

February 9, 2021

Mr. Ken Stoeber
TMC, Inc.
PO Box 69
Belgrade, MT 59714

**Re: Amendment #2 Morgan Family LLC Site
Noise Monitoring Report #4 – January 26, 2021
BSA Project #20174A**

Dear Ken:

Attached is the Noise Monitoring Report #4 for the January 26, 2021 compliance monitoring for the Morgan Family LLC Site Amendment #2 operations. No noise level exceedances were measured during these Year 1 Phase 1, Mining Operations.

If you have any questions or comments, please do not hesitate to call (406) 457-0407 or email me at sean@bigskyacoustics.com.

Sincerely,

Sean Connolly, INCE Bd. Cert.
BIG SKY ACOUSTICS

cc: Pat Eller/Morrison-Maierle

Noise Monitoring Report #4
Field Date: Tuesday, January 26, 2021

1.0 Noise Level Monitoring Methodology

Sean Connolly (INCE Bd. Cert.) of Big Sky Acoustics (BSA) conducted the measurements and field observations. The monitoring was conducted per the requirements listed in *Amendment #2 Morgan Family LLC Site, Environmental Noise Study – Revision 3, Appendix C-Noise Monitoring Plan* (BSA 2020). Measurements were completed according to the American National Standards Institute (ANSI) Standard S12.9-2013/Part 3 (R2018), *Quantities and Procedures for Description and Measurement of Environmental Sound – Part 3: Short-term Measurements with an Observer Present* (ANSI 2018).

Equipment and Measurement Locations Property access was arranged by TMC. Noise level measurements were completed at the worst-case locations shown on the attached **Figure 1**, which represent the closest east and south residences to the current Amendment activities (excluding Receptor R5 occupied by a part-owner of TMC).

1. Measurement Location M1: (Receptor R8)

- GPS coordinates: 45° 36' 45" N, 111° 11' 29" W
- BSA Larson Davis Type 1 Sound Level Meter (BSA LD#1)
- Roland R-07#1 to record continuous audio
- In yard 52 feet west of residence R8, 105 feet south of Zachariah Lane, at the same location as January 12, 2021 measurement.
- Representing closest south residence to Year 1, Phase 1 Mining Operations
- Mic on tripod approximately 8 feet above ground surface (ags), 3" windscreen, case locked and left unattended. Equipment checked by BSA at 0754 and 1329 hours on 01/26/21, all OK.
- Measurement period – 1807 hours on 01/25/21 to 1822 hours on 01/26/21
- Calibration – Prior to measurement: 114.0. After measurement: 113.6

2. Measurement Location M2_{Yr1-2}: (between Receptors R2 and R4)

- GPS coordinates: 45° 36' 57" N, 111° 10' 59" W
- BSA Larson Davis Type 1 Sound Level Meter (BSA LD#2)
- Roland R-07#2 to record continuous audio
- In field, midway between residences R2 and R4, east of Amendment east berm, approximately 367 feet west of Grey Wolf Trail centerline, at the same location as December and January measurements.
- Closest east residences to Year 1, Phase 1 Mining Operations
- Mic on tripod approximately 8 feet ags, 3" windscreen, case locked and left unattended. Equipment checked by BSA at 0736 and 1315 hours on 01/26/21, all OK.
- Measurement period – 1723 hours on 01/25/21 to 1809 hours on 01/26/21
- Calibration – Prior to measurement: 114.0, After measurement: 113.9

3. Weather Station: (same location as December and January measurements)

- BSA Kestrel 5500 Weather Station
- Approximately 33 feet south of Measurement Location M2_{Yr1-2}, in field mid-way between residences R2 and R4.
- Mounted on tripod approximately 7 feet ags.

Weather See the weather station graph in **Attachment 1**. Daytime conditions were mostly sunny with temperatures ranging from 4 to 45 degrees, no precipitation, and light wind ranging from 0 to 7 mph.

