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Subject: Comments for the Painted Hills Wind Repowering Project Initial Study, Commercial WECS Permit No. 180001 / Variance Case No. 180003 – Intent to Adopt a Mitigated Negative Declaration – CEQ180059.

Dear Mr. Jones,

This letter contains my comments on the biological resource impact analysis for the Painted Hills Wind Repowering Project (Project) Initial Study and Mitigated Negative Declaration (IS/MND). 3-75

For the reasons outlined herein, the Project IS fails to meet the requirements of impact analysis and mitigation under the California Environmental Quality Act (CEQA).

As written, the IS/MND fails to adequately:

- Describe the Project baseline,
- Analyze the significant environmental impacts to biological resources of the Project, and
- Propose and describe sufficient mitigation measures and/or alternatives to reduce the various significant and potentially significant impacts to less than significant.

I. THE IS/MND'S FAILURE TO PROVIDE ACCURATE AND COMPREHENSIVE EVIDENCE OF ONSITE BIOLOGICAL RESOURCES PRECLUDES A THOROUGH ANALYSIS OF THE ENVIRONMENTAL SETTING, PROJECT BASELINE, AND IMPACTS TO SPECIES. AS SUCH, DIRECT, INDIRECT, AND CUMULATIVE IMPACTS TO MANY SPECIES REMAIN UNMITIGATED.

A. The IS/MND leaves essential details of the Project unidentified.

The IS/MND does not define what the actual size of the new turbines will be, instead providing a limit of maximum size to 500 feet height and with rotor diameters of up to 427 feet. Without

specifics, adequate baseline determinations regarding the impact by the new turbines is prohibited, thus resulting in speculation in lieu of reliable scientific analysis.

B. The IS/MND Makes Erroneous Assumptions and Conclusions Regarding Impact Analysis Based Upon Indeterminate Turbine Details.

In addition to the the size and configuration of the turbines being indeterminate in the IS/MND - described as a range and not as a specific design or size, and characterized repeatedly as what a "typical" turbine "may" look like - the Applicant goes on to ignore significant impacts to wildlife and habitats by making the erroneous assumption that swapping old turbines with larger, fewer turbines equates zero or beneficial impacts. These assumptions are unsupported by the evidence. Where wildlife and habitat are present, as is obviously the case here, size matters, both on the ground and in the sky.

Higher, wider blades are a larger accidental target for high flying migrants and raptors, including eagles and migrating Swainson's hawks (a California state Threatened species). According to the U.S. Fish and Wildlife Service's Final Environmental Assessment for the Shiloh IV Wind Repowering Project's Eagle Conservation Plan, "Because the Shiloh IV was largely a repowering project—that is, it entailed the removal of 230 old-generation wind turbines and their replacement with 50 new-generation turbines—the project resulted in vastly greater spacing between turbines and the removal of lattice towers that provided perches for eagles and other birds. **However, the total risk area to eagles also increased because of the larger size of the turbine blades.** (Emphasis added.)"[1] This project's status clearly correlates with the current Project proposal actions; and thus the conclusions of USFWS apply as well.

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Other studies of different wind turbine size configurations has established that size is a key variable in bird mortalities, stating "We found support for an increase in mortality with increasing turbine hub height... Evaluation of risks to birds is warranted prior to continuing a widespread shift to taller wind turbines."[2] and that "Bird collision probability depended on

[1] USFWS. June 2014. Final Environmental Assessment Shiloh IV Wind Project Eagle Conservation Plan. p. 33. Retrieved from: https://www.fws.gov/cno/conservation/MigratoryBirds/ShiloIV-FONSI/Attachment1-FEA-ShilohIV-June2014.pdf

[2] Loss, S.R., Will, T., Marra, P.P. (2013). Estimates of bird collision mortality at wind facilities in the contiguous United States. *Biological Conservation*, 168: 201-209. https://doi.org/101016/j.biocon.2013.10.007.

species, turbine height (taller = more victims)."[3] This research is supported by my observations as a lead raptor biologist for two years on the Ocotillo Wind site in Imperial County, an industrial wind farm in the desert with a survey area over 15,000 acres. Part of our data collection included recording the flight path of raptors, including height. I observed that raptor species including red-tailed hawks, Swainson's hawks, and golden eagles tended to prefer flight paths that were higher, i.e. between 300 and 600 feet, on over 80% of recorded observations made three times a week, eight hours a day, throughout two years.

Size matters not only to birds, but bats as well, as bats are also known to be killed by proximity to turbines. Bat research has demonstrated that activity of bats near turbines, and mortality of bats by turbines, can vary significantly depending on species due to differences in behavior and typical zones of foraging and migrating height.[4] However, the IS/MND does not even consider the entire taxa of bats when analyzing the Project's potential for significant impacts, despite the fact that is well established in the scientific literature that wind turbines kills bats, as the U.S. Geological Survey (USGS) bat biologists state, "it's estimated that tend to hundreds of thousands of bats die at wind turbines each year in North America alone."[5] USGS also reminds us that bats are not only an essential component of ecosystem biodiversity and function, they "provide pest control services worth billions of dollars to farmers annually."[6]

The IS claims that due to the fact that they are swapping old for new turbines that impacts will not only be minimal, but beneficial. Clearly this is a fallacious claim unsupported by the evidence. The IS attempts to justify its claim by quoting the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) as follows:

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> "Within each Permittee's jurisdiction, existing wind turbines may be replaced with new turbines. If old turbines are removed and the former impact area is restored to a natural condition, an equal new area may be disturbed without counting toward the calculation of net disturbance."

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[3] Maneula de Lucas, G., Janss, F.E., Whitfield, D.P., and Ferrer, M. (2008). Collision fatality of raptors in wind farms does not depend on raptor abundance. Journal of applied Ecology. 45: 1695–1703 doi: 10.1111/j.1365-2664.2008.01549.x

[4] Wellig, S. D., Nusslé, S., Miltner, D., Kohle, O., Glaizot, O., Braunisch, V., Obrist, M. K., Arlettaz, R. (2018). Mitigating the negative impacts of tall wind turbines on bats: Vertical activity profiles and relationships to wind speed. *PloS one*, 13(3), e0192493. doi: 10.1371/journal.pone.0192493

[5] USGS See https://www.usgs.gov/faqs/how-are-bats-affected-wind-turbines?qt-news_science_products=0#qt-news_science_products

[6] Khalil, Mona, ed. (2017). U.S. Geological Survey: Energy and wildlife research annual report for 2017: U.S. Geological Survey Circular 1435, 91 p., https://doi.org/10.3133/cir1435.

However, the IS/MND appears to ignore the caveat in this statement, namely that if the former impact area *is restored* a new area may avoid contributing to net disturbance. According to the IS clearly no such restoration has occurred, and neither is it described for the future.

In light of these facts alone, it is clear the IS/MND fails to accurately describe significant impacts to birds and bats, thus prohibiting any adequate analysis of how any direct, indirect, or cumulative impacts may successfully be mitigated.

C. The IS/MND Underestimates and Mischaracterizes the Impacts to Onsite Habitat.

The IS/MND describes the Project as impacting a total of 2.59 acres of habitat, which happens to be all within the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) Upper Mission Creek/Big Morongo Conservation Area. Based upon the realities of the Project activities, and the IS/MND's own documentation, this analysis of acreage to be impacted and destroyed is seriously underestimated.

The IS/MND maps what they define as temporary and permanent disturbances[7], but these are mischaracterized and undervalued in respect to the impacts that will be incurred, not to mention the lack of appropriate relevant mitigation where proposed. To begin with, I have been a biologist contracted for survey and monitoring research for pre- and post-construction on various wind development sites in California, from a few hundred to several thousand acres in size (i.e. Ocotillo wind, Tehachapi Wind, Tule wind) and other energy projects. I can confirm that roads, turbine pads, and lay down yards constructed in desert habitats, whether for private or public land projects, are not successfully restored and typically not even re-vegetated whatsoever. For the most part, no attempt is made to restore them regardless of assurances or protocols scripted into impact analyses, due to various reasons including lack of incentive, oversight, and planning.

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On the rare occasion that there is an attempt to revegetate them, such efforts inevitably fail due to the fact that alluvial sand, desert scrub, and other desert habitats require diligent, multifaceted restoration strategies that are not planned or sufficiently described by the responsible parties, resulting in disturbed areas being unsuccessfully restored to anything near an approximation of their original condition prior to major disturbance, especially from grading and impaction from road construction. Where successful restoration has been achieved, such as where desert tortoise habitat protections require such due diligence, researchers confirm that, "Roads [and similar] disturbances negatively affect habitat in numerous ways (e.g.,

[7] IS/MND p. 657

compacting soil, altering hydrology). Techniques such as recontouring road berms to reestablish drainage patterns, vertical mulching ("planting" dead plant material) and creating barriers to prevent trespasses can assist natural recovery on decommissioned backcountry roads. Most habitat enhancement efforts to date have focused on only one factor at a time (e.g., providing fencing) and have not included [successful] proactive restoration activities (e.g., planting native species on disturbed soils)."[8] Therefore, the IS/MND mischaracterizes "temporary" disturbances that should be labelled as permanent, since most if not all of the "temporary" disturbance areas that include widening roads, lay down yard(s), and construction zones around new turbines, and old turbine removal disturbance zones(not estimated in acreage) that will incur direct and long lasting impacts to any and all existing habitat affected by such construction.

According to the IS/MND site maps and construction details, the Project will therefore permanently impact much more than 2.59 acres of habitat. According to Exhibit A of the IS/MND, construction of the new turbines will require construction of both new roads and widening of existing ones along all of the "crane paths", to allow for passage of the cranes and the enormous turbine blades which may each be up to approximately 210 feet in length each. Clearly, roads built for smaller turbines constructed in the 1980s will be inadequate in width and configuration to accommodate passage of the blades. The IS/MND inadequately identifies where roads will require adding or widening; for instance, in the relevant maps in Exhibit A, "existing" roads are labelled as such, proposed turbines are denoted as such, but proposed roads are not. And yet the IS/MND confirms new roads will be necessary, specifically

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> "In addition to the existing roads, permanent access and maintenance roads would be constructed to provide access and circulation within the Project. These access roads would consist of 12 to 16-foot wide permanent roads to provide access to each wind turbine, met tower and ancillary component. These same permanent access roads would be used during construction, although the width of these roads may be temporarily increased to up to 36 feet wide to accommodate cranes and larger construction equipment. Access roads would consist of compacted native material but may also require approximately 4 to 6 inches of aggregate and/or geosynthetic material to provide the soil strength needed for construction. The disturbed areas outside the final roadway width would be graded and compacted for use during construction and then de-compacted and stabilized at the conclusion of construction. New permanent access roads would incorporate applicable local standards regarding internal

[8] Abella, S.R. and Berry, K.H. (2016). Enhancing and Restoring Habitat for the Desert Tortoise. *Journal of Fish and Wildlife Management*. 7(1): 255-279. http://fwspubs.org/doi/pdf/10.3996/052015-JFWM-046

road design and circulation, particularly those provisions related to emergency vehicle access." [9]

To be clear, according to the construction blueprint in the IS/MND, several miles of roads will *require* expansion to 36 feet wide from their existing 8 to 16 feet width at present, not "up to" 36 feet, to allow for the cranes and blade transport access. Just one mile of new roads at 36 feet will incur a minimum of another 4.36 acres of disturbance, and according to the maps, new crane access roads will need to be constructed to towers 2, 3, 13, and 14, while existing roads will require widening. And yet the IS/MND does not describe or detail how these permanent roads will be "partially" restored, merely stating they will be "revegetated" with no further discussion.[10] And, once again, the descriptions are indeterminate, saying actions are "typical" but not defined as what will occur onsite, including the stating that certain structural segments of the road will be described only when the final geotechnical report is submitted.[11]

The IS/MND does not specifically describe where the estimate of 2.59 acres disturbance comes from, so one must infer it comes from creation of the turbine pads and related impacts. However, the laydown yard itself, according to the site map, will comprise over 5 acres of habitat to be permanently disturbed (permanent as per reasons stated above), with the only allusion to mitigation being the claim that it will be "restored" with no further discussion. Additionally, the IS/MND claims it will create construction zones for each turbine approximately 200 by 300 square feet. This is an unreasonably conservative estimate, given the necessity of creating space for large vehicle (cranes, blade transport vehicle) turnaround at the end of the roads (= the turbine site), the potential size of the turbines (over 200 feet in length), the size of the cranes, parking for other vehicles, topsoil and other aggregate replacement if a the turbine site as predicted, "The topsoil from the crane pads...would be used at adjacent locations during restoration activities",[12] and any other miscellaneous construction materials needed at the turbine site. However, even if this 200 by 300 foot estimate were accurate, the total space to be disturbed would amount to almost 20 acres for the entire site, given the addition of 14 new turbines. Finally, the sum disturbance by other structures and the MET towers would comprise impacts to the site, and are also not part of the disturbance estimate in the IS/MND.

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Regardless of the IS/MND's mischaracterization of permanent disturbances as temporary, they also make no little attempt to analyze their so-called temporary impacts with accuracy, not just

[9] IS/MND p. 312

[10] IS/MND Exhibit A, see also p. 312

[11] *Ibid.*

[12] *Ibid.*

due to their conflicting discussion of road construction, but also due to the fact they do not address the impact that removal of 291 existing turbines will have on ground-dwelling species next to and near these activities. As the IS/MND photos themselves portray, these turbines are surrounded extensively by native habitat, which could be occupied by protected species like the Desert tortoise, among many sensitive species not yet surveyed (see details, below). The disturbance to these areas necessitated by break down, removal, and transport of almost 300 turbines off-site could incur an abundance of significant impacts across the entire Project site, disturbance that cannot feasibly be limited to the existing narrow roads constructed decades ago (not to mention impacts of indirect disturbance including fugitive dust, and mortality to protected lizards (see below). This reality needs to be incorporated into the impact analysis for it to meet the minimum requirements of CEQA analysis for direct and indirect impacts to the existing habitat and related species that may abut and be in proximity to the turbines, existing roads, and roads to be expanded for these purposes.

As importantly, it should be noted these impacts discussed thus far are primarily for direct impacts, and do not take into account the indirect impacts from noise, dust, vehicle disturbance to sensitive wildlife in the form of harassment or mortality, among other sources. In short, all of this speculation, mischaracterization, and erroneous summation of site disturbance prohibits an accurate analysis of impacts to habitats and to whatever wildlife may be occupying or otherwise using those habitats for breeding, foraging, migration, over-wintering, and dispersal.

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D. The IS/MND Fails to Adequately Survey and Describe the Sensitive Species that May Occur Onsite, Prohibiting Analysis of Impacts, and Thus Fails to Mitigate Significant Impacts

The sum total of the relevant, recent focused or protocol surveys for all of the sensitive species that have a moderate to high potential to occur onsite presented in the IS/MND is zero. The only survey of any kind conducted in the past several years, for this Project, amounts to one day in March, specifically "A general field survey within the Survey Area was conducted by LSA Biologist Jodi Ross-Borrego on March 1, 2018."[13] According to the habitat present onsite, the California Natural Diversity Database (CNDDB) as well as other databases and resources for this locale (discussed further below), species that have a moderate to high potential to occur include the Federally endangered Coachella Valley milkvetch (*Astragalus lentiginosus var. coachellae*), Federally endangered triple-ribbed milk vetch (*Astragalus tricarinatus*), Federally and State-listed threatened Desert tortoise (*Gopherus agassizii*), Federally threatened and State-listed endangered Coachella Valley fringe-toed lizard (*Uma inornata*), the California fully protected species the Golden eagle (*Aquila chrysaetos*), the State listed threatened Swainson's

[13] IS/MND p. 652

hawk (*Buteo swainsoni*), and the Federally listed endangered and State listed threatened, California fully protected species the Peninsular Bighorn sheep (*Ovis canadensis nelsonii*) (peninsular Distinct Population Segment). An additional 25 sensitive species have a moderate to high potential to occur onsite, including but not limited to the Little San Bernardino Mountains linanthus (*Linanthus maculatus (Gilia maculata*); Desert beardtongue (*Penstemon pseudospectabilis* ssp. *pseudospectabilis*); Coachella giant sand treader cricket (*Macrobaenetes valgum*); Coachella Valley Jerusalem cricket (*Stenopelmatus cahuilaensis*); Orangethroat whiptail (*Aspidoscelis hyperythra*); Burrowing owl (*Athene cunicularia);* Prairie falcon (*Falco mexicanus*); and the Loggerhead shrike (*Lanius ludovicianus*). As the IS/MND stands, not one of these species has received adequate analysis of onsite status nor a resultant thorough impact mitigation assessment.

1. Impact analysis and resultant mitigation analysis for any and all species potentially onsite is precluded by a lack of surveys.

For the IS/MND to ignore the need for focused / protocol surveys for these protected species, as well as avoiding rare plant surveys, bat surveys, general avian, mammal, reptile, and herpetological surveys, demonstrates a fatal flaw in the analyses. It is impossible to analyze direct, indirect, or cumulative impacts to species without such ground-truthing or data on hand.

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2. The IS/MND presents incomplete and invalid data for the Golden eagle.

It is well documented that wind facilities locally and nationally cause mortalities to eagles and other raptors, in evidence by the abundance of research, regulations, monitoring and conservation plans, other forms of oversight, and the existence of a strict permitting process for eagle take at wind facilities. The IS/MND attempts to downplay this reality by citing statistics from other project and avian mortality surveys that are anywhere from 17 to several decades old. The IS/MND also refers to golden eagle surveys by Dave Bittner of the Wildlife Research Institute (WRI) for the 2011 breeding season. Specifically, it states, "In order to comply with USFWS survey recommendations, golden eagle occupancy and productivity surveys were conducted in 2011..." In fact, the discussion herein demonstrates the eagle report is not in compliance with USFWS. Additionally, the WRI report, included in the IS, contradicts the conclusions made elsewhere in the IS/MND, where the report states how anthropogenic causes including wind facilities with increasingly larger turbines have contributed to drops in eagle reproduction rates to as low 12 % in the Mojave and Sonoran deserts.[14]

[14] IS/MND Appendix C p. 2

a) First, these survey data are far too old to represent the current condition for the golden eagle use in and near the site. According to the USFWS' Interim Golden Eagle Inventory and Monitoring protocols, determinations regarding golden eagle breeding status for a nest territory is based upon "whether or not a location is a nest used for breeding in the current year by a pair."[15] No accurate analysis of relevant nesting information can be made by a study that is seven years old. Additionally, the USFWS states that all breeding sites within a breeding territory are deemed occupied "while raptors are demonstrating pair bonding activities and developing an affinity to a given area." Again, without knowledge of recent eagle activity throughout the project site and vicinity, no valid conclusions can be made regarding impacts to breeding or foraging territories. Not only are current eagle nesting territory surveys necessary for this Project's impact analysis, so are ground surveys that assess presence and abundance of prey for foraging eagles. As the American Eagle Research Institute points out in their Protocol for golden eagle occupancy, reproduction, and prey population assessment, golden eagle reproduction and related foraging behavior is highly correlated with prey abundance of species like the black-tailed jackrabbits and ground squirrels; the primary prey of golden eagles in many areas of the western United States depending on the region. As written the IS presents no information on the presence or absence, diversity, richness, density, or abundance of eagle prey species on or bordering the site, therefore any analysis regarding potential for use of the site by golden eagles for foraging is further prohibited.[16]

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b) Second, although outdated, the eagle surveys conducted by WRI in 2011 demonstrate the Project area has high potential to support a wide variety of not only raptors, but other sensitive species as well. As the IS/MND states, the 2011 study reported findings of no less than

> "Six golden eagle nests, comprising three territories, were documented with core nesting areas within the Painted Hills spatial buffer...during additional surveys, three golden eagles, an American kestrel (*Falco sparverius sparverius*), 13 bighorn sheep (*Ovis canadensis*), 35

[15] Pagel, J.E., D.M. Whittington, and G.T. Allen 2010. Interim Golden Eagle inventory and Monitoring protocols; and other recommendations. Division of Migratory Bird Management. U.S. Fish and Wildlife Service. https://www.fws.gov/southwest/es/oklahoma/documents/te_species/wind%20power/usfws_interim_goea_monitoring_protocol_10march2010.pdf. p. 26

[16] Driscoll, D.E. 2010. Protocol for golden eagle occupancy, reproduction, and prey population assessment. American Eagle Research Institute, Apache Jct., AZ. 55pp. Https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83955&inline

common ravens (*Corvus corax*), four great horned owls (*Bubo virginianus*), two peregrine falcons (*Falco peregrinus*), three prairie falcons (*Falco mexicanus*), 13 red-tailed hawks (*Buteo jamaicensis*), seven Swainson's hawks (*Buteo swainsoni*)(a state listed threatened species), a turkey vulture (*Cathartes aura*), and an unidentified falcon (*Falco* sp.) were observed comprising a total of 83 unique wildlife documentations."

These data further underscore the need for onsite focused protocol surveys for protected species as well as other sensitive species that may be impacted by installation of larger turbines.

c) Third, even if the WRI were current, it is too limited in scope to be comprehensive or adequate; the report itself lists constraints that resulted in incomplete coverage of the core target territories in and around the Project site. Specifically, it acknowledges that due to high winds, presence of protected bighorn sheep, supposed delayed receipt of a permit, and "size and complexity of the range", the surveys resulted in incomplete coverage and failure to follow USFWS protocol guidelines.[17]

d) Fourth, the survey is technically invalid. In August, 2013 Dave Bittner, the presumed permitted biologist conducting the WRI studies, was convicted of golden eagle "take" under the Migratory Bird Act and the Bald and Golden Eagle Protection Act, golden eagle theft, working without a state or federal permit, and banding eagles despite an officially inactive banding permit.[18] Since 2000 Bittner had been working without a California state permit, thus the surveys conducted for this project in 2011 were not invalid based upon his lack of meeting state and federal requirements, and having his banding permit denied. The sentencing memorandum indicates that Bittner lied to probation officials, for years failed to provide required data to wildlife agencies, while accepting over $600,000 in payment from industrial wind facilities developers. The memorandum also states that Bittner conducted a helicopter survey of eagle nests in Joshua Tree National Park even after being specifically denied a permit for use of a helicopter due to fears of disturbing the birds. Based upon the timing and location, it appears that the unpermitted, illegal helicopter survey was the same one cited in this IS/MND.[19] In summary the WRI survey was not only unpermitted but conducted by a researcher proven by a federal court to be lacking in the integrity or veracity necessary to provide reliable data. For the IS/MND to present such data in support of their claims makes the IS/MND equally lacking in integrity and utility for impact analysis.

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[17] IS/MND Appendix C p. 8-9, and Figure 3.

[18] See Sentencing memorandum: https://www.eastcountymagazine.org/sites/eastcountymagazine.org/files/2013/July/BittnerSentencingmemo.pdf Retrieved Nov 24, 2018.

[19] *Ibid.*

Based on the evidence presented above, for the IS/MND to claim "The current Project description proposes tubular monopole towers and a large reduction in the number of proposed turbines which would reduce risks to avian species [including eagles] by reducing the total rotorswept area, reducing rotor speeds, and increasing turbine spacing included on the site" is unsupported, erroneous, and thus fails to demonstrate mitigation to significant impacts to birds that may forage onsite and migrate through, including the protected golden eagle and Swainson's hawk that have been detected on and near the Project previously, according to the IS/MND's own referenced study.

