

DOCKETED

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Willow Rock Energy Storage Center (21-AFC-02)

Responses to California Unions for Reliable Energy (CURE) Data Request Response Set 1

Submitted by:

GEM A-CAES LLC with technical assistance from WSP USA Inc.

23 January 2023



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CU DR 15-2: Modeled Flat Weighted Average Noise Levels from Construction

CU DR 15-3: Modeled Flat Weighted Average Noise Levels from Operations

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Appendix G, Technical Guidance for Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Birds, Caltrans 2016

Acronyms and Abbreviations

<i>AFC</i>	<i>Application for Certification</i>
<i>APLIC</i>	<i>Avian Power Line Interaction Committee</i>
<i>CDFW</i>	<i>California Department of Fish and Wildlife's CDFW</i>
<i>CEC</i>	<i>California Energy Commission</i>
<i>CEQA</i>	<i>California Environmental Quality Act</i>
<i>CURE</i>	<i>California Unions for Reliable Energy</i>
<i>dBA</i>	<i>decibel A-weighted</i>
<i>GHG</i>	<i>greenhouse gases</i>
<i>IES</i>	<i>Illuminating Engineering Society</i>
<i>kV</i>	<i>kilovolt</i>
<i>LADWP</i>	<i>Los Angeles County Department of Water and Power</i>
<i>Leq</i>	<i>equivalent continuous sound level</i>
<i>Lmax</i>	<i>maximum sound level</i>
<i>ROW</i>	<i>right of way</i>
<i>SCE</i>	<i>Southern California Edison</i>
<i>USFWS</i>	<i>United States Fish and Wildlife Services</i>
<i>WRESC</i>	<i>Willow Rock Energy Storage Center</i>

1.0 AIR QUALITY

Data Request 1

Please provide the CAT 2012 manufacturer specifications reference in Footnote (a) and “emission data from manufacturer specifications (not-to-exceed)” reference in Footnote (b) to Appendix 5.1A, Table 1.

Response: The requested information is provided in Attachment CU-DR1-1. Please note that this information may change as a result of Project Optimization activities.

2.0 PUBLIC HEALTH

Data Request 2

*Please describe the methods that will be utilized to test the construction site to determine if spores of *Coccidioides* ssp. are present and the timing for the test(s).*

Response: The Applicant will comply with Kern County’s standard Air Quality Conditions as mitigation measures including those specifically related to Valley Fever exposure minimization. These can be found in Attachment B to the County’s May 19, 2022 Letter (TN 243152). There are no additional plans to test the site for *Coccidioides*.

Data Request 3

Please state whether a Valley Fever Mitigation Plan (“Plan”) will be prepared that includes measures to prevent Valley Fever outbreaks during Project construction and operation. If such a Plan has been prepared, please produce a copy of the Plan. If not yet prepared, please identify mitigation measures that may be included in the Plan, indicate when the Plan will be available, and include a copy in the Docket 21-AFC-02 for this matter once available.

Response: The Applicant will comply with Kern County’s standard Air Quality Conditions as mitigation measures including those specifically related to Valley Fever exposure minimization. These can be found in Attachment B to the County’s May 19, 2022 Letter (TN 243152). The Applicant will prepare a Fugitive Dust Control Plan as required by the County’s standard conditions (rather than a Valley Fever Mitigation Plan) before the commencement of construction.

Data Request 4

Please provide a copy of the document(s) where the CEC has provided the opinions regarding the significance of Noise increases and construction noise, as described in AFC Section 5.7.3.1.

Response: Source: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=57736&DocumentContentId=50506>

“Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is considered significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the case.”

Data Request 5

Please state whether the input data in AFC Table 5.7-7 is shown as sound power or sound pressure levels. If sound pressure levels, please provide the reference distances.

Response: Input data presented in AFC Table 5.7-7 are sound power levels.

Data Request 6

Please provide a copy of the CadnaA model files used for the construction noise calculations.

Response: Model inputs for the CadnaA construction model are presented in Appendix B and Appendix E of the AFC. Noise model configuration parameters are presented in Table 5.7-6 of the AFC. Please note that this information may change as a result of Project Optimization activities.

Data Request 7

Please clarify what metric is being shown for the modeled results in Table 5.7-8 and contours in Figures 5.7-3, e.g., hourly Leq or daily Ldn.

Response: The modeled construction noise is not time-averaged. Therefore, the modeled sound level represents an hourly Leq or the Leq. Equipment usage rates were included in Table 5.7-7 of the AFC. Please note that this information may change as a result of Project Optimization activities.

Data Request 8

Please state whether the data in Table 5.7-10 is shown as sound power or sound pressure levels. If sound pressure levels, please provide the reference distances.

Response: Input data presented in AFC Table 5.7-10 are sound power levels. Please note that this information may change as a result of Project Optimization activities.

Data Request 9

Please clarify what metric is being shown for the modeled results in Table 5.7-11, Table 5.7-12, and Figure 5.7-4, e.g., hourly Leq or daily Ldn.

Response: The modeled operational noise is not time-averaged. Therefore, the modeled sound level represents an hourly Leq. Please note that this information may change as a result of Project Optimization activities.

Data Request 10

Please provide an explanation of Footnote (a) in Table 5.7-11.

Response: The explanation for footnote (a) from Table 5.7-11 is as follows: Modeled noise generated by the proposed center operations configuration calculated by the noise model Cadna A. Please note that this information may change as a result of Project Optimization activities.

Data Request 11

Please provide 1/3-octave band data for operational noise sources listed in Table 5.7-10 that could have a tonal component or provide a discussion of the frequency range and the typical magnitude of these tonal effects.

Response: Specific equipment has not been selected and therefore there are no equipment specifications with 1/3 octave data. Equipment was chosen to best represent expected Project equipment from an overall noise perspective, not from a tonal perspective. Tonal considerations will be considered once Project-specific equipment has been selected. Please note that this information may change as a result of Project Optimization activities.

3.0 BIOLOGICAL RESOURCES

Data Request 12

Please provide the analysis of the permanent direct adverse impacts to special-status wildlife species from the Project's construction activities.

