

BOULEVARD PLANNING GROUP

PO Box 1272, BOULEVARD, CA 91905

DATE: July 22-18

TO: Bronwyn Brown, PDS Project Manager via Bronwyn.Brown@sdcounty.ca.gov

FROM: Donna Tisdale, Chair; tisdale.donna@gmail.com; 619-766-4170

RE: PDS2018-MUP-18-014: INITIAL COMMENTS ON TORREY WIND

These initial comments are submitted on behalf of the Boulevard Planning Group. We also incorporate by reference our Climate Action Plan comments submitted on 1-16-18, 2-12-18, and our Wind Energy Ordinance comments and Resolution submitted / presented in 2012 and 2013.

At our regular meeting held on July, 12th, after public discussion and review of an opposition letter from adjacent property owners of 102 acres, Clifford and Conception Caldwell, the Boulevard Planning Group voted to deny the project and to authorize the Chair to submit comments. Both motions passed with 4 yes, -0- no, with 3 members absent. PDS Form -534 was submitted on July 13th.

When asked if anyone supported the project, no one raised their hand. When asked who opposed the project, all those present raised their hands with the exception of Jim Whalen of J. Whalen & Associates and one unidentified couple. The concerns expressed now are the same as those expressed in opposition to the Wind Energy Ordinance and previously proposed wind projects in our area: Jewel Valley Wind, Manzanita Wind, Tule Wind, Shu'luuk Wind, Energia Sierra Juarez Wind and their related infrastructure. The projects represent significant environmental impacts, cumulatively considerable impacts, and are not in harmony bulk or scale with existing uses on private lands, in addition to adversely impacting public health and safety, property values and overall quality of life.

A full EIR is required for Torrey Wind project impacts and cumulatively considerable impacts from numerous other projects:

- An EIR must be prepared for this project that represents individual and cumulatively considerable impacts when added to existing, approved, and proposed renewable energy and related infrastructure and impacts in the general area.
- Legal definition of cumulative impacts: "A cumulative impact is defined as: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7) Northwest Env'tl. Def. Ctr. v. Nat'l Marine Fisheries Serv., 647 F. Supp. 2d 1221, 1244 (D. Or. 2009)¹

¹ <https://definitions.uslegal.com/c/cumulative-impact/>

Existing wind turbines generate adverse impacts:

- Kumeyaay Wind, Tule Wind, and Energia Sierra Juarez Wind are already in operation on federal and cross-border land as is Ocotillo Wind just down the hill in Imperial County. All have generated complaints of noise, vibrations, reduced wildlife, injured birds and bats, and adverse health impacts and all are visually intrusive day and night with churning blades and lighting. Individually and cumulatively these projects have reduced and fragmented existing and connected habitats cannot be replaced or exchanged.
- All these wind projects and related infrastructure have had adverse and cumulative impacts on local residents, visitors, and resources including but not limited to: visual/aesthetic, dark skies, groundwater, biological and cultural resources, they have increased allegedly /potentially harmful levels of noise and vibrations, degraded the overall quality of life and community character.
- In addition, Rugged Solar is in the permitting process on Rough Acres Ranch between Ribbonwood Road and McCain Valley Road.

Torrey Wind turbines are much larger than existing turbines which are on federal land and further from most impacted homes:

- The Torrey Wind project, proposed for the same north of I-8 site as Enel Green Power's terminated Jewel Valley Wind that proposed using 2MW turbines, will generate increased adverse impacts due to the proposed 30 much larger 4.2MW wind turbines up to 586 feet tall (hub height of 361feet and 450 rotor diameter- 225 ft blades).
- Tule Wind I uses 52 GE 2.5 MW wind turbines with towers 252 feet tall and rotor diameter of 351 feet².
- Kumeyaay Wind uses 25 Gamesa G87 2 MW wind turbine towers are 228 feet tall with rotor diameter of 285 feet.³ It has been in operation since late 2005. On December 7, 2009, Kumeyaay Wind suffered catastrophic failure that required replacement of most electrical components and all 75-turbine blades.⁴ In December 2013 one of its turbines caught fire and sparked a brush fire.
- Larger wind turbines generate increased levels of low-frequency noise, infrasound and vibrations and related adverse health impacts.
- Infrasound and low frequency noise and vibrations travel greater distances unimpeded than smaller wind turbines.

Terminated wind turbine projects:

- Enel Green Power terminated their Jewel Valley Wind project proposed both north and south of I-8 after inclusion of low-frequency noise restrictions in the County's Wind Energy Ordinance.

² <http://www.sandiegouniontribune.com/business/energy-green/sd-fi-tule-wind-20170308-story.html>

³ <https://www.edprnorthamerica.com/wp-content/uploads/2014/04/G87.pdf>

⁴ <https://aws-dewi.ul.com/about-us/case-study/kumeyaay-wind-project-extreme-wind-analysis-san-diego-california/>

- Invenergy’s Shu’luuk Wind was terminated by a vote of the Campo tribe over concerns of health effects and risk of fire after one of their Kumeyaay Wind turbines caught fire in December 2013 and sparked a vegetation fire. The Bureau of Indian Affairs cancelled the Environmental Impact Assessment.⁵



- Manzanita Wind: SDG&E submitted a completed interconnection request to the CAISO. By 2014 it was the subject of an auction by SDG&E⁶. There is no information available on whether or not the auction was successful.
- Iberdrola withdrew MET towers and plans for wind turbines in the Table Mountain area of Jacumba and BLM land at the Southwest corner of the Campo Indian Reservation near the US/Mexico border.

The project description is inadequate and inconsistent:

- The current conditions and production rate of the existing water wells is not provided, nor is the estimated amount of groundwater proposed to be mined from the on-site well(s) the Jacumba Community Services District, or any other potential local source.
- Are any new water wells proposed? Are the existing wells permitted with well logs?
- Adjacent project neighbors Clifford and Conception Caldwell have alleged that the Notice to Property Owners that they received did not include the project’s parcel numbers.
- The acreage of the proposed project is inconsistently listed as 720.6 acres & 6 lots (PDS-524); 2,041 acres (Notice to Property Owners); 13 parcels listed on Torrey Wind Parcel List; 18 parcels listed in description provided in PDS-367; and 2,246 acres listed in Project Description Form 346S by Dudek, dated June 2018.

⁵<https://www.windpowermonthly.com/article/1282289/native-americans-scrap-250mw-project>

⁶<https://www.sdge.com/sdge-auction-manzanita-wind-project>

Change in project name:

- We want to note that the Torrey Wind project was previously proposed by Terra Gen as the San Diego Wind project.
- All of our previous comments, actions, and/or appeals submitted for San Diego Wind and Terra-Gen's related MET facilities application PDS2018-AD-007 are hereby incorporated in full by reference.

Terra-Gen's PDS-346 Form is inaccurate:

- The Project APPEARS TO BE WITHIN ½ MILE of a Regional Park: McCain Valley Recreation Area and Lark Canyon OHV Park. The YES box should be checked instead of the NO box.
- The listed 720.6 acres on 6 lots conflicts with acreage and lot numbers on other project documents, including the PROJECT DESCRIPTION and the Torrey Wind Parcel List with 13 parcels. See above.
- The project is located in the Boulevard Community Planning Area not Mountain Empire.

PDS -346S: Supplemental Application for exemption to Height Limits:

- We strongly oppose any exemptions to Height Limits for the proposed 310 foot tall MET towers that will include guy wires that are harmful to birds and bats and create a cumulatively significant visual intrusion and degradation for impacted residents and visitors to public lands in the McCain Valley and surrounding areas.

