



LOCATION: Front Range 2

DOCUMENT: NOISE MITIGATION PLAN

Section 23, Township 6 North, Range 67 West

Lat: 40.466418°, Long: -104.859778°

Form 2A Doc No. 403691333

Weld County, Colorado

Background

Carbon Storage Solutions seeks to develop a well that will support a Class VI Carbon Capture Sequestration program. This EPA required well will monitor pressure, temperature, and formation fluid sampling.

Introduction

This Noise Mitigation Plan is intended to facilitate compliance with the Front Range 2 ECMC Rules and Regulations, Rule 304.c.(2) as well as Weld County Ordinance Sec. 21-5-435. This document serves as the Noise Mitigation Plan for Form 2A.

Noise Mitigation

This plan will serve as site specific guidance and recommended best management practices to properly maintain compliant noise levels throughout the lifetime of the proposed pad. The operator will utilize these general guidelines on this site at the onset of construction activities as well as perform the necessary mitigation measures as necessary.

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General

Location

The Front Range 2 Proposed Location will be in Township 6 North, Range 67 West, Section 23 in unincorporated Weld County Colorado on privately owned land. The proposed monitor well will be located north of an industrial complex. Rail lines border to the north & west, public roads WCR 66 / Eastman Park Drive to the south, and Great Western Drive to the east. The adjacent parcels include industrial, agricultural, and residential.

The Proposed Location will be located on Parcel 080723000015. The Total Surface Disturbance Area will be 10.82 acres. This 10.82 acres is a combination of a 10.14 acre Location combined with a 0.68 acre Access Road that will be 60 feet wide and run 495 feet. Post Interim Reclamation, the approximate un-reclaimed acreage will amount to ± 0.95 acres. At the present time this parcel is zoned for agriculture, the surface owner utilizes this parcel for Cropland (Corn & Barley). The surface owner intends to continue this use it this way into the future, and our mutually agreed upon Surface Use Agreement conforms to all current ECMC regulations and setbacks.

The Proposed Location and eventual proposed Front Range 2-1 well is required by the Environment Protection Agency's Underground Injection Control Program for Class VI wells. The Front Range 2-1 is part of a greater program to be used in conjunction with the Front Range 1-1 well, drilled in 2023. It is this Operator's goal to re-permit the Front Range 1-1 from that of a Stratigraphic Well, under ECMC primacy to that of a Class VI CO₂ injection well under EPA primacy.

The Front Range 2's (on this Proposed Location) intended use is that of a "Monitor Well," as part of the EPA UIC Class VI Program. As part of this program an Operator is asked to monitor sub-surface *temperature* and *pressure*. This Proposed Location will not require the use of Compression equipment, Hydraulic Fracturing equipment or Flowback equipment, nor will it have any kind of production profile. The long-term profile of this Proposed Location, post Interim Reclamation will include a wellhead and a meter shack with no engines or noise sources on location.

Below the estimated schedule is based upon the Front Range 2-1 well development program;

Table 1

~~Operational Phases with duration and estimated start dates.~~

PHASE	SUB-PHASE	DURATION	ESTIMATED START DATE
Construction	Pad & lease Road (<500')	10 Days	3 rd Quarter (Aug 2024)
Construction	Set Conductor	1 Day	3 rd Quarter (Sept 2024)
Drilling (1 Well)	MIRU	3 Days	3 rd Quarter (Sept 2024)
Drilling	Drilling Operations	15 Days	4 th Quarter (Oct 2024)
Drilling	RDMO	2 Days	4 th Quarter (Oct 2024)
Completion	Wireline Prep	5 Days	4 th Quarter (Oct 2024)
Interim Reclamation	Operations	10 Days	4 th Quarter (October 2024) *

**or first favorable growing season*

Background and Regulation

Authorities

Noise at well locations is regulated by both the Colorado Energy & Carbon Management Commission (ECMC), Weld County, and Colorado Parks and Wildlife (CPW). Both the ECMC and Weld County specify noise levels applicable to each phase of operations as well as best management practices to limit the impact of the noise. CPW specifies noise levels that apply to critical wildlife habitats. During all phases of operations, Carbon Storage Solutions will comply with the most stringent limits applicable.