II. THE IS/MND RELIES ON ABSENT, INCOMPLETE, AND DEFERRED MITIGATION STRATEGIES FOR SENSITIVE BIOLOGICAL RESOURCES RESULTING IN THE ERRONEOUS CLAIM THAT IMPACTS TO WILDLIFE AND HABITAT WILL BE LESS THAN SIGNIFICANT. THUS, IMPACTS TO VARIOUS SENSITIVE RESOURCES REMAIN UNMITIGATED.

A. The IS/MND Consistency Analysis with the CVMSHCP is Vague, Incomplete, and Erroneous in its Conclusions Regarding Impacts and Mitigation to All Species with the Potential to Occur Onsite.

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Instead of providing a Biological Technical Report that provides data and analyses of biological resources identified onsite as is customary and essential for impact assessments under CEQA, the IS/MND eschews the importance of such baseline data and detailed analysis by instead repeatedly referring to what they call a consistency analysis with the CVMSHCP.[20] It does not even provide specific data from other standard analyses, including species detected in the region as noted in the CNDDB. In fact, the CNDDB lists no fewer than 145 sensitive species that may occur in the region where the Project site is located[21], but the IS/MND offers no maps of what species accounts occur in or near the site, as is also customary for impact analyses; and instead draws erroneous conclusions[22]for potential for species to occur based upon zero recent, focused project-wide surveys for rare plants or animals, while offering no maps of vegetation or habitats located onsite. Aside from the data presented being completely inadequate for mitigation analyses as discussed above, there are three major problems with this approach:

[20] IS/MND Exhibit S p. 643

[21] CNDDB see Desert Hot Springs and Whitewater Quad species lists https://map.dfg.ca.gov/bios/?tool=cnddbQuick Retrieved No 23, 2018

[22] IS/MND Appendix B

- As mentioned above, the IS/MND conducts virtually no actual surveys or site-relevant analyses that describe the actual, real-time environmental status of the Project. And yet the IS/MND acknowledges that the Project Survey Area "lies entirely within the boundaries of the CVMSHCP. Specifically, the 492-acre Survey Area lies within the Upper Mission Creek/Big Morongo Canyon Conservation Area."[23] As such, they cannot explain how they will maintain the integrity or consistency with the CVMSCHP without having a complete set of data for such comparisons to begin with.

- The IS/MND relies on poorly described, cursory, deferred actions as their primary mitigation for direct, indirect, and cumulative impacts to species - where such impacts are appropriately or accurately acknowledged, which is rarely, despite the many sensitive species that have a high likelihood to occur onsite, including those mentioned above. This prohibits the reviewer from assessing the validity or effectiveness of mitigation for all species discussed, and the many others not mentioned and yet part of the CVMSCHP. Meanwhile, their "consistency analysis" is almost entirely limited to a discussion of how to mitigate the erroneous and limited data point of direct disturbance to 2.59 acres.

- The CVMSCHP is not a document that provides a host of clearly defined, species-specific, Project-specific mitigation protocols as the IS/MND would have the reviewer believe. Neither does it make review of said "protocols" available to the public, as is required under CEQA. And yet it bases its conclusions of successful mitigation on the assumption that "consistency" with the CVMSCHP equates successful mitigation analyzed and described. It does not, and these conclusions are wholly unsupported. The CVMSHCP is comprised of thousands of pages of discussion regarding umbrella topics including goals of research monitoring, conservation, FAQ's, and suggestions for adaptive management for species. It does not provide specific protocols unique to specific developments with their unique array of habitats, species, and development threats. And yet the IS/MND relies on generic statements for impacts to entire taxa, such as stating, "The Project is subject to the requirements of the CVMSHCP. Based on the recommendations outlined above, the Project is consistent with the CVMSHCP...."[24] and yet do not actually spell out what these recommendations are, or how they apply. The burden is on the Applicant to provide the details they are referring to. They fail to meet this burden, instead merely pointing to the existence of the CVMSHCP, and saying in essence they will follow undescribed, indeterminate CVMSHCP "protocols" and therefore be "consistent" and

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[23] *Ibid.* p 667

[24] IS/MND Exhibit S p. 15.

therefore reduce impacts to below significant. This is completely unsatisfactory, especially when one conducts a review of the actual content of the CVMSHCP: no such specific mitigation protocols exist as the IS/MND infers, certainly not for a wind farm in this region, in this mix of habitat, with this (yet to be determined) combination, density, abundance, richness, etc. of species present.

For instance, their mitigation details for impacts to the protected Desert tortoise are comprised primarily of the statement that "During construction-related activities, contractors will comply with the mitigation and minimization measures contained in the CVMSHCP protocol." However, they do not provide any details about this protocol, nor do they discuss how indirect impacts will be mitigated, and do not acknowledge the reality of cumulative impacts onsite for the Desert tortoise, despite the fact that the CVMSHCP concludes one of the reasons for its existence is to address concerns regarding the high potential for cumulative impacts to regional sensitive species including the Desert tortoise.[25]

B. Impacts to Bats Remain Unclear and Unmitigated.

As noted above, it is widely accepted by scientists and wildlife agencies that wind facilities cause significant mortalities to bats, and do not discriminate between common, sensitive, or endangered species by design.[26,27,28] This results in the conclusion by researchers of a multi-faceted study of bat mortality at different wind facilities that, "we recommend that individual wind facilities conduct project-specific pre- and postconstruction monitoring rather than infer mortality effects based on published results from other wind facilities."[29] However, the IS/MND ignores this fact by conducting no surveys, no analysis, and thus no mitigation for bats. The IS/MND fails to assess or discuss an entire taxon of species, namely bats, in its analysis of impacts, despite the fact that the CVMSCHP and CNDDB identifies several protected bat species, including the Southern yellow bat (a primary conservation "covered species" for the CVMSCHP)[30], and the Townsend's big-eared bat (*Corynorhinus townsendii*), as occurring in the

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[25] See http://www.cvmshcp.org/Monitoring_Management.htm Retrieved 11-25-2018.
[26] Wellig, S. D., Nusslé, S., Miltner, D., Kohle, O., Glaizot, O., Braunisch, V., Obrist, M. K., Arlettaz, R. (2018). Mitigating the negative impacts of tall wind turbines on bats: Vertical activity profiles and relationships to wind speed. *PloS one*, 13(3), e0192493. doi:10.1371/journal.pone.0192493
[27] David Drake, Christopher S. Jennelle, Jian-Nan Liu, Steven M. Grodsky, Susan Schumacher, and Mike Sponsler. Regional Analysis of Wind Turbine-Caused Bat Mortality, *Acta Chiropterologica.* Jun 2015 : Vol. 17, Issue 1, pp 179- 188 https://doi.org/10.3161/15081109ACC2015.17.1.015
[28] USFWS. 2012. Land Based Wind Energy Guidelines. OMB Control No.10-18-0148 https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf
[29] *Ibid.*
[30] See http://www.cvmshcp.org/Plan_Documents_old.htm Retrieved Nov 25018

region. Even the DRECP, the massive Desert Renewable Energy Conservation Plan for the desert southwest that includes the Project site region, focuses on bats as part of their conservation priority species. According to U.S. Geological Survey (USGS) biologists, "North American bats face unprecedented threats including habitat loss and fragmentation, white-nose syndrome, wind energy development, and climate change."[31] They also state that "It is difficult to evaluate impacts of these threats because there is a lack of basic information about the distribution and abundance of bats across the continent. A statistically robust and standardized bat monitoring program across North America would help managers estimate extinction risk, set conservation priorities and evaluate the effectiveness of conservation actions."[32] Indeed, if project biological consultants including LSA would embrace the scientific reality that bats are an essential component of ecosystem biodiversity and viability by conducting the necessary surveys for CEQA and similar analyses - which they could then contribute to CNDDB and elsewhere – databases would be more complete, allowing for more efficacious conservation planning as development increases and spreads throughout the desert southwest. And yet the IS/MND makes no attempt to analyze impacts to bats, not to mention to present a Bird and Bat Monitoring Program that should be part and parcel to every wind facility that proposes to mitigate injuries and deaths that are incurred during the life of a wind development, as recommended by USFWS official wind energy guidelines for wildlife monitoring and mitigation.[33]

3-75 (cont)

Finally, it should be noted that although it is important for data collection that drives best management practice, a bat monitoring program does not actually reduce impacts to bats. As such a conservation plan, including compensatory mitigation, should be part of the IS/MND's analysis to reduce potential significant impacts to bird and bat species that will be incurred throughout the life of the project. However, the IS/MND completely fails to offer any such mitigation, and thus fails once again to meet the requirements for a MND.

Not only is there abundant evidence that wind turbines kill bats, research has demonstrated that artificial light and noise can increase the risk of mortality and reduce foraging success by

[31] See https://www.usgs.gov/ecosystems/status-and-trends-program/science/bats?qt-science_center_objects=0#qt-science_center_objects Retrieved No 14, 2018.
[32] *Ibid.*
[33] USFWS. 2012. Land Based Wind Energy Guidelines. OMB Control No.10-18-0148 https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf

bats in both urban and rural settings.[34,35] As such, bats could be impacted by the presence of artificial lighting by the Project, throughout the life of the Project, as well as by its other various anthropogenic disturbances in the form of noise, light, dust, barriers, negative attractants, etc.

The necessity of detailed, baseline data for bats (as well as other sensitive species mentioned above) is underscored by the fact that the definition of a substantial impact analyses under CEQA as used in the significance criteria has three principal factors: magnitude or intensity and duration of the impact; rarity and context of the affected resource; and susceptibility of the affected resource to disturbance. The evaluation of significance must also consider the interrelationship of these three factors. For example, a relatively small-magnitude impact on a state or federally listed species could be considered significant if the species is rare and highly susceptible to disturbance. This is true not only for determining significance of impact, but degree of significance in respect to what mitigation measures would be adequate. One cannot determine factors such as context and susceptibility of an entire population regarding impacts of the development of the Project if one does not know whether there may be one, ten, or one hundred or more individuals of a special status species present. It is therefore impossible to determine, without such data, if any given mitigation measure – during construction impact reduction protocol, restoration, relocation, or compensatory mitigation will reduce the Project impacts to below significant. It is especially difficult to determine the efficacy of mitigation protocols when they are not even provided, as is the case with this IS/MND. Given all of these factors, and the complete lack of any discussion regarding presence or impacts to bats, the IS/MND has completely failed to describe how and to what extent bats may likely be impacted by the Project, and as it stands any impacts to bats remain significant and unmitigated by the Project.

3-75 (cont)

C. Impacts to Reptiles, including the C/ESA listed Coachella Valley fringe-toed lizard (*Uma inornata*), Remain Unmitigated.

As noted above, the IS/MND fails to analyze any impacts to lizards, and thus fails to mitigate them. This is an unacceptable oversight, especially in light of the evidence that they have high

[34] Warner, K. A. (2016). *Investigating the effects of noise pollution from energy development on the bat community in the Piceance basin* (Order No. 10149854). Available from ProQuest Central; ProQuest Dissertations & Theses Global. (1815584239).

[35] Cravens, Z. M., Brown, V. A., Divoll, T. J., & Boyles, J. G. (2018). Illuminating prey selection in an insectivorous bat community exposed to artificial light at night. *The Journal of Applied Ecology*, 55(2), 705-713. doi:http://dx.doi.org.jerome.stjohns.edu:81/10.1111/1365-2664.13036

potential to occur in the vicinity of the Project site, according to the CVMSHCP[36], the DRECP[37], and the following:

It is common knowledge that reptiles represent a key taxon in desert habitats and are highly sensitive to anthropogenic ground disturbances.[38] Many are nocturnal, fossorial, or crepuscular, and often highly secretive; most desert reptile species do not lend themselves to daytime, incidental observations as the IS/MND infers by not providing a thorough survey for onsite species. Neither can habitat type alone be a reliable source of potential for species to occur, countless records of species occurrences demonstrate that are many species of reptiles that, while having a habitat preference; are known to occur in a variety of habitats within their known range, including in disturbed habitat in the western Mojave Desert.[39,40,41]

The USGS recently completed a detailed study of reptile species found in alluvial sand habitat, in a 500-acre area almost the same size as this Project footprint, that they characterized as "highly disturbed" due to the predominance of non-native, invasive plant species. In fact, where the Project site is only partly predominated by disturbed habitat, the USGS study site in an arid ecosystem in eastern San Diego county was almost entirely comprised of disturbed or ruderal habitat. And yet the study findings resulted in 1,208 total captures, revealing a "high species richness and diversity" and "Despite the relatively limited 12-month sampling period, a longstanding drought, and severe habitat disturbance, our study demonstrates that [alluvial

3-75 (cont)

[36] CVMSHCP. March 2012. Coachella Valley Multiple Species Habitat Conservation & Natural Community Conservation Plan Aeolian Sand Communities and Species Monitoring Protocolshttp://www.cvmshcp.org/pdf%20files/Aeolian%20Sands%20Monitoring%20Protocol%20Final.pdf

[37] DUDEK and ICF. DRECP Appendix B. March 2012. https://www.drecp.org/documents/docs/baseline_biology_report/10_Appendix_B_Species_Profiles/10a_Reptile_Amphibian/Mojave_Fringe-toed_Lizard.pdf

[38] Vandergast, A.G.; Bohonak, A.J.; Hathaway, S.A.; Boys, J.; Fisher, R.N. 2008. Are hotspots of evolutionary potential adequately protected in southern California? *Biol. Conserv.* 141:1648–1664.

[39] Vera, P., Sasa, M., Encabo, S. I., Barba, E., Belda, E. J., & Monrós, J. S. (2011). Land use and biodiversity congruences at local scale: applications to conservation strategies. *Biodiversity & Conservation*, *20*(6), 1287–1317. https://doi.org/10.1007/s10531-011-0028-x

[40] Dutcher, K. E. (2009). *Microhabitat patch use and movement patterns in Uta stansburiana populations fragmented by a 2005 wildfire in the Mojave national preserve, California* (Order No. 1466162). Available from ProQuest Dissertations & Theses Global. (305177324). Retrieved from http://jerome.stjohns.edu:81/login?url=https://search-proquest-com.jerome.stjohns.edu/docview/305177324?accountid=14068

[41] Heaton, J. S. (2002). *The LizLand model: Geomorphic landform and surface composition analysis of lizard habitat in the California Mojave desert* (Order No. 3029564). Available from ProQuest Dissertations & Theses Global. (305504439). Retrieved from http://jerome.stjohns.edu:81/login?url=https://search-proquest-com.jerome.stjohns.edu/docview/305504439?accountid=14068

and and related habitat] harbors a rich herpetofauna that includes many sensitive species."[42] When I asked one of the USGS authors about the study findings, he said that their results were "completely unexpected" and revealed an abundance and diversity "beyond what we ever would have imagined based on the habitat alone" (C. Rochester, *pers. comm.*, Dec 15, 2016). These results underscore the need for focused, scientific surveys to truly establish the necessary faunal data to create an accurate impact assessment.

Further evidence of this fact is revealed by a study by USGS herpetologists where they explored the genetic diversity of several desert species, including shovel-nosed snake (*Chionactis occipitalis*), the collared lizard (*Crotaphytus bicinctores*), the northern desert iguana (*Dipsosaurus dorsalis dorsalis*), the desert tortoise (Gopherus agassizii), rosy boa (*Lichanura trivirgata*), Gilbert's skink (*Plestiodon gilberti*), desert spiny lizard (*Sceloporus magister*), fringe-toed lizard (*Uma scoparia*), and the desert night lizard (*Xantusia vigilis*). The study identified several biodiversity "hot spots" within the Mojave and Sonoran deserts, based upon high genetic divergence and diversity of species tested, in habitats similar in type and disturbance to those found on the Project site.[43]

Even when not hibernating, the Coachella Valley fringe-toed lizard (like other similar species) are incredibly cryptic and spend a good deal of time buried under the sand for physiologic and behavioral reasons, including predator avoidance. They have been described in the species account for the BLM as having "interesting behavioral adaptations for their dune habitat. Most notable is their sand burial behavior...fringe-toed lizards tend to frequently bury themselves within 4-6 cm of the sand surface."[44] The species' morphology itself demonstrates its unique evolutionary adaptations for spending a lot of time under sand, including a countersunk lower jaw, valved nostrils, keeled supralabials, enlarged and imbricate shoulder scales, and a dorsoventrally compressed body. As fringe-toed specialists describe, "the dorsal network of dark ocelli on a yellowish ground color make these lizards extremely cryptic on the sandy substrate".[45] (See Photos 1- 3).

3-75 (cont)

[42] Richmond, J. Q., Rochester, C. J., Smith, N. W., Nordland, J. A., & Fisher, R. N. (2016). Rare Alluvial Sands Of El Monte Valley, California (San Diego County), Support High Herpetofaunal Species Richness And Diversity, Despite Severe Habitat Disturbance. *The Southwestern Naturalist,* 61(4), 294-306. Retrieved from http://jerome.stjohns.edu:81/login?url=https://search-proquest-com.jerome.stjohns.edu/docview/1894921403?accountid=14068

[43] Vandergast, A. G., Inman, R. D., Barr, K. R., Nussear, K. E., Esque, T. C., Hathaway, S. A., Fisher, R. N. (2013). Evolutionary hotspots in the Mojave Desert. *Diversity, 5*(2), 293-319. http://dx.doi.org.jerome.stjohns.edu:81/10.3390/d5020293

[44] Hollingsworth, B. and Beaman, K. 2001. Mojave fringe-toed lizard (*Uma scoparia*)." Prepared for the Western Mojave Plan. Bureau of Land Management, Moreno Valley, California.

[45] *Ibid.*

Photo 1 (USFWS)

Photo 2 (W. Ervin)

Photo 3 (R. Owens)

3-75
(cont)

Due to their cryptic nature and difficulty to detect without conducting focused surveys, reptiles are historically underserved in conservation management plans, including those dependent on environmental impact analyses. As co-researcher of the world's most extensive study of the world's largest snake species, the green anaconda (*Eunectes murinus*), I discovered the difficulty of visually locating a secretive species despite the fact it can be over 17 feet long. This species had not been studied to any extent previously due primarily to the false belief that they were not in high abundance anywhere and thus difficult to observe for research. However, once I and my associate conducted focused surveys where they had been anecdotally observed, we caught over 800 anacondas within a few square kilometers, using a focused technique that involved tactile searching among other methods, not visual observations[46]. Visual searching alone resulted in missing over 90% of the individuals encountered via an alternative focused methodology.[47] This example keenly underscores how even one of the largest reptile species in the world can be very difficult to detect if one is not conducting surveys with a protocol and methodology designed for species-specific detection. Additionally, desert habitats that reptiles use typically include more than those identified as preferred habitats or optimal foraging habitats, and as a result environmental impact analyses that estimate the "potential to occur" of reptiles species based only such assertions of "preferred habitat" in the literature, and not focused field surveys, typically fall short of accurate site assessments regarding species presence and use.[48,49,50,51]

3-75 (cont)

New roads and access driveways constructed in most habitats, southwestern deserts included, increase the risk of direct morality of lizards and snakes by vehicles, cause habitat fragmentation and potential barriers to gene flow, and makes previously inaccessible areas available to vehicles including off-road vehicles.[52]Habitats on existing wind facilities are often disrupted by fencing of various kinds during and post-construction, and though serve to exclude

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[46] Rivas, J. A. (1999). *The life history of the green anaconda (Eunectes murinus), with emphasis on its reproductive biology* (Order No. 9973496). Retrieved from: http://www.anacondas.org/diss/disser.pdf

[47] *Ibid.*

[48] Gerson, M. M. 2004. *Aspects of the ecology of a desert lizard, Callisaurus draconoides (blainville 1835), in Joshua Tree National Park with an emphasis on home range and diet* (Order No. 3146172).

[49] Heaton, J. S. 2002. *The LizLand model: Geomorphic landform and surface composition analysis of lizard habitat in the California Mojave Desert* (Order No. 3029564).

[50] Williams, A. K. 2004. *The influence of probability of detection when modeling species occurrence using GIS and survey data* (Order No. 3123715).

[51] Rosen, P. C. 2000. *A monitoring study of vertebrate community ecology in the northern Sonoran Desert, Arizona* (Order No. 9965915).

[52] *Ibid.*

some individual animals like the Desert tortoise, also serves to trap or funnel other small species - including reptiles seeking shade - within a construction site.

In light of these realities, it is not surprising that I and my colleagues have witnessed an important phenomenon on development project construction sites in arid regions where lizard species are abundant, including wind facility sites (i.e. Ocotillo Wind). Specifically, while working on several development projects in sandy desert habitats we observed that lizards of various species, sizes, and with differing behavioral repertoires are directly and immediately attracted to roads on and around construction sites where trucks spraying water and other erosion control liquids are used to reduce airborne dust. The IS/MND notes that such methods will be implemented for this Project at least three times a day. This practice serves to attract lizards of a variety of species to the higher moisture levels on the roads, resulting in increased lizard mortality and injury due to being hit by construction site traffic that use the roads subsequent to the water trucks passing.

Within the course of one month this phenomenon resulted in the mortality of over 20 flat-tailed horned lizards (*Phrynosoma mcallii*) (a rare species) (FTHL) on one construction site in the southern Sonoran desert during 2014, and where an additional 110 FTHL were relocated to avoid mortality from vehicle impacts during several weeks of the construction phase.[53] During the construction of the Sunrise Powerlink gen-tie line in the Sonoran Desert, from just April to November, 103 flat-tailed horned lizards were relocated and 25 mortalities were recorded.[54] It is key to note that these projects failed to anticipate significant impacts to lizards, impacts due primarily to the phenomenon described above, and as a result in one instance their facility construction had to completely stop work for at least a week mid-construction. One contractor reported his company lost over $150,000 a week due to the unexpected delay.[55] Additionally, it remains unknown how effective the poorly conducted relocation actions were, since no follow-up was conducted to analyze long term success of translocation, a process known to often fail with various species and taxa.

3-75 (cont)

In summary, observations during the construction phase of an industrial site facilities in Southern California desert reveal that lizards of varying species and sizes appear to be opportunistically attracted to the added moisture on the roads from water trucks. Such

[53] Wilton, Ben. Tenaska, pers. comm., March 19, 2015; P. Hord, pers. comm., Aug 27 207.

[54] Flat-tailed Horned Lizard Interagency Coordinating Committee. (2011). Annual Progress Report: Implementation of the Flat-tailed Horned Lizard Rangewide Management Strategy, January 1, 2010 to December 31, 2010. Report prepared by the Flat-tailed Horned Lizard Interagency Coordinating Committee.

[55] Clarke, C. March 2015. Work on Solar Project Halted to Protect Lizard. KCET. Retrieved from: http://www.kcet.org/news/redefine/rewire/solar/work-on-solar-project-halted-to-protect-lizard.html

behavior observed was not restricted to any lizard species in particular. When this phenomenon was officially noted as impacting sensitive species (i.e. the FTHL), additional on-site biologists and mitigation management practices were necessary to ensure complete coverage of all construction roadways and other areas where lizards were prone to death and injury from vehicle impacts[56]. It must be noted that mortalities from even one Project such as this could have a population level effect, considering several Distinct Population Segments have been identified in this region.[57] According to Murphy et. al., "many local populations of *U. scoparia* are quite small with some having perhaps fewer than 500 adults. Small patches of sand cannot support large populations of lizards. Thus, the species is considered rare according to geographic distribution, population size and habitat specificity." Further, fringe-toed lizard densities are negatively affected by sand depletion and surface stabilization.[58]

In order to adequately mitigate for such high potential impacts to the fringe-toed and other lizards, the County must take into consideration the risks iterated above and require mitigation measures to reduce resultant impacts include additional biologists present onsite during all hours of construction, enhanced traffic restrictions, and a reptile relocation Plan and Monitoring Strategy during the construction phase.