PDS-367: Application for Environmental Initial Study (AEIS)

Project Description

III. Features of the Project:

- A full EIR is required for this project that includes some of the largest onshore wind turbines available today.
- 4.2 MW turbines are some of the largest available on the market and are much larger and taller than existing wind turbines at Kumeyaay Wind, Tule Wind, Ocotillo Wind and Energia Sierra Juarez Wind.
- The brief project description on page 4 of 13 fails to include the full height of the turbines including blade height.
- Access is proposed over private roads connecting to Ribbonwood Road. If those private access roads include easements across non-participating private properties that were granted to the project site for residential or agricultural use, the proposed commercial industrial wind turbine project may not be authorized or supported by existing easements and impacted owners.
- No estimate of groundwater use is included in the description.

IV. Environmental Aspects of Project:

- **1. Land Use:** The proposed use is not an existing use on private lands in the area. The Tule Wind and Kumeyaay Wind projects are located on federal lands at a distance from existing homes and

uses that will be impacted by Torrey Wind. The Sunrise Powerlink is also located at the far north end of the proposed site that is at a distance from most private homes accessed by Ribbonwood Road.

- **2. Agricultural Resources:** It is our understanding that the most if not the entire project site has been used for cattle grazing for years. See answer to 1. Land Use above.
- **3. Population and housing:**
 - Based on adverse health impacts reportedly documented at other homes impacted by industrial wind turbine projects around the globe, Torrey Wind project's impacts may result in residents abandoning their homes if they are deemed uninhabitable due to proximity and related adverse health impacts from noise, vibration, and shadow flicker (flash and glare).
 - At this point, we cannot find any information based on 4.2 MW wind turbines due to their limited time on the market and real world information. Cumulatively significant impacts from other projects in the area must also be addressed.
 - Aerial maps should be produced and circulated for public showing how many existing homes are located within a 3 mile radius of the project and the distance from the closest turbines and other project facilities.
- **4. Geological Issues:**
 - The project site was impacted by the 7.8 Laguna Salada earthquake in 1892 that resulted in severe shaking, ground fissures, and rock slides in the McCain Valley and Jewel Valley areas of Boulevard. In McCain Valley, the ground was seen to move in waves.⁷
 - Severe shaking was also felt in the Boulevard area the 2010 quake on the Laguna Salada.
 - The project site includes the Tule Creek floodplain that includes alluvial soils that become saturated during El Nino years and other heavy rainfall events.
 - Saturated alluvial soils are much more prone to movement and potential damage during quakes.
- **5. Water Resources:**
 - This section fails to provide an estimated amount of groundwater mining/ consumption for this project.
 - What is the current production and recovery rate of the existing wells? How many other wells are proposed for the project site other than the existing wells and the one proposed for the O&M building's potable source?
 - How much water is proposed to be imported from the Jacumba Community Services District wells? Local groundwater and wells are the only source available to local residents and biological resources.
 - Groundwater resources are under stress from ongoing severe drought conditions⁸ and the construction of numerous large projects during the last 6-10 years: Sunrise Powerlink, ECO Substation and related transmission lines, Tule Wind, Jacumba Solar, Reconductoring of TL6931, US Border Patrol Station on Ribbonwood Road.

⁷ https://en.wikipedia.org/wiki/1892_Laguna_Salada_earthquake

⁸ <https://www.drought.gov/drought/states/california>

- One 10,000 tank would not be adequate for fire protection.
- Any local springs need to be identified as well. Some tribal homes rely on springs for their homes and/or livestock.
- Pulling large amounts of water from the project site can impact wells and springs in the surrounding areas and must be fully and honestly addressed.
- Tule Creek flood plain has suffered flooding in previous years, as described in Clifford Caldwell's letters on this project.
- In response to the flooding and significant erosion along Tule Creek, the County required at least one homeowner to place funds into an account for a future bridge project across Tule Creek.
- Torrey Wind, a for-profit project, should be required to build a bridge across Tule Creek to ensure all weather access for employees, emergency services, and impacted residents.
- **6. Air Quality:**
 - Project grading and disturbance of soils will increase dust and particulates during construction and operation until the disturbance is mitigated, if that is even feasible.
 - Dust suppressants can become flammable once they dry out and can wash off during rain events and flow into surface waters and seep into groundwater resources.
 - Residents impacted by the Ocotillo Wind project in Imperial County have documented numerous events of increased dust, particulates and foaming dust suppressant run off.
 - An Ocotillo resident posted a video (5-6-17) showing dust blowing from 42 miles of access roads and 81 miles of underground collector cable that disturbed carbon sequestering desert crust on the Ocotillo Wind project⁹.
 - Electrical pollution and electrical magnetic interference, generated by industrial wind turbines, falls under the air quality category as well. We have submitted exhaustive details on all these impacts previously for the Climate Action Plan, the Wind Energy Ordinance, Tule Wind, Shu'luk Wind, Jewel Valley Wind, Energia Sierra Juarez Wind and cross-border line.
- **7. Transportation/Circulation:**
 - Ribbonwood is the primary access route for the project; it is also the sole legal access road for people who use Ribbonwood Road to reach their homes.
 - Traffic plans must address traffic impacts that include notification to impacted home owners alerting them to when their only road will be subject to long delays or closures.
 - The section of Ribbonwood Road north of the new road installed for Tule Wind access from Ribbonwood Road includes several sections with limited or zero line of sight and tight turns that will not accommodate large equipment or careless drivers.
 - The section of Ribbonwood Road that is dirt is private and it needs to be determined who owns the road and if Torrey Wind has the right to use that private road to access their commercial for-profit wind project.

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<https://www.facebook.com/OcotilloWindTurbineDestruction/videos/vb.422340074490464/1410186462372482/?type=2&theater>

- The Boulevard Trails Map, approved by the Board of Supervisors in 2009, includes proposed community pathways and trails along Ribbonwood Road and the project site that connect up to BLM land at the north end of the project.
- Impacts to Board approved community pathways and trails for Boulevard must be addressed.
- **8. Biological Resources:**
 - Any biological studies must take into account current severe drought conditions and how that reduces plant and wildlife until the rains come again.
 - San Diego County’s long-stalled East County Multiple Species Conservation Plan lists many endangered and listed species exist in the general area, including Golden Eagles, a wide variety of raptors, mountain lions, bats, reptiles, mammals, plants, and more.
 - The Tule Creek floodplain and seasonal wetlands exist on the project site with the potential for springs.
 - These resources and conditions and the biological resources that go with them are fairly rare in our high-desert transitional area.
 - The construction and operation of Tule Wind, Kumeyaay Wind and Sunrise Powerlink have already limited and fractured habitat and connectivity for a wide variety of wildlife. Cumulative and cumulatively considerable impacts must be recognized and addressed.
- **9. Hazards:**
 - Noise and electrical pollution are hazards and hazardous to public health and safety.
 - The project will generate waste oil/ lubricants from transformers, inverters, generators, and other equipment. It will need to be stored and transported to a licensed hazmat facility.
 - Due to the fact that the project is located within a sole source aquifer that is relied upon by residents, livestock, pets and wildlife, extreme caution must be used when storing, handling, and transporting used oil and any other hazardous materials.
 - Discarded turbine blades are also hazardous and non-recyclable. They also are highly flammable.
 - Discarded blades must be removed from the site and transported to a licensed facility.
 - The MUP should not allow storage or stockpiling of discarded blades or electrical components onsite or at any other non-licensed facility. A strict removal timeframe must be included in the MUP.
- **10. Noise:**
 - 4.2MW wind turbines will generate significantly more noise and vibrations than existing wind turbines and will be placed much closer to adjacent residents.
 - Any noise study will need to include real world operational noise measurements from any existing facilities using 4.2 MW wind turbines, including those taken at impacted homes.
 - Noise from turbines can move through the air and soil as pressure waves that can be perceived at varying distances, especially if there is underlying rock formations.
 - Ambient noise and electrical testing should be required at adjacent homes prior to permit and operation of any Torrey Wind turbines.