Colorado Energy & Management Commission (ECMC)

ECMC Rule 423 establishes standards and permissible noise levels for oil and gas operations. “All Oil and Gas Operations will comply with the following maximum permissible noise levels in Table 423-1 unless otherwise required by Rule 423.” **Table 2** recreates the information referenced in Rule 423.

Table 2

Maximum Permissible Noise Levels – ECMC Table 423-1.

Land Use	7:00 am to 7:00 pm	7:00 pm to 7:00 am
Residential / Rural / State Parks/ State Wildlife Areas	55 dBA	50 dBA
Commercial / Agricultural	60 dBA	55 dBA
Light Industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA
All Zones	60 dBC	60 dBC

Exceptions to the noise limits above are given in Rule 423.b(2)

(2) Unless otherwise required by Rule 423, drilling or completion operations, including Flowback:

- A. In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be **60 dB(A)** in the hours between 7:00 p.m. to 7:00 a.m. and 65 dB(A) in the hours between 7:00 a.m. to 7:00 p.m.; and
- B. In all zones maximum permissible noise levels will be **65 dB(C)** in the hours between 7:00 p.m. to 7:00 a.m. and 65 dB(C) in the hours between 7:00 a.m. to 7:00 p.m.

Weld County

Weld County also regulates noise levels from Oil and Gas operations, and these regulations are provided in Section 21-5-435 of the Weld County Code. The following **Table 3** lists the maximum permissible noise levels prescribed by Weld County:

Table 3

Maximum Permissible Noise Levels – Weld County Table 435 A.1.

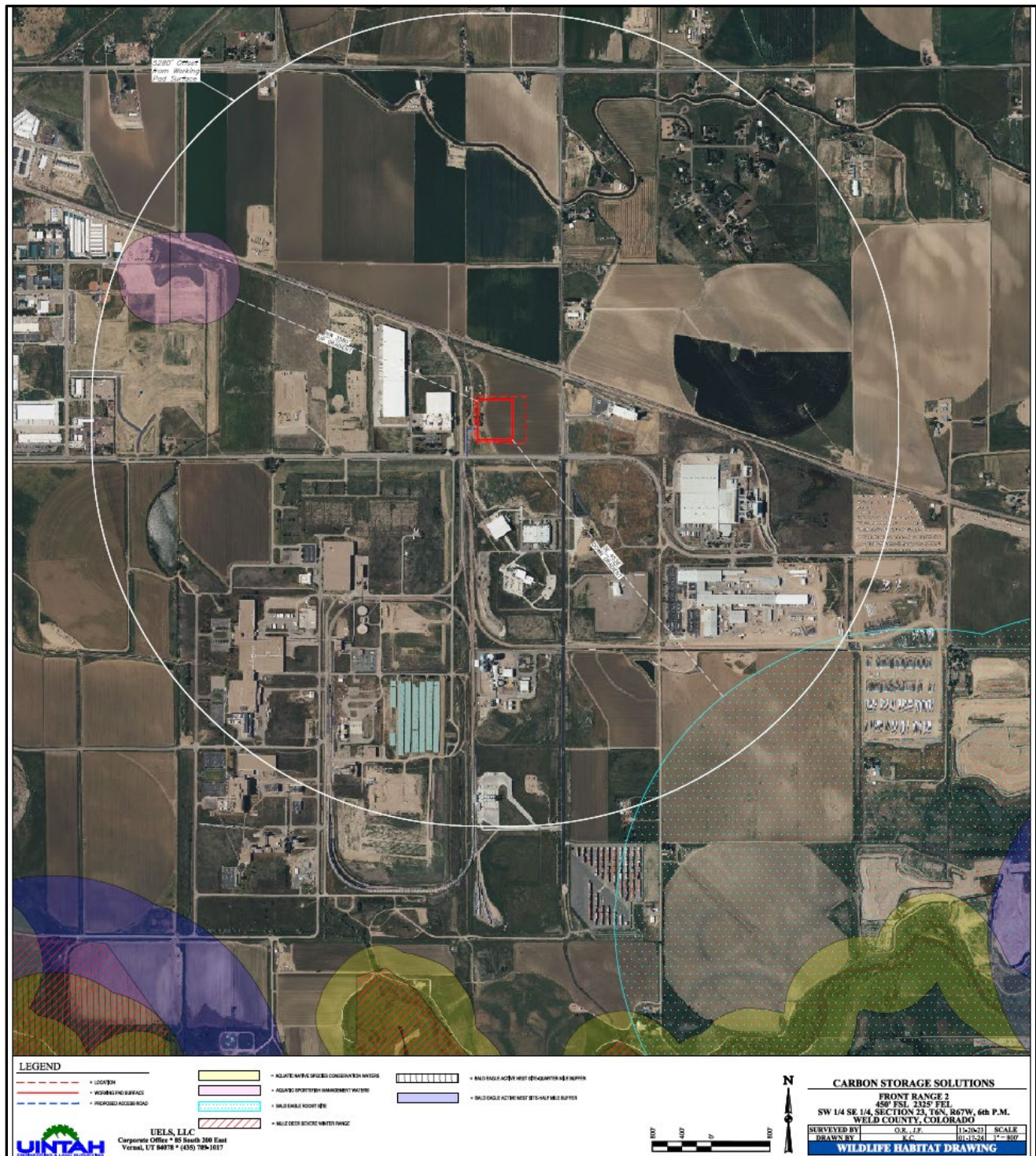
Noise Levels	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
A-Scale		
NL-1	55 dBA	50 dBA
NL-2	60 dBA	55 dBA
NL-3	65 dBA	60 dBA
NL-4	70 dBA	65 dBA
C-Scale		
All Areas	65 dBC	65 dBC