Response: The applicant is in the process of completing its project optimization and will be performing supplemental surveys that are expected to be completed in the Spring-Summer 2023 timeframe. Once this work is completed the Applicant will provide the requested information. Please note that this information may change as a result of Project Optimization activities.

Data Request 13

Please describe the "agency approved mitigation practices" that would be implemented to reduce the Project's significant permanent direct impacts to special-status wildlife species during construction activities.

Response: The applicant is in the process of completing its project optimization and will be performing supplemental surveys that are expected to be completed in the Spring-Summer 2023 timeframe. Once this work is completed the Applicant will provide the requested information. Please note that this information may change as a result of Project Optimization activities.

Data Request 14

Please provide unweighted Lmax and Leq data for the equipment listed in AFC Tables 5.7-7 and 5.7-10.

Response: Unweighted Leq data is provided in AFC Tables 5.7-7 and 5.7-10 under the "dB" column. In Table 5.7-7 the sound power levels presented are not averaged out based on the presented usage rates, therefore the noise levels represent the Lmax noise level. Operational sound levels are continuous, therefore the Lmax and Leq (dBA) would be assumed to be the same in AFC Table 5.7-10. Please note that this information may change as a result of Project Optimization activities.

Data Request 15

Please provide figures that depict unweighted Lmax and Leq noise contours associated with the Project's construction noise and the Project's operational noise.

Response: The following figures have been provided:

1. CU DR 15-1: Modeled Flat Weighed Maximum Noise Levels from Construction
2. CU DR 15-2: Modeled Flat Weighted Average Noise Levels from Construction
3. CU DR 15-3: Modeled Flat Weighted Average Noise Levels from Operations.

For Project operations the model assumes continuous operation of all equipment; therefore, the Lmax and Leq are represented by the same figure. Please note that these contours may change as a result of Project Optimization activities.

Data Request 16

Please explain the basis for the "threshold of 60 dBA Leq hourly" and why this threshold was used to analyze impacts to wildlife.

Response: 60 dBA is a commonly applied threshold that continues to be used by many agencies. Attachment CU DR16-1 (Appendix G from Technical Guidance for Assessment and Mitigation of the Effects of Highway and Road Construction Noise on Birds, Caltrans, June 2016) provides a brief history of the 60 dBA criterion and states that it is likely to be "...far too conservative and unnecessarily restrictive." Wildlife species such as mammals and reptiles can temporarily move in response to any noise impacts that are perceived as a threat. The main reason nesting birds are the focus of this discussion is because they cannot move a nest once it is established.

Data Request 17

Please specify the light level recommendations of the Illuminating Engineering Society referenced in the AFC at page 5.13-16 (TN 240751-19).

Response: The Illuminating Engineering Society (IES) provides building exterior and outdoor lighting level recommendations based on the application of the lighting. These recommendations, presented as average horizontal footcandle (fc), range from a low of 0.8 fc for an industrial parking lot to 20 fc for loading and unloading platforms and active storage area. Recommendations for building exteriors range from 1 fc in normally inactive areas to 5 fc in active areas and entrances.

Source: Illuminating Engineering Society. 1993, *IES lighting handbook*. 8th edn. Illuminating Engineering Society of North America, New York

Data Request 18

Please provide the Project's lighting plan.

Response: The Applicant anticipates the preparation of a lighting plan before the commencement of construction will be required by Kern County (TN 243152), and as a condition of certification. The Applicant will conform to that requirement.

Data Request 19

Please describe the gen-tie construction activities that would require clearing and grubbing.

Response: Activities that may require clearing and grubbing include material laydown, setting foundations for transmission structures; and conductor pull and tensioning sites. Please note that this information may change as a result of Project Optimization activities.

Data Request 20

Please state whether clearing and grubbing would be required for maintenance of the gen-tie line.

Response: No clearing or grubbing is anticipated for maintenance of the gen-tie line.

Data Request 21

Please state the location and dimensions for the new access roads that may be required for the Project's gen-tie line.

Response: The locations of new and existing access roads are shown in AFC Figure 5.2-6 (TN 242791). The new access roads are expected to be 16 feet wide and will conform to Kern County Building Department standards (TN 243152). This response will be updated if necessary following Project Optimization activities.

Data Request 22

Please explain whether new access road(s) would be constructed along the "existing access route" segments identified in AFC Figure 5.2-6 (TN 242791).

Response: At this time, the Applicant anticipates using existing access roads for these routes. Please note that this information may change as a result of Project Optimization activities.

Data Request 23

Please explain whether new access road(s) would be constructed along Alternate Route 2A or 2B to the future Los Angeles County Department of Water and Power ("LADWP") Substation.

Response: At this time, the Applicant anticipates using existing access roads for these routes. Please note that this information may change as a result of Project Optimization activities.

Data Request 24

Please explain how the values in AFC Tables 8a, 8b, 9a, and 9b (TN 242791) were calculated, including any assumptions that were built into those calculations.

Response: The values shown in these tables were calculated by ARCGIS using the shapefiles for the areas shown in AFC Figure 5.2-5 (TN 242791) for each habitat type and using the measurement functionality in ARCGIS. Please note that this information may change as a result of Project Optimization activities.

Data Request 25

Please disclose the location(s) of the optical ground wire and fiber optic cable in relation to the Project's power lines.

Response: With the exception of where the line is crossing under existing transmission lines, the fiber optic cable will be installed as optical ground wire (OPGW) in the shield wire position above the transmission line. This response will be updated if necessary following Project Optimization activities.

Data Request 26

Please provide a map that identifies the transmission line route segments with existing aboveground powerlines for both the preferred route to the Whirlwind Substation and the alternative routes to the future LADWP substation.

Response: Please refer to AFC Figure 1-4 for the location of the transmission line segments.

Open access California transmission infrastructure locations or GIS data can be downloaded from the California Energy Commission at the source noted below:

Source: https://cecgis-caenergy.opendata.arcgis.com/datasets/260b4513acdb4a3a8e4d64e69fc84fee_0/explore?location=36.526884%2C-122.255690%2C7.50

This response will be updated if necessary following Project Optimization activities.

Data Request 27

Please describe the spatial arrangement of the Project's transmission lines in relation to existing powerlines. This description should include both the horizontal and vertical spacing.

