorological towers. This installation phase would take approximately six months.

Construction emissions described as "short-term" or temporary might cause a significant impact to air quality. ROG and NO_x emissions, which contribute to the formation of ozone, are associated primarily with gas and diesel vehicle and equipment exhaust and the application of architectural coatings. Fugitive PM₁₀ dust emissions are associated primarily with site preparation, roadway preparation, and direct construction activities. Dust emissions would vary as a function of soil particle size and silt content, soil moisture, wind speed, acreage of areas disturbed, and vehicle miles traveled by construction vehicles, on and off site. Per direction received by the ~~BAAQMD~~ ~~YSAQMD~~, construction related emissions were estimated using the Roadway Construction Emissions Model (Version ~~6.3.2~~ ~~5.2~~). Table 4.4-3 shows the modeling results for project emissions for an assumed total construction period of 18 months.

The total area to be disturbed during construction would be approximately 3 percent of the total acreage, or 142 acres (see the Project Description). It is estimated that up to 10 acres would be under construction on any particular day.

Industry BMP mitigation measures would be incorporated into the project design and implemented to the maximum practicable extent. Nonetheless, it is likely that short-term construction-generated emissions would exceed an air quality standard or contribute substantially to an existing or projected

air quality exceedance, especially considering that ~~Solano County~~ the BAAQMD is currently classified as non-attainment for state and federal ozone and PM_{2.5} standards and for the state PM₁₀ standard. As a result, this direct impact would be significant and unavoidable, and the implementation of mitigation measures would be necessary.

4.4.5 Mitigation Measures

The following mitigation measures will be applied to the project to reduce air quality impacts.

Mitigation AIR-1: Implement industry BMPs to reduce vehicle and equipment emissions and dust emissions pursuant to mitigation measures recommended by ~~YSAQMD~~ BAAQMD.

Implementing the following mitigation measures to the maximum feasible and practical extent will reduce construction vehicle and equipment exhaust emissions (NO_x, and ROG, PM₁₀, and PM_{2.5}) and fugitive dust emissions (PM₁₀ and PM_{2.5}).

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per construction day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 2 minutes (The California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR] restricts idling time to 5 minutes). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Post a publicly visible sign with the telephone number and person to contact at SMUD regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.
- Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of coarse gravel.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.

- ~~Restrict vehicle engine idling, when not in use, to 5 minutes unless more time is necessary according to the engine manufacturer's specifications or for safety.~~
- ~~Ensure equipment and engines are maintained and properly tuned.~~
- ~~Ensure the hours of operation of equipment, the amount of equipment in use, or both are limited to what is necessary to complete the work.~~
- ~~Apply water or suitable soil stabilizers to inactive or other areas that can give rise to airborne dust.~~

Table 4.4-3. Road Construction Emissions Model, Version 5.2

Emission Estimates for 2010					-	-	-
Project Phases	ROG (lbs/day)	CO (lbs/day)	NO _x (lbs/day)	Total PM ₁₀ (lbs/day)		Exhaust PM ₁₀ (lbs/day)	Fugitive Dust PM ₁₀ (lbs/day)
Grubbing/Land Clearing	69	308	330	68		18	50
Grading/Excavation	69	288	307	67		17	50
Drainage/Utilities/Sub-Grade	0	0	1	0		0	0
Paving	0	0	0	0		0	0
Maximum (lbs/day)	69	308	330	68		18	50
Total (tons/construction project)	13.73	55.95	65.99	13.33		3.43	9.90

Notes: — Project Start Year → 2010
 Project Length (months) → 18
 Total Project Area (acres) → 142
 Maximum Area Disturbed/Day (acres) → 10
 Total Soil Imported/Exported (yd³/day) → 0

PM₁₀ estimates assume 50 percent control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM₁₀ emissions shown are the sum of exhaust and fugitive dust emissions shown.

CO ——— = carbon monoxide

lb/day — = pounds per day

NO_x — = oxides of nitrogen

PM₁₀ — = particulate matter less than or equal to 10 microns

ROG — = reactive organic gasses

yd³/day — = cubic yards per day

% — = percent

•

Table 4.4-3. Road Construction Emissions Model, Version 6.3.2

Emission Estimates for ->	2010									
	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM ₁₀ (lbs/day)	Exhaust PM ₁₀ (lbs/day)	Fugitive Dust PM ₁₀ (lbs/day)	Total PM _{2.5} (lbs/day)	Exhaust PM _{2.5} (lbs/day)	Fugitive Dust PM _{2.5} (lbs/day)	CO ₂ (lbs/day)
Grubbing/Land Clearing	29.5	131.8	177.9	106.5	6.5	100.0	26.6	5.8	20.8	27,951.6
Grading/Excavation	29.3	130.0	177.5	106.5	6.5	100.0	26.6	5.8	20.8	27,953.5
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	29.5	131.8	177.9	106.5	6.5	100.0	26.6	5.8	20.8	27,953.5
Total (tons/construction project)	5.8	25.9	35.2	21.1	1.3	18.8	5.2	1.1	3.9	5,534.6

Notes: Project Start Year -> 2010
 Project Length (months) -> 18
 Total Project Area (acres) -> 142
 Maximum Area Disturbed/Day (acres) -> 10
 Total Soil Imported/Exported (yd³/day)-> 0

Results shown in this table include a 50% reduction in fugitive dust PM10 and PM2.5 realized by using water trucks
 Results shown on this table include a 5% reduction in NOx, PM10 and PM2.5 from off road diesel exhaust realized by implementing basic construction mitigation measures.
 Results shown on this table include a 20% reduction in NOx and a 45% reduction in PM10 and PM2.5 from off road diesel exhaust realized by implementing 2 minute idle restrictions mitigation measure
 Total PM10 emissions are the sum of exhaust and fugitive dust emissions. Total PM2.5 emissions are the sum of exhaust and fugitive dust emissions.

CO = carbon monoxide
 CO₂ = carbon dioxide
 lbs/day = pounds per day
 NOx = oxides of nitrogen
 PM₁₀ = particulate matter less than or equal to 10 microns
 PM_{2.5} = particulate matter less than or equal to 2.5 microns
 ROG = reactive organic gases
 yd³/day = cubic yards per day
 % = percent

- ~~Water exposed surfaces up to three times daily to prevent fugitive dust from migrating beyond the proposed project's boundaries.~~
- ~~Cover all inactive stockpiles with tarps or water to prevent airborne dust.~~
- ~~Water all haul roads, as needed, to prevent airborne dust.~~
- ~~Limit speeds on any unpaved roads to less than 15 miles per hour.~~
- ~~Replace ground cover in disturbed areas as soon as construction in these areas is completed.~~
- ~~Maintain 2 feet of freeboard space on haul trucks.~~
- ~~Water soil piles three times daily.~~
- ~~Minimize the amount of disturbed area, material actively worked, and material stockpiled.~~
- ~~Sweep or wash paved streets adjacent to the proposed project construction site at least once a day to remove accumulated dust.~~
- ~~Ensure all portable equipment with engines of 50 hp or greater is currently registered under the State Portable Equipment Registration Program.~~
- ~~Ensure District Rule 2.3 is implemented; this rule requires controlling visible emissions exceeding 40 percent opacity for no more than 3 minutes in any one hour on all diesel-powered equipment.~~

~~SMUD will reduce dust emissions (PM10 and PM2.5) during construction by implementing the following mitigation measures:~~

- ~~During construction, SMUD will control emissions of airborne dust by using industry BMPs, recommended by YSAQMD, as shown in Table 4.4-4.~~
- ~~SMUD will implement and enforce a 15-mph speed limit on all dirt roads during construction and project operation.~~
- Before beginning construction, SMUD and its construction contractors will prepare a Construction Fugitive Dust Control Plan for submittal to the county for approval, as required for the Solano County Grading Permit. The plan will describe how SMUD will minimize construction-generated dust. ~~in accordance with Table 4.4-4 of this RDEIR.~~ The Construction Fugitive Dust Control Plan will include the following elements.
 - A general description of each operation that may result in fugitive dust generation.
 - The identification of all fugitive dust sources (e.g., vehicle traffic, earth moving, roadway construction, storage piles).
 - A detailed description of the specific control measures to be applied to each of the sources of dust emissions identified. The description will be detailed enough to demonstrate that the applicable BMPs specified in ~~Table 4.4-4 of this RDEIR~~ will be implemented, used, or installed during periods of active operations.

Table 4.4-4. Fugitive Dust Control Measures for Yolo-Solano Air Quality Management District

Fugitive Dust Source Category	Control Measures
Earthmoving	1. For any earthmoving that is more than 100 feet (30.5 meters) from all property lines, water as necessary to prevent visible dust emissions from exceeding 100 feet (30.5 meters) in any direction.
Disturbed surface areas—except completed grading areas	2a/b. Apply dust suppression in a sufficient quantity and frequency to maintain a stabilized surface; any areas that cannot be stabilized, as evidenced by wind-driven dust, must have water applied at least twice per day, to at least 80 percent of the unstabilized area.
Disturbed surface areas—completed grading areas	2c. Apply chemical stabilizers within five working days of grading completion; OR 2d. Take action 3a or 3c specified for inactive disturbed surface areas.
Inactive disturbed surface areas	3a. Apply water to at least 80 percent of all inactive disturbed surface areas daily when there is evidence of wind-driven fugitive dust, excluding any areas that are inaccessible as a result of excessive slope or other safety conditions; OR 3b. Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR 3c. Establish a vegetative ground cover within 21 days after active operations have ceased; ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting and at all times thereafter; OR 3d. Use any combination of control actions 3a, 3b, and 3c, so that, in total, they apply to all inactive disturbed surface areas.
Unpaved roads	4a. Water all roads used for any vehicular traffic at least once every two hours of active operations; OR 4b. Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 mph; OR 4c. Apply chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	5a. Apply chemical stabilizers; OR 5b. Apply water to at least 80 percent of the surface areas of all open storage piles on a daily basis when there is evidence of wind-driven fugitive dust; OR 5c. Install a three-sided enclosure with walls with no more than 50 percent porosity that extend, at a minimum, to the top of the pile.

Table 4.4-4. (Continued)

Fugitive Dust Source Category	Control Measures
Track-out control	<p>6a. Pave or apply chemical stabilization at a sufficient concentration and frequency to maintain a stabilized surface, starting from the point of intersection with the public paved surface and extending for a centerline distance of at least 100 feet (30.5 meters) and a width of at least 20 feet (6 meters);</p> <p>OR</p> <p>6b. Pave from the point of intersection with the public paved road surface and extending for a centerline distance of at least 25 feet (7.6 meters) and a width of at least 20 feet (6 meters) and install a track-out control device immediately adjacent to the paved surface so that exiting vehicles do not travel on any unpaved road surface after passing through the track-out control device.</p>
All categories	7. Any other control measures approved by YSAQMD, where necessary.
Control Measures for Winds Exceeding 25 mph	
Earthmoving	1a. Apply water to soil not more than 15 minutes before moving the soil.
Disturbed surface areas	<p>1b. On the last day of active operations before a weekend, holiday, or any other period when active operations will not occur for more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of 6 months;</p> <p>OR</p> <p>2b. Apply chemical stabilizers prior to a wind event;</p> <p>OR</p> <p>3b. Apply water to all unstabilized disturbed areas three times per day; if there is any evidence of wind-driven fugitive dust, watering frequency is increased to a minimum of four times per day;</p> <p>OR</p> <p>4b. Take the actions specified in Item 3c for inactive disturbed surface areas;</p> <p>OR</p> <p>5b. Use any combination of control actions specified in this table in Items 2b, 3b, and 4b, so that, in total, they apply to all disturbed surface areas.</p>
Unpaved roads	<p>1c. Apply chemical stabilizers prior to a wind event;</p> <p>OR</p> <p>2c. Apply water twice per hour during active operation.</p>
Open storage piles	<p>1d. Apply water twice per hour;</p> <p>OR</p> <p>2d. Install temporary coverings.</p>
Paved road track-out	<p>1e. Cover all haul vehicles;</p> <p>OR</p> <p>2e. Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for operation on both public and private roads.</p>
All categories	1f. Any other control measures approved by YSAQMD.

mph = miles per hour

YSAQMD = Yolo-Solano Air Quality Management District

SOURCE: Jones, 2007.

- For technical (non-economic) considerations (which may include safety issues) that may prevent the use of the required mitigation measures for any of the identified sources, a justification statement will be provided to explain why the required control measure(s) cannot be implemented.
- A method for addressing any complaints received regarding dust emissions and the resolution of such complaints (e.g., increase watering or implement additional dust control measures).
- Upon completion of the project, SMUD will restore and stabilize those areas that will be only temporarily disturbed during construction.

~~The Handbook for Assessing and Mitigating Air Quality Impacts (YSAQMD, 2007)~~ The 2009 BAAQMD Draft CEQA guidelines estimates that watering all active construction sites twice daily will reduce dust emissions by 50 percent. (The 50 percent reduction is already included in the modeling, as noted in the footnote to Table 4.4-3 4.4-2.) ~~The handbook does not~~ The BAAQMD Draft CEQA guidelines discuss additional specific reductions in emissions by implementing vehicle and equipment exhaust mitigation measures. These reductions have been included in the modeling results as noted in the footnote to Table 4.4-3.

Even with the implementation of the mitigation measures discussed, the Roadway Construction Emissions Model results indicated that the project's construction NO_x emissions will exceed the applicable BAAQMD ~~YSAQMD~~ thresholds of significance. Therefore, this short-term construction impact would remain significant and unavoidable.

4.4.6 Significant Unavoidable Impacts

There would be no long-term adverse environmental air quality impacts from the project. However, the construction and operation of the project would rely on the use of nonrenewable resources. Use of fossil-fuel-derived energy sources, such as diesel fuel and gasoline, would be necessary to transport workers and materials during project construction and to operate construction equipment. During project operation, fuel usage would be limited to fuel used to transport workers to and from the project site and driving associated with limited project maintenance. Although fossil fuel consumption associated with the project would constitute the irretrievable and depletion of a nonrenewable resource, the amount of resources consumed would not be extraordinary, in a regional context.

(p. 4.5-5)

Clean Water Act

As discussed in Section 4.9, Hydrology and Water Quality, USACE and EPA regulate the discharge of dredged or fill material into waters of the U.S. under Sections 404 and 401 of the CWA, respectively. Fill material is defined as “material placed in waters of the United States where the material has the effect of either (1) replacing any portion of a water of the United States with dry land; or (2) changing the bottom elevation of any portion of a water of the United States.” (33 C.F.R. § 323.2(e)(1).) Project proponents may be required to obtain a permit from USACE for all

discharges of fill material into waters of the U.S., including wetlands, before proceeding with a proposed action. Pending a formal wetlands delineation, all wetlands are considered potentially jurisdictional by USACE.

There are two types of permits issued under Section 404: general permits, and individual permits. General permits are issued for similar activities that will only cause minimal adverse or cumulative effects. General permits may be issued as nationwide, regional or statewide and provide an expedited means of permitting a class of activities. Individual permits involve a project specific review, must follow Section 404(b)(1) guidelines, and require public notification.

(p. 4.5-6)

Magnuson-Stevens Fishery Conservation and Management Act

Congress originally enacted the Magnuson-Stevens Act, historically known as the Magnuson-Stevens Fishery Conservation and Management Act, to establish a management system for national marine and estuary fishery resources. In 1996, Congress revised the act and refined its focus on fisheries management by emphasizing the need to protect habitat by requiring fishery management plans that identify areas of Essential Fish Habitat (EFH), which are areas necessary to fish for their basic life functions. The Magnuson-Stevens Act requires NMFS and regional fishery management councils to minimize, to the extent practicable, adverse effects to EFH caused by fishing activities, and for federal agencies to consult with NMFS about actions that could damage EFH.

The Sacramento River is considered EFH for four separate runs of Chinook salmon: spring, fall, late fall and winter. Through the CWA permit process USACE will determine if the permitted actions may lead to impacts to EFH. If so, and these actions are not covered under the NLAA Programmatic Agreement (2007) between NMFS and USACE, USACE will be required to consult with NMFS to mitigate impacts to EFH.

(p. 4.5-7)

CDFG Fully Protected Species

CFG Code Section 3503.5 states that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any other adopted regulation adopted. CFG Code sections 3511, 4700, 5050, and 5515 prohibit the takes or possession of fully protected species, including California black rail, sandhill crane, American peregrine falcon, bald eagle, golden eagle, and salt marsh harvest mouse.

(p. 4.5-8)

4.5.1.3 Local

Impacts on biological resources are subject to the policies and regulations of Solano County. The Resource Conservation and Open Space and Land Use and Circulation Elements of the Solano County General Plan establish policies to protect marsh and wetland habitats.

The Solano County ~~Siting Plan~~ General Plan also recommends siting WTGs a minimum of 100 feet from sensitive biological communities, burying transmission lines, minimizing clearing and grading, and revegetating with native plants (Solano County, ~~1987~~ 2008). To minimize the potential for collisions and electrocution of raptors, transmission lines and tower designs should conform to the guidelines for raptor protection described by the Avian Power Line Interaction Committee (2006). All transmission lines and facilities should avoid crossing ridge tops to avoid bird and tower line collisions. Whenever possible, transmission lines should be underground to avoid bird collisions with aboveground transmission lines. The Solano Wind Project will include collection lines that are underground.

Solano County Water Agency (SCWA) is currently preparing a Multispecies HCP and is in its final administrative draft stage (SCWA, 2007). The final adoption of this HCP is not expected to occur until Fall 2010 (Lee, 2009). The Solano HCP establishes a framework for complying with state and federal endangered species regulations while accommodating future urban growth, development of infrastructure, and ongoing O&M activities associated with flood control, irrigation facilities, and other public infrastructure undertaken by or under the permitting authority/control of the Plan Participants within Solano County over the next 50 years. The HCP serves to promote the conservation of biological diversity consistent with the recognition of private property rights; provide for a healthy economic environment for the citizens, agriculture, and industries; and allow for the ongoing O&M of public and private facilities in Solano County. The Collinsville-Montezuma Hills WRA was not included in the risk analysis because the HCP considers preserves in this area to be suitable only for CTS (*Ambystoma californiense*) and vernal pool species.

(p. 4.5-8)

Lake/Streambed Alteration Agreement Program

CDFG's Lake and Streambed Alteration Program regulates projects that occur in and around lakes, rivers, or streams that could adversely affect fish and wildlife resources. The purpose of the program is to protect fish and wildlife resources, which sometimes requires mitigation and/or compensation for adverse impacts. CDFG Section 1601 requires a public entity and Section 1603 requires a nonpublic entity to notify and obtain authorization (known as the Lake or Streambed Alteration Agreement) for CDFG (including, but not limited to) when the action:

- Involves any activity that will divert or obstruct the natural flow or change the bed, channel, or bank of any rivers, stream, or lake;
- Involves the use or alteration of any streambed material;

- Occurs within the annual high-water mark of a wash; stream, or lake.

Native Plant Protection Act

(p.4.5-13)

4.5.2.3 Special Status Species in the Project Area Wetlands

Special status species are plants and animals that are legally protected under FESA, CESA, or the Native Plant Protection Act (NPPA) or are defined as rare under CEQA.

Prior to the field investigations, the California Natural Diversity Database (CNDDDB), the California Native Plant Society (CNPS) Inventory, the USFWS FESA lists, and other available biological literature were reviewed in order to identify species of concern that might occur in the project area. Other references consulted include the *Progress Report on the Avian Use Surveys at the SMUD Solano Wind Project* (URS, 2007a), the *Draft Environmental Impact Report, Shiloh II Wind Plant Project* (Ecology and Environment, Inc., 2006a), and the *Multispecies Habitat Conservation Plan (Working Draft 2.2)* (SCWA, 2007). Tables 4.5-1 and 4.5-2 describe special status wildlife and plant species, respectively, along with the potential for occurrence proximate to the project area. Special status animals and plants are evaluated based on the potential for habitat loss or construction-related disturbance. The CNDDDB was consulted for Antioch North, Birds Landing, Jersey Island, and Rio Vista United States Geological Survey 7.5-minute topographic quadrangle maps (CNDDDB, 2007).

Based on a review of the CNDDDB, the delta smelt and salt marsh harvest mouse may occur in the project area. The remaining species listed in Table 4.5-1 could occur, based on the presence of suitable habitat or the location of the project area within the species' known range. Figure 4.5-2 shows the locations of recorded special status plant and wildlife species.

(p. 4.5-14)

Table 4.5-1. Special Status Wildlife Species Potentially Occurring in the Project Area

Common and Scientific Name	Status	Geographic Distribution	Habitat Requirements	Potential Occurrence in the Project Area
	Federal/State			
Mammals				
Salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	E/E, FP	San Francisco, San Pablo, and Suisun Bays; the Sacramento–San Joaquin River Delta.	Salt marshes with a dense plant cover of pickleweed and fat hen; adjacent to an upland site.	Low. Suitable habitat is present southwest of the project area, next to the Sacramento River.
Pallid bat <i>Antrozous pallidus</i>	–/SSC	Throughout California, except in the high Sierra Nevada, from Shasta to Kern Counties and the northwestern corner of the state from Del Norte and western Siskiyou Counties.	Closely associated with oak, yellow pine, redwood, and giant sequoia in northern California.	Low. No records, but may forage over the project area.
Great western big-eared bat <i>Eumops perotis californicus</i>	–/SSC	Widespread in California.	Open, arid grassland and sparse woodlands, often using cliffs for breeding and roosting.	High. Habitat exists within the project area; however, it has not been observed within the project area.
<u>Western red bat</u> <u><i>Lasiurus blossevillii</i></u>	<u>–/SSC</u>	<u>Highly migratory and widespread from southern British Columbia and throughout Baja California.</u>	<u>Roosting primarily in the foliage of trees, or shrubs, commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes urban areas.</u>	<u>High. Has been found in avian and bat mortality monitoring studies in the CMHWRA.</u>
Long-eared myotis bat <i>Myotis evotis</i>	SC/–	Widespread in California.	Avoids the Central Valley and hot deserts.	Low. Project is within the western edge of the Central Valley, which can be seasonally arid with high temperatures.

(p. 4.5-28)

Fairy shrimp, clam shrimp, tadpole shrimp, and water fleas are all branchiopods. Branchiopods require vernal pools or other seasonally ponded depressions for breeding. Several species of branchiopods have been recorded in Solano County (Erickson and Belk, 1999). The nearest occurrence of a listed branchiopod is the vernal pool tadpole shrimp (*Lepidurus packardii*), known to occur approximately 3 miles west of the project boundary, 1 mile west of the intersection of Talbert Lane and Collinsville Road. Branchiopods are considered to have no potential to occur at the project site because soils in the vicinity of the project area are typically sloping to steep, well-drained clays, formed from weakly consolidated sediments, which are not suitable for vernal pools (United States Department of Agriculture [USDA] Soil Conservation Service [SCS], 1972). Given the lack of suitable habitat and the likelihood that branchiopods do not occur at the project site, the project is not expected to have an adverse effect on them.

4.5.2.3 Special Status Avian Species

Table 4.5-3 lists avian species seen within the project area that are afforded protection under state or federal laws and have been observed in the project area. No federal endangered species were observed during the surveys. During eight days of surveys between December 2006 and March 2007, there were 165 observations of 9 different species protected under state laws which were observed in the project area. Of these observations, 60% were of northern harrier, 32% were of white-tailed kite, and 2% were of golden eagles.

**Table 4.5-3. Special Status Species Observed During Avian Use
“Surveys in the Project Area
(12/19/2006 through 3/28/2007)**

Species	Number of Observations	Listing Status	
		State	Federal
Burrowing owl	1	CSC	None
California gull	2	CSC	None
Double-crested cormorant	1	CSC	None
Golden eagle	4	CSC; FP	None
Horned lark	3	CSC	None
Northern harrier	99	CSC	None
Peregrine falcon	1	CE; FP	D
Prairie falcon	2	CSC	None
White-tailed kite	52	FP	None
Total	165		

CE = California Endangered Species
 CSC = California Species of Special Concern
 D = Federally Delisted
 FP = California Fully Protected Species

Invertebrates

Fairy shrimp, clam shrimp, tadpole shrimp, and water fleas are all branchiopods. Branchiopods require vernal pools or other seasonally ponded depressions for breeding. Several species of branchiopods have been recorded in Solano County (Erickson and Belk, 1999). The nearest

occurrence of a listed branchiopod is the vernal pool tadpole shrimp (*Lepidurus packardi*), known to occur approximately 3 miles west of the project boundary, 1 mile west of the intersection of Talbert Lane and Collinsville Road. Branchiopods are considered to have no potential to occur at the project site because soils in the vicinity of the project area are typically sloping to steep, well-drained clays, formed from weakly consolidated sediments, which are not suitable for vernal pools (United States Department of Agriculture [USDA] Soil Conservation Service [SCS], 1972). Given the lack of suitable habitat and the likelihood that branchiopods do not occur at the project site, the project is not expected to have an adverse effect on them.

(p. 4.5-32)

Impact BIO-1: The project would result in both permanent and temporary habitat loss for sensitive or special status raptors and migratory birds.

Agricultural lands and non-native grasslands dominate the project area. These vegetative communities provide valuable habitat for several species. Agricultural lands provide foraging habitat for golden eagle, western burrowing owl, Swainson's hawk, white-tailed kite, and peregrine falcon, while grasslands provide nesting and foraging habitat for raptors and for migrating and wintering birds. CDFG does not consider either vegetative community a sensitive natural community ~~and, therefore, the development of wind power would not impact foraging habitat.~~ Approximately 95 acres of agriculture and non-native grassland would be converted to project infrastructure. Within the context of the entire project area (4,244 acres) the impact is less than significant. In addition, no wildlife nursery sites or non-avian migration corridors have been identified within the project area. Several wetlands and drainages occur in the project area; impacts on these sensitive communities are further described under Impact BIO-2: Project construction and installation could result in adverse impacts to wetlands and stream habitat.

(p.4.5-32)

(Paragraph 4)

~~Areas permanently removed from future habitat would include land needed for construction of the WTG pads (0.4 acre), meteorological towers (0.1 acre), substation expansion (maximum 2.0 acres), and the O&M building (2.0 acres), totaling less than 5 acres.~~ As noted on pg 4.3-7 of the RDEIR, installation of project infrastructure would permanently convert approximately 95 acres of agricultural land and non-native grasslands into the Solano Wind Project Phase 3 project infrastructure. The remaining disturbed acreage will either be temporarily disturbed (and returned to pre-project conditions following construction) or reduced in habitat value (e.g., roads). This amount of land represents approximately ~~0.1~~ 2 percent (95/4,244 acres) of the project area being permanently changed from agricultural (and foraging) habitat.

(p. 4.5-35)

Impact BIO-5: WTG blades could result in mortality of avian species including but not limited to golden eagles, bald eagles, American peregrine falcons, Swainson's hawks, white-tailed kites, and western burrowing owls, and California black rails and bats causing a substantial adverse effect on species identified as California Threatened, Endangered, Fully Protected, or Species of Special Concern.

(Second paragraph)

White-tailed kite is present in the project area and has been observed flying over and foraging in the project area. However, white-tailed kites typically soar, glide and hover less than 30 meters above the ground in search of prey. It hunts almost exclusively by hovering from 5 to 25 meters in height (Dixon et al. 1957, Dunk, and Warner and Rudd, 1975, in Technology Associates, 2009). There may be anecdotal reports of white-tailed kites flying considerable higher than 30 meters. However, there is substantial evidence that supports white-tailed kites soaring less than 30 meters above ground. Potential collision within the rotor swept area for white-tailed kites is low ~~would not likely occur.~~ Potential impacts to white-tailed kites in the rotor swept area would be less than significant.

(p. 4.5-36)

As has been discussed in other wind development environmental documents (Jones and Stokes, 2006; Ecology and Environment, Inc., 2006b; Kerlinger et al., 2006 and Curry & Kerlinger, Inc., 2009), construction and operation activities would potentially cause impacts to raptors and special status birds. ~~As CDFG notes,~~ The most recent information data on bird and bat monitoring in the region is presented in the publicly available [Shiloh I Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project Solano County, California, Final Report, 2009](#) and [Montezuma EIRs](#).

(p. 4.5-37)

According to the Montezuma Wind Project EIR (Ecology and Environment, Inc., 2006), the following bat species may occur within the Collinsville-Montezuma Hills WRA:

- Mexican free-tailed bat
 - Western red bat (CDFG:SSC)
 - Hoary bat
 - Silver-haired bat
 - Pallid bat (CDFG:SSC)
-

(p. 4.5-38)

Western red bats²⁴ are a migratory species, distributed from southwestern British Columbia southward through the coastal zone and throughout Baja California. Little is known about the populations of these forest-dwelling bats except that they are widely distributed and relatively common through their range (Ecology and Environment, Inc., 2006a).

Hoary bats are found throughout the U.S. and northward into much of Canada, and southward through Mexico and into central South America. They are considered to be a common forest-dwelling bat with densities sometimes equaling one female per hectare, suggesting that these animals number upwards into the tens of millions globally (Ecology and Environment, Inc., 2006a).

Silver-haired bats³ are found from southeastern Alaska throughout southern Canada and all of the U.S. southward into northeastern Mexico and even Bermuda. There are no estimates readily available of population sizes or densities of these animals, although they are said to be one of the most common of forest-dwelling bats (Ecology and Environment, Inc., 2006a).

The pallid bat⁴ ranges from western Canada to central Mexico. Pallid bats have larger eyes than most other species of bats in North America and have pale, long, and wide ears; their fur is generally lightly colored. They average a total length of 92 to 135 millimeter (mm).

(p. 4.5-40)

The most recent data on bird and bat mortality that has been recorded in the WRA area is presented in the Revised Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California, Final Report, October 2009 (Curry and Kerlinger, 2009) on page 4.5-46 and Shiloh II Wind Project EIR: Ecology and Environment 2006 and Appendix B of the Montezuma EIR (FPL Energy Montezuma Wind, LLC, 2006.) These studies are incorporated by reference.

(p. 4.5-45)

Avian Fatalities in the Collinsville Montezuma Hills Wind Resource Area (CMHWRA)

To date, one American kestrel, one morning dove, and one western red bat was struck. In addition, one injured golden eagle was found on Phase 2 of the Solano Wind Project and was taken to the UC Davis California Raptor Center, where it was determined to have severe injuries and was euthanized. Because SMUD turbines were not operating at that time, the eagle was likely struck at an adjacent off-site operating turbine, and then found on SMUD's Phase 2 site.

The injured golden eagle (*Aquila chrysaetos*) was included in Burleson Consulting, Inc.'s Third and Fourth Quarter Summary for the Sacramento Municipal Utility District Avian and Bat Mortality

3 Western Bat Working Group designation for high-priority/imperiled bat species.

4 CDFG species of special concern and USFS sensitive species.

Monitoring, Solano Wind Project, Solano County, California, dated August 19, 2009. The injured golden eagle was an incidental find by maintenance crews in late April 2009 and reported to SMUD. The SMUD Phase 2 project's turbines were not operating from January through April 2009, due to the cable replacement and substation upgrades.

SMUD is currently completing the subject Avian Mortality Monitoring Report for the Solano Wind Project, Phases 1 and 2, which is scheduled for release in May 2010. As such, Curry and Curlinger, 2009, comprises the most recent completed reporting on avian fatalities in the CMHWRA.

(p. 4.5-46)

The information from the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California, Final Report, October 2009 (Curry and Kerlinger, 2009) has been added to the bird and bat mortality analysis. See recent information below that will be added to the end of the discussion, supplementing the information from Shiloh and Montezuma Wind EIRs.

However, Solano County Department of Resource Management provided SMUD with the Revised Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project, Solano County, California, Final Report, October 2009, post completion of the RDEIR and circulation. Additional data from the Shiloh I post-construction study has been added to this analysis as follows:

The Shiloh I post-construction study details the three-year post construction monitoring of the Shiloh I Wind Power Project, prepared by Curry and Kerlinger, LLC for Iberdrola Renewables. During the first eighteen months (April 10, 2006 to October 15, 2009) of this three year-study, carcass surveys were conducted once per week at every other wind turbine, for a total of 78 rounds at 50 turbines. After this period (October 15, 2007 to April 11, 2009), carcass surveys were conducted on the second half of the wind turbines, for a total of 78 complete rounds. Thus, during the 36 month study all turbines were searched at the same interval and an equal number of times (Curry and Kerlinger, 2009).

Results of the Shiloh I post-construction study showed a total of 511 (unadjusted) wind turbine related avian incidents were recorded over three years by searchers during standardized surveys, representing 54 species and 22 unidentified birds (of those identified as to species: two were blackbirds; three were sparrows; a swallow; and 14 were unidentified passerines). Of the 54 avian species, 9 were raptor species including American Kestrel (N = 27), Merlin (1), Peregrine falcon (1), Red-tailed hawk (15), Ferruginous hawk (2), Northern Harrier (2), Golden Eagle (1), Barn Owl (2), and Great Horned Owl (4), comprising a total of 55 raptor incidents during the three years. The largest numbers of carcasses found were songbirds, representing 247 incidents, (5 Mallards and 1 unknown goose spp.), 19 waterbird incidents (10 American coots, 1 Sora, 2 Virginia Rails, 4 Killdeer, and 1 Black-crowned Night-Heron), as well as some other species (Curry and Kerlinger, 2009).

None of the carcasses or injured birds found during the Shiloh I post-construction surveys were listed as federally or state threatened or endangered species. One Peregrine falcon, currently listed as a state candidate for delisting was found. Eight fatalities involved California Species of Special

Concern (SCS): Northern Harrier; Tricolored blackbirds; Yellow Warblers; and a Yellow-breasted Chat. Two SCS Watch list species, Golden Eagle and Merlin were found within the standardized search area. A vast majority of individuals found were common species: Western Meadowlark, Red-winged Blackbird, Morning Dove, Horned Lark, and Brewer's Blackbird (Curry and Kerlinger, 2009).

One hundred thirty-two (132) bat carcasses were found: Hoary Bat (N = 64); Mexican Free-tailed Bat (63); Silver-haired bat (3); and Western Red Bat (2) (Curry and Kerlinger, 2009).

The number of wind turbine associated incidents found during the standardized surveys for the Shiloh I project were calculated per month for each species grouping.

(Curry and Kerlinger, 2009) also reported, the greatest number of bird incidents occurred during the month of January of 2007, with a total of 40 (~8% of the total) incidents in that month alone, 34 (85%) of them passerine species (Table 4 of Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project Final Report). Sixteen raptor incidents found during year one (~67% of that year's total) were found during the fall migration and pre-breeding season, between and including October 2006 and January 2007. The number of raptor incidents found during those same months in the following years only comprised 46% of the raptors for the second year and 43% raptors for the third year. Waterfowl and waterbird incidents were rare and incidents of species within these groups were sporadically distributed throughout the seasons. Thirty-five out of 51 of all "other" bird incidents (~69%) were recorded in the later period of the three years (August to December).

Table 4 of Curry and Kerlinger. Unadjusted number of incidents per species during the 3rd year of surveys per total installed megawatt capacity* per year, and per turbine year, at the Shiloh I Project Area, April 2008 – April 2009, found during standardized surveys (Curry and Kerlinger, 2009).

Species Name	# Incidents (3 years)	Unadjusted # Incidents/MW/year	Unadjusted # Incidents/Tower/year	Incidental Finds
<i>Birds (Large)</i>				
Goose spp.	<u>1</u>	<u>0.01</u>	<u>0.01</u>	<u>0</u>
Great Horned Owl	<u>1</u>	<u>0.01</u>	<u>0.01</u>	<u>0</u>
Mallard	<u>1</u>	<u>0.01</u>	<u>0.01</u>	<u>0</u>
Red-tailed Hawk	<u>2</u>	<u>0.01</u>	<u>0.02</u>	<u>1</u>
Ring-necked Pheasant	<u>4</u>	<u>0.03</u>	<u>0.04</u>	<u>1</u>
Total Large Birds	<u>9</u>	<u>0.06</u>	<u>0.09</u>	<u>2</u>
<i>Birds (Medium)</i>				
American Coot	<u>1</u>	<u>0.01</u>	<u>0.01</u>	<u>0</u>
American Kestrel	<u>5</u>	<u>0.03</u>	<u>0.05</u>	<u>1</u>
Brewer's Blackbird	<u>3</u>	<u>0.02</u>	<u>0.03</u>	<u>0</u>
Chukar	<u>3</u>	<u>0.02</u>	<u>0.03</u>	<u>0</u>
Common moorhen	<u>1</u>	<u>0.01</u>	<u>0.10</u>	<u>0</u>
Killdeer	<u>3</u>	<u>0.02</u>	<u>0.03</u>	<u>1</u>
Mourning Dove	<u>7</u>	<u>0.05</u>	<u>0.07</u>	<u>2</u>
Rock Pigeon	<u>2</u>	<u>0.01</u>	<u>0.02</u>	<u>0</u>

	# Incidents (3 years)	Unadjusted # Incidents/MW/year	Unadjusted # Incidents/Tower/year	Incidental Finds
Sora	0	0.00	0.00	1
Western Meadowlark	10	0.07	0.10	0
Total Medium Birds	35	0.23	0.35	5
<i>Birds (Small)</i>				
American Pipit	4	0.03	0.04	0
Blackbird spp.	1	0.01	0.01	0
Black-throated Gray Warbler	1	0.01	0.01	0
European Starling	1	0.01	0.01	0
Horned Lark	8	0.05	0.08	0
Lincoln's Sparrow	1	0.01	0.01	0
MacGillivray's Warbler	0	0.00	0.00	1
Orange-crowned warbler	1	0.01	0.01	0
Pacific-Slope Flycatcher	2	0.01	0.02	0
Passerine spp.	2	0.01	0.02	0
Red-winged Blackbird	5	0.03	0.05	1
Savannah Sparrow	2	0.01	0.02	0
Swainson's Thrush	2	0.01	0.02	0
Townsend's Warbler	1	0.01	0.01	0
Tree Swallow	1	0.01	0.01	0
Tri-colored Blackbird*	1	0.01	0.01	0
Warbling Vireo	2	0.01	0.02	0
White-throated swift	2	0.01	0.02	0
Wilson's Warbler	1	0.01	0.01	0
Yellow-rumped Warbler	0	0.00	0.00	1
Total Small Birds	38	0.25	0.38	3
Total Birds	82	0.55	0.82	10
<i>Bats</i>				
Hoary Bat	25	0.17	0.25	1
Mexican Free-tailed Bat	16	0.11	0.16	1
Silver-Haired Bat	1	0.01	0.01	0
Western Red Bat	0	0.00	0.00	0
Total Bats	42	0.28	0.42	2
Total (Birds & Bats)	124	---	---	---

* Denotes California Species of Special Concern (CSC)

The great majority of bat incidents occurred north of Birds Landing Road during the fall migration months, with 115 out of 132 carcasses recorded between August and October of the three years, representing (~87%) of bats found during the entire three year study period south of Birds Landing Road 17 (13%) bat carcasses were found (Curry and Kerlinger, 2009).

The data from the Shiloh I post-construction surveys suggested that the distribution of bird incidents was somewhat disproportionately greater at searched sites north versus south of Birds Landing Road, only for passerines as a group and American Kestrels as an individual species, but not for any other group of birds or bats. These two regions (north and south) differ in both topography and crop types. In comparison to the north, the southern area consists of steeper hills of higher elevations, which open up to a broad plain extending south to the Sacramento River and Suisun Marsh. The southern porting of the project more closely resembles the topography of the Altamont with higher ridges and deeper valleys, whereas, the northern portion is more uniform with gentler slopes and gentler relief (Curry and Kerlinger, 2009).

Curry and Kerlinger reported, with respect to individual turbines, there were about 4 out of 100 searched towers (for birds) and 1 out of 100 searched for towers (for bats) where fatalities deviated significantly from the average. By chance, five (5) of 100 statistical tests should have shown significance for each category. Therefore we conclude that, individually and with respect to general location (north vs. south), there is no evidence to conclude that any turbines had fatalities that deviated significantly from the average (Curry and Kerlinger, 2009).

Fatalities of night migrating birds and bats were not disproportionately greater at turbines with flashing red FAA lights as opposed to turbines without such lights. Thus, Curry and Kerlinger reported. Red flashing lights do not attract night migrants (Curry and Kerlinger, 2009).

Avian carcasses tended to be located somewhat evenly over a wider range of distances from wind turbine bases than bat carcasses, which were located closer to the towers. Seventy-four percent (74%) of bat carcasses were found within 60 meters of towers as compared to thirty-eight percent (38%) for birds (Curry and Kerlinger, 2009).

Among the different bird species group fatalities were not disproportionately greater at turbines with 80 meter towers as opposed to turbines with 65 meter towers (Curry and Kerlinger, 2009).

Curry and Kerlinger reported that the vegetative cover of the wind farm consists entirely of agricultural land, roughly sorted into two types of cover, pasture and crop land. The percentage of incidents found was higher in pasture, lower in crop and fallow and approximately the same in till than would be expected based on the percentage of ground cover. Pasture is short vegetative cover, so carcass visibility by the surveyor could be an explanation for this difference in incidence distribution. When comparing the species grouped by size to cover height, the smallest percentage of incidents was found in tall vegetation, with the most noticeable differences between the numbers of incidents found in tall versus short vegetation occurring in the small and medium bird and bat groups.

After adjusting for scavenging and searcher efficiency, the estimated annual number of avian fatalities at Shiloh I were as follows for each of the three years:

- Year 1 – 11.97 bird incidents/MW (17.96 incidents/tower) and 5.24 bat incidents/MW (7.86 incidents/tower)
- Year 2 – 8.6 bird incidents/MW (12.9 incidents/tower) and 5.75 bat incidents/MW (8.63 incidents/tower).
- Year 3 – 2.82 bird incidents/MW (4.23 incidents/tower) and 2.14 bat incidents/MW (3.21 incidents/tower).

Curry and Kerlinger reported that these results show significant annual variation. However, efforts in Years 2 and 3 were calculated using more robust numbers of searcher efficiency and scavenge rate tests. While Curry and Kerlinger did not discount Year 1 results, they felt that subsequent years reflect a more thorough analysis and more plausible results (Curry and Kerlinger, 2009).

In addition, Curry and Kerlinger reported there was a disparity in the size of the area searched between Shiloh I project and the adjacent High Winds Project. The area searched per tower at Shiloh I was nearly 2 times the amount searched per tower at High Winds Project and was not

adjusted for. If Curry and Kerlinger only count the number of carcasses found in search areas of comparable size, the rates between the two areas are not so different. Moreover, the Shiloh I fatality rates were reportedly within the ranges of fatality rates reported for other wind farms. The per year estimates of fatality rates for each of the three years, adjusted for area searched, are as follows:

- Year 1 – 6.51 bird incidents/MW (9.76 incidents/tower) and 4.24 bat incidents/MW (6.35 incidents/tower)
- Year 2 – 4.82 bird incidents/MW (7.23 incidents/tower) and 3.03 bat incidents/MW (4.54 incidents/tower).
- Year 3 – 1.63 bird incidents/MW (2.54 incidents/tower) and 1.84 bat incidents/MW (2.75 incidents/tower).

(Curry and Kerlinger, 2009) reported when the three years are combined for the Shiloh I project and the differences in search areas is not accounted for, the estimated number of fatalities (averaged over 3 years) was 1,044 birds/year or 9.96 bird incidents/MW/year or 10.44 bird incidents/tower/year. The 95% CI for these three metrics were ± 74 birds/year, ± 0.49 bird incidents /MW/year and 0.74 bird/incidents/tower/year.

A total of 588 bats fatalities per year (3.92 bat incidents/MW/year, 5.88 bat incidents/tower/year) was estimated for the Shiloh project. The 95% CI for these three metrics were ± 37 bats/year, ± 0.25 bat incidents/MW/year and 0.37 bat incidents/tower/year. This estimate of bat incidents is greater than the average bat fatality rate of High Winds (2.02 bat incidents/MW/year), but less than or similar to that found at most wind farms in North America (Curry and Kerlinger, 2009).

When examining the differences between species groups at the two adjacent projects we see that the adjusted number of raptors a Shiloh I (0.44 incidents/MW/year) is only slightly greater than at High Winds (0.41 incidents/MW/year). The major difference in fatality rates is derived from the smaller carcasses (i.e., bats, mentioned previously, as well as small birds). Passerine bird incidents at Shiloh I (5.82 incidents/MW/year) were ~8 times greater than at High Winds (0.71 incidents/MW/year). The initial low searcher efficiency rating in year one for small birds magnified the effect of the larger number of passerines found at Shiloh I on the adjusted rates. Nevertheless, on a species-by-species examination of fatalities over the three years of the study, there is no species that has sustained a disproportionate number of fatalities at the Shiloh I project (Curry and Kerlinger, 2009).

(Curry and Kerlinger, 2009) reported, there are small differences in the number of bird and bat fatalities for most species at the Shiloh I project in comparison with the adjacent High Winds project. Moreover, (Curry and Kerlinger, 2009) reported there is nothing to suggest that a turbine or group of turbines in the Shiloh I project is substantially out of line with other projects.

The abundance of carcasses of five very common species at Shiloh accounts for a large portion of the difference between the sites. These species (listed above) accounted for 47.5% of carcasses found at Shiloh I, but only 23.3% of carcasses found at High Winds (Curry and Kerlinger, 2009).

(Curry and Kerlinger, 2009), reported the numbers of fatalities found at Shiloh I do not suggest biologically significant impacts to birds and bats. With respect to birds it is important to remember that the number of fatalities, both estimated and actual carcasses found represent extremely small

proportions of the North American and regional populations of these animals, suggesting that the impact to these species' populations will not cause declines that could potentially threaten the populations of these species. Even species for which larger numbers of carcasses were found, North American populations are in the tens to hundreds of millions of individuals, so it is highly unlikely that the fatalities at the Project site will result in declines of any species. These numbers are not biologically significant compared to the number of birds killed due to legalized hunting. The fact that no endangered and, or threatened species were killed during three years of this study strongly suggests that the turbines at Shiloh I are not a significant risk to these species (Curry and Kerlinger, 2009).

Table 30 of Curry and Kerlinger. Estimates for bird and bat collision mortality under 100 turbines of the Shiloh Project, All Years (April 10, 2006 – April 11, 2009), corrected for searcher efficiency, scavenger removal rate and proportion of towers searched (Curry and Kerlinger, 2009).

Birds					
Correction Factor	Small	Medium	Large	Bats	Total Carcasses
# Found	<u>155</u>	<u>181</u>	<u>43</u>	<u>132</u>	<u>511</u>
% Not Scavenged (Sc)	<u>40%</u>	<u>62%</u>	<u>91%</u>	<u>43%</u>	
Searcher Efficiency (Se)	<u>35%</u>	<u>69%</u>	<u>100%</u>	<u>35%</u>	
Proportion Searched Turbines (Ps)	<u>50.00%</u>	<u>50.00%</u>	<u>50.00%</u>	<u>50.00%</u>	
Adjusted Total	<u>729</u>	<u>283</u>	<u>32</u>	<u>588</u>	<u>1629</u>
95% CI (±)	<u>169</u>	<u>50</u>	<u>2</u>	<u>112</u>	

By dividing the estimated number (adjusted for searcher efficiency and scavenger losses) of birds/bats by the number of towers searched in each year of this study, a rate of incidents/tower and incidents/megawatt (MW) can be calculated, allowing for comparisons between wind farms of different sizes (different numbers of turbines and different generational capabilities per turbine) (Curry and Kerlinger, 2009).

Table 32 of Curry and Kerlinger. Adjusted number of incidents per species per turbine and per total installed megawatt capacity at Shiloh I, found during standardized surveys All Years (April 10, 2006 – April 11, 2009) (Curry and Kerlinger, 2009).