Section 21-5-435.A.1. of the Weld County Code specifies that the maximum permissible noise level for construction, drilling, completions, flowback, and production will be established during the Weld Oil and Gas Location Assessment (WOGLA) hearing. In the case of this Proposed Location, Weld County did not require a WOGLA. That said, for this region, the approved level in the Near-Urban Planning Area may be up to the **NL-3** standard depending upon the proximity of Building Units or High Occupancy Building Units.

Colorado Parks and Wildlife (CPW)

This Proposed Location does not reside in critical wildlife habitats as established by Colorado Park and Wildlife.

This Proposed Location's Working Pad Surface is 3,580 feet from an Aquatic Sportfish Management Water and 4,538 feet from a Bold Eagle Roost Site. Carbon Storage Solutions has been active and proactive in our communications and cooperation with CPW to be good stewards of our wildlife resources. After consultation, CPW stated that they had no objections or concerns with the construction and long-term plans for this Proposed Location.



Estimated Noise Levels

The closest Residential Building Unit (RBU) is approximately 1,613 feet, northeast from the edge of the Proposed Location. Carbon Storage Solutions commissioned a Sound Impact Assessment to determine the sound impact of all aspects of the anticipated operations, which for this program only include the Construction, Drilling, and Interim Reclamation phases. The results of the Sound Impact Assessment can be found in **Appendix A**. Below, **Table 4**, shows the estimated noise levels at 2,000 ft from each operational phase *after* mitigation.

Table 4

Operational Phases with duration and estimated noise level at 2,000ft.

Phase	Duration	Estimated Noise Level
Drilling (1 Well)	25 Days	<49 db(A), <61 db(C)

Ambient Sound Survey

It is this Operator's belief that this Proposed Location does not meet the ECMC requirements for an ambient sound survey as defined in ECMC 423.a.(5). The proposed location does not meet the Weld County Code requirements for a background ambient survey as defined in 21-5-435.B.7.

ECMC Rule 423.a.(5) refers to Proposed Oil & Gas Location with a Working Pad Surface within 2,000 feet of one or more Residential Building Units will require at least one, and no more than six noise points of compliance where monitors will be located. ECMC Rule 423.b states the Director may require as a Condition of Approval on the Form 2A that the Operator conduct a background ambient noise survey between 30 and 90 days prior to start of construction.

Given that this Proposed Location will not include a "Completion" and "Flowback" phase as utilized by the Oil & Gas industry, this Proposed Location's noise profile is exceedingly low as illustrated by the Sound Impact Assessment in **Appendix A**. Sound levels at Residential Building Units within 2,000 ft of this Proposed Location are below Maximum permissible Noise Levels within model space.

Cumulative Noise

Carbon Storage Solution does not plan to utilize background ambient noise or cumulative noise to allow for increased noise threshold levels.

Sound Impact Assessment

Carbon Storage Solution commissioned a Sound Impact Assessment, the results of which are in **Appendix A**.