Frequency Per the Noise Monitoring Plan (BSA 2020), worst-case 24-hour noise measurements during the Amendment activities are required **monthly** (20 working days) after the first four weeks of Year 1 Phase 1 Mining Operations, which includes stockpiling and no crushing or processing activities (**Table 1**). Period for this monitoring is weekdays occurring:

- Year 1, Weeks 5 – 8: Tuesday, January 19 – Wednesday, February 17, 2021 (without operations on Presidents' Day, February 15th)

Background Per Section 7.3.3(c) of ANSI S12.9-2013/Part 3 (ANSI 2018), BSA measured the background L_{eq} between 0600-0700 hours (before construction activities), during one 30-minute (minimum) mid-day break, and between 1700-1800 hours (after construction activities), to determine the ambient sound environment without the influence of TMC's equipment and operations. If required, the measured $L_{eq}(h)$ data were corrected for background sound representative of the time of day, including traffic. The corrected $L_{eq}(h)$ data for each hour during Amendment activities were used to calculate the overall L_{eq} and L_{dn} values due to the Amendment activities for comparison to the appropriate Permissible Noise Levels (**Section 3**).

Adjustments If required, measurement intervals corrupted by transient noises not associated with Amendment activities, such as aircraft flyovers, excessively barking dogs, residential activities, wind in excess of 11 mph, heavy precipitation, BSA checking the equipment, and natural sounds (i.e., birds, insects, leaves rustling, etc., within 1,600 to 10,000 Hertz) were removed by BSA, and the $L_{eq}(h)$ of the corrupted hour was recalculated according to ANSI S12.9-2013/Part 3 (ANSI 2018) (**Section 3**).

If applicable, the background $L_{eq}(h)$ data was adjusted by BSA by subtracting a 3 dBA uncertainty factor from the measured values according to Section 7.3.3(c) of ANSI S12.9-2013/Part 3 (ANSI 2018). If the $L_{eq}(h)$ minus the background value is less than 3 dBA, then a 99 dBA correction was applied (**Section 3**). This uncertainty factor is required since the measurements are intended to determine compliance.

If tonal noises were detected due to the Amendment activities (i.e., heard during the fieldwork and/or on the recorded data), BSA added 5 dB penalty to the measured L_{eq} according to Table 2 of ANSI S12.9/Part 4 (ANSI 2020). If applicable, the penalty was applied to the measured $L_{eq}(h)$ value before correcting for background, according to Annex B of ANSI S12.9/Part 3 (ANSI 2018) (**Section 3**).

2.0 Field Observations

Onsite TMC was conducting Year 1 Phase 1 Mining Operations northeast of the bridge that connects the Amendment area to the existing Morgan pit (**Figure 1**). The east and south berms located along the Amendment area boundaries had been previously completed to 12 feet ags during the Year 1 Stripping and Berm Construction activities. These Year 1, Weeks 5 – 8 activities began on Tuesday, January 19th occurring weekdays from 0700 to 1700 hours. At night, the construction equipment was stored in the existing Morgan Pit. No additional TMC equipment (e.g., crusher, loaders, conveyors, etc.) were located or operated onsite. The Year 1 Phase 1 Mining Operations does not include crushing or processing activities, just material stockpiling (**Table 1**).

During the field measurements on January 26th, the operations began at 0700 hours, all construction activities ceased for 30 minutes for lunch (1200 to 1230 hours), and all operations ceased at 1700 hours. The TMC equipment operating during the measurements included two dump trucks and one excavator. All three pieces of equipment operated simultaneously and were equipped with broadband backup alarms.

The excavator was digging down to approximately 12 feet below ground surface (bgs) and simultaneously loading the rock/dirt material mix into the two dump trucks in the northeast corner of the Year 1 Amendment Area. On site noise sources included the operating TMC heavy equipment, and rock impacts when loading into the empty truck beds and when hitting metal on sides of truck beds. The noise sources were mitigated by the cut slopes and berms, and did not cause exceedances at the nearby receptors (**Section 3**). The dump trucks transported the material over the bridge into the existing Morgan pit and dumped into stockpiles north of the bridge. The onsite operations are documented in the following photos.

Onsite Operations – January 26, 2021



Looking east from Morgan pit bridge in the Year 1 Amendment Area at the excavator and dump trucks, and east boundary berm behind the mined cut slope.