3-75
(cont)

[56] P. Hord, pers. comm., Sage Wildlife Biology. Aug 27, 2017.

[57] Murphy, R., Trepanier, T., Morafka, D. Conservation genetics, evolution and distinct population segments of the Mojave fringe-toed lizard, *Uma scoparia*. *Journal of Arid Environments*. Volume 67, Supplement, 2006, pp 226-247. https://doi.org/10.1016/j.jaridenv.2006.09.023

[58] Kaufmann, J. S. 1982. Patterns of habitat resource utilization in a population of *Uma scoparia*, the Mojave fringe-toed lizard. M. S. Thesis, Univ. Illinois, Chicago. 78pp.

CONCLUSION

Based on the issues described in this letter, it is my professional opinion that the IS/MND has not met the obligations of CEQA and that the Project would result in significant and unmitigated impacts to several sensitive biological resources. The IS/MND must be revised and resubmitted to disclose, adequately analyze, and mitigate the significant impacts. If the impacts cannot be reduced to less than significant, they are unavoidable. No further consideration should be given to the proposed Project until an IS/MND or Environmental Impact Report is prepared and circulated that fully complies with CEQA.

Sincerely,

Renée Owens, M.S.
Conservation Ecologist

3-75
(cont)

Professional Background

I am a conservation biologist and environmental consultant with 25 years of professional experience in wildlife ecology and natural resource management. I have managed an independent environmental consultancy since 1993, contracted for work in the U.S. and Latin America. Since 1994 have maintained U.S. Fish and Wildlife (USFWS) Recovery permits for listed species under the federal Endangered Species Act (ESA), including species discussed herein. I also hold several California state and federal certifications for surveys and monitoring of protected and special status species. I have extensive experience monitoring and studying many species across several taxa, including reptiles and amphibians, passerines and raptors, and marine and terrestrial mammals. I have served as a biological resource expert on over a hundred projects involving water, urban and rural residential developments, mines, and industrial scale energy projects; on private, public, and military lands; in California, the southwest, and Latin America. I have extensive experience observing the species and habitats located within and in proximity to the Project presented in the DEIR.

The scope of work I have conducted as an independent environmental contractor, supervisor, and full time employee has included assisting clients to evaluate and achieve environmental

compliance, restoration, mitigation, and research as related to biological resources; as well as submitting written reports and comments for such work to oversight agencies. This work includes analyzing and reviewing actions pursuant to the California Environmental Quality Act, the National Environmental Policy Act, the Endangered Species Act, the Clean Water Act, the Migratory Bird Treaty Act, and other regulations, along with surveying for and preparing Biological Technical Reports and Assessments. I have been contracted as an environmental consultant by the USFWS, the USDA Forest Service, Ultrasystems, ICF, Helix Environmental, URS, AECOM, AMEC, GeomorphIS, DUDEK, ESA, Tetra Tech, Bridgenet, Bioacoustics, among others. I am a member of the National Sierra Club's Wildlife and Endangered Species Committee and Marine Advisory Committee.

My conservation and natural history research on endangered vertebrate species in Latin America have received various awards including the National Geographic Research and Exploration Award and the National Commission for Scientific and Technological Research Award. My research has been featured on National Geographic Television and Discovery Channel documentaries, and I have served as technical consultant for wildlife documentaries filmed by National Geographic Television, Discovery Channel, BBC, and Animal Planet; in 2017 I received a Special Commendation for contributions to environmental conservation from the City of San Diego.

I have a Master's degree in Ecology; my teaching experience includes college instruction since 1991. I have been an adjunct instructor in Biology, Zoology, Botany, and Environmental Science at Palomar Community College, San Diego State University, and Imperial Valley College. I taught field courses in Tropical Ecology in Ecuador and the Galapagos for Boston University, and was a Visiting Full Time Professor in Environmental Science and Botany at Imperial Valley College. At present I am completing a second MS degree in Environmental Studies from Green Mountain College, focusing on Environmental Education and Communication.

I have gained particular knowledge of the biological resource issues associated with the Project through my extensive work on numerous research and consulting projects throughout southern California. My comments are based upon first-hand observations, review of the environmental documents prepared for the Project, review of scientific literature pertaining to biological resources known to occur in and near the Project area, consultation with other biological resource experts, and the knowledge and experience I have acquired throughout my 25 years of working in the field of natural resources research and management.

3-75 (cont)

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MEMORANDUM

To:	Jay Olivas, Riverside County Planning Department
From:	Collin Ramsey, Dudek
Subject:	Painted Hills Wind Energy Repowering Project (WECS Permit No. 180001) Responses to Exhibit E of CURE's Appeal Letter, Dated December 14, 2018
Date:	January 16, 2019
cc:	Ken Baez, Riverside County Planning Department
Attachment(s):	A – Bracketed Exhibit E to Appeal Letter

This memorandum responds to Exhibit E to the December 14, 2018 appeal letter submitted by Adams Broadwell Joseph & Cardozo on behalf of California Unions for Reliable Energy ("CURE"), appealing the Planning Commission's decision to approve the Initial Study/Mitigated Negative Declaration ("IS/MND") for the Painted Hills Wind Energy Repowering Project and related approvals (the "Project"). The individual comments contained in Exhibit E have been bracketed and numbered (see Attachment A) for ease of reference. This letter supplements our January 15, 2019 letter responding to the remainder of CURE's appeal letter.

Responses to Comments

Response to Comment 3-76

This is an introductory comment to Ms. Owens' letter, to which no response is necessary.

Response to Comment 3-77

This comment states that, without turbine specifics, adequate baseline determinations cannot be made.

While it is true that the exact make and model of the new turbines has not been finalized, CEQA imposes no such specific requirement. Instead, the IS/MND describes the maximum possible dimensions of the new turbines so as to provide a conservative analysis of potential Project impacts. Based on these specifications, the IS/MND conducts a "worst case" analysis to assess potential impacts resulting from decommissioning, construction, and operation of the Project. Please refer to Response to Comment 3-13 for a complete response to this topic.

Response to Comment 3-78

This comment questions the use of results of fatality monitoring conducted at the repowered Shiloh IV Wind Project to asses impacts of repowering on eagles. Additionally, the comment claims that observations of flying raptors at the Ocotillo Wind Project are relevant for assessing risk of collision at the Project.

G

This comment does not offer any substantial evidence that the Project will increase risks to migratory birds in comparison to existing baseline conditions. The use of fatality monitoring results from the Shiloh IV Wind Project is relevant to the discussion of risk to golden eagle by tall, modern turbines, as it is an area of known golden eagle use with documented historical golden eagle mortality. That being said, Ms. Owens is correct in stating that the fatality monitoring conducted at Shiloh IV represents impacts for a limited time period; it does not reflect mortality since the repowering or over the life of the project. Ms. Owens' claim that her observations of raptors at the Ocotillo Wind Project are relevant for assessing impacts at the Project is not appropriate and not supported by the available data as described in more detail in Response to Comment 3-79 below.

Response to Comment 3-79

This comment states that raptors are frequently observed flying at the altitudes of modern wind turbines near the Ocotillo Wind Site and suggests that impacts due to taller turbines would result.

As an initial matter, the relevant inquiry is not whether, in a vacuum, impacts would result from taller turbines. The issue is whether impacts will be increased as compared to baseline conditions. In any event, there is no evidence to support Ms. Owens' claim. Flight paths and flight heights of raptors depends on a number of factors including wind, topography, season, prey, behavior, species, and other site-specific conditions. Flight heights of raptors observed at Ocotillo may (or may not) inform risk to those species at Ocotillo, but to extrapolate to other sites is inappropriate. For instance, Ms. Owens' assertions would suggest a disproportionately high level of raptor fatalities at Ocotillo; however, this has not been the case. In reality, raptor fatalities at most modern wind energy facilities are relatively uncommon, despite their tendency to fly at the height of modern wind turbines. Alternatively, high raptor fatality rates have been documented at smaller, old-generation turbines at Altamont Pass. Repowering those older sites has generally decreased impacts substantially, which has also been well-documented (Smallwood and Karas 2009; Insignia Environmental 2012; Brown et al. 2013; ICF International 2016). This suggests some degree of avoidance for larger wind turbines.

Even though the speed of rotor revolution has significantly decreased with the development of larger turbines, blade tip speeds have remained about the same. So, while the blades of the new turbines that will be used to repower the Project will be up to approximately six times longer than the old turbine blades, the speed of the blade, and presumably the risk to birds and bats, varies considerably throughout the rotor-swept area. Birds and bats flying near the central portion (the "donut") of the rotor-swept area may be able to avoid colliding with the relatively slow-moving blades of larger turbines, while, at some point within the rotor-swept area the blades are moving at a speed that birds and bats are unable to avoid. Caution should, therefore, be taken in extrapolating fatality rates based on overall rotor-swept area or turbine height alone, as the central portion of newer turbines may pose proportionately less risk to birds and bats than the outer reaches of the turbine blades. For further discussion of potential avian impacts, refer to the response provided in Response to Comment 3-19.

Response to Comment 3-80

This comment states that the Shiloh IV Wind Farm mortality report mentioned in the SWEA and the WRI eagle report are outdated and irrelevant, and that survey of the Project site must be conducted.

Ms. Owens' critique of the Shiloh IV EA is not relevant to this discussion. Occupancy of eagle nests in surrounding landscape undoubtedly changes from year to year. The WRI report establishes that eagles historically (and are assumed to currently) nest in the Project vicinity and eagles are known to occur in the San Gorgonio WRA. Foraging habitat is present in the Project area as stated in the IS/MND. The potential for eagle occurrence in the Project is not in question. The presence of zero or three occupied eagle nests within 10 miles of the Project does not change that assessment. The best available data for assessing potential impacts to eagles from the Project operation is an examination of the impacts of repowering at other wind energy sites, as well as impacts documented at other nearby wind energy facilities (e.g., Dillon Wind Energy Project; Chatfield et al. 2009).

Ms. Owens, however, provides no evidence that the Project will result in increased risks to golden eagle populations in comparison to baseline conditions. To the contrary, studies at repowered wind plants (particularly Altamont Pass) show that repowering can substantially reduce impacts to golden eagles. (Smallwood and Karas 2009, Insignia Environmental 2012, Brown et al. 2013). Ms. Owens has presented no evidence to support the claim that the removal of 291 towers will result in increased impacts to eagles. For further discussion of potential avian impacts, refer to the response provided in Response to Comment 3-19. For further discussion of golden eagles, refer to the responses provided in Response to Comment 3-24 and 3-25.

Response to Comment 3-81

This comment states re-powering projects should not be the only relevant outside project comparison for the Project's impacts and re-iterates the claim that a survey of the Project site must be conducted.

The IS/MND evaluates potential for impacts over and above the existing baseline conditions, which include an existing, 291-turbine wind energy project and associated infrastructure. Accordingly, "repowering" is the only relevant term to use when evaluating impacts (i.e., change in number of turbines, turbine size, RSA, etc.) and other repowering projects are the most relevant project comparison. With respect to Ms. Owens' claim that surveys be conducted, please refer to Response to Comment 3-80 for a complete response to this topic.

Response to Comment 3-82

This comment references comments made by the U.S. Fish and Wildlife Service with respect to the Shiloh IV Wind Farm and suggests that Project impacts to eagles may be greater. The comment also claims that the assertion that no eagle take has occurred at Shiloh IV since repowering is inaccurate because it does not include the past six years. Additionally, the comment states that project design elements may have contributed to the reduction in eagle mortality at Shiloh IV. The comment then goes on to state that the status of nearby eagle territories is essential for accurate impact analysis.

The comment regarding take at Shiloh IV is noted—take has not occurred at Shiloh IV since repowering based on the standardized fatality study and other publicly-available data. Many of the same project design features used for Shiloh IV, however, will be used for the Project (e.g., removal of lattice towers, greater spacing between turbines). Other design features at Shiloh IV are not appropriate for this Project (e.g., discourage establishment of increased prey base, responsible livestock husbandry and removal of livestock carcasses). The discussion of active nests in the vicinity of Shiloh IV included in the EA also would not be relevant to the Project as there are no farming operations or grasslands with a high prey base within or adjacent to the Project. Furthermore, no assumptions of

equivalent risk or equivalent impacts to eagle from the Project and Shiloh IV are made in the IS/MND. With respect to Ms. Owens' claim that surveys be conducted, please refer to Response to Comment 3-80 for a complete response to this topic. For further discussion of potential eagle impacts, refer to the responses provided in Response to Comment 3-19 and 3-24.

Response to Comment 3-83

This comment states that it is incorrect to assume that the current environmental baseline contributes to greater impacts than the Project simply because the number of turbines will be reduced.

Contrary to Ms. Owens' statements, the IS/MND does not simply compare the number of turbines. To the contrary, an increasing body of evidence suggests that repowering could result in a substantial reduction in overall avian fatalities (e.g., Smallwood and Karas 2009, Insignia Environmental 2012, Brown et al. 2014). Studies, particularly those from the APWRA, suggest this is true for both raptor (golden eagle, burrowing owl, red-tailed hawk) and non-raptor species (e.g., western meadowlark and loggerhead shrike). This is likely from, among other possible things, the combined effect of reducing the number of turbines at a site and an increase in the overall energy production per turbine and for the project as a whole.

The Year 1 Golden Hills fatality monitoring report (H.T. Harvey 2017) referenced by Ms. Owens is not directly comparable to other monitoring studies at repower projects conducted in the APWRA due to the use of scent detection dogs for carcass searching, which likely allowed for higher detection rates for carcasses (primarily bats and small birds). Regardless, compared to the pre-repowering APWRA-wide avian fatality monitoring study, the fatality estimates at Golden Hills were lower for raptors overall and lower for kestrels and burrowing owls. Fatality estimates for golden eagles and red-tailed hawks at Golden Hills were higher than pre-repowering estimates; however, the authors suggest the alternate fatality estimates (using BT H-T and naïve estimators) are more appropriate for estimating eagle mortality as they more accurately reflect searcher efficiency and carcass persistence for eagles (H.T. Harvey 2017). Based on these alternate estimates presented in the report, fatality rates for eagles at Golden Hills following repowering were very similar or slightly lower than pre-repowering fatality rates in the APWRA (H.T. Harvey 2017).

The comment is unclear as to what 2003-2004 study of avian use is referenced. Furthermore, such a study, which the commenter acknowledges was conducted to forecast avian mortality in repowered portions of the APWRA, are outdated as repowered sites in the APWRA have actual mortality data resulting from more recent monitoring studies. While studies of avian use may be useful for micro-site turbines, the best predictor/characterization of project impacts is always fatality monitoring. As discussed in earlier responses to comments, including Response to Comment 3-19, monitoring results to date indicate that repowering in the APWRA has resulted in a reduction in overall avian mortality, including golden eagle mortality, for those projects.

The idea that the number of bird and bat fatalities increases with increasing turbine height is not in question and has been well-documented (see Hotker 2006, Evareart 2014, Thaxter et al. 2017). What the comment fails to consider is the increase in turbine capacity and the overall reduction in number of turbines resulting from repowering a site. The Hötker (2006) study referenced in the comment analyzed impacts of wind turbines on birds, with an emphasis on how repowering is expected to change the risk of collision a per turbine basis only. Modeling avian fatality rates as a function of turbine capacity (ranging from less than 0.1 MW up to 2.0 MW) and turbine

height (22 m to 114 m) showed that collision rates for birds correlate with hub height and total blade height (i.e., larger wind turbines have higher collision rates than smaller ones); however, mass mortalities were still not reported for migrating birds, even for the tallest turbines examined (Hötker 2006). Alternatively, Hötker (2006) found no statistically significant relationship between turbine height and bat mortality; rather, the level of mortality at a site was largely influenced by habitat, with repower facilities sited in forested areas having the greatest bat mortality. This finding suggests that the siting of a wind farm and habitat present within the surrounding landscape may have a greater influence on bat fatality rates than turbine height.

Thaxter et al. (2017) conducted a recent meta-analysis of avian collision mortality at wind farms, examining 88 bird studies at 93 onshore wind energy sites to generate predictions of bird fatalities per turbine per year with increasing turbine capacity. The range of turbines included in the review was 0.1-2.5 MWs. For birds, larger turbines were associated with increased collision rates per turbine; however, a greater number of smaller turbines resulted in higher estimated mortality than a smaller number of larger turbines at projects of similar size on a per MW basis (Thaxter et al. 2017). Simulations using 0.01-MW turbines resulted in the largest estimated number of bird fatalities. Thereafter, the number of bird fatalities decreased exponentially up to approximately 1.2-MW turbines, and continued to decline up to 2.5-MW turbines (Thaxter et al. 2017). Finally, based on a study of eight land-based wind farms in Belgium with a total of 66 small to large turbines, results indicated that local factors (e.g., habitat, micrositing) can lead to strong variation in mortality rate and collision risk that could obscure possible effects of turbine size at wind farms (Evareart 2014). However, the author suggests that large turbines have more installed capacity (MW), so repowering wind farms with larger but fewer turbines could reduce total mortality at certain locations (Evareart 2014). While the largest capacity turbines examined in the above studies are still smaller than those proposed for the Project, results indicate that while overall bird fatalities per turbine will likely increase, bird fatality rates on a per MWh basis may decrease substantially. For further discussion of potential avian and bat impacts, refer to the response provided in Response to Comment 3-19.

Response to Comment 3-84

The commenter claims that the IS/MND underestimates habitat disturbance and impacts are not broken down into detail. She claims without clarification of what habitat is impacted it is impossible to analyze.

As a factual matter, Ms. Owens is incorrect. The grading plan included in the IS/MND depicts the limits of disturbance and is based upon engineering design. The acreage associated with these limits of disturbance are clearly stated throughout the IS/MND. That is, the Project will impact a total of 40.07 acres, comprising 3.74 acres of temporary impacts and 36.33 acres of permanent impacts. All Project technical studies assumed these disturbance figures for their analyses. It should also be noted that the final JPR estimates that disturbance will be approximately 45 acres. This is not a significant deviation from the 40.07 acres disclosed in the IS/MND, and the Project will mitigate impacts as disclosed in the final JPR. To the extent the comment also references jurisdictional waters, please refer to the Jurisdictional Delineation Report in Appendix E of the Biological Resources Assessment & CVMSCHP Consistency report.

Response to Comment 3-85

This comment states that the JPR process is incomplete and references the fact that the JPR states there are 45 acres of proposed new disturbance.

With respect to the status of the JPR process, Ms. Owens is incorrect. The final JPR was received by the County on December 19, 2018, and the project is a covered activity under the CVMSHCP. The project has completed the JPR and will be consistent with the avoidance, minimization, and mitigation measures outlined in the JPR. The final JPR estimates that disturbance will be approximately 45 acres, which is slightly more than the acreage calculated by the applicant and stated in the IS/MND. This is not a significant deviation from the 40.07 acres disclosed in the IS/MND, and the Project will mitigate impacts as disclosed in the final JPR. For further discussion of habitat disturbance, refer to the response provided in Response to Comment 3-84.

Response to Comment 3-86

This comment claims that protocol surveys should be conducted in order to analyze impacts.

Contrary to Ms. Owens' characterization, the IS/MND includes an analysis of special status species and identifies 44 state and/or federally listed, candidate, or otherwise sensitive species with potential to occur within the Project area. The likelihood of occurrence was determined for each species based on habitats present and known species' range. The IS/MND also describes pre-construction surveys for desert tortoise, burrowing owl, and nesting birds that would be required prior to ground-disturbing or vegetation removal activities during construction to avoid/minimize impacts to these species, consistent with the CVMSHCP. Ms. Owens has not provided any substantial evidence demonstrating that the analysis provided in the IS/MND is inadequate or that the Project otherwise will result in any undisclosed impacts to onsite biological resources. Ms. Owens disparages the many additional days of field surveys for a jurisdictional delineation and the many hours of review of existing reports and literature searches, but these only used to corroborate the analysis contained in the IS/MND.

There is also no evidence that any special status species exist on the site that have not been disclosed in the IS/MND. Ms. Owens likewise fails to provide evidence that there will be any impacts to special status species that are not covered by the CVMSHCP, mitigation measures, conditions of approval, and/or any other applicable regulatory requirement. To the contrary, the IS/MND includes measures to ensure that any impacts to special status species would be less than significant. In particular, compliance with the CVMSHCP will reduce/minimize impacts to covered species to acceptable levels of significance. The County will require the Project to comply with the CVMSHCP and the JPR (which was finalized on December 17, 2018) as a condition of approval. The project will comply with the avoidance, minimization, and mitigation measures outlined within the JPR, which includes survey protocols for the desert tortoise and burrowing owl. In addition, as explained in the IS/MND, impacts to avian species, including eagles, will be less than significant without the need for the incorporation of mitigation measures. MM-BIO-1 was included to cover any potential impacts to nesting birds covered by the MBTA and the Fish and Game Code. For further discussion of potential avian impacts, refer to the response provided in Response to Comment 3-19. For further discussion of special status species surveys, refer to the responses provided in Response to Comment 3-20 and 3-22.

Response to Comment 3-87

This comment reiterates claims that protocol surveys should be conducted in order to analyze impacts.

Please refer to Response to Comment 3-86 for a complete discussion of this topic.

Response to Comment 3-88

This comment claims that the onus is on the IS/MND to demonstrate sensitive species do not and will not occur on the Project site.

Please refer to Response to Comment 3-86 for a complete discussion of this topic.

Response to Comment 3-89

This comment questions the extent to which species occurring on the site are covered under the CVMSHCP.

Please refer to Response to Comment 3-86 for a complete discussion of this topic.

Response to Comment 3-90

This comment concerns potential impacts resulting from the new turbines in the northern portion of the Project.

The turbines in the north of the Project would be sited within 1200 feet (365 m) of the old project turbines. The closest historical golden eagle nest is over 3.5 miles from that location and that nest was last occupied in 1987, based on data from CDFW. Ms. Owens' purported observations of eagle nest site fidelity are irrelevant as eagle nests would not be impacted by Project operations and Swainson's hawks do not nest in the area. For further discussion of potential avian impacts, refer to the response provided in Response to Comment 3-19.

Response to Comment 3-91

This comment claims that updated baseline survey data are needed to properly assess impacts to golden eagles. The comment also states that the Wildlife Research Institute, Inc. survey for golden eagles referenced in the IS/MND fails to accurately inventory habitat and impacts to eagles and is too old to represent current conditions.