	<u># Incidents (3 years)</u>	<u>Unadjusted # Incidents/MW/ year</u>	<u>Unadjusted # Incidents/Tower/ year</u>		<u>Est. of mortality Incidents/ year</u>
Species Name					
<i>Birds (Large)</i>					
Black-crowned Night Heron	<u>1</u>	<u>0.00</u>	<u>0.01</u>		<u>1</u>
Ferruginous Hawk	<u>2</u>	<u>0.01</u>	<u>0.01</u>		<u>1</u>
Golden Eagle*	<u>1</u>	<u>0.00</u>	<u>0.01</u>		<u>1</u>
Goose spp.	<u>1</u>	<u>0.00</u>	<u>0.01</u>		<u>1</u>
Great Horned Owl	<u>4</u>	<u>0.02</u>	<u>0.03</u>		<u>3</u>
Mallard	<u>5</u>	<u>0.02</u>	<u>0.04</u>		<u>4</u>
Northern Harrier*	<u>2</u>	<u>0.01</u>	<u>0.01</u>		<u>1</u>
Peregrine Falcon	<u>1</u>	<u>0.00</u>	<u>0.01</u>		<u>1</u>
Red-tailed Hawk	<u>15</u>	<u>0.07</u>	<u>0.11</u>		<u>11</u>
Ring-necked Pheasant	<u>8</u>	<u>0.04</u>	<u>0.06</u>		<u>6</u>
Turkey Vulture	<u>2</u>	<u>0.01</u>	<u>0.01</u>		<u>1</u>
Unkown bird spp.	<u>1</u>	<u>0.00</u>	<u>0.01</u>		<u>1</u>
				Total Estd. Large	
Total Large Birds	43	0.21	0.32		32
<i>Birds (Medium)</i>					
American Coot	<u>10</u>	<u>0.10</u>	<u>0.16</u>		<u>16</u>
American Kestrel	<u>27</u>	<u>0.28</u>	<u>0.42</u>		<u>42</u>
Barn Owl	<u>2</u>	<u>0.02</u>	<u>0.03</u>		<u>3</u>
Brewer's Blackbird	<u>15</u>	<u>0.16</u>	<u>0.23</u>		<u>23</u>
Chukar	<u>4</u>	<u>0.04</u>	<u>0.06</u>		<u>6</u>
Common moorhen	<u>1</u>	<u>0.01</u>	<u>0.02</u>		<u>2</u>
Killdeer	<u>4</u>	<u>0.04</u>	<u>0.06</u>		<u>6</u>
Merlin	<u>1</u>	<u>0.01</u>	<u>0.02</u>		<u>2</u>
Mourning Dove	<u>26</u>	<u>0.27</u>	<u>0.41</u>		<u>41</u>
Northern Flicker	<u>2</u>	<u>0.02</u>	<u>0.03</u>		<u>3</u>
Northern Mockingbird	<u>1</u>	<u>0.01</u>	<u>0.02</u>		<u>2</u>
Rock Pigeon	<u>9</u>	<u>0.09</u>	<u>0.14</u>		<u>14</u>
Sora	<u>1</u>	<u>0.01</u>	<u>0.02</u>		<u>2</u>
Virginia Rail	<u>2</u>	<u>0.02</u>	<u>0.03</u>		<u>3</u>
Western Meadowlark					
	<u>76</u>	<u>0.79</u>	<u>1.19</u>		<u>119</u>
				Total Estd. Medium Birds	
Total Medium Birds	181	1.89	2.83		2.83
<i>Birds (Small)</i>					
American Goldfinch	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
American Pipit	<u>9</u>	<u>0.28</u>	<u>0.42</u>		<u>42</u>
Blackbird spp.	<u>2</u>	<u>0.06</u>	<u>0.09</u>		<u>9</u>
Black-Headed Grosbeak	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Black-throated Gray Warbler	<u>4</u>	<u>0.13</u>	<u>0.19</u>		<u>19</u>

	# Incidents (3 years)	Unadjusted # Incidents/MW/ year	Unadjusted # Incidents/Tower/ year		Est. of mortality Incidents/ year
Dark-eyed Junco, slate	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
European Starling	<u>6</u>	<u>0.19</u>	<u>0.28</u>		<u>28</u>
Golden Crowned Kinglet	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Golden Crowned Sparrow	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Hammond's Flycatcher	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Horned Lark	<u>21</u>	<u>0.66</u>	<u>0.99</u>		<u>99</u>
House Finch	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
House Sparrow	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Lincoln's Sparrow	<u>2</u>	<u>0.06</u>	<u>0.09</u>		<u>9</u>
MacGillivray's Warbler	<u>2</u>	<u>0.06</u>	<u>0.09</u>		<u>9</u>
Orange-crowned warbler	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Pacific-Slope Flycatcher	<u>3</u>	<u>0.09</u>	<u>0.14</u>		<u>14</u>
Passerine spp.	<u>14</u>	<u>0.44</u>	<u>0.66</u>		<u>66</u>
Red-winged Blackbird	<u>42</u>	<u>1.32</u>	<u>1.98</u>		<u>198</u>
Savannah Sparrow	<u>7</u>	<u>0.22</u>	<u>0.33</u>		<u>33</u>
Sparrow spp.	<u>3</u>	<u>0.09</u>	<u>0.14</u>		<u>14</u>
Swainson's Thrush	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Swallow Spp.	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Townsend's Warbler	<u>3</u>	<u>0.09</u>	<u>0.14</u>		<u>14</u>
Tree Swallow	<u>4</u>	<u>0.13</u>	<u>0.19</u>		<u>19</u>
Tri-colored Blackbird*	<u>2</u>	<u>0.06</u>	<u>0.09</u>		<u>9</u>
Warbling Vireo	<u>3</u>	<u>0.09</u>	<u>0.14</u>		<u>14</u>
Western Wood Pewee	<u>0</u>	<u>0.00</u>	<u>0.00</u>		<u>0</u>
White-crowned Sparrow	<u>2</u>	<u>0.06</u>	<u>0.09</u>		<u>9</u>
White-throated swift	<u>2</u>	<u>0.06</u>	<u>0.09</u>		<u>9</u>
Wilson's Warbler	<u>7</u>	<u>0.22</u>	<u>0.33</u>		<u>33</u>
Yellow Warbler*	<u>4</u>	<u>0.13</u>	<u>0.19</u>		<u>19</u>
Yellow-breasted Chat*	<u>1</u>	<u>0.03</u>	<u>0.05</u>		<u>5</u>
Unknown bird Spp.	<u>0</u>	<u>0.00</u>	<u>0.00</u>		<u>0</u>
Total Small Birds	<u>155</u>	<u>4.86</u>	<u>7.29</u>	Total Estd. Small	<u>729</u>
Total Birds	<u>379</u>	<u>6.96</u>	<u>10.44</u>	Total Estd. Birds	<u>1044</u>
Bats					
Hoary Bat	<u>64</u>	<u>1.90</u>	<u>2.85</u>		<u>2.85</u>
Mexican Free-tailed Bat	<u>63</u>	<u>1.87</u>	<u>2.81</u>		<u>281</u>
Silver-Haired Bat	<u>3</u>	<u>0.09</u>	<u>0.13</u>		<u>13</u>
Western Red Bat	<u>2</u>	<u>0.06</u>	<u>0.09</u>		<u>9</u>
Total Bats	<u>132</u>	<u>3.92</u>	<u>5.88</u>	Total Estd. Bats	<u>588</u>
Total (Birds & Bats)	<u>511</u>	<u>---</u>	<u>---</u>	Total Estd. (Birds & Bats)	<u>1632</u>

* Denotes California Species of Special Concern (CSC)

As shown in Table 32, the estimated average fatality rate over three years for all birds is 10.44 birds/tower/year (6.96 birds/MW/year), and for all bats is 5.88 bats/tower/year (3.92 bats/MW/year).

Because the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project Solano County, California, Final Report, October 2009, only gives the unadjusted and adjusted numbers of incidents per species during the 3rd year (April 2008 – April 2009) of surveys per total installed megawatt capacity per year, per turbine and per turbine year and unadjusted and adjusted numbers of incidents per species during all 3 years (April 10, 2006 – April 11, 2009) at Shiloh I, each individual year of data can not be compared.

Given the variety of locational and other factors that contribute to patterns in avian traffic, extrapolated data from other wind turbine projects should not be used in a strictly predictive manner. The best methodology for quantifying the effects of wind turbine projects on avian population is to use data derived from a project's operation. As such, while SMUD has provided data for both the High Winds and Shiloh I projects, we believe the SMUD Solano Wind Project Phase 3 mortality estimates (in terms of avian mortalities per MW and per turbine) could range from between High Winds, on the low end, and Shiloh I, on the high end, as presented in Table 4.5-8 below. Additionally, SMUD has committed to an adaptive management strategy to review operational data with the TAC and collaborate on potential implementation strategies for the mitigation measures identified herein, as needed and feasible.

Table 4.5-8 Collinsville-Montezuma Hills WRS Annual Reported Avian Mortality Comparison of Relevant Recent Study Results

Attribute or Metric	Shiloh I		High Winds
Number of Turbines	100		90
Nameplate Capacity (MW)	1.5		1.8
Total Installed Capacity (MW)	150		162
Total Height (meters)	103.5/118.5		100
Rotor Diameter (meters)	77		80
Duration of Study (Yrs)	3		2
Study Dates	2006 - 2009		2003 - 2005
Search Interval (days)	7		15
Annual Adjusted Mortality Data	Average	Year 3	Average
Total Birds	1044	422	210
Total Bats	588	321	310
Birds Per Turbine	10.44	4.22	2.45
Bats Per Turbine	5.88	3.21	3.63
Birds Per Megawatt	6.96	2.82	1.36
Bats Per Megawatt	3.92	2.14	2.02

Project implementation would have a potentially significant impact to golden eagle, bald eagle, American peregrine falcon, Swainson's hawk, white-tailed kite, blackrail, California Clapper rail, common yellow throat, Suisun song sparrow, western burrowing owl, and bats. Further monitoring and mitigation is required.

(p. 4.5-49)

The CNDDDB was rechecked for the nearest locations of recorded California tiger salamander (CTS) locations south of Highway 12 on January 5, 2010. One CTS location, recorded in 2007, is located 4.17 miles northwest of the Solano Wind Project, Phase 3 site boundary, and is reported to be extant. This is the only CNDDDB recorded CTS location south of Highway 12 in the Montezuma Hills area within a 10-mile radius of the Phase 3 Project Boundary, contrary to the comment. However, there are five recorded CTS locations located in the Potrero Hills area, south of Highway 12 and Travis Air Force Base, all are located 10 or more miles northwest of the Phase 3 project boundary.

The nearest other CTS location, recorded in 1983 is 3.19-miles southwest, across the Sacramento River in Antioch, CA, and is presumed extirpated.

(p. 4.5-51)

Mitigation BIO-2: Avoid wetlands and streams to the maximum extent that is feasible and practical, to prevent impacts to the aquatic environment.

If any streams are permanently filled or impacted, the loss shall be mitigated at a 1:1 ratio or as required in a project specific Lake or Streambed Alteration Agreement.

(p.4.5-53)

Mitigation BIO-4a: Pre-construction surveys for burrowing owls, nesting raptors, special status birds, and migratory birds.

The following guidelines, adapted from CDFG Staff Report on Burrowing Owl Mitigation (CDFG, 1995), will be implemented:

- ~~▪ Preconstruction burrowing owl surveys will be conducted in all areas that may provide suitable nesting habitat according to CDFG (1995) guidelines.~~
 - ~~— No more than 30 days before construction, a qualified wildlife biologist will conduct a survey for burrows and burrowing owls within 500 feet of the construction corridor in areas suitable for burrowing owls.~~
 - ~~— The survey will conform to the protocol described by the 1993 California Burrowing Owl Consortium, which includes up to four surveys on different dates if suitable burrows are present.~~
 - ~~— If occupied owl burrows are found during preconstruction surveys, a qualified biologist, in consultation with CDFG, will determine whether access road construction or other proposed construction activities will impact occupied burrows or disrupt reproductive behavior.~~

- ~~If it is determined that construction activities will not adversely affect occupied burrows or disrupt breeding behavior, construction can proceed without any restriction or mitigation measures for burrowing owls.~~

Before construction begins, burrowing owls nesting season, winter season, preconstruction survey will be conducted according to the Burrowing Owl Survey Protocol and Mitigation Guidelines (California Burrowing Owl Consortium 1993) and Department of Fish & Game Staff report on Burrowing Owl Mitigation (1995). An area extending 500 feet from Phase 3 Potential WTG siting areas, locations of temporary and permanent roads, buried cable routes, O&M building(s), collection line route and areas within 500 feet of these locations. A complete burrowing owl survey consists of four site visits repeated on four separate days. Site visit will be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise.

- Nesting season. Nesting season surveys should be conducted during the peak of breeding season, between April 15 and July 15.
- Winter Surveys. Winter surveys should be conducted between December 1 and January 31.
- Preconstruction surveys. Preconstruction surveys in all areas that may provide suitable nesting habitat within 500 feet of the construction corridor will be conducted no more than 30 days before the onset of ground disturbing activities. If occupied burrows are found a qualified biologist in consultation with CDF&G, will determine whether construction activities will impact occupied burrows or disrupt reproductive behavior. If it is determined that construction activities will not adversely affect occupied burrows or disrupt breeding behavior, construction can proceed without any restrictions or mitigation measures.

Similar to the measures to avoid burrowing owl nests, surveys for other nesting birds will also be performed. These surveys may be combined with burrowing owl surveys.

For all construction during the nesting season (February 1 through August 15):

- No more than 30 days before construction, a qualified wildlife biologist will conduct a survey for nest platforms, tree nests, and ground nests within 500 feet of the construction corridor in areas suitable for bird nesting.
- If active nests are found during preconstruction surveys, a qualified biologist, in consultation with CDFG, will determine whether proposed construction activities will impact active nests or disrupt reproductive behavior.
- If it is determined that construction activities will not adversely affect occupied nests or disrupt breeding behavior, construction can proceed without any restriction or additional mitigation measures.

(p. 4.5-55)

Mitigation Bio-5a: Implement a Bird and Bat Mortality Monitoring Program to determine if mortality is occurring.

The Bird and Bat Mortality Monitoring Program will survey for bird mortality ~~annually~~ in the project area for a period of three years; from the date of commercial operation of the project as follows:

- ~~Qualified~~ An independent USFWS-approved biologists will monitor bird and bat mortality annually throughout the project area, including where any new overhead transmission lines have been installed within the project area.
- Bird species, number, location, and distance from WTGs, availability of raptor prey species, and cause of bird and bat mortalities will be noted. All results will be transmitted to the Wildlife Response and Reporting System (WRRS) database.
- SMUD will participate in the Solano County Avian Technical Advisory Committee (TAC) and will contribute to the efforts of the ~~Committee~~ TAC to develop mitigation measures to lessen potential impacts on raptors as a result of WTG operation. The ~~Committee~~ TAC is an interagency organization composed of biologists from CDFG, USFWS, the Solano County Department of Resource Management, and representatives from wind plant developers in the Collinsville-Montezuma Hills WRA. The Avian Mortality Monitoring Study will follow the methodology of the Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project Solano County, California Final Report, October 2009 (Curry and Kerlinger, LLC, 2009), and will be consistent with the standardized guidelines outlined by the California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Developments (CEC and CDFG, 2007). SMUD will prepare and provide reports from the monitoring to all TAC participants, and fully share the results of this research with the TAC.
- Banding information obtained from the CDFG will be analyzed to assess the origin and population of red-tailed hawks, American kestrels, and other raptors.
- ~~Any disproportional mortality at individual WTGs will be analyzed. The avian mortality monitoring will be conducted by an independent USFWS-approved biologist, and reports shall contain sufficient information to allow evaluation of turbine design characteristics and location effects that contribute to mortality.~~
- At the conclusion of the three year study period, An analysis will be made to validate, through comparison, that bird mortality from the project is not disproportionate to other wind projects (e.g., Shiloh I and II Wind Plant Project, Montezuma Wind Project, Solano County High Winds Project, and SMUD Solano Wind Project Phases 1 and 2B). Any disproportionate mortality at individual WTGs will be analyzed. Based on the results of the monitoring effort and analyses, and with coordinated input from the TAC, significantly disproportionate avian mortality will be addressed, and mitigation measures implemented, based on the available and feasible options (e.g. maintenance activities, habitat management, WTG shutdowns or other operational changes during migratory or other identified high risk periods).
- If, based upon its review and consideration of the final Avian Mortality Monitoring Report, the TAC determines that the avian mortality resulting from operation of the Phase 3 project

significantly exceeds the High Winds and Shiloh I range of values presented herein, (expressed as thresholds in terms of mortalities per megawatt per year) for species of concern, SMUD will request that the TAC recommend a comprehensive set of biologically based, reasonable, and feasible management and/or mitigation measures to directly respond to the fatality threshold being exceeded. Within one year from receipt of the TAC's written recommendations, SMUD will initiate full implementation of these recommendations.

The classification of project monitoring periods related in the CEC (2007) for evaluation of impacts is specified as Category 1, 2, or 3 (CEC 2007) and is, based on a number of considerations, but m Most applicable are the proximity of other wind projects and the studies conducted relative to avian mortality in the area. According to CEC Guidelines, a Category 1 site is characterized as projects "near existing wind facilities for which there is little uncertainty as to the level of impacts" (CEC Guidelines, page 7). Other characteristics of a Category 1 facility include:

- Whether the field data were collected using a credible sample design. (Mortality surveys analysis for High Winds EIR were performed by Curry and Kerlinger, and evaluated by Jim Estep, using state-of-the-art methods.)
- The availability of data collected is in close proximity to the proposed site. (The High Winds Site is north and adjacent to the proposed Phase 3 location; FPL's Montezuma Wind Project is due north; enXco's V and Shiloh II project are northeast and northwest of the SMUD Solano Wind Project, respectively (Figure 4.5-3). Data have been collected for all these projects).

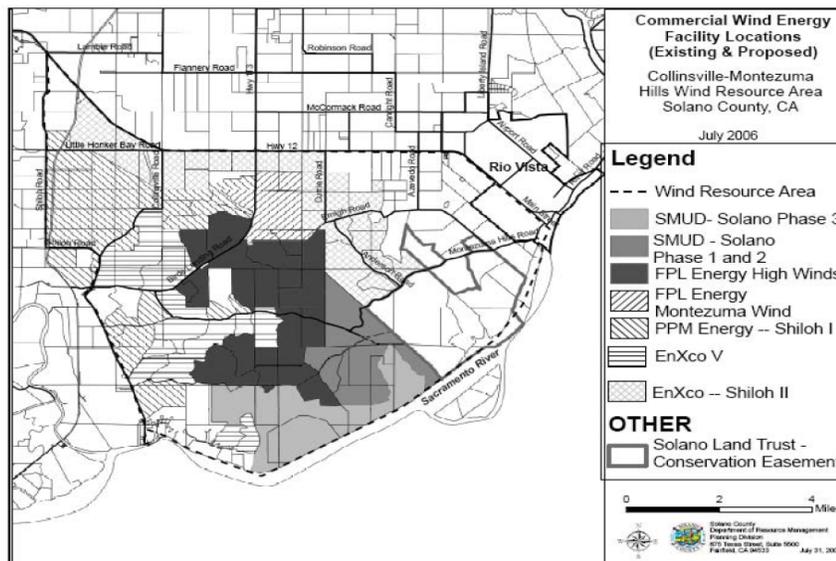


Figure 4.5-3. Commercial Wind Energy Facility Locations, Existing and Proposed (Energy Background Report, Solano County General Plan Update, 2006)

- Whether the existing data reflect comparable turbine type, layout, habitat, suitability for migratory species, physical features and winds. (High Winds uses the V80 1.8 MW turbine (60 meter hub height and the Shiloh I project uses the GE 1.5 MW turbine at 65 and 80 meter hub heights) compared to the SMUD-proposed turbines, which may be 105 meters in hub height. The turbine location layout is determined largely by inter-turbine distances, as well as availability of ridge tops, and, therefore, is essentially the same. In addition, the project area habitat type is

dryland farming and pasture. The suitability for migratory species is very similar to the Phase 3 site. Last, physical features and winds are nearly identical.

- Whether the data are scientifically defensible and still relevant. ~~(To date, the validity of Curry & Kerlinger's studies and analyses has not been challenged.)~~

Based on these criteria, SMUD considers the project area to be Category 1; a. Although one year of post-construction monitoring is ~~warranted as requested~~ sufficient, in light of requests from by the Solano County Department of Resource Management, three years of bird and bat mortality studies will be performed.

(p. 4.5-57)

Mitigation BIO-5b: Provide off-site mitigation land to support and enhance raptor populations.

Prior to construction activities from the Solano Wind Project Phase 3, SMUD will provide 68 to 107 acres of property outside the WRA as open space suitable as breeding and foraging habitat for raptors impacted by the project. This conservation land or easement will meet the following requirements.

Actual acreage will be based on a 1:1 ratio of designated open space land to rotor-swept area. ~~This ratio is based on the designation of open space within the WRA.~~ SMUD will purchase land at the maximum mitigation area which has been calculated using a 1:1 ratio of mitigation area to rotor swept area, resulting in ~~a required area for mitigation to be~~ a maximum of 107 acres for the rotor swept area.

To calculate the necessary mitigation acreage, SMUD has identified the 8 types of turbines under consideration for potential project WTGs and the general range required for the build out of 128 MWs (112.5 MWs for the 1.5-MW units) of net generating capacity for the project. As specified on page 2-12, the build-out of net generating capacity for the project would require 75 units if the 1.5-MW units (the smallest WTGs being considered) would be installed or as few as 36 units if the 3.6-MW units (the largest WTGs being considered) would be installed. Table 2-3 Specification of Turbines, page 2-12 provides information on the representative sample of manufactures that can supply the quantity of WTGs required for the project. The megawatts per turbine can be determined by dividing the kilowatts per turbine by 1,000 for each turbine type. This table also identifies the rotor swept area for each turbine type. The rotor swept area can be calculated by using the value for each turbine type and the number of turbines of each of the eight potential WTG model types.

The range of acres of mitigation land represents the low of 68 acres using 1.5-MW WTGs and the high of 107 acres 3.6-MW WTGs. SMUD's preference is to use larger WTGs, available from wind turbine manufactures such as Vestas, Siemens, or Clipper; however, actual selection will depend on responses to a forthcoming request for proposal for the project.

- ~~Management measures and enhancements will be provided (if such features do not already exist on the property) to provide suitable raptor foraging and nesting habitat on the property.~~

- A conservation easement will be recorded, and will run with the land in perpetuity ~~or until the project is decommissioned and removed~~, and will list prohibited activities inconsistent with the purpose of supporting raptor foraging and breeding habitat. Prohibited activities include but are not limited to:
 - No incompatible development on the property;
 - No wind turbine development on the property;
 - No incompatible crops such as vineyards and orchards.
- ~~Fund the maintenance, management, and monitoring of the conserved land in the amount of \$10,000 per year.~~ Management activities and/or restrictions are based on the Final Environmental Impact Report Shiloh II Wind Plant Project, 2007, prepared for the Solano County Department of Resource Management (Ecology and Environment, Inc., 2007) and will include the following:
 1. ~~Maintaining or enhancing natural areas, particularly grasslands and seasonal wetlands, or maintaining compatible agricultural crops and practices. Acceptable crops will include those that provide low-lying vegetation suitable for raptor habitat, while unacceptable crops will include those that do not provide sufficient accessibility or have low prey densities for raptors.~~
 2. ~~Nesting opportunities will be protected by maintaining, enhancing, or protecting trees for nesting habitat. The installation of artificial nesting structures will be acceptable only if live trees also are planted and maintained on the property.~~
 3. ~~Three years after the first delivery of power, an open space and habitat management plan will be prepared for the conserved area. This plan will be developed in consultation with the resource agencies.~~
- Prior to issuance of the first builders permit or grading permit for the project, whichever occurs first, SMUD shall establish an irrevocable letter of credit in favor of the County of Solano from a reputable bank with a branch in the United States in an amount approved by the County to ensure compliance with the conservation land or easement provisions described in paragraphs 2 through 4 below.
- If SMUD timely requests approval of the location of the conservation land or easement and approval is not granted within the two-year period, SMUD shall purchase and record the land or easement within a reasonable amount of time after the County Gives its approval and shall be deemed to have complied with this two year requirement. The conservation land or easement shall meet the following requirements:
 1. The conserved area shall be at least 68 acres and no more than 107 acres in size, depending on type and model of WTG utilized, and located on land in Solano County providing similar habitat as the Solano Wind Project Area but shall be outside the WRA.
 2. The conserved land or easement site shall be dominated by natural vegetation, agricultural uses, or a combination of both. The primary purpose of this land or easement will be to provide conservation lands for raptor species that could potentially be impacted by the Solano Wind Project Phase 3 project.

3. The conserved lands shall provide breeding opportunities in an effort to offset raptor mortality associated with operation of the project. The main species anticipated to be impacted by the project are raptor species such as golden eagle, red-tailed hawk, and American Kestrel, although the easement could also provide habitat for other guilds of birds such as ground nesting songbirds. Types of habitat enhancement measures on the easement will be weighted according to the relative abundance of birds impacted by the project and the species specific needs of those species, and the type and quality of habitat that may already exist on the conserved land. A number of management measures and enhancements shall be provided (if such features are already not present) to provide suitable foraging and nesting habitat on the easement.
 4. The conservation easement shall be recorded, shall run with the land in perpetuity, and shall list and prohibit activities inconsistent with the purpose of supporting avian foraging and breeding opportunities. If the land is acquired in fee-title and conveyed to a land trust or similar entity, an irrevocable deed restriction shall be recorded on the property to assure that the property permanently remains in conservation regardless of ownership and contains the same restrictions as a conservation easement.
- SMUD shall establish a funding mechanism to finance the maintenance, management, and monitoring of the conservation area for the life of the project. Estimated costs shall be established using a PAR-type analysis. The analysis and funding mechanism shall require approval by the county, in consultation with the resource agencies, prior to recordation of the conservation easement. Management activities or restrictions in the conservation easement shall include:
 1. Provisions for suitable foraging habitat by maintaining or enhancing Natural Areas, particularly grasslands and seasonal wetlands; or by maintaining compatible agricultural crops and practices. Suitable crop types for foraging raptors include those with low-lying vegetation such as alfalfa and other hays, various row and grain crops. Unsuitable crop types that would be restricted in the easement shall include those that do not provide sufficient accessibility or have low prey densities, such as orchards and vineyards.
 2. Maintaining or enhancing nesting opportunities by protecting trees or planting trees that are suitable for raptor nesting, including native valley oaks and cottonwood trees. The installation of artificial nesting structures would be acceptable only in combination with the planting and maintenance of live trees.
 - Within three years following the first delivery of power, SMUD Solano Wind Project Phase 3, in conjunction with a qualified wildlife biologist, shall undertake breeding habitat enhancement measures if required by the County on the conserved property, which shall include the following:
 1. Prior to recording the conservation easement, SMUD Solano Wind Project Phase 3, shall submit to the County an open space and habitat management plan for the conserved area, which shall be prepared by a qualified Wildlife Biologists. Approval of the plan by the County, in consultation with the resource agencies, shall be required prior to recordation of the easement.
 2. Types of enhancement measures on the easement, if required by the County, will be weighted according to the relative abundance of birds impacted by the Phase 3 project and

- the species-specific needs of those species but could include the placement of nesting substrate for golden eagles, red-tailed hawks and American Kestrels (nesting boxes, trees, perches, and/or other features). The use of artificial nesting structures would be acceptable only in combination with the planting and maintenance of live trees.
3. A number of management measures and enhancements shall be provided, (if such features are not already present) to provide suitable foraging and nesting habitat on the easement.
 4. Prior to recording the conservation easement or conveying the project in fee-simple, SMUD Solano Wind Project Phase 3 shall designate, for the county's approval, a public agency or non-profit entity, or a designative representative to manage the conserved area.
- SMUD shall be responsible for all mitigation costs including habitat enhancements for the life of the project (if required by the County), preparation and implementation of the open space management plan, and long-term management of the conservation area.
 1. In-lieu fee – off-site conservation land or easement – As an alternate to the off-site conservation easement requirements described in section 2. above, SMUD may contribute an in-lieu fee to the Solano Land Trust or other conservation entity approved by the County in consultation with CDFG (hereinafter “Trust”) in an amount and according to the terms as approved by the County in consultation with the CDFG for the establishment of 68 to 107-acres (depending on which turbines utilized) of permanent conservation land or easement in Solano County. This fee shall be used by the Trust for the sole purpose of purchasing, recording, enhancing, maintaining, and preserving the conserved land in fee-title or easement that provides protected breeding and foraging habitat for the raptors and other avian species impacted by the project. The requirements for the in-lieu fee alternative shall include the following:
 - The amount of the in-lieu fee shall require approval by the County, in consultation with the CDFG, which approval shall not be unreasonably withheld, and shall be based on the Trust's costs for the following:
 1. Acquisition of a minimum of 68 acres and no more than 107 acres of conservation land in fee-title and/or easement for open space and habitat suitable as breeding and foraging for raptors such as the golden eagle, red-tail hawk, and other guilds of birds impacted by the project; and
 2. Reasonable administrative and other overhead costs by the Trust to acquire the land and/or easement for the life of the project; and
 3. The development, approval, and implementation of the required habitat enhancement and management plan as required by the County in consultation with the CDFG; and
 4. The maintenance, management, and monitoring of the conserved land and habitat for the life of the project, based on a PAR-type analysis.
 - SMUD shall furnish the entire in-lieu fee, as approved by the County, to the Trust, and a receipt to this effect shall be provided to the County, within two years following the first delivery of power.

- The requirements for the conserved land shall be based on a written agreement with the Trust and the County, and shall be binding on the Trust, and shall include the following:
 1. The conserved land and/or easement shall be at least 68 acres and no more than 107 acres in size, depending on type and model of WTG utilized, and located on land in Solano County but outside the WRA. The location shall require County approval in consultation with CDFG, which approval shall not be unreasonably withheld, prior to acquisition.
 2. The conserved land shall provide similar habitat as the Solano Wind Project Phase 3 project area, dominated by natural vegetation, agricultural uses, or a combination of both. The land shall also provide, to the maximum extent feasible, foraging and breeding opportunities for the species most affected by the project including raptors such as golden eagles, red-tailed hawk, and American kestrel. Habitat for other species such as ground-nesting songbirds is also appropriate.
 3. The land and/or easement shall be held, maintained and protected in perpetuity for the conservation purposes prescribed in this mitigation measure. If the land is acquired in fee-title, an irrevocable deed restriction shall be recorded on the property to assure that the property permanently remains in conservation regardless of ownership.
 4. The deed restriction or conservation easement shall be recorded, shall run with the land in perpetuity, and shall list and prohibit activities inconsistent with the purpose of supporting raptor and other avian and breeding opportunities.
 5. Required enhancements, maintenance, and monitoring of the easement shall be in accordance with the habitat enhancement and management plan as prepared by the Trust and approved by the County in accordance with paragraph below.
 6. The conservation land and/or easement shall be purchased and the deed restriction or easement shall be recorded within two years following the first delivery of power, and the documentation to this affect shall be furnished by the County.
 7. The in-lieu fee furnished by SMUD shall be held in an interest bearing or other appropriate investment account until expended for purchase of the land/or easement acquisition, recordation, maintenance, monitoring for the life of the project and other measures under the terms of the Agreement.
 8. All in-lieu fees furnished by SMUD shall be used exclusively for the conservation land or easement associated with the Solano Wind Project Phase 3 project only.
- The Trust shall prepare and submit to the County an open space and habitat management plan for the conserved area, which shall be prepared by a qualified Wildlife Biologist. Approval of the Plan by the County, In consultation with CDFG, shall be required prior to implementation. The open space and habitat management plan shall include the following:
 1. Foraging and breeding habitat protection and maintenance measures, as well as land management measures including restrictions in the conserved area.
 2. Provisions for maintaining suitable foraging habitat or enhancing natural areas, particularly grasslands and seasonal wetlands; or maintain compatible agricultural crops and practices. Suitable crop types for foraging raptors include those with low-lying vegetation such as

- alfalfa and other hays, various row and grain crops. Unsuitable crop types that would be restricted in the easement shall include those that do not provide sufficient accessibility or have low prey densities, such as orchards and vineyards.
3. Management measures that include, but are not limited to, maintenance and protection of trees suitable for nesting including valley oaks and other native trees, appropriate grazing management practices, vegetation management, and establishment of land use restrictions and activities that may be inconsistent with the purposes of the conserved area.
 4. Any required enhancements in the conservation easement will be weighted according to the relative abundance of birds impacted by the Solano Wind Project, Phase 3 and the specific needs of those species and the type and quality of habitat that may already exist on the conserved land. At a minimum, the placement of nesting substrate for golden eagle, red-tailed hawks and American kestrels (nesting boxes, trees, perches, and/or other natural features) will be necessary, unless such habitat already exists, as determined by the County. The use of artificial nesting structures would be acceptable only in combination with the planting and maintenance of live trees.
 5. Habitat enhancements (if required by the County) shall be fully undertaken by the Trust within one year following the acquisition of the conservation land or easement by the Trust.
- Mitigation bank credits – off-site conservation easements – as an alternative to the off-site conservation requirements described in sections 2 and 3 above, SMUD may purchase Swainson’s hawk or other mitigation credits approved by the County in consultation with CDFG for the benefit of the species of raptors impacted by the Solano Wind Project, Phase 3 Project, equivalent to a minimum for 68 acres and a maximum of 107 acres of established conservation land from the Jenny Farms Conservation Bank, Elise Gridley Multi-Species Conservation Bank, or other conservation bank with appropriate raptor habitat in Solano County as approved by the County in consultation with CDFG. The purchase of conservation easement credits shall comply with the following:
 1. Full purchase of all required credits shall be completed within two years following the first delivery of power, and a receipt to this affect shall be furnished to the County.
 2. The credits shall be equivalent to the protection of the area of the rotor swept area, depending on the turbine selected (a minimum of 68 acres and a maximum of 107 acres) of similar habitat as the Phase 3 project area, dominated by natural vegetation, agricultural lands, or a combination of both. The conserved land shall further provide, to the maximum extent feasible, foraging and breeding opportunities for the avian species most affected by the project including golden eagle, red-tailed hawk, and American kestrel. Habitat for other species such as ground-nesting songbirds is also appropriate.
 3. Purchase of the credits shall include costs for the design, installation and maintenance of the nesting enhancements on the conservation bank property for the life of the project (if nesting opportunities are not already present), as required by the County in consultation with the CDFG, and in coordination with the conservation bank operator. The nesting enhancement requirements shall include following:
 - The enhancements to the conservation bank will be weighted according to the relative abundance of birds impacted by the Solano Wind Project Phase 3 project and the specific needs of those

species but shall include, at a minimum, the placement of nesting substrate for golden eagle, red-tailed hawks and American kestrels (nesting boxes, trees, perches, and/or other natural features) will be necessary, unless such habitat already exists, as determined by the County. The use of artificial nesting structures would be acceptable only in combination with the planting and maintenance of live trees. All nesting enhancement measures shall be specified in the sales Agreement between the bank operator and SMUD.

- The quantity of nesting enhancements shall be proportionate to the area of the required off-site conservation easement.
- Nesting enhancements, if required by the County shall be completed by the bank operator within one year of the purchase of mitigation bank credits by SMUD, and this shall be specified in the sales Agreement between the bank operator and SMUD.
- The bank operator shall be responsible for notifying the County upon completion of nesting enhancements, which shall be specified in the sales Agreement between the bank operator and SMUD.
 1. The conservation bank operator shall adequately document and report their transaction as specifically provided for in their banking agreement with the appropriate resource agencies.

(p. 4.5-58)

Mitigation BIO-5d: Obtain an Incidental Take Permit

In addition, SMUD will seek an ~~incidental~~ eagle take permit under the Bald and Golden Eagle Protection Act pursuant to 50 CFR Sections 22.6 and 22.7.

(p. 4.5-58)

Mitigation BIO-6a. SMUD will conduct site assessments for areas of red-legged frog suitable habitat.

Based on the CNDDDB (September 2009) data, SMUD will follow the requirements from USFWS for protocol level habitat site assessment and surveys for red-legged frog surveys will be limited to pre-construction surveys for to identify areas of suitable habitat and presence only. If suitable habitat is identified in the site assessment, a qualified biologist with a Section 10(a)(1)(A) recovery permit will conduct surveys for the presence of red-legged frog, after providing the Sacramento Fish and Wildlife Office (SFWO) with the site assessment report. Guidance will be obtained from SFWO on how red-legged frog issues should be addressed, including whether field surveys are appropriate or should be conducted, and whether incidental take authorization should be obtained pursuant to the Endangered Species Act. If red-legged frog are identified in the project area then protocol level red-legged frog surveys, with multiple survey visits conducted throughout the survey-year (January through September), will be conducted consistent with the USFWS' (2005) Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog.

Field Survey

The Service will be notified in writing (e.g., email) by the surveyor within three (3) working days once a red-legged frog is detected. To avoid and minimize the potential of harassment or harm to red-legged frogs, no additional surveys will be conducted once occupancy has been established.

Survey Guidance

A total of up to eight (8) surveys to determine the presence of red-legged frog will be conducted at or near the site. Two (2) day surveys and four (4) night surveys will be conducted during the breeding season (January 1 through February 28); one (1) day and one (1) night survey will be conducted during the non-breeding season (between July 1 and September 30). Each survey will take place at least seven (7) days apart and at least one survey will be conducted prior to August 15th. The survey period will be over a minimum period of six (6) weeks (i.e., the time between the first and last survey must be at least six weeks).

If red-legged frogs are identified at any time during the course of surveys, no additional surveys will be conducted in the area.

(p. 4.5-60)

Mitigation BIO-8a: SMUD will conduct ~~pre-construction~~ site assessments for suitable CTS habitat.

Based on the CNDDDB data, SMUD will follow the requirements from USFWS for protocol level habitat site assessment and surveys for CTS to identify areas of suitable habitat and presence. SMUD will follow the USFWS' "Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander, October 2003". A qualified biologist with a Section 10(a)(1)(A) recovery permit will conduct a site assessment to determine if the project site is suitable habitat for CTS. A site assessment report will consist of the following three elements:

Element 1. Determine if the project site is within the range of the CTS. The project proponent or surveyor should consult the California Natural Diversity Data Base (CNDDDB) to determine known localities of the CTS. Other information sources on local occurrences of CTS should be consulted also. Sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resources managers and biologists from municipal, state, and Federal agencies, environmental groups, and herpetologists at museums and universities.

Element 2. Project proponent or surveyors should note in their report all known CTS localities within the project site and within 3.1 miles of the project boundaries; if there are no localities within 3.1 miles, the nearest locality will be noted.

Element 3. The upland and aquatic habitats within the project site and within 1.24 miles of the project boundaries should be described. Characteristics of the site to be recorded include acreage, elevation, topography, plant communities, presence and types of water bodies, fossorial mammal

species and their burrows, current land use, a description of adjacent lands, and an assessment of potential barriers to CTS movement. Use of aerial photographs should be used to characterize potential breeding habitats that are not part of the project site under consideration. The aquatic habitats should be mapped and characterized (e.g., natural vernal pools, stockponds, drainage ditches, creeks, types of vegetation, surface area, depth, approximate drying date). Suitable upland habitat, including locations of underground refugia, for CTS should be mapped as well, with a focus on areas where small mammal burrows are located or are most dense.

After completing all three elements a site assessment should be submitted to the USFWS and DFG. Based on the information the USFWS and DFG will provide recommendations as to the appropriateness of field surveys. Biological field surveys will not be initiated until recommended by the USFWS and DFG.

Based on the information provided from the site assessment, the USFWS and CDFG will provide recommendations as to the appropriateness of field surveys and whether incidental take authorization should be obtained pursuant to the Endangered Species Act and the California Endangered Species Act. Surveys will not be initiated to determine presence of CTS until recommended by the USFWS and CDFG.

~~Habitat for CTS is found in Solano County, but suitable habitat is not likely found in the Phase 3 project area. CTS is listed as threatened under the ESA and is a state ESA candidate species. CTS has been located within the Jepson Prairie Preserve (approximately 10 miles north of the Montezuma Hills WRA), Potrero Hills (approximately 4 miles northwest of the Montezuma Hills WRA) (SMUD, 2007), and the North Suisun Mitigation Bank (approximately 6 miles north of the northeastern portion of the project boundary).~~

~~On the Potrero Hills' northwestern edge, an estuarine marsh extends eastward from marshes of Hill Slough. An extensive zone of mima mounds, small vernal pools and swales, and two larger pools lie north of these hills and south of Highway 12, where at least one of the pools supports a CTS breeding population. Conservancy fairy shrimp, vernal pool tadpole shrimp, and several special status vernal pool plants have also been recorded in this area (Noss et al., 2002).~~

~~Previous environmental documents prepared for other projects in the Montezuma Hills have considered aquatic habitats, such as ponds and vernal pools and the uplands surrounding these habitats, as suitable for CTS (Ecology and Environment, Inc., 2005).~~

~~Jones & Stokes biologists did not detect this species in the Montezuma Hills during CTS monitoring and surveys at the Shiloh I project, surveys for the Shiloh II project, and surveys for the Montezuma Wind Project failed to result in any detections of this species in the Montezuma Hills. The FEIR states that "CNDDDB lists no records of California tiger salamanders (CTS) within 3 miles of the project area, and there are no known breeding ponds in the vicinity." Part of the basis for this statement was the surveying of an area 3.1 miles north of the Phase 3 site that potentially had sensitive resources (e.g., CTS and vernal pool fairy shrimp) within the proposed transmission route for the Shiloh II project (Jones & Stokes, 2006). However, this reference indicated suitable habitat only, and no CTS or vernal pool fairy shrimp were detected there (Brad Schafer, Jones & Stokes, personal communication, January 31, 2008).~~

Based on the Jones & Stokes surveys and the CNDDDB records search which put the closest known occurrence of CTS outside of 3.1 miles, CTS surveys will be limited to pre-construction surveys for identifying areas of suitable habitat only. If suitable habitat is identified, a qualified biologist with a Section 10(a)(1)(A) recovery permit will conduct surveys for the presence of CTS. If CTS's are identified in the project area then protocol level CTS surveys will be conducted consistent with the USFWS' "*Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander, October 2003*".

(p. 4.5-61)

Mitigation BIO-8b: Avoid impacts to CTS by restricting construction activities to areas outside of suitable habitat for CTS.

To avoid impacts on suitable habitat for the California tiger salamander, SMUD will locate WTGs, step-up transformer, roads, and other facilities outside of and away from, areas identified as suitable habitat of California tiger salamander. Although the presence of CTS onsite is unlikely due to the distance of the proposed project from other known occurrences, a site assessment will be conducted and submitted to USFWS and CDFG for review as provided above.

If CTS is determined to be present within the Phase 3 Solano Wind Project boundary, and avoidance of suitable habitat is not feasible due to construction requirements, SMUD will implement the mitigation measures listed below or substantially equivalent mitigation that may be required by the wildlife agencies.

To avoid significant impacts on the CTS, SMUD shall comply with the following mitigation measures:

- a. All project components shall be located a minimum of 250 feet from suitable habitat.
- b. Ground-disturbance activities within 0.5 mile (2,640 feet) of potential wet CTS habitat shall occur only during the dry season (i.e., June 1 through October 15).
- c. A worker-training program covering CTS shall be conducted before groundbreaking. The program shall provide workers with information on their responsibilities with regard to this species, an overview of the appearance of the species, and a description of the measures being taken to reduce the potential effects on the species during Project construction.
- d. A USFWS-approved biologist shall conduct a preconstruction survey to assess the potential for CTS appearance relative to the quality and status of wetland and upland habitats in the vicinity of the Project features and shall identify any key areas that would require avoidance. Qualified surveyors/monitors shall be on-site during construction to provide clearance for all work activities in potential CTS habitat, including potential movement corridors and hibernation sites.
- e. If CTS is encountered during construction work, activities shall cease until the salamander is removed and relocated by a USFWS-approved biologist. In the event of an injury or

mortality to CTS, the USFWS and CDFG shall be contacted by telephone within one working day.

- f. Signs that can be easily read from at least 20 feet away shall be placed to indicate potential CTS habitat that must be avoided by construction personnel. Prior to construction, a USFWS-approved biologist shall determine the location and number of signs necessary.
- g. To prevent inadvertent entrapment of CTS during the project, deep trenches that are within 2,000 feet of CTS habitat shall have escape ramps built into them at the close of each day to allow for escape of any CTS that may become entrapped. Before the trench is filled, it shall be thoroughly inspected for trapped animals.
 - i. If at any time a trapped CTS is discovered, the USFWS-approved biologist shall carefully remove the animal by hand and place it at the entrance of a suitable rodent burrow within walking distance from the excavation site but outside the area where the animal could be injured or killed by Project activities.
 - ii. The rescued CTS shall be monitored until it enters the burrow.
 - iii. The USFWS and CDFG shall be notified by telephone and a letter within three working days if a CTS is found in the Solano Wind Project Phase 3 Project Area. If any mortality of CTS occurs, specimens shall be collected by an USFWS-approved biologist, preserved by freezing; The USFWS and the CDFG Department shall be contacted by telephone within one working day.
- h. To eliminate the attraction of CTS predators, all food-related trash items such as wrappers, cans, bottles, and food scraps that are within 2,000 feet of the suitable habitat shall be disposed of in closed containers and removed from the Solano Wind Project Phase 3 Project Area at the end of each day.
- i. BMPs (required as part of the SWPPP) shall be implemented to prevent sediment from entering suitable CTS habitat at the project site, including but not limited to, silt fencing, sterile hay bales, and temporary sediment disposal.

In addition, the following mitigation plan has been adapted from *California Tiger Salamander Model and Mitigation Recommendations, Potrero Hills Landfill Phase II Expansion, Solano County, CA* (LSA, 2007). Mitigation for impacts to CTS upland and aquatic habitats will be calculated using the methods specified in the interim mitigation measures for CTS in the *Santa Rosa Plain Conservation Strategy* (USFWS, 2005) and the *Programmatic Biological Opinion for U.S. Army Corps of Engineers Projects that May Affect California Tiger Salamander and Three Listed Plants on the Santa Rosa Plain, California* (Corps File Number 223420N) (USFWS, 2007). Upon full implementation of the conservation strategy, all areas within 1.3 miles of a known or extirpated breeding site will be subject to a mitigation ratio of 2:1 (preserved to impacted). The current interim ratios for area of mitigation to area of impact are as follows:

- Mitigation of 3:1 – For projects within 500 feet of a known breeding site.

- Mitigation of 2:1 – For projects more than 500 feet and within 2,200 feet of a known breeding site, and for projects beyond 2,200 feet from a known breeding site but within 500 feet of an adult occurrence.
- Mitigation of 0.2:1 – For projects that are greater than 1.3-miles from a known breeding site and greater than 500 feet from an adult occurrence.

If necessary, mitigation will be conducted on site relative to the impact ratios stated above in an area that meets the habitat requirements of CTS and as approved by USFWS.

Implementation of this mitigation measure would result in a less than significant impact after mitigation.

(p. 4.8-5)

4.8.1.3 Local

Safety

Solano County ~~Wind Turbine Siting Plan/Solano County~~ General Plan – Establishes siting guidelines and setback requirements for WTGs to avoid potential hazards to adjacent uses. Implementation of these guidelines and setback requirements by Solano county, for a wind project located in the Collinsville-Montezuma Hills WRA, has most recently been documented in the Final Shiloh II EIR (Ecology and Environment, Inc., 2007).

(p. 4.8-13)

4.8.2.3 Air Traffic

Additionally, SMUD participated in the December 2009 Cooperative Research and Development Agreement (CRADA) with the United States Transportation Command. A principal goal of the CRADA was to assess the operational impact of the Shiloh III, Montezuma Wind, and Solano Wind Project Phase 3 on the Travis Air Force Base air traffic control areas. The CRADA facilitated the use of simulation methodology to perform that assessment and was subject to independent government verification. Through the efforts of the CRADA, a minimum average probability of detection (Pd) over the Wind Resource Area (WRA) at the radar scope of 75.3% at surface to 4,000 feet, and 79.2% at surface to 10,000 feet as the baseline values necessary to maintain aviation safety and efficiency of flight operations.

The interim results of the simulations indicate that the three proposed projects will not result in degradation of the average Pd over the WRA to below the baseline values. As such, this confirms the results of the analysis in the RDEIR that no significant cumulative impacts would occur as a result of the project. As a result, Department of the Air Force and Travis Air Force Base have withdrawn the previous comments to the Solano Wind Project Phase 3 EIR. The CRADA report is attached to this EIR as Appendix L.

(p.4.8-17)

Impact HAZ-4: The use of motor vehicles, portable generators, and welding equipment during construction and operation could increase fire hazards in the Collinsville-Montezuma Hills area, which is designated as a high-risk wildfire area.

During the hot summer months, the project area is highly susceptible to grass fires. The grass is dry and flammable, the wind blows regularly, and there are few roads in the area to assist with fire control. Vehicles, generators, welding equipment, and smoking by construction workers will increase the possible sources of ignition that could increase the risk of wildfire in the area.

The Solano County ~~Siting Plan~~ General Plan (Solano County, ~~1987~~ 2008) classifies the Collinsville-Montezuma Hills area as a high-risk area for wildfires. As a result, this impact would be potentially significant and mitigation is required.