- **Wind Farm Nuisance Litigation¹⁰ June 8, 2018: Agricultural Law & Taxation Blog (excerpt)**
 - Nuisance litigation involving large-scale “wind farms” is in its early stages, but there have been a few important court decisions. A case decided by the West Virginia Supreme Court in 2007 illustrates the land-use conflict issues that wind-farms can present. In *Burch, et al. v. Nedpower Mount Storm, LLC and Shell Windenergy, Inc.*, 220 W. Va. 443, 647 S.E.2d 879 (2007), the Court ruled that a proposed wind farm consisting of approximately 200 wind turbines in close proximity to residential property could constitute a nuisance. Seven homeowners living within a two-mile radius from the location of where the turbines were to be erected sought a permanent injunction against the construction and operation of the wind farm on the grounds that they would be negatively impacted by turbine noise, the eyesore of the flicker effect of the light atop the turbines, potential danger from broken blades, blades throwing ice, collapsing towers and a reduction in their property values. The court held that even though the state had approved the wind farm, the common-law doctrine of nuisance still applied. While the court found that the wind-farm was not a nuisance per se, the court noted that the wind-farm could become a nuisance. As such the plaintiffs’ allegations were sufficient to state a claim permitting the court to enjoin the creation of the wind farm.
 - In another case involving nuisance-related aspects of large-scale wind farms, the Kansas Supreme Court upheld a county ordinance banning commercial wind farms in the county. *Zimmerman v. Board of County Commissioners*, 218 P.3d 400 (Kan. 2009). The court determined that the county had properly followed state statutory procedures in adopting the ordinance, and that the ordinance was reasonable based on the county’s consideration of aesthetics, ecology, flora and fauna of the Flint Hills. The Court cited the numerous adverse effects of commercial wind farms including damage to the local ecology and the prairie chicken habitat (including breeding grounds, nesting and feeding areas and flight patterns) and the unsightly nature of large wind turbines. The Court also noted that commercial wind farms have a negative impact on property values, and that agricultural and nature-based tourism would also suffer.
 - **Buy-Out Ordered**
 - A recent settlement order of the Minnesota Public Utilities Commission (Commission) requires a wind energy firm to buy-out two families whose health and lives were materially disaffected by a wind farm complex near Albert Lea, Minnesota. As a result, it is likely that the homes will be demolished so that the wind farm can proceed unimpeded by local landowners that might object to the operation. That’s because the order stated that if the homes remained and housed new residents, those residents could not waive the wind energy company’s duty to meet noise standards even if the homeowners were willing to live with violations of the Minnesota Pollution Control Agency’s ambient noise standard in exchange for payment or through some other agreement.

¹⁰ <http://lawprofessors.typepad.com/agriculturallaw/2018/06/wind-farm-nuisance-matter-resolved-buy-the-homeowners-out.html>

- **Development of the WHO Environmental Noise Received: 12 April 2018; Accepted: April 2018; Published: 20 April 2018¹¹ (includes wind turbine noise impacts)**
 - Abstract: “Following the Parma Declaration on Environment and Health adopted at the Fifth Ministerial Conference (2010), the Ministers and representatives of Member States in the WHO European Region requested the World Health Organization (WHO) to develop updated guidelines on environmental noise, and called upon all stakeholders to reduce children’s exposure to noise, including that from personal electronic devices. The WHO Environmental Noise Guidelines for the European Region will provide evidence-based policy guidance to Member States on protecting human health from noise originating from transportation (road traffic, railway and aircraft), wind turbine noise, and leisure noise in settings where people spend the majority of their time. Compared to previous WHO guidelines on noise, the most significant developments include: consideration of new evidence associating environmental noise exposure with health outcomes, such as annoyance, cardiovascular effects, obesity and metabolic effects (such as diabetes), cognitive impairment, sleep disturbance, hearing impairment and tinnitus, adverse birth outcomes, quality of life, mental health, and wellbeing; inclusion of new noise sources to reflect the current noise environment; and the use of a standardized framework (grading of recommendations, assessment, development, and evaluations: GRADE) to assess evidence and develop recommendations. The recommendations in the guidelines are underpinned by systematic reviews of evidence on several health outcomes related to environmental noise as well as evidence on interventions to reduce noise exposure and/or health outcomes. The overall body of evidence is published in this issue.”
 - **Effects of Different Spectral Shapes and Amplitude Modulation of Broadband Noise and Annoyance Reactions in Controlled Listening Experience; published in International Journal of Environmental Research and Public Health-** by [Beat Schäffer](#), [Reto Pieren](#), [Sabine J. Schlittmeier](#) and [Mark Brink](#) *Int. J. Environ. Res. Public Health* **2018**, *15*(5), 1029; <https://doi.org/10.3390/ijerph15051029> ¹²:
 - **Abstract:** “Environmental noise from transportation or industrial infrastructure typically has a broad frequency range. Different sources may have disparate acoustical characteristics, which may in turn affect noise annoyance. However, knowledge of the relative contribution of the different acoustical characteristics of broadband noise to annoyance is still scarce. In this study, the subjectively perceived short-term (acute) annoyance reactions to different broadband sounds (namely, realistic outdoor wind turbine and artificial, generic sounds) at 40 dBA were investigated in a controlled laboratory listening experiment. Combined with the factorial design of the experiment, the sounds allowed for separation of the effects of three acoustical characteristics on annoyance, namely, spectral shape, depth of periodic amplitude modulation

¹¹ <https://docs.wind-watch.org/WHO-Noise-Europe-2018.pdf>

¹² <http://www.mdpi.com/1660-4601/15/5/1029>

(AM), and occurrence (or absence) of random AM. Fifty-two participants rated their annoyance with the sounds. Annoyance increased with increasing energy content in the low-frequency range as well as with depth of periodic AM, and was higher in situations with random AM than without. Similar annoyance changes would be evoked by sound pressure level changes of up to 8 dB. The results suggest that besides standard sound pressure level metrics, other acoustical characteristics of (broadband) noise should also be considered in environmental impact assessments, e.g., in the context of wind turbine installations.”

- **11. Public Services:**
 - Fire & Emergency Services should be included under this section.
- **13. Aesthetics (includes landforms):**
 - The proposed 4.2MW turbines at 586 feet are not only taller than the existing wind turbines in the area by about 100 feet; they are also taller than any of San Diego’s urban skyscrapers.
 - One America Plaza at 500 feet is reportedly San Diego’s tallest high-rise¹³—86 feet shorter than Torrey Wind turbines proposed for our rural and predominantly low-income community—far too close to existing homes and sensitive wildlife.



- The turbines will be highly visible to residents throughout Boulevard and surrounding neighborhoods, visitors to adjacent and regional public lands, the Pacific Crest Trail, I-8, Tierra Del Sol Road and other local areas at higher elevations, and some Boulevard’s proposed and approved paths and trails, especially those north of I-8.
- The project area has many unique boulder displays and the Tule Creek floodplain and riparian area, with seasonal ponds, springs, and running water.
- **14. Cultural and Historical Resources:**
 - The project site is located in Kumeyaay territory next to the Campo and Manzanita Reservations and along Tule Creek and known areas of habitation that represents the significant potential for cultural resources. Cumulatively significant impacts may result when added to Tule Wind, Sunrise Powerlink, ECO Substation and more.
 - The area was also home to the McCain family that settled the area now known as the upper northwest end of McCain Valley, in the late 1860’s.