Response: The details of transmission crossings will be coordinated with LADWP and SCE. In general, all crossings will conform to the spacing requirements outlined in California Public Utilities Commission (CPUC) General Order 95 published at the source noted below.

Source: <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M338/K730/338730245.pdf>

Data Request 28

Please discuss how the Project's gen-tie line components would adhere to the Avian Power Line Interaction Committee ("APLIC") practices for avian protection from power lines.

Response: The Avian Power Line Interaction Committee has several documents that identify avian impacts associated with powerlines for both collisions and electrocutions. The following documents were reviewed:

- 1) Avian Power Line Interaction Committee (APLIC). 2018. Eagle Risk Framework: A Practical Approach for Power Lines. Edison Electric Institute and APLIC. Washington, DC.
- 2) Avian Protection Plan Guidelines – A Joint Document Prepared by The Edison's Electric Institute's APLIC and USFWS. April 2005

- 3) Reducing Avian Collisions with Power Lines. 2012. Prepared by The Edison's Electric Institute's APLIC
- 4) APLIC Suggested Practices for Avian Protection on Power Lines: The State of the Art. 2006. Edison Electric Institute and the California Energy Commission, Washington, DC, and Sacramento, CA.

Recommendations are provided in the above to address potential power line electrocution impacts are isolation and insulation. The guidelines recommend a minimum separation of 150 cm (60 inches) between phase conductors or a phase conductor and grounded hardware/conductor. If isolation is not feasible, then phases and grounds should be covered, In addition, perch discouragers may also be used to prevent the birds from utilizing that portion of the Gen-Tie that may have the highest potential for avian impacts.

Recommendations for addressing potential power line collision impacts include line placement that considers avian migration patterns, avian flight paths, prevailing winds, and topographic features; reducing the vertical spreading of lines by clustering lines in the same right-of-way, keeping lines parallel to each other, increasing visibility, and/or decreasing the span length. Additional options include line marking and burying lines if feasible and warranted.

Data Request 29

Please provide a list of past, present, and reasonably foreseeable future projects within the Project vicinity for the Project's cumulative impacts analysis on biological resources. If none are identified, please explain why not.

Response: The January 2020 EIR for the nearby Big Beau Solar Project Big Beau Solar Project - Kern County Planning & Natural Resources Dept. (kernplanning.com) was used as the primary resource for identifying past, present, and reasonably foreseeable projects from a biological resources standpoint. The Big Beau Solar Project EIR includes a list of 56 projects included in the cumulative impact analysis.

Source: <https://kernplanning.com/environmental-doc/big-beau-solar-project/>

Data Request 30

Please list the biological resource reports for projects in the Project vicinity that the Applicant's biologists reviewed if not already identified on page 7 of the Biological Technical Report (TN 242779).

Response: The reports reviewed are identified on page 7 of the Biological Technical Report (TN 242779).

Data Request 31

Please explain how the information and data in the biological resource reports for projects in the Project vicinity identified on page 7 of the Biological Technical Report (TN 242779) and any other reports reviewed by the Applicant's biologists informed the Applicant's field survey efforts.

Response: These reports were reviewed for their survey methods and results, as well as any mitigation measures they proposed that might be applicable. The reports provided our field staff with a general awareness of both positive and negative findings for targeted special-status species.

Data Request 32

Please state when the pre-construction surveys for the American badger will be conducted in relation to initiation of the Project's ground-disturbance activities.

Response: The initial pre-construction survey for American Badger will be completed within the entire project site 3-days prior to the initial ground disturbance. This will be followed by another clearance survey the morning construction is scheduled to begin to ensure that no American Badger occupies the site before construction. The project biological monitor will coordinate with the construction crew the day before, to identify the areas that are scheduled to be cleared. The biologist will clear those areas before the morning tail-board meeting.

Data Request 33

Please describe the mitigation measures that may be implemented to mitigate the Project's impacts on habitat for the American badger.

Response: An American Badger Mitigation Management Plan has been requested by the CEC as part of a separate data request. This plan will be prepared and docketed before project implementation. In general, the Pre-Construction surveys described will be implemented. Also, a biomonitor will be present during all construction activities that require vegetation removal or soil disturbance. All open holes or trenches will be covered each night. If that is not feasible, escape ramps will be constructed to ensure that no animals are trapped. All food or trash will be removed from the construction site daily to ensure that it does not attract any animals in the vicinity.

Data Request 34

Please state whether the Applicant will implement the 50-foot (occupied dens) and 250-foot (natal dens) buffer distances recommended in the California Department of Fish and Wildlife's ("CDFW") comment letter at page 19 (TN 245782).

Response: If present, a 50-foot buffer will be placed around all occupied dens and a 250-foot buffer will be placed on all natal dens, as recommended in the CDFW comment letter. It should also be noted that this buffer area may increase or decrease at the discretion of the biological monitor.

Data Request 35

Please explain the basis for determining that the burrows were being used by wildlife other than desert tortoises.

Response: As a standard assessment of burrow use, wildlife biologists will often look for key signs that would provide evidence of what kind of species is likely to have created the burrow. These key signs include scat, fur (hair), scratch marks, dust baths, carcasses, remnant prey items, shape, substrate, angle of the entry hole, the shape of the burrow, and steepness of the entry hole. Typically, if desert tortoises have utilized the burrows, there would be other identifiable signs, such as tortoises, tortoise scat, scuts, carcasses, or known recorded occurrences in the vicinity.

Data Request 36

Please identify the other wildlife species that may have been using the burrows within the Survey Area.

Response: Other wildlife species that may have created the burrows on-site include Audubon's desert cottontail, white-tailed antelope ground squirrel, California ground squirrel, round-tailed ground squirrel, or Merriam's kangaroo rat. Also, it should be noted that coyotes, badgers, and desert kit foxes may alter the burrows during predation activities.

Data Request 37

Please provide the date(s) at which time the Class 5 burrows were detected.

Response: The Class 5 burrows were identified during protocol-level surveys on April 12, April 14, May 4, and May 5, 2021.

Data Request 38

Please describe the potential nesting habitat for golden eagles that occurs east of the Survey Area and state the distance of this potential nesting habitat from the Project site.

Response: Golden eagle nesting habitat in the vicinity of the project site includes rocky outcrops and cliff faces. This type of habitat is observed on an aerial photo approximately 10 miles to the east, 16 miles to the west, 12 miles to the south, and 20 miles to the north.