As stated in the IS/MND, golden eagles occur in the San Gorgonio Pass area and are known to nest in the Project vicinity. In general, eagle use of the region appears to be low, although use may fluctuate somewhat from year to year based on occupancy of nesting territories in the region. Ms. Owens provides no evidence that the Project will result in increased risks to golden eagle populations in comparison to baseline conditions. Further, she presents no data showing that golden eagle mortality has increased due to any wind repowering projects anywhere in California. To the contrary, studies at repowered wind plants (particularly Altamont Pass) show that repowering can substantially reduce impacts to golden eagles. (Smallwood and Karas 2009, Insignia Environmental 2012, Brown et al. 2013). She therefore has presented no evidence to support the claim that the removal of 291 towers (the majority of which have lattice towers) will result in increased impacts to golden eagles. For further discussion of potential avian impacts, refer to the responses provided in Response to Comment 3-19 and 3-24. With respect to the reference to the Wildlife Research Institute, Inc. survey, please refer to Response to Comment 3-25 for a complete response to this topic.

Response to Comment 3-92

This comment claims there is a high potential for burrowing owl in the project area and that adequate mitigation needs to be imposed on the Project.

The JPR process is now final, and the project will comply with the burrowing owl avoidance, minimization, and mitigation measures outlined in the JPR. Among other things, a pre-construction burrowing owl survey would be required using an accepted protocol (as determined by the CVCC in coordination with the applicant and the wildlife agencies). Prior to construction, an acceptable biologist would survey the construction area, including a 500-foot buffer, or to the edge of the property is less than 500 feet, for burrows that could be used by burrowing owls. If a burrow is located, the biologist would determine whether an owl is present in the burrow. If the burrow is determined to be occupied, the burrow would be flagged, and a 160-foot buffer during the non-breeding season or a 250-foot buffer during the breeding season would be established around the burrow. The buffer would be staked and flagged. No development activities would be permitted within the buffer until the young are no longer dependent on the burrow.

Response to Comment 3-93

This comment asserts that protocol surveys should be conducted in order to analyze impacts.

Please refer to Response to Comment 3-86 for a complete discussion of this topic.

Response to Comment 3-94

This comment claims that the IS/MND's use of the NREL study to conclude low risk to avian species in the San Gorgonio Pass region is erroneous and that other sources of information (CNDDB, other bird use studies, and other public reports) suggest otherwise.

The CNDDB, however, is not an appropriate tool for assessing species abundance or risk to avian species in the region. Additionally, the two references provided by Ms. Owens (James 2014, Lovich 2015) do not support her claim of an increase in eagle observations and mortalities in the San Gorgonio Pass region by the USFWS and USGS. Of note is that the two eagle fatalities reported by Lovich (2015) occurred in 1995 and 1997 and were found at old-generation, lattice-style turbines with a tower height of 24.4 meters.

While the NREL study does have its limitations, which are clearly identified in the report and acknowledged in the IS/MND, it does provide information relevant to establishing regional baseline conditions, for example, species composition of fatalities at old-generation wind turbines in the San Gorgonio Pass area. Fatalities have included a number of raptor species (including a single golden eagle) establishing known risk to these raptor species at old-generation turbines. This is relevant information even if standardized fatality rates cannot be estimated. For further discussion of the NREL study, refer to the responses provided in Response to Comment 3-22.

Response to Comment 3-95

This comment references two studies (McCrary et al. 1983 and McKernan et al. 1984) that were prepared for and funded by the Southern California Edison Company to assess the use and abundance of birds in the San Gorgonio WRA. Findings of these studies suggest abundance of bird use in region, with greater percentage of migrant vs. resident birds in all areas studied. The comment states that these findings suggest that migrant species could be significantly impacted by the Project.

These results of both the McCrary et al. 1983 and KcKernan et al. 1984 studies, however were included in the CH2M Hill avian use memorandum that is referenced in the IS/MND. Additionally included in the CH2M Hill memo was that McCrary et al. 1983 estimated that 6,800 birds were killed annually, based on 38 dead birds (consisting of 25 different species) found while monitoring nocturnal migrants. Considering the high number of nocturnal migrants relative to fatalities, the authors concluded that the level of mortality was biologically insignificant. Ms. Owens claim is speculative. She provides no evidence to support high level of migrant fatalities at the Project. In fact, one of the studies she cites concludes the opposite (McCrary et al. 1983).

Collision mortality of nocturnal migrant birds has generally been low at wind energy facilities, particularly in the western U.S., and multi-bird fatality events are extremely rare. Relatively large numbers of nocturnal migrant fatalities, such as those found at communication towers, have not been documented at wind energy facilities, likely due to the use of a different type of lighting. Even at facilities within a well-defined migration corridor, such as along the Texas Gulf Coast, migrant fatalities were relatively low and not quantitatively different from facilities further inland in the region (Erickson et al. 2016). Although nocturnal radar studies at proposed wind energy projects have been implemented as a method to characterize migration patterns and potential exposure levels for nocturnal migrants, no correlation has been found between radar-measured passage rates of avian targets and post-construction fatality rates, indicating that preconstruction radar studies are not an effective tool for assessing risk to migrating birds at wind energy facilities (Tidhar et al. 2012, Stantec 2017).

Response to Comment 3-96

This comment claims that the IS/MND ignores potential risks to Swainson's hawk.

Ms. Owens does not provide any substantial evidence that any impacts to Swainson's hawk may result. Although Swainson's hawks are known migrants throughout southern California, no Swainson's hawk fatalities have been documented in publicly-available fatality studies at California wind energy facilities, according to data compiled by WEST, Inc. While risk of collision for this species cannot be entirely ruled out at the Project (or similarly at Ocotillo) the risk is extremely low and unlikely to occur.

Response to Comment 3-97

This comment claims that the NREL Survey cited by the Bio Memorandum and relied on by the CH2M HILL Survey is insufficient to determine the existing environmental setting for the Project.

While the NREL study does have its limitations, which are clearly identified in the report and acknowledged in the IS/MND, it does provide information relevant to establishing regional baseline conditions, for example, species composition of fatalities at old-generation wind turbines in the San Gorgonio Pass area. Fatalities have included a number of raptor species (including a single golden eagle) establishing known risk to these raptor species at old-

generation turbines. This is relevant information even if standardized fatality rates cannot be estimated. Ms. Owens' lengthy discussion of pseudoreplication and other fatal flaws of the NREL study is not relevant to the Project. For further discussion of the NREL study, refer to the responses provided in Response to Comment 3-22.

Response to Comment 3-98

This comment suggests that the IS/MND's use of the CH2M Hill memorandum is inappropriate because it was prepared by a wind project consultant and states that the IS/MND wrongly treats the memo as a Project survey.

Ms. Owens does not provide sufficient evidence to support her claim. Contrary to Ms. Owens' characterization, the IS/MND does not characterize the CH2M Hill as a site-specific survey completed for the Project. The document is clearly identified as an "avian use memorandum" examining regional survey efforts at various wind energy facilities in the San Gorgonio Pass area, near the Project site, and serves as a reference point for data in the surrounding area. Ms. Owens offers no evidence that the Project will result in increased avian impacts. For further discussion of potential avian impacts, refer to the response provided in Response to Comment 3-19. For further discussion of the CH2M Hill memorandum, refer to the response provided in Response to Comment 3-99.

Response to Comment 3-99

This comment claims that the CH2M Hill memo is too old and unscientific to constitute substantial evidence.

Ms. Owens does not provide sufficient evidence to support her claim that the CH2M Hill memo is incomplete and deliberately misleading. Information presented in the memo includes the best available regional information at that time and identifies differences in the various study methodologies and the study limitations. While much of this information is considered incidental or anecdotal, it does provide baseline information on species occurrences in the Project vicinity. Furthermore, it is unclear to what "studies of repowered wind farms conducted by independent researchers across the U.S." Ms. Owens is referring. Studies referenced in her comments above at Golden Hills and Shiloh IV were conducted by consultants contracted by wind energy companies. To date, the best predictor of impacts at the Project is a review of impacts observed at other regional (San Gorgonio WRA) and other southern California (Tehachapi Pass WRA) wind energy facilities, as well the known impacts at other repowered projects in California and elsewhere. Such studies provide evidence that overall impacts to avian species will be reduced from baseline conditions following repowering of the Project. For further discussion of potential avian impacts, refer to the response provided in Response to Comment 3-19.

Response to Comment 3-100

This comment claims that the IS/MND fails to assess impacts to golden eagles.

Please refer to Response to Comment 3-95 for a complete discussion of this topic.

Response to Comment 3-101

This comment claims that the IS/MND lacks explanation of how CVMSHCP plans and policies would be implemented.

While Ms. Owens apparently would prefer for the IS/MND to include more detail regarding the CVMSHCP, CEQA imposes no such requirement and she does not otherwise present any substantial evidence that impacts to special status species might occur. To the contrary, the IS/MND includes measures to ensure that any impacts would be less than significant. Compliance with the CVMSHCP will reduce/minimize impacts to covered species to acceptable levels of significance. The County will require the Project to comply with the CVMSHCP and the JPR (which was finalized on December 17, 2018) as a condition of approval. The project will comply with the avoidance, minimization, and mitigation measures outlined within the JPR, which includes survey protocols for the desert tortoise and burrowing owl. To the extent Ms. Owens desires additional information, all of these materials are available in the public record.

Response to Comment 3-102

This comment re-iterates comments previously submitted by Ms. Owens and claims that the IS/MND lacks explanation of how CVMSHCP plans and policies would be implemented.

Please refer to Response to Comment 3-101 for a complete response to this topic.

Response to Comment 3-103

This comment claims that the IS/MND lacks explanation of how CVMSHCP plans and policies would be implemented. In particular, the comment references the Desert tortoise.

Please refer to Response to Comment 3-101 for a complete response to this topic.

Response to Comment 3-104

This comment claims that the IS/MND lacks explanation of how CVMSHCP plans and policies would be implemented. In particular, the comment references the Desert tortoise.

Please refer to Response to Comment 3-101 for a complete response to this topic.

Response to Comment 3-105

This comment refers to the CVMSHCP as a complicated and obtuse set of thousands of pages of documents that define species and conservation goals for the broad region within which the Project falls and summarizes reports on the history of the plan.

Please refer to Response to Comment 3-101 for a complete response to this topic.

Response to Comment 3-106

This comment claims that the IS/MND fails to address potential impacts to bats.

Ms. Owens presents no substantial evidence that the Project may result in significant impacts to bats. Post-construction mortality studies at other southern California wind facilities have shown low impacts to bats. At new-generation wind energy facilities in the open desert scrub habitats in southern California's Tehachapi WRA and San Gorgonio WRA bat fatality rates have been among the lowest in North America. In the TWRA, bat fatality rates have ranged from zero bats/MW/year at a number of facilities (see Levenstein and Bay 2013, 2014, Chatfield et al. 2014, Rintz et al. 2016, Thompson et al. 2016, WEST 2016, 2018, Rintz and Pham 2018) to 2.59 bat/MW/year at the North Sky River Wind Energy Facility (Levenstein et al. 2014). Although publicly available bat fatality data are limited within the SGWRA, where the Project is located, the bat fatality estimate at the Dillon Wind Energy Facility, located about two kilometers (1.2 miles) northeast of the Project, was 2.17 bats/MW/year during a year-long fatality monitoring study in 2008-2009 (Chatfield et al. 2009). The Dillon facility comprises 45 1-MW turbines each with a hub height of 69 m and rotor diameter of 61 m for a facility-wide rotor-swept area of 133,200 m2. This is slightly smaller than the maximum rotor-swept area for the proposed Project.

Further, Hötker (2006) found no statistically significant relationship between turbine height and bat mortality; rather, the level of mortality at a site was largely influenced by habitat, with repower facilities sited in forested areas having the greatest bat mortality. This finding suggests that the siting of a wind farm and habitat present within the surrounding landscape may have a greater influence on bat fatality rates than turbine height. Based on published and unpublished reports on bat mortality at wind farms in northwestern Europe, Rydell et al. (2010) found that the estimated number of bats killed per turbine annually was relatively low (0-3 bats) on flat, open farmland away from the coast, higher (2-5 bats) in more complex agricultural landscapes, and highest (5-20 bats) at the coast and on forested hills and ridges. These findings are consistent with the results of bat fatality rates estimated at new-generation wind energy facilities in the open desert scrub habitats in the TWRA and SGWRA. For all of these reasons, impacts to bats associated with the Project are not expected to increase as compared to baseline conditions (i.e., the existing 291-turbine wind farm). For further discussion of potential bat impacts, refer to the discussion in Response to Comment 3-19.

Response to Comment 3-107

This comment claims that the applicant's assertion that the Project was vetted by the CVCC via the JPR process is misleading. The comment also states that there was no mention of impacts on a Metropolitan Water District parcel (which purportedly is not a participant in the CVMSHCP).

With respect to the JPR process, Ms. Owens is incorrect. The final JPR was received by the County on December 19, 2018, and the project is a covered activity under the CVMSHCP. The project has completed the JPR and will be consistent with the avoidance, minimization, and mitigation measures outlined in the JPR. With respect to the MWD parcel, the roadway in the project site crosses MWD lands and no new impacts are proposed within the existing roadway.

Response to Comment 3-108

This comment states that the IS/MND does not reference the restoration plan for the Coachella Valley Jerusalem cricket habitat.

Ms. Owens is incorrect—the IS/MND references this plan on page 32. In addition, per the requirements outlined in the JPR, the applicant will restore Jerusalem cricket habitat that will be temporarily disturbed by the project.

Response to Comment 3-109

This comment concludes Ms. Owens' letter. The comment does not provide any additional substantive analysis regarding the IS/MND, and the comment is generally acknowledged.

Attachment A

Bracketed Exhibit 'E' Comment Letter

EXHIBIT E

Renee Owens, M.S. - Biologist and Independent Environmental Consultant

December 14, 2018

Kyle Jones
Adams Broadwell Joseph & Cardozo
520 Capitol Mall, Suite 350
Sacramento, CA 95814

Subject: RESPONSE to Comments for the Painted Hills Wind Repowering Project Initial Study, Commercial WECS Permit No. 180001 / Variance Case No. 180003 – Intent to Adopt a Mitigated Negative Declaration – CEQ180059.

Dear Mr. Jones,

This letter contains my responses to the County/ DUDEK's replies to my comments on the biological resource impact analysis for the Painted Hills Wind Repowering Project (Project) Initial Study and Mitigated Negative Declaration (IS/MND).

The following is a response to comments in a Memorandum ("Bio Memo") written by DUDEK's Collin Ramsey, provided by the County as response to comments regarding the biological impact analysis of the Project. It is important to preface these comments by noting that for the County to rely on the opinionated response of a DUDEK employee as any part of the County's argument or justification for the approval of this Project's MND is inappropriate. As the primary environmental consultant, DUDEK is a paid contractor for the Project Applicant. As such DUDEK has a conflict of interest and cannot be relied upon for an independent or unbiased scientific response to an IS/MND that they scripted; if there is to be any such response it should come from the County staff as the lead decision-makers for the permitting process. 3-76

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1. The Bio Memo states that the assertion that the Project description is incomplete is erroneous by claiming that "no data is[*sic*] submitted that shows that shorter turbines than the maximum height with smaller rotor diameter would have a greater impact on avian species than assumed for the project." First, this claim lacks clarity in its expository goal to negate claims that were not made. Nowhere in my previous comment did I refer to "shorter turbines 3-77

than the maximum height with smaller rotor diameter"; an irrelevant statement in respect to the subject, which is the fact that regardless of the conclusions to be made about turbine size, the Project description by default is indeed incomplete because it does not establish clearly what the turbine size to be used will be. It bears repeating that without turbine specifics, adequate baseline determinations regarding the impact by the new turbines is prohibited, thus resulting in speculation in lieu of reliable scientific analysis, and an inability by the public to accurately analyze what exactly is being proposed with this repowering project. 3-77 (cont)

The Bio Memo references the U.S. Fish and Wildlife Service's Shiloh IV Wind project Environmental Assessment (SWEA)[1] saying that since there were no eagle take at Shiloh IV Wind "at all since the repowering with fewer taller turbines occurred" that this somehow justifies their claim that there will no significant impact to eagles from this Project, while in the same breath claiming that my observations from Ocotillo Wind are "inapposite" because it is not a repowering Project. 3-78

a. First, my hundreds of direct observations of raptor species, including golden eagles and the California ESA Threatened Swainson's hawk, over the course of several years at the Ocotillo Wind site, pre- and post-construction, confirms that eagles are seen repeatedly flying within higher altitudes that are the altitudes relevant to the Project's new presumably taller turbines. These observations are revelatory of species behavior and are thus relevant wherever (a) the species occurs as residents or migrants, and (b) taller turbines exist that can pose a barrier / injury to the species. Behavioral proclivities are relevant regardless of eagle take data statistically analyzed from a few years from some other Project (as is the case with Shiloh IV project referenced in the Bio Memo), and whether take occurred in a repowering site or non-repowered wind farm. It is important to note that both golden eagles and Swainson's hawks have been observed in the Project area as part of studies funded by Southern California Edison to measure the activity of birds in these areas where wind farms are now distributed.[2] 3-79

b. Second, Shiloh IV Wind farm's mortality report mentioned in the SWEA, referenced in the Bio Memo, falls far short of a complete picture of (a) what degree of eagle take may have occurred on that project site since the study was completed, and (b) what can and may 3-80

[1] USFWS. (June 2014). Final Environmental Assessment Shiloh IV Wind Project Eagle Conservation Plan. p. 33. Retrieved from: https://www.fws.gov/cno/conservation/MigratoryBirds/ShilohIV-FONSI/Attachment1-FEA-ShilohIV-June2014.pdf

[2] McKernan, R. Wagner, W., Landry, R. and McCrary, M. (1984). Utilization by Migrant and Resident Birds of the San Gorgonio Pass, Coachella Valley, and Southern Mojave Desert of California. Prepared for Research and Development Southern California Edison. 242 pp.

happen at this Project over the course of this Project's lifetime. As iterated in my original comments, the reviewer has no way of knowing what impact *this Project in this location* with taller turbines *that exists in proximity to various historical eagle nesting territories* (as per the Bittner/WRI report cited in the IS/MND) may have on nesting, since it provides no valid, or current baseline (see.my original comments) information on how many eagles may occur within this given location whatsoever. As iterated with evidence in my original comments, the WRI eagle report is so outdated to be irrelevant regarding population status, the data was collected illegally, and is invalid in its determinations of eagle nesting status. However, the fact that golden eagles have a historical record of nesting in proximity to the Project site is as relevant today as it was ten and twenty years ago. What remains unknown, and un-surveyed, is how many eagles may be impacted via impacts to nesting, breeding, and foraging, by the new Project turbines.

3-80 (cont)

c. Third, the inference that the Bio Memo repeatedly relies on, specifically that the term 'repowering' equates the one and only relevant outside project comparison for this Project's impacts to eagles - or other avian species - is unscientific, a logical fallacy. In fact, the SWEA states that, in respect to accuracy of impact analysis for Shiloh IV, "we believe that the number of eagle fatalities in the WRA could be higher than the currently reported from post-construction monitoring or other incidental detections in view of limited search intervals, limited search areas, and existing land use /cropping patterns."[3] USFWS eagle biologists go on to state that "The effect of turbine-related golden eagle fatalities on the local population is dependent on the age, status, and origin of the individual eagle. Direct mortality of golden eagles could adversely affect local survival and fecundity, and could thereby affect local and possibly regional populations. **The biological impact of killing an eagle within the WRA on the overall population depends on the type of eagle killed: a breeding adult, a juvenile, or a floater**.[Emphasis added.]" In other words, risk, take, and thus significant impacts from the Project could come down to a few or even one eagle. The fact is the IS/MND has provided no valid, current information on the local eagle population relevant to the Project site, its nesting or foraging status, nor on any changes that may have occurred (i.e. increased nesting activity) in recent years in proximity to the Project, therefore no valid or accurate comparison can be made regarding an unknown site baseline and impacts that may occur in the near and projected future life of the Project.

3-81

d. The inference of the Bio Memo is that a mortality report snapshot of zero eagle take at Shiloh IV - which apparently is what Mr. Ramsey is referring to when he erroneously claims

3-82

[3] McKernan, R. Wagner, W., Landry, R. and McCrary, M. (1984). Utilization by Migrant and Resident Birds of the San Gorgonio Pass, Coachella Valley, and Southern Mojave Desert of California. Prepared for Research and Development Southern California Edison. P. 32

there has been no eagle take "at all since repowering" (for which the Bio Memo provides no conclusive evidence of to present, since the data referenced in the EA does not include the past six years) - is not the entire picture represented by Shiloh IV. USFWS also states in the SWEA, "Because the Shiloh IV was largely a repowering project...the project resulted in vastly greater spacing between turbines and the removal of lattice towers that provided perches for eagles and other birds. However, the total risk area to eagles also increased because of the larger size of the turbine blades. Under all alternatives, Shiloh IV will actively discourage establishment of an increased prey base through project design and maintenance and will coordinate with landowners to encourage responsible livestock husbandry and immediate removal of livestock carcasses to avoid attracting eagles into the project area."[4]

In respect to reducing eagle take after the repowering phase, the SWEAs also says, "Four active nests and territories have been identified within 10 miles of the project area: one nest approximately 1 mile east of the project area, one approximately 5 miles northeast of the project area, and two 10 miles southwest and south of the project area (Figure 3-1). Nesting adults and juveniles from these nests are at risk from project operations. We have evaluated these risks in the context of existing foraging and operational conditions and find that the nest nearest to the project area is at greatest risk. However, due to existing farming operations and a limited prey base, foraging throughout the project area is of lower quality than in nearby grassland areas. Ongoing farming operations have been observed to reduce or eliminate prey such as ground squirrels, because they are killed or their burrows are removed during agricultural operations. Nearby unfarmed areas likely support higher prey populations because of this decreased disturbance, which allows populations to persist and reproduce more readily without periodic fatalities from farming operations."[5] 3-82 (cont)

This underscores three points ignored by the IS/MND and the Bio Memo when it refers to the SWEA: (a) USFWS asserts that by design a repowering project can increase risk of impacts to eagles, (b) it is quite likely that minimization of eagle take by the repowered Shiloh IV occurred thanks to Shiloh IV following the recommendations made by USFWS for reducing take, including those mentioned above, in addition to proximity to agricultural operations, and (c) knowing the current status of nearby eagle territories is essential for accurate impact analysis. In summary, USFWS acknowledges that the repowering project can increase take despite a reduction in turbines overall, and that other variables are

[4] McKernan, R. Wagner, W., Landry, R. and McCrary, M. (1984). Utilization by Migrant and Resident Birds of the San Gorgonio Pass, Coachella Valley, and Southern Mojave Desert of California. Prepared for Research and Development Southern California Edison. p. 33

[5] *Ibid.* p. 32

equally and more relevant to reduced eagle take than reduced turbine numbers. This third point is reiterated elsewhere for other repowered wind farms as well.[6] It is important to note that while the Bio Memo is referring to the repowered Shiloh IV project as an equivalent standard for eagle take comparison, the USFWS state in the SWEA that there could be no significant adverse cumulative impacts to eagles *if* the Applicant offsets them with compensatory mitigation unlike any mentioned in the IS/MND, and "through the implementation of experimental ACPs (Advanced Conservation Practices" ("e.g. visual and auditory deterrence procedures, and monitoring flight patterns in the WRA.)"[7] No such mitigation protocols are suggested by the IS/MND to reduce significant cumulative take of eagles over the life of the Project, and the IS/MND does not provide adequate or substantial evidence that such impacts will not occur. Therefore assumptions of equivalent risk and thus impacts to eagles between Shiloh IV and this Project being very similar are erroneous.