¹³ https://en.wikipedia.org/wiki/List_of_tallest_buildings_in_San_Diego

- According to a 2009 report on historical ranches, The McCain's built their cattle ranch near the Indian village of Sacatoon, relying on springs along Tule Creek.¹⁴
- The Walker Express Route also crossed the McCain Valley area and potentially the project site in the 1800's.
- McCain Valley is the historic heart of the Boulevard area.

V. Off-Site Improvements:

• **1. Streets:**

- Ribbonwood Road may need to be widened at certain choke points with zero or limited sight lines and to accommodate large construction equipment and delivery of turbine and substation components.
- The private dirt section of Ribbonwood Road should be engineered and paved, once legal access for a commercial project is confirmed and private property owners are compensated for potential easement adjustments or expansions if agreements can be reached.
- A new bridge should be required to cross Tule Creek to ensure all-weather access for employees, emergency services, and impacted residents north of Tule Creek.

• **2. Extension of Utility Lines:**

- How will the O&M building, wells, SCADA and other project components be connected to SDG&E distribution lines?
- Is there an existing electrical service on the project site or will any easements be required to connect to the closest distribution line?
- Will any underground water lines or holding tanks need to be connected to existing or proposed water wells?

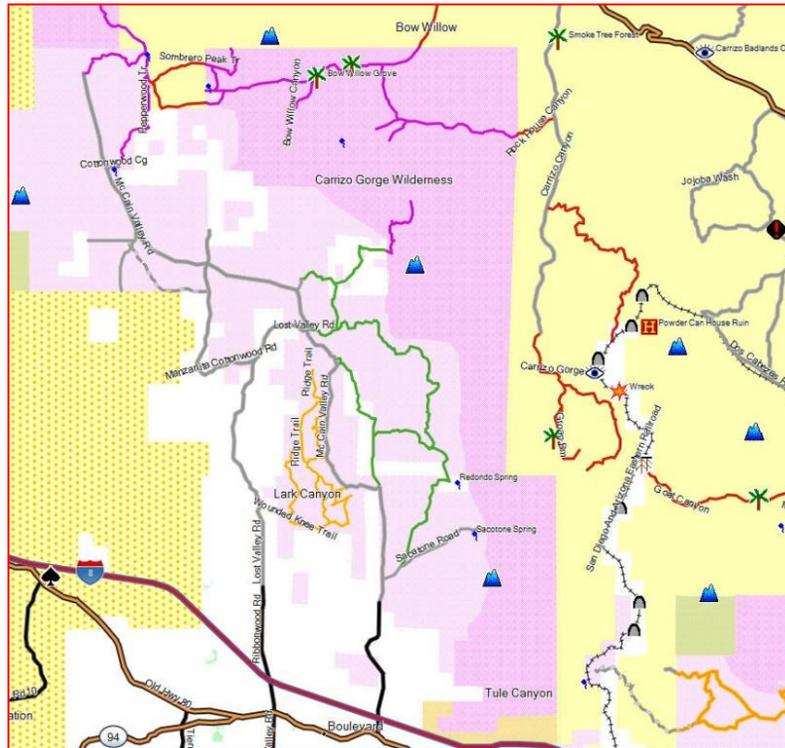
• **3. Drainage/Stormwater/Flood Control:**

- See comments for IV (7) above regarding need for bridge over Tule Creek.

• **4. Paths:**

- See comments for IV (7) above regarding Boulevard Trails Map approved in 2009.
- The map below shows some of the trails on adjacent BLM land in the McCain Valley Recreation and Conservation Area. The project site and other private land is shown in yellow dots, north of I-8.

¹⁴ Starting at page 102: <http://sohosandiego.org/warners/images/240yearsofranching.pdf>



VI. Grading:

- **Preliminary Grading Plans:** Please provide a copy of the preliminary grading plan. We would like to know the estimated about of cut and fill for this project.
- **Off-site grading:** Grading may be required for improvements needed for Ribbonwood Road to accommodate delivery of large construction equipment and project components. Grading will probably be required for new bridge structure needed to provide all-weather access to the project for employees, emergency services and adjacent residents.
- **Blasting:** Blasting was required for some of the Tule Wind turbines and may be required for some Torrey Wind turbines due to existing boulders including subterranean.

VII. Proposed Site Utilization:

- The project is a commercial industrial project but this section includes -0- footage/ acres for those uses.
- Will 10 parking spaces accommodate the number of employees proposed?

VIII. Commercial Industrial Site Utilization:

- **A. Project Operations:**
 - This section should include the number of proposed employees per shift, hours per shift, average daily vehicle trips generated.
 - This is a rural area and Ribbonwood Road was designed to as a residential road not to support huge for-profit industrial use.
- **B. Industrial Waste:**
 - See comments above at IV (9) regarding waste oil and discarded blades.

- Discarded electrical components also represent industrial/hazmat.
- Only non-toxic dust suppressants, oil, and lubricants should be authorized to protect our sole-source aquifer and better than average air quality.
- **Miscellaneous:**
 - **1.** This section should have been marked YES due to the low-frequency noise, infrasound, vibrations, shadow flicker, flash and glare, electrical pollution of the air and ground and electromagnetic interference with TV and other communication systems and more associated with the operation of industrial wind turbines.
 - **2.** It is good to see that Terra-Gen recognizes and admits the potential for substantial noise generation that could be heard outside the project. The project site may be too narrow to accommodate adequate / increased wind turbine setbacks based on larger and noisier wind 4.2 MW wind turbines, and compliance with noise restrictions for large wind turbines.
 - **3.** The project may involve the storage of dangerous, hazardous, flammable new and used materials used for fuel and lubrication of project vehicles and all related project components including turbines, inverters, transformers, generators, substation, electrical lines, and more.

PDS-399W: Project Facility Availability – Water:

- The Water Availability form, dated 6-5-18 and signed by Ken Wagner, has not been signed by the “Jacumba Water District” mentioned in PDS-367.
- The correct name is the “Jacumba Community Service District”.

PDS346S-Torrey Wind Project Description; Dudek June 2018:

1.1 Project Description:

1. The project description mentions decommissioning at the end of the project’s useful life but fails to mention what that estimated timeframe is or the potential for replacing the proposed turbines with even larger turbines prior to decommissioning.
2. Turbines with a range of 2.5 MW to 4.2 MW are proposed but only the 4.2MW turbines will produce the stated production goal of 126 MW. Only 75 MW could be produced using 2.5 MW turbines.
3. The developers should be required to state their intent to use 4.2MW turbines so the public can focus on the impacts from that size turbine instead of having to research and comment on impacts related to turbines between 2.5 MW and 4.2 MW.
4. 4.2 MW turbines are fairly new with little information available for review and comment.
5. The actual make and model of turbine and manufacturer’s specs and estimated noise emissions should be provided for public comment.
6. The project description fails to mention that the existing Kumeyaay and Tule Wind turbines are located on federal land or that Kumeyaay Wind was approved by the Bureau of Indian Affairs without a full Environmental Impact Statement (EIS) and that Tule Wind was lumped in with numerous other projects as part of the ECO Substation EIR/EIS project, making it very difficult and virtually overwhelming for public participation.

7. Instead of just mentioning adjacent “large rural lots”, the project description should be required to include an aerial survey that documents all the existing residences on private land and tribal land within at least a two mile radius of the proposed turbines.