Looking east from Morgan pit at the excavator loading the dump truck.

Onsite Operations – January 26, 2021



Looking to the east at the material stockpiles in the existing Morgan pit.

Monitoring Locations

- 1. Measurement Location M1:** BSA's sound level meter was located in the yard 52 feet west of residential Receptor R8 and 105 feet south of Zachariah Lane, at the same location as on January 12th (**Figure 1**). During the measurement, the dominant noise source was US 191 traffic. Other noise sources recorded included traffic on Zachariah Lane, aircraft and birds/geese. From Measurement Location M1, the south berm blocked the viewshed into the Amendment Area, TMC's equipment was not visible, and the operations were inaudible during BSA's observations. The following photos document Measurement Location M1 during the January 26th measurements.

Measurement Location M1 – January 26, 2021



Looking east at Measurement Location M1 and residential Receptor R8.



From Measurement Location M1, looking north at Zachariah Lane and TMC's south Amendment berm.

Measurement Location M1 – January 26, 2021



From Measurement Location M1, looking west at neighboring Receptor R9.

2. **Measurement Location M2_{Yr1-2}:** BSA's sound level and weather meters were located in the field, midway between residential Receptors R2 and R4, east of the Amendment Area and east berm, and approximately 367 feet west of Grey Wolf Trail centerline (**Figure 1**), at the same location as the December and January measurements. During the measurement, the dominant noise source was US 191 traffic. Other noise sources recorded at Measurement Location M2_{Yr1-2} included aircraft, dog barks, birds/geese, and occasionally audible/very faint TMC operations (i.e., excavator engine and rock impacts). In addition, construction was occurring with saws at residential Receptor R3, located east of R2 and northeast of R4 (**Figure 1**). Measurement Location M2_{Yr1-2} is documented on January 26, 2021 in the following photos.

Measurement Location M2_{Yr1-2} – January 26, 2021



Looking west from Measurement Location M2_{Yr1-2} at the east TMC Amendment boundary and berm.



Measurement Location M2_{Yr1-2} and weather station looking south at residential Receptor R4.

Measurement Location M2_{Yr1-2} – January 26, 2021



Measurement Location M2_{Yr1-2} and weather station looking north at residential Receptor R2.



Looking northeast from Measurement Location M2_{Yr1-2} at residential Receptor R3 and exterior construction progress.

3.0 Measurement Results

Permissible Noise Levels that shall not be exceeded by the current Amendment activities at the 12 nearby Receptors (i.e., 11 residences and the cemetery) are shown on **Figure 1**, which excludes the owner/operator residences (Receptors R5 and R14). The Amendment activities that were occurring on January 26, 2021 are highlighted in **Table 1**, and include Year 1 Phase 1 Mining without crushing or processing operations.

Table 1: Permissible Noise Levels

Amendment Year	Amendment Activity	Hours	Permissible Noise Level at Receptor	Guideline or Standard Notes	Reference
Years 1 – 4	Loading and Offsite Hauling only	0600 – 0700 Weekdays (acoustical nighttime hour)	L _{eq} (1h) 45 dBA	Nighttime, outside at open bedroom window, to avoid sleep disturbance at residence	WHO 1999
Year 1 only	Year 1 Berm Construction and Concurrent Stripping	0700 – 1800 Weekdays	L _{eq} (8h) 80 dBA	At adjacent residential land use	FTA 2018
			L _{dn} 60 dBA	Marginally compatible occurrence during construction of noise attenuation berms at residential outdoor living area	ANSI 2017
Years 2 – 4	Stripping	0700 – 1800 Weekdays	L _{eq} (11h) 50 dBA	At residential outdoor living area, to avoid moderate annoyance	WHO 1999
Year 1 Phase 1	Mining (without Crushing/Processing)				
Year 1 Phase 2 & Years 2 – 4	All Operations ¹				
Years 1 – 4	All Operations ¹	0700 – 1800 Weekdays	L _{dn} 55 dBA	Compatible occurrence to protect public health and welfare in residential areas and other places where quiet is a basis for use	ANSI 2017
Years 1 – 4	Loading, Hauling and/or Maintenance only	0700 to 1700 Saturdays	L _{eq} (10h) 50 dBA	At residential outdoor living area, to avoid moderate annoyance	WHO 1999

Note:

¹ All Operations = Mining + Crushing + Processing + Loading + Hauling + Maintenance with all equipment operating (worst-case conditions).