3-82 (cont)

e. The Bio Memo relies heavily on its assertion that the (ill-defined) current environmental baseline contributes to greater impacts than the Project will purely by default of the number of turbines being reduced, and yet provides no concrete evidence to support this. On the other hand, abundant evidence exists that challenges the persistence of the assumption that numbers of turbines are the only factor, or only relevant factor, impacting mortality rates:

In their year 1 report of bird and bat mortalities of the Golden Hills Wind Energy Center, a repowered region of Altamont Pass Wind Resources Area (APWRA), H.T. Harvey and Associates used dogs to aid in the detection of carcasses. Their improved search methodology resulted in findings where they concluded that, compared to the pre-repowering bird years of the APWRA-wide avian fatality monitoring study, mortality estimates were higher for golden eagles and red-tailed hawks.[8] In their two-year study of the APWRA in 2003-2004, the researchers designed the study to perform spatial analysis of raptor flight heights in order to elucidate flight patterns in response to topographic features and wind conditions. The study goal was to forecast avian mortality in the repowered APWRA under two scenarios, and included observations of bird behaviors recorded during study in the APWRA, in order to analyze the effect of attributes of the proposed new wind turbines and their spatial locations and arrangements in the repowered APWRA. Their

3-83

[6] H.T. Harvey and Associates. (2017). Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1. Prepared for Golden Hills Wind LLC. 97 pp.

[7] USFWS. (June 2014). Final Environmental Assessment Shiloh IV Wind Project Eagle Conservation Plan. Retrieved from: https://www.fws.gov/cno/conservation/MigratoryBirds/ShilohIV-FONSI/Attachment1-FEA-ShilohIV-June2014.pdf. pp. 17, 39

[8] H.T. Harvey and Associates. (2017). Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1. Prepared for Golden Hills Wind LLC. 97 pp.

conclusions from over a thousand observations were several, including the fact that golden eagles and other raptors (i.e. red-tailed hawks) were consistently observed flying at varying heights between 50 and 200 m (164 and 656 feet). They also found that golden eagles flew over flat terrain nearly 7 times more often than expected by chance, and otherwise favored west- and south-facing slopes, and most strongly avoided southwest and east slopes.[9] A systematic study by Loss *et. al.*[10] looked at mortality rates and risk to birds by monopole turbines (similar to those proposed for the Project) throughout the U.S., concluding that "between 140,000 and 328,000 (mean = 234,000) birds are killed annually by collisions with monopole turbines in the contiguous U.S. **We found support for an increase in mortality with increasing turbine hub height... Evaluation of risks to birds is warranted prior to continuing a widespread shift to taller wind turbines**. Regional patterns of collision risk...may inform broad-scale decisions about wind facility siting."[11] Other studies similarly conclude that, as asserted in my original comments, size of turbines matter when it comes to mortality rates of birds as well as bats.[12] Indeed, the SWEA that the Bio Memo mentions refers to differential mortalities among both birds and bats based upon differential turbine heights.[13] In Hotker's research on the impact of repowering of wind farms on birds and bats, the overriding conclusion was that, "the results of modelling show that in all cases repowering has a negative impact on birds – larger wind turbines have higher collision rates than smaller ones (see also chapter 4.2)."[14]

3-83 (cont)

These findings support the reality that impacts from wind farms to raptors involve a host of variables, including size, design, height, the micro-siting of turbines, location in respect to slope, habitat, ecotones, hills, breeding territories, and migratory pathways. Therefore for the IS/MND and the Bio Memo to conclude the

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[9] Smallwood, K. S., and L. Neher.(2004). *Repowering the APWRA: Forecasting and Minimizing Avian Mortality Without Significant Loss of Power Generation*. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2005-005. 21 pp.

[10] Loss, S. R., T. Will, and P. P. Marra. (2013). Estimates of bird collision mortality at wind facilities in the contiguous United States. *Biological Conservation* 168:201–209.

[11] *Ibid.* p. 1

[12] Smallwood, K. S. (2007). Estimating wind turbine-caused bird mortality. *Journal of Wildlife Management* 71:2781–2791.

[13] USFWS. (June 2014). Final Environmental Assessment Shiloh IV Wind Project Eagle Conservation Plan. Retrieved from: https://www.fws.gov/cno/conservation/MigratoryBirds/ShilohIV-FONSI/Attachment1-FEA-ShilohIV-June2014.pdf. pp. 17, 39

[14] Hotker, H. (2006). The Impact of Repowering of Wind Farms on Birds and Bats. Nature and Biodiversity Conservation Union. p. 24. Retrieved from: https://bergenhusen.nabu.de/imperia/md/images/bergenhusen/impact_of_repowering.pdf

Project will have no significant impacts based solely on the theory that reduced number of turbines will reduce impacts is not only unproven and negated by the evidence at hand, but ignores the purpose and scope of these studies that seek to better inform repowering projects about how to truly reduce impacts with the assistance of advanced conservation best practices elucidated in their findings. 3-83 (cont)

2. Despite the detailed evidence provided in my original comments,[15] the Bio Memo claims that the IS/MND's purported amount of habitat disturbance of "36.33 acres" as proposed is not underestimated. First, in making this claim Mr. Ramsey ignores the fact that in my comments I provided extensive evidence supporting how the IS/MND underestimates and mischaracterizes permanent (2.59 according to the IS/MND) vs. temporary impacts; he makes no argument to counter my evidence and thus my argument stands as presented. Neither does the Bio Memo – or the IS/MND – explain with any clarity how they came to the conclusion of what all impact disturbances will be, what habitats (or resident species) comprise the 36.33 acres of "disturbance" specifically, or exactly what the sum total of temporary and permanent impacts are in relation to types of "disturbance". For instance, the IS/MND states that "For purposes of overseeing compliance with CVMSHCP requirements and with the Implementing Agreement (IA), a Joint Project Review (JPR) process shall be instituted by the CVCC for Project impacts within the Upper Mission Creek/Big Morongo Canyon Conservation Area to address 2.59 acres of permanent disturbances within the Conservation Area."[16] The IS/MND also states that "The Project will have 0.25 acres of permanent impacts and 2.20 acres of temporary impacts to potential non-wetland USACE waters of the U.S., and 0.25 acres of permanent impacts and 2.20 acres of temporary impacts to CDFW streambed." [17] Yet no impacts are described or broken down in detail for this purported 2.59 acres of "disturbance" or wetland impacts. Without clarification of what habitat is impacted in totality of the Project site, where, and how, what species may be present on this habitat, once again it is impossible for the reviewer to make any accurate analysis of the nature of the direct, indirect, or cumulative impacts these disturbances will have in respect to significant impacts, not to mention any clarity on how they are proposed to be successfully mitigated. 3-84

Instead, the Bio Memo defends the IS/MND's disturbance values by stating, vaguely, "the surveys coincide with the disturbance area of 36.33 acres and do not underestimate impacts." It goes on to say it is a "covered project" under the CVMSCHP and the habitat "disturbance" was vetted (despite the fact that the IS/MND repeatedly refers to JPR as a process to occur in 3-85

[15] R. Owens, Letter from Renée Owens to Kyle Jones (Nov. 27, 2018) Comments for the Painted Hills Wind Repowering Project Initial Study, Commercial WECS Permit No. 180001 / Variance Case No. 180003 – Intent to Adopt a Mitigated Negative Declaration – CEQ180059

[16] LSA Biological Resources Assessment (BRA) p. 15

[17] *Ibid.* p. 14

the future). First, the JPR provided upon request by CURE – not within the IS/MND – is referred to as incomplete, and it is submitted as a "draft", thus not finalized. Second, the JPR states the there are "45 acres of proposed new disturbance". Third, the JPR characterizes impacts further as applying to the Jerusalem Cricket (5.50 acres), Desert Tortoise (43 acres), and Sand Source areas (43 acres). These impacts are not identified or clarified in the IS/MND. Fourth, simply because a Project is "covered" under a Plan, by definition of its location, does not certify that impacts have been accurately estimated, described, or mitigated by the IS/MND, indeed they have not as iterated by the evidence above and in my original comments. 3-85 (cont)

3. The Bio Memo says that CURE comments find fault with survey protocols and methods. This is an inaccurate assessment, the IS/MND is devoid of current ground-truthing surveys and any other current, comprehensive protocol surveys for wildlife or rare plants; therefore it is impossible to analyze (and thus describe faults) with protocols and methods of surveys that do not - but should – exist in order to assess impacts appropriately. What CURE finds fault with is this complete lack of valid and applicable surveys to establish any coherent picture of the Project's baseline biological resources beyond generic habitat types and species that "may" occur based on databases and highly outdated surveys. 3-86

The Bio Memo asserts that no evidence is provided that sensitive avian species "must" occur on site, and as with the IS/MND claims that if sensitive species do occur impacts will be "covered" under the CVMSCHP. In actuality, my original comments stated that in order for the IS/MND to assess impacts it should show a moderate / high likelihood of species to occur based on surveys to assess risk. To ask for evidence that they "must" occur is not what is required by the reviewer nor what my comments detailed. The need for specific, thorough, current information to assess degree, type, and duration of impacts to sensitive birds (as well as other species) has already been spelled out in evidentiary detail in the original comments on biological resources; such detail on impacts as well as mitigation protocols are lacking, as already iterated extensively. DUDEK's response opinion repeatedly ignores this argument presented, so much so that one wonders if Mr. Ramsey actually read the comment letter in its entirety. 3-87

The onus is on the IS/MND to demonstrate that sensitive species do not and will not occur onsite. With zero focused, current species surveys of any kind they failed to meet this burden. Meanwhile, the existence of a Habitat Conservation Plan does not preclude the IS/MND's requirement to adequately describe exactly how (as of yet unknown) baseline conditions that include impacts to sensitive birds will be mitigated. Simply referring to the HCP does not fulfill the requirement for a clear description of what impacts will be, not just for the short-term impacts as may be addressed by pre-construction surveys for burrowing owls or other nesting 3-88

species, but also for the long term impacts due to habitat disturbances (temporary and permanent), and due to the presence of turbines of new designs and in new locations. 3-88 (cont)

Saying "most sensitive bird species that may be present on site are covered under the Plan" is, as clarified in evidentiary detail in my original comments, completely unsatisfactory for CEQA. In addition to those arguments posed, "most" is not good enough. Which species are not covered? For those that are even mentioned in the CVMSHCP, how will any loss of foraging and breeding habitat, or injury and deaths from permanent direct, indirect, and cumulative disturbance to habitat actually mitigated? None of these questions are answered by the IS/MND, indeed neither are they addressed – for this Project - by the CVMSCHP either. How will turbine related deaths from purportedly taller turbines, constructed in new sites that may have greater impacts based on locations in respect to slope, hillsides, proximity to raptor nesting territories, etc. than previously in existence be mitigated? 3-89

New turbines are proposed for construction closer to the north end of the Project site in the mountain foothills where none have been in existence prior. As mentioned above, numerous studies have demonstrated that multiple variables affect bird behavior and resultant mortalities around turbines, including where turbines are located in respect to slope degree and position, proximity to other turbines, proximity to certain habitats, and proximity to nest territories. Additionally, the scientific literature is replete with data revealing that most bird species studied, including golden eagles and other raptors, have a high natal site fidelity.[18,19,20,21] As such, their evolutionary proclivities dictate that regardless of new, anthropogenic constructs that may pose impacts or otherwise create a negative disturbance, they retain a high affinity for their location of hatching, not just for breeding but also foraging, even if they are long distance 3-90

[18] DeSorbo, C. R., D. Riordan, J. Tash, R. B. Gray and Hanson, W. (2015). Documenting Areas of Importance to Maine Subadult Bald Eagles: Insights from Satellite Telemetry. Report #2014-24 prepared for the Maine Outdoor Heritage Fund, Portland, ME, The Bailey Wildlife Foundation, Cambridge MA, and the Maine Department of Inland Fisheries & Wildlife, Bangor ME. 38 pp.

[19] Beringia South. (2013). Golden Eagle Breeding Ecology and Resource Selection in South Central Montana. https://static1.squarespace.com/static/528f911de4b01f2a31514e96/t/56e9c5fa62cd94b74de00845/1458161149635/2013_Livingston_GOEA_AnnualReport.pdf

[20] Pagel, J.E., D.M. Whittington, and G.T. Allen 2010. Interim Golden Eagle inventory and Monitoring protocols; and other recommendations. Division of Migratory Bird Management. U.S. Fish and Wildlife Service. https://www.fws.gov/southwest/es/oklahoma/documents/te_species/wind%20power/usfws_interim_goea_monitoring_protocol_10march2010.pdf.

[21] Driscoll, D.E. 2010. Protocol for golden eagle occupancy, reproduction, and prey population assessment. American Eagle Research Institute, Apache Jct., AZ. 55pp. Https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83955&inline

migrants. When conducting research of banded birds that migrate thousands of miles, I have observed first year offspring return to the same branch of the same tree to construct a nest within inches of the one from the previous year where they hatched. I have observed raptors (golden eagles, re-tailed hawks, Swainson's hawks) return to the same grove, tree, or cliff face to nest where they hatched. It is also abundantly documented that birds' avoidance of human activities and constructs may have significant adverse effects on their distribution and abundance.[22] This response can have adverse influences on their breeding success, feeding success, range use, reproduction, fecundity, survival, and abundance at the population level.[23, 24,25,26,27,28,29] And yet the IS/MND and the Bio Memo make no mention of the potential for new impacts to raptors and other protected bird species by the Project based upon the siting and location variables relevant to new turbines proposed.

3-90 (cont)

Golden Eagles

Despite the specious claims to the contrary in the Bio Memo, the IS/MND ignores the evidence provided in comments, and the onsite reality, that the Project poses a risk of significant impacts to various sensitive bird species. The IS/MND does infer that golden eagles will be impacted by the Project by its referral to an eagle survey by WRI. However, as my comments demonstrate in detail, that survey is completely inadequate for several reasons, not the least of which being it

3-91

[22] Ruddock, M. and Whitfield, D. (2007). A Review of the Disturbance distances in Selected Bird Species. A Report from the Natural Research Project Ltd. To Scottish Natural Heritage. Retrieved from: https://www.nature.scot/sites/default/files/2018-05/A%20Review%20of%20Disturbance%20Distances%20in%20Selected%20Bird%20Species%20-%20Natural%20Research%20Ltd%20-%202007.pdf

[23] Burger, J. & Gochfeld, M. (1991). Human distance and birds: tolerance and response distances of resident and migrant species in India. *Environmental Conservation*, 18, 158–165.

[24] Fernández, C. & Azkona, P. (1993). Human disturbance affects parental care of marsh harriers and nutritional status of nestlings. *Journal of Wildlife Management*, 57, 602-608.

[25] Madders, M & Whitfield, D.P. (2006). Upland raptors and the assessment of wind farm impacts. *Ibis*, 148, 43–56.

[26] Walker, D., McGrady, M., McCluskie, A., Madders, M. & McLeod, D. (2005). Resident Golden eagle ranging behaviour before and after construction of a windfarm in Argyll. *Scottish Birds*, 25, 24-40.

[27] Fraser, J.D. (1983). The impact of human activities on bald eagle populations - a review. Pages 68-84 in Gerrard, J.M. and T.N. Ingram, Eds. *The bald eagle in Canada*. White Horse Plains Publishers, Headingley, Manitoba.

[28] Gill, J.A., Norris, K. & Sutherland, W. (2001). Why behavioural responses may not reflect the population consequences of human disturbance. *Biological Conservation*, 97, 265-268.

[29] Winkelman, J.E. (1992). Effects of the Sep wind farm at Oosterbierum (Fr.) on birds, 1-4, collision victims, nocturnal collision risks, flight behaviour during daylight, and disturbance. *RIN-Report* 92/2-5. Instituut voor Bos- en Natuuronderzoek (IBN-DLO), Arnhem, The Netherlands.

is far too old to represent the current baseline for the Project.[30] What the WRI survey does reveal that is relevant to the Project is that the Project site is in close proximity to several historical nesting golden eagle territories, and given the natal site fidelity mentioned above, a new survey is essential to establish the baseline conditions and assess impacts from new towers - including those to be located closer to some of the nest territories than any turbines already in existence – to local eagle individuals and the population. This necessity is underscored by the fact that both the USGS and USFWS have more recently determined that "take" by a wind farm of more than even one eagle per year to be potentially significant to the population level.[31,32,33] This reality reinforces the potential of the Project to have significant long term, cumulative impacts to eagles as new information is gathered regarding eagle mortalities at wind farms, including in the Project regions, where USFWS "estimates that on average more than 20 golden eagles are probably killed each year among the wind turbines of San Gorgonio Pass."[34]

3-91 (cont)

Burrowing owls

The IS/MND acknowledges that there is a **moderate** potential for burrowing owls to be impacted by the Project. In actuality the potential for them to occur is **high** based upon (a) CNDDB accounts for the burrowing owl for this area, (b) the habitat types on and near the site are preferred by burrowing owls, and (c) the CVMSHCP (Plan) has observed them throughout almost every site noted in their species account report, including those in close proximity to the Project site, which is a primary reason why they are a species protected under the Plan for this region.[35] However, it does not come close to offering adequate mitigation since it only

3-92

[30] USGS. (Sept 2016.) Roughly over a quarter of the golden eagles killed at the Altamont Pass Wind Resource Area in Northern California from 2012-2014 were recent immigrants to the local population. Retrieved from: https://www.usgs.gov/news/local-wind-energy-development-has-broad-consequences-golden-eagles

[31] USFWS (2018). Retrieved from: https://www.fws.gov/cno/conservation/MigratoryBirds/EaglePermits.html

[32] Pagel, J.E., D.M. Whittington, and G.T. Allen (2010). Interim Golden Eagle inventory and Monitoring protocols; and other recommendations. Division of Migratory Bird Management. U.S. Fish and Wildlife Service.

[33] Katzner, T., Nelson, D., Braham, M., Doyle, J., Fenandez, N., Duerr, A., Bloom, P., fitpatcik, M., Miller, T., Culber, R., Braswell, L., and DeWoody, J. (2016). Golden Eagle fatalities and the continental-scale consequences of local wind-energy generation. *Conservation Biology*. 31 (2): 406-415. Retrieved from: https://www.usgs.gov/news/local-wind-energy-development-has-broad-consequences-golden-eagles

[34] James, I. (July 3, 2014). Groups raise concerns about eagle deaths at California wind farms. *The Desert Sun / USA Today*. Retrieved from: https://www.desertsun.com/story/news/environment/2014/07/03/palm-springs-bald-eagles-dying-windmills/12205617/

[35] Coachella Valley Association of Governments. August 2016. Species Accounts and Conservation Measures. Final major Amendment to the CVSMHCP.

addresses the potential for impacts during the construction phase, and ignores addressing the Project baseline, scope, or mitigation of impacts to burrowing owls for cumulative, direct, and indirect impacts for the life of the Project other than those that may occur during construction. 3-92 (cont)

4. The Bio Memo attempts to justify a lack of relevant, current surveys by stating that "many days" were spent for the vaguely described "jurisdictional delineations". Since the term jurisdictional delineations is used in the IS/MND to be synonymous with wetland delineations, one must assume it is intended to be the same here. To that end, it clearly does not support my comments demonstrating the lack, and necessity, of focused, protocol, or otherwise established method searches for any and all relevant vertebrate and invertebrate taxa. To state what is usually obvious, wetland delineations are very specific protocols for identifying and mapping wetlands and reporting them in a way the jurisdictional agencies have designated. They involve no aspect of methodically searching for, detecting, mapping, recording, or observing any species of animal, fungi, or plants aside from any onsite plants relevant that assist in the wetland delineation process. ESA species searches require permits, MOUs, and/or certifications; they also require special training and methodologies that necessitate very specific "focus" on the species/ taxa at hand in order to make a comprehensive and scientific search (hence the term, focused surveys) while minimizing the potential for the observing biologist (as opposed to a hydrologist) to harass protected species. It is absurd to suggest that wetland delineations can and do replace wildlife surveys of any kind. It is equally specious to infer that "many hours" spent looking at the literature can replace ground-truthing to establish baseline conditions, especially when that literature is not from the Project site and / or is several years old and thus not necessarily representative of what exists at present onsite. 3-93

The Bio Memo also points to the NREL study to conclude that risks to avian species in the San Gorgonian Pass are low. This is an erroneous conclusion for several reasons:

a) My original comments provide evidence that this has not been confirmed due to a lack of baseline evidence, as well as my referral to the long list of bird species in the CNDDB observed for the Project region.[36] And as noted above, USFWS and USGS have noted an 3-94

[36] R. Owens, Letter from Renée Owens to Kyle Jones (Nov. 27, 2018) Comments for the Painted Hills Wind Repowering Project Initial Study, Commercial WECS Permit No. 180001 / Variance Case No. 180003 – Intent to Adopt a Mitigated Negative Declaration – CEQ180059

increase in observations of eagles, including mortalities, in the San Gorgonio Pass region near the Project.[37,38] 3-94 (cont)

b) Two detailed studies were prepared for, and funded by, the Southern California Edison Company to assess the use and abundance of birds in the San Gorgonio Wind Resources Study Area (WRA). This research was requested to analyze use of the area where this Project and neighboring wind farms are now located for the specific purpose of analyzing the potential for wind farm impacts to avian species.[39,40,41] The research studied both daytime and nocturnal use of the region by resident and migrant species. The studies identified the region as comprising major routes of migration for a host of species and a major route for migrating birds crossing the desert.[42] Additionally, the two-year census involved 24 observation sites – several within 1 - 2 km of the Project – that concluded the area to be a flyway with high species richness. The also state that "of the approximately 535 species of birds that have been recorded in California, 306 of these were observed during this study, with 217 species in San Gorgonio Pass, and 262 species in the Coachella Valley. A greater percentage of migrant birds vs. resident birds were recorded in all areas."[43] Protected species detected included golden eagle, burrowing owl, Swainson's hawk (CESA listed), yellow warbler, and southwestern willow flycatcher (ESA listed). These findings are significant not only because they demonstrate an abundance of bird use in the Project area, but also that migrants that may not use the habitat for breeding – **and thus not normally** 3-95

[37] James, I. (July 3, 2014). Groups raise concerns about eagle deaths at California wind farms. *The Desert Sun / USA Today*. https://www.desertsun.com/story/news/environment/2014/07/03/palm-springs-bald-eagles-dying-windmills/12205617/

[38] Lovich, J. USGS. (2015). Golden Eagle mortality at a wind-energy facility near Palm Springs, California. Western Birds. Western Birds 46:76–80. https://www.westernfieldornithologists.org/archive/V46/46(1)-p076-p080.pdf

[39] McCrary, M., McKernan, R., Landry, R., Wagner, W., and Schreiber, R. 1983. Nocturnal Avian Migration Assessment of the San Gorgonio Wind Resource Study Area, Fall 1982. Report Prepared for Research and Development Southern California Edison Company by the L.A. County natural history Museum Foundation. 142 pp.

[40] McKernan, R., Wagner, W., Landry, R. And McCrary, M. 1984. Utilization by Migrant and Resident Birds Of the San Gorgonio Pass, Coachella Valley, and Southern Mojave Desert of California. Report Prepared for Research and Development Southern California Edison Company by the L.A. County natural history Museum Foundation. 254 pp.