1.2 Project Design:

1. As stated previously, it will take 30 – 4.2 MW wind turbines to produce the stated goal of 126 MW.
2. The Plot Plan shows bare minimum setbacks of 1.1 times the turbine height (644.16 ft) but that setback does not take into account the need to increase turbine setbacks from public recreation lands and private properties and tribal homes and businesses for noise emissions including low frequency noise and infrasound that should be required under zoning ordinance 6952 LARGE WIND TURBINES and NOISE ORDINANCE section 36.401, and to address potential blade throw.
3. ***NO NOISE WAIVERS SHOULD BE ALLOWED IN ORDER TO PROTECT PUBLIC HEALTH AND SAFETY AND TO REDUCE BIOLOGICAL IMPACTS FOR WILDLIFE, LIVESTOCK, AND PETS.***
4. The NREL’s posted Wind Farm Area Calculator specifically states that “...The "footprint," which is typically around 0.25 acres per turbine, does not include the 5-10 turbine diameters of spacing required between wind turbines...”¹⁵
5. The project design does not take into account the recommended spacing between turbines of 10-15 rotor diameter widths, based on 300 ft rotor widths, to reduce wake effect.
6. **2011 Wind turbine spacing study at John Hopkins = 15 turbine rotor widths apart:** The newest wind farms, which can be located on land or offshore, typically use turbines with rotor diameters of about 300 feet. Currently, turbines on these large wind farms are spaced about seven rotor diameters apart. The new spacing model developed by Meneveau and Johan placing the wind turbines 15 rotor diameters apart -- more than twice as far apart as in the current layouts -- results in more cost-efficient power generation.^{16, 17}
7. **Wind Turbine Separation Distances Matter ; prepared by Peter R Mitchell, AM, BChE June 2014**¹⁸: Summary (excerpt): Siting wind turbines too close together has a number of predictable consequences resulting from the turbulent nature of the air exiting turbines and entering adjacent turbines. The consequences include: • increased wear on the turbine components, ultimately increasing early failure rates; • increased audible noise; • increased infrasound and low frequency noise. These predictable and long known consequences of placing turbines too close are frequently ignored by both wind turbine manufacturers and developers; particularly if they are operating in a country with systemic regulatory failure of the wind industry, such as Australia. Evidence is that the manufacturer-recommended separation distances of 7 to 8 rotor diameters for turbines in line with the prevailing wind and 5 rotor diameters for turbines abreast, still allows turbulent air exiting one turbine to retain significant turbulence when entering the next; so the manufacturers’ recommended spacings can be considered as an unfortunate compromise and inadequate to contain noise. The most efficient turbine spacing,

¹⁵ http://www.energybc.ca/cache/wind2/www.nrel.gov/analysis/power_databook/calc_wind.html

¹⁶ Johns Hopkins University. "Better turbine spacing for large wind farms." ScienceDaily. ScienceDaily, 7 February 2011. www.sciencedaily.com/releases/2011/01/110120111332.htm

¹⁷ <http://gazette.jhu.edu/2011/01/18/new-study-yields-better-turbine-spacing-for-large-wind-farms/>

¹⁸ <http://www.na-paw.org/Mitchell/Mitchell-Wind-Turbine-Separation-Distances.pdf>

i.e., that which allows the turbines to economically extract the most energy from the wind, has been shown to be some 15 rotor diameters. Most efficient extraction of useful energy will approximately coincide with the least production of waste energy, namely sound and vibration”.

8. Spacing turbines 10-15 rotor diameters apart would also help reduce wake effects, turbulence, and complex emissions of noise, vibrations, and infrasound.

1.2.1 Wind Turbines:

1. The brief project description on page 4 of 13 of PDS-367 proposes up to 4.2 MW GE Wind Turbine Renewable Energy Facility
2. Identifying GE Wind Turbines in one document and then declining to identify the turbine technology that will be used in another form is contradictory, misleading, and confusing.
3. By failing to identify the intended turbine technology that will be used, the developer and the County deny the public the information necessary to help defend public health and safety.
4. Rotor diameter is stated as approximately 450 feet (225-foot blades)
5. 10 times the rotor diameter = 4,500 feet between turbines.
6. 15 times the rotor diameter = 6,750 feet between turbines.
7. It appears that most of the project site is too narrow (approximately 5,500-6,500 ft at widest point)to accommodate the recommended turbine spacing needed to reduce wake effects that increase noise and vibrations and increase productivity, and to protect impacted residents in the area on private and tribal lands.
8. In addition the wake effects from the Kumeyaay Wind and Tule Wind turbines must be taken into consideration as they will at times generate additional wake effect, turbulence, and noise, and reduce production.
9. The project developer should be required to identify their preferred turbine make and models in order to allow public comment based on facts and actual specifications available on those specific turbines.
10. Vestas Confidential Health and Safety Instruction Manual for a Falmouth MA Wind Farm warns of blade throw up to 1640 Feet (500 Meters), and they advise employees to stay at least 1,300 ft from turbine unless necessary and to evacuate by running upwind 1,640 ft in the event of a runaway turbine.^{19, 20}
11. **INFRA SOUND AND LOW FREQUENCY NOISE – informative video presentation on related health impacts by Dr. Mariana Alves Pereira - Ljubljana 2018²¹**
12. Research shows that the larger wind turbines generate higher levels of low frequency noise that is annoying and disruptive with alleged and potential adverse health impacts for impacted neighbors.
 - *Low-frequency noise from large wind turbines; The Journal of the Acoustical Society of America 129, 3727 (2011); <https://doi.org/10.1121/1.3543957>²²*

¹⁹ <https://northeastwindmills.com/wp-content/uploads/2013/07/vestas-nordex.pdf>

²⁰ <https://patch.com/massachusetts/falmouth/falmouth-vestas-wind-turbine-blade-throw-warning-1640-feet>

²¹ https://www.youtube.com/watch?time_continue=194&v=ZXCZ3OyklrE

²² <https://asa.scitation.org/doi/abs/10.1121/1.3543957>

ABSTRACT

“As wind turbines get larger, worries have emerged that the turbine noise would move down in frequency and that the low-frequency noise would cause annoyance for the neighbors. The noise emission from 48 wind turbines with nominal electric power up to 3.6 MW is analyzed and discussed. The relative amount of low-frequency noise is higher for large turbines (2.3–3.6 MW) than for small turbines (≤ 2 MW), and the difference is statistically significant. The difference can also be expressed as a downward shift of the spectrum of approximately one-third of an octave. A further shift of similar size is suggested for future turbines in the 10-MW range. Due to the air absorption, the higher low-frequency content becomes even more pronounced, when sound pressure levels in relevant neighbor distances are considered. Even when A-weighted levels are considered, a substantial part of the noise is at low frequencies, and for several of the investigated large turbines, the one-third-octave band with the highest level is at or below 250 Hz. It is thus beyond any doubt that the low-frequency part of the spectrum plays an important role in the noise at the neighbors.”

1.2.2 Electrical Collection System:

1. What is the status of the CAISO interconnection agreement to connect the new proposed 500kV substation to SDG&E's 500 kV Sunrise Powerlink?
2. What is the remaining capacity on the Sunrise Powerlink with all the existing wind and solar projects already connected to it in the Imperial County?

1.2.3 Project Substation:

- See comments for 1.2.2 above.
- What are the setback requirements between the substation and Sunrise Powerlink?
- Substation lighting should be shielded.
- Electrical pollution from all project sources also radiates through the air and soil and can be inducted into homes through their communication lines, plumbing, and more.

1.2.4 O& M Building:

- The O&M Building should be placed further away from non-participating properties to reduce the impacts on neighbors.
- Lighting on O&M building should be shielded.