Data Request 39

Please explain when perimeter fence installation will occur in relation to other Project construction activities.

Response: As currently designed, a temporary construction fence will be installed in accordance with Kern County requirements to delineate the boundaries of the project site. The fence will be of standard orange plastic safety fence or similar material. The fence will be built with an opening to allow wildlife to pass through the fence. Once construction is complete, the permanent perimeter fence will be installed.

Data Request 40

If the perimeter fence will be installed before completion of all other construction activities, please discuss the mitigation measures that would be implemented to prevent entrapment of wildlife within the perimeter of the fence.

Response: If for any reason the permanent fence must be installed before completion of the project, a biological monitor will conduct a clearance sweep of the project site at the beginning and end of each workday, especially if there is no way for wildlife to escape. This may include spot checks during the weekend if wildlife species can access the project site either under, through, or over the permanent fence.

Data Request 41

Please state whether the stormwater ponds would be fenced in addition to the perimeter fence.

Response: The stormwater ponds will be located within the chain-linked fence. Please note that this information may change as a result of Project Optimization activities.

Data Request 42

Please state whether the perimeter fence would have barbed wire.

Response: Refer to DR-41 for discussion on perimeter fence. Please note that this information may change as a result of Project Optimization activities.

In consultation with and under the direction of the Hydrostor Project Team, these responses were prepared by or under the supervision of the team members listed in Table 1.

Table 1: Preparers of Technical Responses

Topic Area	Data Response No.	Name and Title
Air Quality during Operations	DR-1	David Stein, <i>Vice President, Environmental Planning and Permitting</i>
Valley Fever	DR-2 – DR-3	David Stein <i>Vice President, Environmental Planning and Permitting</i>
Operational Noise	DR-8 – DR-11	Gage Miller <i>Senior Environmental Scientist</i> David Stein <i>Vice President, Environmental Planning and Permitting</i>
Construction impacts on wildlife	DR-12 – DR-13	Scott Crawford <i>Biology Group Manager</i>
Noise impacts on Wildlife	DR-14 – DR-16	Gage Miller <i>Senior Environmental Scientist</i> Scott Crawford <i>Biology Group Manager</i>
Night Lighting	DR-17 – DR-18	Gage Miller <i>Senior Environmental Scientist</i>
Generator tie-line	DR-19 – DR-24	David Stein <i>Vice President, Environmental Planning and Permitting</i>
Avian collisions and electrocutions	DR-25 – DR-28	Scott Crawford <i>Biology Group Manager</i>
Cumulative Impacts	DR-29 – DR-31	David Stein <i>Vice President, Environmental Planning and Permitting</i> Peter Masson <i>Director Environmental Programs</i>
American Badger	DR-32 – DR-34	Scott Crawford <i>Biology Group Manager</i>
Desert Tortoise	DR-35 – DR-37	Scott Crawford <i>Biology Group Manager</i>
Golden Eagle	DR-38	Scott Crawford <i>Biology Group Manager</i>
Perimeter Fence	DR-39 – DR-42	Scott Crawford <i>Biology Group Manager</i> David Stein <i>Vice President, Environmental Planning and Permitting</i>

ATTACHMENT CU-DR1-1

Manufacturer Specifications

DIESEL GENERATOR SET



Image shown may not reflect actual package

STANDBY 5320 kW 6650 kVA 60 Hz 900 rpm

Caterpillar is leading the power generation Market place with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY

- Low BSFC

FULL RANGE OF ATTACHMENTS

- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER

- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT

- Cat® dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1600 dealer branch stores operating in 200 countries.
- The Cat S•O•SSM program effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by products.

3616 DIESEL ENGINE

- Reliable, rugged, durable design
- Four-stroke diesel engine combines consistent performance and excellent fuel economy with minimum weight

CAT® GENERATOR

- Matched to the performance and output characteristics of Cat engines

CAT GENERATOR SET MONITORING SYSTEM (GSM)

- Simple user friendly interface and navigation
- Provides protection, monitoring, and control of the diesel generator set.
- Redundant shutdown protection