Impact HAZ-5: The project could expose employees and the public to hazards from accidental rotor failure.

Rotor failure includes throwing or cracking a blade and could result from over-speed, material fatigue, excessive stresses, and vibration. The Public Interest Energy Research (PIER) Interim Project Report (PIER, 2006) estimates that the probability of WTG rotor failure is 1 in 1,000 per WTG per year, based on reported incidents worldwide and rotor fragment throw analysis modeling. The distance a thrown blade would travel varies with the aerodynamics of the blade, the manner of blade failure, and the blade orientation at the time of blade failure. WTG manufacturers have designed methods to prevent over-speed and to minimize the occurrence of rotor failure. In addition, the safety setbacks detailed in the Solano County ~~Siting Plan~~ General Plan (Solano County, ~~1987~~ 2008) and the recently County-approved Shiloh II EIR offer protection for the public in the event of equipment failure. As a result, this impact would be less than significant and no mitigation is required.

(p 4.8-20)

Impact HAZ-6: WTG interference with radar signals has the potential to increase risk of accidental aircraft collision hazards in the project area.

Additionally, SMUD participated in the December 2009 Cooperative Research and Development Agreement (CRADA) with the United States Transportation Command. A principal goal of the CRADA was to assess the operational impact of the Shiloh III, Montezuma Wind, and Solano Wind Project Phase 3 on the Travis Air Force Base air traffic control areas. The CRADA facilitated the use of simulation methodology to perform that assessment and was subject to independent government verification. Through the efforts of the CRADA, a minimum average probability of detection (Pd) over the Wind Resource Area (WRA) at the radar scope of 75.3% at surface to 4,000 feet, and 79.2%

at surface to 10,000 feet as the baseline values necessary to maintain aviation safety and efficiency of flight operations.

The interim results of the simulations indicate that the three proposed projects will not result in degradation of the average Pd over the WRA to below the baseline values. As such, this confirms the results of the analysis in the RDEIR that no significant cumulative impacts would occur as a result of the project. As a result, Department of the Air Force and Travis Air Force Base have withdrawn the previous comments to the Solano Wind Project Phase 3 EIR. The CRADA report is attached to this EIR as Appendix L.

(p. 4.8-21)

1. ~~SMUD commissioned an An~~ expert assessment concluded ~~ed~~ that the Phase 3 project would have no significant impact to radar.
2. Through the efforts of the CRADA, a minimum average Pd over the WRA at the radar scope of 75.3% at surface to 4,000 feet, and 79.2% at surface to 10,000 feet as the baseline values necessary to maintain aviation safety and efficiency of flight operations. The interim results of the simulations indicate that the Shiloh III, Montezuma Wind, and Solano Wind Project Phase 3 projects will not result in degradation of the average Pd over the WRA to below the baseline values.

(p. 4.10-2)

Solano County General Plan

The Solano County General Plan identifies goals, policies, and implementation measures to guide the development and conservation of natural resources within the county on a long-term basis. The General Plan designates the project area as ~~Extensive~~ Agriculture and ~~I-WD~~ Water Dependent Industrial. The intent of the ~~Extensive~~ Agriculture designation is to protect productive agricultural land from the intrusion of non-agricultural development. The purpose of the ~~I-WD~~ Water Dependent Industrial designation is to accommodate industrial development along the Sacramento River as provided for in the Collinsville-Montezuma Hills Area Plan.

The General Plan was updated and was adopted in November 2008. Figure 4.10-1 shows the current General Plan land-use designations.

Solano County Zoning Ordinance

The Solano County Zoning Ordinance ~~designates a 1,300-acre portion of the project area as being a I-WD District~~ classifies the entire project area as “Exclusive Agriculture” (A-160) including a 1,300-acre parcel owned by Greenport Energy Park LLC. Wind energy development is a consistent use with the “Exclusive Agriculture” zoning classification. An adjacent 411-acre parcel owned by SMUD, but not included in the project, is currently zoned I-WD. The purpose of this district is to reserve waterfront lands for large-scale, water-dependent industries to ensure ~~that there is~~ an efficient use of waterfront industrial sites.

(p.4.10-2)

Text from page 4.10-5 has been moved to page 4.10-2 and edited as shown below.

Solano County Wind Turbine Siting Plan

The ~~Siting~~ General Plan (Solano County, ~~1987~~ 2008) provides guidance for siting WTGs that encourages using wind energy as a resource in the Collinsville-Montezuma Hills WRA consistent with the General Plan.

The ~~Siting~~ General Plan requires WTGs to be sited in specific locations to ensure land-use compatibility and protect health and safety. The following are requirements that specifically address these issues:

- A minimum safety setback from adjacent transmission lines that is 3 times the WTG height;
- A minimum setback from adjacent public roads that is 3 times the WTG height;
- A minimum setback of 0.25 mile from scenic roadways, such as SR 12;
- A minimum setback of 1,000 feet or 3 times the WTG height from a residence or land zoned for residential uses;
- A minimum setback of 3 times the WTG height from any property line, public roadway, transmission facility, or railroad; and
- A minimum setback of 3 times the WTG height from any zoning district (nonresidential) that does not permit WTGs.

However, Solano County recently approved minimum safety setback distances of 1.25 times the maximum blade throw distance for the Shiloh II project (Ecology and Environment, Inc., 2008). ~~Although no setback requirements for meteorological towers are identified in the Siting Plan, the~~ Solano County Public Works Department has provided a setback requirement for meteorological towers of the tower height plus 25 percent for locations near county roadways.

Solano County Zoning Ordinance

The Solano County Zoning Ordinance ~~designates a 1,300-acre portion of the project area as being a I~~ WD District classifies the entire project area as “Exclusive Agriculture” (A-160) including a 1,300-acre parcel owned by Greenport Energy Park LLC. Wind energy development is a consistent use with the “Exclusive Agriculture” zoning classification. An adjacent 411-acre parcel owned by SMUD, but not included in the project, is currently zoned I-WD. The purpose of this district is to reserve waterfront lands for large-scale, water-dependent industries to ensure ~~that there is an~~ efficient use of waterfront industrial sites.

(p. 4.10-8)

4.10.3 Significance Criteria

- Conflict with an applicable regulation or plan.

Applicable regulations or plans, relative to the project, include the Solano County General Plan, Suisun Marsh Protection Plan, ~~the Solano County Siting Plan (Solano County, 1987)~~, Travis AFB LUCP, and the Solano County Airport Land Use Compatibility Review Procedures. The General Plan designates the project area as Extensive Agriculture and Water-Dependent Industrial (see Figure 4.10-1). The General Plan specifies that uses such as the proposed WTGs are, allowed in these designated areas. Therefore, the project would not conflict with the Solano County General Plan.

The WTGs proposed as part of the project would be sited to comply with the requirements of the Solano County ~~Siting~~ *General Plan*, which establishes setback regulations for WTGs from adjacent facilities, structures, and properties.

These ~~Siting~~ *General Plan* guidelines are as follows:

- The WTGs would be located to maintain a minimum safety setback from adjacent transmission lines 3 times the WTG height.
- The WTGs would be located to maintain a minimum setback from adjacent roads 3 times the WTG height.
- The WTGs would be located more than 3 miles from SR 12, which is identified as a scenic roadway in the Siting Plan.

(p. 4.12-2)

4.12.1.3 Local

Solano County General Plan: ~~Solano County Housing Element~~

The Solano County Housing Element, which is a part of the county's General Plan, guides housing and development within the county. In the Solano County Housing Element Update, the county has developed the following policy, which applies to water use for the project area.

G.2 Domestic water for rural development shall be provided principally through on-site individual wells. When individual well systems in an area of the unincorporated county become marginal or inadequate for serving domestic uses, public water service may be permitted in conformance with the General Plan. In such cases, public water service shall be provided and managed through a public agency. If lands proposed for water service are not within the boundaries of an existing public water agency, the Board of Supervisors shall, as a condition of development, designate a public agency to provide and manage the water service. Water facilities shall be designed to provide water service only to the developed areas and those designated for potential development. Such facilities shall be

designed to prevent any growth inducing impacts on adjoining designated agricultural and open space land (Bay Area Economics, 2004).

The project does not propose any housing. However, the project might require the construction of an O&M building that would require water supply for consumptive and sanitary use. In conformance with the plan, water would be provided by an on-site well.

Solano County Wind Turbine Siting Plan

The Solano County ~~Wind Turbine Siting~~ General Plan (Solano County, 1987 2008) requires that wind projects minimize WTG interference with existing communication networks by doing the following.

- Notify the FAA of proposed WTG locations so that it can review the proposed siting and recommend alternative siting, if necessary; submit proof of this notification.
- Notify owners of frequency-based communication stations and towers within 2 miles of the project so that they can review the proposed siting and recommend alternative siting, if necessary; submit proof of this notification.
- Take measures to prevent communication interference before installing WTG towers.
- Maintain a distance of 1,000 feet (304.8 meters) between WTG towers and television/radio receivers or transmitters.
- Filter or shield WTG towers to prevent the emission of radio frequency energy.

(p. 4.12-7)

Impact PSU-1: The project could increase the demand for fire protection or emergency medical services.

The project could increase the demand on the Montezuma Fire Protection District for fire protection services. The project area is classified as high risk for grass fires (~~Siting General Plan (Solano County, 1987)~~). The risk of fire danger might increase during project construction because of heavy equipment and automobiles driving on vegetated areas before these areas are cleared. Heated mufflers could ignite surrounding vegetation; welding activities or heavy equipment scraping rocks could create ignition sources. This impact is considered potentially significant.

(p. 4.12-8)

Mitigation PSU-2: Evaluate the potential for WTG interference with microwave transmissions.

Mitigation PSU-2: Evaluate the potential for WTG interference with microwave transmissions.

An evaluation of possible WTG interference with existing microwave and fixed station RF transmitting facilities was conducted (Evans & Associates, 2007). The study evaluated existing FCC licensed facilities, compared their locations to the planned WTG locations, and determined possible impacts to the signals. Additionally, SMUD contacted the NTIA regarding the project. The NTIA advised SMUD of U.S. Coast Guard concerns regarding possible WTG interference with one signal path. Based on this study and NTIA comments, WTGs will be sited to avoid the microwave and RF signal paths.

Implementation of this mitigation measure will reduce potential impacts to microwave transmissions to a less than significant level. No further mitigation measures are required.

(p. 4.13-4)

4.13.1.3 Local

Solano County General Plan

~~Solano County Wind Turbine Siting Plan~~

The *~~Siting General Plan~~* (Solano County, 1987) also set the following development criteria. In some cases, these criteria are more stringent than the Solano County zoning regulations.

-
- (p. 4.13-5)

In addition to setback restrictions, the *~~Siting General Plan~~* establishes traffic policies relevant to the project, including the following regulatory and implementation goals:

- All land use modification approvals for wind energy development should be conditioned upon developer provision of road access and maintenance; storm drainage, erosion control, and fire prevention measures; and other capital improvement requirements required by the county, and
- Wherever possible, road access and electrical transmission facilities should be located in common utility corridors.

The *~~Siting General Plan~~* also recommends that existing roads be used to the greatest extent feasible to minimize increased erosion.

(p. 4.13-13)

Impact TRA-4: WTGs might cause an impact to aviation patterns.

Additionally, SMUD participated in the December 2009 Cooperative Research and Development Agreement (CRADA) with the United States Transportation Command. A principal goal of the

CRADA was to assess the operational impact of the Shiloh III, Montezuma Wind, and Solano Wind Project Phase 3 on the Travis AFB air traffic control areas. The CRADA facilitated the use of simulation methodology to perform that assessment and was subject to independent government verification. Through the efforts of the CRADA, a minimum average probability of detection (Pd) over the Wind Resource Area (WRA) at the radar scope of 75.3% at surface to 4,000 feet, and 79.2% at surface to 10,000 feet, as the baseline values necessary to maintain aviation safety and efficiency of flight operations.

The interim results of the simulations indicate that the three proposed projects will not result in degradation of the average Pd over the WRA to below the baseline values. This conclusion confirms the results of the analysis in the RDEIR that no significant cumulative impacts would occur as a result of the project. As a result, Department of the Air Force and Travis AFB have withdrawn the previous comments to the Solano Wind Project Phase 3 EIR. The CRADA report is attached to this EIR as Appendix L.

(p. 4.13-14)

- SMUD commissioned an An-expert review concludeding that the Phase 3 project would have no significant impact to radar.
- Through the efforts of the CRADA, a minimum average Pd over the WRA at the radar scope of 75.3% at surface to 4,000 feet, and 79.2% at surface to 10,000 feet were established as the baseline values necessary to maintain aviation safety and efficiency of flight operations. The interim results of the simulations indicate that the Shiloh III, Montezuma Wind, and Solano Wind Project Phase 3 projects will not result in degradation of the average Pd over the WRA to below the baseline values.

(p. 5-1)

5.1 INTRODUCTION

According to section 15130(a) of the CEQA Guidelines, “an EIR shall discuss cumulative impacts of a project when the project’s incremental effect is cumulatively considerable, as defined in section 15065(c). Where a lead agency is examining a project with an incremental effect that is not ‘cumulatively considerable,’ a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.” In addition, the CEQA Guidelines state that “the discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as provided for the effects attributable to the project alone” (section 15130(b) of the CEQA Guidelines).

Solano County designated the Collinsville-Montezuma Hills WRA in 1987, and since this designation, approximately 853833 WTGs have been installed within the WRA. Because the WRA

is the only area currently designated for WTGs in Solano County, the WRA is considered the cumulative impact study area for this project.

There are up to ~~9861,125~~ WTGs (existing and planned through 2011) in the WRA, which will have a total production capacity of approximately ~~8191,274~~ MW. An additional 112 to 178 WTGs and up to 365 MWs of capacity are currently proposed, representing the various scenarios for Montezuma Wind, Shiloh III, and SMUD Solano Wind Phase 3 projects. Two speculative projects, Montezuma Wind II and Shiloh IV, are currently being discussed with Solano County. (see Table 5-1). This section addresses the impacts of these existing wind farms in combination with the impacts of the proposed project. In addition, reasonably foreseeable future projects are addressed in this section (Table 5-1).

(p. 5-2)

Table 5-1. Existing and Planned Wind Plants

Project	Number of Turbines	Turbine Rating	Total Megawatts	Status
SMUD Solano Wind				
Phase 1	23 Vestas V-47	660 kilowatts (kW)	15 MW	Built in 2004 and in current operation.
Phase 2A	8 Vestas V-90	3 MW	24 MW	In operation in May of 2006.
Phase 2B	21 Vestas V-90	3 MW	63 MW	Online 12/07 and currently operating.
Phase 3	36 to 75 WTGs	1.5 to 3.6 MW	128 MW (net)	SMUD EIR Certification pending recirculation.
High Winds				
NextEra Energy (formerly FPL)	90 Vestas V-80	1.8 MW	162 MW	Built in 2003 and currently in operation.
enXco V (formerly U.S. Windpower)				
enXco	510 U.S. Windpower KCS-56-100	100 kW	51 MW	Built in 1989-1990 and currently in operation.
enXco RePowering	6 GE 1.5	1.5 MW	9 MW	Built in 2006 and currently in operation.
Shiloh I				
Iberdrola Energy (formerly PPM)	120 GE 1.5	1.5 MW	180 MW	Built in 2006 and currently in operation.
Shiloh II				
enXco	75 RePower MM92	2.0 MW	150 MW	Built in 2008 and currently in operation.
Montezuma Wind				
NextEra Energy (future)	31 Siemens	1.5 to 2.3 MW	34 to 37 MW	FEIR and Use Permit suspended indefinitely, pending resolution of Travis AFB radar issues certification.
enXco V (formerly U.S. Windpower) Shiloh III				
Repowering (future)	Proposed 60-80	—	—	NOP has not yet been

Project	Number of Turbines	Turbine Rating	Total Megawatts	Status
Shiloh III Shiloh Wind Partners L.L.C. (future)	WTGs (replacement of 510 KCS-56-100 WTGs) with GE 1.5 or similar WTG	1.8 to 2.5 MW	Up to 200 MW	released December 3, 2009.
Montezuma Wind II				
NextEra Energy (future)	Up to 35 WTGs (Replacement of KCS-56-100 WTGs)	—	—	NOP has not yet been released.
Shiloh IV				
enXco (future)	79 WTG (Replacement of KCS-56-100 WTGs)	—	—	NOP has not yet been released.

AFB	=	Air Force Base	MW	=	megawatts
EIR	=	Environmental Impact Report	PPM	=	PPM Energy
FEIR	=	Final Environmental Impact Report	SCH	=	Sacramento State Clearing House
FPL	=	Florida Power and Light	SMUD	=	Sacramento Municipal Utility District
KW	=	kilowatts	WTG	=	wind turbine generator

(p.5-4)

5.5 BIOLOGICAL RESOURCES

Rationale

The High Winds EIR (Ecology and Environment, 2006) reported if the three to four bats and two to three birds per turbine per year fatality rate are used to extrapolate to 650 turbines at build-out of the Collinsville-Montezuma Hills WRA, this could translate to approximately 1,950 to 2,600 bats and 1,300 to 1,950 birds per year within the entire WRA. Birds and bats killed at High Winds were probably migrating and come from populations that are geographically large, suggesting that the fatalities are diluted with respect to local populations.

~~Using this methodology with the current estimate of 986 WTGs planned or operating in the WRA, bat mortality could be 2,958 to 3,944 individuals per year within the entire WRA. Additionally, there could be approximately 1,972 to 2,958 bird fatalities per year within the WRA.~~

~~Using the same per turbine mortality estimate as above, the project's maximum of 75 WTGs could potentially account for approximately 8 percent of the annual bat (225 to 300 individuals) and bird (150 to 225 individuals) mortality incidents in the WRA.~~

The combinations of the data from High Winds and Shiloh I, in Table 4.5-8 Collinsville Montezuma Hills WRA Annual Reported Avian Mortality Comparison of Relevant Recent Study Results, are shown in Table 5-2. Based on these data, the Project's range of WTGs (36 to 75 WTGs) and 128

MW could potentially account for the approximate range of bird and bat mortalities shown in Table 5-3.

Table 5-2. Collinsville-Montezuma Hills WRA Cumulative Estimated Annual Avian Mortality

<u>Attribute or Metric</u>	<u>High</u>		<u>Low</u>	
	<u>Per Unit</u>	<u>Total WRA</u>	<u>Per Unit</u>	<u>Total WRA</u>
<u>Birds Per Turbine</u>	<u>10.44</u>	<u>10,555</u>	<u>2.45</u>	<u>2,477</u>
<u>Bats Per Turbine</u>	<u>5.88</u>	<u>5,945</u>	<u>3.21</u>	<u>3,245</u>
<u>Birds Per Megawatt</u>	<u>6.96</u>	<u>6,883</u>	<u>1.36</u>	<u>1,345</u>
<u>Bats Per Megawatt</u>	<u>3.92</u>	<u>3,877</u>	<u>2.02</u>	<u>1,998</u>
<u>Total WTGs</u>	<u>1,011</u>			
<u>Total Installed Capacity (MW)</u>	<u>989</u>			

Table 5-3. Potential Phase 3 Project Share of Cumulative Annual Avian Mortality

<u>Attribute or Metric</u>	<u>Values</u>	<u>Birds</u>		<u>Bats</u>	
		<u>High</u>	<u>Low</u>	<u>High</u>	<u>Low</u>
<u>Phase 3 Percent of WTGs (Max)</u>	<u>7%</u>	<u>783</u>	<u>184</u>	<u>441</u>	<u>241</u>
<u>Phase 3 Percent of WTGs (Min)</u>	<u>4%</u>	<u>376</u>	<u>88</u>	<u>212</u>	<u>116</u>
<u>Phase 3 Percent of total Capacity (MW)</u>	<u>13%</u>	<u>891</u>	<u>174</u>	<u>502</u>	<u>259</u>
<u>Phase 3 Maximum WTGs</u>	<u>75</u>				
<u>Phase 3 Minimum WTGs</u>	<u>36</u>				
<u>Phase 3 Capacity (MW)</u>	<u>128</u>				

Even with the implementation of mitigation the project would add cumulatively to the impact on the avian and bat population of the WRA and to the statewide impact on avian and bat species. Bats and Birds migrating through the project area would be subject to the cumulative effects of the other wind projects in the WRA.

Conclusion

Because the project would add to the number of birds and bats killed by wind turbines, and because some of these birds and bats may be considered special-status species, the project would contribute to significant and unavoidable cumulative impacts to biological resources. Even with mitigation, this impact would remain potentially significant.

(p. 5-6)

5.8 HAZARDS AND HAZARDOUS MATERIALS

Rationale

Additionally, SMUD participated in the December 2009 the CRADA with the United States Transportation Command. A principal goal of the CRADA was to assess the operational impact of the Shiloh III, Montezuma Wind, and Solano Wind Project Phase 3 on the Travis AFB air traffic control areas. The CRADA facilitated the use of simulation methodology to perform that assessment and was subject to independent government verification. Through the efforts of the CRADA, a minimum average probability of detection (Pd) over the Wind Resource Area (WRA) at the radar scope of 75.3% at surface to 4,000 feet, and 79.2% at surface to 10,000 feet, as the baseline values necessary to maintain aviation safety and efficiency of flight operations.

The interim results of the simulations indicate that the three proposed projects will not result in degradation of the average Pd over the WRA to below the baseline values. This conclusion confirms the results of the analysis in the RDEIR that no significant cumulative impacts would occur as a result of the project. As a result, Department of the Air Force and Travis AFB have withdrawn the previous comments to the Solano Wind Project Phase 3 EIR. The CRADA report is attached to this EIR as Appendix L.

(p. 5-6)

Conclusion

With the recent installation of the new ASR-11 radar system increasing the radar detection levels over the WRA above the pre-existing conditions and above the acceptable standard for detection as required by the FAA, that with the existing 800 plus WTGs in the WRA, the Pd experienced a loss of only 1.3 percent by the new ASR-11 radar system in the vicinity of the WRA compared to the rest of Travis AFB airspace. The interim results of the simulations from the CRADA indicate that the Shiloh III, Montezuma Wind, and Solano Wind Project Phase 3 projects would not result in degradation of the average Pd over the WRA to below the baseline values. ~~And due to the lower density of the Phase 3 WTG layout, the Phase 3 project would not cause significant cumulative impacts or regional hazards.~~ As such, this report confirms the results of the analysis in the RDEIR that no significant individual or cumulative impacts would occur as a result of the project.

(p. 6-3)

Air Quality				
Impact AIR-1: The project would cause a short-term increase in criteria air pollutants and precursor emissions from construction activities.	Mitigation AIR-1: Implement industry BMPs to reduce vehicle and equipment emissions and dust emissions pursuant to mitigation measures recommended by the YSAQMD <u>BAAQMD</u> .	SMUD's construction contractor will develop a Construction Fugitive Dust Control Plan which will be submitted to the county for approval as required by the Solano County Grading Permit.	SMUD	Throughout project construction.

(p. 6-4)

Table 6-1 Continued

Potential Impact	Mitigation Measure	Compliance Demonstrated By	Responsible Agency	Timing
Impact BIO-2: Project construction and installation could result in adverse effects by filling wetlands and stream habitat.	Mitigation BIO-2: Avoid wetlands and streams to the maximum extent that is feasible and practical, to prevent impacts to the aquatic environment. <u>If any streams are permanently filled or impacted, the loss shall be mitigated at a 1:1 ratio or as required in a project specific Lake or Streambed Alteration Agreement.</u>	<p>If wetlands and waters of the United States cannot be not fully avoided, SMUD will apply for a USACE Section 404 permit and will comply with all activities as required</p> <p>SMUD will complete the Notification Package for the Lake or Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, and obtain the permit prior to construction of the watercourse crossings.</p>	SMUD, CDFG, and USACE	Throughout project construction.

(p. 6-5)

<p>Impact BIO-5: WTG blades operation could result in mortality of golden-eagles and Swainson's hawks <u>avian species</u>, causing a substantial adverse effect on species identified as sensitive or on special status species.</p>	<p>Mitigation BIO-5a: Implement a Bird and Bat Mortality Monitoring Program to determine if mortality is occurring.</p> <p>Mitigation BIO-5b: Provide off-site mitigation land to support and enhance raptor populations.</p> <p>Mitigation BIO-5c: Provide Funding for Raptor Rehabilitation.</p> <p>Mitigation BIO-5d: Obtain an Incidental Take Permit</p>	<p>SMUD will provide CDFG and USFWS with a final bird mortality monitoring report for <u>each year monitored</u>.</p> <p>SMUD will convey by fee-title or conservation easement land off-site mitigation land to CDFG, or other third party for operation as a mitigation area.</p> <p>SMUD will provide a one-time payment of \$50,000 to the UC Davis Raptor Center.</p> <p>SMUD will obtain Incidental Take Permits form USFW and CDFG.</p>	<p>SMUD, CDFG; USFWS</p>	<p>The final bird and bat mortality monitoring report will be due three months after the completion of the monitoring.</p> <p>Off-site mitigation land will be obtained prior to construction activities.</p> <p><u>Prior to issuance of the first builders permit or grading permit for the project, whichever occurs first, SMUD shall establish and irrevocable letter of credit in favor of the County of Solano to ensure compliance with the conservation land or easement provisions</u></p> <p>\$50,000 payment will be made to the UC Davis Raptor Center prior to construction activities.</p> <p>SMUD will obtain Incidental Take Permits prior to construction activities.</p>
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CHAPTER 5
REFERENCES

The following documents are added to the references section of the RDEIR:

B. Benjamin Evans. 2007. *Engineering Report Concerning the Effects upon FCC Licensed RF Facilities Due to the Construction of the SMUD Solano Phase 3 Wind Project in Solano County, CA.*

California Energy Commission and California Department of Fish and Game. 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development. Commission Final Report.* California Energy Commission, Renewables Committee, and Energy Facilities Siting Division, and California Department of Fish and Game, Resources Management and Policy Division. CEC-700-2007-008-CMF.

Curry, R., and P. Kerlinger. 2009. *Post-Construction Avian Monitoring Study for the Shiloh I Wind Power Project Solano County, California. Final Report.* October 2009. Prepared for: Iberdrola Renewables.

Dixon, K. L., R. E. Dixon, and J. E. Dixon. 1957. *Natural History of the White-Tailed Kite in San Diego County, California.* Condor 59:156-165

Dunk, J. R. 1995. White-tailed kite (*Elanus leucurus*). *The Birds of North America, No. 178* (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C. In : <http://www.prbo.org/calpif/htmldocs/species/grassland/wtkiacct.html> (accessed February 2, 2010).

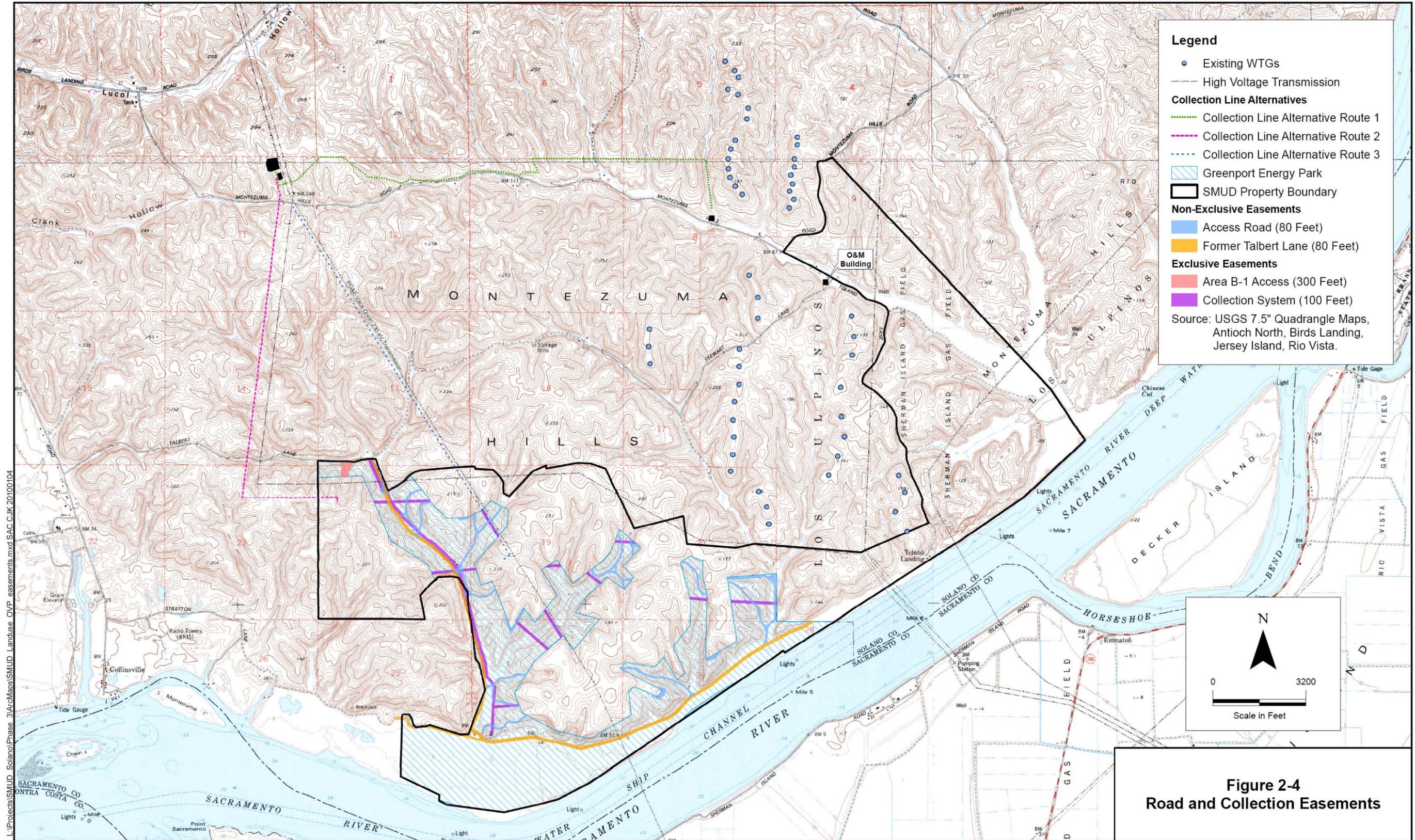
Evans & Associates, 2008. *Evans Associates Report Recommendations.* July 1, 2008

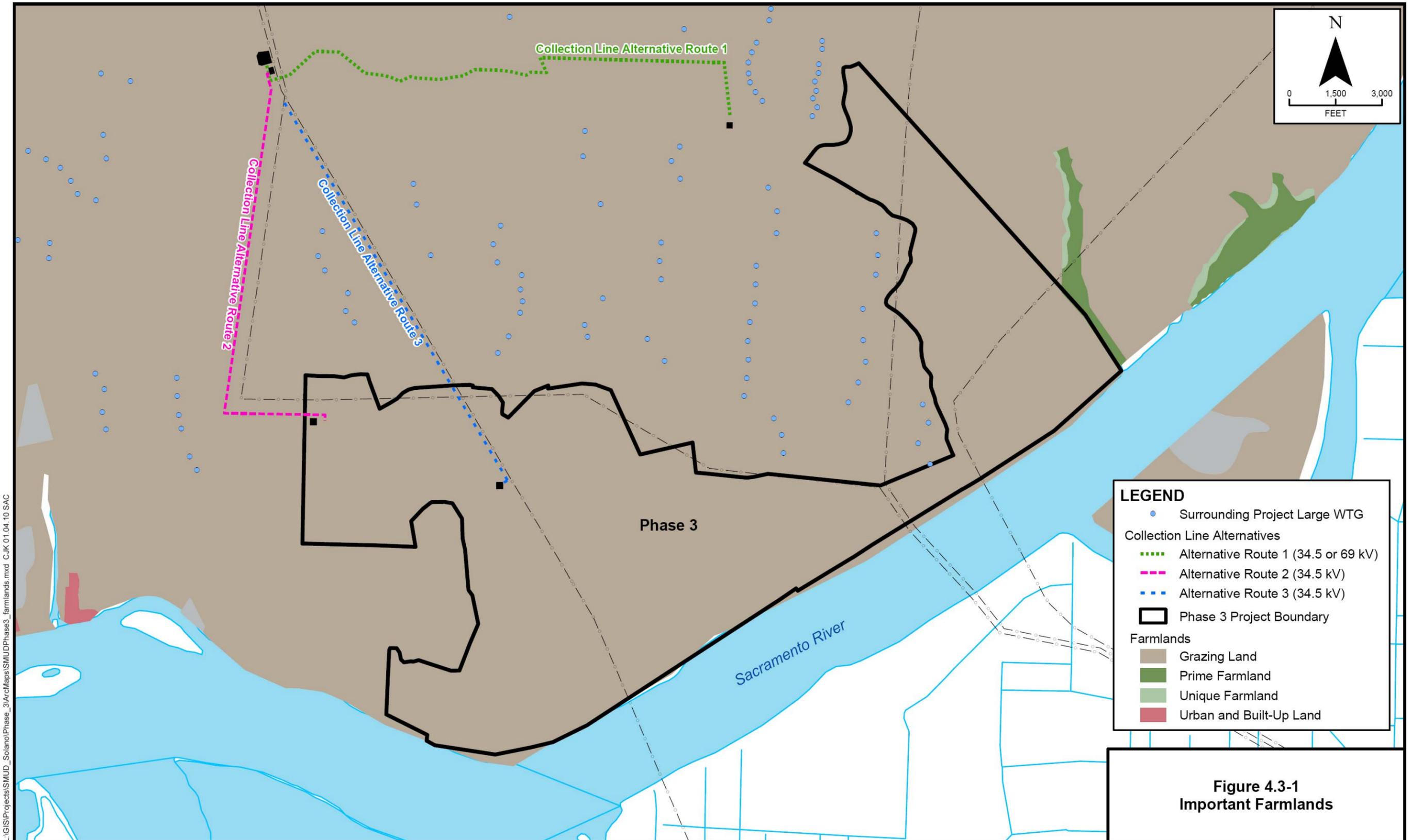
Kerlinger, P., Curry, R., Wilkerson, C., Culp, L., Hasch, A., and A. Jain. 2006. *Avian Monitoring Study and Risk Assessment for the Shiloh Wind Power Project, Solano County, California.*

U.S. Fish and Wildlife Service. 2005. *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog.* August 2005.

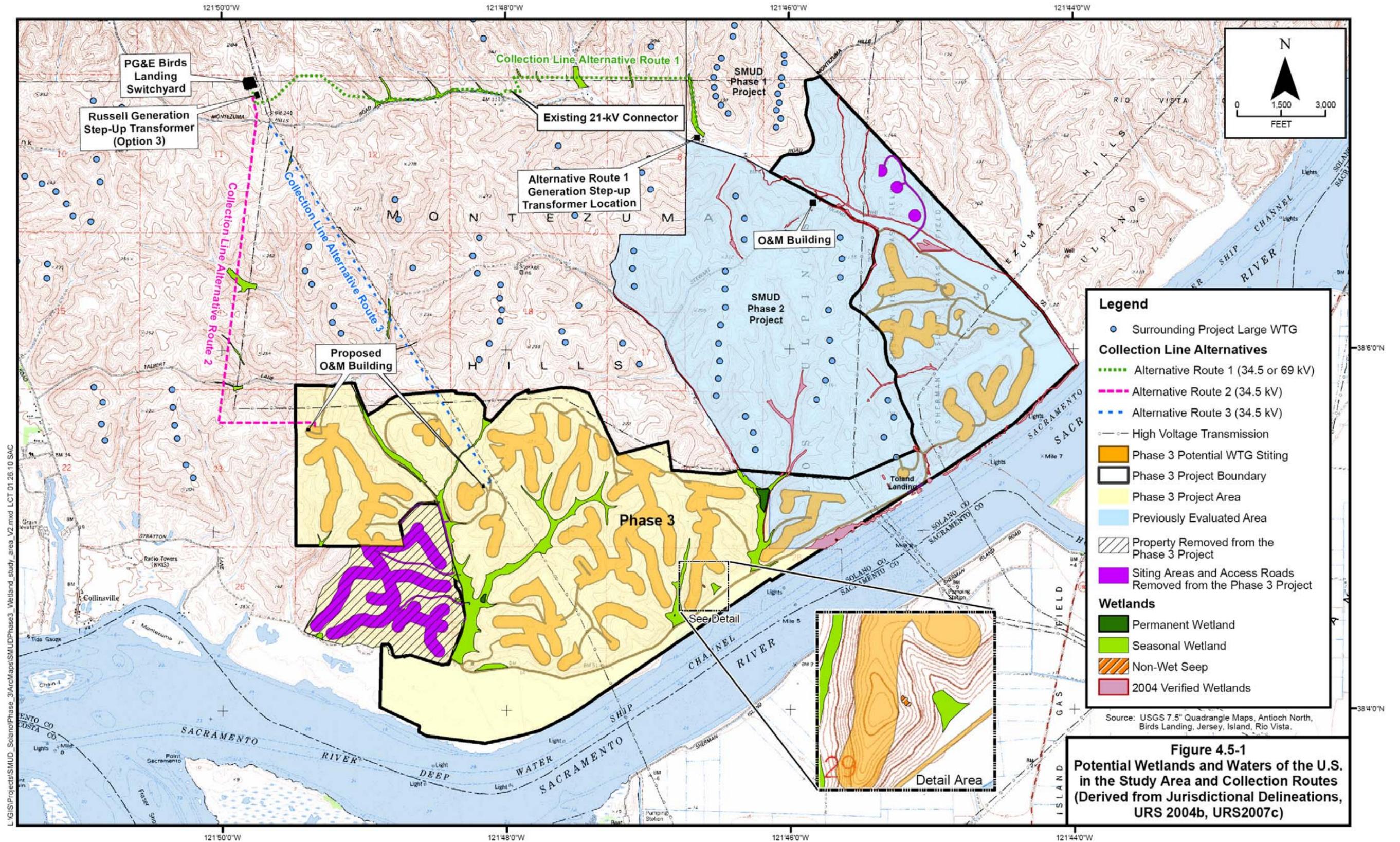
U.S. Fish and Wildlife Service. 2003. *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander.* October 2003.

Warner, J. S., and R. L. Rudd. 1975. *Hunting by the White-Tailed Kite (*Elanus leucurus*).* Condor 77:226-230





**Figure 4.3-1
Important Farmlands**



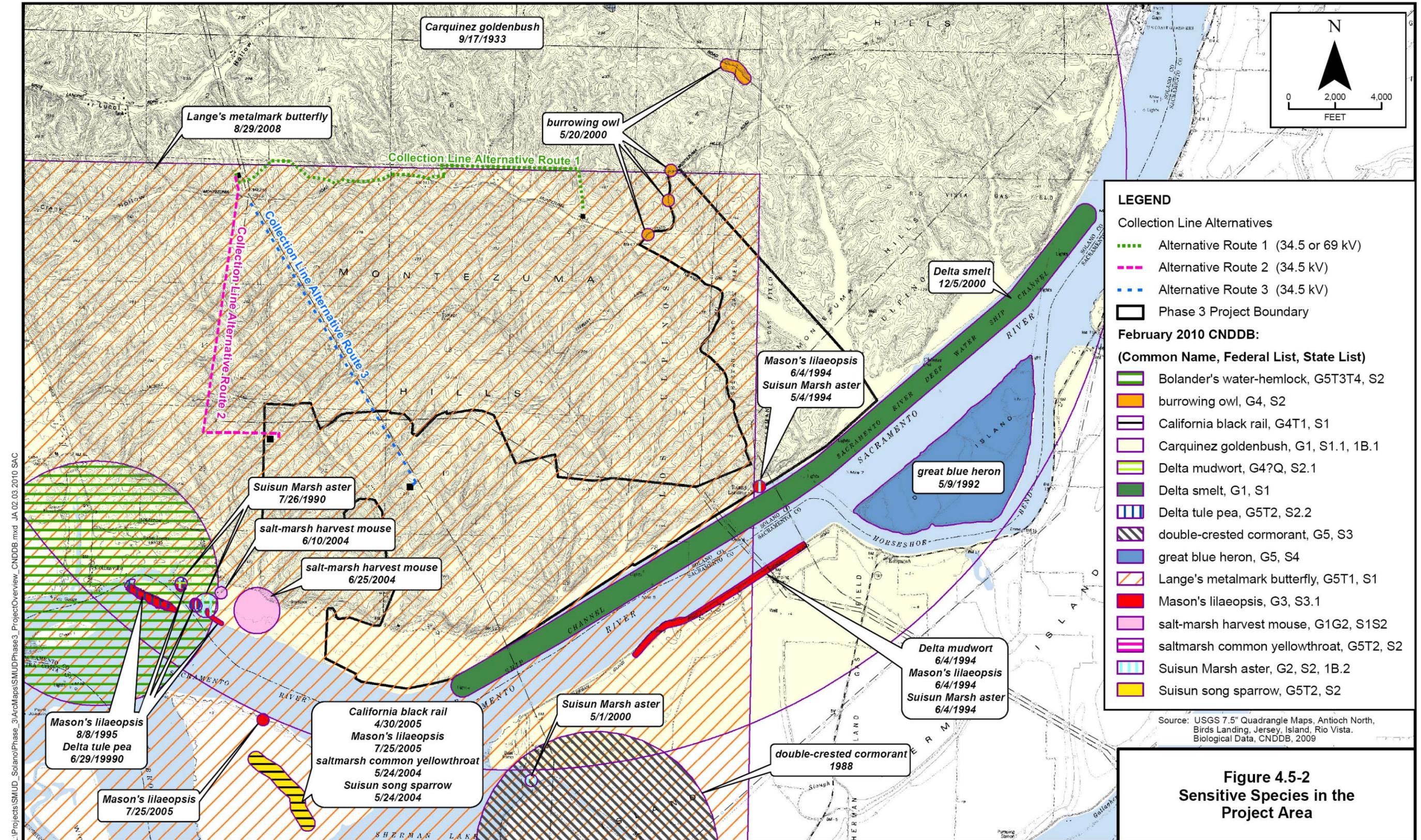


Figure 4.5-2
Sensitive Species in the Project Area

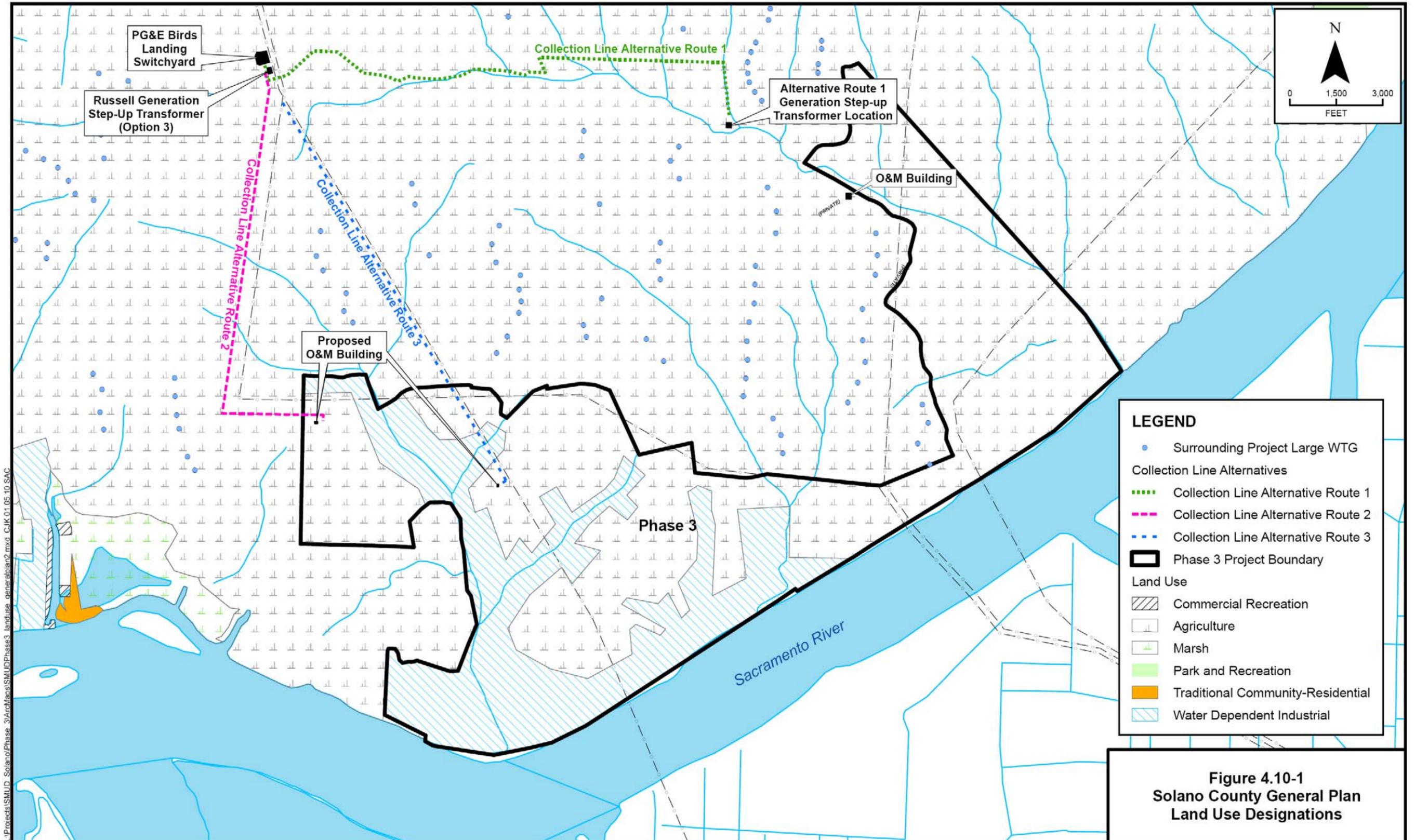


Figure 4.10-1
Solano County General Plan
Land Use Designations

The following appendixes have been added to the RDEIR.

APPENDIX I

SMUD Phase III Record of Phone Conversation BAAQMD and YSAQMD Jurisdiction

Record of Phone Conversation(s)

Project: SMUD Solano Phase III Draft EIR – 17325767.10001

Date: Monday October 1, 2007, 9:30 AM

By: Gerald Baribeau, URS.

Person(s) contacted: -Greg Tholen, Senior Environmental Planner, Bay Area Air Quality Management District (415) 749-4954

-Dan O'Brien, Associate Air Quality Planner, Yolo Solano Air Quality Management District (530) 757-3677

The SMUD Solano Phase III EIP project falls within both the BAAQMD and YSAQMD jurisdiction. URS has prepared the Draft EIR to meet the YSAQMD CEQA requirements as they are more conservative (restrictive) than the BAAQMD requirements.

I spoke with Greg Tholen at the BAAQMD regarding the SMUD Solano Phase III EIR and the fact that the project appears to be within both the BAAQMD and YSAQMD jurisdiction and URS has prepared the Draft EIR to meet the YSAQMD CEQA requirements as they are more conservative. I told Greg that E.J. Koford (URS) had spoken with Dan O'Brien at YSAQMD on Friday September 28 and explained the situation to Dan and Dan suggested we talk with Greg at BAAQMD. I told Greg that based upon E.J.'s discussion, if Greg was OK with us using YSAQMD as the jurisdiction then Dan was also OK. Greg and I looked at jurisdiction maps and agreed that the project is within BAAQMD jurisdiction and YSAQMD for the northern portion of the proposed project. We discussed the project, the anticipated construction emissions, the nearly non-existent operational emissions (minimal maintenance of 85 WTGs), the use of YSAQMD thresholds of significance adopted in July 2007, the use of the roadway construction model to quantify construction phase emissions and the inclusion of YSAQMD recommended mitigation measures. Greg agreed that the YSAQMD's CEQA requirements for construction are more conservative (restrictive) than BAAQMD requirements. Greg said that if YSAQMD's CEQA requirements are met and YSAQMD staff is OK with having jurisdiction for the project then he would be OK with it also.

After speaking with Greg Tholen at the BAAQMD, I called Dan O'Brien at the YSAQMD to follow-up with him. I refreshed his memory of his discussions on Friday with E.J., and told him of my discussion with Greg at the BAAQMD. Dan was appreciative of my follow-up and said everything is OK and it would be acceptable to continue using the YSAQMD CEQA standards for analysis in the preparation of the EIR.