Mitigation Measures and Best Management Practices

Site Specific BMPs

With guidance from consultant firms that are familiar with noise mitigation, Carbon Storage Solutions does not believe this Proposed Location should be subject to Mitigation Measures given the exceedingly low A-Weighted and C-Weighted Levels.

Complaints

Operator shall provide and post 24-hour, 7 days per week contact information to deal with all noise complaints arising due to Operator's Proposed Location. If a noise complaint is made to either Operator directly, or to the ECMC or the Local Government Designee and Operator is notified of the complaint, noise levels will be measured within forty-eight (48) hours of Operator's receipt of the complaint pursuant to Rule 423.c.(2). Operator will contact the concerned party (if contact information is available) to discuss the complaint and the results of the noise measurements.

If it is found that Operator is not in compliance with restricted noise level, Operator will implement measures to do so, including but not limited to sound enclosures. Post implementation of sounds measures, Operator will commit to remeasuring noise levels to confirm compliance.

Appendix A – Sound Impact Assessment



Front Range 2 Sound Impact Assessment

February 13, 2024

Principal Environmental, LLC (TruHorizon) was contracted by Carbon Storage Solutions to investigate the anticipated sound impact of drill operations on the surrounding environment at the Front Range 2 site. The following document provides the results and models conducted for the sound impact assessment.

Executive Summary

Sound levels from drill operations have been modeled for the Front Range 2 site using field data from Sound Signatures conducted by TruHorizon in February through May 2022 at active drill sites in Weld County, CO. An equipment layout was provided by a Carbon Storage Solutions representative. This layout was used to provide the most accurate path of noise propagation within the model.

ECMC Rule 423 sets State-level maximum permissible noise levels:

- For the purposes of this Sound Impact Assessment, in accordance with ECMC Rule 423.b.(2), an A-weighted threshold level of 60dB has been adopted.
- For the purposes of this Sound Impact Assessment, in accordance with ECMC Rule 423.b.(2), a C-weighted threshold level of 65.0 dB has been adopted.

1041 WOGLA Code Article V Sec. 21-5-435. – Noise sets local-level maximum permissible noise levels:

- Sites with Residential Building Units between 500 to 2,000 ft. of the Working Pad Surface will adhere to NL-3 Noise Level Standards of 60 dBA and 65 dBC during the hours of 7:00 p.m. to 7:00 a.m., unless existing Ambient noise levels exceed these limits.
- Operators shall be considered in compliance unless their noise contribution increases field-measured noise above ambient levels by greater than 5 dBA and 5 dBC. No Ambient survey was elected by Carbon Storage Solutions representatives. Tables 1 through 2 display the adopted maximum permissible noise levels.

Since the Front Range 2 site falls under rules of more than one ordinance, if applicable, the more stringent of the ordinance requirements will be used as threshold criteria for the purposes of this sound study.



Tables 1-2 below shows the A- and C-weighted sound levels at Building Units within 2000 ft of the Working Pad Surface during drill operations.

Table 1. A-Weighted Sound Levels - Drill Operations (BUs within 2000 ft.)

Receptor	Distance/Direction from WPS (ft.)	Max Permissible Noise Level (LAeq)	Drill Operations (LAeq)	Drill Operations--Mitigated (LAeq)
1	1,613 NE	60.0	48.4	43.9

Table 2. C-Weighted Sound Levels - Drill Operations (BUs within 2000 ft.)

Receptor	Distance/Direction from WPS (ft.)	Max Permissible Noise Level (LCeq)	Drill Operations (LCeq)	Drill Operations--Mitigated (LCeq)
1	1,613 NE	65.0	60.1	57.9

Based on the results of this study, the sound impact of drill operations without mitigation is below conversational speech levels at the nearest Residential Building Unit. After installing mitigation as recommended, sound levels are shown to drop further below conversational speech levels, and below Maximum Permissible Noise Level at all Receptors.

Ordinance Summary

Ordinance No. 423 was enacted for the State of Colorado by the Energy and Carbon Management Commission (formerly Colorado Oil and Gas Conservation Commission) which regulates environmental performance standards for Noise. Relevant Ordinance details as follows:

- For proposed location with a Working Pad Surface within 2000 feet of one or more RBUs, at least one, and no more than six noise points of compliance will be identified where monitors will be located pursuant to Rule 423.a.(5). A map illustration of the Operator's intended monitoring locations is attached as an appendix item.
- Sound level measurements shall be taken at least three hundred fifty (350) feet from the Working Pad Surface in the direction of the RBUs and no less than twenty-five (25) feet from nearest RBU.
- Operator will take sound level measurements 5 feet above ground level and will be determined by taking an average logarithmic minute-by-minute measurement.
- Measurements will include at least 24 hours prior to Construction Phase between 10:00pm on Friday and 4:00am on a Monday.
- Noise levels not to exceed designated limits in Table 423-1 – Maximum Permissible Noise Levels.