STANDBY 5320 ekW 6650 kVA
60 Hz 900 rpm



FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	<ul style="list-style-type: none"> • Aftercooler, fresh water, corrosion resistant coated (air side) • Air inlet shutoff • Air Cleaner • Breather, crankcase, top-mounted • Turbocharger, engine oil lubricated 	<ul style="list-style-type: none"> <input type="checkbox"/> Soot Filter <input type="checkbox"/> Air cleaner Louver Assembly <input type="checkbox"/> Vertical Support Bracket <input type="checkbox"/> Heavy Duty Air Cleaner <input type="checkbox"/> Air Inlet Adapter <input type="checkbox"/> Boost Control Valve
Cooling	<ul style="list-style-type: none"> • Engine coolant water drains • Front Mounted Turbos • Three-bundle oil cooler. • Water Temperature Regulator • Jacket Water Thermostats 	<ul style="list-style-type: none"> <input type="checkbox"/> Heat Exchanger for single circuit <input type="checkbox"/> Heating Aids <input type="checkbox"/> Cooling System Aids <input type="checkbox"/> Auxiliary Water Pump <input type="checkbox"/> Expansion Tank
Exhaust	<ul style="list-style-type: none"> • 457 mm (18 in) Cat bolt pattern • Dry, gas tight, exhaust manifold • Includes adapter, flexible exhaust fitting 	<ul style="list-style-type: none"> <input type="checkbox"/> Flexible Exhaust Fittings <input type="checkbox"/> Weld Flange and Related Hardware
Fuel	<ul style="list-style-type: none"> • Simplex or Duplex 	<ul style="list-style-type: none"> <input type="checkbox"/> Fuel Priming Pump <input type="checkbox"/> Duplex Primary Fuel Strainer <input type="checkbox"/> Fuel System Connections
Generator	<ul style="list-style-type: none"> • Custom Generator Per Generator Data Sheet Completed by Dealer 	<ul style="list-style-type: none"> <input type="checkbox"/> 3 Phase, six leads, WYE <input type="checkbox"/> Class F insulation <input type="checkbox"/> Bus bar connections <input type="checkbox"/> Winding temperature detectors <input type="checkbox"/> Anti-condensation space heaters
Governor	<ul style="list-style-type: none"> • UG Actuator 	<ul style="list-style-type: none"> <input type="checkbox"/> Electronic/ Actuators <input type="checkbox"/> Digital Programmers <input type="checkbox"/> Battery Backup/Power Supply <input type="checkbox"/> 230 UA <input type="checkbox"/> 723 Plus <input type="checkbox"/> EGB Actuator
Lube	<ul style="list-style-type: none"> • Centrifugal oil filters with single shutoff • Service side engine mounted on cylinder block inspection covers • Wet oil sump. Includes engine-driven main lubrication pump, installed oil lines, engine-driven oil pump and oil pan. • Oil filler and dipstick • Valve, oil pressure regulating • Valves, crankcase explosion relief 	<ul style="list-style-type: none"> <input type="checkbox"/> Oil Pan Drain valve <input type="checkbox"/> Lube ANSI adapter (Emergency Connection)
Mounting	<ul style="list-style-type: none"> • Damper, torsional vibration • Engine and Generator Mounting 	<ul style="list-style-type: none"> <input type="checkbox"/> Isolator <input type="checkbox"/> Spring type vibration isolator <input type="checkbox"/> Vertically Restrained <input type="checkbox"/> Non-vertically Restrained
Starting / Charging	<ul style="list-style-type: none"> • Vane type air starter • Two motors, engine mounted at rear, on left side • Includes air silencer • Line Group for Single Point Custom Connection 	<ul style="list-style-type: none"> <input type="checkbox"/> Pressure Reducing Valve <input type="checkbox"/> Compressed Air Flex Hose <input type="checkbox"/> Turbine Type Air Starters <input type="checkbox"/> Redundant Air Starters
General	<ul style="list-style-type: none"> • Paint, Caterpillar yellow • Pumps, gear driven: fuel, oil, jacket water, aftercooler/oil cooler water 	<ul style="list-style-type: none"> <input type="checkbox"/> Custom Paint Colors

STANDBY 5320 ekW 6650 kVA

60 Hz 900 rpm



SPECIFICATIONS

CAT GENERATOR

ExcitationPermanent Magnet
Pitch.....Optimum
Number of poles.....8
Number of bearingsTwo Bearing
InsulationNormal Class F or H
IP ratingDrip proof IP23
Over speed capability - % of rated.....125%
Wave form deviation.....3 %
Voltage regulator..... 3 phase sensing with load
adjustable module

CAT DIESEL ENGINE

3616, V-16, 4 stroke, water-cooled diesel

Bore280 mm(11.0 in)
Stroke300 mm (11.8 in)
Displacement per cylinder.....18.5L (1127 in³)
Total Displacement.....296L (18,032 in³)
Compression ratio.....13:1
Aspiration.....TA
Fuel system.....Direct Unit Injection

Generator Set Monitoring System (GMS)

Features:

- 10 inch (254 mm) color monitor to display all engine parameters and alarm annunciation
- Annunciation of all engine shutdowns, alarms, and status points
- Start/prelube control switch, fuel control switch and emergency stop buttons
- Speed control switch with automatic changing to ball head control when a governor failure occurs, if ball head control is available. Contacts are available for customer use.
- Selection of local/remote control of engine
- Selection of idle/rated control of engine.
- Equipped for remote communication
- Four 4-20mA outputs (programmable)
- Relay contract signals to the remote monitoring system (summary shutdown, summary alarm, local operation/remote, engine running, PLC failure, fuel control and idle/rated).



TECHNICAL DATA

Open Generator Set - 900 rpm/60 Hz	NOTES	STANDBY DM5417-06
<u>RATING</u>		
Engine Power	(2)	5580 bkW
Generator Power	(2)	5320 ekW
Engine efficiency (ISO 3046/1)	(1)	43.8 %
Engine efficiency (nominal)	(1)	42.5 %
<u>ENGINE DATA</u>		
Fuel Consumption (ISO3046/1)	(1)	193.5 g/bkW-hr
Fuel Consumption (nominal)	(1)	197.3 g/bkW-hr
Fuel Consumption (90% confidence)	(1)	199.3 g/bkW-hr
Air Flow (@ 25°C, 101.3 kPaa)		571.2 m3/min
Air Mass Flow		38228 kg/hr
Compressor Outlet Pressure		333.6 kPa(abs)
Compressor Outlet Temperature		220.4 °C
Inlet manifold Pressure		332.4 kPa(abs)
Inlet Manifold Temperature		69.8 °C
Timing	(10)	11.0 °BTDC
Exhaust Stack Temperature		381.4 °C
Exhaust Gas Flow (@stack temp, 101.3kPa)		1214.7 m3/min
Exhaust Gas Mass Flow		39333 kg/hr
<u>ENERGY BALANCE DATA (nominal)</u>		
Fuel Input Energy (LHV)	(1)	13134 KW
Heat Rej. To jacket water	(4)	1096 KW
Heat Rej. To atmosphere	(5)	315 KW
Heat Rej. To oil cooler	(6)	540 KW
Heat Rej. To EXH. (LHV to 25°C)	(4)	4086 KW
Heat Rej. To EXH. (LHV to 177°C)	(4)	3038 KW
Heat Rej. To aftercooler	(7), (8)	1495 KW
<u>EMISSIONS</u>		
NO _x (as NO)	(9)	10.51g/bkW-hr
CO	(3)	0.87 g/bkW-hr
THC (molecular weight of 13.018)	(3)	0.77 g/bkW-hr
Particulates	(9)	0.14 g/bkW-hr

CONDITIONS AND DEFINITIONS

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1 AND SAE J1995 JAN90 STANDARD REFERENCE CONDITIONS

OF 25°C, 100 KPA, 30% RELATIVE HUMIDITY AND 150M ALTITUDE AT THE STATED AFTERCOOLER WATER TEMPERATURE. CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE.

PERFORMANCE AND FUEL CONSUMPTION ARE BASED ON 35 API, 16°C FUEL HAVING A LOWER HEATING VALUE OF 42.780 KJ/KG USED AT 29°C WITH A DENSITY OF 838.9 G/LITER.