1.2.5 SDG&E Switchyard and 500 kV Om & Out Legs to the Sunrise Powerlink:

- See comments for 1.2.2 above.

1.2.6 Meteorological Towers:

- This section fails to mention the temporary MET tower facilities that have been appealed but no hearing has been held.
- We strongly oppose a height waiver for 361 foot tall MET Towers that are taller than many of downtown San Diego's high rise buildings.

1.2.7 Roads:

- The estimated acreage required for new and expanded existing roads and improvements to Ribbonwood Road should be provided for public review and comment.
- See previous comments regarding need to improve the dirt private road section of Ribbonwood Road and need to confirm easements across private land allow for the proposed use that was never considered at the time the easements were granted in a rural residential / agricultural area.
- An all weather access bridge should be required across Tule Creek, as stated previously in these comments.

1.2.8 Temporary Staging, parking, Batch Plant, and Construction Trailer areas:

- With up to 350 employees per day during construction, all of these very noise and dusty project uses should be moved from the current sites that are too close to adjacent residents/ non-participating properties.
- Construction is estimated to take at least 12 months which is a long time for rural residents to live next door to and deal with a massive construction site.
- Are there any on-site sand minding or rock blasting / crushing for aggregate planned for use in the batch plant? Both would be very noisy operations.
- Noise carries further in our higher elevation with limited natural barriers, and tends to bounce off hard surfaces like boulders.

1.2.9 Lighting and Security:

- It is good to know that the entire project will not be fenced in with prison like fencing topped with barbed or razor wire. The less disruption to wildlife passage the better.
- Please ensure that all project lighting is shielded and directed down at on-the-ground facilities.
- Invasive and disruptive wind turbine lighting should also be shielded from ground view if possible. The neighbors will know the turbines are there and don't need to be forced to deal with more obnoxious and sleep disrupting blinking red lights all night long. The FAA required lighting just needs to be visible from the air.
- Turbine lighting should be made to sync with the blinking of the existing Tule Wind and Kumeyaay Wind turbines.

1.3 Construction:

- Clearing grading should be kept to a minimum and should not be allowed to take place on windy days in order to reduce potentially significant dust storms and off-site impacts.

Table 2:

- The estimated number of each type of construction equipment should be provided.

1.3.1 Work Force:

- With up to 350 employees per day 6 days a week, with potential for extended hours, during construction, some form of car-pooling should be required.
- The Golden Acorn Casino at I-8 and Crestwood Road has lots of unused parking spaces and may be willing to negotiate an arrangement to allow workers to park and ride to the job site together, for a fee.
- Some form of working hour limits should be placed on the project to allow some relief for the impacted neighbors during the estimated 12 months of construction.
- Some form of employment office should be set up locally to encourage the hiring of at least some local workers—if the project is approved.

1.3.2 Construction Access Right-of-Way:

- See comments on 1.3.1, 1.2.7, V.1, and IV.7, above.
- An alternate route should be considered using McCain Valley Road and Lost Valley Road that would relieve the burden on Ribbonwood Road and the people who rely on it as their sole access road.

1.3.3 Clearing and Grading:

- The stated 250 by 350 ft (2.9 acres) clearance required for 30 turbines = 87 acres, just for the turbines.
- The plot plans show existing and planned roads.
- The estimated amount of acres to be cleared and tons of earth to be graded should be provided for public review and comment.
- Grading and leveling should be minimized in seasonal wetland and floodplain areas where previous El Nino and other heavy rain events have resulted in flooding, erosion, standing water, and seasonal springs and creek flow, washing out Ribbonwood Road.
- The estimated amount of water needed for clearing and grading should also be produced for public review and comment.
- Due to severe drought conditions additional water resources will likely be required, similar to the situation when SDG&E used significantly more water to construct the ECO Substation than planned or disclosed during public review—despite having geotechnical investigations.
- Construction of the ECO Substation also unearthed numerous cultural resources and the same will likely be true for the Torrey Wind site due to previous Indian occupation of the McCain Valley and Tule Creek area, prior to their displacement when settlers moved in.

1.3.4 Foundation Construction and Tower Erection:

- See comments at 1.3.3 above.

1.3.5 Construction of Underground Electrical Collection System:

- How many additional acres of clearance and trenching (road width expansion?) would be needed for underground electrical and communication systems?
- During the Ocotillo Wind project in Imperial County the width of the proposed roads increased significantly for their underground components, which took local residents by surprise.

1.3.6 Project Substation:

- Industry is well aware that along with the potential for electrical pollution to move off-site through the air and ground from wind turbines and substations, there is also the potential for substation noise to leave the site through air and ground pressure waves that can be perceived at distance.
- In addition to homes in the area, there is also wildlife habitat, trails, and habitat connectivity that must be recognized and addressed.
- ***Cautions and recommendations from the Electrical Engineering Portal²³ include the following:***
 - Substation Noise Sources to take into consideration:
 - Continuous audible sources
 - Continuous radio frequency (RF) sources
 - Impulse sources
 - Equipment noise levels
 - Attenuation of noise with distance
 - Noise Abatement Methods to take into consideration:
 - Reduced transformer sound levels
 - Low-impulse noise equipment
 - RF noise and corona-induced audible noise control
 - Site location
 - Larger yard area
 - Equipment placement
 - Barriers or walls
 - Active noise cancellation techniques

1.3.7. Water Quantities:

- An estimated amount of water use overall should be provided for public review and comment.
- Groundwater is our only source of water in the Boulevard area with no water district or other source serving homes that access their properties via Ribbonwood Road.
- Project interference with groundwater quality and quantity is a major concern locally.
- Some Canadian communities are complaining about adverse impacts to their wells during and after construction of wind turbine projects, with pile driving and vibrations from turbine operations which results in seismic coupling - stirring up turbidity and silt that plugs up the filters provided by the wind project developer after complaints were raised. There are reportedly 20 impacted well owners at one project and more at other projects, according to the head of the Ontario Groundwater Association.²⁴
- At least 14 well owners filed water well interference complaints against Samsung wind turbine project for polluting wells in the Chatham-Kent area of Ontario Canada.
 - “Dave Lusk filed the fourteenth well interference complaint after his water stopped running while he was showering on Wednesday. “Four generations of my family have had pure, beautiful drinking water from that well for 52 years” said Lusk. “A week after

²³ <https://electrical-engineering-portal.com/audible-substation-noise>

²⁴ <https://www.chathamdailynews.ca/2016/07/15/we-want-the-water-sampled-ontario-ground-water-association/wcm/29e201cc-05ef-89d1-2b40-15297d19ce1a>

the pile drivers started next door, we are choked out with black silt. How the hell are they allowed to keep doing this to people? This has to stop.”²⁵

1.4 Operation and Maintenance:

- Please provide a copy of the Environmental Health and Safety Plan and the Fire Protection plan, mentioned in this section, for public review and comment.
- VII.5 states that there will be 10 parking spaces at the O&M facility but this section states there will be 12 employees.
- Our area can have some quickly shifting and turbulent winds and wind shears that may require turbines being services more than twice a year.
- Poor maintenance generally results in noisier wind turbines, based on observations of impacted residents.
- Is one 10,000 gallon tank enough for adequate fire protection?

1.5 Decommissioning:

- The County should require a decommissioning bond to ensure proper site rehabilitation.
- Our concerns include the potential for new and even bigger wind turbines to be installed when the currently proposed turbines are pulled out of service.
- Some limits should certainly be placed on turbine height and MW which have been increasing significantly in the last 10 years. Larger turbines generate larger impacts over greater distances.