Ordinance Summary (cont.)

Unless otherwise required by Rule 423, drilling, or completion operations, including Flowback:

- In Residential/Rural or Commercial/Agricultural, maximum permissible noise levels will be 60 dB(A) in the hours between 7:00 p.m. to 7:00 a.m. and 65 dB(A) in the hours between 7:00 a.m. to 7:00 p.m.; and
- In all zones maximum permissible noise levels will be 65 dB(C) during all hours
- At new or substantially modified Oil and Gas Locations where ambient noise levels at noise points of compliance designated pursuant to Rule 423.a.(5) already exceed the noise thresholds identified in Table 423-1, then Operators will be considered in compliance with Rule 423, unless at any time their individual noise contribution, measured pursuant to Rule 423.c, increases noise above ambient levels by greater than 5 dBC and 5 dBA between 7:00 p.m. and 7:00 a.m. or 7 dBC and 7 dBA between 7:00 a.m. and 7:00 p.m.

In addition to the ECMC ordinance for this work, reference was made to Weld County code ordinance Sec. 21-5-435 Noise.

Full specific tables and limit levels can be found in 400 Series for ECMC ordinance or Weld County code Sec 21.5-435.

Equipment Sound Signature Data

Spectra data used in these models was referenced from Sound Signatures conducted by TruHorizon during active drill operations.

The sound levels from Table 3 are utilized in the drill models:

Table 3: Drill Operations Sound Sources at Select Distances

Sound (Point Source)	Drill Equipment		Distance (ft.)
	Quantity	Sound Level (dBA)	
Rig Floor	1	71.9	5
Mud Pump	2	78.0	15
Generators/AC Units	3	88.7	10



Sound Model Limitations and References

By modeling the geographical properties of the location and utilizing equipment sound level data sound levels around the location can be predicted at specific locations. The predicted sound levels can then determine if mitigation is required. TruHorizon utilized DataKustik CadnaA version 2023 MR1 software for the calculation and assessment of noise propagation to generate the models in the report.

Field measured sound levels may vary from model-projected sound levels due to high dependency on ambient conditions. Wildlife, vehicle traffic, air traffic, human activity and other variables will skew field measured sound levels. Weather conditions such as wind speed, wind direction, temperature and humidity can influence sound intensity in a given direction. Wind can affect the propagation of sound by several decibels depending on the wind speed, direction and cloud cover. Attachment 1 details typical decibel levels for various types of sound for reference and comparison. All models are oriented in the northern direction unless stated otherwise.

Predictive modeling of C-weighted sound data is not included in the International Standard ISO 9613 (Acoustics – Attenuation of sound during propagation outdoors.)

The services provided for this project were performed in accordance with industry best practices for environmental noise measurements using the most accurate, Type/Class 1 acoustic instrumentation. No warranty, expressed or implied, is made or intended by rendition of these consulting services or by furnishing oral or written reports of the findings made. This report has been prepared by Principal Environmental, LLC for the exclusive use by Carbon Storage Solutions Energy.



TruHorizon

Carbon Storage Solutions
Front Range #2
Sound Impact Assessment

Sound Level Measurement Device Locations

Carbon Storage Solutions Front Range 2 Drill Sound Impact Assessment

Principal Environmental, LLC | 401 S Jim Wright Fwy Suite 103, Fort Worth, TX | Phone: 817.599.5332 | www.TruHorizon.com

Operator intends to not only set a Sound Level Measurement Device within 25 feet from the exterior wall of the only Residential Building Unit within 2,000 feet of the Working Pad Surface, but the Operator will set a second Measurement Device 500 feet from the WPS in the direction of the Residential Building Unit.