APPENDIX J

**Engineering Report Concerning the Effects Upon FCC Licensed RF Facilities Due to the
Construction of the SMUD-Solano Phase 3 Wind Project**

Prepared For SMUD
Project SMUD Solano Phase 3 Wind Project
Date January 7, 2010
Subject Effects upon FCC Licensed RF Facilities Due to the Construction of the SMUD Solano Phase 3 Wind Project
Prepared By Rachel Avila
Reviewed By Christine Stora, January 2010

Evans Associates completed the Engineering Report Concerning the Effects upon FCC Licensed RF Facilities Due to the Construction of the SMUD Solano Phase 3 Wind Project in Solano County, CA . on September 21, 2007 (attached). At that time one microwave signal, one AM station, and two land mobile stations were identified within two miles of the SMUD Solano Phase 3 Wind Project. Evans Associates recommended notifying these 3 stations and one microwave facility. As of January 6th, 2010, only the microwave facility (call letters WHY635) was still potentially impacted as outlined in the report. AM station KATD had since moved to a transmitter out of the immediate area, which was confirmed by contacting Julie Re, KATD's General Manager on January 6th 2010. The license for land mobile station KPG841 is listed as canceled by the FCC and is no longer broadcasting. Land mobile station WNST617 is located 2.3 miles from the nearest turbine site. According to the author of the Engineering Report B. Benjamin Evans, turbines located more then 2 miles away would not affect the station.

Considering these changes only facility WHY635 has been sent a notification letter. A courtesy call was made to station WNST617, located more than two miles from the nearest turbine, and a message was left with Jim Earl who maintains the office for the station.

The Evans Associates Engineering Report stated on page 8 that "Operation of RF frequencies for federal government use is managed by the National Telecommunication Information Agency (NTIA), which is part of the U.S. Department of Commerce. The technical specifications for most government facilities are unavailable to the public." As a result of FAA's Determination of No Hazard to Air Navigation process for SMUD's Phase 3 a letter was received from the National Telecommunications and Information Administration sent June 12, 2009 from Edward M Davison. The letter expressed one concern. An 8GHz microwave link signal is reportedly transmitted through the project site by the U.S. Coast Guard. The letter suggested that one turbine site (as submitted to the FAA) is 250 meters from the center of the signal path and could potentially interfere. A message was left on January 7, 2010 with the point of contact listed in the letter, Dan Freedman, and a reply was received on January 11, 2010. Mr. Freedman reviewed the documents and found that the turbine in question was over 400 meters from the signal path and could not interfere with the microwave path. He determined that there was no potential interference from any of the Phase 3 turbines.



**ENGINEERING REPORT
CONCERNING THE EFFECTS UPON
FCC LICENSED RF FACILITIES
DUE TO THE CONSTRUCTION OF THE
SMUD-SOLANO PHASE 3 WIND PROJECT**

In

SOLANO COUNTY, CALIFORNIA

Prepared for

URS Corporation

September 21, 2007

Prepared By: B. Benjamin Evans, P.E.

Evans Associates

210 South Main Street

Thiensville, WI 53092

262-242-6000 PHONE

262-242-6045 FAX

www.evansassoc.com



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I. INTRODUCTION

This engineering report describes the results of a study and analysis to determine the locations of FCC-licensed microwave and fixed station radio frequency (RF) facilities that could be adversely impacted as a result of the construction of the SMUD-Solano Phase 3 Wind Project in Solano County, California. This document describes impact zones and any necessary mitigation procedures, along with recommendations concerning individual wind turbine siting. All illustrations, calculations and conclusions contained in this document are subject to on-site verification¹.

Frequently, wind turbines located on land parcels near RF facilities or receivers can cause more than one mode of RF impact, and may require an iterative procedure to minimize adverse effects. This procedure is necessary in order to ensure that disruption of RF facilities either does not occur or, in the alternative, that mitigation procedures will be effective. For instance, once turbine impact zones are identified, it may be necessary to survey nearby transmitting support towers to a much higher degree of accuracy than is contained in the FCC's database. In the case of some TV facilities, resolving interference may not be possible, but alternatives are usually available to the broadcast consumer, represented by other stations (e.g., stations carrying the same programming) or other venues (e.g. satellite or cable TV). The purpose of this study is to facilitate the siting of turbines to avoid unacceptable impact to FCC licensed RF facilities and, to the maximum extent possible, identify available alternatives to individual consumers in intractable cases.

The Phase 3 turbine project, as presently configured, consists of approximately 40 turbines situated about 18 miles southeast of Fairfield, California, in southeast Solano County. The locations of the turbines have not been finalized.

Using industry standard procedures and FCC databases, a search was conducted to determine the presence of any existing microwave paths crossing the subject property, as well as other RF facilities within or adjacent to the identified area.

¹ The databases used in creating the attached tables and map are generally accurate, but anomalies have been known to occur. An on-site verification survey is suggested as part of the due diligence process.

With respect to the broadcast facilities, pertinent TV, FM and AM stations were listed and the estimated impact to broadcast consumers in the turbine area is described.

The following map shows the Solano Phase 3 wind project area:

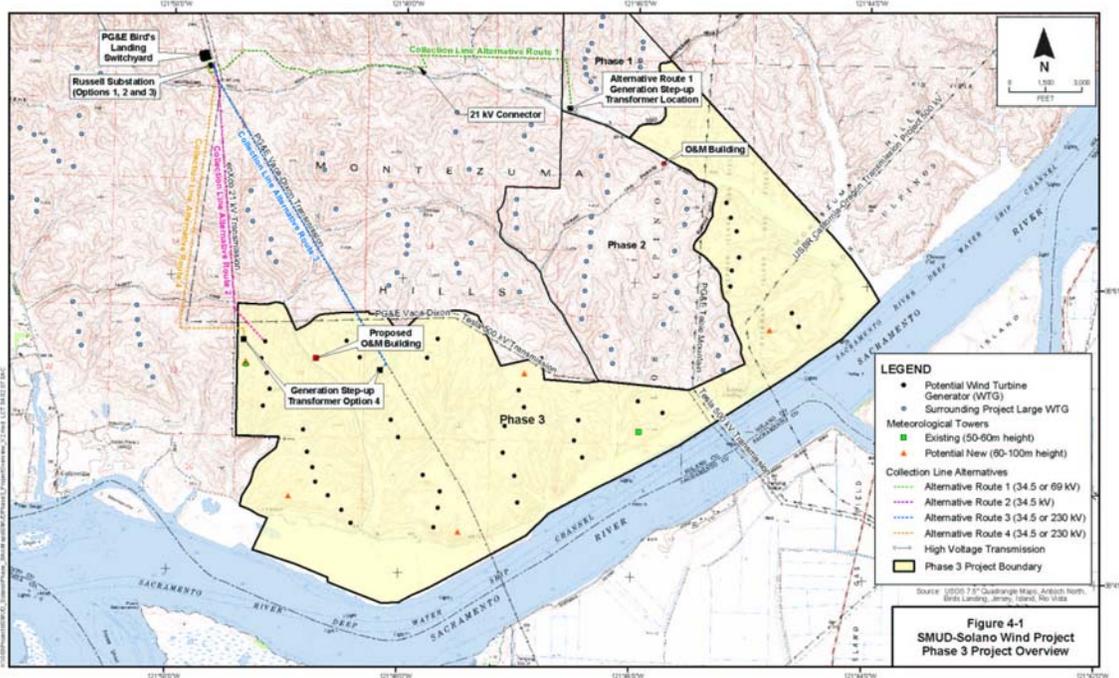


Figure 1 – SMUD-Solano Wind Project Phase 3 Overview

The instant analysis consists of three sections:

1. Microwave path analysis
2. Land mobile, FAA, DoD and cellular analysis
3. Broadcast television and radio analysis

The FCC database search revealed 13 microwave links that crosses the search area, but only one that creates an exclusion zone in the Phase 3 area, and two land-mobile facilities and one AM broadcast station within two miles of the turbine sites. The location of the one microwave path with respect to the turbine locations is shown in Figure 2 (identified as path #8) and Appendix A. The land-mobile facilities and the AM station are shown in Appendix A.

The attached maps were generated based upon the notified locations of the FCC-licensed stations as contained in the FCC databases.



The following analysis examines in detail the pertinent FCC licensed services in the area for significant adverse impact. This analysis assumes that all licensed services have been designed and constructed according to FCC requirements and good engineering practice. If this is not the case, the impacted facility must share responsibility with the wind turbine company for the costs of any mitigation measures².

Each of the RF analyses is described separately in the sections that follow.

II. ANALYSIS OF MICROWAVE LINKS

An extensive analysis was undertaken to determine the likely effect of the new wind turbine farm upon the existing microwave paths. The microwave path is overlaid on the USGS topographic base maps attached, and is also available as overlays for the GeoPlanner™ program files.

Important Note: Microwave path studies are based upon third party and FCC databases that normally exhibit a high degree of accuracy and reliability. Although Evans performs due diligence to ensure that all existing microwave facilities are represented, we cannot be responsible for database errors that may lead to incomplete results. In addition, some frequencies are occasionally “warehoused” by imbedded licensees for future use, and do not therefore currently appear as operational links. Although this practice is technically illegal in a “first come first served” service, disruptive delays can result. However, should such situations occur, Evans would perform an engineering analysis at no additional cost to determine how the additional facilities can be accommodated or, if wind turbine structures are already built, determine a method to re-direct the offending beam path.

Worse Case Fresnel Zones (WCFZ) were calculated for each microwave path. The widest (or worst case) Fresnel zone radius occurs at the mid-point of a microwave path. The radius R of the Worst Case Fresnel Zone, in meters, is calculated using the following formula:

$$R \cong 8.65 \sqrt{\frac{D}{F_{\text{GHz}}}}$$

where:

R = First Fresnel Zone Radius, in meters

F_{GHz} = Frequency of microwave link, in GHz

D = Distance between transmit and receive points, in kilometers

² For instance, some microwave paths may have insufficient ground clearances as they are presently configured.

In general, the WCFZ, determined by the above formula, is defined by the cylindrical area whose axis is the direct line between the microwave link endpoints and whose radius is R as calculated by the formula above. This is the zone where the siting of obstructions should be avoided. Possible geographic coordinate errors must be taken into account when siting turbines near microwave paths³.

A search of existing and proposed microwave links in the vicinity of the Solano Phase 3 area revealed facilities whose paths are shown below (width of microwave path line is double the WCFZ):

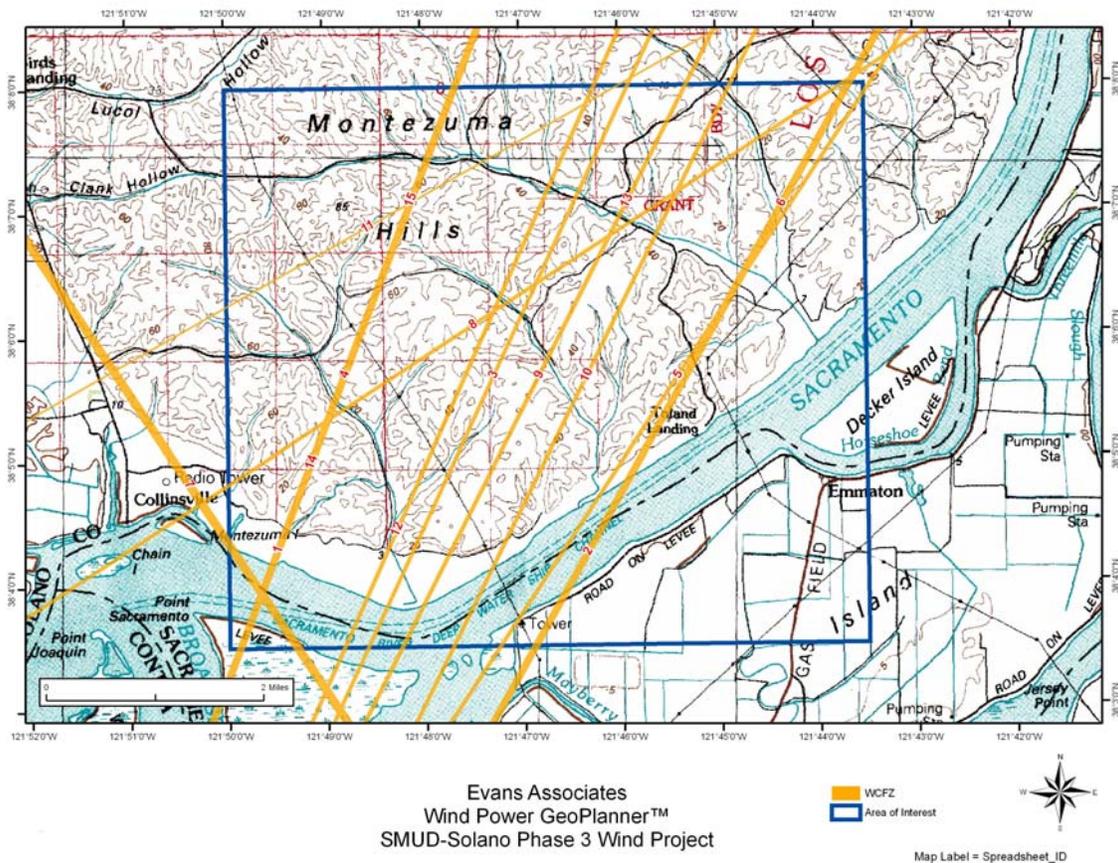


Figure 2 – WCFZs of Microwave Paths in Vicinity of Project

Evans Associates has determined that all but two of these microwave paths intersect the Phase 3 project area.

³ Many microwave facilities were built before accurate methods were available to establish exact geographic coordinates (such as GPS). It is not unusual for database errors of up to 4 or 5 seconds to occur, which can effect the positioning of critical turbines located near microwave paths.



One microwave path would potentially influence the siting of turbines, which is shaded in blue in the following list of microwave paths:

ID	Site Name 1	Site Name 2	Call Sign 1	Call Sign 2	Band Name	Licensee	WCFZ (m)
1	GARDEN HWY	MT DIABLO	GARDENHW	RXONLY	6.1 GHz	KQED INC	32.43
2	DIABLO	KROY	KMA743B	KMA743C	2.1 GHz	DELTA VALLEY RADIOTELEPHONE CO INC	53.84
3	SAC MW	MT DIABLO	KMD35	KMD34	6.7 GHz	California, State of	30.87
4	MT DIABLO	GARDEN HWY	KMS57	KMS54	2 GHz	KVIE INC	56.31
5	SACRAMENTO	CLAYTON HILL	KNG40	KNF41	6.7 GHz	Pacific Gas and Electric Co.	29.51
6	DIABLO	KROY	WGX449	WGX450	2.1 GHz	DELTA VALLEY RADIOTELEPHONE CO INC	53.84
8	VOLLMER PK	WALNUT GROVE	WHY635	RXONLY	7 GHz	Sacramento Television Stations, Inc	28.30
9,10	MAACO TOWER	DIABLO SOUTH	WLI 618	RXONLY	7 GHz	Telefutura Sacramento, LLC	31.12
12	SACRAMNTOCTY	MT DIABLO	WNTU522	KMD34	6.1 GHz	California, State of	32.49
13	DIABLO SOUTH	MAACO TOWER	WPOT265	RXONLY	7 GHz	Telefutura Sacramento, LLC	31.12
14	GARDEN HWY	MT DIABLO	WPZU838	WPZU839	7 GHz	NBC Telemundo License Co – KNTV	30.46
15	MT DIABLO	GARDEN HWY	WQAP211	RXONLY	7 GHz	KVIE INC	30.46

Table 1 – Microwave Links Crossing SMUD-Solano Phase 3 Turbine Area

Microwave Path #8, call letters WHY635, is the only microwave facility that has the potential for impact to turbine siting in the Solano Phase 3 area. Our analysis shows that a turbine with a blade tip height of 125 meters or more, if sited along Path #8, would penetrate the Fresnel Zone of the microwave link. The recommended minimum horizontal clearance to the centerline of this path is 28.3 meters plus the turbine blade radius. As part of the due diligence process, it is recommended that the transmit and receive sites of Microwave Path #8 be verified by actual land survey.

For all the other microwave paths listed above, the vertical distance between the ground and the bottom of the Fresnel Zone in the space above the turbine area is well above 500 feet; thus, wind turbine blockage of these paths is not a concern (see Appendix B).

Shown below is a terrain profile graph which demonstrates that a turbine with a blade tip height of 125 meters or more, situated directly in line with the microwave path, would penetrate the Fresnel Zone of the path.

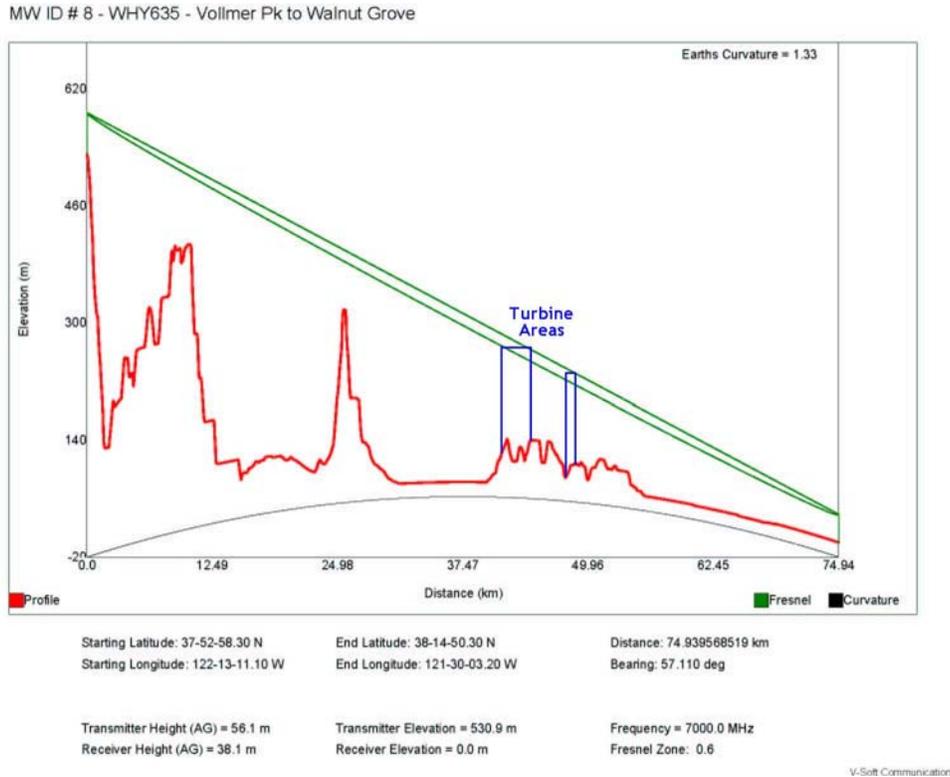


Figure 3 – Terrain Profile Graph of Microwave Path #8 and Turbine Areas

III. ANALYSIS OF FIXED RADIO FACILITIES

Land Mobile Facilities

There are two *Land Mobile* stations identified from the FCC’s database that fall within two miles of the Phase 3 area boundaries shown in Figure 1. They are as follows:

ID	Call Sign	Ant. Height (m)	Freq. (MHz)	Licensee	Contact	Phone
1	KPG841	7.0	450.01	Way Broadcasting Licensee, LLC	Andrea Yamazaki	415-978-5378
2	WNST617	20.0	47.08, 47.10	California, State of	General Services Dept.	916-657-9999

Table 2 – Land Mobile Stations near SMUD-Solano Phase 3 Turbine Area



KPG841 is located 1.0 mile from the nearest Phase 3 area boundary, while WNST617 is 1.7 miles from the nearest boundary. Significant disruptions to these land mobile stations are not expected. However, there can be occasional instances of service areas being disrupted by rotating turbine blades in cases where the towers used by the land mobile facilities are lower in height than the turbines. Therefore, the following procedure is recommended concerning the land mobile stations:

1. When the turbine layout is finalized, the land mobile licensees identified in this report should be contacted via a notification letter in order to obtain their concurrence for a letter of “no impact” (usually dubbed a “*Memorandum of Understanding*”).
2. If such a letter is not forthcoming, the licensees should be contacted to solicit their opinions concerning the adverse effects they contend will result from the turbine configuration. A deadline should then be established for a reply. If comments are received, they should be addressed via an engineering analysis that either:
 - a. Shows how the licensee’s analysis is not accurate, or
 - b. Suggests a compromise mitigation procedure.
3. Mitigation measures can include the following:
 - a. Converting to digital transmitting and receiving equipment.
 - b. In the case of the VHF station close to turbines, relocating to the UHF band.
 - c. Installing more sensitive mobile radios.

FAA and DoD Concerns

At the present time, FAA and Department of Defense (DoD) standards for aircraft and airport navigation facilities, including military radar, are in a state of flux. The long-awaited DoD wind farm interference report⁴ was released to the public on September 27, 2006. The Department of Defense and the Department of Homeland Security *Long Range Radar Joint Program Office* “JPO” had previously adopted an interim policy of objecting to any turbines located within line of sight of any air defense or Homeland Security radar⁵. At least 12 projects in Illinois, Wisconsin, North Dakota and South Dakota had been held up because of this interim policy.

⁴ This report is named “The Effect of Windmill Farms On Military Readiness”.

⁵ This consultant is not aware of any publicly accessible database identifying the locations of military radar sites, except those shared with airport navigation facilities.



The standards contained in the newly released report allow intervening terrain shielding, as well as placing turbines beyond line of sight, to be used to avoid impact to military radar, but these are the only mitigation measures that have been approved so far. SMUD may assume that FAA obstruction clearance also includes defense radar and military flight routes⁶. However, it is absolutely crucial that the FAA clearance, once received, must not be allowed to expire. It would also be prudent to submit 7460-1 forms to the FAA as the first consideration in the site development process. At the same time, notification should be made to the JPO.

Other Government RF Facilities

Operation of RF frequencies for federal government use is managed by the National Telecommunication Information Agency (NTIA), which is part of the U.S. Department of Commerce. The technical specifications for most government facilities are unavailable to the public. In order to avoid the derailment of the SMUD project due to late objections from a government agency, the NTIA should be notified of the proposed project during pre-construction planning. The NTIA has set in place a review process, wherein the Interdepartmental Radio Advisory Committee (IRAC), consisting of representatives from various government agencies, reviews new proposals for wind turbine projects for impact on government communications facilities. In almost all cases, no adverse impact is found, and IRAC usually issues a determination within 30 days. However, notification to NTIA should not be regarded as an alternative to notifying JPO concerning military radar impact, or the FAA concerning airspace navigation impact. All three agencies should be notified.

Cellular Facilities

The FCC database does not necessarily reflect the existence of individual cellular and PCS antenna sites. However, impact to these services is insignificant to non-existent⁷ as long as all tower structures are located farther away than 0.25 mile (0.4 kilometer)⁸. It is recommended that possible cellular and PCS antennas be researched with a physical site visit, since some of these antennas are not individually tabulated in the FCC records.

⁶ Evans has contacted private aeronautical consultants who agree with this assertion. However, there are no guarantees that FAA approval will not be rescinded if it is in the “national interest”. The best way to guard against this eventuality is to submit the turbine project proposal to the JPO office at Langley Air Force Base in Langley, Virginia at the time the FAA is notified. Care should be taken in contacting JPO once clearance is received, however, lest the case be re-opened.

⁷ These services operate on high UHF and SHF frequencies that are less sensitive to nearby turbines.

⁸ Cellular antennas employ diversity and multiple receivers to compensate for any disruptions at any one location.



IV. ANALYSIS OF BROADCAST FACILITIES

TV FACILITIES

The rotating blades of a wind turbine have the potential to disrupt over-the-air broadcast TV reception within a few miles of the turbine. This is manifested in an analog TV picture by a flickering or tearing of the image in time with the blade rotation, which is caused by signals reflected by the blades arriving at the TV antenna along with the direct signal. This is known as “multipath interference.” However, as turbine manufacturers have replaced all-metal blades with blades constructed of mostly nonmetallic materials⁹, this effect has been minimized. Also, the new generation of HDTV receivers is much better equipped to deal with minor multipath interference (which is manifested by “pixilating” or “freezing” of the picture) than analog TV sets, as special circuitry is employed to suppress the weaker reflected signal. Analog TV transmission is scheduled to end in February of 2009, after which TV stations will only transmit in DTV.

⁹ Modern turbine blades are usually constructed from glass-reinforced plastic (GRP), although they may contain some metal for strengthening, balance and lightning conduction.

The following full service analog TV facilities have been identified as placing a predicted FCC primary service contour over at least part of the turbine area:

Call Sign	Affiliate	Channel	City of License	Power (KW)	Ant. Ht. (m HAAT)	Dist. (km)	Azimuth (°T) ¹⁰
KTVU	FOX	2	Oakland	100	479	69.6	238.0
KCRA-TV	NBC	3	Sacramento	100	600	32.1	52.3
KRON-TV	NBC	4	San Francisco	100	506	69.6	238.0
KPIX-TV	CBS	5	San Francisco	100	506	69.6	238.0
KVIE	PBS	6	Sacramento	100	550	31.5	49.7
KGO-TV	ABC	7	San Francisco	316	509	69.6	238.0
KQED	PBS	9	San Francisco	316	509	69.6	238.0
KXTV	ABC	10	Sacramento	314	612	29.7	55.5
KNTV	NBC	11	San Jose	316	392	72.8	232.1
KOVR	CBS	13	Stockton	316	610	29.7	55.5
KDTV	Univision	14	San Francisco	3980	701	65.9	186.9
KUVS-TV	Univision	19	Modesto	5000	576	92.7	87.6
KBWB	WB	20	San Francisco	3470	472	69.6	238.0
KTSF	Independent	26	San Francisco	2510	421	72.8	232.2
KSPX	i Network	29	Sacramento	5000	522	32.1	52.3
KMAX-TV	CW	31	Sacramento	5000	560	32.1	52.3
KMTP-TV	PBS	32	San Francisco	1320	491	69.6	238.0
KICU-TV	Independent	36	San Jose	4070	686	67.1	186.5
KCNS	Independent	38	San Francisco	5000	440	69.6	238.0
KTXL	FOX	40	Sacramento	5000	597	31.6	49.8
KTNC-TV	TuVision	42	Concord	1290	856	24.1	205.3
KBCW	CW	44	San Francisco	5000	491	69.6	238.0
KSTS	Telemundo	48	San Jose	2510	688	65.9	186.9
KQCA	WB	58	Stockton	5000	537	32.1	52.3
KTFK-TV	TeleFutura	64	Stockton	1950	874	24.1	205.6
KKPX	i Network	65	San Jose	3090	812	108.6	182.8
KFSF-TV	TeleFutura	66	Vallejo	3470	466	69.9	238.1
KTLN-TV	Total Living Network	68	Novato	1100	402	71.5	275.7

Table 3 – Analog Broadcast TV Facilities

¹⁰ Bearing FROM Turbine area TO the TV Station.



Evans Associates
SMUD-Solano Phase 3 Wind Project
RF Impact Study

The following full service digital TV facilities have been identified as placing a predicted FCC primary service contour over at least part of the turbine area:

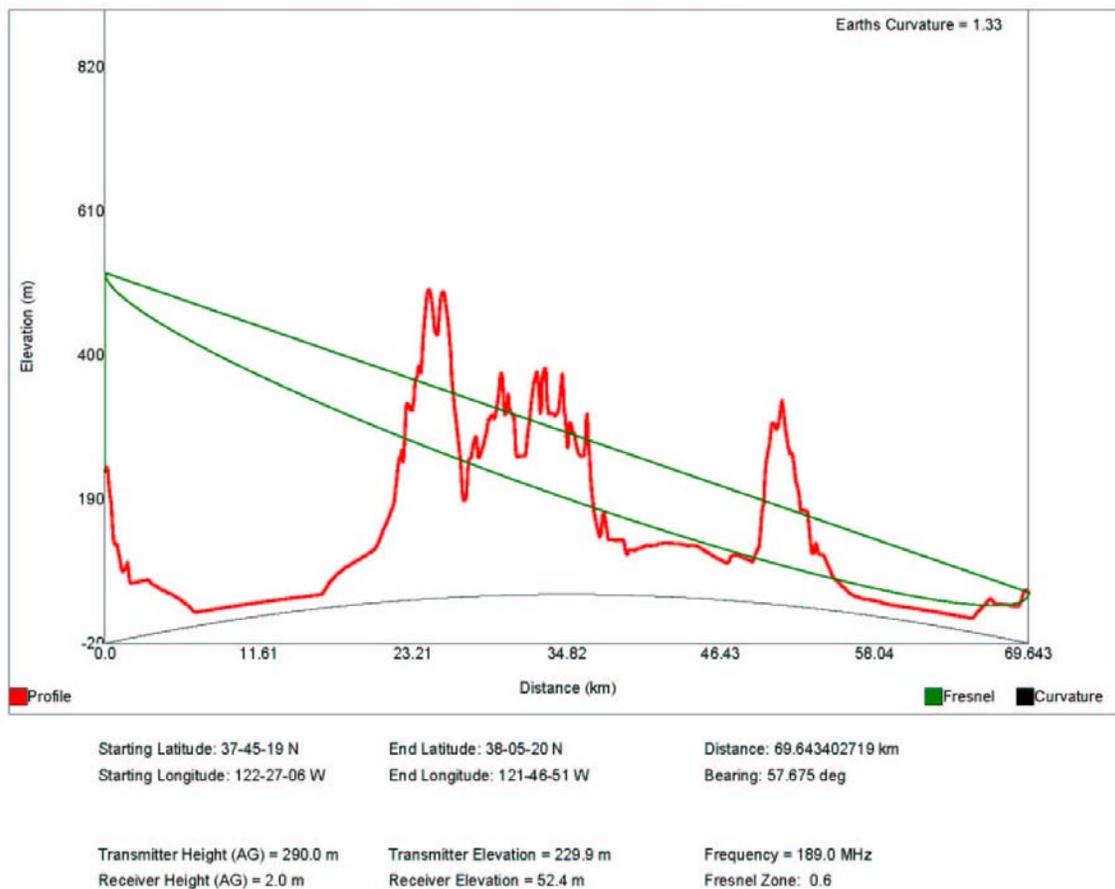
Call Sign	Affiliate	Channel	City of Lic.	Power (KW)	Ant. Ht. (m HAAT)	Dist. (km)	Azimuth (°T)
KNTV	NBC	12	San Jose	103	377	72.8	232.1
KUVS-TV	Univision	18	Modesto	500	555	92.7	87.6
KBWB	WB	19	San Francisco	383	418	69.6	238.0
KMAX-TV	CW	21	Sacramento	850	581	32.1	52.3
KRCB	PBS	23	Cotati	105	630	75.5	292.8
KGO-TV	ABC	24	San Francisco	561	437	69.6	238.0
KOVR	CBS	25	Stockton	760	591	29.7	55.5
KTSF	Independent	27	San Francisco	500	403	72.8	232.2
KPIX-TV	CBS	29	San Francisco	1000	401	69.6	238.0
KQED	PBS	30	San Francisco	777	437	69.6	238.0
KMTP-TV	PBS	33	San Francisco	500	496	69.6	238.0
KFSF-TV	TeleFutura	34	Vallejo	150	419	69.6	238.0
KCRA-TV	NBC	35	Sacramento	1000	462	30.2	54.2
KCNS	Independent	39	San Francisco	1000	428	69.6	238.0
KKPX	i Network	41	San Jose	1000	418	72.7	232.3
KCSM-TV	PBS	43	San Mateo	536	428	69.6	238.0
KBCW	CW	45	San Francisco	400	446	69.6	238.0
KQCA	WB	46	Stockton	600	580	32.1	52.3
KTLN-TV	Total Living Network	47	Novato	1000	402	71.5	275.7
KSPX	i Network	48	Sacramento	1000	489	32.1	52.3
KSTS	Telemundo	49	San Jose	257	688	65.9	186.9
KTEH	PBS	50	San Jose	290	662	67.1	186.5
KDTV	Univision	51	San Francisco	476	701	65.9	186.9
KICU-TV	Independent	52	San Jose	251	668	67.1	186.5
KVIE	PBS	53	Sacramento	360	566	31.6	49.8
KTXL	FOX	55	Sacramento	1000	581	31.6	49.8
KTVU	FOX	56	Oakland	1000	433	69.6	238.0
KRON-TV	NBC	57	San Francisco	1000	446	69.6	238.0
KXTV	ABC	61	Sacramento	1000	593	29.7	55.5
KTFK-TV	TeleFutura	62	Stockton	195	935	26.0	207.6
KTNC-TV	TuVision	63	Concord	47.3	942	26.0	207.6

Table 4 – Digital Broadcast TV Facilities

As seen in the following terrain profile graph, rugged terrain between the San Francisco/Oakland TV towers and the turbine area may prevent reliable over-the-air signals of most of these distant stations from being received unless high-gain antennas and sensitive receivers are used.

The following diagram shows the terrain profile between the San Francisco and Oakland TV stations and the turbine area. The straight green line shows the terrain-blocked direct signal.

Antenna Line of Site from Typical San Francisco TV Station to Turbine Area



V-Soft Communications

Figure 4 – Transmission Path Between Typical San Francisco/Oakland TV Station Antenna and Turbine Area

The following terrain profile graph shows that the path from the Sacramento TV stations' antennas and the turbine area are relatively unobstructed by terrain:

Antenna Line of Site from Typical Sacramento TV Station to Turbine Area

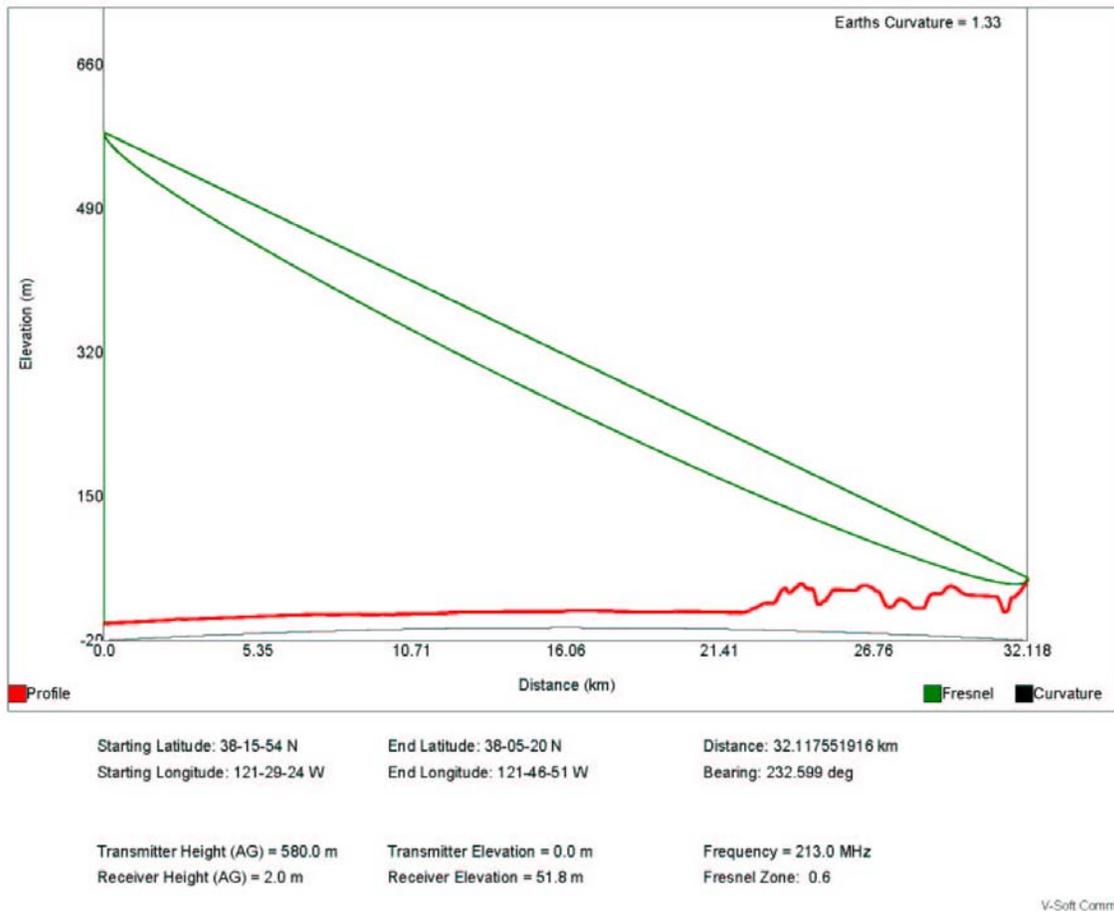


Figure 5 – Transmission Path Between Typical Sacramento/Stockton TV Station Antenna and Turbine Area

Thus, it is evident that residents in and near the project area rely primarily on the local stations in Sacramento and Stockton, which provide much stronger and unobstructed signals, for over-the-air TV programming.

Most of the multipath effects, whether they impact viewers of the San Francisco market stations or those of the Sacramento stations, should be dissipated for locations farther than approximately 3 to 6 kilometers of a turbine farm, but some residual problems could be noted for TV receivers that are located below the grade level at the turbine base. Usually, a rule of thumb is that approximately 10% of receiver locations are affected to some extent within 2 miles of a large



turbine farm. The usual effect is intermittent “pixelating” or “freezing” of the digital picture, and “tearing” of an analog picture. This estimate is based upon Evans’ experience with similar turbine farms.

After the turbines have been constructed, the possible mitigation methods, in order of most likely to least likely, are:

1. Relocation of the antenna to receive a better signal
2. Installation of a better outside antenna, or one with a higher gain
3. Installation of a DTV set top box to receive DTV stations on an analog TV
4. Installation of satellite or cable TV

A small fraction of the 10% of impacted viewers (perhaps about one-fifth) might require mitigation beyond relocation of the antenna¹¹.

To obtain a better handle on these numbers, it is suggested that an outdoor TV antenna inventory be compiled during the site survey.

Dense population centers such as Rio Vista, Pittsburg and Antioch are beyond the 6-kilometer distance at which multipath interference is typically below significant levels. Thus, it is the opinion of this engineer that instances of over-the-air TV interference will be small and manageable.

FM FACILITIES

Disruption of FM broadcast home receivers by wind turbines occurs rarely. If it does occur, the solution is simple and inexpensive, usually involving the use of a better antenna.

The following full-service FM stations each place a predicted primary signal over at least a portion of the turbine property (according to the FCC, ***only*** stations providing predicted service are entitled to protection):

¹¹ In some similar cases, a *Master Antenna System* can be installed. However, this solution is expensive and is usually not warranted for the number of cases anticipated by this study.

Call Sign	Format ¹²	Freq. (MHz)	City of License	Power (KW)	Ant. Height (m HAAT)	Dist. (km)	Azimuth (°T)
KVHS	Modern Rock	90.5	Concord	.41	137	20.4	251.4
KUIC	Adult Contemporary	95.3	Vacaville	.49	617	44.0	320.9
KEAR-FM	Religious Teaching	88.1	Sacramento	8.4	303	30.2	54.2
KQED-FM	News/Talk	88.5	San Francisco	110	387	72.8	232.6
KXPR	Classical	88.9	Sacramento	50	150	31.8	49.7
KLRS (App)	Unkown	89.7	Lodi	2.5	487	31.6	49.8
KYCC (CP)	Contemp. Christian/ Religious Teaching	90.1	Stockton	41	107	46.1	108.2
KPFA	Variety	94.1	Berkeley	59	405	45.9	237.3
KYLD	Rhythmic – CHR	94.9	San Francisco	30	369	72.7	232.5
KYMX	Soft AC	96.1	Sacramento	50	145	63.9	18.0
KOIT-FM	Adult Contemporary	96.5	San Francisco	24	480	69.6	238.0
KSEG	Classic Rock/ HD2: Rock	96.9	Sacramento	50	152	67.5	23.0
KLLC	Hot AC/ HD2: Smooth Jazz	97.3	San Francisco	82	309	68.3	247.4
KISQ	R&B Oldies/ HD2: Urban	98.1	San Francisco	75	310	68.3	247.4
KSOL	Regional Mexican	98.9	San Francisco	6.1	409	69.6	238.0
KMVQ-FM	Rhythmic AC/ HD2: Country	99.7	San Francisco	40	396	72.7	232.3
KIOI	Hot AC/ HD2: 80s Hits	101.3	San Francisco	125	354	72.7	232.6
KDFC-FM	Classical/ HD2: Classical KDFC-2	102.1	San Francisco	33	319	68.3	247.4
KSFM	Rhythmic CHR	102.5	Woodland	50	152	55.7	5.0
KATM	Country	103.3	Modesto	50	152	68.3	146.6
KKSF	Smooth Jazz/ HD2: Jazz	103.7	San Francisco	7.2	461	69.6	238.0
KHKK	Classic Rock	104.1	Modesto	50	152	55.3	151.1
KFOG	Adult Alternative	104.5	San Francisco	7.1	459	69.6	238.0
KITS	Modern Rock/ HD2: Modern Rock All New Music	105.3	San Francisco	15	366	72.7	232.5
KMEL	Urban Contemp./ HD2: Urban Xtreme Hip-Hop	106.1	San Francisco	69	393	72.7	232.6
KFRC-FM	Classic Hits/ HD2: News	106.9	San Francisco	80	305	68.3	247.4
KSTN-FM	Oldies	107.3	Stockton	8.1	491	29.7	179.9

Table 5 – FM Stations Serving the SMUD-Solano Turbine Area

Because of the “capture effect” supported by the “discriminator” in FM receivers, significant disruptions to home FM receivers is not expected. Although the received signal may vary with the blade rotation at some receive locations in the immediate area, good quality FM radios will most likely factor out such time-varying signals. In those relatively few cases where significant

¹² Formats as listed in the *The RadioBook 2006-2007* published by M Street Publications.



impact is caused (e.g. when a listener is located within 0.50 miles of a turbine and is not within line-of-sight of the FM transmitter), home FM radios could be connected to rooftop TV receive antennas or to better indoor FM antennas to pull in a stronger direct signal. Mobile or portable receivers may only need to be moved slightly to pick up a stronger signal (for instance, radios using line cords for antennas).

AM BROADCAST FACILITIES

A search of the FCC's broadcast database revealed one licensed AM station near the wind project area, KATD in Pittsburg, California.

The transmitter of station KATD, licensed to operate using a three-tower directional antenna array on 990 KHz with 5 KW, is located just west of the turbine area on Stratton Lane in Collinsville, about 2 kilometers from the nearest planned turbine. Generally, steel shafts of the turbines could produce re-radiation adverse to a nearby directional AM station's compliance with field radiation limits established by the FCC, potentially creating a legal liability for the wind power developer unless the situation is addressed during project planning. In cases where turbine re-radiation is especially destructive, some turbines would have to be detuned, i.e. specialized equipment installed and tuned to the AM station's frequency, that would minimize RF fields induced in the turbine tower, and thus ensure that the directional AM transmitter does not operate outside of its legal operating parameters.

KATD has an FCC construction permit to move its transmitting facility to the Sacramento area, 75 kilometers northeast of the existing site. The new transmitting facility is being built out as of this date. This would place the station well outside the RF impact range of the Solano Phase 3 wind project. Furthermore, the station is currently operating non-directionally at the Collinsville site under a special temporary authorization from the FCC, with a power of 1 KW (20% of its licensed power). Thus, KATD is not required at this time to operate using its directional antenna or to monitor compliance with licensed field radiations.

The most likely outcome regarding KATD is that the station will continue to operate non-directionally until their new directional antenna near Sacramento is built and operating. This may well happen before the Solano Phase 3 turbines are built. Thus, it is likely that the owner of the station will not be concerned about the Solano Phase 3 wind project and its effect on the Collinsville facility, since that facility will be decommissioned when the new Sacramento area facility begins regular operation. Therefore, the only action recommended with respect to AM station KATD would be to send the owner of the station, Way Broadcasting Licensee LLC, a courtesy notification letter.



V. CONCLUSIONS

The following conclusions have been reached as a result of the analysis undertaken with respect to the SMUD-Solano Phase 3 wind project:

1. The siting of turbines is potentially affected by one microwave station, WHY635. If turbines are sited from the centerline of the path at a distance of at least 28.3 meters plus the blade radius, the turbines should clear the path, but a surveyor should determine the actual locations of the microwave endpoints to make absolutely certain that this is the case. This licensee should be sent a notification letter.
2. Based upon reasonable assumptions, there is no significant impact potential to any land mobile station. Currently it appears that no land mobile station is closer than about one mile to the nearest project area boundary. Notification should be made to two land mobile licensees whose antenna sites are within 2 miles of the project area boundaries.
3. Some impact to regularly-viewed over-the-air TV signals may occur in the area, but it is expected to affect relatively few receivers and a limited number of TV stations. Mitigation measures are expected to be available for all expected anomalies, including, in the worst case, hookup to cable or satellite TV.
4. Based upon FCC database information, no significant impact is expected to the reception of FM broadcast facilities. A few receive locations may experience a fluctuating signal level in time with the blade rotors, but the receiver AGC should be able to manage these variations. In a few cases, it might be necessary to utilize outside antennas within nearby homes.
5. AM Station KATD is located within the notification distance of 3 kilometers from one or more planned turbines. Notification should be made to the licensee of the station, however it is anticipated that no re-radiation studies or formation of a mitigation plan will be required since the station is in the process of building a new transmitter plant near Sacramento.
6. It is suggested that an on-site survey be undertaken to look for unregistered transmit antennas, inventory outdoor TV antennas, and verify antenna coordinates.



**Evans Associates
SMUD-Solano Phase 3 Wind Project
RF Impact Study**

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "B. Benjamin Evans".