Plot Plans (dated 6-21-18):

- The proposed wind turbines are approximately 587 ft tall including 225 ft long rotors (450 rotor diameter)
- As noted in comments in section 1.2.1 above, physics-based recommendations for reduced wake effect, more efficient production, and reduced noise impacts, requires that wind turbines be spaced 5-15 rotor diameters apart, and that is based on smaller wind turbines –not the new 4.2 MW monster turbines that should require even greater spacing and setbacks.
- 450 ft x 5 = 2,250 ft spacing between turbines; 450 x 10 ft = 4,500 ft spacing; 450 x 15 ft = 6,750 ft.
- The bare minimum setback of 1.1 times the turbine height (644.16 ft), used on the plot plans, is vastly inadequate and does not take into account the need to increase turbine setbacks to meet noise restrictions as identified in the wind energy zoning ordinance , or the 4.2 MW monster turbines that are taller than the tallest high-rise in downtown San Diego!
- Reminder that Vesta’s confidential health and safety manual warns employees to stay at least 1,300 ft from turbines and blade throw can be 1,640 ft, as noted in comment on 1.2.1-10 above.
- **Sheet # 1 of 11:** The parcel is 3,978 feet wide with two turbines and well #1: T-12 does not appear to meet bare minimum setback of 1.1 times the turbine height (644.16 ft) and T13 barely

²⁵ <https://canadians.org/media/fourteenth-complaint-filed-against-samsung-wind-turbine-project-polluting-water-wells-chatham>

exceeds that bare minimum. Why are two MET towers proposed only 250 feet or so apart? T-6, T-7, and T-8 are spaced about 650 feet or so apart. T-15, T-16 and T-17 appear to be spaced less than 800 ft or so apart.

- **Sheet #2 of 11:** T-15, T-16, T-17, T-6, T-7, and T-8 also barely make the bare minimum setback of 1.1 times the turbine height.
- **Sheet #3 of 11:** T-14 barely meets the minimum turbine setback and sits almost on top of existing well 2. Installation of and vibrations generated during operations from T-14 could adversely impact the integrity and production and water quality of well 2.
- **Sheet #4 of 11:** T-18 barely meets minimum turbine setbacks and appears to be less than 700 feet or so from the adjacent BLM public recreation area boundary. See map at comment V. 4 above.
- **Sheet #5 of 11:** T-19 appears to be less than 500 ft from tribal land on the west side; T-20 appears to be less than the bare minimum setback of 644.16 ft. T-19 and T-20 appear to be spaced only 700 ft or so apart.
- **Sheet #6 of 11:** T-1 appears to be 300 ft or so from tribal land on the west side; T-2 is less than the bare minimum 1.1 turbine height setback; and T-3 appears to be less than 800 ft or so from tribal land. Tribal members have limited land and options for future home building. Placing turbines too close to their land can reduce the number of future home sites and the same is true for private land owners. T-1, T-2 and T-3 appear to be spaced only 825-850 ft apart.
- **Sheet #7 of 11:** T-9 and T-10 appear to be spaced less than 700 ft apart; T-11, T-28, T-29 and T-30 all appear to be spaced about 800 feet or so apart.
- **Sheet #8 of 11:** T-21, T-22, T-23, T-24, T-25 and T-26 do not meet or barely meet the bare minimum turbine setback of 644 ft. T-22, T-23 and T-25 are approximately 900-1,000 ft from non-participating eastern property boundary.
- **Sheet #9 of 11:** T-5 is too close to the non-participating Caldwell (est. 1,300 ft) and Barnes (est. 1,500 ft) boundaries. It the understanding of this writer that several extended members of the Barnes family have expressed health complaints related to the Kumeyaay Wind turbines operating too close to their homes on the Manzanita Reservation. One member reportedly moved to another house to get further away from the turbines that bothered them. Housing options on the local reservations are limited as are most incomes.
- **Sheet #10 of 11:** APN 611-010-02. Well #4 is about 200-300 ft from adjacent non-participating property boundaries for Caldwell and Barnes. Pumping from well #4 could result in off-site well interference; non-participating property owner to the east is not identified and the laydown yard is proposed less than 100 ft from that property boundary. The dusty and noisy batch plant and O&M building should be moved further away from non-participating Caldwell and Barnes properties to help reduce noise and dust impacts.
- **Sheet #11 of 11:** T-27 does not meet the bare minimum 644 ft setback from public BLM lands on the east and south. How close is the nearest non-participating house to this turbine at the north end of Ribbonwood Road?
- **Zoning Ordinance Section 6952 5 (i):** Even Tule Wind turbines were required to be setback four (4) times the wind turbine height , when measured from the center of the turbine to residence

or building occupied by civic use type. For Torrey Wind turbines that would equal 2,344 feet which is still not enough to protect public health and safety.

New information on adverse health impacts related to industrial wind turbine operations:

- Among lots of new information since San Diego County adopted the Wind Energy Ordinance with the misconception that there are no adverse health impacts related to industrial wind turbines.
- The San Diego County Planning Commission has failed to conduct the promised updates on turbine related health impacts as promised and repeatedly requested by the Boulevard Planning Group.
- Below is a summary of the key factual findings and conclusions on noise and health in the legal decision made on December 4, 2017, by an Australian Administrative Appeals Tribunal.
- The full decision – *Waubra Foundation v Commissioner of Australian Charities and Not-for-profits Commission* [2017] AAT is posted at the link in the footnote.²⁶
- Starting at paragraph 467 of the judgment, here are the key factual findings and conclusions on noise and health:
- **SUMMARY OF THE EFFECT OF THE MEDICAL AND SCIENTIFIC EVIDENCE**
On our analysis, a number of propositions emerge from the medical and scientific evidence. Some of those propositions had unanimous support by the relevant experts, and others had the support of most. The propositions which we understand have unanimous support from the relevant experts or are not contested include the following:
 - “Wind turbines emit sound, some of which is audible, and some of which is inaudible (infrasound);
 - There are numerous recorded instances of WTN exceeding 40 dB(A) (which is a recognised threshold for annoyance/sleep disturbance);
 - There are also recorded instances of substantial increases in sound at particular frequencies when particular wind farms are operating compared with those at times when they are shut down. [Measurements undertaken at the Waterloo wind farm showed that “noise in the 50 Hz third-octave band was found to increase by as much as 30 dB when the wind farm was operational compared to when it was shut down” – Exhibit A51, p 2.]
 - If it is present at high enough levels, low frequency sound and even infrasound may be audible;
 - WTN is complex, highly variable and has unique characteristics;
 - The amount and type of sound emitted by a wind farm at a given time and in a given location is influenced by many variables including topography, temperature, wind speed, the type of wind turbines, the extent to which they are maintained, the number of turbines, and their mode of operation;
 - Wind farms potentially operate 24 hours a day, seven days a week;
 - There are numerous examples of WTN giving rise to complaints of annoyance from nearby residents, both in Australia and overseas.