[41] McCrary, M. D., R. L. McKernan, and R. W. Schreiber. 1986. San Gorgonio wind resource area: Impacts of commercial wind turbine generators on birds, 1985 data report. Prepared for Southern California Edison Company.

[42] *Ibid.*

[43] *Ibid.* p. 86

detected by breeding bird surveys, or anticipated by habitat type onsite – could be significantly impacted throughout the life of the Project. 3-95 (cont)

Swainson's hawk

c) It is also important to note that the risk of the Project impacts to the Swainsons' hawk, a California ESA threatened species, is ignored by the IS/MND and the Bio Memo. However, the IS/MND's own eagle report notes sightings of the Swainson's hawk in the vicinity as does the McKernan *et. al.* census.[44] The risk of impacts by turbines to this species even when a species is a migrant (non-resident), is underscored by the fact that the mitigation protocols for the Ocotillo Wind facility in the Sonoran desert, hundreds of miles from Swainson's hawk breeding grounds, include turbine curtailment upon sighting of Swainson's hawks during standard operation throughout the life of the project.[45] 3-96

d) Upon careful review of the NREL study - touted by the Bio Memo as primary evidence to disregard project impacts to birds - it can be determined that the findings are suspect in their relevance, and worse, statistically invalid, according to experts and by the study authors' own admission: The NREL study states,

"This study was not specifically designed to provide standardized estimates of avian fatalities. The wide interval between searches (90 days) led to a high level of uncertainty in the fatality estimates. The unknown impact of scavenging on the fatality estimates could greatly impact them...The lack of random assignment of treatments to experimental units may have caused some variables to be confounded. For example, there were no lattice structures in the Phase II geographic locations, possibly confounding the effect of turbine type with geographic location. Differences in overall fatality rates or risk index between tubular towers and lattice towers may be due to differences in geographic location and not differences due to turbine type. Scavengers, predators, and other removal sources (e.g., oiled carcass sinking in water, carcasses plowed into field) may remove carcasses between the time the casualty occurs and the time the next search is conducted. Estimating scavenging rates is vital to providing good fatality rates (Erickson et al. 2000)...Due to the low fatality rates [observed], strong patterns in comparison results of fatality and the risk 3-97

[44] McCrary, M. D., R. L. McKernan, and R. W. Schreiber. 1986. San Gorgonio wind resource area: Impacts of commercial wind turbine generators on birds, 1985 data report. Prepared for Southern California Edison Company.

[45] BLM. 2012. Avian Bat and Bird Protection Plan for the Ocotillo Wind Energy Facility. http://www.ocotilloeccmp.com/Wild_1p_Avian%20and%20Bat%20Protection%20Plan.pdf

index among levels of factors such as geographic location and type of turbine were not very apparent."

The authors go on to say that, "This was a mensurative study (Hurlbert 1984, Morrison *et al.* 2001) designed to provide statistical evidence regarding differences in use, fatality rates, and the risk index among levels of multiple factors. In addition, confounding of some factors existed. For example, the *Medium* elevation area for Phase I had no large tubular towers when studied. Therefore, geographic location was confounded with turbine type, and significant differences observed may be due to geographic location or to turbine type. The basic study design was a stratified random design, with geographic location, turbine sizes, and tower types used in defining strata (p. 4)".[46]

It is ironic that the authors reference Hurlbert's article that is an excerpt from his seminal text, The Design of Experiments, with associated statistical analysis. As a graduate student of Dr. Hurlbert's, I became very familiar with the fatal flaw of pseudoreplication highlighted in his book, which by the NREL's own admission they reveal to have committed in their study. Specifically, they state that they "confounded" location with turbine type. This a fundamental flaw that amounts to pseudoreplication, a profound design error that invalidates the entire experiment's statistical conclusions based upon the fact that the design assumptions used for the statistical analyses -namely of replication of treatments, and in this case additionally the assumptions of randomness (for a stratified random design) - were not met; the authors acknowledge both lack of randomly assigned treatments, and lack of equivalent treatments. To be clear, pseudoreplication is no minor detail or experimental minutiae; when committed it invalidates conclusions about the data's relevance to the population they purport to represent (one main reason why Hurlbert devoted so much time in his expository text and research defining the problem and how to avoid it). It is further defined as the use of inferential statistics to test for treatment effects with data from experiments where either treatment is not accurately replicated or replicates are not statistically independent.[47] Put simply, it involves incorrectly defining and thus artificially inflating the number of samples or replicates. As a result, statistical tests performed on the data are rendered invalid.

3-97 (cont)

In other words, pseudoreplication can be described as is the testing for treatment effects with an error term inappropriate to the hypothesis being considered. Hurlbert defines this as unwanted nondemonic intrusion quite specifically; where it results in impingement of

[46] IS/MND p. 760

[47] Hurlbert, S.J. 1984. Pseudoreplication and the design of ecological field experiments. *Ecological Monographs* 54:187-211.

chance events on an experiment in progress. As a safeguard against it – as well as preexisting gradients – appropriate assignation and interspersion of treatments is considered not to be preferential, but an obligatory feature of essential design. Comprehension of the conflict between interspersion and randomization is aided by distinguishing pre-layout (or conventional) and layout-specific alpha (probability of type I error).[48] In the case of this NREL study, by the author's own admission of lack of appropriate treatment identification and invalid randomness assignations they have committed pseudoreplication, and more. This invalidates the referential conclusions of the study since the experimental design does not match the assumptions the statistics are based upon. As such, the veracity of the report is in serious question, since this report would not be accepted to a peer review journal due to its fatally flawed statistics and lack of statistical power. Additionally, assumptions about relevance to the regional scenario and population as a whole that are theoretically represented are also invalid. 3-97 (cont)

e) It is also ironic that the IS/MND has chosen as their *other* document supporting their claim of less than significant impacts to birds a summary report ("Report") by a wind project's contracted environmental consultant (CH2M Hill), to support this IS/MND's theory of minimal Project impacts to birds. Once again, the cited Report fails to contribute to the required baseline for this Project, since it is too old to be relevant for reporting the current baseline of resident and breeding species in proximity to and within the Project site, and more to the point the studies it refences are not directly related to the Project.[49] As importantly, the CH2M report is a summary of other studies, it is not a survey of the Project site as the IS/MND infers from its conclusions. 3-98

The IS/MND cites the Report as evidence that their new monopole turbines will unquestionably have reduced impact, yet (a) the summary of the findings of the Report as stated in IS/MND is incomplete and deliberately misleading; (b) the findings of the Report are not in agreement with has been determined by several studies of repowered wind farms conducted by independent researchers across the U.S. (noted in detail and citations above), and (c) the Report's singular conclusions are based upon experimental assumptions of like comparisons where these assumptions are erroneous. The Report treats various studies of differing variables and different treatments from different sites and locations as equitable when they are not; from bird studies using a wide variety of methodologies and 3-99

[48] Hurlbert, S.J. 1984. Pseudoreplication and the design of ecological field experiments. *Ecological Monographs* 54:187-211.

[49] CH2M Hill. 2011. Painted Hills IV Wind Energy Project, Avian Use. Prepared by Patti Murphy and David Phillips. May 31, 2011.

experimental rigor; some at wind sites, some at repowered wind sites, some with no structures; all studying different variables, some experimental, others observational. These studies are informative, but only so far as their discussion and conclusions accurately reflect the individual study's goals and theories being tested/observed. However, the Report cherry-picks data they choose as relevant, and pool the data into a singular summary conclusion. To do this with any statistical significance or scientific integrity, such a report should conduct a meta-analysis with appropriate statistical design and analysis. However, the Report made no attempt to do this, choosing instead to loosely describe different studies and then conveniently draw the conclusion that based, upon their "analysis", the proposed project they have been contracted to analyze will result in no significant impacts to birds.

Further, the Report makes subjective, vague, and unsupported determinations upon which the IS/MND extrapolates and relies upon for *their* impact analysis claims of low impacts to birds as well. For instance, the CH2M Report claims that "during the surveys" – though not citing exactly which study or surveys they are referring to - one area had "low" numbers of avian species. However, they do not attempt to describe or otherwise indicate what "low" means in respect to any sort of baseline, population, or comparison, or by what measure or relevant to what variable "low" is being assessed. They also assume that "low" species numbers are indicative of low mortality, confusing variables of richness with other unmentioned characteristics that may be equally important, including density, abundance, and whether or not species in question are rare, protected, etc. Elsewhere in the Report CH2M subjectively chooses studies – and more importantly, subjectively summarizes the findings from these reports - about other potentially relevant variables, such as bird flight height. For instance, based upon one study they claim that birds fly too high to be impacted significantly by *their* proposed project's turbines. One of several distinctions that they blur in drawing such a conclusion is that migratory birds may tend to fly higher than resident birds on average, since residential birds are foraging, breeding, perching, nesting, etc., whereas migrants tend to be doing just that, migrating from wintering to breeding grounds or vice-versa. However, this does not preclude the fact that different species fly at highly variable heights, and resident bird abundance, richness, density, and use of habitat for

3-99 (cont)

foraging in and around turbines all play a role in the risks to resident species; risks not actually addressed in the CH2M summary.[50,51,52]

The CH2M Report also states that, "Though focused bird use counts have not been conducted for Painted Hills IV or for many of the recently proposed wind energy projects in the vicinity, some information is available based on incidental sightings recorded as part of more general wildlife survey reports. The information is presented here to further qualitatively characterize avian use in the area."[53] Incidental sightings are anecdotal by definition, and not part of scientific evidence that can be used to make quantitative and qualitative declarations that the Report sets out to do, drawing major conclusions about the Painted Hills IV site as a "low impact" project based upon these inferences and anecdotes. Additionally, the Report claims that taller turbines would not pose a "greater" risk to birds because one of McCrary's cited nocturnal surveys stated that the "majority" of nighttime migrants flew well above the height of the proposed turbines. However, they make no mention of other studies (one of which they cite elsewhere for other conclusions) conducted during the daytime that show variable flight height results, nor do they make note of how sensitive resident species including burrowing owls and American kestrels are observed to fly at lower heights.[54] CH2M authors have a penchant for using terms like "most, many, high, low, majority" without assigning definitive statistical, numerical, or contextual meaning to these terms relative to the actual studies they are being drawn from. In addition to these omissions, for the most part the Report does not disclose the specifications of the turbines they are referring to in most of the studies they cite that involved turbines, instead they pose the turbines specifications for the future project they have been assigned to discuss, with the erroneous assumption that they can make comparisons across any repowering wind farm studies as relevant to their proposed project simply by default.

3-99 (cont)

As if these omissions and errors weren't enough to raise doubt about the equanimity and resultant applicability of comparisons the Report makes, CH2M's broad-based, definitive

[50] H.T. Harvey and Associates. (2017). Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1. Prepared for Golden Hills Wind LLC. 97 pp.

[51] Arnett, E.B. and May, R. F. (2016). Mitigating Wind Energy Impacts on Wildlife: Approaches for Multiple Taxa. *Human–Wildlife Interactions* 10(1):28–41

[52] Loss, S. R., T. Will, and P. P. Marra. (2013). Estimates of bird collision mortality at wind facilities in the contiguous United States. Biological Conservation 168:201–209.

[53] IS/MND p. 735

[54] H.T. Harvey and Associates. (2017). Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1. Prepared for Golden Hills Wind LLC. 97 pp.

conclusions include statements like "Studies of the San Gorgonio Pass, including data from the Painted Hills IV site, have documented relatively low numbers of avian species, including few observations of raptors". One cannot be sure which "studies" they are referring to, since their same Report cites studies by McCray and McKernan that find just the opposite.[55,56] The Report fails to conduct *any* of statistical analyses necessary in order to draw the broad conclusions they do. For instance, CH2M refers to point count data from a study that conducted very few observations overall (approximately 4- 6 per location, totally fewer than 8 hours of observations per site) and lumps it in with another study that created a model based on wholly different variables and assumptions, and then compiles the findings from these studies to singular conclusions of low impacts to birds by wind farms. It is one thing to present and discuss these findings in a descriptive summary for the sake of exposition or adding to a database, it is entirely another for the Report to take these findings and draw a singular conclusion from them as if they are comparable in design or statistical approach, especially when such a conclusion has the risk of allowing impacts to many species going unmitigated over decades. As the Report claims, "Based on the data available for the region and the turbine specifications and design elements incorporated into the Painted Hills IV Project, it is reasonable to assume that the Project would not contribute to significant adverse impacts to any avian species potentially present in the area."[57] Actually, based upon the erroneous comparisons and other errors described above, such a conclusion is not reasonable. This Report would never be accepted to a peer reviewed journal, and its findings cannot be taken as well-vetted science or evidentiary for something as important as impact analysis extrapolated two-fold for this Project.

3-99 (cont)

5. The Bio Memo ignores the analysis and evidence put forth in my original comments regarding the lack of appropriate baseline data available to assess impacts to the golden eagle. (See also comments above establishing evidence of the presence of golden eagles in the region, and a potential increase in breeding and mortality of eagles.) In fact in the Bio memo Mr. Ramsey erroneously argues that CURE provides no evidence that the Project will increase impacts to eagles; I propose once again the burden is on the IS/MND to prove that the Project will *not* impose significant impacts to eagles (or present how impacts will be successfully mitigated), a burden they have clearly not met with their outdated, invalid, illegal eagle surveys.

3-100

[55] McCrary, M. D., R. L. McKernan, and R. W. Schreiber. (1986). San Gorgonio wind resource area: Impacts of commercial wind turbine generators on birds, 1985 data report. Prepared for Southern California Edison Company.

[56] McCrary, M., McKernan, R., Landry, R., Wagner, W., and Schreiber, R. (1983). Nocturnal Avian Migration Assessment of the San Gorgonio Wind Resource Study Area, Fall 1982. Report Prepared for Research and Development Southern California Edison Company by the L.A. County natural history Museum Foundation. 142 pp.

[57] IS/MND p. 736

In fact, one wonders why the IS/MND would bother presenting a survey of eagles as part of their analysis if they did not consider eagles to be potentially impacted by the project. 3-100 (cont)

6. See my responses above and below.

7. The Bio Memo claims that, "CURE alleges that the Plan (CVMSHCP) is inadequate because it was prepared at a plan level." No, that is not what is alleged; my comments stated that the IS/MND's descriptions of mitigated impacts are lacking due to the IS/MND's reliance on simply pointing to the existence of the Plan as all they deem necessary for their explanation (or lack thereof) of how Project impacts will be mitigated for different species, for different impacts (direct, indirect, cumualtive impacts?) from which kind of disturbances (temporary, permanent?), and what kind of mitigation would be applied (compensatory, off-site, best management practices, adaptive management practices, monitoring followed by consult, etc?). Specifically, my comments[58] stated, 3-101

> "The CVMSCHP is not a document that provides a host of clearly defined, species-specific, Project-specific mitigation protocols as the IS/MND would have the reviewer believe. Neither does it make review of said "protocols" available to the public, as is required under CEQA. And yet it bases its conclusions of successful mitigation on the assumption that "consistency" with the CVMSCHP equates successful mitigation analyzed and described. It does not, and these conclusions are wholly unsupported. The CVMSHCP is comprised of thousands of pages of discussion regarding umbrella topics including goals of research monitoring, conservation, FAQ's, and suggestions for adaptive management for species. It does not provide specific protocols unique to specific developments with their unique array of habitats, species, and development threats. And yet the IS/MND relies on generic statements for impacts to entire taxa, such as stating, "The Project is subject to the requirements of the CVMSHCP. Based on the recommendations outlined above, the Project is consistent with the CVMSHCP...."[59] and yet do not actually spell out what these recommendations are, or how they apply. The burden is on the Applicant to provide the details they are referring to. They fail to meet this burden, instead merely pointing to the existence of the CVMSHCP, and saying in essence they will follow undescribed, indeterminate CVMSHCP "protocols" and therefore be "consistent" and therefore reduce impacts to below significant. This is completely unsatisfactory, especially when one conducts a review of the actual content of the CVMSHCP: no such specific mitigation protocols exist as the IS/MND infers, certainly not for a wind farm in this region, in this mix 3-102

[58] R. Owens, Letter from Renée Owens to Kyle Jones (Nov. 27, 2018) Comments for the Painted Hills Wind Repowering Project Initial Study, Commercial WECS Permit No. 180001 / Variance Case No. 180003 – Intent to Adopt a Mitigated Negative Declaration – CEQ180059

[59] IS/MND Exhibit S p. 15.

of habitat, with this (yet to be determined) combination, density, abundance, richness, etc. of species present. 3-102 (cont)

For instance, their mitigation details for impacts to the protected Desert tortoise are comprised primarily of the statement that "During construction-related activities, contractors will comply with the mitigation and minimization measures contained in the CVMSHCP protocol." However, they do not provide any details about this protocol, nor do they discuss how indirect impacts will be mitigated, and do not acknowledge the reality of cumulative impacts onsite for the Desert tortoise, despite the fact that the CVMSHCP concludes one of the reasons for its existence is to address concerns regarding the high potential for cumulative impacts to regional sensitive species including the Desert tortoise."[60] 3-103

In summary, my comments do not question the validity or integrity of the Plan, they question its ability as a *guideline* to dictate and describe *specific* mitigation actions that will be appropriate and relevant to this Project's specific design, biological resources, and related disturbances. If such actions and protocols exist already scripted in the Plan, it would be more than appropriate for the IS/MND to reiterate these protocols in the IS/MND so that in order to assess the appropriateness of how impacts will be mitigated the reviewing public need not mind-read what the IS/MND authors are thinking. For example: if one visits the Plan website, www.cvmshcp.org, one will find links to thousands of pages including web page links titled "Fact sheet / FAQ's / Plan Documents / Plan Maps / Final permit/ NCCP Permit and Findings / Management and Monitoring / GIS Data / BWG Materials." If one clicks on the link "Plan Documents" they will then be presented with another page that has no fewer than 68 new links of topics to search, many not explanatory (i.e. Appendices labelled by letter, EIR sections labeled by number, other headings simply labeled "Section" and number). If one clicks on the "Management and Monitoring" link, they will be presented with 15 large documents titled by habitat, species, action, Unit Plan, etc. One must therefore ask how the reviewing public is expected to know exactly which of these documents contains the appropriate information for mitigation that applies to this Project, and what it says. If the actual mitigation protocol for each and any Project species impact is outlined somewhere herein, it behooves the IS/MND to repeat those protocols in the IS/MND. 3-104

8. The Bio Memo attempts to defend the IS/MND's numerous baseline omissions, poorly defined impacts, inadequate description of how impacts will be mitigated, and resultant ineffectiveness of purported mitigation by not addressing these issues as raised. It instead 3-105

[60] See http://www.cvmshcp.org/Monitoring_Management.htm Retrieved 11-25-2018.

proffers a red herring by defending the validity of the CVMSHCP (Plan). My comments did not question the validity or integrity of the Plan. However, it is also true that the Plan is a complicated and obtuse set of thousands of pages of documents that define species and conservation goals for the broad region in which the Project falls, but does not define specific protocols required for this Project. Neither does the existence of the Plan, nor its documentation therein, guarantee that any mitigation protocols will be implemented appropriately and adequately as required, including exactly where, when, and how, and in respect to which types of impacts. Reports on the long history of the Plan's development underscore this reality, including the historical research that states, "The CVMSHCP process became bogged down—despite strong scientific input and many political advantages—due to problematic relationships between the Plan's local supporters, its municipal signatory parties, and officials from the state and federal wildlife agencies, particularly the regional office of the US Fish and Wildlife Service, with some detail regarding monitoring of the species in various locales and habitats" and "those charged with actually executing the Plan after its passage will encounter a political, economic, and ecological environment much more complicated, and perhaps less amenable, to comprehensive regional biodiversity conservation than the one that existed when the process began 13 years ago. Enacting a habitat conservation plan should be considered just the beginning—not the end—of a scientifically informed... and openly democratic political process."[61] In summary, the Plan is a complex package of research and resultant guidelines, not the required script necessary for a project IS/MND.

3-105 (cont)

9. The Bio Memo once again attempts to mislead by erroneously claiming that my comments provide "no evidence" that there will be significant impacts to bats, and criticizing CURE for relying on research applicable to "other wind projects". To begin with, I would be quite willing to assess research on bats from *this proposed* Project and its site to use as evidence for the baseline conditions and resultant potential impacts, however since the IS/MND provides zero such evidence this is impossible. Second, I refer Mr. Ramsey back to my comments so that he may actually review them in detail, while I reiterate that once evidence demonstrating that bats may be present in the area and impacted by the project, the burden is on the IS/MND, not the reviewer, to clearly demonstrate that the Project will *not* incur significant impacts to bats or that any significant impacts will be mitigated, and how. By hardly alluding to the existence of bats at all, clearly the IS/MND has not met this burden of describing and establishing a baseline for discussion. Equally surprising is Mr. Ramsey's assertion in the Bio Memo that "there are no listed bat species in California and the lack of roosting habitat on site did not warrant more surveys." He goes on to say that mortality studies at other wind facilities in California have shown low impacts to bats. It appears Mr. Ramsey is confused on the subject of bats and wind

3-106

[61] Alagona, S. and Pincetl, S. (2008). The Coachella Valley Multiple Species Habitat Conservation Plan: A Decade of Delays. Environmental Management, 41:1–11.

farms altogether. To this end, I will reiterate my original comments here, followed by further evidence that contradicts the Bio Memo's assertions:

"...it is widely accepted by scientists and wildlife agencies that wind facilities cause significant mortalities to bats, and do not discriminate between common, sensitive, or endangered species by design.[62,63,64] This results in the conclusion by researchers of a multi-faceted study of bat mortality at different wind facilities that, "we recommend that individual wind facilities conduct project-specific pre- and postconstruction monitoring rather than infer mortality effects based on published results from other wind facilities."[65] However, the IS/MND ignores this fact by conducting no surveys, no analysis, and thus no mitigation for bats. The IS/MND fails to assess or discuss an entire taxon of species, namely bats, in its analysis of impacts, despite the fact that the CVMSCHP and CNDDB identifies several protected bat species, including the Southern yellow bat (a primary conservation "covered species" for the CVMSCHP)[66], and the Townsend's big-eared bat (*Corynorhinus townsendii*), as occurring in the region. Even the DRECP, the massive Desert Renewable Energy Conservation Plan for the desert southwest that includes the Project site region, focuses on bats as part of their conservation priority species. According to U.S. Geological Survey (USGS) biologists, "North American bats face unprecedented threats including habitat loss and fragmentation, white-nose syndrome, wind energy development, and climate change."[67] They also state that "It is difficult to evaluate impacts of these threats because there is a lack of basic information about the distribution and abundance of bats across the continent. A statistically robust and standardized bat monitoring program across North America would help managers estimate extinction risk, set conservation priorities and evaluate the effectiveness of conservation actions."[68] Indeed, if project biological consultants including LSA

3-106 (cont)

[62] Wellig, S. D., Nusslé, S., Miltner, D., Kohle, O., Glaizot, O., Braunisch, V., Obrist, M. K., Arlettaz, R. (2018). Mitigating the negative impacts of tall wind turbines on bats: Vertical activity profiles and relationships to wind speed. *PloS one*, 13(3), e0192493. doi:10.1371/journal.pone.0192493

[63] David Drake, Christopher S. Jennelle, Jian-Nan Liu, Steven M. Grodsky, Susan Schumacher, and Mike Sponsler. Regional Analysis of Wind Turbine-Caused Bat Mortality, *Acta Chiropterologica.* Jun 2015 : Vol. 17, Issue 1, pp 179- 188 https://doi.org/10.3161/15081109ACC2015.17.1.015

[64] USFWS. 2012. Land Based Wind Energy Guidelines. OMB Control No.10-18-0148 https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf

[65] *Ibid.*

[66] See http://www.cvmshcp.org/Plan_Documents_old.htm Retrieved Nov 25, 2018

[67] See https://www.usgs.gov/ecosystems/status-and-trends-program/science/bats?qt-science_center_objects=0#qt-science_center_objects Retrieved No 14, 2018.