Carbon Storage Solutions Front Range 2 Noise Measurement Sensor Location



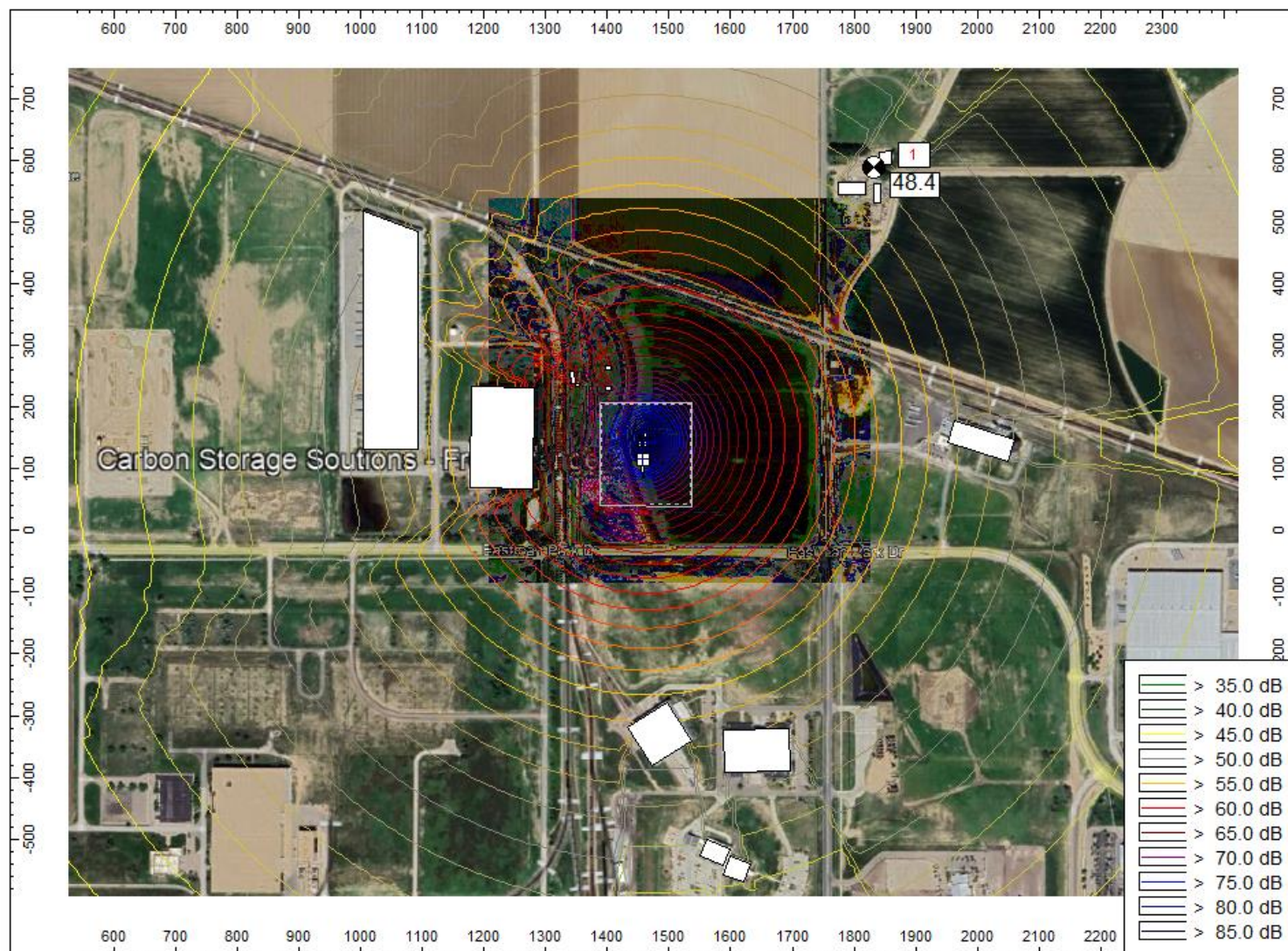
TruHorizon

Carbon Storage Solutions
Front Range #2
Sound Impact Assessment

Drill Models – No Mitigation

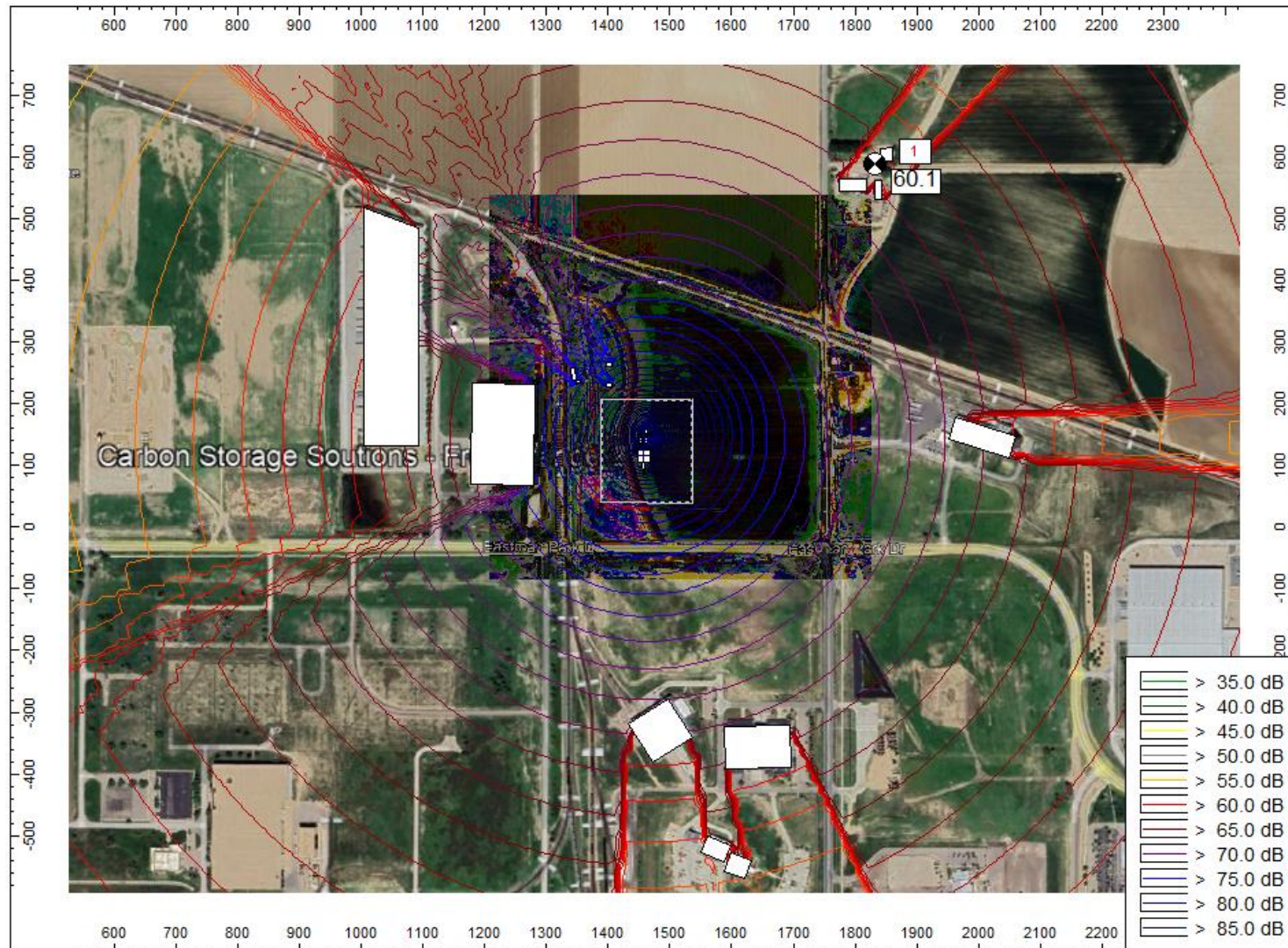
Carbon Storage Solutions Front Range 2 Drill Sound Impact Assessment

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Model 1. Drill Operations at Front Range 2 Location (A-Weighted Levels)

Carbon Storage Solutions Front Range 2 Drill Sound Impact Assessment



Model 2. Drill Operations at Front Range 2 Location (C-Weighted Levels)

Carbon Storage Solutions Front Range 2 Drill Sound Impact Assessment



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Carbon Storage Solutions
Front Range #2
Sound Impact Assessment

Site Recommendations

Sound levels at Residential Building Units within 2,000 ft of the Front Range 2 location are below Maximum permissible Noise Levels within model space. TruHorizon does not recommend mitigation at this time due to low noise impact. TruHorizon has provided an optional mitigation plan in the event that Carbon Storage Solutions finds a future need for such a plan, but was not included in this site specific plan.