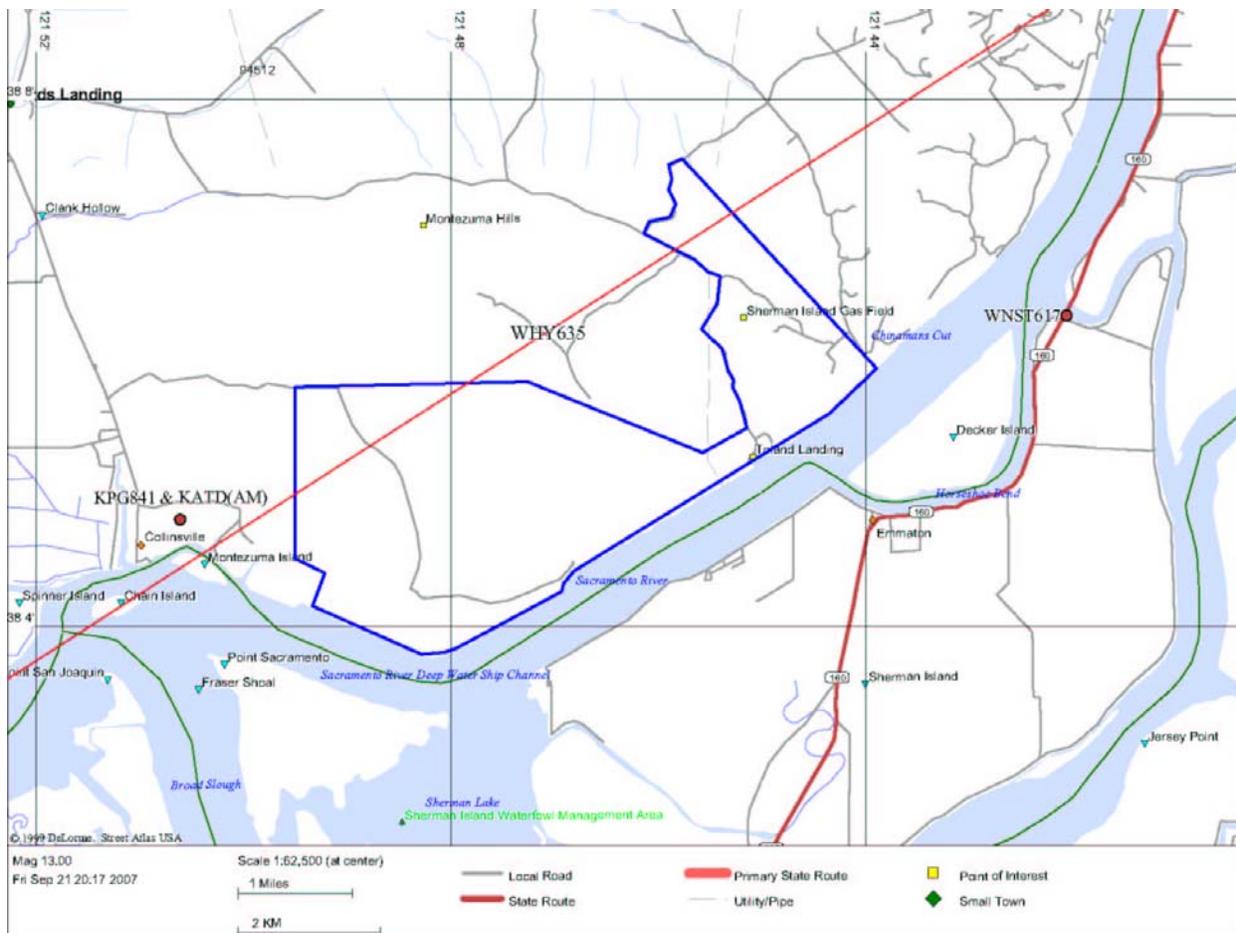
B. Benjamin Evans, P.E.
Communications Consultant

September 21, 2007

F:\EA\Client Services\Windmills\SMUD\RFImpactStudyReportSMUD-SolanoPhase3.doc

Appendix A

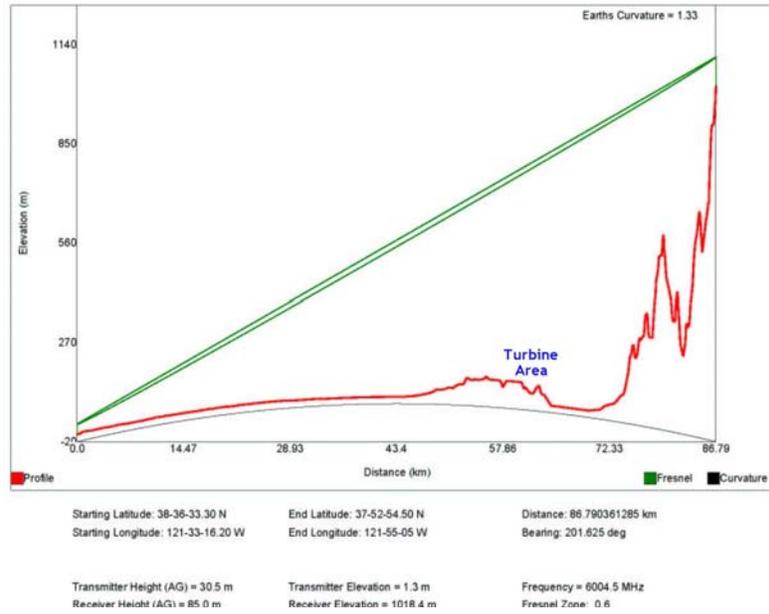
Fixed Transmitter Sites Near Phase 3 Area And Affected Microwave Path



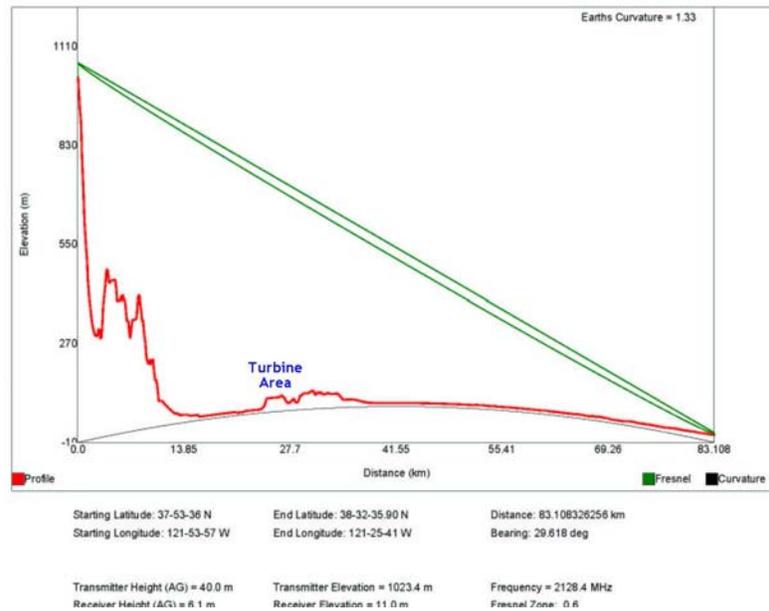
Appendix B-1

Microwave Paths Unaffected by Phase 3 Wind Project

MW ID #1 - GARDENHW - Garden Hwy to Mt. Diablo



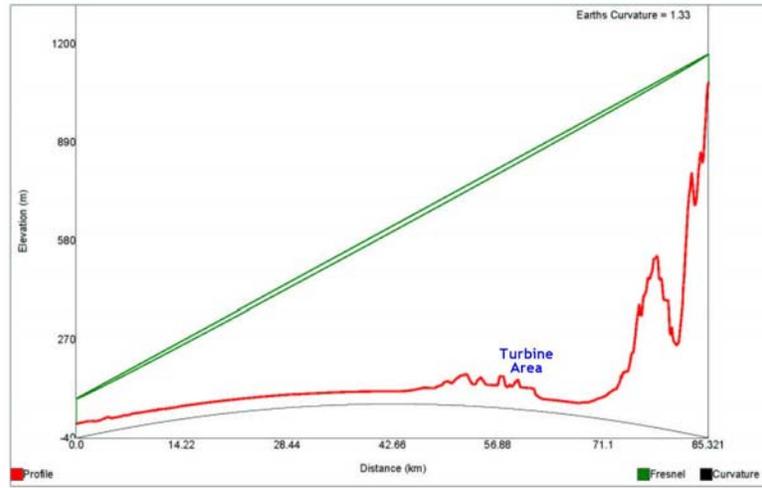
MW ID #2 - KMA743B - Mt. Diablo to Kroy



Appendix B-2

Microwave Paths Unaffected by Phase 3 Wind Project

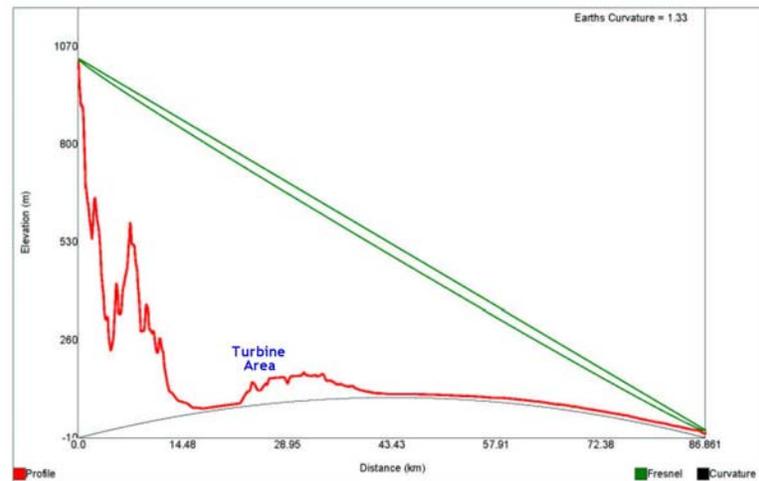
MW ID #3 - KMD35 - Sactodcmwcenter to Mt. Diablo



Starting Latitude: 38-34-33 N End Latitude: 37-52-53 N Distance: 85.321154261 km
Starting Longitude: 121-29-48 W End Longitude: 121-54-52 W Bearing: 205.517 deg

Transmitter Height (AG) = 79.2 m Transmitter Elevation = 5.0 m Frequency = 6685.0 MHz
Receiver Height (AG) = 90.0 m Receiver Elevation = 1078.3 m Fresnel Zone: 0.6

MW ID #4 - KMS57 - Mt. Diablo to Garden Hwy



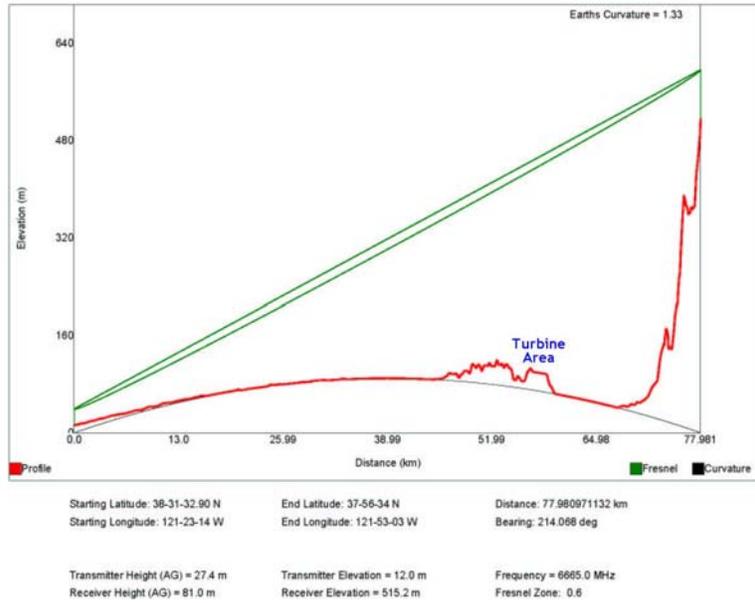
Starting Latitude: 37-52-54 N End Latitude: 38-36-34.90 N Distance: 86.861275853 km
Starting Longitude: 121-55-05 W End Longitude: 121-33-15 W Bearing: 21.402 deg

Transmitter Height (AG) = 7.3 m Transmitter Elevation = 1029.3 m Frequency = 2042.0 MHz
Receiver Height (AG) = 9.1 m Receiver Elevation = 2.0 m Fresnel Zone: 0.6

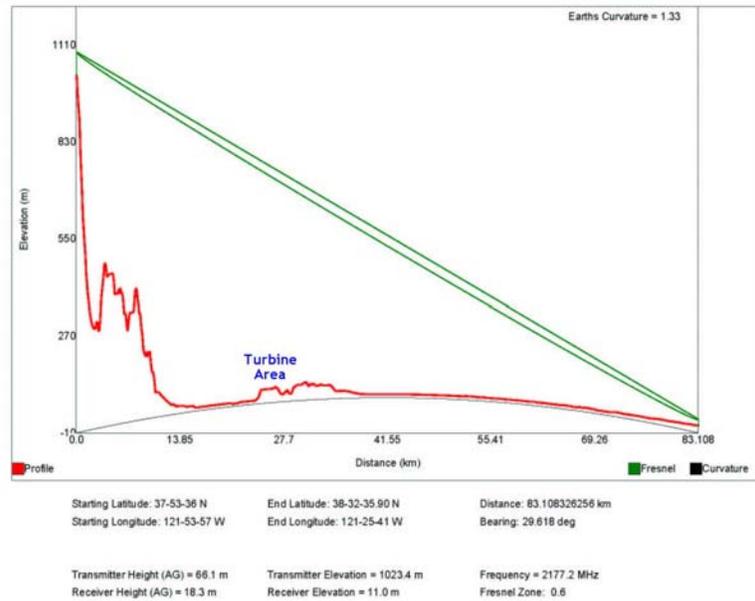
Appendix B-3

Microwave Paths Unaffected by Phase 3 Wind Project

MW ID #5 - KNG40 - Sacramento to Clayton Hill



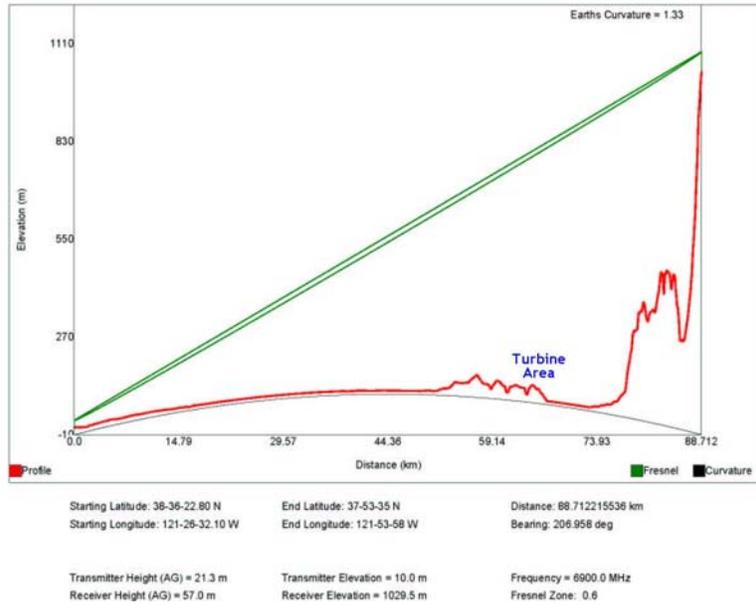
MW ID# 6 - WGX449 - Mt. Diablo to Kroy



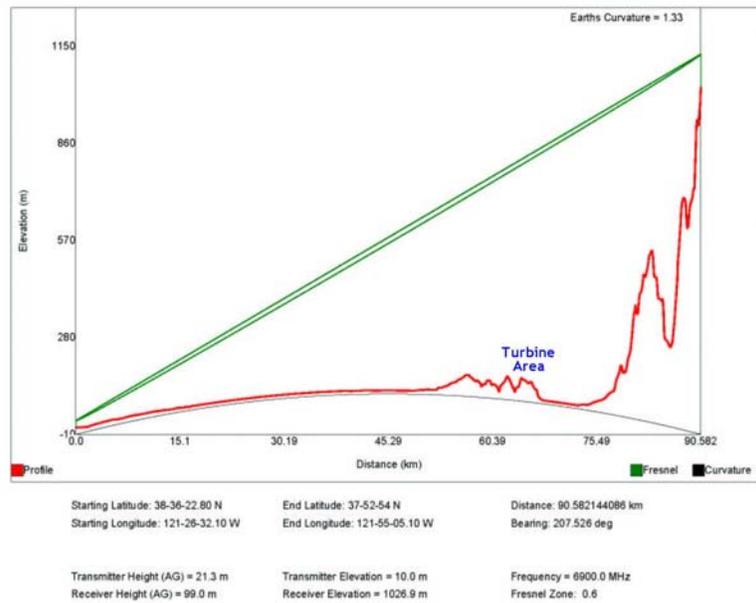
Appendix B-4

Microwave Paths Unaffected by Phase 3 Wind Project

MW ID #10 - WLI618 - Maaco Tower to Mt. Diablo North



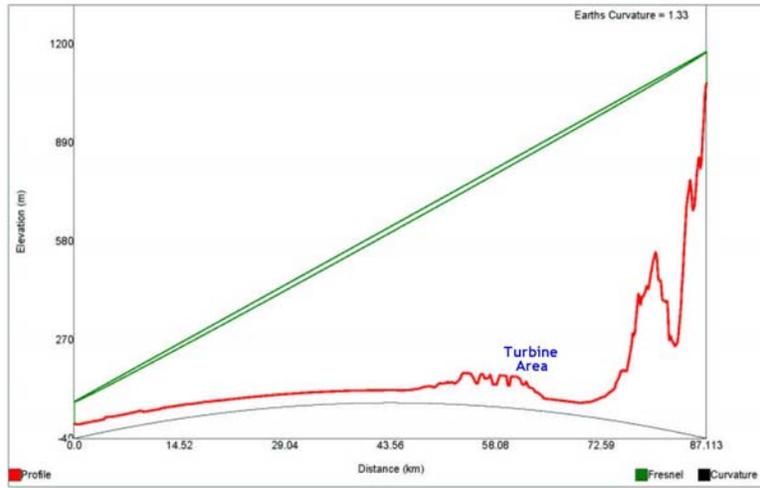
MW ID # 9 - WLI618 - Maaco Tower to Mt. Diablo South



Appendix B-5

Microwave Paths Unaffected by Phase 3 Wind Project

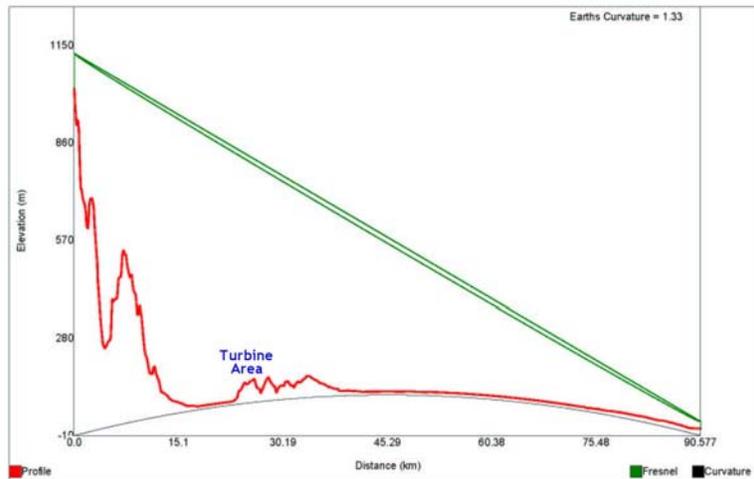
MW ID# 12 - WNTU522 - Sacramento Cty to Mt. Diablo



Starting Latitude: 38-35-43 N End Latitude: 37-52-53 N Distance: 87.112819083 km
 Starting Longitude: 121-30-04 W End Longitude: 121-54-52.10 W Bearing: 204.676 deg

Transmitter Height (AG) = 70.1 m Transmitter Elevation = 5.5 m Frequency = 6123.1 MHz
 Receiver Height (AG) = 100.0 m Receiver Elevation = 1076.5 m Fresnel Zone: 0.6

MW ID# 13 - WPOT265 - Mt. Diablo South to Maaco Tower



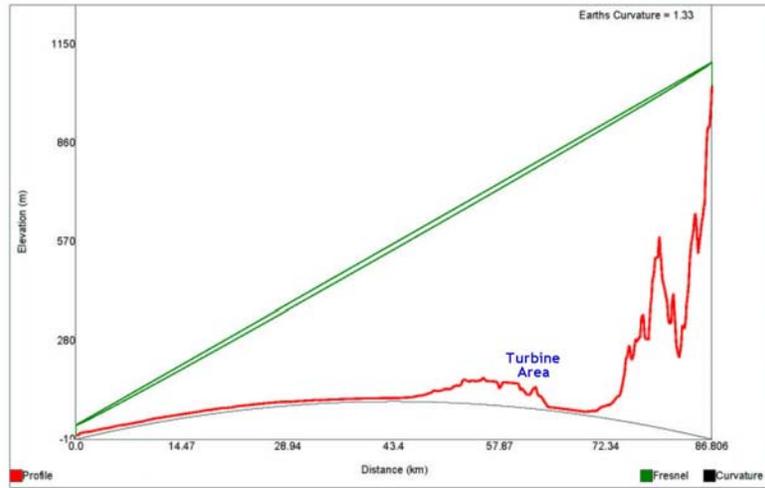
Starting Latitude: 37-52-54.50 N End Latitude: 38-36-22.80 N Distance: 90.577386275 km
 Starting Longitude: 121-55-05 W End Longitude: 121-26-31.20 W Bearing: 27.247 deg

Transmitter Height (AG) = 103.0 m Transmitter Elevation = 1022.7 m Frequency = 7075.0 MHz
 Receiver Height (AG) = 21.3 m Receiver Elevation = 10.3 m Fresnel Zone: 0.6

Appendix B-6

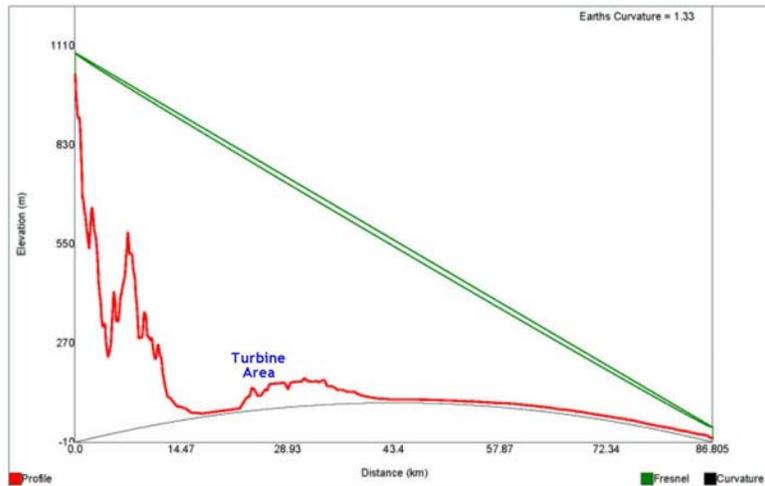
Microwave Paths Unaffected by Phase 3 Wind Project

MW ID# 14 - WPZU838



Starting Latitude: 38-36-33.30 N	End Latitude: 37-52-54 N	Distance: 86.805605407 km
Starting Longitude: 121-33-16.20 W	End Longitude: 121-55-05.10 W	Bearing: 201.623 deg
Transmitter Height (AG) = 30.5 m	Transmitter Elevation = 1.3 m	Frequency = 6887.5 MHz
Receiver Height (AG) = 70.0 m	Receiver Elevation = 1026.6 m	Fresnel Zone: 0.6

MW ID# 15 - WQAP211 - Mt. Diablo to Garden Highway



Starting Latitude: 37-52-54 N	End Latitude: 38-36-33.30 N	Distance: 86.804713886 km
Starting Longitude: 121-55-05 W	End Longitude: 121-33-16.20 W	Bearing: 21.396 deg
Transmitter Height (AG) = 60.0 m	Transmitter Elevation = 1029.3 m	Frequency = 7100.0 MHz
Receiver Height (AG) = 30.5 m	Receiver Elevation = 1.3 m	Fresnel Zone: 0.6

APPENDIX K

Sacramento Municipal Utility District Avian Protection Plan

Sacramento Municipal Utility District Avian Protection Plan



December 2007
(Revised November 2009)



SMUD

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Sacramento Municipal Utility District Avian Protection Plan

Prepared for:

Sacramento Municipal Utility District
PO Box 15830 MS B203
Sacramento, CA 95852
Contact: Lonn Maier
(916) 732-6566

Prepared by:

Estep Environmental Consulting
3202 Spinning Rod Way
Sacramento, CA 95833
Contact: Jim Estep
(916) 921-2515

December 2007
(Revised November 2009)

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Executive Summary

SMUD has approximately 3,900 miles of overhead distribution and subtransmission lines and 450 miles of overhead transmission lines. Both the overhead and underground electric facilities serve approximately 600,000 customers in a safe, reliable, and cost effective manner. Unfortunately, some overhead power lines pose an electrocution or collision hazard to birds. As a result, SMUD has incorporated avian protection practices in its construction standards.

This Avian Protection Plan (APP) formalizes and enhances past practices of avian protection and incorporates industry best practices for future installations as necessary. This document is based on and is organized according to the APP Guidelines, a joint guidance document prepared by the Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS) (APLIC and USFWS 2005).

The SMUD service area supports an abundance of nesting and wintering birds. Of particular note are the presence of certain birds and bird groups that are most susceptible to electrocution and collision mortality, such as large raptors and large water-associated birds, such as cranes, egrets, and herons. Raptors are most susceptible to electrocution due to their large size, use of utility poles as perches, and potential contact with phase conductors or electrical equipment that can result in electrocution. Large water birds are most susceptible to collision with overhead wires – particularly during periods of low visibility (e.g., fog conditions) – when lines intersect with wetland, open water, or other traditional feeding and roosting sites.

Intent and Need

Avian mortality from interactions with the human-built environment is a world-wide phenomenon. The causes of incidental avian mortality are numerous, but primary causes are associated with obstacles to bird flight, such as moving vehicles, tall buildings, and radio towers. Overhead electrical facilities also take a toll on bird populations. Inherent in the construction and operation of overhead high-voltage energized facilities is the potential for bird collision with overhead wires and electrocution from contact with conductors or a conductor and ground source. While incidental avian mortality is generally an accepted consequence of the built environment, measures can be taken to reduce the impact of certain structures, such as overhead electric facilities on avian resources; such measures are identified in this plan.

It is not the intent of this Avian Protection Plan to eliminate all potential sources of collision and electrocution within the SMUD service area, nor is there any intent to perform a carte blanche assessment or retrofit of SMUD facilities. With over 4,350 miles of overhead power lines in the service area, it is neither economically prudent nor biologically necessary to consider targeting all areas for remedial actions. SMUD will continue to address the issue of avian mortality with an approach that takes into account a number of different factors as described in the following sections. Engineering design,

assessments, data keeping, and practical experience will all contribute to having a positive impact on the phenomena of avian mortality. This will entail a multi-year effort spanning decades into the future. This is a living document that may be periodically revised based on new information or new developments in avian protection.

The APP will provide a level of compliance with regulatory agencies and their regulatory requirements, such as the US Fish and Wildlife Service and the California Department of Fish and Game (e.g., Migratory Bird Treaty Act, Endangered Species Act, and California Endangered Species Act).

Background

When considering avian mortality and the types of electrical facilities used in the industry, (e.g., transmission, subtransmission and distribution lines), distribution lines tend to be responsible for the majority of bird electrocutions and collisions, and this may be due to the sheer number of miles of distribution lines compared to others. Typically, avian risk occurs where 1) poles provide perching opportunities and conductor separation and/or proximity to other energized hardware creates electrocution potential and 2) where overhead wires cross traditional bird use areas and create collision potential. This is found more often than not with distribution facilities.

Even though data is currently maintained on outages caused by avian activity¹, the exact extent of existing bird mortality within the SMUD service area is uncertain. Several issues are relevant to the APP process, including the mechanisms of electrocution and collision mortality as it relates to structures and operations; the costs – both avian and economic of bird-caused power outages; and state and federal laws and regulations that protect birds. This APP was developed to minimize the potential for mortality and comply with state and federal laws and regulations by implementing mortality reduction actions based on reported incidents and through a risk assessment process. It is designed to identify problem areas and implement measures to prevent or reduce mortality associated with new construction and with existing power lines.

Approach

The approach used in the formulation of this APP focuses on the following two response mechanisms:

- **Reactive** – responds to reported incidents and problem nests; and
- **Proactive** – incorporates avian standards in new projects and new structures as required.

These processes are incorporated into the elements of the APP described below.

¹ For example, in 2007, birds were responsible for 84 outages from January 1 through November. This equates to about 0.02 bird-caused outages per mile per year of overhead sub-transmission and distribution line.

Response Procedures for Power Outages and Incidental Observations

Response procedures address *actual* reported bird incidents identified through outage investigations or actual observations. Actual observations are either witnessed contacts by SMUD staff or incidental observations reported by SMUD staff or the public of possible electrocution or collision mortality incidents. This process includes investigating and reporting procedures, and implementing avian-safe designs.

Risk Assessment Procedures

The proactive process addresses the *potential* for incidents by assessing mortality potential associated with new projects and selecting the appropriate construction standards. Based on proximity to important bird use areas, habitats, and relevant historical information, environmental staff will assist the project designer to select a route and pole construction that minimizes the potential for avian contact.

Mortality Reduction Actions

Mortality reduction actions are triggered as a result of reported incidents or the risk assessment process for new projects. Mortality reduction actions would include:

- _ consideration of alternative routing of new facilities to avoid sensitive or high use areas (e.g., siting near high bird use areas);
- _ avian-safe pole configurations for new construction;
- _ mortality monitoring by troubleshooter and specialty staff (with expertise in avian species); and
- _ retrofitting demonstrated hazard poles and lines to reduce electrocution and collision hazard potential.

Design and Siting Standards

Where potential problem areas are identified, reducing the risk of electrocution or collision requires modifications to structures and structural design, and consideration for high risk areas during project route siting. To provide guidance on design and siting standards, this APP establishes:

- _ Siting standards for new power line corridors,
- _ Avian-safe design standards for new construction, and
- _ Avian-safe design standards for existing power poles and overhead lines.

Nest Management

The APP also provides a process for risk determination and if necessary removal or relocation of bird nests. Bird nests often pose no problems for system functioning and reliability and are thus allowed to remain. Occasionally, however, bird nests are constructed in areas that pose either a risk of system malfunction, create maintenance

issues, or a risk to the birds themselves. In these cases, SMUD may elect to remove or relocate nests. The APP provides guidance on nest detection, risk determination, and an approach for dealing with problem nests.

Avian Reporting System

The District Outage Management System (OMS) will be enhanced to provide a more complete avian reporting system, including identification of species, location of the contact or problem nest, and notification for corrective action.

Permit Compliance

Several state or federal permits may be required to implement some portions of the APP, including:

- Incidental Take Permits
 - Section 10(a)(1)(b) Incidental Take Permit
 - Bald and Golden Eagle Act Permit
 - Section 2081 Permit
- Collection/Salvage Permits
- State Scientific Collection Permit
- Federal Migratory Bird Permit
- Nest Removal and Relocation Permits

Training

Successful implementation of this APP will require a thorough understanding of the issues and corresponding protocols. To accomplish this, SMUD will develop a training program focusing on staff with direct and indirect implementation responsibilities including managers, supervisors, first responders, field crews, engineers, dispatch staff, and design staff.

Avian Enhancement Options

SMUD has and will continue to promote natural resource protection and actions that benefit local and regional bird populations and other wildlife. SMUD commits to a continuing partnership with local agencies and state and federal resource agencies to explore and participate in activities that enhance and restore habitat. Possible enhancement measures include planting trees, installing artificial nest platforms and perches, and restoring riparian and wetland vegetation.

Program Review and Quality Control and Public Awareness

SMUD will institute program review and quality control measures to ensure continuing monitoring of the effectiveness of the APP, and expand its public awareness campaign to provide information on implementation and effectiveness of mortality reduction actions.

Section 1. Introduction

This Avian Protection Plan (APP) was developed to expand and formalize the Sacramento Municipal Utility District's (SMUD) existing avian protection program in accordance with the APP Guidelines, a joint guidance document prepared by the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS). The APP Guidelines along with related APLIC documents (described below) are considered the most up-to-date and comprehensive guidance tools to reduce the potential for avian electrocution and collision mortality. The APP Guidelines (APLIC and USFWS 2005) define an APP as "a utility-specific document that delineates a program designed to reduce the operational and avian risks that result from avian interactions with electric utility facilities". This document incorporates the principals of an APP as outlined in the APP Guidelines and establishes a process for monitoring and evaluation, reporting and data collection, siting and design considerations, and implementation of remedial actions.

This APP consists of introductory sections that describe relevant issues and the regulatory framework; a description of the SMUD service area including the various relevant components of the electrical system, the landscape and land use within the service area, and a general description of bird use and populations within the service area; and finally the APP itself.

1.1 Background

1.1.1 Brief History of SMUD

The voters of Sacramento County created SMUD in 1923 as a publicly owned and operated utility. However, it wasn't until 1946 that SMUD acquired the distribution system (previously owned by Pacific Gas and Electric Company) and began building an organization that would eventually become the sixth largest publicly owned utility in the country in terms of customers served. SMUD was founded with the idea that providing electric power to the Sacramento region was a job best done by a public utility overseen by an elected board of directors. Local control was thought to be the best way to ensure a reliable source of electricity at a lower cost and with more reliable service.

Over the last 60 years, SMUD has successfully transformed the antiquated electrical system it acquired into an efficient and diverse system of energy production, transmission, and distribution facilities. SMUD's Energy Management Center allows the utility to make its own minute-by-minute decisions on buying power and managing energy resources. During the 1970s and 1980s, SMUD began to move away from the concept of large central energy production plants toward diverse power sources such as cogeneration plants, wind power, low-cost purchased power, and research and development of renewable resources and advanced technologies like solar, fuel cells, gas

turbines, and biomass. As a result, SMUD's efforts toward reliable, diverse, and innovative energy programs and its emphasis on energy conservation have been recognized throughout the state, nation, and world.

1.1.2 SMUD Service Area

SMUD's current service area includes all of Sacramento County with the exception of the lower southwest arm of the county, and a small portion of Placer County (Exhibit 1-1). A description of the SMUD service area and electrical facilities is presented in Section 4.

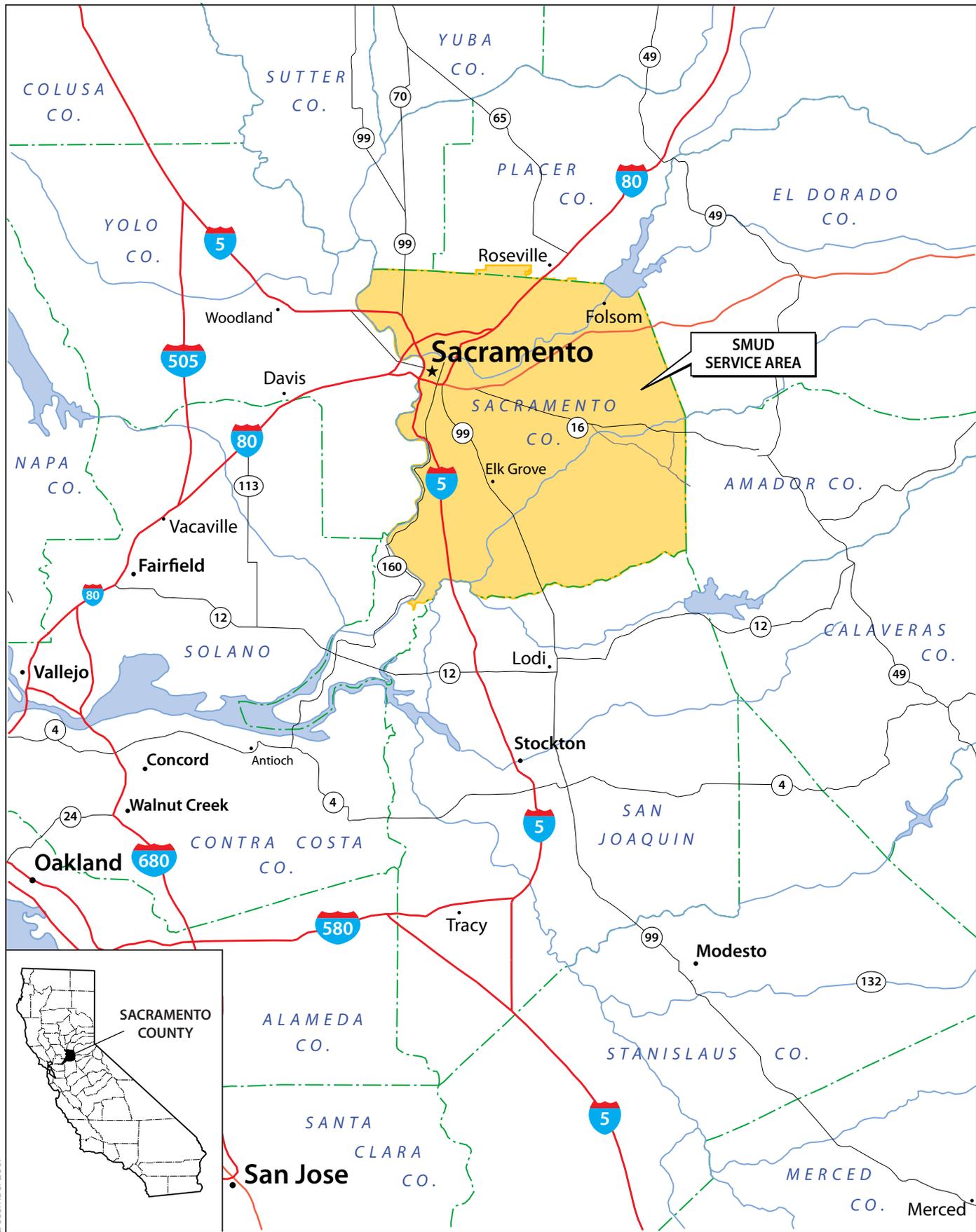
1.1.3 Avian Mortality Associated with Overhead Power Lines

Many bird species are quite adaptable to the presence of man-made structures. Electrical facilities are no exception and in fact in some case attract bird use by providing perching and nesting structures. However, electrical structures can also pose risk to birds through electrocution by exposure to energized wires and related devices. These and other man-made structures (e.g., buildings, communication towers, etc.) can also act as obstacles to bird flight occasionally resulting in collision mortality or injury.

Electrocution and collision-related bird mortality from power lines and related structures have been documented for many decades (California Energy Commission 1995). Focusing primarily on raptor mortality, in the mid-1970s the Edison Electric Institute (EEI) developed a manual for addressing raptor electrocution on power lines entitled *Suggested Practices for Raptor Protection on Power Lines* (Miller et al. 1975). Since then, this guidance document has been updated and expanded several times beginning with the 1981 version (Olendorff et al. 1981). Following the formation APLIC, which is composed of biologists from the utility industry, the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the National Audubon Society, an updated guidance manual was prepared in 1996 (APLIC 1996) followed by the most recent version entitled *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).

APLIC also produced a guidance document that addresses bird collisions with power lines entitled *Mitigating Bird Collisions with Power Lines: the State of the Art in 1994* (APLIC 1994).

To supplement these APLIC guidance documents and to provide a standard approach that can be adopted industry-wide, APLIC and the USFWS jointly prepared the Avian Protection Plan (APP) Guidelines (APLIC and USFWS 2005). The intent of the APP guidelines is to provide utilities with a planning approach designed to reduce avian risk as well as reducing risk of enforcement under the Migratory Bird Treaty Act (MBTA). This APP was prepared according to the guidance in the APP Guidelines.



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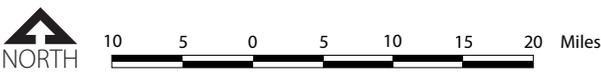


Exhibit 1-1
SMUD Service Area

1.1.4 SMUD's Current Avian Protection Program

SMUD has taken steps to minimize avian electrocution on power poles. As far back as 1981 SMUD has implemented avian protection measures in its service area. Engineers designed utility pole configurations to accommodate protection measures (such as shown in Exhibit 1-2), where bird perch guards were included in the design.

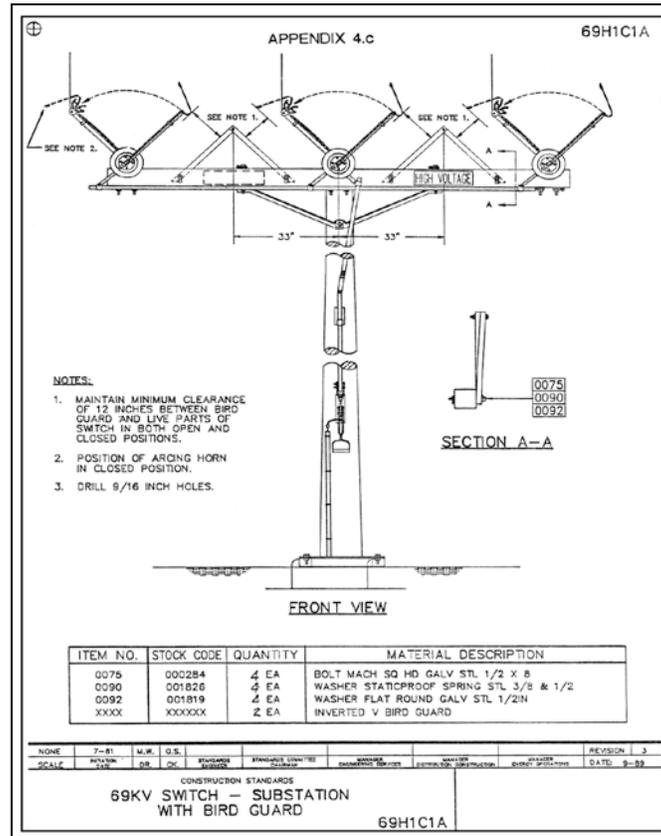


Exhibit 1-2. Bird guard installation and switch design (SMUD 1989)

Power line siting and design characteristics are evaluated with respect to potential avian mortality and other biological resource-related issues during environmental review of all new 69 kV and substation projects pursuant to the California Environmental Quality Act (CEQA).

SMUD's present Outage Management System (OMS) documents and stores information on not only avian, but also other types of outages (e.g., primary failures, wind or lightning caused, animal and automobile-pole accidents). Both the OMS and the previous outage logging system did not capture information regarding bird species, type of contact (e.g., phase-to-phase or phase-to-ground), or other relevant data. Enhancing the OMS, as described in this APP, will provide distribution operators and environmental staff with the ability to collect, store, and monitor specific information about the species

and the mechanisms of electrocution and collision mortality that gives the engineering staff data to determine appropriate mitigation.

1.2 Purpose

This Avian Protection Plan (APP) formalizes and enhances past practices of avian protection and incorporates industry best practices for future installations as necessary. This document is based on and is organized according to the APP Guidelines, a joint guidance document prepared by the Avian Power Line Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service (USFWS) (APLIC and USFWS 2005).

It is not the intent of this Avian Protection Plan to eliminate all potential sources of collision and electrocution within the SMUD service area, nor is there any intent to perform a carte blanche assessment or retrofit of existing SMUD facilities. With over 4,230 miles of overhead power lines in the service area, it is neither economically prudent nor biologically necessary to consider targeting all areas for remedial actions. SMUD will continue to address the issue of avian mortality with an approach that takes into account a number of different factors as described in the following sections. Engineering design, assessments, data keeping, and practical experience will all contribute to having a positive impact on the phenomena of avian mortality. This will entail a multi-year effort spanning decades into the future. This APP is therefore a living document that may be periodically revised based on new information or new developments in avian protection.

The overall purpose and goal of this APP is to reduce the potential for bird mortality associated with SMUD's electrical transmission, sub-transmission and distribution facilities by responding to reported incidents of electrocution and collision mortality, by assessing the potential for electrocution and collision-related mortality, and by implementing specific mortality reduction actions designed to address mortality associated with existing and proposed facilities.

Section 2. Issues

This section discusses the relevant issues related to avian interaction with power lines that establish the need to prepare this APP and implement mortality reduction actions, including the mechanisms of bird mortality, bird nesting on transmission towers and utility poles, power outages and the economic costs of bird interactions, and the regulatory protection provided to most bird species.

2.1 Avian Mortality

The use of power lines by birds is influenced by several ecological factors including 1) the presence and distribution of natural perches (e.g., trees, outcrops); 2) topography; 3) vegetation; and 4) prey abundance and availability. Thus, use of power lines and utility poles by raptors and other large birds is primarily an issue associated with rural areas and open natural or farmland landscapes.

Bird fatalities occur as a result of electrocution through contact with energized phase conductors and associated hardware and collision with wires.

2.1.1 Electrocution

Electrocution is usually associated with distribution poles because they provide perching and sometimes nesting opportunities for birds in close proximity to energized hardware and phase conductors. Certain bird species and species groups are more susceptible to electrocution mortality than others based on their size and behavior that increases their risk of exposure to energized wires and hardware. For example, raptors (e.g., hawks, eagles, falcons, and owls) are more susceptible to electrocution mortality than other bird groups because they will readily perch on utility poles and conductors, exposing them to energized electrical hardware and power lines (see Exhibit 2-1 below).

Electrocution occurs when a bird completes an electric circuit by simultaneously touching two energized conductors or an energized conductor and a grounded part of the electrical equipment. This can occur in several ways, including:

- Phase to phase contact: this can occur when a bird that is perched, landing, or taking off from a utility pole cross-arm comes into contact with two conductors completing an electrical circuit. Where the wrist-to-wrist distance of the bird is greater than or equal to the distance between conductors, phase-to-phase contact is possible and electrocution can occur. Larger birds of prey are at particular risk of this type of electrocution because of their larger wingspan. For example, an adult golden eagle has a wrist-to-wrist distance of approximately 54 inches. If the distance between the conductors is less than 54 inches, upon landing, taking off, or stretching of the wings, the eagle has the opportunity to touch both conductors simultaneously.



Exhibit 2-1. Red-tailed hawk perching on cross arm.

- A complete circuit can also occur through simultaneous contact with energized phase conductors and other equipment. Poles with equipment such as transformers, reclosers, sectionalizers, and capacitor banks are at higher risk for electrocution through contact with jumper wires and equipment bushings, particularly where these energized parts are in close proximity to neutral or ground conductors.
- Phase to ground and phase to neutral contact: simultaneous contact with an energized wire and a grounded wire or other grounded device or neutral wire can result in an avian injury or death.

Exhibits 2-2 and 2-3 illustrate the elements of a power pole that are most commonly associated with bird electrocutions.

While a fatality can potentially occur at any unprotected pole, certain configurations have been shown to be more lethal than others (APLIC 2006). Most electrocutions occur on medium-voltage distribution lines (4 to 34.5 kV) where the spacing between conductors is typically less than on higher voltage lines. As noted above, poles with exposed hardware or equipment such as transformers, capacitor banks, jumper wires, cutouts, or lightning arresters tend to be responsible for a disproportionate amount of mortality (Harness 2000, Liguori 2001, Dwyer 2004). Multiple phase distribution lines with conductor separation less than 60 inches, dead-end structures, and corner pole multi-phase configurations are also responsible for a disproportionate amount of mortality (APLIC 2006).

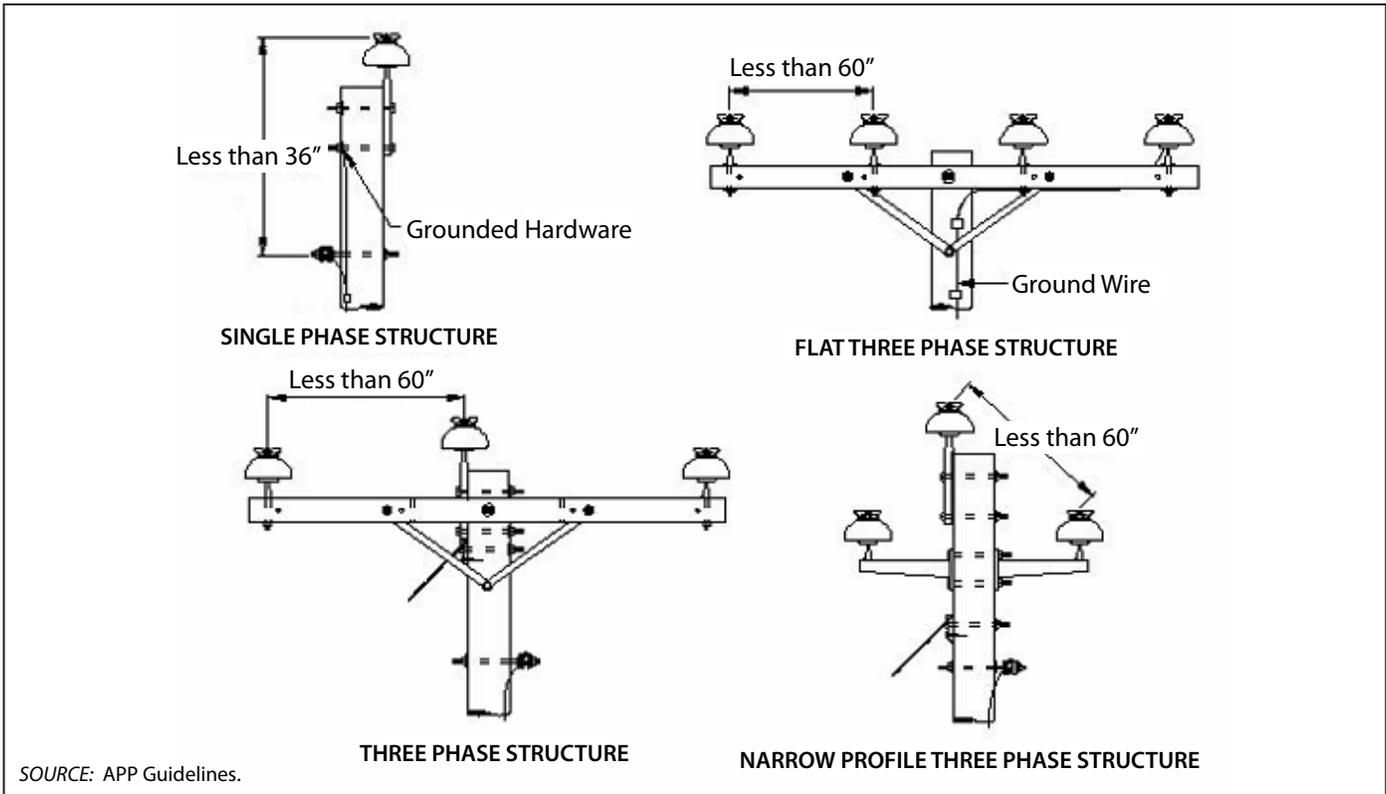


Exhibit 2-2. Examples of avian electrocution risk based on conductor spacing and configuration

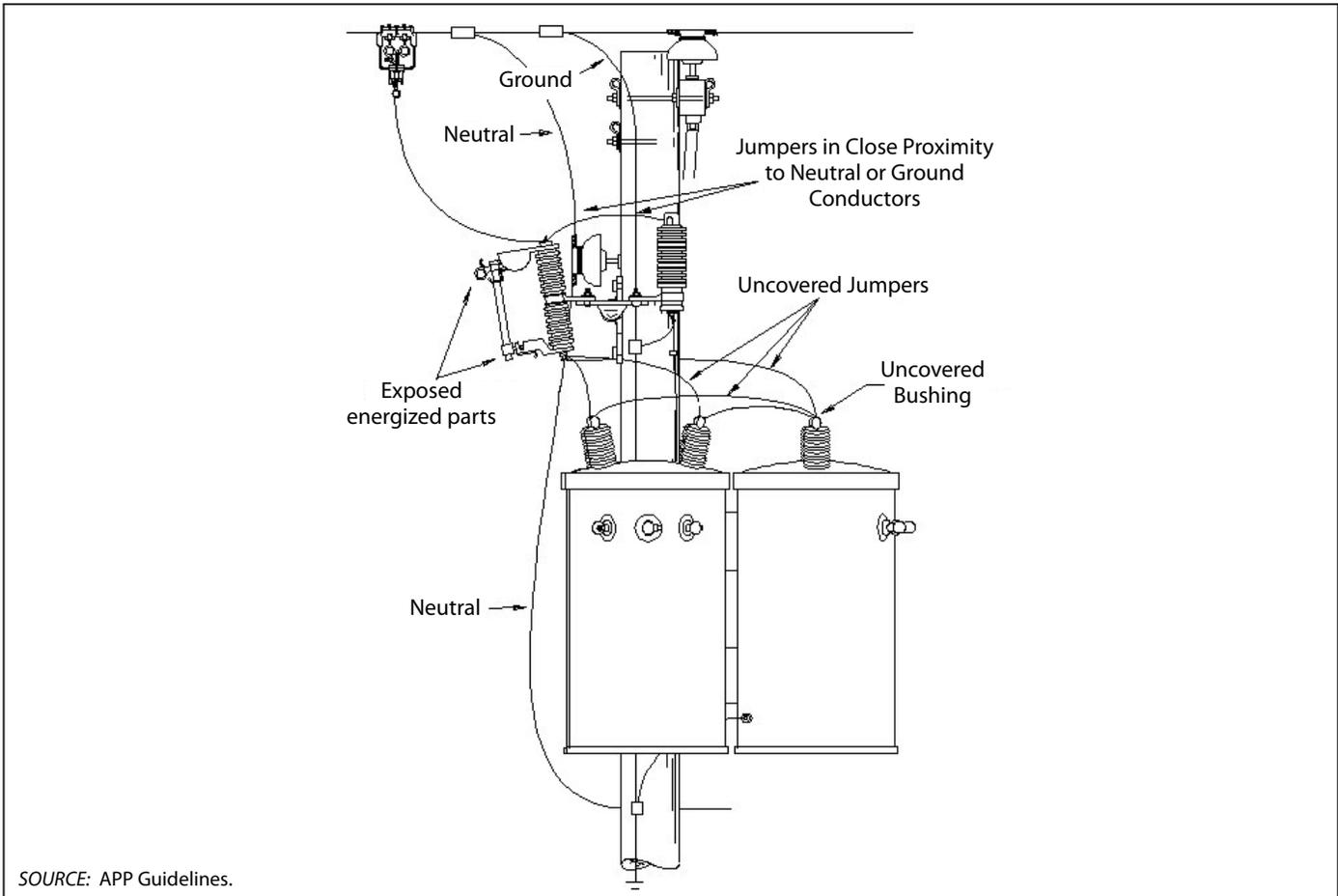


Exhibit 2-3. Examples of avian electrocution risk based on type, configuration, and proximity of transformers and related hardware components

2.1.2 Collision with Power Lines

Collision with power lines occurs during circumstances when the lines are not detectable by flying birds. Collisions are influenced by the conductor size (smaller conductor sizes are more difficult to see); the type and behavior of the bird species (large, slower moving birds, species that are active at night, flocking birds, less experienced juvenile birds, and raptors distracted during hunting or defensive maneuvers tend to be more susceptible); and inclement weather (which reduces visibility).