²⁶ <https://waubrafoundation.org.au/resources/aat-decision-reasons-waubra-foundation-vs-acnc-dec-4-2017/>

- The propositions which are supported by the preponderance of relevant expert opinion, and which we accept on that basis, include the following:
 - A significant proportion of the sound emitted by wind turbines is in the lower frequency range, i.e. below 20 Hz;
 - The dB(A) weighting system is not designed to measure that sound, and is not an appropriate way of measuring it. It is even acknowledged in the International Standard, ISO 1996-1 that the A-weighting system alone is “not sufficient to assess sounds characterized by tonality, impulsiveness or strong low-frequency content” – Exhibit A29, T43/8; Section 6.1; “Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures”, International Standard ISO (1996-1).
 - The most accurate way of determining the level and type of sound present at a particular location is to measure the sound at that location;
 - The best way of accurately measuring WTN at a particular location is through ‘raw’ unweighted measurements which are not averaged across time and are then subjected to detailed “narrow-band” analysis;
 - When it is present, due to its particular characteristics, low frequency noise and infrasound can be greater indoors than outdoors at the same location, and can cause a building to vibrate, resulting in resonance;
 - Humans are more sensitive to low frequency sound, and it can therefore cause greater annoyance than higher frequency sound;
 - Even if it is not audible, low frequency noise and infrasound may have other effects on the human body, which are not mediated by hearing but also not fully understood. Those effects may include motion-sickness-like symptoms, vertigo, and tinnitus-like symptoms. However, the material before us does not include any study which has explored a possible connection between such symptoms and wind turbine emissions in a particular population.
- We consider that the evidence justifies the following conclusions:
 - The proposition that sound emissions from wind farms directly cause any adverse health effects which could be regarded as a “disease” for the purposes of the ACNC Act is not established;
 - Nor, on the current evidence, is there any plausible basis for concluding that wind farm emissions may directly cause any disease;
 - However, noise annoyance is a plausible pathway to disease. We note the World Health Organization has stated: “There is sufficient evidence from large-scale epidemiological studies linking the population’s exposure to environmental noise with adverse health effects. Therefore, environmental noise should be considered not only as a cause of nuisance but also a concern for public health and environmental health”– Exhibit A4, T287/5709, citing “WHO. Burden of disease from environmental noise.” World Health Organization; 2011 [viewed April 2013]; Available from: <http://www.euro.who.int/en/what-we-publish/abstracts/burden-of-disease-from-environmental-noise.-quantification-of-healthy-life-years-lost-in-europe> as referenced by Professor G Wittert in Exhibit 56 NHMRC Draft Information Paper: Evidence on Wind Farms and Human Health, “Expert Review: Comments in full”, National Health and Medical Research Council, February 2015, Appendix 8; and Exhibit 4, T299/6308, Reference No. 40, WHO “Burden of disease from environmental noise”. Bonn: World Health Organization

European Centre for Environment and Health, 2011. Available from: http://www.euro.who.int/_data/assets/pdf_file/0008/136466/394888.pdf

- There is an established association between WTN annoyance and adverse health effects (eg. this was established by the Health Canada study);
- There is an established association between noise annoyance and some diseases, including hypertension and cardiovascular disease, possibly mediated in part by disturbed sleep and/or psychological stress/distress. This is also supported by much of the documentary material before us, including a Victorian Department of Health publication entitled “Wind farms, sound and health”, Technical Information, at 7. How can noise affect our health? – Exhibit A4, T297/6232362.
- There are as yet no comprehensive studies which have combined objective health measurements with actual sound measurements in order to determine for a given population the relationships between the sound emissions of wind turbines, annoyance, and adverse health outcomes. Indeed there is as yet no study which has given rise to a soundly based understanding of the degree to which particular types or levels of wind turbine emissions give rise to annoyance, or what levels or types of emissions are associated with what level of annoyance in the population. Because it relied on calculated rather than actual sound measurements, and was limited to the A and C-weighted systems, the Health Canada study did not do this.
- ...The applicant submitted that the evidence in the hearing provided plausible and credible evidence of the kind required. Counsel referred in particular to the effect of noise on sleep and, in particular, in disturbing sleep. It was not contentious that impaired sleep, if sufficiently serious, may result in a number of ailments and diseases. Professor Wittert said that “depression and sleep disturbance are, respectively, the first and third most common psychological reasons for patient encounters in general practice”. The professor went on to say that insomnia doubles the risk of future development of depression and that insomnia symptoms together with shortened sleep are associated with hypertension. Professor Wittert also said that a person suffering from restricted sleep is exposed to an increased risk of elevated blood sugar levels and endocrine disorders such as diabetes, symptomatic ischaemic heart disease, hypertension, obesity, insomnia and anxiety related illnesses.
- The applicant emphasised that Environmental Sleep Disorder has been recognised in the International Classification of Diseases, although there does appear to be some controversy about its existence as a separate and discrete condition.
- We also note that the evidence indicated that the annoyance resulting from noise during sleeping times may be greater for those with a noise sensitivity or who have become sensitised to noise.
- As our earlier findings have indicated, some wind farms generate sound which is capable of causing, and does cause, annoyance. We are further satisfied that annoyance of the kind which is generated (often associated with psychological distress and sleep disturbance), is a recognised pathway to a range of adverse health outcomes, including hypertension and cardiovascular disease”

Miscellaneous:

- **Gone with the wind: Valuing the visual impacts of wind turbines through house prices**²⁷

Stephen Gibbons

- **Abstract**” This study provides quantitative evidence on the local benefits and costs of wind farm developments in England and Wales, focussing on their visual environmental impacts. In the tradition of studies in environmental, public and urban economics, housing sales prices are used to reveal local preferences for views of wind farm developments. Estimation is based on quasi-experimental research designs that compare price changes occurring in places where wind farms become visible, with price changes in appropriate comparison groups. These groups include places close to wind farms that became visible in the past, or where they will become operational in the future and places close to wind farms sites but where the turbines are hidden by the terrain. All these comparisons suggest that wind farm visibility reduces local house prices, and the implied visual environmental costs are substantial.
- The article below is important due to the fact that the Torrey Wind project is proposed for an already very dry area in a Very High Fire Hazard Zone²⁸ that will become even drier if climate change progresses as predicted, thereby further increasing an already highly flammable wildland area.
 - [The Observed Impacts of Wind Farms on Local Vegetation Growth in Northern China](#)²⁹ March 2017; DOI: [10.3390/rs9040332](https://doi.org/10.3390/rs9040332)
 - Wind farms (WFs) can affect the local climate, and local climate change may influence underlying vegetation. Some studies have shown that WFs affect certain aspects of the regional climate, such as temperature and rainfall. However, there is still no evidence to demonstrate whether WFs can affect local vegetation growth, a significant part of the overall assessment of WF effects. In this research, based on the moderate-resolution imaging spectroradiometer (MODIS) vegetation index, productivity and other remote-sensing data from 2003 to 2014, the effects of WFs in the Bashang area of Northern China on vegetation growth and productivity in the summer (June–August) were analyzed. The results showed that: (1) WFs had a significant inhibiting effect on vegetation growth, as demonstrated by decreases in the leaf area index (LAI), the enhanced vegetation index (EVI), and the normalized difference vegetation index (NDVI) of approximately 14.5%, 14.8%, and 8.9%, respectively, in the 2003–2014 summers.

²⁷ <https://www.sciencedirect.com/science/article/pii/S0095069615000418?via%3Dihub>

²⁸ http://frap.fire.ca.gov/webdata/maps/san_diego/fhszs_map.37.pdf

²⁹ (PDF) *The Observed Impacts of Wind Farms on....* Available from:

https://www.researchgate.net/publication/315741377_The_Observed_Impacts_of_Wind_Farms_on_Local_Vegetation_Growth_in_Northern_China [accessed Jul 22 2018].

There was also an inhibiting effect of 8.9% on summer gross primary production (GPP) and 4.0% on annual net primary production (NPP) coupled with WFs; and (2) the major impact factors might be the changes in temperature and soil moisture: WFs suppressed soil moisture and enhanced water stress in the study area. This research provides significant observational evidence that WFs can inhibit the growth and productivity of the underlying vegetation.

Thank you for consideration of our comments.

Any errors or omissions are unintentional

###