TruHorizon

Carbon Storage Solutions
Front Range #2
Sound Impact Assessment

ATTACHMENT 1

TABLE OF TYPICAL SOUND LEVELS

Carbon Storage Solutions Front Range 2 Drill Sound Impact Assessment

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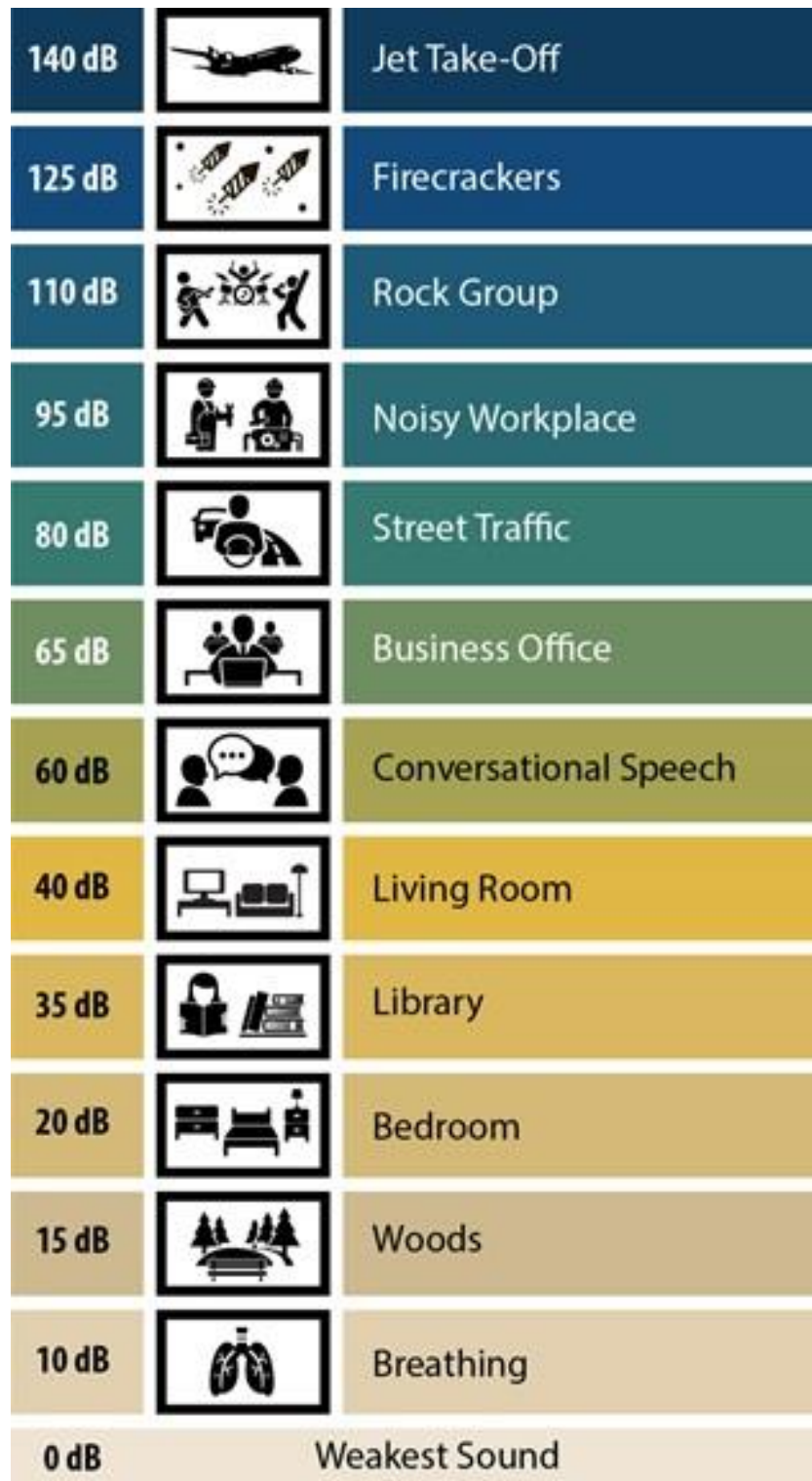


Figure 2. Typical sound levels (dBA) for common noise sources.