Raptors are more susceptible to collision with power lines when the visibility of the line is partially obscured by vegetation, particularly in areas where small diameter lines cross trees and other tall vegetation and where multiple lines intersect near poles or other raptor perches (Exhibit 2-4). Waterfowl, cranes, egrets and herons, and other water birds are susceptible to collision when lines are placed in the vicinity of traditional use areas such as wetlands and certain types of agricultural habitats – and particularly during inclement weather when visibility is reduced (Exhibit 2-5).



Exhibit 2-4. Conductors in vegetation reduce visibility.



Exhibit 2-5. Small diameter conductors reduce visibility particularly during inclement weather.

2.2 Bird Nesting

Utility poles and transmission towers also provide nesting opportunities for many bird species. Raptors, particularly golden eagle, osprey, and red-tailed hawk often construct nest sites on transmission towers, especially in areas where other nesting habitat is limited. Nests are constructed on a variety of flat surfaces depending on the configuration of the transmission tower (Exhibit 2-6). Many nests in transmission towers pose little risk to the nesting birds or to the functionality of the line. Nests are occasionally constructed in areas that may pose risk to the birds or interfere with access or maintenance of the tower. In these cases, further action such as relocation of the nest is often considered.

Nests constructed on distribution poles generally pose a greater risk to birds and greater likelihood of power outages. Nests are often constructed on tops of transformers or other flat locations in close proximity to energized conductors and hardware (Exhibit 2-7).



Exhibit 2-6. Red-tailed hawk nest on transmission tower.



Exhibit 2-7. Red-tailed hawk nest on transformer.

2.3 Power Outages

Depending on electrical facility configuration, electrocution events may result in power outages. Within the SMUD service area, a total of 63 bird-caused outages between January 1, 2007 and September 19, 2007 were reported. These outages resulted in temporary loss of service to SMUD customers that can range from a few minutes to a few hours as well as staff time to investigate the cause of the outage. Since the present outage information does not include species type, the number of raptor deaths associated with electrical lines is not known.

2.4 Protected Species

Most native migratory birds are protected under the federal Migratory Bird Treaty Act (MBTA). Bird electrocution and collision mortality associated with aboveground electrical lines have been interpreted by the U.S. Fish and Wildlife Service, the Department of Justice and the United States Courts (U.S. v Moon Lake) as a violation of the MBTA. In addition, several special-status species that are afforded additional protection under state or federal regulation occur within the SMUD service area that may be susceptible to electrocution or collision mortality (Table 2-1). Electrocution or collision mortality of state or federally listed species may be considered take pursuant to the state or federal endangered species acts and in the absence of required permits may constitute violations of one or both acts.

Table 2-1. Special-status birds known to occupy the SMUD service area.

Species	Status (State/Federal)	Habitat Associations
Least bittern <i>Ixobrychus exilis</i>	SSC/-	Fresh/brackish water emergent wetlands
Redhead <i>Aythya americana</i>	SSC/-	Freshwater emergent wetlands/open water
Northern harrier <i>Circus cyaneus</i>	SSC/-	Grasslands, seasonal wetlands, irrigated pastures/croplands
White-tailed kite <i>Elanus leucurus</i>	FP/-	Grasslands, seasonal wetlands, irrigated pastures/croplands
Swainson's hawk <i>Buteo swainsoni</i>	T/-	Grasslands, irrigated pastures and croplands
Ferruginous hawk <i>Buteo regalis</i>	SSC/FSC	Grasslands, irrigated pastures and croplands
Osprey <i>Pandion Haliaetus</i>	SSC/-	Rivers, lakes, reservoirs and associated woodlands/forests
Bald eagle <i>Haliaeetus leucocephalus</i>	E,FP/BGEPA	Rivers, lakes, wetlands and associated woodlands/forests
Golden eagle <i>Aquila chrysaetos</i>	SSC,FP/FSC,BGEPA	Grasslands, irrigated pastures and croplands
Peregrine falcon <i>Falco peregrinus</i>	E,FP/-	Wetlands, open water, grasslands, cliffs and outcrops
Greater sandhill crane <i>Grus canadensis tabida</i>	T,FP/-	Seasonal wetlands, irrigated pastures and croplands
Lesser sandhill crane <i>Grus canadensis canadensis</i>	SSC/-	Seasonal wetlands, irrigated pastures and croplands

Table 2-1. Continued.

Species	Status (State/Federal)	Habitat Associations
Burrowing owl <i>Athene cunicularia</i>	SSC/FSC	Grasslands, irrigated pastures and croplands
Short-eared owl <i>Asio flammeus</i>	SSC/-	Grasslands, pasturelands, wetlands, croplands
Loggerhead shrike <i>Lanius ludovicianus</i>	SSC/FSC	Grasslands, irrigated pastures and croplands
Purple martin <i>Progne subis</i>	SSC/-	Urban areas, woodlands
Tricolored blackbird <i>Agelaius tricolor</i>	SSC/FSC	Wetlands, grasslands, irrigated pastures, croplands
Yellow-headed blackbird <i>Xanthocephalus xanthocephalus</i>	SSC/-	Freshwater emergent wetlands

T – threatened, E – endangered, FSC – federal species of concern, SSC – state species of special concern, FP – state fully protected, BGEPA – Bald and Golden Eagle Protection Act.

Section 3. Regulatory Framework

3.1 Applicable State and Federal Regulations

Most birds are protected under one or more state or federal regulations. The following state and federal laws and regulations are directly applicable to the issues of avian mortality from electrocution or collision and nest management on utility poles and towers.

3.1.1 Migratory Bird Treaty Act (MBTA)

The MBTA (Title 16, United States Code [USC], Part 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the (former) Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of MBTA.

The MBTA is the overriding federal regulation that has guided the development of bird protection guidelines, including the APP Guidelines. Most birds receive protection under the MBTA; however, the Act is not regularly enforced with respect to power line-associated bird mortality due to ongoing efforts on the part of utilities to take corrective actions to minimize the potential for mortality. The U.S. Fish and Wildlife Service actively engages the electric utility industry to reduce the incidental take of protected birds, and reserves the option of seeking prosecution when deemed necessary.

The human-built environment is an inescapable reality for most birds and a circumstance that poses a variety of risks as well as some benefits to some species. The MBTA has been interpreted to cover bird mortality that could occur as a result of construction or operation of virtually any man-made structure. However, while most bird mortality goes undetected and undocumented, mortality associated with certain industries is more visible and in some cases has been documented for many years. Bird electrocution on power poles has been documented and studied for over 100 years (California Energy Commission 1995). It is considered a particularly important problem because it affects mainly birds of prey, species that breed at relatively low densities and that could suffer significant regional population declines as a result of electrocution events. As a result of this more visible and potentially more biologically significant issue, the USFWS has and likely will continue enforcement of the MBTA where raptor mortality has been reported and where the utility is not in compliance with standard practices to reduce electrocution and collision mortality.

3.1.2 Federal Endangered Species Act

The USFWS administers the federal Endangered Species Act (ESA) as it relates to terrestrial wildlife. The ESA requires USFWS to maintain lists of threatened and endangered species and affords substantial protection to listed species. The USFWS can list species as either endangered or threatened. An endangered species is at risk of extinction throughout all or a significant portion of its range (ESA Section 3[6]). A threatened species is likely to become endangered within the foreseeable future (ESA Section 3[19]). Section 9 of the ESA prohibits the take of any fish or wildlife species listed under the ESA as endangered and most species listed as threatened. Take, as defined by the ESA, means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Harm is defined as “any act that kills or injures the species, including significant habitat modification.”

The ESA includes mechanisms that provide exceptions to the Section 9 take prohibitions. For non-federalized projects, Section 10 allows for the issuance of a 10(a)(1)(b) permit to take covered species during otherwise lawful activities with approval of a habitat conservation plan. In the absence of permits or authorization by the USFWS, fatality of federally listed species from electrocution or collision could potentially result in an enforcement action under the federal ESA.

3.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act¹ prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. Under this act, it is a violation to “...take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof...” Take is defined to include pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, and disturbing.

3.1.4 State Endangered Species Act

The California Endangered Species Act (CESA) prohibits take of wildlife listed as threatened or endangered by the California Fish and Game Commission. *Take* is defined under the California Fish and Game Code as any action or attempt to “hunt, pursue, catch, capture, or kill.” Like the ESA, CESA allows exceptions to the take prohibition for take that occurs during otherwise lawful activities. The requirements of an application for incidental take under CESA are described in Section 2081 of the California Fish and Game Code. Incidental take of state-listed species may be authorized if an applicant submits an approved plan that minimizes and “fully mitigates” the impacts of the take.

¹ 16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978.

3.1.5 California Fish and Game Code

California Fully Protected Species

In the 1960s, before CESA was enacted, the California Legislature identified species for specific protection under the California Fish and Game Code. These “fully protected” species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Fully protected bird species are described in Section 3511 of the California Fish and Game Code. These protections state that “...no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird], [mammal], [reptile or amphibian], [fish].”

California Fish and Game Code 3503 (Bird Nests)

Section 3503 of the Fish and Game Code makes it unlawful to take, possess or needlessly destroy the nests or eggs of any bird. California Department of Fish and Game (DFG) may issue permits authorizing take.

California Fish and Game Code 3503.5 (Birds of Prey)

Section 3503.5 of the Fish and Game Code prohibits the take, possession or destruction of any birds of prey or their nests or eggs. DFG may issue permits authorizing take.

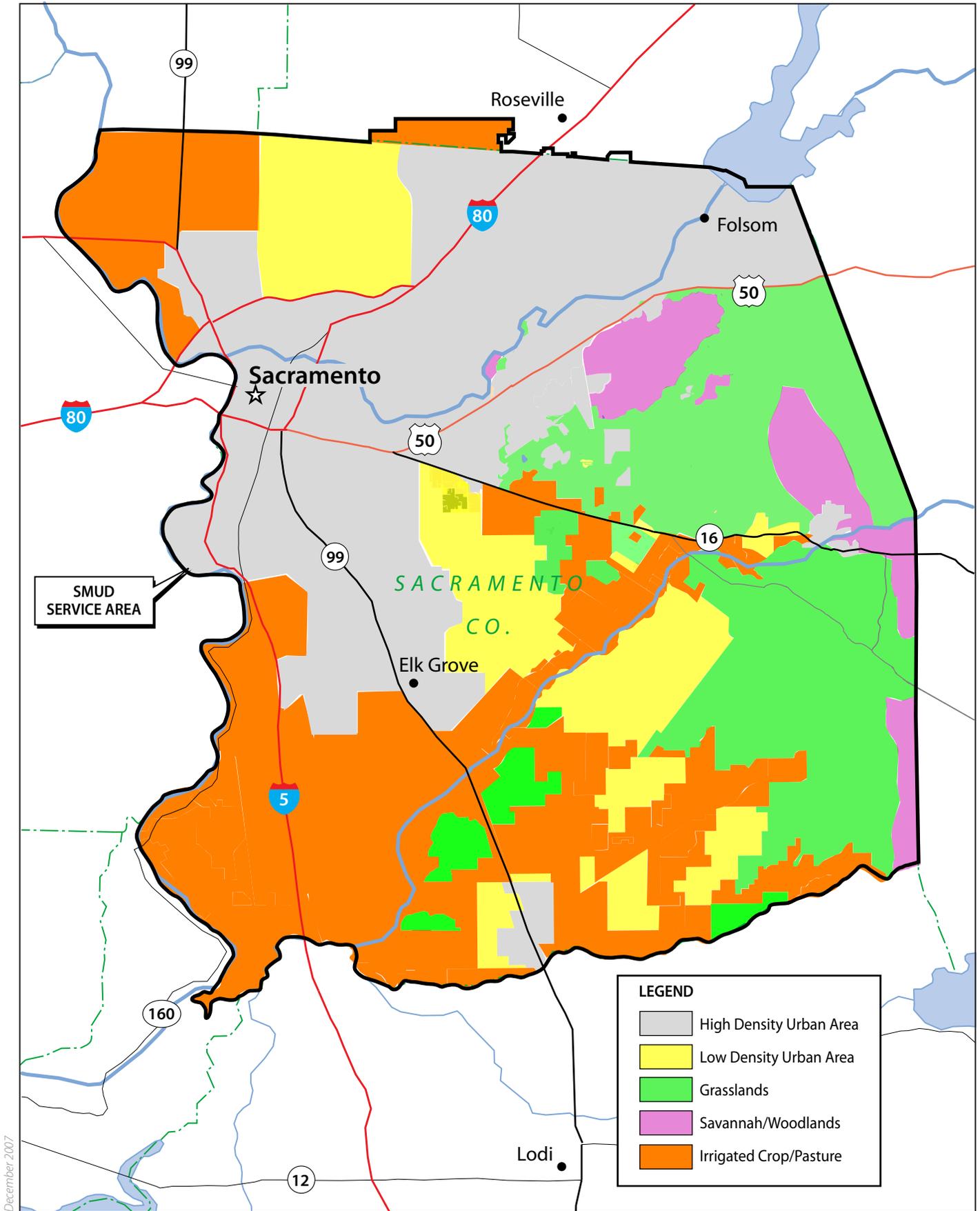
Section 4. Description of the SMUD Service Area

This section describes the SMUD service area in terms of the landscape and land uses, bird populations and distribution, and the SMUD electrical transmission and distribution system network.

4.1 Landscape Characteristics

The SMUD service area extends from the Sacramento-San Joaquin Delta east to the foothills of the Sierra Nevada, transitioning from low elevation croplands to higher elevation western slope grasslands and woodlands (Exhibit 4-1). In general, the service area can be characterized by the following land use types:

- Irrigated cropland. This type is defined as areas that are dominated by crop patterns that involve annual cultivation (Exhibit 4-2). This type is found primarily in the Delta and Natomas Basin portions of the service area.
- Irrigated cropland/irrigated pastureland. This type is defined as areas that are dominated by a mixture of irrigated croplands and a large percentage of irrigated pasture (Exhibit 4-3). This type is found primarily in the interior of the service area south of the City's of Sacramento and Elk Grove.
- Uncultivated grasslands. This type is defined as uncultivated annual grassland habitat and vernal pool grasslands that are regularly or irregularly grazed by livestock and that have retained most topographical and other natural features (Exhibit 4-4). This type is found primarily in the eastern portion of the service area.
- Woodlands and Savannas. Other than several relatively small remnant oak groves south of Sacramento, oak and cottonwood woodlands occur primarily along the eastern edge of the service area (Exhibit 4-5).
- Watercourses and Riparian Systems. Several major river systems occur in the service area, including the Sacramento, American, and Cosumnes Rivers (Exhibit 4-6), along with numerous other smaller creeks and sloughs.
- Low Density Urban. Low density urban development occurs primarily on the northern edge of Sacramento and south of Sacramento in the vicinity of Wilton and Galt (Exhibit 4-7).
- High Density Urban. Densely populated urban areas occur primarily within the Sacramento Metropolitan area and in the City of Galt.



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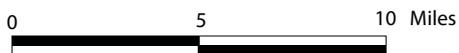


Exhibit 4-1
Generalized Representation of Major
Land Use Types in the SMUD Service Area



Exhibit 4-2. Irrigated cropland west of I-5



Exhibit 4-3. Irrigated cropland/pastureland south of Elk Grove



Exhibit 4-4. Uncultivated grasslands - eastern Sacramento County



Exhibit 4-5. Oak woodlands and savannah - eastern Sacramento County



Exhibit 4-6. Watercourses and riparian vegetation - Cosumnes River



Exhibit 4-7. Low density rural residential - north Sacramento County

4.2 Bird Populations and Use within the SMUD Service Area

The Sacramento Valley supports abundant bird populations year round. The combination of open rangeland, agricultural lands, riparian corridors, oak woodlands, and wetlands creates high value bird habitat that supports large and diverse bird populations. Several bird groups that are most susceptible to electrocution and collision mortality are discussed below.

4.2.1 Raptors

The Sacramento Valley is home to abundant raptor populations year round. Several medium-sized raptor species are common breeders in the service area, including red-tailed hawk (Exhibit 4-8), Swainson's hawk (Exhibit 4-9), red-shouldered hawk, white-tailed kite, and great-horned owl. As an example of raptor nesting distribution in the service area, Exhibit 4-10 illustrates the 2006/2007 breeding distribution of the red-tailed hawk and Swainson's hawk (Estep Environmental Consulting 2007a,b; Jones & Stokes 2007). Swainson's hawk breeding density in this area is among the highest reported within the species' range.



Exhibit 4-8. Adult red-tailed hawk



Exhibit 4-9. Adult Swainson's hawk

During the non-breeding season, many more raptors move into the Sacramento Valley where they remain from approximately October through February. A large number of red-tailed hawks are present during this period along with wintering ferruginous hawks and rough-legged hawks. Golden eagle is less common within the service area, but is occasionally observed during the breeding and wintering seasons, particularly in the eastern portion of the service area.

Bald eagle also occurs occasionally in the service area, particularly during winter in the Folsom Lake area and less frequently in waterfowl concentration areas near Stone Lakes National Wildlife Refuge and the Cosumnes River Preserve.

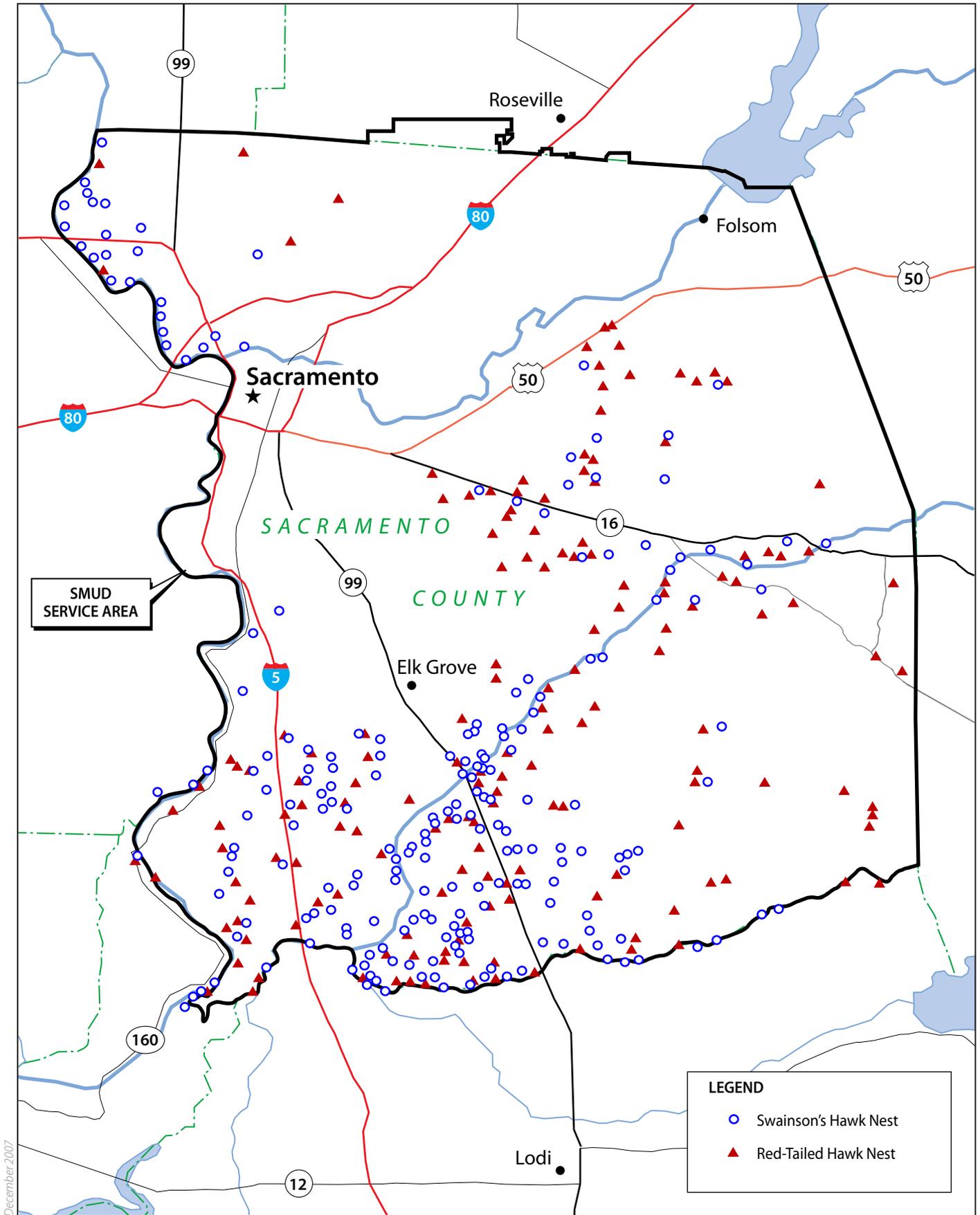


Exhibit 4-10
2006 Distribution of Swainson's Hawk
and Red-Tailed Hawk Nesting Territories

Table 4-1 lists the raptor species that occur in the SMUD service area that are susceptible to electrocution mortality.

Table 4-1. Raptors in the SMUD service area that are susceptible to electrocution mortality.

Species	Description	Behavior	Season	Relative Susceptibility
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Largest of our local raptors. Adults with white head and tail. Length (L) = 31 inches Wingspan (WS) = 80 inches	Occasionally perches on utility poles	Year-round – but uncommon – primarily in the vicinity of Folsom Lake.	High – due to size and potential for phase to phase contact.
Golden eagle (<i>Aquila chrysaetos</i>)	Large local raptor; dark body with golden mantle. L = 30 inches WS = 79 inches	Occasionally perches on utility poles.	Year-round – but relatively uncommon – primarily in eastern Sacramento County	High – due to size and potential for phase to phase contact.
Osprey (<i>Pandion haliaetus</i>)	Large, long-winged raptor with white underside, dark upperside, and dark eyestripe. L = 23 inches WS = 63 inches	Occasionally constructs nests on utility poles and transmission towers.	Spring/summer breeding season and during migration primarily in eastern Sacramento County.	High – due to size and behavior. Constructs large stick nests on utility poles that can potentially ignite ground fires.
Red-tailed hawk (<i>Buteo jamaicensis</i>)	Common medium-sized raptor. Variable plumage, dark belly band, red tail. L = 19 inches WS = 49 inches	Regularly hunts from and perches on utility poles. Will also construct nests on transformers and towers.	Year-round; but winter populations are highest and include greater numbers of juvenile birds that are particularly susceptible to electrocution.	High – due to size and behavior. Uses utility poles as perches more frequently than other medium and large raptors.
Swainson’s hawk (<i>Buteo swainsoni</i>)	Relatively common (in Sacramento County) medium-sized raptor. Variable plumage, dark breast band. L = 19 inches WS = 51 inches	Occasionally perches on utility poles.	Present only during the breeding season (March through September)	Moderate – perches less frequently on utility poles than red-tailed hawk and other buteos.
Ferruginous hawk (<i>Buteo regalis</i>)	Uncommon winter visitor. Largest buteo with variable plumage, reddish shoulders. L = 23 inches WS = 56 inches	Frequently perches and hunts from utility poles.	Present only during the non-breeding season (October through February)	High – due to size and behavior

Table 4-1. Continued

Species	Description	Behavior	Season	Relative Susceptibility
Rough-legged hawk (<i>Buteo lagopus</i>)	Uncommon winter visitor; medium-sized with dark underwing patches and white tail band. L = 21 inches WS = 53 inches	Frequently perches and hunts from utility poles.	Present only during the non-breeding season (October through February)	High – due to size and behavior
Red-shouldered hawk (<i>Buteo lineatus</i>)	Relatively common medium-sized breeding raptor. A shorter-winged buteo with reddish breast and shoulders. L = 17 inches WS = 40 inches	Occasionally hunts from wires and perches on utility poles.	Year-round	Moderate – due to smaller wing-span (wrist-to-wrist distance) and less frequent use of poles compared with other buteos.
White-tailed kite (<i>Elanus leucurus</i>)	Relatively common breeder – smaller in size than buteos. White with black shoulder patches and white tail. L = 15 inches WS = 39 inches	Occasionally hunts from wires and occasionally perches on utility poles	Year-round	Moderate – due to smaller size and less frequent perching on poles compared with other hawk species.
Cooper's hawk (<i>Accipiter cooperii</i>)	Uncommon breeder in the service area. Smaller than buteos with long tail, dark cap and back, and reddish front. L = 16.5 inches WS = 31 inches	Occasionally perches and hunts from poles and power lines.	Year-round	Low – due to smaller size and less frequent use of poles compared with buteos.
Peregrine falcon (<i>Falco peregrinus</i>)	Uncommon falcon, large with relatively long wings, dark back, head, and face, white breast/throat. L = 16 inches WS = 41 inches	Occasionally observed perching on utility poles.	Year-round.	Low due to less frequent use of utility poles compared with eagles and hawks.
American kestrel (<i>Falco sparverious</i>)	Small falcon with reddish back and distinct facial stripes. L = 9 inches WS = 22 inches	Regularly perches and hunts from power lines and utility poles	Year-round	Low. Small size helps avoid phase-to-phase contact.

Table 4-1. Continued

Species	Description	Behavior	Season	Relative Susceptibility
Great-horned owl (<i>Bubo virginianus</i>)	Largest local owl species with large heavy body and distinct ear tufts. L = 22 inches WS = 44 inches	Regularly perches on and hunts from poles.	Year-round	Moderate due to size and behavior.
Barn owl (<i>Tyto alba</i>)	Large owl with light plumage and distinct heart-shaped facial disc. L = 16 inches WS = 42 inches	Occasionally perches on poles and power lines.	Year-round	Moderate.

4.2.2 Sandhill Crane

Three subspecies of sandhill crane occur in the study area during the winter, including the greater sandhill crane, a state threatened species (Exhibit 4-11). Cranes are highly traditional to their wintering grounds and occur regularly on Delta Islands and in and around the Cosumnes River Preserve during winter. Several thousand cranes migrate to this area each winter, occupying wetlands and agricultural lands for feeding and roosting. Cranes are highly mobile during this period, regularly moving between feeding areas and between feeding and roosting areas each day – and creating opportunities for collision with overhead power lines, particularly during inclement weather and other periods of low visibility.



Exhibit 4-11. Greater sandhill cranes flying in low visibility conditions

4.2.3 Waterfowl

The service area is within the Pacific Flyway, a waterfowl migration corridor that extends the length of the Central Valley. Large groups of wintering waterfowl (ducks, geese, and swans) overwinter in wetland and agricultural lands throughout the region, particularly in portions of the northern Sacramento County in and around the Natomas Basin, in and around the Stone Lakes National Wildlife Refuge, Delta Islands, and in and around the Cosumnes River Preserve. Much of this area is managed to attract and provide wintering habitat for waterfowl (Exhibit 4-12). Like cranes, waterfowl frequently move between feeding and roosting habitats and can be susceptible to collision mortality, particularly during periods of low visibility.



Exhibit 4-12. Seasonal wetland near Cosumnes River Preserve.

4.2.4 Other Water Birds

The service area is also home to a variety of other large water-associated birds, such as herons, egrets, ibis, cormorants, and white pelicans. These birds can be found throughout Sacramento County in wetlands, open water, and agricultural habitats. They are highly active species that regularly move between feeding and roosting habitats and are susceptible to collision mortality. Several large traditional rookeries (breeding colonies) occur within the service area occupied by great-blue herons, great egrets, black-crowned night herons, and snowy egrets. During the breeding season, these birds travel relatively large distances to feeding areas, regularly traveling back and forth between nesting and feeding sites.

4.3 SMUD Electrical Transmission and Distribution System Network

The SMUD electrical transmission, subtransmission, and distribution system includes the following components:

- _ 447 circuit miles of overhead transmission (230 and 115 kV)
- _ 586 circuit miles of overhead 69 kV sub-transmission
- _ 3,320 circuit miles of overhead distribution (21 kV, 12 kV, and 4 kV)
- _ 235 electrical substations
- _ 145,000 sub-transmission and distribution poles
- _ 35,426 pole-bolted transformers

The majority of SMUD's aboveground distribution lines are associated with older urban areas and rural areas. New developments are all underground 12 kV distribution lines with overhead 69 kV lines (Exhibit 4-13).



Exhibit 4-13. 69 kV (double circuit) power line.

SMUD typically uses cross-arm, standoff brackets, and line post insulators for its overhead sub-transmission and distribution lines. An 8-foot-long crossarm is typically used for poles with and without equipment. A 5-foot-long wooden crossarm can also be installed with the center phase on a kingpin.

Exhibits 4-14 through 4-21 illustrate some of the more typical distribution pole and hardware configurations within the SMUD service area.



Exhibit 4-14. Three phase, two on one side.



Exhibit 4-15. Three phase, center kingpin.



Exhibit 4-16. Three phase, one center, fiberglass crossarms.



Exhibit 4-17. Double crossarm, three phase each; upper with center, lower with two on one.



Exhibit 4-18. Double crossarm, three phase corner pole.



Exhibit 4-19. Single transformer bank.



Exhibit 4-20. Double transformer bank.



Exhibit 4-21. Triple transformer bank.

Section 5. Avian Protection Plan

5.1 District Policy

The SMUD Board of Directors recently adopted a number of Strategic Directives (SDs) that embody the core values of SMUD. SD-7 is related to environmental protection, and in part states

“The District will conduct its business affairs and operations in a manner that reduces adverse environmental impacts, reduces pollution, and enhances resource conservation and stewardship.”

As part of its ongoing commitment to the protection of natural resources and observance of SD-7, SMUD is committed to managing its existing facilities, developing new energy resources, and expanding electrical energy services in a manner that minimizes the potential for avian mortality as a result of electrocution and collision incidents.

Thus, it is the intent of the District to adopt and implement the avian protection measures as described herein to minimize potential avian mortality and injury as a result of operation of the District’s facilities, to continue to comply with state and federal regulations that protect avian resources, and for the benefit of its costumers and natural resources within its service area.

5.2 APP Development

This APP was developed based on recommendations from the APP Guidelines (APLIC and USFWS 2005) and includes sections from the 12 elements addressed in the APP Guidelines below:

- _ Corporate Policy (see 5.1 above)
- _ Risk Assessment (5.5)
- _ Mortality Reduction Actions (5.6)
- _ Construction Design and Siting Standards (5.7)
- _ Nest Management (5.8)
- _ Avian Reporting System (5.9)
- _ Permit Compliance (5.10)
- _ Training (5.11)
- _ Avian Enhancement Options (5.12)
- _ Program Review and Quality Control (5.13)
- _ Public Awareness (5.14)
- _ Key Resources (5.15)

5.3 Approach and Organization

5.3.1 Approach

The approach used in the formulation of this APP is a process of assessment and implementation of mortality reduction actions. Assessment is accomplished through standard observation and/or investigation, monitoring, and data collection procedures. Based on assessment results, mortality reduction actions are implemented according to the following two response mechanisms and as illustrated in Exhibit 5-1.

- **Reactive** – responds to reported incidents and problem nests. SMUD’s current program consists of responding to power outages, investigating the cause of the power outage, and if the result of a bird electrocution, implementing retrofitting measures to reduce the potential for future incidents at that specific location. This program will be expanded to include assessment of surrounding power poles from where the avian-caused power outage occurred. It will also include examination of additional mortality observations reported by field staff and the public.
- **Proactive** – responds to new projects and new structures with avian-safe standards. Based on known avian use and habitat data, the appropriate construction standards will be implemented for all projects (includes new projects and reconstruction) to minimize the potential for avian mortality. Alternate routes for new lines will be considered when available to avoid specific habitats.

5.3.2 Organization

The APP is organized into the following sections:

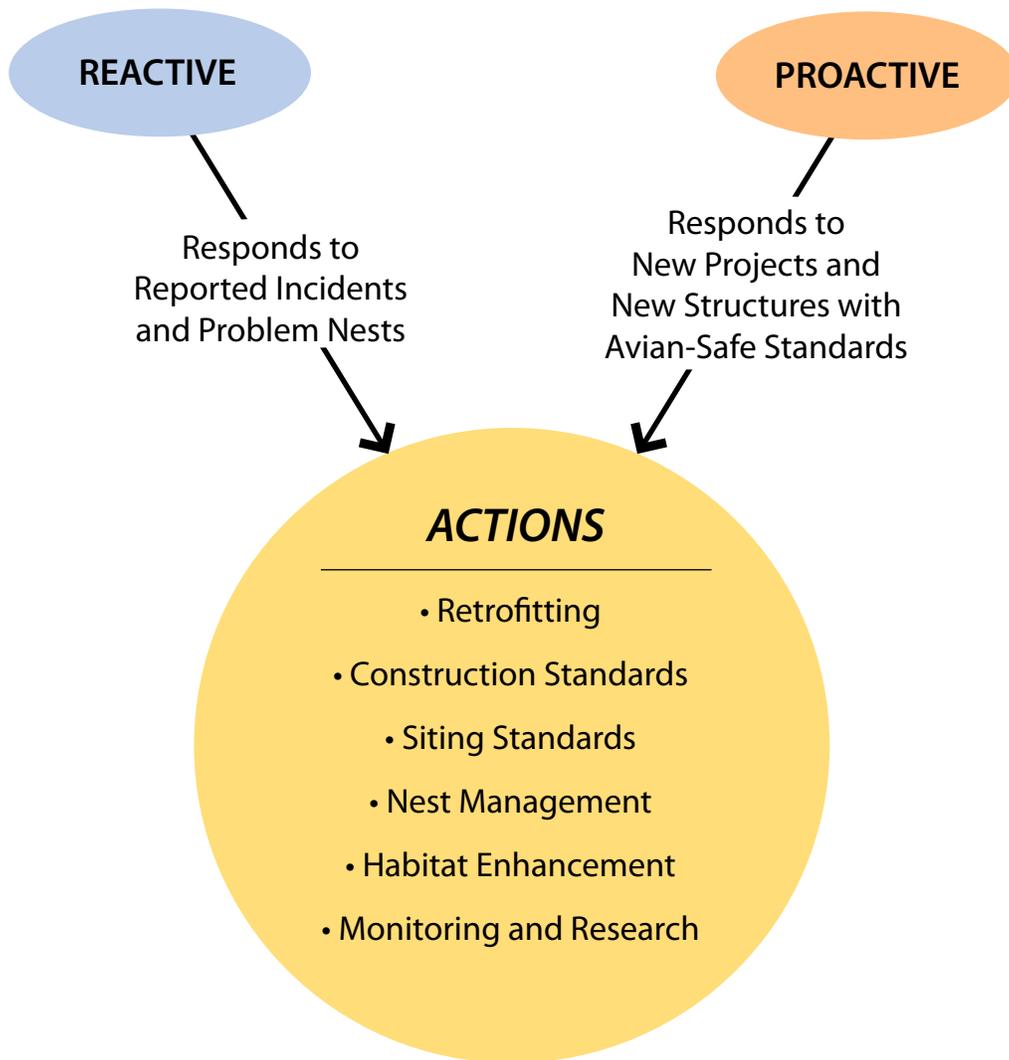
Response procedures for power outages and incidental observations.

Describes the procedures for responding to and investigating the cause of avian-related power outages and incidental observations of bird injury or mortality.

Risk assessment. Describes the procedures used to evaluate the risk of future avian contacts when planning for new facilities or reconstruction of existing facilities.

Mortality reduction measures. Describes the mortality reduction actions that may be implemented based on an assessment of reported incidents and the results of the risk assessment procedures.

Construction design and siting standards. Describes the construction design and siting standards that may be used to reduce the potential for electrocution and collision mortality through siting of new power line corridors, design standards for new construction, and design standards for retrofitting existing power poles.



Nest management. Describes assessment procedures and additional mortality reduction actions that will be implemented to address bird nests on pole or tower structures.

Avian reporting system. Describes the process of reporting, processing, and managing data collected through implementation of the APP.

Permit compliance. Describes the state and federal permits required to implement some elements of the APP, including handling raptors and sensitive species and nest removal or relocation.

Training. Describes the framework for a staff training program.

Avian enhancement options. Describes additional involvement and possible mitigation options associated with habitat enhancement programs.

Program review and quality control. Outlines program review and quality control procedures.

Public awareness. Describes the potential for public awareness of avian mortality reduction actions implemented by SMUD.

Key contacts. Lists a variety of local regulatory and support contacts.

5.4 Response Procedures for Avian-caused Power Outages and Incidental Observations

Response procedures address *actual* reported bird-caused outages or incidental observations. Incidental observations refer to observations made by SMUD staff or reported to SMUD of a dead or injured bird – or bird remains that suggest a possible electrocution or collision fatality. The process includes the following steps as outlined in Exhibit 5-2:

- Respond to power outage and determine if it is bird-related, and respond to reports of incidental mortality observations.
- Determine the species or bird group. Use the accompanying bird guide as needed.
- If state or federally listed species or banded bird, contact environmental manager for direction regarding documentation, agency contact, and disposition of bird and bands.
- Investigate the possible cause of the injury or fatality.
 - Document location of the bird contact (pole UD#)
 - Document visible injuries

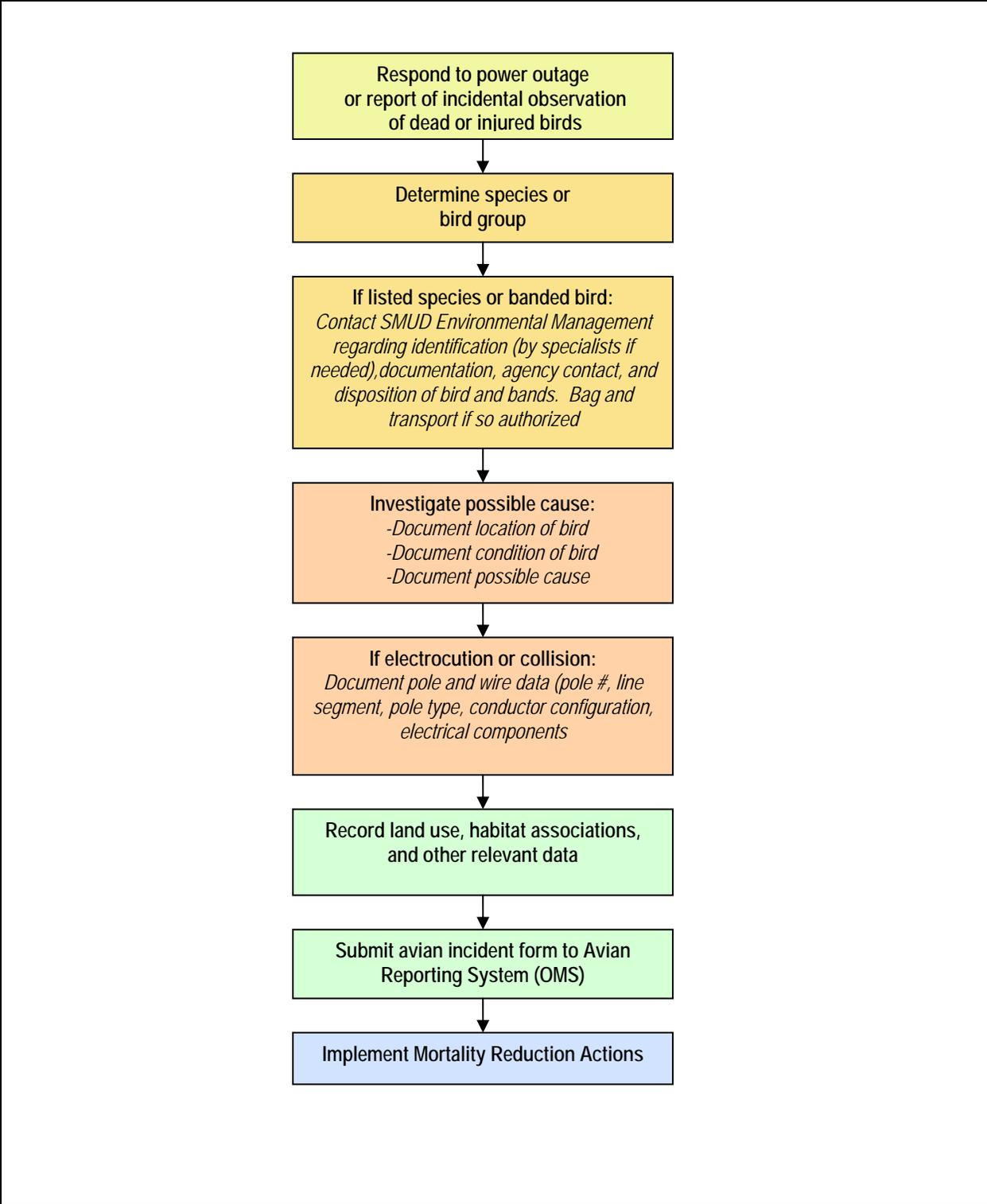


Exhibit 5-2
Response Procedures for Power Outages
and Incidental Observations

- Based on location (i.e., beneath pole, mid-span) and type of injuries, record the possible cause (e.g., electrocution, wire collision, vehicle collision, predation, shot, etc.)
- Document pole type, phase conductor configuration, and associated electrical components.
- Record land use and habitat associations.
- Submit completed Avian Incident Form to the Distribution System Operator (DSO), who logs data into the OMS.
- Area Engineer evaluates information and determines appropriate mortality reduction actions.

5.5 Risk Assessment

With over 3,900 miles of overhead distribution and subtransmission lines in the service area, it is neither economically prudent nor biologically necessary to consider targeting all areas for remedial actions. Thus, the risk assessment process under this APP is currently limited to new project routes and reconstruction efforts along existing routes. Establishing risk assessment procedures is a proactive approach to guiding management efforts and focusing remedial actions into areas with the highest potential for avian incidents.

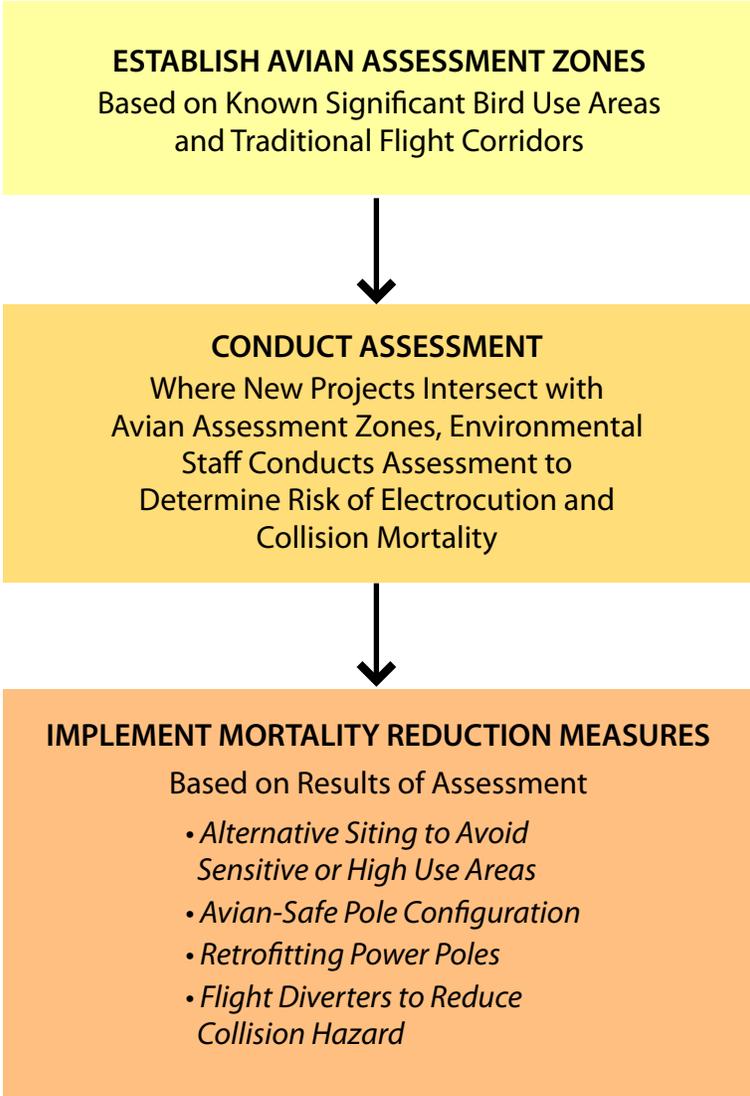
5.5.1 Risk Assessment Process

The risk assessment process utilizes available information on important avian use areas, habitats, and avian movement corridors to establish avian assessment zones. The creation of these zones will provide guidance to designers and field personnel on the possible implementation of mortality reduction measures in these sensitive areas. The boundaries of the avian assessment zones will be established using available information from local, state, and federal resource agencies, local expertise on bird use and movements, and SMUD environmental staff. These zones will be used for new construction and reconstruction (i.e. pole replacement, insulator replacement, etc.) and can be used to address site-specific mortality issues associated with existing facilities.

The process involves three steps: 1) establishing avian assessment zones within the SMUD service area where significant avian use is known; 2) assessing the potential for mortality based on proximity to key habitats or bird use areas with the zone; and 3) applying appropriate mortality reduction measures to new project segments or reconstructed segments within these zones (Exhibit 5-3).