[68] *Ibid.*

would embrace the scientific reality that bats are an essential component of ecosystem biodiversity and viability by conducting the necessary surveys for CEQA and similar analyses - which they could then contribute to CNDDB and elsewhere – databases would be more complete, allowing for more efficacious conservation planning as development increases and spreads throughout the desert southwest. And yet the IS/MND makes no attempt to analyze impacts to bats, not to mention to present a Bird and Bat Monitoring Program that should be part and parcel to every wind facility that proposes to mitigate injuries and deaths that are incurred during the life of a wind development, as recommended by USFWS official wind energy guidelines for wildlife monitoring and mitigation.[69]

Finally, it should be noted that although it is important for data collection that drives best management practice, a bat monitoring program does not actually reduce impacts to bats. As such a conservation plan, including compensatory mitigation, should be part of the IS/MND's analysis to reduce potential significant impacts to bird and bat species that will be incurred throughout the life of the project. However, the IS/MND completely fails to offer any such mitigation, and thus fails once again to meet the requirements for a MND.

Not only is there abundant evidence that wind turbines kill bats, research has demonstrated that artificial light and noise can increase the risk of mortality and reduce foraging success by bats in both urban and rural settings.[70,71] As such, bats could be impacted by the presence of artificial lighting by the Project, throughout the life of the Project, as well as by its other various anthropogenic disturbances in the form of noise, light, dust, barriers, negative attractants, etc.

The necessity of detailed, baseline data for bats (as well as other sensitive species mentioned above) is underscored by the fact that the definition of a substantial impact analyses under CEQA as used in the significance criteria has

3-106 (cont)

[69] USFWS. 2012. Land Based Wind Energy Guidelines. OMB Control No.10-18-0148 https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf

[70] Warner, K. A. (2016). *Investigating the effects of noise pollution from energy development on the bat community in the Piceance basin* (Order No. 10149854). Available from ProQuest Central; ProQuest Dissertations & Theses Global. (1815584239).

[71] Cravens, Z. M., Brown, V. A., Divoll, T. J., & Boyles, J. G. (2018). Illuminating prey selection in an insectivorous bat community exposed to artificial light at night. *The Journal of Applied Ecology*, 55(2), 705-713. doi:http://dx.doi.org.jerome.stjohns.edu:81/10.1111/1365-2664.13036

three principal factors: magnitude or intensity and duration of the impact; rarity and context of the affected resource; and susceptibility of the affected resource to disturbance. The evaluation of significance must also consider the interrelationship of these three factors. For example, a relatively small-magnitude impact on a state or federally listed species could be considered significant if the species is rare and highly susceptible to disturbance. This is true not only for determining significance of impact, but degree of significance in respect to what mitigation measures would be adequate. One cannot determine factors such as context and susceptibility of an entire population regarding impacts of the development of the Project if one does not know whether there may be one, ten, or one hundred or more individuals of a special status species present. It is therefore impossible to determine, without such data, if any given mitigation measure – during construction impact reduction protocol, restoration, relocation, or compensatory mitigation will reduce the Project impacts to below significant. It is especially difficult to determine the efficacy of mitigation protocols when they are not even provided, as is the case with this IS/MND. Given all of these factors, and the complete lack of any discussion regarding presence or impacts to bats, the IS/MND has completely failed to describe how and to what extent bats may likely be impacted by the Project, and as it stands any impacts to bats remain significant and unmitigated by the Project."

3-106 (cont)

In addition to these facts regarding the high potential of sensitive bat species to occur onsite, it is important to note that the USGS has designated that the Project site location is a high priority for data acquisition in respect to bat surveying.[72] Also, the CVMSHCP itself describes the protected yellow bat as occurring in the Whitewater canyon area in close proximity to the site. Although it is correct that there are no bats listed under the ESA or CESA as protected, the inference by Mr. Ramsey that the status of a threatened or endangered bat is the only reason for surveying them to determine baseline and resultant impacts to populations demonstrates an irresponsible disregard and /or gross lack of comprehension of the ecological importance of the bat species and populations that exist in California, including those mentioned above as occurring on and near the Project, and protected under the CVMSCHP. Indeed, if bats were only significant by default of having a C/ESA listed status, one would question why dozens of bird and bat monitoring and mitigation plans have been scripted for wind projects statewide, with assistance from CDFW and USFWS. And it should go without saying that one of the main

[72] USGS bat Sampling Grid Priorities. Conservation Biology Institute Data Basin. Retrieved from: https://drecp.databasin.org/maps/new#datasets=f9d248d688e04d55ac423de5bac7bec6

reasons for avoiding and minimizing significant impacts to sensitive and rare species is to prohibit them from becoming so vulnerable in their population status as to necessitate the need to be protected under the C/ESA, accompanied by the obligatory costly and long-term endeavor to Recover the endangered population.

Further, for the Bio Memo to state that a lack of roosting habitat did not warrant more surveys is absurd. First, one cannot have "more" surveys for bats when none were conducted to begin with. Second, apparently it is necessary to point out that much like most birds, bats fly. In fact, it is not unusual for them to fly miles in search of food, mates, breeding habitat, and when migrating; therefore, proximity to roosts is just one of many factors that influence potential for bats to occur and to thus be potentially significantly impacted by developments wind turbines.

More the point of this Project, there is abundant evidence in the peer reviewed literature that demonstrates that taller turbines – similar to those proposed for the Project – are known to increase risk and rate of mortality of bats around wind farms, as are other factors (such as turbine micro-siting) that may be imposed by this Project but are yet to be discussed or mentioned by the IS/MND. In their studies of bat mortalities at many different wind facilities, including repowered wind farms, Barclay *et. al.* concluded that, "There is considerable variation in the fatality rates of birds and bats among sites that is not explained by the size of the turbines alone. Turbines differ in other ways that may influence fatality. For example... monopoles [part of taller, newer turbines] have been hypothesized to mimic potential roost trees for bats (Kunz et. al. 2007). Our analysis indicates that fatalities of bats per megawatt of installed energy capacity are greater at some of the new, larger turbines, and overall, bat fatalities increase per megawatt....therefore, the potential impact on bat populations may be greater [as a result]." In summary, "bat fatalities increased exponentially with tower height. Minimizing tower heights may minimize bat fatalities."[73] Smallwood and Karas's research on repowered wind farms also concluded that repowering wind facilities may result in greater bat mortality,[74] as did the research finding summaries provided by Arnett and May,[75] Loss *et. al.*,[76]

3-106 (cont)

[73] Barclay, R. M. R., E. F. Baerwald, and J. C. Gruver. (2007). Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height. *Canadian Journal of Zoology*. 85:381–387.

[74] Smallwood, K. S., and B. Karas. (2009). Avian and bat fatality rates at old-generation and repowered wind turbines in California. *Journal of Wildlife Management* 73:1062–1071.

[75] Arnett, E.B. and May, R. F. (2016). Mitigating Wind Energy Impacts on Wildlife: Approaches for Multiple Taxa. *Human–Wildlife Interactions* 10(1):28–41

[76] Loss, S. R., T. Will, and P. P. Marra. (2013). Estimates of bird collision mortality at wind facilities in the contiguous United States. *Biological Conservation* 168:201–209.

Baerwald et. al.,[77] and Arnett *et. al.* (2008, 2013)[78,79] As significantly, Frick *et. al.*'s recent study concludes that fatalities at wind turbines may threaten[80] the population viability of a migrating (as opposed to roosting, resident) bat. Simply put, to adequately and thoroughly analyze the potential impacts a repowering project such as this Project may have on bats, the minimum requirement is for the Applicant to conduct current, thorough surveys of both resident and migrating bats. It is important to note that in order to adequately asses the long term, cumulative impacts of the Project in operation (if permitted), the research demonstrates that not only is a mortality monitoring program essential (despite the fact that monitoring does not actually mitigate any impacts), it should include a mitigation and monitoring plan that incorporates the use of dogs to detect fatalities of birds and bats. Where dogs have been used for mortality monitoring on wind facilities, the bird and bat fatalities discovered have been exponentially higher.[81,82,83,84] Such a methodology is essential to adapt best management practices to be applied to mitigate mortalities. On the subject of monitoring and the need for appropriate mitigation, Arnett and May summarize important, relevant recommendations as follows:

3-106 (cont)

> "Mitigating impacts of wind energy development on wildlife is important for conservation and public acceptance of this energy source...Planning and avoiding predicted high-risk areas is fundamental to reduce impacts on birds and bats. Contrary to avoidance, once facilities are built, options to minimize impacts need to be tailored to species at the specific

[77] Baerwald. E. F., and R. M. R. Barclay. (2011). Patterns of activity and fatality bats at a wind energy facility in Alberta. *Journal of Wildlife Management* 75:1103–1114.
[78] Arnett, E. B., K. Brown, W. P. Erickson, J. Fiedler, T. H. Henry, G. D. Johnson, J. Kerns, R. R. Kolford, C. P. Nicholson, T. O'Connell, M. Piorkowski, R. Tankersley Jr. (2008). Patterns of fatality of bats at wind energy facilities in North America. *Journal of Wildlife Management* 72:61–78.
[79] Arnett E. B., E. F. Baerwald. (2013). Impacts of wind energy development on bats: implications for conservation. Pages 435–456 *in* R. A. Adams, S. C. Peterson, editors, Bat Evolution, Ecology, and Conservation.Springer, New York, New York.
[80] Frick, W.F., E.F. Baerwald, J.F. Pollock, R.M.R. Barclay, J.A. Szymanski, T.J. Weller and A.L. Russell, S.C. Loeb, R.A. Medellin, and L.P. McGuire. (2017). Fatalities at wind turbines may threaten population viability of a migratory bat. *Biological Conservation*. 209: 172–177.
[81] Huso, M. M. P., and D. H. Dalthorp. (2014). Accounting for unsearched areas in estimating wind turbine-caused fatality. *Journal of Wildlife Management* 78:347–358.
[82] Mathews, F., M. Swindells, R. Goodhead, T. A. August, P. Hardman, D. M. Linton, and D. J. Hosken. (2013). Effectiveness of search dogs compared with human observers in locating bat carcasses at wind-turbine sites: a blinded randomized trial. *Wildlife Society Bulletin* 37:34–40.
[83] Paula, J., M. C. Leal, M. J. Silva, R. Mascarenhas, H. Costa, and M. Mascarenhas. (2011). Dogs as a tool to improve bird-strike mortality estimates at wind farms. *Journal for Nature Conservation* 19:202–208.
[84] Reyes, G. A., M. J. Rodriguez, K. T. Lindke, K. L. Ayres, M. D. Halterman, B. B. Boroski, and D. S. Johnston. (2016). Searcher efficiency and survey coverage affect precision of fatality estimates. *Journal of Wildlife Management* 80:1488–1496.

site, and can be limited especially for bats. Curtailing wind turbine operations is the only approach proven effective at reducing bat mortality... Compensation should be considered only as part of the mitigation hierarchy when unforeseen or unavoidable impacts remain. **Offsite habitat-based compensatory measures may provide the best offsets for incidental bird and bat mortality.** While the conceptual framework and predictive modelling for compensatory measures are well-established, empirical evidence demonstrating effectiveness and achievement of no-net loss for wildlife populations is lacking. Similarly, few studies have evaluated effectiveness of minimization measures and other forms of mitigation. Evaluating effectiveness of preconstruction wildlife assessments and habitat modeling in predicting wildlife mortality at wind facilities remains a research need. Additionally, lack of population data for many species of wildlife hinders knowledge of population-level impacts and effectiveness of mitigation measures. [Emphasis added]."[85]

3-106 (cont)

10. It is worth reiterating that the Bio Memo's assertion that the Project was vetted by the CVCC via the Joint Project Review is misleading. The JPR report for this Project (October 30, 2018) as provided is titled a draft, and thus review is incomplete. However, it does state the following, "The Project footprint crosses through an MWD owned parcel, (as shown in Map 3) that is not a participate in the multiple species plan. The Project also has species and natural impacts, (Map 4a) CV Jerusalem Cricket (5.50 acres), (Map 4b) Desert Tortoise (43 acres), (Map 4c) Sand Source areas (43 acres)." The Bio Memo, nor the IS/MND, makes no mention of these "new" impacts, nor how they will be mitigated.

3-107

Finally, in respect to the Jerusalem cricket mitigation, "Attachment 1", the Riverside County-Environmental Programs Department (EPD) Conditions provided by the County states that Prior to issuance of any grading permit, a biologist with a Memorandum of Understanding with Riverside County will prepare a Restoration Plan to cover the restoration of, at minimum, 3.74 acres of new temporary disturbance found in Coachella Valley Jerusalem cricket habitat on site." It appears yet another oversight by the IS/MND that no such mitigation plan for the cricket is even mentioned or detailed.

3-108

CONCLUSION

For the reasons outlined above, despite the claims put forth by the Bio Memo, the Project IS/MND fails to meet the requirements of impact analysis and mitigation under the California Environmental Quality Act (CEQA). Based on my responses in this letter, and my original

3-109

[85] Arnett, E.B. and May, R. F. (2016). Mitigating Wind Energy Impacts on Wildlife: Approaches for Multiple Taxa. *Human–Wildlife Interactions* 10(1):28–41

comments to the Project not being adequately addressed, it is my professional opinion that the IS/MND has not met the obligations of CEQA and that the Project would result in significant and unmitigated impacts to several sensitive biological resources. The IS/MND must be revised and resubmitted to disclose, adequately analyze, and mitigate the significant impacts. If the impacts cannot be reduced to less than significant, they are unavoidable. No further consideration should be given to the proposed Project until a complete IS/MND or Environmental Impact Report is prepared and circulated that fully complies with CEQA. 3-109 (cont)

Sincerely,

Renée Owens, M.S.
Conservation Ecologist

Professional Background

I am a conservation biologist and environmental consultant with 25 years of professional experience in wildlife ecology and natural resource management. I have managed an independent environmental consultancy since 1993, contracted for work in the U.S. and Latin America. Since 1994 have maintained U.S. Fish and Wildlife (USFWS) Recovery permits for listed species under the federal Endangered Species Act (ESA), including species discussed herein. I also hold several California state and federal certifications for surveys and monitoring of protected and special status species. I have extensive experience monitoring and studying many species across several taxa, including reptiles and amphibians, passerines and raptors, and marine and terrestrial mammals. I have served as a biological resource expert on over a hundred projects involving water, urban and rural residential developments, mines, and industrial scale energy projects; on private, public, and military lands; in California, the southwest, and Latin America. I have extensive experience observing the species and habitats located within and in proximity to the Project presented in the DEIR.

The scope of work I have conducted as an independent environmental contractor, supervisor, and full time employee has included assisting clients to evaluate and achieve environmental compliance, restoration, mitigation, and research as related to biological resources; as well as submitting written reports and comments for such work to oversight agencies. This work

includes analyzing and reviewing actions pursuant to the California Environmental Quality Act, the National Environmental Policy Act, the Endangered Species Act, the Clean Water Act, the Migratory Bird Treaty Act, and other regulations, along with surveying for and preparing Biological Technical Reports and Assessments. I have been contracted as an environmental consultant by the USFWS, the USDA Forest Service, Ultrasystems, ICF, Helix Environmental, URS, AECOM, AMEC, GeomorphIS, DUDEK, ESA, Tetra Tech, Bridgenet, Bioacoustics, among others. I am a member of the National Sierra Club's Wildlife and Endangered Species Committee and Marine Advisory Committee.

My conservation and natural history research on endangered vertebrate species in Latin America have received various awards including the National Geographic Research and Exploration Award and the National Commission for Scientific and Technological Research Award. My research has been featured on National Geographic Television and Discovery Channel documentaries, and I have served as technical consultant for wildlife documentaries filmed by National Geographic Television, Discovery Channel, BBC, and Animal Planet; in 2017 I received a Special Commendation for contributions to environmental conservation from the City of San Diego.

I have a Master's degree in Ecology; my teaching experience includes college instruction since 1991. I have been an adjunct instructor in Biology, Zoology, Botany, and Environmental Science at Palomar Community College, San Diego State University, and Imperial Valley College. I taught field courses in Tropical Ecology in Ecuador and the Galapagos for Boston University, and was a Visiting Full Time Professor in Environmental Science and Botany at Imperial Valley College. At present I am completing a second MS degree in Environmental Studies from Green Mountain College, focusing on Environmental Education and Communication.

I have gained particular knowledge of the biological resource issues associated with the Project through my extensive work on numerous research and consulting projects throughout southern California. My comments are based upon first-hand observations, review of the environmental documents prepared for the Project, review of scientific literature pertaining to biological resources known to occur in and near the Project area, consultation with other biological resource experts, and the knowledge and experience I have acquired throughout my 25 years of working in the field of natural resources research and management.

Attachment B

Health Risk Assessment Data and Supporting Materials

Painted Hills Wind Project

Salton Sea Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1,000.00	User Defined Unit	268.25	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	20
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Painted Hills Wind Project - Salton Sea Air Basin, Annual

Project Characteristics -

Land Use - Acreage based on disturbed area for project.

Construction Phase - Based on applicant provided construction schedule.

Off-road Equipment - Based on applicant provided construction assumptions.

Off-road Equipment - Based on applicant provided data.

Off-road Equipment - Based on applicant provided construction assumptions.

Off-road Equipment - Based on applicant provided construction assumptions.

Off-road Equipment - Based on applicant provided construction assumptions.

Off-road Equipment - Based on applicant provided construction assumptions.

Off-road Equipment - Based on applicant provided construction data.

Off-road Equipment - Based on applicant provided construction data.

Off-road Equipment - Based on applicant provided construction data.

Trips and VMT - Based on applicant provided construction assumptions.

On-road Fugitive Dust - Based on distance from Indian Canyon Dr. Road silt loading based on CARB Entrained Paved Road Dust Paved Roat Travel, July 1997.

Demolition -

Grading - CalEEMod defaults.

Consumer Products - No consumer products.

Area Coating - No architectural coatings.

Landscape Equipment - No landscaping

Water And Wastewater - Based on 16,000 gallons per day for dust suppression.

Construction Off-road Equipment Mitigation - Water for dust suppression.

Painted Hills Wind Project - Salton Sea Air Basin, Annual

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	300.00	87.00
tblConstructionPhase	NumDays	180.00	11.00
tblConstructionPhase	NumDays	465.00	44.00
tblConstructionPhase	NumDays	465.00	45.00
tblConstructionPhase	NumDays	180.00	34.00
tblConstructionPhase	NumDays	4,650.00	32.00
tblConstructionPhase	NumDays	4,650.00	45.00
tblConstructionPhase	NumDays	300.00	132.00
tblLandUse	LotAcreage	0.00	268.25
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	8.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	4.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOnRoadDust	HaulingPercentPave	50.00	82.00
tblOnRoadDust	HaulingPercentPave	50.00	82.00
tblOnRoadDust	HaulingPercentPave	50.00	82.00
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tblOnRoadDust	HaulingPercentPave	50.00	82.00
tblOnRoadDust	HaulingPercentPave	50.00	82.00
tblOnRoadDust	HaulingPercentPave	50.00	82.00
tblOnRoadDust	HaulingPercentPave	50.00	82.00
tblOnRoadDust	RoadSiltLoading	0.10	0.02
tblOnRoadDust	RoadSiltLoading	0.10	0.02
tblOnRoadDust	RoadSiltLoading	0.10	0.02
tblOnRoadDust	RoadSiltLoading	0.10	0.02
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tblOnRoadDust	RoadSiltLoading	0.10	0.02
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tblOnRoadDust	VendorPercentPave	50.00	33.30
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tblOnRoadDust	VendorPercentPave	50.00	33.30
tblOnRoadDust	VendorPercentPave	50.00	33.30
tblOnRoadDust	VendorPercentPave	50.00	33.30
tblOnRoadDust	VendorPercentPave	50.00	33.30
tblOnRoadDust	WorkerPercentPave	50.00	67.00

tblOnRoadDust	WorkerPercentPave	50.00	67.00
tblOnRoadDust	WorkerPercentPave	50.00	67.00
tblOnRoadDust	WorkerPercentPave	50.00	67.00
tblOnRoadDust	WorkerPercentPave	50.00	67.00
tblOnRoadDust	WorkerPercentPave	50.00	67.00
tblOnRoadDust	WorkerPercentPave	50.00	67.00
tblOnRoadDust	WorkerPercentPave	50.00	67.00
tblTripsAndVMT	HaulingTripNumber	0.00	924.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,404.00
tblTripsAndVMT	VendorTripLength	5.40	0.19
tblTripsAndVMT	VendorTripLength	5.40	0.19
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tblTripsAndVMT	VendorTripLength	5.40	0.19
tblTripsAndVMT	VendorTripLength	5.40	0.19
tblTripsAndVMT	VendorTripLength	5.40	0.19
tblTripsAndVMT	VendorTripLength	5.40	0.19
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tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	70.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT
tblTripsAndVMT	WorkerTripLength	11.00	0.19

tblTripsAndVMT	WorkerTripLength	11.00	0.19
tblTripsAndVMT	WorkerTripLength	11.00	0.19
tblTripsAndVMT	WorkerTripLength	11.00	0.19
tblTripsAndVMT	WorkerTripLength	11.00	0.19
tblTripsAndVMT	WorkerTripLength	11.00	0.19
tblTripsAndVMT	WorkerTripLength	11.00	0.19
tblTripsAndVMT	WorkerTripLength	11.00	0.19
tblTripsAndVMT	WorkerTripNumber	30.00	0.00
tblTripsAndVMT	WorkerTripNumber	15.00	0.00
tblTripsAndVMT	WorkerTripNumber	28.00	0.00
tblTripsAndVMT	WorkerTripNumber	28.00	0.00
tblTripsAndVMT	WorkerTripNumber	48.00	0.00
tblTripsAndVMT	WorkerTripNumber	30.00	0.00
tblWater	OutdoorWaterUseRate	0.00	10,228,571.43