NOTES

- 1) FUEL CONSUMPTION TOLERANCE. ISO 3046/1 IS 0, + 5% OF FULL LOAD DATA. NOMINAL IS ± 3 % OF FULL LOAD DATA.
- 2) ENGINE POWER TOLERANCE IS ± 3 % OF FULL LOAD DATA.
- 3) EMISSION DATA SHOWN ARE NOT TO EXCEED VALUES.
- 4) HEAT REJECTION TO JACKET AND EXHAUST TOLERANCE IS ± 10% OF FULL LOAD DATA. (heat rate based on treated water)
- 5) HEAT REJECTION TO ATMOSPHERE TOLERANCE IS ±50% OF FULL LOAD DATA. (heat rate based on treated water)
- 6) HEAT REJECTION TO LUBE OIL TOLERANCE IS ± 20% OF FULL LOAD DATA. (heat rate based on treated water)
- 7) HEAT REJECTION TO AFTERCOOLER TOLERANCE IS ± 5% OF FULL LOAD DATA. (heat rate based on treated water)
- 8) TOTAL AFTERCOOLER HEAT = AFTERCOOLER HEAT x ACHRF (heat rate based on treated water)
- 9) EMISSION DATA SHOWN ARE DRY AND NOMINAL VALUES.
- 10) TIMING BASED ON AFM INJECTORS.



RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications: · AS1359, CSA, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33, UL508A, 72/23/EEC, 98/37/EC, 2004/108/EC

Standby - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions

Fuel Rates are based on fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Caterpillar representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

STANDBY 5320 ekW 6650 kVA

60 Hz 900 rpm



DIMENSIONS

Package Dimensions		
Length	10261.7 mm	404.00 in
Width	2530.3.1 mm	99.62 in
Height	3977.7 mm	156.60 in
Weight	64,470 kg	141,840 lb

NOTE: For reference only - do not use for installation design. Please contact your local dealer for exact weight and dimensions. (General Dimension Drawing #2476610).

Performance No.: DM5417 06

Feature Code: 616DE04

Sourced: U.S. Sourced

LEHE0353-01 (03-12)

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Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication.

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ATTACHMENT CU-DR15-1

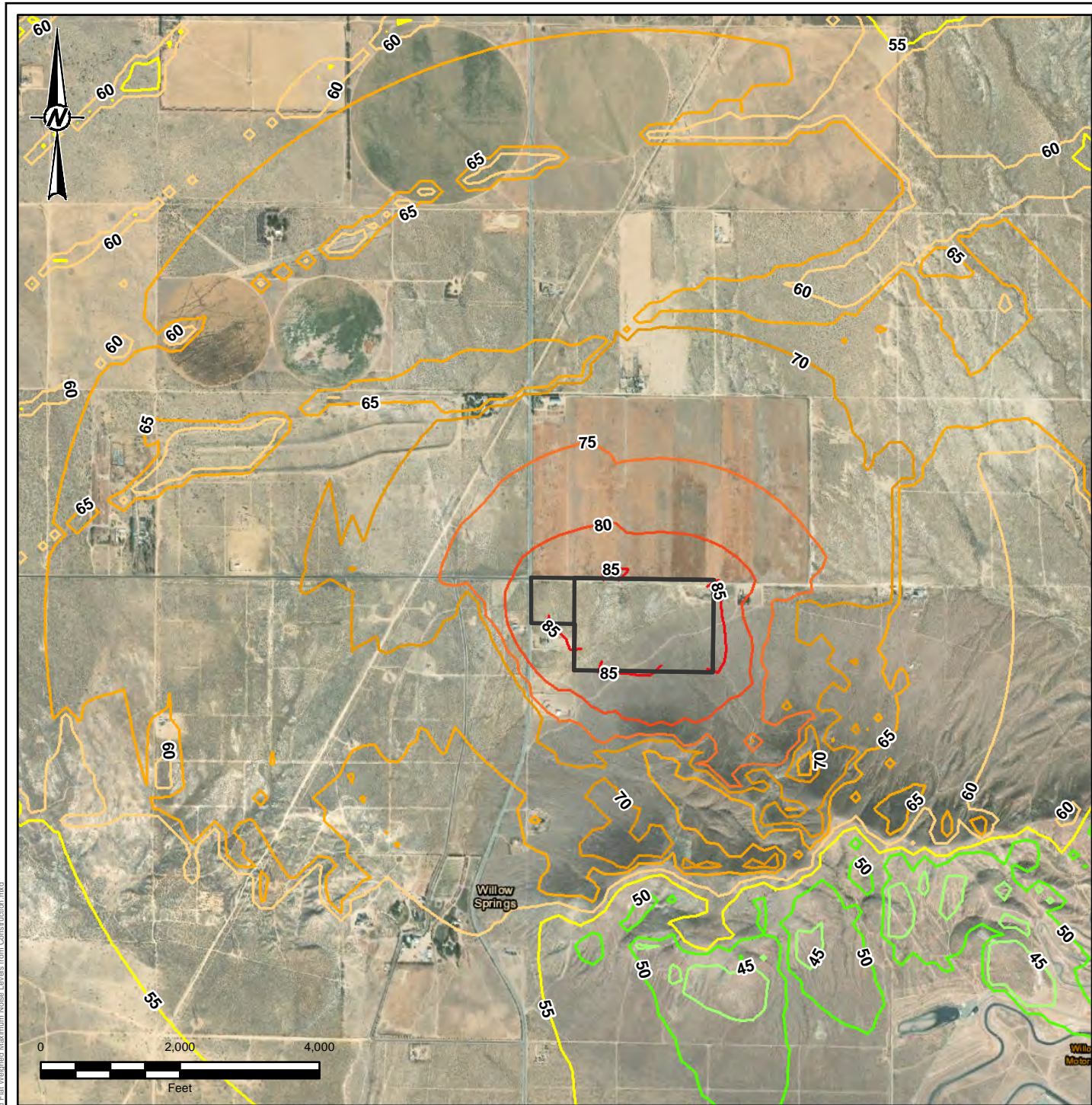
Modeled Flat Weighed Maximum Noise Levels from Construction