Avian zones will initially be created in the vicinity of known significant bird use areas, including:

- Stone Lakes National Wildlife Refuge
- Cosumnes River Preserve
- Folsom South Canal



- Sacramento Regional County Sanitation District Bufferlands
- Rancho Seco
- American River Parkway
- Natomas Basin
- Other state, federal, local, or private conservation lands
- Duck clubs and other traditionally flooded agricultural lands
- Important raptor nesting and wintering areas
- Important sandhill crane use areas

The SMUD service area includes a spectrum of landscapes with some that are completely urbanized and others that consist of rural farmlands and native habitats. This highly diverse landscape results in a distribution of bird populations and use that follows land uses. Most densely urbanized areas pose less risk to birds because they lack open landscapes and habitats that support large and diverse bird populations, particularly those bird groups such as raptors and large water birds that are most susceptible to electrocution and collision mortality. However, important wildlife habitat may intersect some densely urbanized areas (e.g., the American River Parkway).

Rural areas pose a greater risk to avian mortality due to open landscapes, presence of wetlands, woodlands, riparian vegetation, open water habitats, farmlands, and other habitats that attract large and diverse bird populations. Thus, bird use and potential risk is variable within the service area depending on these and other factors. The avian assessment zones will initially be selected based on known significant avian use areas, such as those listed above. Additional avian zones may be established in the future on the basis of these factors.

Mortality reduction actions will be implemented based on the results of individual risk assessments conducted when projects intersect with an avian assessment zone. For example, power lines that cross through the Cosumnes River Preserve will be assessed to determine the potential for greater sandhill crane collisions with above-ground wires. Where this potential exists, applicable mortality reduction actions may include alternative siting or installation of flight diverters to reduce collision hazard as described below.

5.6 Mortality Reduction Actions

This section describes the mortality reduction actions that will be implemented based on an assessment of reported incidents and the results of the Predictive Analysis and Risk Assessment procedures.

Mortality incidents reported as a result of power outages or through incidental observations are immediately reviewed. If the review indicates the cause is related to an unprotected power pole or conductor visibility issues, mortality reduction actions (i.e., retrofitting poles or installation of flight diverters) will be implemented accordingly. Adjacent pole retrofits will be considered on a case-by-case basis.

As noted above, once completed the Risk Assessment can be used to inform, strategize, and direct mortality reduction actions. This is a proactive strategy designed to minimize risk by targeting remedial actions into areas identified as having the greatest risk.

Actions may include:

- Alternative siting of new facilities to avoid sensitive or high use areas
- Avian-safe pole configurations
- Retrofitting distribution poles to reduce electrocution hazard
- Installing flight diverters to reduce collision hazard

Each action is described below and implementation sequence of each action is illustrated on Exhibit 5-4.

5.6.1 Alternative Siting of New Facilities

Data derived from the risk assessment process within avian assessment zones will be used when selecting routes for future powerlines. When alternative routes are available, staff will consider routes that minimize the potential for electrocution or collision mortality. When alternative routes are not available, construction design standards will be implemented in areas where avian habitat or important movement corridors creates contact potential (See Section 5-7 – Construction Design and Siting Standards).

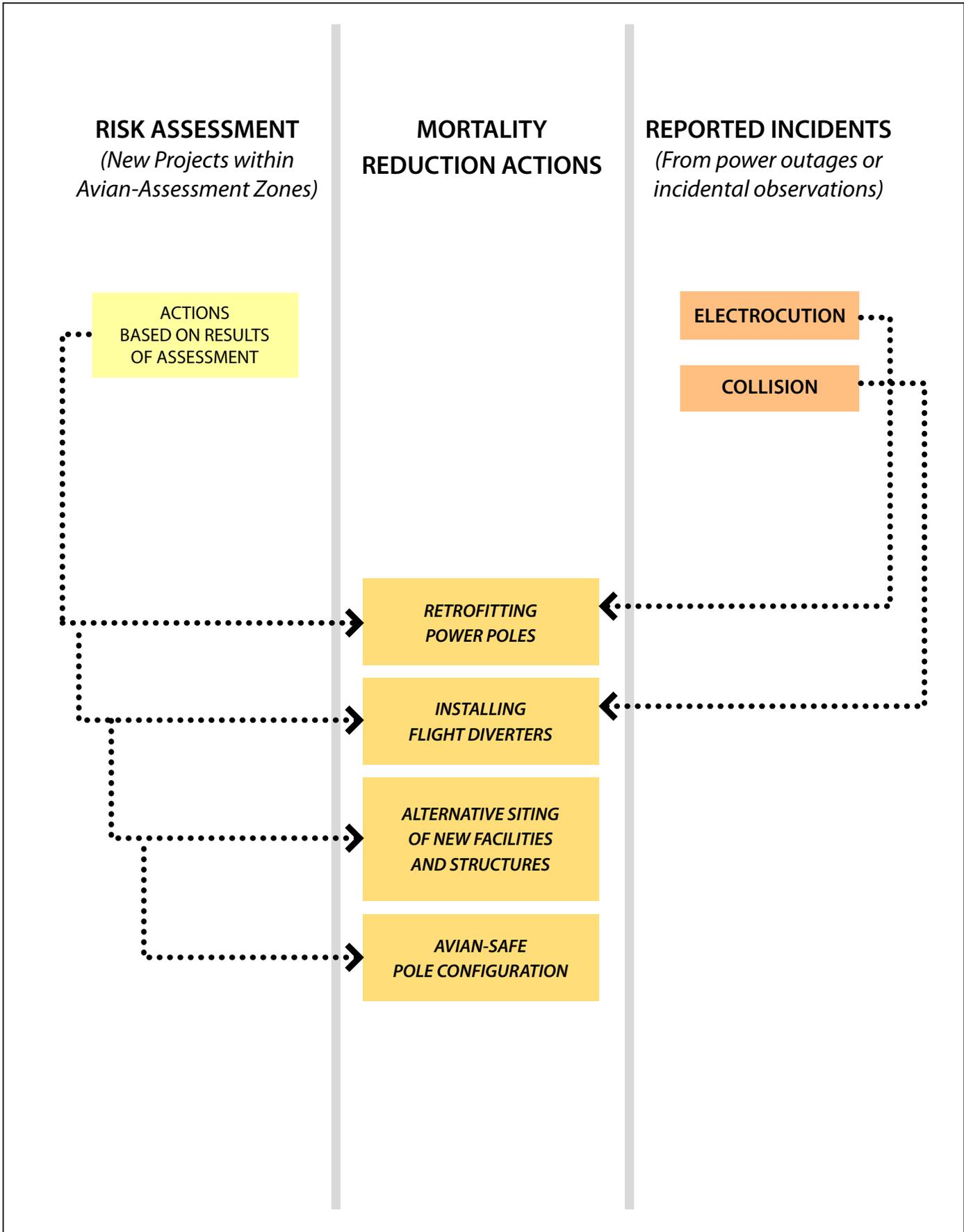
5.6.2 Avian-Safe Pole Configurations

The structural design of new power pole configurations will also be analyzed during or prior to the environmental review process to assess the effects of operation on electrocution and collision hazard. As discussed in Section 2, configurations that do not provide sufficient separation between energized equipment can result in electrocution. The APP Guidelines (APLIC and USFWS 2005) provide several examples of alternative configurations that will be considered to reduce electrocution potential (See Section 5-7 – Construction Design and Siting Standards).

5.6.3 Retrofitting Power Poles

At sites with recorded electrocution fatalities of raptors or other large birds detected either through power outages or incidentally by field staff, SMUD will retrofit utility poles with protection devices as described below under Construction Design and Siting Standards. Retrofitting includes installation of protective coverings including cutout covers, conductor insulators, conductor covers, jumper covers, and bushing covers. In addition, wood pole caps, perch flight diverter, and anti-perch triangles may also be installed. Installation of these protection devices is consistent with standard practices according to the APLIC's *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006*.

In areas of significant raptor use and where safe perches are limited, SMUD may also install raptor perches above the upper crossarm of utility poles.



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Figure Exhibit 5-4
Implementation of Mortality Reduction Actions

5.6.4 Installing Flight Diverters to Reduce Collision Hazard

Where the results of the risk assessment indicate a potential collision hazard, SMUD may install flight diverters as described below under Construction Design and Siting Standards. Installation of these protection devices is consistent with the standard practices and guidance in the Edison Institute's *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*.

5.7 Construction Design and Siting Standards

This section describes and illustrates the design and siting standards that can be used for new and retrofit construction in avian assessment zones. As discussed in Section 2, avian risk occurs where 1) poles provide perching opportunities and conductor separation and/or proximity to other energized hardware creates electrocution potential and 2) where power lines cross historical bird use areas and create collision potential. To reduce this potential requires modifications to structures and structural design, and consideration for sensitive areas during project route siting. This section describes how this can be achieved by implementing the following:

- _ Siting standards for new power line corridors,
- _ Avian-safe design standards for new construction, and
- _ Avian-safe design standards for existing power poles and overhead lines.

5.7.1 Siting New Power Line Corridors

Siting issues are related primarily to proximity to significant bird use areas that may increase the potential for bird electrocution and collision mortality. The following siting standards will be addressed and implemented to the extent possible in consideration of engineering, safety, or other logistical or practical constraints.

- _ Minimize proximity to significant wetland habitats that attract and support breeding and/or wintering waterfowl and other water bird populations.
- _ Minimize proximity to important avian flyway corridors that are used traditionally for migration or local movement between feeding and roosting/breeding areas.
- _ Minimize proximity to areas traditionally used by listed or other sensitive species (e.g., Greater sandhill crane).
- _ Avoid or minimize proximity to Stone Lakes National Wildlife Refuge, Cosumnes River Preserve, and other state, federal, local, and private (e.g., land trust, mitigation banks, duck clubs) lands set-aside or managed for bird use and other natural resource uses.

5.7.2 Design Standards for New Construction

SMUD will analyze electrocution and collision potential (See Risk Assessment Section) and in consideration of engineering, operational, geographic area, economic and other related constraints, will use avian-safe standards as illustrated by example in Exhibits 5-5 and 5-6 to reduce bird electrocution hazard. Risk factors will be assessed and addressed as determined necessary (e.g., it would not be practical to use raptor protection spacing standards in urban areas).

The objective of these standards is to maximize phase separation and phase-to-ground clearances in order to minimize the risk of electrocution or to prevent perching where sufficient clearance cannot be achieved, as described in Section 2.

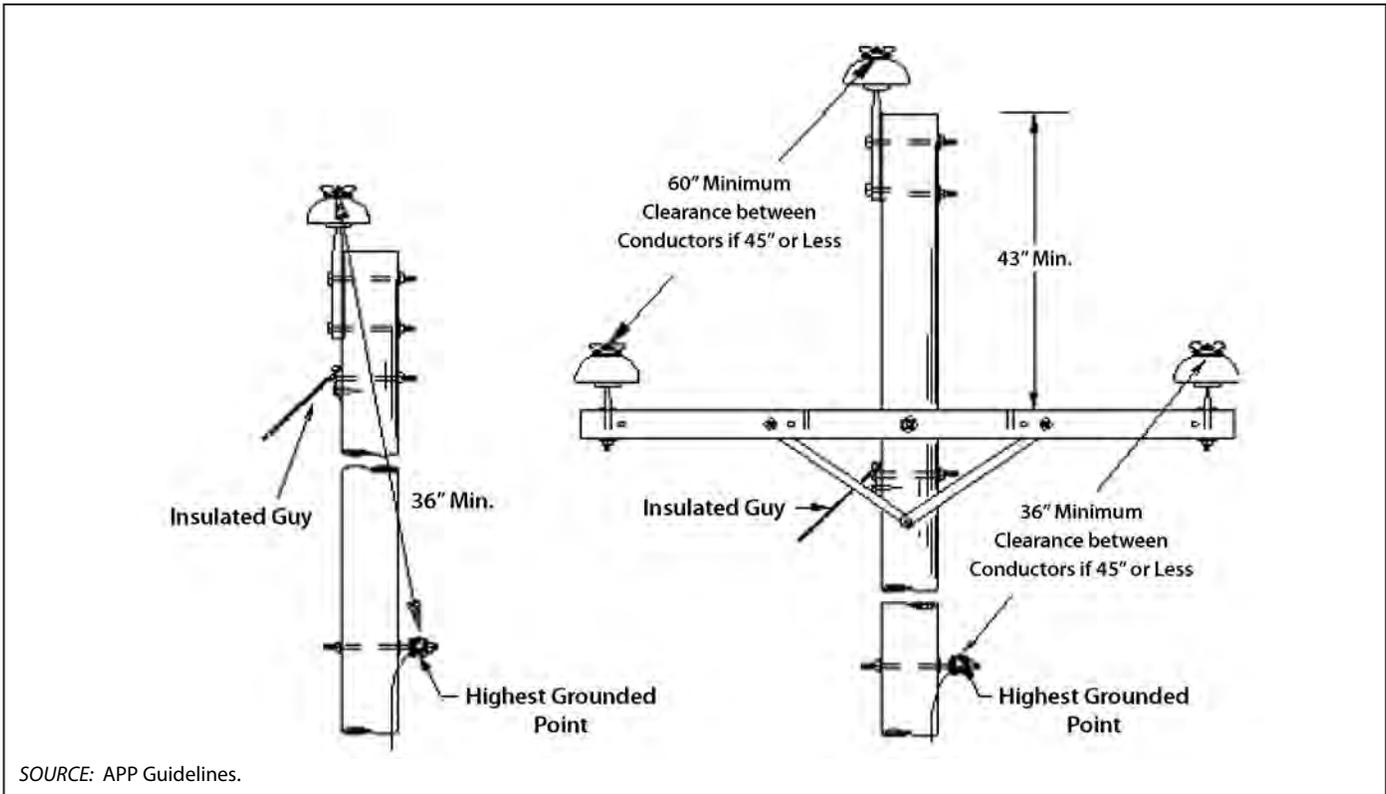
The standard 60-inch separation as described in the APP Guidelines (APLIC and USFWS 2005), is based on the wrist-to-wrist distance of eagles. As illustrated on Exhibit 5-5, a minimum vertical separation of 36 inches from phase to ground is needed on single phase structures to safely accommodate eagles. On three-phase structures, a vertical clearance of at least 43 inches between energized conductors and ground components is required. In most cases, an 8-foot crossarm with center phase kingpin will provide the necessary 60-inch clearance.

Although eagles are uncommon throughout most of the service area, this standard will be considered in areas where eagles are more likely to occur – such as the eastern edge of the service area and in the vicinity of Folsom Lake and upper reaches of the American River. An alternative standard is warranted in areas where eagles are unlikely to occur. Throughout most of the service area, buteos such as red-tailed hawk, Swainson's hawk, ferruginous hawk, and rough-legged hawk are among the larger raptors that are susceptible to electrocution. In these areas, a standard clearance of 48 inches is sufficient to minimize electrocution potential based on the wing length (and wrist-to-wrist distance) of buteos. Thus, the dimensions used in Exhibits 5-5 and 5-6 will be modified using a standard horizontal separation of 48 inches where eagles are unlikely to occur.

As an alternative to modifying pole configuration, where this standard is impractical or otherwise unfeasible, SMUD will apply the retrofitting standards described below to new construction. Through initial assessment of raptor and other avian use, insulators, covers, perch guards, and flight diverters (see below) can be used to minimize electrocution and collision potential.

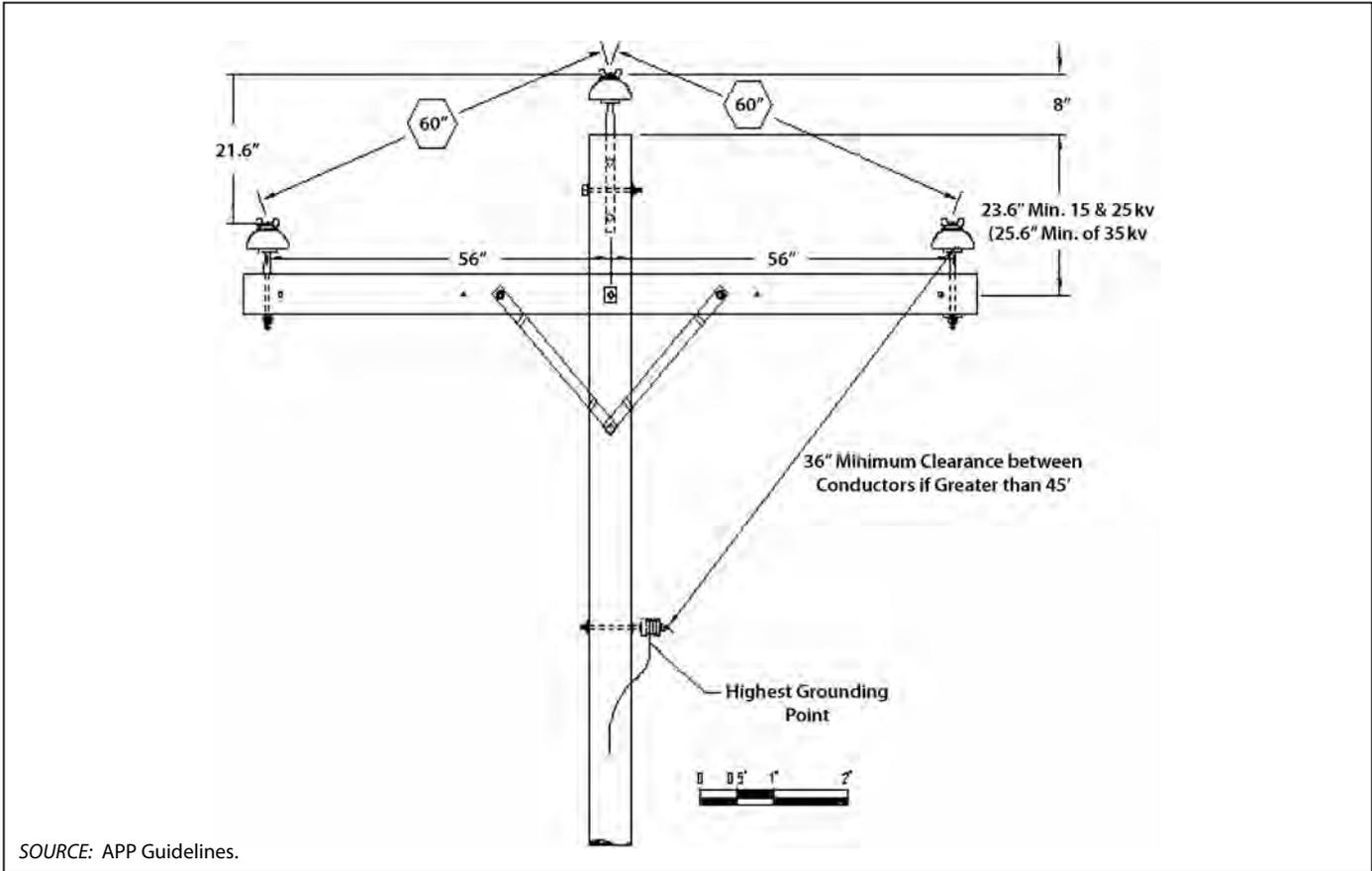
5.7.3 Design Standards for Retrofitting Existing Power Poles

Design standards to modify existing power poles are based on standard techniques, materials, and dimensions as described in the APP Guidelines using commercially available equipment designed specifically for this purpose. Exhibit 5-7 illustrates the standard avian protection modifications that can be used by SMUD to minimize electrocution potential on power poles. These modifications provide a level of insulation around energized components that are potential electrocution hazards. Once properly



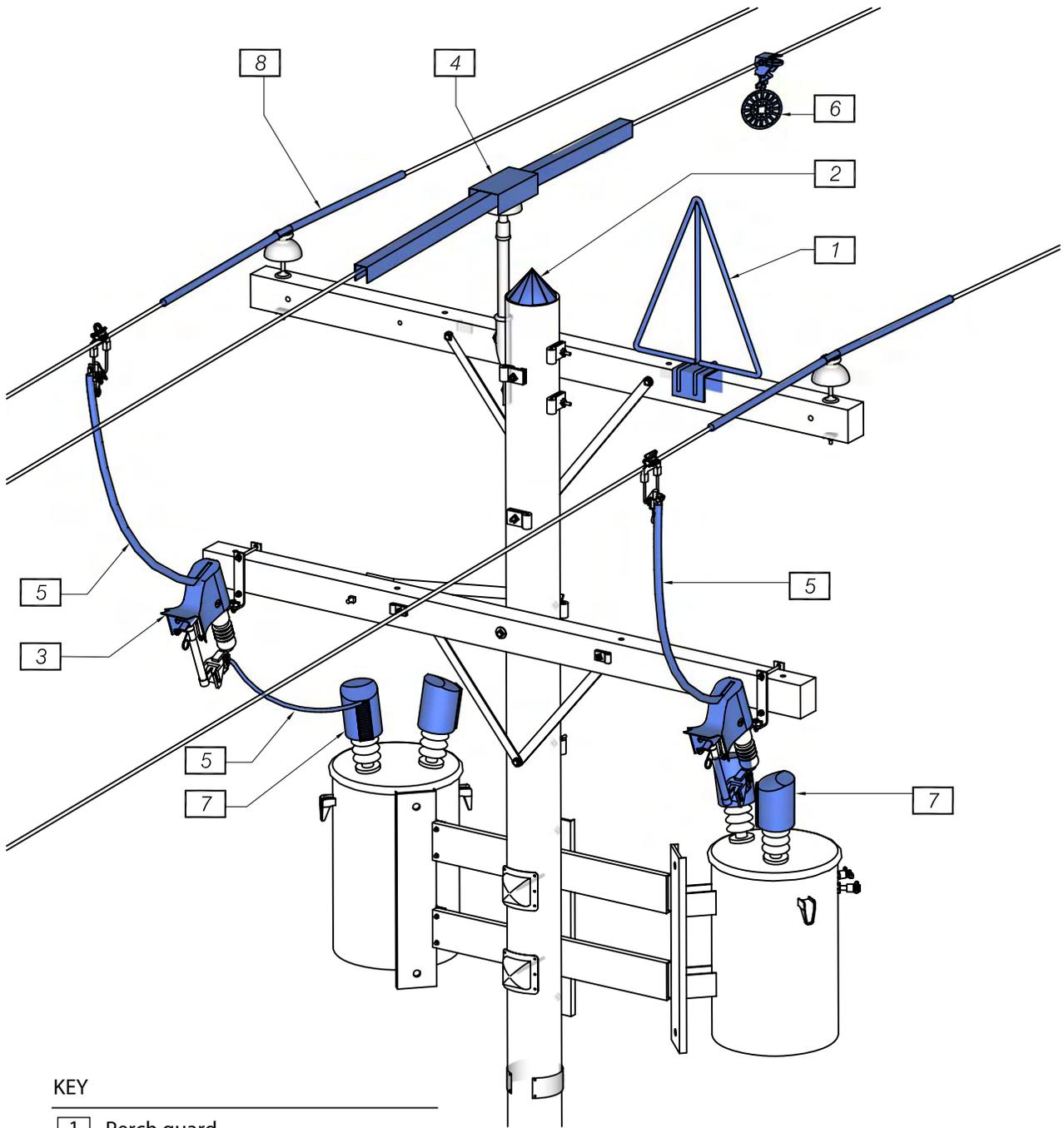
SOURCE: APP Guidelines.

Exhibit 5-5. Typical avian-safe structures: single phase (left), three-phase with lowered 8-foot crossarm (right)



SOURCE: APP Guidelines.

Exhibit 5-6. Typical three-phase avian-safe structure with 10-foot crossarm



KEY

- 1 Perch guard
- 2 Wood pole cap
- 3 Cutout cover
- 4 Conductor insulator/cover
- 5 Jumper/neutral wire insulator/cover
- 6 Flight diverter
- 7 Bushing cover
- 8 Conductor insulator/cover

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retrofitted with these devices, the opportunity for birds to complete an electrical circuit through contact with phase conductors or energized parts is significantly reduced. Exhibit 5-8 illustrates the use of a conductor insulator. In this example, an insulated middle phase conductor is sufficient to protect perching birds from electrocution. Exhibit 5-9 illustrates a properly installed perch guard.

Flight Diverters

To reduce the potential for collision with power lines, SMUD may install flight diverters in high risk areas. Flight diverters are designed to increase the visibility of overhead wires to birds. Exhibit 5-10 illustrates two types of devices, a swinging marker and a coiled flight diverter. Each of these devices is installed directly onto the overhead wire, which alerts the bird to the presence of the wire and reduces the potential for collision.

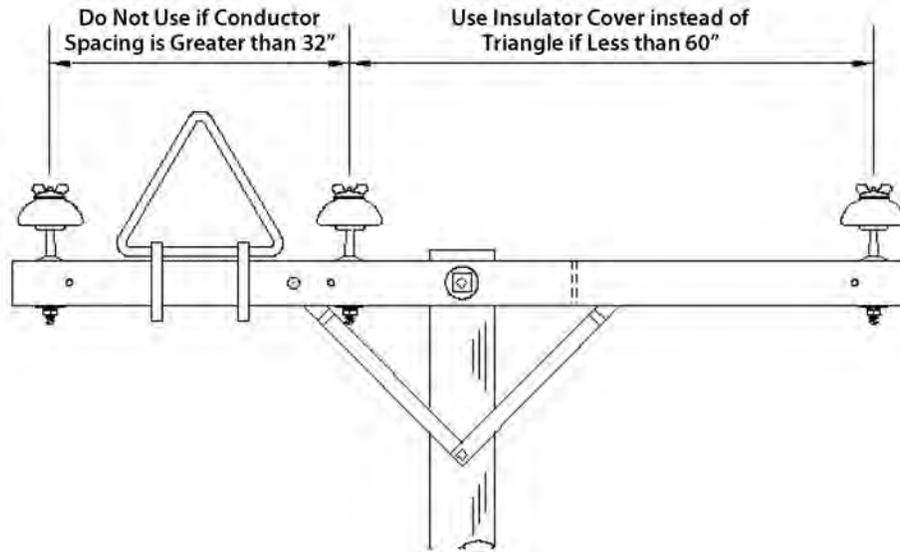


Exhibit 5-8. Example of conductor insulator on center conductor. No other modifications are required to make this pole configuration raptor safe.
(Photo courtesy of Rick Harness and EDM International, Inc.)

5.8 Nest Management

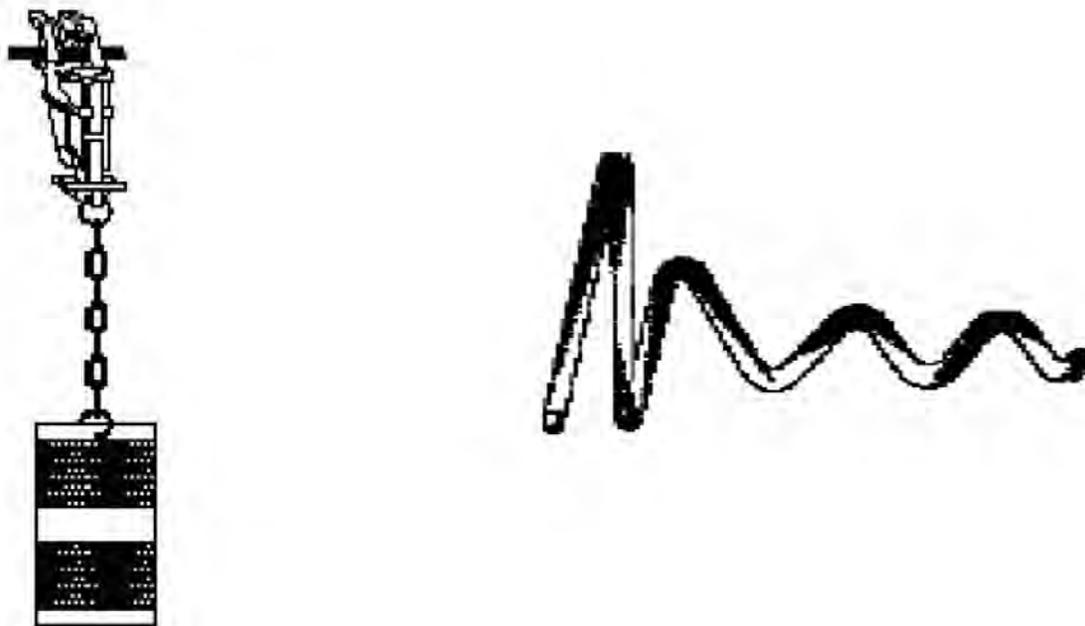
5.8.1 General Nest Management

Utility poles and transmission towers often provide nesting substrate for a variety of bird species. In some areas, these artificial landscape features provide valuable nesting habitat for birds, particularly raptors. They often pose no problems for system functioning and reliability and are thus allowed to remain. Occasionally, however, bird nests are constructed in areas that pose either a risk of system malfunction or a risk to the birds themselves. In these cases, SMUD may elect to remove or relocate nests as described below and described in Exhibit 5-11, Nest Management Procedures.



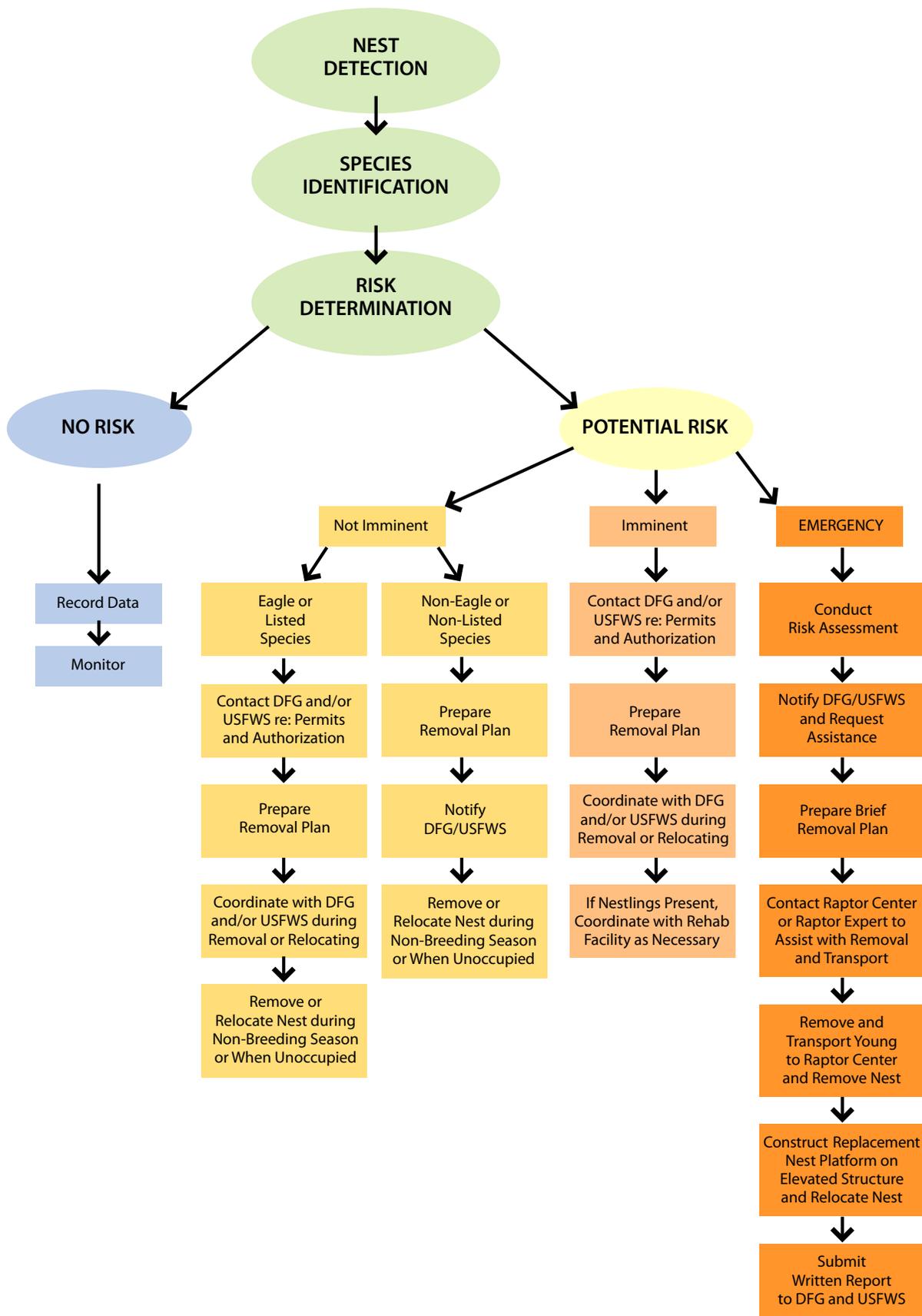
SOURCE: APP Guidelines.

Exhibit 5-9. Properly installed perch guard



SOURCE: APP Guidelines.

Exhibit 5-10. Swinging marker device (left) and bird flight diverter (right)



August 2009

Exhibit 5-11
Nest Management Procedures

In all cases where nests are detected, data will be recorded on a standardized field form (Bird Nest Record – See Avian Reporting System below). Once the bird species is identified, the environmental staff will conduct a risk assessment to determine if nest removal or relocation is warranted. If it is determined that the nest poses no risk to system function, maintenance procedures, or to the birds, the nest is allowed to remain. Data are recorded on the Bird Nest Record form and the site is periodically monitored. If it is determined that the nest poses a potential risk, then a further assessment is conducted to determine if the risk is non-imminent, imminent (i.e., if the risk of electrocution is high or if the nest compromises system function) or an emergency (i.e., if there is a substantial risk of ignition due to contact between the nest and conductors or hardware that could result in a nest-caused ground fire under conditions that could lead loss of property and life). In all cases, SMUD will coordinate with the DFG and/or the USFWS to determine whether the nest will be removed and discarded or relocated to an alternative location. Nest relocation will primarily involve eagles or special-status raptor species.

5.8.2 Non-Imminent Risk

Unless there is an immediate threat to birds or system function, nest removal or relocation (excluding eagles and state or federally listed species) will occur only during the non-breeding season when the nest is not being used or during the breeding season if the nest is unoccupied. When this activity is planned, SMUD will coordinate with DFG by providing notification and a nest removal plan. Upon removal of the nest, SMUD will either monitor the site during the early part of the breeding season to prohibit nest building activities or install devices to the structure to prevent future nesting at that location. If removal or relocation of an eagle or state or federally listed species nest is necessary, SMUD will coordinate with DFG and/or the USFWS regarding permitting and authorization pursuant to state or federal endangered species acts and the Bald and Golden Eagle Protection Act (BGEPA).

5.8.3 Imminent Risk

Nest removal or relocation will occur when the nest is occupied only in cases where it is deemed warranted based on the risk to system function or electrocution risk of the birds. This activity requires coordination and permitting/authorization with DFG and the USFWS pursuant to DFG Code and the MBTA (and state or federal endangered species act or BGEPA if an eagle or state or federally listed species nest). A plan will be developed that will include the timing, location, and techniques used to remove or relocate the nest. If possible, the nest will be relocated intact with young or eggs to an alternate location on the pole or tower structure. If necessary, and based on consultation with DFG and the USFWS, eggs or young will be collected from the nest and transported to a rehabilitation facility where they will be hatched and cared for until the earliest releasable date.

5.8.4 Emergencies

Emergencies occur when there is immediate risk to system function that could result in loss of life or property. The most immediate potential threat is from fire. Fires can be ignited as a result of bird electrocution, but also when nests are placed directly on conductors (Lehman and Barrett 2002). Ignition can occur when sticks from nests make contact with 2 conductors or a conductor and a ground wire, or from contact between jumper wires leading to transformers. Following initial ignition, sticks can fall to the ground and ignite vegetation. Under dry conditions, particularly in dry grassland or forest habitats, this can lead to grass or forest fires potentially resulting in significant loss of property, wildlife habitat, and under extreme conditions, loss of life. Osprey nests are often implicated in nest-caused fires probably due to the very large nests they construct and the opportunities for ignition. Relocation of nests on platforms constructed above the original location of the nest has proven to be a successful management measure both in terms of continued nesting of the resident birds and a reduction in electrocution and fire potential. While this is typically done during the non-nesting season, occasionally the immediate removal or relocation of an active nest may be required in order to avoid a highly hazardous condition. At these times, the protocols for permitting and authorization from DFG and USFWS as required under the Imminent Risk category may be too lengthy in order to avoid an emergency situation. Therefore, the following emergency protocols are established to address conditions deemed particularly and immediately hazardous with respect to the imminent threat of nest-caused ground fires.

Immediate nest removal will occur when the nest is occupied only in cases where it is deemed warranted based on the risk to system function and the threat of nest-caused ground fires. This activity requires a rapid assessment of the site and local environmental conditions; a determination that nest-caused ground fire is imminent due to the proximity of the nest material to conductors and hardware; immediate notification and request for assistance from CDFG and USFWS; preparation of a brief removal plan; notification of a nearby raptor center or raptor expert to assist with removal and transport; collection of the young and removal of the nest; transport of young to raptor center; construction of a replacement nest platform on elevated structure above pole crossarms and relocation of the nest (if intact) within 1 week of removal; and submittal of a written report to the CDFG and USFWS. Contact with DFG will be through the Department's CalTIP Phone Operator (1-888-DFG-CALTIP), who will notify appropriate DFG staff. A follow-up email will also be sent to the local DFG Staff Environmental Scientist. SMUD staff will provide site-specific information and details regarding the specific nature of the emergency activity.

5.9 Avian Reporting System

The Avian Reporting System is the process by which all avian incidents, nest sites, and monitoring data are recorded and cataloged into the data base. It includes the following three components:

- Detection
- Investigation, and
- Reporting

5.9.1 Detection

The detection of avian fatalities occurs through the investigation of avian-caused power outages and incidental observations. The detection of nest sites occurs through incidental observations and through monitoring efforts.

5.9.2 Investigation

Once detected, field staff will record the circumstances associated with dead or injured birds. Data will be recorded on standardized field forms (See Reporting below).

A site assessment will be conducted in response to all power outages to determine the cause and circumstances involved. If the cause is bird-related, the assessment will include a determination of bird species using the bird guide booklet that accompanies this APP; the types of injuries; the pole type and configuration; the specific cause of the fatality if possible; and other relevant data. To enhance the probability of incidental detections, all field staff will be directed to be alert for dead or injured birds in the vicinity of all SMUD facilities.

Data collection activities associated with assessments conducted within avian assessment zones will provide information on site conditions, avian use and behavior, and mortality risk within these zones. These data can be used to determine the need for remedial measures on existing structures and assess the need to explore siting alternatives for new construction.

Information on all bird nests will also be recorded as described under Nest Management and a determination made regarding the potential risk posed by the presence of the nest to system function and hazard to the nesting birds.

5.9.3 Reporting

Once a fatality or injury has been detected and investigated, the incident will be reported by submitting an Avian Incident Form (Exhibit 5-12) to the staff responsible for maintaining the data base. Information will be entered into the OMS data base and then forwarded to staff responsible for making decisions regarding remedial actions.

Exhibit 5-12

Avian Incident Report

Date Found: _____ **Name of Staff:** _____

Location

Line (Circuit) Name: _____ Segment: _____ Voltage: _____ Pole/Tower ID: _____

Pole Type and Configuration: _____

Electrical Parts (circle):

Transformers Capacitor Cutouts Arresters Jumper wires

Other: _____

General Land Use (circle one):

Farmland Rangeland Rural Residential Urban Urban/Rural Interface

Location of Bird Relative to Pole or Line

Beneath Pole: _____ Beneath mid-span of Line: _____ Distance in feet from pole or line: _____

Species or Bird Group (note species if known, otherwise circle the most representative category)

Species (if known): _____

Hawk Eagle Falcon Owl Raptor Duck
Goose Waterfowl Crane Heron/Egret Waterbird Crow/Raven
Magpie Passerine Large Unidentified Bird Small Unidentified Bird

General Condition of Bird (circle one)

Fresh Partially Decomposed Mostly Decomposed Bones and Feathers only

Injuries (circle one)

Burn marks Dismembered Holes Trauma None Visible

Describe: _____

Likely Cause of Death (circle one)

Electrocution Wire Collision Vehicle Collision Shot Undetermined

Comments: _____

Nest data are recorded on the Bird Nest Report form (Exhibit 5-13). This information will also be entered into the OMS data base and then forwarded to staff responsible for making decisions regarding remedial actions. SMUD's Environmental Management staff will maintain other avian mortality data (e.g., line strikes) as information is received from different sources.

5.10 Permit Compliance

5.10.1 Incidental Take Permits

Section 10(a)(1)(b) Incidental Take Permit

If federally-listed birds are at risk from electrocution or collision mortality, the USFWS may recommend that SMUD seek a Section 10(a)(1)(b) incidental take permit pursuant to Section 10 of the federal ESA. This permit will allow a specified amount of take of each at-risk listed species through approval of a habitat conservation plan that includes measures to minimize potential mortality.

With the recent federal de-listing of the bald eagle and peregrine falcon, there are few federally listed birds that occur in the service area that are susceptible to electrocution or collision mortality that would warrant seeking a Section 10(a)(1)(b) permit. If species that occur within the service area become federally listed in the future and that are susceptible to electrocution or collision mortality, SMUD will work with the USFWS to assess the potential for mortality and the need to seek a Section 10(a)(1)(b) permit.

Bald and Golden Eagle Act Permit

Under the BGEAP, the USFWS issues permits to take, possess, or transport bald and golden eagles. Given the relatively unlikely event of a bald or golden eagle fatality within the SMUD service area, the need for a permit under the BGEPA is considered unnecessary at this time. If a bald or golden eagle injury or fatality occurs, SMUD staff will immediately report the incident to the USFWS who will take possession of the carcass. SMUD staff will not handle or dispose of bald and golden eagles.

2081 Permit

Section 2081 of the DFG Code provides for authorization for incidental take of state-listed species with approval of a plan that minimizes and fully mitigates the impacts of the take. Two species that occur within the service area, the state-threatened Swainson's hawk and the state-threatened greater sandhill crane, are susceptible to electrocution and collision mortality.

SMUD will submit this APP along with an application for incidental take to DFG pursuant to Section 2081. To minimize the potential for injury or mortality of these species, SMUD will focus bird collision avoidance efforts (e.g., installation of bird flight

Exhibit 5-13

Bird Nesting Record

Date: _____ **Name of Staff:** _____

Location

Line (Circuit) Name: _____ Segment: _____ Voltage: _____ Pole/Tower ID: _____

Crossroads or other specific location information: _____

General Land Use (circle one)

Farmland Rangeland Rural Residential Urban Urban/Rural Interface

Description of location of nest on tower or pole: _____

Species or Bird Group (note species if known, otherwise circle the most representative category)

Species (if known): _____

Hawk Eagle Falcon Owl Raptor Crow/Raven

Magpie Passerine Large Unidentified Bird Small Unidentified Bird

Condition of Nest (circle one)

Currently in use Intact Partially Deteriorating Mostly Deteriorating

Comments: _____

Eggs or Nestlings Observed: _____

Description of Nesting History at this Location: _____

Risk to Birds/System and Recommended Actions (circle one)

No risk Not Imminent Risk Imminent Risk Emergency

Comments: _____

diverters) in the vicinity of known crane feeding and roosting areas. Pole retrofitting efforts will target known Swainson's hawk use areas.

5.10.2 Collection/Salvage Permits

There may be occasion for SMUD field staff to collect bird carcasses for necropsy to determine cause of death, for disposal purposes, or temporary collection for onsite inspection or extraction from electrical components. There may also be occasion to collect injured birds and transport them to a rehabilitation facility. It is unlawful to collect or salvage or otherwise have in possession any raptor or raptor body part, including feathers, without a state and federal permit. Thus, SMUD will coordinate with DFG and the USFWS to determine the need for a permit and if necessary will seek permits to handle dead and injured birds in the event that need arises. Each permit is described below.

State Scientific Collecting Permit

DFG requires a scientific collecting to collect, salvage, or otherwise handle all protected species including all raptors and all special-status species.

Federal Migratory Bird Permit

This permit is issued by the USFWS pursuant to the MBTA. This permit is required to salvage birds protected under the MBTA. The permit is issued by the Regional Migratory Bird Permit Office of the USFWS in Portland, Oregon.

5.10.3 Nest Removal and Relocation Permits

Raptors and other birds occasionally construct nests on certain types of distribution poles and transmission towers. Where the placement of the nest poses risk to the birds and to the functionality of the electrical system, the nests should be removed or relocated as advised by USFWS or CDFG. The nests of all birds protected under the MBTA and/or DFG Codes 3503 and 3503.5 cannot be removed or relocated without permits from the USFWS and DFG, respectively.

Nests of most birds (exceptions are bald and golden eagles and threatened or endangered species) can be removed during the non-breeding season when there is no risk to adults, eggs, or young birds. Neither the DFG Code nor the MBTA includes provisions that prohibit the removal of nests when they are not in use. Thus, nests that are not in use (either during the non-breeding season or if the nest is determined to be inactive) can be removed without state or federal permits.

If it is necessary to remove a nest while it is active, SMUD will contact the USFWS and DFG to obtain permits for this purpose under the federal Migratory Bird Permit and DFG Code under an Imminent Risk scenario (Refer to Section 5.8.3). If it is necessary to remove an active nest under an Emergency scenario (Refer to Section 5.8.4), SMUD will

contact and seek assistance from DFG and USFWS but will not necessarily wait to obtain permits, which can be a lengthy process. SMUD will coordinate with DFG and USFWS to develop Memoranda of Understanding or similar agreements or investigate development of an expedited or temporary permitting process to allow emergency nest removal without having to wait for formal permits.

5.11 Training

Successful implementation of this APP will require a thorough understanding of the issues and corresponding protocols. To accomplish this, SMUD will develop a training program focusing on staff with direct and indirect implementation responsibilities including managers, supervisors, first responders, field crews, engineers, dispatch staff, and design staff.

The training program will consist of the following elements:

- _ Introduction and description of the issue
- _ District Policy
- _ Identification of bird-related issues – electrocution and collision mechanisms
- _ Description of avian resources within the service area and species most susceptible to electrocution and collision mortality
- _ Discussion of state and federal regulations that protect birds, legal implications, and the need for compliance
- _ Construction and design standards and retrofitting standards designed to reduce mortality
- _ Protocols of plan implementation including assessing problems, proactive approaches, and recording/reporting data
- _ Discussion of each of the APP elements
- _ Responsibilities of staff to implement the APP

An annual review will be made to determine effectiveness of the training program and field staff.

5.12 Avian Enhancement Options

SMUD has and will continue to promote natural resource protection and actions that benefit local and regional bird populations and other wildlife. SMUD commits to a continuing partnership with local agencies and state and federal resource agencies to explore and participate in activities that enhance and restore habitat. Possible enhancement measures include:

- Planting trees. Expand the existing SMUD tree planting program that is focused primarily on urban landscapes and reducing energy consumption to include restoring or enhancing habitat for nesting native birds.
- Installing artificial nest platforms and perches. As noted above, artificial perches can be installed on existing utility poles. In other areas where nesting sites and perches are limited (and where utility poles are raptor-safe), installation of artificial structures can enhance raptor use.
- Restoring riparian and wetland vegetation. SMUD will continue to coordinate with local jurisdictions in efforts to maintain, create, and enhance habitat for wildlife and associated public access (e.g., Rancho Seco), and partner with DFG and USFWS regarding bird protection issues and habitat enhancement opportunities.

5.13 Program Review and Quality Control

The primary goal of this APP is to reduce electrocution and collision-related avian mortality and injury associated with SMUD’s aboveground facilities. To do so, in addition to the monitoring, reporting, and management measures described above, SMUD will institute program review and quality control measures to ensure effectiveness of the APP. This will include the following elements:

- Responsibility for program review and quality control will be assigned to senior staff in SMUD’s Environmental Management group.
- Staff will annually review the mortality data base, submitted field forms, monitoring results, and associated mortality reduction actions to ensure that the process as described above is adhered to, the data base is up-to-date, information is recorded accurately, and mortality reduction actions are implemented. The staff person will report the results of the review and recommend remedial actions needed on a separate PR/QC form.
- Sites that have been subject to retrofitting, nest protection/avoidance measures, etc. will be monitored to assess their effectiveness and need for maintenance.
- SMUD will coordinate with DFG and USFWS representatives periodically to review the program and its effectiveness.