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1104	1.0299	0.7101	1.4400e-003	2.3904	0.0568	2.4472	0.2391	0.0554	0.2945	0.0000	127.6815	127.6815	0.0171	0.0000	128.1084
2019	0.6868	7.3780	3.9697	8.3200e-003	7.0783	0.3567	7.4350	1.0190	0.3349	1.3540	0.0000	743.3321	743.3321	0.1733	0.0000	747.6655
2020	0.1436	1.3918	1.1121	2.3400e-003	3.6405	0.0687	3.7092	0.3641	0.0671	0.4312	0.0000	205.4407	205.4407	0.0254	0.0000	206.0757
Maximum	**0.6868**	**7.3780**	**3.9697**	**8.3200e-003**	**7.0783**	**0.3567**	**7.4350**	**1.0190**	**0.3349**	**1.3540**	**0.0000**	**743.3321**	**743.3321**	**0.1733**	**0.0000**	**747.6655**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1104	1.0299	0.7101	1.4400e-003	0.1485	0.0568	0.2052	0.0152	0.0554	0.0706	0.0000	127.6813	127.6813	0.0171	0.0000	128.1082
2019	0.6868	7.3780	3.9697	8.3200e-003	0.6825	0.3567	1.0392	0.1906	0.3349	0.5255	0.0000	743.3313	743.3313	0.1733	0.0000	747.6647
2020	0.1436	1.3918	1.1121	2.3400e-003	0.2262	0.0687	0.2949	0.0232	0.0671	0.0903	0.0000	205.4405	205.4405	0.0254	0.0000	206.0755
Maximum	**0.6868**	**7.3780**	**3.9697**	**8.3200e-003**	**0.6825**	**0.3567**	**1.0392**	**0.1906**	**0.3349**	**0.5255**	**0.0000**	**743.3313**	**743.3313**	**0.1733**	**0.0000**	**747.6647**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	91.94	0.00	88.67	85.88	0.00	66.99	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	11-5-2018	2-4-2019	1.7624	1.7624
2	2-5-2019	5-4-2019	1.6361	1.6361
3	5-5-2019	8-4-2019	2.5327	2.5327
4	8-5-2019	11-4-2019	2.1024	2.1024
5	11-5-2019	2-4-2020	1.5249	1.5249
6	2-5-2020	5-4-2020	0.9861	0.9861
		Highest	2.5327	2.5327

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.8000e-004	9.0000e-005	9.2800e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0179	0.0179	5.0000e-005	0.0000	0.0191
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	36.2080	36.2080	1.4900e-003	3.1000e-004	36.3375
Total	**8.8000e-004**	**9.0000e-005**	**9.2800e-003**	**0.0000**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**36.2258**	**36.2258**	**1.5400e-003**	**3.1000e-004**	**36.3566**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.8000e-004	9.0000e-005	9.2800e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0179	0.0179	5.0000e-005	0.0000	0.0191
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	36.2080	36.2080	1.4900e-003	3.1000e-004	36.3375
Total	**8.8000e-004**	**9.0000e-005**	**9.2800e-003**	**0.0000**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**36.2258**	**36.2258**	**1.5400e-003**	**3.1000e-004**	**36.3566**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Turbine Decommissioning-1	Demolition	11/1/2018	3/1/2019	5	87	
2	Mobilization/Laydown	Site Preparation	1/25/2019	2/8/2019	5	11	
3	Site Preparation/Grading	Grading	2/10/2019	4/11/2019	5	44	
4	Roads	Grading	4/15/2019	6/14/2019	5	45	
5	Excavation/Collector Lines	Site Preparation	4/30/2019	6/14/2019	5	34	
6	Foundations	Building Construction	6/16/2019	7/30/2019	5	32	
7	Install	Building Construction	8/4/2019	10/4/2019	5	45	
8	Turbine Decommissioning-2	Demolition	10/7/2019	4/7/2020	5	132	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Turbine Decommissioning-1	Air Compressors	4	8.00	78	0.48
Turbine Decommissioning-1	Concrete/Industrial Saws	0	8.00	81	0.73
Turbine Decommissioning-1	Cranes	2	8.00	231	0.29
Turbine Decommissioning-1	Excavators	0	8.00	158	0.38
Turbine Decommissioning-1	Generator Sets	4	8.00	84	0.74
Turbine Decommissioning-1	Rubber Tired Dozers	0	8.00	247	0.40
Turbine Decommissioning-1	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Mobilization/Laydown	Forklifts	1	8.00	89	0.20

Mobilization/Laydown	Graders	1	4.00	187	0.41
Mobilization/Laydown	Rollers	1	4.00	80	0.38
Mobilization/Laydown	Rubber Tired Dozers	2	4.00	247	0.40
Mobilization/Laydown	Rubber Tired Loaders	0	8.00	203	0.36
Mobilization/Laydown	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Site Preparation/Grading	Excavators	0	8.00	158	0.38
Site Preparation/Grading	Forklifts	1	8.00	89	0.20
Site Preparation/Grading	Graders	3	4.00	187	0.41
Site Preparation/Grading	Rollers	3	4.00	80	0.38
Site Preparation/Grading	Rubber Tired Dozers	3	4.00	247	0.40
Site Preparation/Grading	Rubber Tired Loaders	0	4.00	203	0.36
Site Preparation/Grading	Scrapers	0	8.00	367	0.48
Site Preparation/Grading	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Roads	Excavators	0	8.00	158	0.38
Roads	Forklifts	1	8.00	89	0.20
Roads	Graders	3	4.00	187	0.41
Roads	Rollers	3	4.00	80	0.38
Roads	Rubber Tired Dozers	3	4.00	247	0.40
Roads	Rubber Tired Loaders	0	8.00	203	0.36
Roads	Scrapers	0	8.00	367	0.48
Roads	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Excavation/Collector Lines	Excavators	3	4.00	158	0.38
Excavation/Collector Lines	Forklifts	3	8.00	89	0.20
Excavation/Collector Lines	Graders	3	4.00	187	0.41
Excavation/Collector Lines	Rollers	3	4.00	80	0.38
Excavation/Collector Lines	Rubber Tired Dozers	5	4.00	247	0.40
Excavation/Collector Lines	Rubber Tired Loaders	0	8.00	203	0.36

Excavation/Collector Lines	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Foundations	Cranes	0	8.00	231	0.29
Foundations	Excavators	3	4.00	158	0.38
Foundations	Forklifts	3	8.00	89	0.20
Foundations	Generator Sets	0	8.00	84	0.74
Foundations	Graders	3	4.00	187	0.41
Foundations	Rollers	3	4.00	80	0.38
Foundations	Rubber Tired Dozers	5	4.00	247	0.40
Foundations	Rubber Tired Loaders	0	8.00	203	0.36
Foundations	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Foundations	Welders	0	8.00	46	0.45
Install	Cranes	8	8.00	231	0.29
Install	Forklifts	4	8.00	89	0.20
Install	Generator Sets	0	8.00	84	0.74
Install	Rollers	1	4.00	80	0.38
Install	Rubber Tired Dozers	1	4.00	247	0.40
Install	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Install	Trenchers	2	4.00	78	0.50
Install	Welders	0	8.00	46	0.45
Turbine Decommissioning-2	Air Compressors	4	8.00	78	0.48
Turbine Decommissioning-2	Concrete/Industrial Saws	0	8.00	81	0.73
Turbine Decommissioning-2	Cranes	2	8.00	231	0.29
Turbine Decommissioning-2	Excavators	0	8.00	158	0.38
Turbine Decommissioning-2	Generator Sets	4	8.00	84	0.74
Turbine Decommissioning-2	Rubber Tired Dozers	0	8.00	247	0.40
Turbine Decommissioning-2	Tractors/Loaders/Backhoes	2	4.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Turbine Decommissioning-1	12	0.00	20.00	924.00	0.19	0.19	20.00	LD_Mix	HDT_Mix	HHDT
Mobilization/Laydown	6	0.00	6.00	0.00	0.19	0.19	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation/Grading	11	0.00	0.00	0.00	0.19	0.19	20.00	LD_Mix	HDT_Mix	HHDT
Roads	11	0.00	2.00	0.00	0.19	0.19	20.00	LD_Mix	HDT_Mix	HHDT
Excavation/Collector Lines	19	0.00	4.00	0.00	0.19	0.19	20.00	LD_Mix	HDT_Mix	HHDT
Foundations	19	0.00	70.00	0.00	0.19	0.19	20.00	LD_Mix	HHDT	HHDT
Install	16	0.00	24.00	0.00	0.19	0.19	20.00	LD_Mix	HHDT	HHDT
Turbine Decommissioning-2	12	0.00	20.00	1,404.00	0.19	0.19	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Turbine Decommissioning-1 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1080	0.9336	0.6936	1.2200e-003		0.0565	0.0565		0.0552	0.0552	0.0000	106.6342	106.6342	0.0152	0.0000	107.0152
Total	**0.1080**	**0.9336**	**0.6936**	**1.2200e-003**		**0.0565**	**0.0565**		**0.0552**	**0.0552**	**0.0000**	**106.6342**	**106.6342**	**0.0152**	**0.0000**	**107.0152**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4000e-003	0.0629	7.6700e-003	1.8000e-004	2.3146	2.3000e-004	2.3148	0.2315	2.2000e-004	0.2317	0.0000	17.1775	17.1775	9.7000e-004	0.0000	17.2018
Vendor	1.0700e-003	0.0335	8.8400e-003	4.0000e-005	0.0758	4.0000e-005	0.0759	7.5800e-003	4.0000e-005	7.6100e-003	0.0000	3.8697	3.8697	8.7000e-004	0.0000	3.8914
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.4700e-003**	**0.0963**	**0.0165**	**2.2000e-004**	**2.3904**	**2.7000e-004**	**2.3907**	**0.2391**	**2.6000e-004**	**0.2393**	**0.0000**	**21.0472**	**21.0472**	**1.8400e-003**	**0.0000**	**21.0931**

3.2 Turbine Decommissioning-1 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1080	0.9336	0.6936	1.2200e-003		0.0565	0.0565		0.0552	0.0552	0.0000	106.6341	106.6341	0.0152	0.0000	107.0151
Total	**0.1080**	**0.9336**	**0.6936**	**1.2200e-003**		**0.0565**	**0.0565**		**0.0552**	**0,0552**	**0.0000**	**106.6341**	**106.6341**	**0.0152**	**0.0000**	**107.0151**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4000e-003	0.0629	7.6700e-003	1.8000e-004	0.1438	2.3000e-004	0.1440	0.0148	2.2000e-004	0.0150	0.0000	17.1775	17.1775	9.7000e-004	0.0000	17.2018
Vendor	1.0700e-003	0.0335	8.8400e-003	4.0000e-005	4.6800e-003	4.0000e-005	4.7200e-003	4.8000e-004	4.0000e-005	5.1000e-004	0.0000	3.8697	3.8697	8.7000e-004	0.0000	3.8914
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.4700e-003**	**0.0963**	**0.0165**	**2.2000e-004**	**0.1485**	**2.7000e-004**	**0.1487**	**0.0152**	**2.6000e-004**	**0.0155**	**0.0000**	**21.0472**	**21.0472**	**1.8400e-003**	**0.0000**	**21.0931**

3.2 Turbine Decommissioning-1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0976	0.8635	0.6952	1.2500e-003		0.0496	0.0496		0.0485	0.0485	0.0000	108.6349	108.6349	0.0148	0.0000	109.0058
Total	**0.0976**	**0.8635**	**0.6952**	**1.2500e-003**		**0.0496**	**0.0496**		**0.0485**	**0.0485**	**0.0000**	**108.6349**	**108.6349**	**0.0148**	**0.0000**	**109.0058**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3700e-003	0.0601	7.5700e-003	1.8000e-004	2.3146	2.1000e-004	2.3148	0.2315	2.0000e-004	0.2317	0.0000	17.4143	17.4143	9.6000e-004	0.0000	17.4382
Vendor	1.0000e-003	0.0331	8.2700e-003	4.0000e-005	0.0776	3.0000e-005	0.0776	7.7500e-003	3.0000e-005	7.7900e-003	0.0000	3.9182	3.9182	8.5000e-004	0.0000	3.9395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.3700e-003**	**0.0932**	**0.0158**	**2.2000e-004**	**2.3922**	**2.4000e-004**	**2.3924**	**0.2393**	**2.3000e-004**	**0.2395**	**0.0000**	**21.3325**	**21.3325**	**1.8100e-003**	**0.0000**	**21.3777**

3.2 Turbine Decommissioning-1 - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0976	0.8635	0.6952	1.2500e-003		0.0496	0.0496		0.0485	0.0485	0.0000	108.6348	108.6348	0.0148	0.0000	109.0057
Total	**0.0976**	**0.8635**	**0.6952**	**1.2500e-003**		**0.0496**	**0.0496**		**0.0485**	**0.0485**	**0.0000**	**108.6348**	**108.6348**	**0.0148**	**0.0000**	**109.0057**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3700e-003	0.0601	7.5700e-003	1.8000e-004	0.1438	2.1000e-004	0.1440	0.0148	2.0000e-004	0.0150	0.0000	17.4143	17.4143	9.6000e-004	0.0000	17.4382
Vendor	1.0000e-003	0.0331	8.2700e-003	4.0000e-005	4.7900e-003	3.0000e-005	4.8200e-003	4.9000e-004	3.0000e-005	5.2000e-004	0.0000	3.9182	3.9182	8.5000e-004	0.0000	3.9395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.3700e-003**	**0.0932**	**0.0158**	**2.2000e-004**	**0.1486**	**2.4000e-004**	**0.1488**	**0.0153**	**2.3000e-004**	**0.0155**	**0.0000**	**21.3325**	**21.3325**	**1.8100e-003**	**0.0000**	**21.3777**

3.3 Mobilization/Laydown - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0346	0.0000	0.0346	0.0184	0.0000	0.0184	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1050	0.0468	9.0000e-005		5.2600e-003	5.2600e-003		4.8400e-003	4.8400e-003	0.0000	8.0290	8.0290	2.5400e-003	0.0000	8.0925
Total	**9.7200e-003**	**0.1050**	**0.0468**	**9.0000e-005**	**0.0346**	**5.2600e-003**	**0.0398**	**0.0184**	**4.8400e-003**	**0.0232**	**0.0000**	**8.0290**	**8.0290**	**2.5400e-003**	**0.0000**	**8.0925**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0000e-005	2.4900e-003	6.2000e-004	0.0000	5.8200e-003	0.0000	5.8200e-003	5.8000e-004	0.0000	5.8000e-004	0.0000	0.2939	0.2939	6.0000e-005	0.0000	0.2955
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.0000e-005**	**2.4900e-003**	**6.2000e-004**	**0.0000**	**5.8200e-003**	**0.0000**	**5.8200e-003**	**5.8000e-004**	**0.0000**	**5.8000e-004**	**0.0000**	**0.2939**	**0.2939**	**6.0000e-005**	**0.0000**	**0.2955**

3.3 Mobilization/Laydown - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0135	0.0000	0.0135	7.1600e-003	0.0000	7.1600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1050	0.0468	9.0000e-005		5.2600e-003	5.2600e-003		4.8400e-003	4.8400e-003	0.0000	8.0290	8.0290	2.5400e-003	0.0000	8.0925
Total	**9.7200e-003**	**0.1050**	**0.0468**	**9.0000e-005**	**0.0135**	**5.2600e-003**	**0.0188**	**7.1600e-003**	**4.8400e-003**	**0.0120**	**0.0000**	**8.0290**	**8.0290**	**2.5400e-003**	**0.0000**	**8.0925**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0000e-005	2.4900e-003	6.2000e-004	0.0000	3.6000e-004	0.0000	3.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.2939	0.2939	6.0000e-005	0.0000	0.2955
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.0000e-005**	**2.4900e-003**	**6.2000e-004**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.2939**	**0.2939**	**6.0000e-005**	**0.0000**	**0.2955**

3.4 Site Preparation/Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2162	0.0000	0.2162	0.1111	0.0000	0.1111	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0671	0.7467	0.3166	6.5000e-004		0.0354	0.0354		0.0326	0.0326	0.0000	58.8603	58.8603	0.0186	0.0000	59.3259
Total	**0.0671**	**0.7467**	**0.3166**	**6.5000e-004**	**0.2162**	**0.0354**	**0.2516**	**0.1111**	**0.0326**	**0.1437**	**0.0000**	**58.8603**	**58.8603**	**0.0186**	**0.0000**	**59.3259**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Site Preparation/Grading - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0843	0.0000	0.0843	0.0433	0.0000	0.0433	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0671	0.7467	0.3166	6.5000e-004		0.0354	0.0354		0.0326	0.0326	0.0000	58.8603	58.8603	0.0186	0.0000	59.3258
Total	**0.0671**	**0.7467**	**0.3166**	**6.5000e-004**	**0.0843**	**0.0354**	**0.1197**	**0.0433**	**0.0326**	**0.0759**	**0.0000**	**58.8603**	**58.8603**	**0.0186**	**0.0000**	**59.3258**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Roads - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2211	0.0000	0.2211	0.1137	0.0000	0.1137	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0686	0.7636	0.3238	6.7000e-004		0.0362	0.0362		0.0333	0.0333	0.0000	60.1981	60.1981	0.0191	0.0000	60.6742
Total	**0.0686**	**0.7636**	**0.3238**	**6.7000e-004**	**0.2211**	**0.0362**	**0.2574**	**0.1137**	**0.0333**	**0.1470**	**0.0000**	**60.1981**	**60.1981**	**0.0191**	**0.0000**	**60.6742**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	3.3900e-003	8.5000e-004	0.0000	7.9400e-003	0.0000	7.9400e-003	7.9000e-004	0.0000	8.0000e-004	0.0000	0.4007	0.4007	9.0000e-005	0.0000	0.4029
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-004**	**3.3900e-003**	**8.5000e-004**	**0.0000**	**7.9400e-003**	**0.0000**	**7.9400e-003**	**7.9000e-004**	**0.0000**	**8.0000e-004**	**0.0000**	**0.4007**	**0.4007**	**9.0000e-005**	**0.0000**	**0.4029**

3.5 Roads - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0863	0.0000	0.0863	0.0443	0.0000	0.0443	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0686	0.7636	0.3238	6.7000e-004		0.0362	0.0362		0.0333	0.0333	0.0000	60.1980	60.1980	0.0191	0.0000	60.6741
Total	**0.0686**	**0.7636**	**0.3238**	**6.7000e-004**	**0.0863**	**0.0362**	**0.1225**	**0.0443**	**0.0333**	**0.0776**	**0.0000**	**60.1980**	**60.1980**	**0.0191**	**0.0000**	**60.6741**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-004	3.3900e-003	8.5000e-004	0.0000	4.9000e-004	0.0000	4.9000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.4007	0.4007	9.0000e-005	0.0000	0.4029
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-004**	**3.3900e-003**	**8.5000e-004**	**0.0000**	**4.9000e-004**	**0.0000**	**4.9000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.4007**	**0.4007**	**9.0000e-005**	**0.0000**	**0.4029**

3.6 Excavation/Collector Lines - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2695	0.0000	0.2695	0.1421	0.0000	0.1421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0852	0.9191	0.4608	8.6000e-004		0.0458	0.0458		0.0421	0.0421	0.0000	77.3841	77.3841	0.0245	0.0000	77.9962
Total	**0.0852**	**0.9191**	**0.4608**	**8.6000e-004**	**0.2695**	**0.0458**	**0.3152**	**0.1421**	**0.0421**	**0.1842**	**0.0000**	**77.3841**	**77.3841**	**0.0245**	**0.0000**	**77.9962**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6000e-004	5.1200e-003	1.2800e-003	1.0000e-005	0.0120	1.0000e-005	0.0120	1.2000e-003	0.0000	1.2000e-003	0.0000	0.6055	0.6055	1.3000e-004	0.0000	0.6088
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.6000e-004**	**5.1200e-003**	**1.2800e-003**	**1.0000e-005**	**0.0120**	**1.0000e-005**	**0.0120**	**1.2000e-003**	**0.0000**	**1.2000e-003**	**0.0000**	**0.6055**	**0.6055**	**1.3000e-004**	**0.0000**	**0.6088**

3.6 Excavation/Collector Lines - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1051	0.0000	0.1051	0.0554	0.0000	0.0554	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0852	0.9191	0.4608	8.6000e-004		0.0458	0.0458		0.0421	0.0421	0.0000	77.3840	77.3840	0.0245	0.0000	77.9961
Total	**0.0852**	**0.9191**	**0.4608**	**8.6000e-004**	**0.1051**	**0.0458**	**0.1509**	**0.0554**	**0.0421**	**0.0975**	**0.0000**	**77.3840**	**77.3840**	**0.0245**	**0.0000**	**77.9961**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6000e-004	5.1200e-003	1.2800e-003	1.0000e-005	7.4000e-004	1.0000e-005	7.4000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.6055	0.6055	1.3000e-004	0.0000	0.6088
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.6000e-004**	**5.1200e-003**	**1.2800e-003**	**1.0000e-005**	**7.4000e-004**	**1.0000e-005**	**7.4000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.6055**	**0.6055**	**1.3000e-004**	**0.0000**	**0.6088**

3.7 Foundations - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0802	0.8650	0.4337	8.1000e-004		0.0431	0.0431		0.0396	0.0396	0.0000	72.8321	72.8321	0.0230	0.0000	73.4082
Total	**0.0802**	**0.8650**	**0.4337**	**8.1000e-004**		**0.0431**	**0.0431**		**0.0396**	**0.0396**	**0.0000**	**72.8321**	**72.8321**	**0.0230**	**0.0000**	**73.4082**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1200e-003	0.1374	0.0155	2.0000e-004	0.1975	9.0000e-005	0.1976	0.0197	9.0000e-005	0.0198	0.0000	18.8013	18.8013	4.1000e-003	0.0000	18.9037
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.1200e-003**	**0.1374**	**0.0155**	**2.0000e-004**	**0.1975**	**9.0000e-005**	**0.1976**	**0.0197**	**9.0000e-005**	**0.0198**	**0.0000**	**18.8013**	**18.8013**	**4.1000e-003**	**0.0000**	**18.9037**

3.7 Foundations - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0802	0.8650	0.4337	8.1000e-004		0.0431	0.0431		0.0396	0.0396	0.0000	72.8320	72.8320	0.0230	0.0000	73.4081
Total	**0.0802**	**0.8650**	**0.4337**	**8.1000e-004**		**0.0431**	**0.0431**		**0.0396**	**0.0396**	**0.0000**	**72.8320**	**72.8320**	**0.0230**	**0.0000**	**73.4081**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1200e-003	0.1374	0.0155	2.0000e-004	0.0122	9.0000e-005	0.0123	1.2300e-003	9.0000e-005	1.3200e-003	0.0000	18.8013	18.8013	4.1000e-003	0.0000	18.9037
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.1200e-003**	**0.1374**	**0.0155**	**2.0000e-004**	**0.0122**	**9.0000e-005**	**0.0123**	**1.2300e-003**	**9.0000e-005**	**1.3200e-003**	**0.0000**	**18.8013**	**18.8013**	**4.1000e-003**	**0.0000**	**18.9037**

3.8 Install - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1302	1.4590	0.6493	1.3800e-003		0.0707	0.0707		0.0651	0.0651	0.0000	123.7227	123.7227	0.0391	0.0000	124.7013
Total	**0.1302**	**1.4590**	**0.6493**	**1.3800e-003**		**0.0707**	**0.0707**		**0.0651**	**0.0651**	**0.0000**	**123.7227**	**123.7227**	**0.0391**	**0.0000**	**124.7013**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5100e-003	0.0662	7.4700e-003	1.0000e-004	0.0952	4.0000e-005	0.0953	9.5100e-003	4.0000e-005	9.5500e-003	0.0000	9.0649	9.0649	1.9800e-003	0.0000	9.1143
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.5100e-003**	**0.0662**	**7.4700e-003**	**1.0000e-004**	**0.0952**	**4.0000e-005**	**0.0953**	**9.5100e-003**	**4.0000e-005**	**9.5500e-003**	**0.0000**	**9.0649**	**9.0649**	**1.9800e-003**	**0.0000**	**9.1143**