ATTACHMENT CU-DR-15-2

Modeled Flat Weighted Average Noise Levels from Construction

ATTACHMENT CU-DR-15-3

Modeled Flat Weighted Average Noise Levels from Operations



LEGEND

GEM SITE

Noise Contours

- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA
- 85 dBA

REFERENCE(S)

COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N
 SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
 SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
 GEM A-CAES LLC

PROJECT
 WILLOW ROCK ENERGY STORAGE CENTER

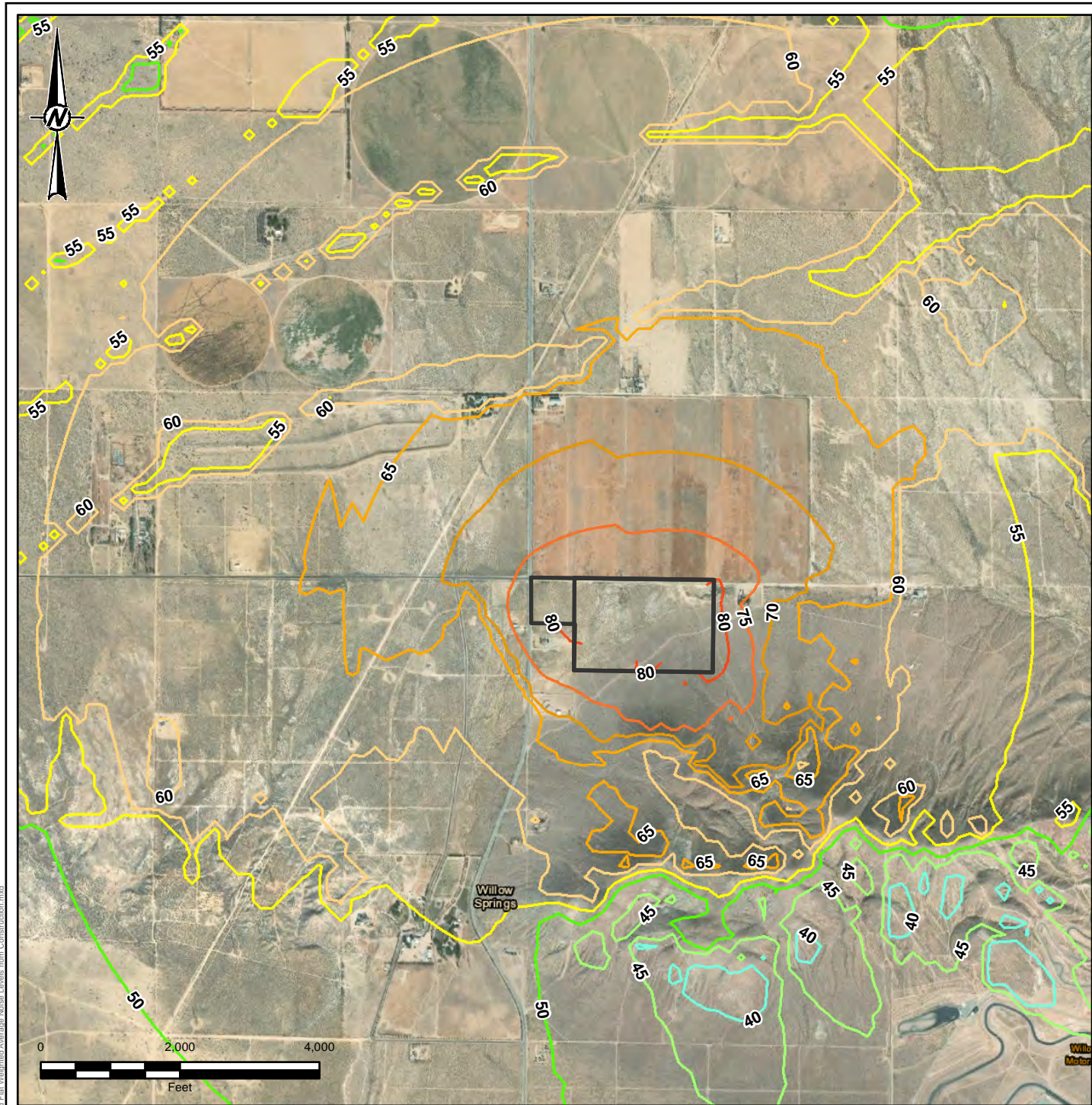
TITLE
CU DR 15-1: MODELED FLAT WEIGHED MAXIMUM NOISE LEVELS FROM CONSTRUCTION

CONSULTANT	YYYY-MM-DD	1/12/2023
	DESIGNED	JAM
	PREPARED	JAM
	REVIEWED	ED
	APPROVED	DS

PROJECT NO.
 20449449

FIGURE

1



LEGEND

GEM SITE

Noise Contours

- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA

REFERENCE(S)

COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N
 SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
 SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
 GEM A-CAES LLC