5.14 Public Awareness

Similar to its tree planting program, SMUD will include avian protection in its ongoing public awareness campaign. The APP will be initially highlighted as a formalized program designed to reduce avian mortality and will describe the management efforts taken to reduce avian incidents. Ongoing public awareness will target the effectiveness of the program including retrofitting actions, ongoing monitoring to detect problem areas, and habitat enhancement activities. There may be opportunities to increase public awareness of the Avian Protection Plan via the internet. Periodic (e.g., biannual) updates

and mid-year reviews to the SMUD Board may be a useful information dissemination tool.

5.15 Key Resources

As noted above, SMUD will partner with local, state, and federal agencies in its efforts to successfully implement this APP. In addition, other organizations and individuals will be accessed as needed for expertise in local and regional bird populations, bird behavior, habitat enhancement concepts and design, and bird protection devices. Some of these key resources include the following:

Federal Agencies

U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
2800 Cottage Way, Rm W-2605
Sacramento, CA 95825

U.S. Fish and Wildlife Service Migratory Bird Permit Office
911 N.E. 11th Avenue
Portland, OR, 97232-4181
Tel: (503) 872-2715. Fax (503) 231-2019
Email: permitsR2MB@fws.gov

State Agencies

California Department of Fish and Game
Region 2
1701 Nimbus Road
Rancho Cordova, CA 95670
Tel: (916) 358-2900. Fax: (916) 358-2912

California Energy Commission
Facilities Siting Division
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512
Tel: 916-654-4287

Local Agencies

Sacramento County
Department of Environmental Review and Assessment
827 7th Street
Sacramento California 95814
Tel: (916) 874-7914. Fax: (916) 874-8343

Placer County
Planning Department/Environmental Coordination Services Division
3091 County Center Drive
Auburn, CA 95603
Tel. 530-745-3000 Fax: 530-745-3080
Email: planning@placer.ca.gov

City of Sacramento
Planning Department
915 I Street
Sacramento, CA

City Rancho Cordova
Planning Department, Environmental Review
2729 Prospect Park Drive
Rancho Cordova, CA 95670
Tel: (916) 851-8700 Fax: (916) 851-8787

City of Elk Grove
Planning Division
8401 Laguna Palms Way
Elk Grove, CA 95758
Tel: (916) 478-2265 Fax: (916) 691-6411

City of Galt
Planning Department
495 Industrial Drive
Galt, CA
Tel: (209) 366-7230

City of Folsom
Planning Services
2nd Floor, City Hall Building
50 Natoma Street
Folsom, CA 95630
Tel: (916) 355-7222 Fax: (916) 355-7274

Universities

California State University Sacramento
Department of Biological Sciences
6000 J Street
Sacramento, CA 95819-6077
Tel: 916-278-6535 Fax: 916-278-6993

University of California Davis
Wildlife, Fish, & Conservation Biology Department
One Shields Ave.
Davis, CA 95616-8751
Tel: (530) 752-6586 Fax: (530) 752-4154

Organizations

Sacramento Audubon Society
765 University Ave # 200
Sacramento, CA 95825
(916) 649-7600

Central Valley Bird Club
www.cvbirds.org

Friends of the Swainson's Hawk
915 L St., Suite C-425
Sacramento, Ca. 95814
Tel: (916) 447-4956 Fax: 916-447-8689

Sacramento Tree Foundation
201 Lathrop Way # F
Sacramento, CA 95815
Tel: (916) 924-8733

The Nature Conservancy
2015 J St
Sacramento, CA 95811
Tel. (916) 449-2858

Ducks Unlimited
3074 Gold Canal Dr
Rancho Cordova, CA 95670
Tel. (916) 852-2000

Sacramento County Conservancy
P.O. Box 163351
Sacramento, CA 95816
Tel: (916) 492-0908 Fax: (916) 448-4120

Local Avian Consultants

AECOM
2022 J St

Sacramento, CA 95811
Tel. (916) 414-5800

EIP Associates
1200 2nd St
Sacramento, CA 95814
Tel. (916) 325-0602

ICF/Jones & Stokes
630 K Street, Suite 400
Sacramento, CA 95814
Tel. (916) 737-3000

CH2MHill
2485 Natomas Park Dr # 600
Sacramento, CA 95833
Tel. (916) 920-0300

Airola Consulting
Tel. (916) 454-3073
d.airola@sbcglobal.net

Beedy Consulting
Tel. (530) 274-7232
tbeedy@comcast.net

Estep Environmental Consulting
Tel. (916) 921-2515
jim.estep@comcast.net

Restoration Consultants

Wildlands, Inc.
3855 Atherton Road
Rocklin, CA 95765
Tel: (916) 435-3555 Fax: (916) 435-3556

Westervelt Ecological Services
600 N Market Blvd # 3
Sacramento, CA 95834
Tel. (916) 646-3644

Hart Restoration, Inc.
13737 Grand Island Rd
Walnut Grove, CA , 95690-9766
Tel: (916) 775-4021 Fax: (916) 775-4022

Hedgerow Farms
21905 County Road 88
Winters, CA 95694
Tel. (530) 662-6847

Bird Control Consultants

BirdMaster
(John Pace – jpace@birdmaster.com)

Bird Protection Device Manufacturers

Eco Electrical Systems, Inc.
7758 Pickering Circle
Reno, Nevada 89511
Tel: (775) 853-8623 Fax: (775) 853-8615

Wildlife Rehabilitation Centers

The California Raptor Center
University of California, Davis
Tel. (530) 752-6091

California Foundation for Birds of Prey
3985 Foothills Boulevard
Roseville, California 95747
Tel. (916) 773-6049
(Vickie Joseph)

Section 6. Literature Cited

- Avian Power Line Interaction Committee. 1994. Mitigating Bird Collisions with Power Lines: the State of the Art in 1994. (<http://aplic.org>)
- Avian Power Line Interaction Committee. 1996. Suggested practices for raptor protection on power lines: The state of the art in 1996. (<http://aplic.org>)
- Avian Power Line Interaction Committee. 2006. Suggested practices for raptor protection on power lines: The state of the art in 2006. (<http://aplic.org>)
- Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service. 2005. Avian Protection Plan (APP) Guidelines. (<http://aplic.org>).
- California Energy Commission. 1995. Avian collision and electrocution: an annotated bibliography. Publication Number: P700-95-001. Sacramento, CA.
- Dwyer, J.F. 2004. Investigating and mitigating raptor electrocutions in an urban environment. Ms Thesis. University of Arizona, Tucson.
- Estep Environmental Consulting. 2006a. The distribution, abundance, and habitat associations of Swainson's Hawk (*Buteo swainsoni*) in South Sacramento County. Prepared for the City of Elk Grove, CA.
- Estep Environmental Consulting. 2006a. The distribution, abundance, and habitat associations of Swainson's Hawk (*Buteo swainsoni*) in the City of Rancho Cordova Planning Area. Prepared for the City of Rancho Cordova, CA.
- Harness, R.E. 2000. Raptor electrocutions – emerging issues (overhead power distribution). Transmission and Distribution Construction, Operation and Live-Line Maintenance Proceedings. 2000 IEEE ESMO - 2000 IEEE 9th International Conference, Page(s):171 - 175
- Jones & Stokes. 2007. Biological effectiveness monitoring for the Natomas Basin Habitat Conservation Plan Area – 2006 Annual Survey Results. (J&S 04002.04.) Sacramento, CA. Prepared for the Natomas Basin Conservancy.
- R.N. Lehman and J.S. Barrett. 2002. Raptor electrocution and associated fire hazards in the Snake River Birds of Prey National Conservation Area. Technical Bulletin No. 02-7, Bureau of Land Management, Boise, ID.
- Liguori, S. 2001. Raptor Electrocution reduction program. Hawkwatch International.

Miller, D., E.L. Boeker, R.S. Thorsell, and R.R. Olendorff. 1975. Suggested practices for raptor protection on powerlines. Prepared for Edison Electric Inst. by Raptor Res. Found., Inc. 19 pp.

Olendorff, R.R., A.D. Miller, and R.N. Lehman. 1981. Suggested practices for raptor protection on power lines: the state-of-the-art in 1981. Prepared by the Raptor Research Foundation, St. Paul, Minnesota. Prepared for the Edison Electric Institute, Washington, D.C. 111 pp.

Sacramento Municipal Utility District. 1989. *69 kV Switch Ground Conversion and Bird Guard Installation Implementation Plan*. Prepared by David Oto, SMUD Engineering Services.

APPENDIX L

**United States Transportation Command Cooperative Research and Development
Agreement “Assessment of Wind Farm Construction on Radar Performance”**

**UNITED STATES
TRANSPORTATION COMMAND
COOPERATIVE RESEARCH AND
DEVELOPMENT AGREEMENT**

**“Assessment of Wind Farm
Construction on Radar
Performance”**

**Operations Working Group
RESEARCH CONCLUSIONS AND
RECOMMENDATIONS
Interim Report
to
Joint Technical Working Group**

January 20, 2010

Background and Introduction

Three energy firms are proposing to construct 142 wind turbines within an established wind resource area (WRA) in Solano County, California. The proposed turbines will be located within a wind farm of approximately 833 existing turbines, the closest of which is located 4.65 nautical miles southeast of Travis Air Force Base (AFB). Over the past two years, FPL Energy Montezuma Wind, LLC (Montezuma Wind), Sacramento Municipal Utility District (SMUD), and enXco Development Corp (enXco) have undertaken the steps necessary to pursue appropriate and applicable zoning and permitting of their respective projects. It was during this local and federal review process that the 60th Air Mobility Wing (AMW) at Travis AFB expressed concerns that the proposed turbines could interfere with the base's ability to provide safe and efficient air traffic services to aircraft operating in the vicinity of the WRA. The 60th AMW's primary concern focused on the potential impact caused by wind turbines on the terminal surveillance radar used by air traffic controllers to provide radar services to aircraft.

Subsequent to findings of "no hazard to air navigation" by the Federal Aviation Administration for the three proposed projects, the 60th AMW invited the three energy firms to enter into a Cooperative Research and Development Agreement (CRADA) with the United States Transportation Command (parent command to Air Mobility Command, in turn parent to the 60th AMW). The objective of the CRADA was to determine the "projected impact of wind turbine development upon air traffic operations near Travis Air Force Base (TAFB), California". The CRADA's purpose was threefold. First, the CRADA was to provide a means to "obtain reliable, objective data to assess current air traffic operational radar coverage in the TAFB area". Second, to "run a simulation to assess the predicted air traffic operational impact potentially caused by proposed wind turbine development". Third, to "assess the operational impact upon the Travis AFB air traffic control areas of Shiloh III, Montezuma Wind and Solano Wind Phase 3 wind projects".

All three energy firms agreed to enter into the agreement in October of 2009. The CRADA was finalized in December of the same year and became the basis for the formation of a Joint Technical Working Group (JTWG) consisting of representatives from the Air Force Flight Standards Agency (AFFSA), Air Mobility Command (AMC), Westslope Consulting, LLC (Westslope), Montezuma Wind, SMUD, Travis AFB, as well as consultants that the participants invited/directed to participate on their behalf, including Idaho National Laboratories (INL), JDA Aviation Technology Solutions, URS Corp, and Volpe National Transportation Systems Center.

The JTWG was tasked to determine the impact from the proposed wind projects on air traffic operations at Travis AFB based on research conducted by two smaller, more focused, working groups, the Radar Working Group (RWG) and the Operations Working

Group (OWG). Upon completion of a baseline surveillance coverage study and predictive simulation conducted by the RWG, the OWG was tasked to determine the significance of impact resulting from the findings of the RWG on air traffic operations and make recommendations to the JTWG regarding the overall operational impact resulting from the three proposed wind projects.

Operations Working Group

The OWG was founded under the auspices of the USTRANSCOM CRADA to provide an overall assessment and recommendations regarding the impact of the three proposed wind turbine projects on air traffic operations in the vicinity of the WRA. The group consists of representatives and subject matter experts from the AFFSA, AMC, 60th AMW, JDA Aviation Technology Solutions, and Westslope. Active members include:

Benjamin Doyle – JDA Aviation Technology Solutions
Ron Morgan – Morgan Aviation
Lt. Col. Brian Lindsey – 60th AMW
Maj. Monty Harshner – 60th AMW
Maj. John Flynn – 60th AMW
1st Lt. Clifford Cochran – 60th AMW
Geoff Blackman – Westslope
CMSgt. Laurence Cole – AFFSA
John Tigue – AMC
Kevin Beebe – AMC

Methodology

Under the CRADA the OWG was assigned two tasks. They were: 1) define the air traffic requirements for the airspace over and adjacent to the WRA; and 2) assess the findings of the RWG and make a determination regarding the level of significance of any impacts identified. The CRADA outlined these two tasks as follows:

TASK 1: Air Traffic Requirements

- The OWG defines the classification of airspace overlaying and in proximity to the WRA.
- The OWG determines the minimal and acceptable level of air traffic control service based upon federal guidelines outlined under the Code of Federal Regulations, FAA Orders and Air Force Instructions (AFI).
- The OWG identifies communications, navigation and surveillance system performance necessary to provide the level of service.

- If applicable, the OWG identifies deficiencies in policy.

TASK 2: Operational Significance Determination

- The OWG assesses the findings of the RWG and determines what air traffic services would not be available or may be degraded as a result of construction of the proposed wind projects.
- The OWG makes a determination and subsequent recommendation regarding the overall operational impact resulting from the proposed wind projects. OWG further recommends any mitigation efforts (if applicable).

In order to accomplish the two assigned tasks, the OWG conducted extensive research into the Code of Federal Regulations, FAA Orders, FAA Handbooks, AFI, Letters of Agreement between Travis AFB and the FAA and Travis operational procedures and training manuals, FLIP and Aeronautical Charts. The purpose of this research was to determine the classification of airspace overlaying and in proximity to the WRA. Additionally, this research aided in identifying the roles and responsibilities of Travis Air Traffic Control (ATC), Oakland Air Route Traffic Control Center (ARTCC), and pilots operating under both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) flight plans. Particular focus was placed on aircraft equipment and ATC communication, navigation and surveillance requirements in accordance with FAA and Air Force standards.

In accordance with the RWG's findings, the OWG ruled out any impacts on aircraft utilizing active transponders. Wind turbines do not impact secondary radar signals in the airspace assigned to TAFB. Likewise, the OWG ruled out any impact on transponder equipped VFR aircraft and focused primarily on non-transponder aircraft operations.

Study Findings

The OWG determined that the airspace over the WRA is designated as Class E airspace as established under the Code of Federal Regulations with a floor of 700 feet above ground level (San Francisco Sectional Ed 83 Pub 27-Aug-2009). The FAA delegated the authority to provide air traffic services to Travis AFB within the Class D airspace (that airspace within 5 statute miles of the airport) and the larger, Class E airspace which overlays the WRA. The FAA establishes the minimum level of safety based on the classification of airspace. The FAA has determined that the level of service provided to aircraft within these classifications of airspace does not require radar service. There are no published minimum operational standards for surveillance coverage. The operational safety practices defined through federal aviation regulation operating procedures dictate an acceptable level of risk and safety for operations.

Class E airspace is controlled airspace that imposes few requirements on pilots operating during visual meteorological conditions (minimum of 1,000 foot ceiling and three miles visibility). There is no minimum aircraft equipment requirement, pilots do not have to file a flight plan nor are they obligated to contact air traffic control for entry into Class E airspace. Pilots operating under these conditions are required to “see and avoid” other aircraft, terrain and obstacles. However, pilots may request air traffic advisories, which air traffic controllers must provide if their workload, radar presentation and equipment permits.

Travis ATC provides air traffic services to both VFR and IFR aircraft operating within its Class E airspace. To aid in the provision of this service and to meet its mission requirements, the Air Force procured and installed an Airport Surveillance Radar model-11 (ASR-11) terminal surveillance radar. This radar provides an increased level of safety above and beyond the minimum “see and avoid” operations standard in Class E airspace. Additionally, the radar enables air traffic control to provide services to a larger number of aircraft than would otherwise be provided in controlled airspace without radar coverage. This efficiency of operations and increased safety is paramount in the overall assessment of operational impact.

It is important to note the airspace over the WRA is complex. The radar downwind pattern and tactical arrivals into Travis AFB extend over the WRA at 2-4000 ft MSL and above. Air traffic controllers at Travis AFB provide service to aircraft flying in and out of Buchanan Field, located in Concord, and Rio Vista Municipal Airport. The initial approach segments of all three instrument approaches into Buchanan Field originate over the WRA at 2500 ft MSL. The missed approach segment for the RNAV (GPS) approach into Rio Vista involves a climbing left turn to 2000 ft MSL over the eastern third of the WRA. Due to its convenient location with no air traffic control interference, the airspace over the WRA is used by student pilots off Buchanan Field and Rio Vista for basic VFR training maneuvers. Also, IFR traffic between the Sacramento and Oakland VORTACs fly through the center of the WRA on Victor-6 as low as 2000 ft MSL. Most importantly, VFR aircraft not equipped with transponders and looking to circumnavigate San Francisco’s 30 nm Mode C Veil frequently transition through the area. These aircraft funnel through the corridor above the WRA (Oakey Gate) and are a primary concern of air traffic controllers working traffic through the WRA.

FAA established a minimum level of safety for Class E airspace that does not require surveillance coverage, degradation of radar coverage caused by wind turbines would not result in a reduction of safety below the minimum standard set by FAA. However, since radar coverage does exist, and that radar coverage increases the safety and efficiency of operations within the airspace, degradation of service could decrease overall safety and efficiency of operations, especially considering the particular

configuration of the airspace over the WRA. Therefore, it was necessary to identify an acceptable level of degradation in radar coverage, more specifically the ability to accurately detect non-transponder equipped aircraft over the WRA.

In order to determine the level of acceptable degradation, the OWG first determined what services would be denied to pilots operating in proximity to the WRA if a loss or degradation of radar coverage was incurred. Since non-participating aircraft (aircraft that have not established two-way communications with air traffic control and do not have an active transponder) are not reliant upon air traffic control for services, the loss or reduction of surveillance coverage would have no impact on this type of operation. The one exception would be the issuance of safety alerts to non-participating aircraft. However, this would require the VFR pilot to be monitoring a guard frequency used by Travis ATC. While worth noting, the remoteness of this scenario warrants no consideration.

The separation of non-participating and participating aircraft was then considered. In accordance with FAA Order 7110.65, radar separation between participating and non-participating aircraft is not required in Class E airspace. Separation responsibility between these two types of operations is incumbent upon pilots who must comply with “see and avoid” procedures. It should be noted, however, that traffic alerts must be issued by air traffic controllers to participating aircraft if they are aware of a potential conflict (FAAO 7110.65: 2-1-6). Therefore, a loss or degradation of radar coverage could reduce controller visibility of non-participating, resulting in a negative impact on their ability to provide alerts to participating aircraft.

Today, Travis ATC provides radar separation and advisory services to all aircraft who request it, workload and radar performance permitting. However, current wind turbines degrade visibility over the WRA, a known operational limitation. This limitation of service is circulated to the Aviation community via a note on the VFR Sectional chart covering the WRA. Thus, additional wind turbine development that significantly increases the footprint of the existing WRA could result in additional loss of capability to provide air traffic advisory services to non transponder equipped VFR aircraft requesting them.

Moreover, current wind turbines present false targets which are difficult to distinguish from actual aircraft on the controllers’ displays. Travis controllers are required to issue traffic advisories against these false targets which results in an increased controller workload. The magnitude of the false target presentation is highly dependent upon prevailing wind conditions. An increase in the number of wind turbines could cause an increase in the number of false targets observed by the controllers. However, it should be noted that the number of false targets presently observed by the controllers’ will be significantly reduced, if not eliminated, after a correction to the STARS configuration.

This correction was temporarily demonstrated by the RWG in December 2009, which clearly showed that the use of Track Eligibility coupled with existing STARS tracking algorithms was able to eliminate false targets even during significant wind activity over the WRA.

Finally, the OWG considered the number of non-participating aircraft likely to be operating at any given time within the lateral limits of the WRA. Initially, it was believed that there were a large number of operations in this area due to flight training at nearby Concord and Rio Vista airports. However, based on the data collection conducted by members of the RWG as part of the scope of the CRADA as well as during installation activities, the number of non-participating aircraft is now estimated to be minimal. The RWG found that approximately 30 primary only flight tracks occurred in October 2009 over the WRA. While weather conditions were favorable for VFR flight during this timeframe, it should be noted that October through March is a lull time for Travis ATC operations and summer traffic can be significantly higher.

Considering all these factors (the airspace classification, operational configuration, air traffic service requirements and traffic workload) the OWG determined that degradation of radar detection resulting from additional wind turbine development in the WRA could result in a degradation of radar services provided to non-participating aircraft, but, given the “see and avoid” requirement, would not constitute a significant degradation of air safety.

In its assessment of impact on air traffic operations, the OWG agreed that a minor reduction in probability of detection (Pd) over the WRA would not create an unsafe operating environment but would decrease the safety and efficiency of operations. While the FAA and the Air Force have a minimum engineering standard used for acquisition of the ASR-11, published in the Department of Defense (DoD) Operational Requirements Document III for Air Traffic Control and Landing Systems, there is no FAA or Air Force minimum operational requirement for Pd for radar services. Since there was no reference point from which to determine the demarcation between acceptable and unacceptable impact, the OWG took into consideration the type and frequency of operations over the WRA to determine a level of degradation of surveillance coverage that would meet operational needs of the Air Force. Additionally, the OWG considered what services would be lost as a result of that degradation and determined that in the best interest of safety and the efficiency of air traffic operations, an average degradation not greater than 5 percentage points below the established baseline values (current performance) of the Pd would be acceptable.

The RWG conducted a baseline data analysis on data collected in October 2009 to determine the Pd for aircraft operating below 4,000 and 10,000 feet over the WRA. This effort analyzed the effect of the existing wind turbines on the ASR-11 at Travis and

found that the average Pd, seen at the scope by air traffic controllers, is 80.3% below 4,000 feet and 84.2% below 10,000 feet. By comparison, the ASR-11 Pd in similar airspace surrounding Travis was 92.4% below 4,000 feet and 93.73% below 10,000 feet, based on a May 2009 data collection.

The RWG then conducted a simulation of the three proposed wind turbine projects to determine what the Pd would be once they were constructed. According to the results of this study, under a worst case scenario, where complete loss of primary detection over each individual wind turbine is assumed, it is likely that a cumulative reduction of 3.5 percentage points in Pd will occur over the WRA below 4,000 feet and 3.2 percentage points below 10,000 feet. It should be noted that there was insufficient primary traffic (i.e., non-squawking aircraft) to measure the drop in Pd using best case assumptions. Therefore, the best case drop is assumed to be zero percentage points (i.e., no impact). The airspace adjacent and above the WRA delegated to Travis AFB starts at 700 feet AGL and extends upwards to 10,000 feet MSL. Therefore, the most relevant data from the RWG's analysis is from the surface to 10,000 feet MSL inside of the WRA.

As alluded to above, while collecting the radar data for this study, the RWG identified a configuration error in the STARS automation system that, has been corrected resulting in a substantial reduction in the number of false targets displayed on the scope.

Recommendations

Information and data for this report was obtained from subject matter experts from the United States Air Force, wind energy developers, and technical experts from the aviation industry involved on a daily basis with quality of radar and airspace operational requirements. These individuals represented a broad range of job assignments from executive leadership positions to very technical science and operational skills. Political, operational, and economic considerations were discussed in addition to a focus on technical issues.

The airspace affected by development in the WRA is Class E airspace. This classification of airspace places very few requirements on pilots or air traffic service providers. This is not to say that certain requirements do not exist for both parties. For example, pilots are required to keep transponders "on" if the aircraft is so equipped and the transponder is operating properly (14 CFR Part 91.215). An example of a requirement on the part of the air traffic service provider is the issuance of a safety alert on non-participating aircraft that are in the flight path of a participating aircraft. This later example requires that the controller sees the aircraft on radar or receives a position report via radio from the pilot.

History shows that the quality of air traffic control services provided by Travis AFB is excellent, acknowledged as excellent by local pilots, and the record of incidents in the airspace above and adjacent to the WRA is close to non-existent.

The RWG evaluated both baseline (data recorded October 2009 from Travis AFB) and simulation data. The overall result of this work indicates that the construction and operation of the three identified projects would not reduce the Pd more than the 5 percentage point margin identified by the OWG to protect the safety and efficiency of operations in proximity to the WRA.

Therefore, the OWG concludes that, for the three projects evaluated for this report, the construction and operation of wind turbines will not significantly impact the mission of Travis AFB or the safety of aircraft operating in the airspace delegated to Travis AFB by the FAA.

The working group determined that the analysis, simulation and findings presented exceeded the level of due diligence necessary to assess the impact of the three proposed turbines. However, opportunities exist for additional mitigation that may result in improvements to the Pd over the WRA.

Although false target generation has been resolved through properly configuring the STARS settings, Travis controllers should continuously monitor the scope's presentation and immediately identify any recurrence. Special vigilance is warranted through the next windy season.

Gap-filling and post-construction validation studies by the RWG should proceed in accordance with the CRADA. Gap-filling will determine whether additional feeds into Travis' STARS using Stockton ASR-11 and McClellan ASR-9 feeds will provide an improvement in Pd at the controllers' displays. Once the additional feeds are installed, the ASR-11's performance should be re-analyzed. This work should be conducted during seasonally higher winds and traffic loads, the month of July being preferred.

Additionally, a study should be considered to determine whether the overlapping radar coverage of the Stockton ASR-11 in the South sector of the airspace controlled by Travis ATC could be used instead of the Travis AFB ASR-11. The Stockton ASR-11 may be less susceptible to interference from the WRA given that part or all of the wind turbines in the WRA are masked by the terrain/curvature of the earth. If the addition of overlapping radar coverage is ultimately implemented, radar coverage over the WRA should be re-baselined.

Post-construction validation should include a re-baselining of the Travis ASR-11 performance. Once validated, this methodology should be used to evaluate future

proposed wind turbine projects against the standard recommended by the OWG (October 2009 baseline – 5 percentage points).

Additionally, Travis AFB should work closely with the local Flight Standards Office on outreach to the General Aviation community, specifically with respect to radar limitations over the WRA and the impact they have on ATC services available and to FAR requirements governing the use of transponders.. Airfield visits performed under Travis AFB's Mid-Air Collision Avoidance program is one excellent avenue for this effort.

Conclusion

The working groups charged with evaluating the impacts of the three proposed projects targeted at construction and operation in the WRA completed an exhaustive review. This study was focused on mission requirements of Travis AFB and the safety of the airspace above and adjacent to the WRA. The results of this study are that there should be no significant impact due to the construction and operation of these projects. All minor impacts are manageable and fall within the expected levels of safety and risk for the airspace being evaluated. Worst case predicted radar impacts fall within the informal standard for operational efficiency of air traffic control radars in both the US Air Force and the FAA.

APPENDIX M

Solano County Airport Land Use Commission Resolution No. 10-01

**SOLANO COUNTY
AIRPORT LAND USE COMMISSION
RESOLUTION NO. 10-01**

**RESOLUTION REGARDING CONSISTENCY OF THE
SOLANO WIND PROJECT PHASE 3 WITH THE
TRAVIS AIR FORCE BASE LAND USE COMPATIBILITY PLAN, AND
RIO VISTA MUNICIPAL AIRPORT LAND USE COMPATIBILITY PLAN**

WHEREAS, pursuant to Public Utilities Code section 21670 et seq., the Solano County Airport Land Use Commission ("ALUC") has the responsibility to prepare and adopt airport land use plans for public airports within Solano County and to amend any such adopted plan as necessary; and

WHEREAS, Public Utilities Code section 21675 grants to the Commission authority to prepare and adopt an airport land use plan for any public airport and federal military airport within Solano County; and

WHEREAS, pursuant to such authority, the Commission adopted airport land use compatibility plans for Travis Air Force Base and Rio Vista Municipal Airport (the "Compatibility Plans"); and

WHEREAS, the Compatibility Plans sets forth criteria to be applied by the Commission when evaluating local land use plans and specific development proposals; and

WHEREAS, the Solano County Airport Land Use Compatibility Review Procedures (Sec. 1.5.3(c) and Travis Air Force Base Land Use Compatibility Plan (Sec. 2.5.5(c)) provide for Commission review of any proposal for construction of a structure taller than 200 feet above the ground level at the site; and

WHEREAS, the Sacramento Municipal Utility District ("SMUD") is proposing to permit, construct, and operate up to 75 wind turbine generators in the Collinsville-Montezuma Hills Wind Resource Area, having an estimated net energy production capacity of up to 128 megawatts (MW), together with associated meteorological towers, and related facilities on property owned by SMUD (the "Solano Wind Project Phase 3" or "Project"); and

WHEREASE, SMUD applied to the Federal Aviation Administration ("FAA") for obstruction evaluation determinations with respect to one potential layout of wind turbine generators which included 50 wind turbine generators having heights of 411 feet above ground level and 5 meteorological towers having heights of 262 feet above ground level; and

WHEREAS, on May 4, 2009, FAA issued Determinations of No Hazard to Air Navigation, described as Aeronautical Studies 2009-WTW-2379-OE through 2009-WTW-2428-OE (wind turbines) and 2009-WTW-2429-OE through 2009-WTW-2433-OE (meteorological towers) with respect to the 50 wind turbine generators and 5 meteorological towers at latitudes and longitudes specified by SMUD; and

WHEREAS, FAA's Determinations were conditioned on the Project structures being marked and/or lighted in accordance with the specified applicable FAA Circulars; and

WHEREAS, the Airport Land Use Commission has duly considered, at a noticed public meeting, the proposed Solano Wind Project Phase 3 in order to ensure consistency of the proposed project with the Compatibility Plans; and

WHEREAS, the Solano County Airport Land Use Compatibility Review Procedures (Sec. 2.3.5) provide that once a project has been found consistent with the relevant compatibility plan or plans, it need not be referred for review at subsequent stages of the planning process unless: (1) insufficient information was available at the time of the Commission's original review of the project to assess whether the proposal would be fully in compliance with compatibility criteria; (2) the design of the project subsequently changes in a manner that reopens previously considered compatibility issues and could raise questions as to the validity of the earlier finding of compatibility; or (3) the local jurisdiction concludes that further review is warranted.

RESOLVED, that after due consideration, the Commission does hereby find and determine that the SMUD Solano Wind Project Phase 3 is consistent with the provisions of the Compatibility Plans. subject to the following conditions:

1. The Project shall comply with all conditions of the FAA Determinations of No Hazard issued in connection with the Project. The FAA conditions include the requirement that the structures be marked and/or lighted in accordance with the applicable FAA Circulars; and
2. Prior to commencement of construction of the Project structures, SMUD shall file with the ALUC a document describing the final latitudes, longitudes, and heights of the structures to be constructed.

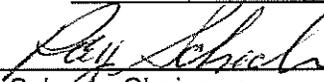
I hereby certify that the foregoing resolution was adopted at a special meeting of the Solano County Airport Land Use Commission on January 20, 2010, by the following vote:

AYES: Commissioners Schoch, Potter, Baldwin, Baumler, and Seiden

NOES: Commissioners None

ABSTAIN: Commissioners None

ABSENT: Commissioners Stockard, Cayanagh and Vancil

By 
Ray Schoch, Chairman
Solano County Airport Land Use Commission

Attest:

By: 
Birgitta Corsello, Secretary to the Commission

APPENDIX N

Solano Wind Project Phase 3 Access Roads and Wetlands Memorandum

Prepared For SMUD
Project Solano Wind Project Phase 3 Access Road Review
Date February 15, 2010
Subject Wetland Assessment
Prepared By Jan Novak, November 2009
Reviewed By Steve Leach, Dennis Dudzik, and Christine Stora, December 2009

INTRODUCTION

On November 17, 2009, URS Sacramento field coordinator Christine Stora, principal-in charge Dennis Dudzik, civil engineer Sean Burnett, and field scientist/GPS operator Rachel Avila accompanied biologists Steve Leach and Jan Novak during a wetland assessment. The purpose of the wetland assessment was to augment the current delineation for the study area (SMUD, 2008). The previous delineation has been verified by the United States Army Corps of Engineers (USACE). The purpose of this visit was to look specifically at selected areas—proposed maintenance roads—in order to identify ways to minimize impacts that might occur from construction activities. These maintenance roads would be approximately 32 feet wide with 4-foot-wide shoulders to accommodate the heavy machinery necessary in wind turbine construction.

STUDY AREA DESCRIPTION

The three areas reviewed are north of Montezuma Hills Road in Solano County, California (Figure 1). The majority of the landscape is hills, intersected by swales and ephemeral drainages, most of which drain into the Delta. The study area and immediate vicinity is vegetated primarily with non-native grasses. Current land use includes cattle grazing, dry-farming, and generation of wind energy. The late season vegetation present within the study area was not readily identifiable, as it was both long past the spring bloom season required to identify most of the grasses (Poaceae family) and had been extensively grazed by cattle.

These three areas reviewed are Proposed Access Roadways 4, 7, and 17. Proposed Access Roadway 4 runs along a current access road and parallels a large drainage/flood basin east of the road. The flood basin appears to have once connected with an area on the western end of the roadway. Proposed Access Roadway 7 is further south the road from Proposed Access Roadway 4 and is a low point at the confluence of the access road. Present at Proposed Access Roadway 7 are an apparently unused dirt road and another dirt road leading northeast into the hills. The Proposed Access Roadway 15 segment between the junction with Existing Access Roadway 3 and the junction with Proposed Access Roadway 17 (Area 15-17) is located within approximately 600 feet of the Delta. Two ephemeral drainages run onto a delta-shaped field that slopes toward a large wetland adjacent near the delta (see Figure 1).

METHODS

The team surveyed all three areas on foot. The team also surveyed surrounding areas that could constitute a significant nexus, including ephemeral channels and swales. We recorded wetland data but did not complete official wetland or ordinary high water mark (OHWM) data sheets. In Proposed Access Roadway 4, the team recorded general hydrology features and dominant vegetation. Several soil test pits were excavated in Proposed Access Roadway 7 and general characteristics were recorded. In Area 15-17, two soil pits were excavated to augment the vegetation data.

RESULTS

Proposed Access Roadway 4 – This area was marked as a seasonal wetland in the previous wetland delineation (SMUD, 2008). Our visit confirmed the previous conclusion that the majority of areas bordering the current gravel roadway are depressions that would qualify as wetlands under the jurisdiction of the USACE. Test pits were not excavated during this site visit; however, the vegetation we observed was dominated by *Distichlis spicata* (wetland indicator status of facultative wetland [FACW]), *Juncus mexicanus* [FACW], *Malvella leprosa* facultative [FAC] and *Hordeum marinum* (widely accepted as FAC) (Photograph 1). Also present were signs of hydrology (sediment deposits). While soils analysis was not completed, the area will most certainly meet USACE criteria for wetlands. Therefore, it is highly recommended that the current gravel roadway not be widened and that no additional roadway be built in this area.

Mr. Dudzik stated that the current gravel road does not have the 32-foot width necessary for heavy equipment. He noted that this roadway could potentially be moved from its current location. Mr. Leach agreed with this statement, mentioning that the current gravel road is built in a floodplain area and its westward realignment (into the slope) would hydrologically connect the eastern and western areas of the floodplain. This restoration could be utilized for mitigation purposes.

Proposed Access Roadway 7 – This is the site of a former farm, with several dilapidated buildings still present. Several large drainages intersect, through a series of culverts, along the dirt roadway. The proposed roadway would follow an existing dirt roadway in the northwest direction. A channel runs along the eastern boundary of the current roadway. This area had seasonal wetlands and a channel mapped in the previous wetland delineation. The team used GPS to demarcate the OHWM in the channel that runs northeast along the roadway. Our OHWM corresponded well with the previous delineation.

Further up the drainage, the area flattens out where the aforementioned drainage is intersected by a swale. This swale lacks sufficient signs of hydrology (no OHWM is present). As a result, this swale would most likely be identified as a non-jurisdictional swale by USACE (USACE and United States Environmental Protection Agency, 2007). We observed several seep wetlands in this area, which had a preponderance of *Juncus mexicanus* (Photograph 2). In addition, the sampled soils had clay loam texture, with reduced colors (Munsell, 2000) and redoximorphic features, which are a positive hydric soil indicator. Again, the team delineated the seep wetlands using a GPS unit.

The general consensus with the engineers present, Mr. Dudzik and Mr. Burnett, was that the western hillside along the current roadway could be utilized to construct a roadway of sufficient width for the heavy machinery. The engineers will use the OHWM (and the readily visible top of bank) to ensure the 32-foot-wide roadway is outside of the drainage channel. In addition, the wet meadow can be avoided by constructing the roadway on the western slope of the hill north of the meadow (as opposed to traversing east through the meadow). Therefore, impacts to jurisdictional channel and the wet meadow can be avoided by engineering the roads to avoid these features.

Proposed Access Roadway 17 (Area 15-17) – This area is marked as both seasonal and permanent wetland in the previous delineation (SMUD, 2008). Site analysis was very difficult due to the lack of identifiable vegetation, both as a result of the late season survey and grazing in the area (Photograph 3). Soils sampled here were of mixed parent material, some of which had redoximorphic features. Our recommendation for this area is to conduct an additional wetland delineation in spring 2010, should a roadway be considered here. Further, Mr. Leach suggested that the roadway be temporary in nature, thus eliminating permanent impacts.

CONCLUSIONS

The supplemental survey indicates that Proposed Access Roadway 4 is not conducive to expansion. The current roadway (if used) should be moved out of the floodplain to accommodate expansion from its current size to 32 feet in width.

Roadway expansion in Proposed Access Roadway 7 is possible as long as the roadway remains outside OHWM as well as the top of bank. The seep wetlands above the drainage can be avoided, according to the engineers.

Area 15-17 will require further delineation during the spring, when hydrology and vegetation are more readily apparent. It is recommended that if the roadway is constructed, it should be temporary, remaining only through the construction period.



**Photograph 1: Proposed Access Roadway 4 floodplain.
Prominent vegetation is *Juncus mexicanus*.**



**Photograph 2. Proposed Access Roadway 7 seep wetland north of channel.
Note change in vegetation.**



**Photograph 3. Proposed Access Roadway 15 - 17 floodplain.
Note grazed vegetation.**



2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
Tel: 916.679.2000 Fax: 916.679.2900

Memorandum

REFERENCES

Munsell Soil Color Charts, 2000. Gretag MacBeth. New Windsor, NY.

Sacramento Municipal Utility District. 2008. *Verified Wetlands Delineation Report for the Sacramento Municipal Utility District Solano Wind Project, Phase 3.*

United States Army Corps of Engineers (USACE). 2008a. *Final Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region.* J.S. Wakely, R.W. Lichvar, and C.V. Noble, ed. ERDC/EL TR-06-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center, Environmental Laboratory.

USACE. 2008b. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States.* R.W. Lichvar and S.M. McColley, ed. ERDC/CRREL TR-08-12. Hanover, NH: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

USACE and United States Environmental Protection Agency. 2007. *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook.*

Prepared For SMUD
Project Solano Wind Project Phase 3
Access Road Review
Date February 15, 2010
Subject Civil Engineering Review of Conceptual Access Road Alignment – Site Visit
Conducted on November 17, 2009
Prepared By Sean Burnett, P.E.
Reviewed By Dennis Dudzik, P.E.

SITE VISIT OBJECTIVE

On Tuesday, November 17, 2009, civil engineer Sean Burnett accompanied principal-in-charge Dennis Dudzik, field scientist/GPS operator Rachel Avila, field coordinator Christine Stora, and biologist Steve Leach and Jan Novak on a site visit to the Solano Wind Project area. The objective of this site visit was to visually inspect the proposed access road alignments to determine (1) how to minimize or eliminate the potential impacts to adjacent wetland areas and (2) the suitability of the easement alignments to encompass all construction activity areas. In cases where more than one alignment option was originally developed, recommendations were made on selection of the most desirable option. Working under the advisement of the wetland delineation personnel, alignment modifications were recommended in areas where conflicts with wetland areas could be avoided.

This memorandum summarizes the site visit observations and makes recommendations for access road alignment modifications. Recommendations are also made for conducting additional engineering analysis, prior to establishing new easement alignments, to determine the extent of cut-and-fill excavation disturbance required during road construction.

ACCESS ROAD PRELIMINARY DESIGN CRITERIA

The following preliminary criteria were used to evaluate the suitability of the proposed access road alignments:

- 32-foot-wide roadways with approximately 4-foot-wide shoulders.
- Roadways constructed with a minimum 8-inch-thick layer of compacted Class 2 aggregate base placed on adequate compacted sub-base material or geogrid stabilization layer as required to provide stability.
- Maximum 2% side slope and 10% travel slope. Minimum slopes required to maintain drainage are assumed.

- Maximum cut slopes of 2 horizontal to 1 vertical ratio (H:V) and fill slopes of 3H:1V unless geotechnical investigation and testing permits steeper slopes within a reasonable factor of safety.
- Minimum centerline radius is 150 feet to accommodate wind turbine delivery vehicles.
- Space for vehicle turnaround maneuvering required at appropriate locations.
- 80-foot-wide easements recommended for adjustment as necessary to encompass the entire disturbed area required to construct the roadways.

FINDINGS AND RECOMMENDATIONS

The following summary describes the findings along separate access road alignments as labeled on the project map. Please refer to the project map for access road alignment identification numbers and the proposed alignment modifications resulting from this visit.

Existing Access Roadway 2 between the northern entrance of the site to the junction with Proposed Access Roadway 4

Approximately 700 feet of this roadway is located directly adjacent to a wetland area. This stretch of roadway could be realigned approximately 100 feet to the west and the existing wetland area could be expanded as a mitigation measure for other destroyed wetlands.

Proposed Access Roadway 4

If the road is realigned to the south side of the swale, the toe of fill will be 5 feet away from the edge of the swale. This realignment will require a shift of the current easement to the south to encompass the entire roadway disturbance.

Existing Access Roadway 2 between Proposed Access Roadway 4 and Proposed Access Roadway 7

It might be desirable to eliminate this stretch of existing roadway because it was constructed within a wetland area. If this roadway were eliminated and the site restored to original condition, there could be an opportunity to obtain mitigation credit for other wetlands that might be destroyed or filled for new roadway construction.

Proposed Access Roadway 5N and 5S

It is recommended to remove these roadways from further consideration due to steep grade issues and other more favorable alignments to access the wind turbines.

Proposed Access Roadway 7 and 7S

The proposed alignment is centered on a wetland area. It is recommended to realign the roadway to the west of the wetland area for this alignment extending from the cattle grazing field access gate located adjacent to the farm to the end of Proposed Access Roadway 7S. Two new drainage culverts are required

near the top end of this alignment to cross existing drainage swales. The map shows the centerline of the revised road alignment and the locations for the new culverts for this revision.

Proposed Access Roadway 15 segment between the junction with Existing Access Roadway 3 and the junction with Proposed Access Roadway 17

Because of the large area of wetlands along this alignment, it is recommended this 500-foot-long segment be eliminated from further consideration. Construction of a temporary roadway is proposed between Proposed Access Roadway 17 and Proposed Access Roadway 15 to move construction equipment and wind turbine equipment to the wind turbine sites. After use, the site could be restored to pre-construction condition or an application filed for conversion to permanent fill. It was observed that a drainage culvert structure will be required at the beginning of the Proposed Access Roadway 17 alignment to convey water from the large upland wetland along Proposed Access Roadway 16 alignment. This culvert can be removed if and when the temporary road is removed. The map shows the centerline of the proposed temporary roadway and the approximate location of the drainage culvert.

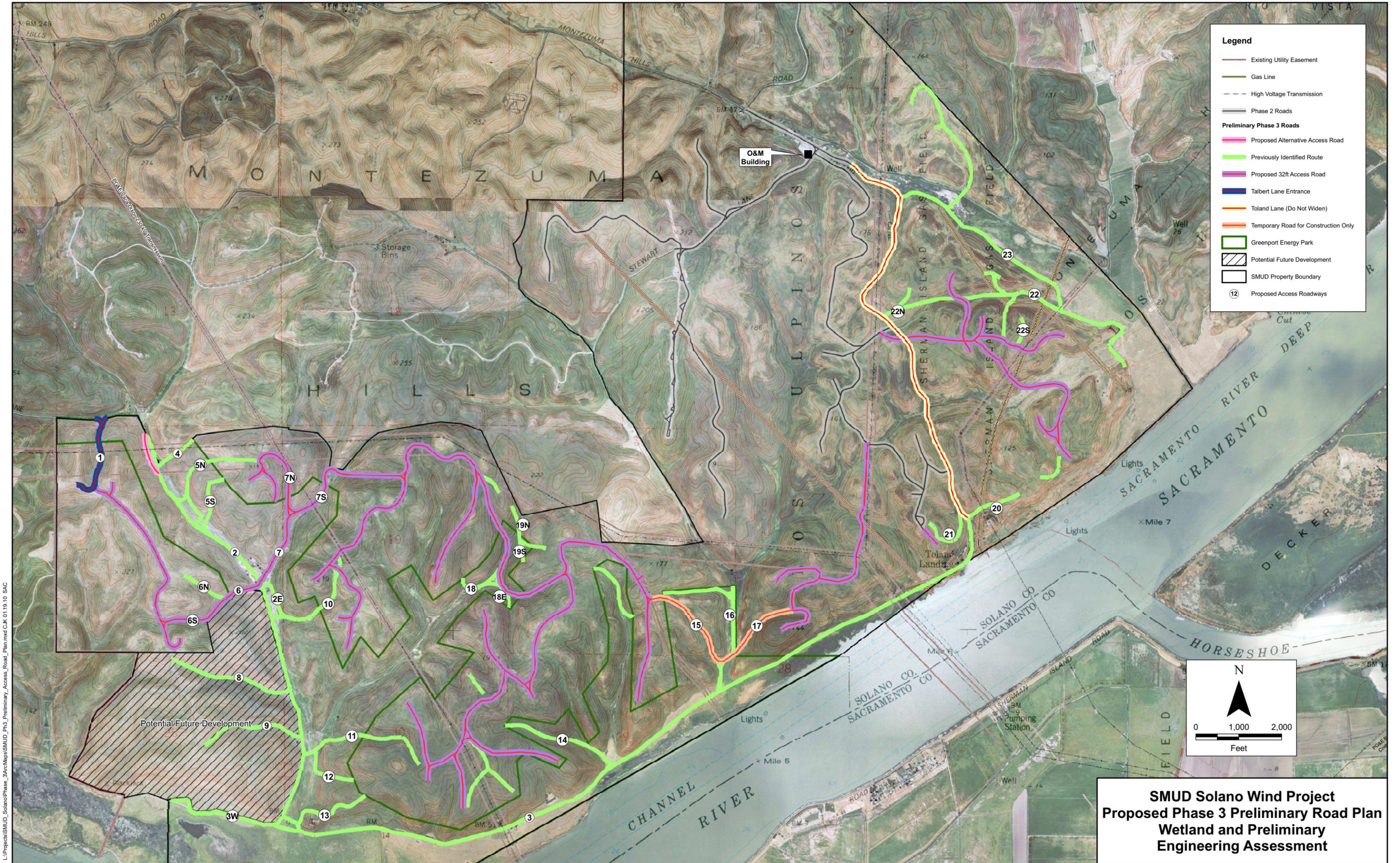
Proposed Access Roadway 16

It is recommended this alignment be eliminated from further consideration due to the suitable alternative roadway alignments available to access the turbine sites.

ADDITIONAL INFORMATION REQUIRED

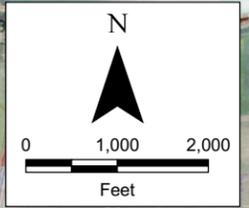
The following information is required prior to revising easement alignments to accommodate the proposed roadway alignment revisions,

- Preliminary engineering layout of the roadways, including horizontal and vertical curvature design, is required to determine the extent of the cut/fill cross-section along the alignments. This preliminary design effort will identify the maximum horizontal extent of the disturbance required to construct the roadways.
- Preliminary geotechnical analysis should be performed to determine the cut-and-fill slope design criteria. This effort will identify the actual steepest slopes possible for the roadway construction. This information could be critical to understanding the actual earthmoving cost for this effort.



Legend

- Existing Utility Easement
- Gas Line
- High Voltage Transmission
- Phase 2 Roads
- Preliminary Phase 3 Roads**
 - Proposed Alternative Access Road
 - Previously Identified Route
 - Proposed 32ft Access Road
 - Talbert Lane Entrance
 - Toland Lane (Do Not Widen)
 - Temporary Road for Construction Only
- Greenport Energy Park
- Potential Future Development
- SMUD Property Boundary
- Proposed Access Roadways



**SMUD Solano Wind Project
Proposed Phase 3 Preliminary Road Plan
Wetland and Preliminary
Engineering Assessment**