PROJECT
 WILLOW ROCK ENERGY STORAGE CENTER

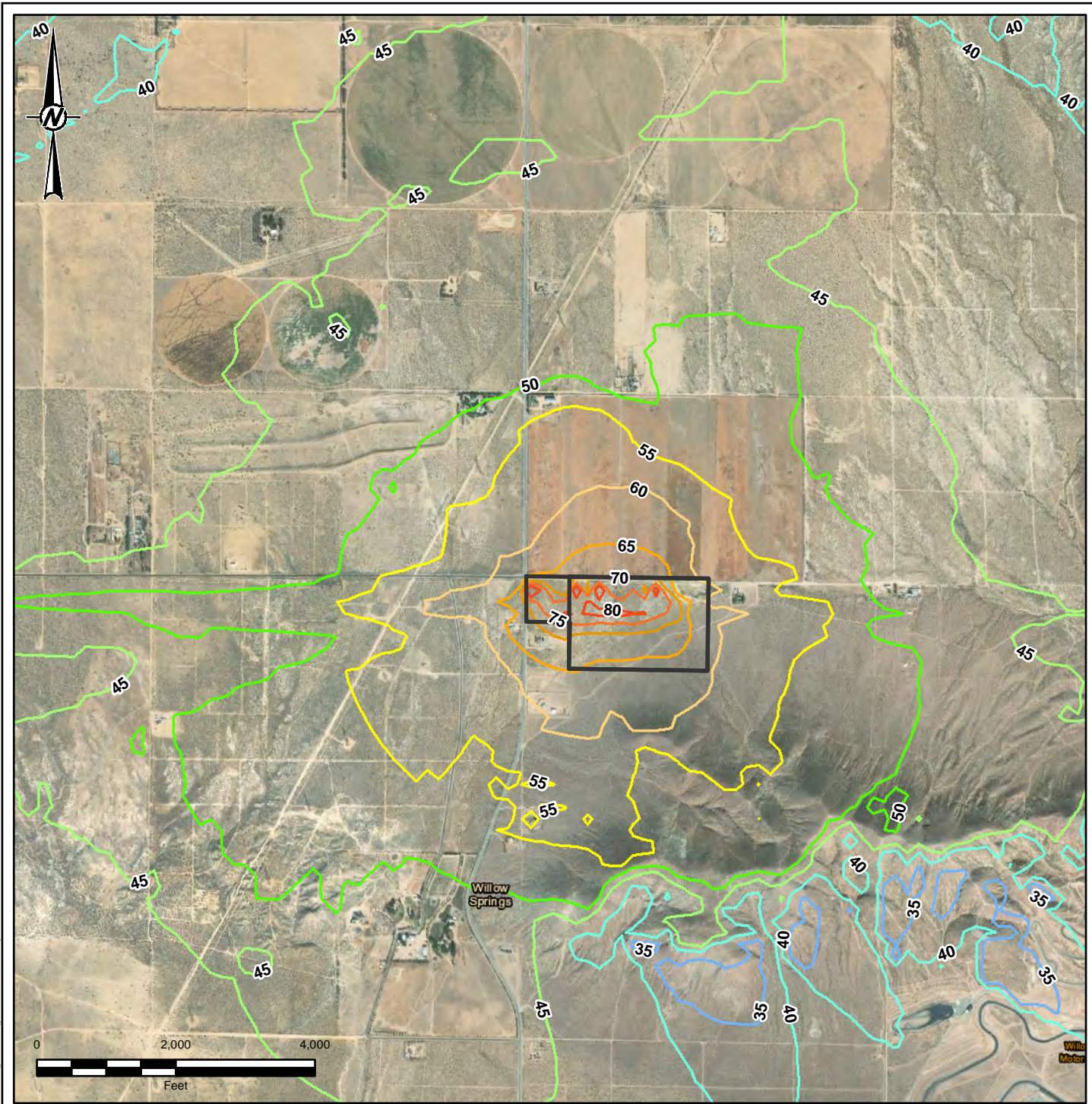
TITLE
CU DR 15-2: MODELED FLAT WEIGHTED AVERAGE NOISE LEVELS FROM CONSTRUCTION

CONSULTANT	YYYY-MM-DD	1/12/2023
	DESIGNED	JAM
	PREPARED	JAM
	REVIEWED	ED
	APPROVED	DS

PROJECT NO.
 20449449

FIGURE

2



LEGEND

GEM SITE

Noise Contours

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA
- 75 dBA
- 80 dBA

REFERENCE(S)

COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N
 SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
 SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
 GEM A-CAES LLC

PROJECT
 WILLOW ROCK ENERGY STORAGE CENTER

TITLE
CU DR 15-3: MODELED FLAT WEIGHTED AVERAGE NOISE LEVELS FROM OPERATION

CONSULTANT	YYYY-MM-DD	1/12/2023
	DESIGNED	JAM
	PREPARED	JAM
	REVIEWED	ED
	APPROVED	DS

PROJECT NO.
 20449449

PATH: G:\Shared\Noise\Noise_Engineering\CU DR 15-3 Modeled Flat Weighted Average Noise Levels from Operation.mxd
 Reason: d:\Maps\Noise\Noise_Engineering\CU DR 15-3 Modeled Flat Weighted Average Noise Levels from Operation.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI/A 25mm

ATTACHMENT CU-DR16-1

**Technical Guidance for Assessment and Mitigation of the Effects of
Traffic Noise and Road Construction Noise on Birds**

Appendix G: A History of the 60 dBA Criterion

In 1987, a biologist, John Rieger, developed a criterion for a California highway project by measuring noise levels at the nests of birds along a highway. On average, these levels approximated 60 dBA (Barrett, 1996). According to Barrett, Rieger assumed that if birds were successfully breeding, then this noise level is, by definition, not detrimental to the birds. Unaware of this work, and completely independently, Dooling also provided the California Fish and Wildlife Service with a noise level of 60 dBA for traffic noise that would begin to raise concerns about potential masking of communication sounds between birds by traffic noise. Barrett's number came from actual observations of birds nesting in noisy areas near a highway. Dooling's number came from an auditory model that calculated whether noise levels from traffic rose above ambient noise levels enough to affect acoustic communication between two birds. In neither case was this number intended to set a precedent or become a standard for noise-impact mitigation. The level of 60 dBA for traffic noise only applies, at best, under a narrow range of specific conditions having to do with the sound-affecting aspects of the habitat, the species life style and dependence on acoustic communication, the level of ambient noise without any traffic noise, as well as whether the species' predators use acoustic signals to locate their prey. The use of one number like 60 dBA provides only a crude and probably conservative estimate. A precise answer would require the information just discussed as well as information about the level and spectrum of the ambient noise, of the traffic noise, and of the bird's vocalizations.

Nevertheless, it appears that the 60 dBA criterion has been inappropriately used in many reports over the past 25 years as a hard and fast rule regarding the effects of highway and other anthropogenic noise on birds. The evidence today clearly shows that the application of this criterion to construction noise is likely to be far too conservative and unnecessarily restrictive. There are several reasons for this conclusion: (1) birds do not hear as well as humans at low frequencies which contain the bulk of energy in traffic noise; (2) bird vocalizations are at higher frequencies than traffic noise; (3) the use of the A scale on the sound level meter which mirrors human hearing, as opposed to bird hearing, overestimates the effects of traffic noise on bird hearing because traffic and construction noises are predominantly low frequency; and (4) birds, like humans, can and do employ a number of short term behavioral strategies for hearing in noise such as turning their heads, changing height or location, raising their voice, and timing their communication to coincide with periods of low noise.