Measurement Location M1: BSA evaluated and adjusted the data per TMC’s Noise Monitoring Plan (BSA 2020), summarized in **Section 1**. Transient sounds removed from the data set included BSA checking the sound level meter, locking the case, and birds/geese. As shown in **Table 2**, the $L_{eq}(h)$ data was not corrected for background sound because the overall measured noise levels were less than the Permissible Noise Levels listed in **Table 1** (ANSI 2018).

BSA used the measured $L_{eq}(h)$ data to calculate the overall L_{eq} and L_{dn} noise levels during the operating hours (0700 to 1200 hours and 1230 to 1700 hours). The resulting overall L_{eq} 46.0 dBA and L_{dn} 42.0 dBA data results are less than the permissible noise levels of $L_{eq}(h)$ 50 dBA and L_{dn} 55 dBA, listed in **Table 1**. The Measurement Location M1 data results are summarized in **Table 2**. As noted in **Section 2.0**, the dominant noise source was traffic on US 191 and the TMC operations were inaudible during BSA’s observations.

**Table 2: Measurement Location M1
Data Summary – January 26, 2021**

Start Time (hours)	Measured $L_{eq}(h)$	$L_{eq}(h)$ after Transient Data Deleted
0600 ^a	51.2	50.4
0700	51.2	50.7
0800	49.0	48.8
0900	47.0	46.3
1000	44.1	42.7
1100	44.8	44.1
1/2hr of 1200 ^a	45.4	47.2
1/2hr of 1200	45.4	40.0
1300	44.5	42.7
1400	43.8	43.1
1500	43.7	42.9
1600	45.4	44.6
1700 ^a	53.0	52.6
Overall L_{eq}:	46.5 (9.5 hrs)	46.0 (9.5 hrs)
Calculated L_{dn}:	51.5 (24-hrs)	42.0 (9.5 hrs)

Notes:

^a Background periods

Measurement Location M2_{Yr1-2}: BSA evaluated and adjusted the data per TMC’s Noise Monitoring Plan (BSA 2020) summarized in **Section 1**. Transient sounds removed from the data set included BSA checking the sound level meter, locking the case, and birds/geese. As shown in **Table 3** on the next page, the $L_{eq}(h)$ data was not corrected for background sound because the overall measured noise levels were less than the Permissible Noise Levels listed in **Table 1** (ANSI 2018).

BSA used the measured $L_{eq}(h)$ data to calculate the overall L_{eq} and L_{dn} noise levels during the operating hours (0700 to 1200 hours and 1230 to 1700 hours). The resulting overall L_{eq} 40.2 dBA and L_{dn} 36.2 dBA data results are less than the permissible noise levels of $L_{eq}(h)$ 50 dBA and L_{dn} 55 dBA, listed in **Table 1**. The Measurement Location M2_{Yr1-2} data results are summarized in

Table 3. As noted in **Section 2.0**, the dominant noise source was traffic on US 191 and the TMC operations were occasionally audible and very faint.

**Table 3: Measurement Location M2_{Yr1-2}
Data Summary – January 26, 2021**

Start Time (hours)	Measured $L_{eq}(h)$	$L_{eq}(h)$ after Transient Data Deleted
0600 ^a	44.3	44.4
0700	46.5	45.5
0800	44.3	44.3
0900	42.7	42.7
1000	33.9	33.4
1100	38.0	37.3
1/2hr of 1200 ^a	43.4	45.7
1/2hr of 1200	43.4	29.0
1300	39.3	35.8
1400	31.7	31.4
1500	35.0	34.3
1600	36.2	35.6
1700 ^a	43.7	42.9
Overall L_{eq}:	41.1 (9.5 hrs)	40.2 (9.5 hrs)
Calculated L_{dn}:	44.1 (24-hrs)	36.2 (9.5 hrs)

Notes:

^a Background periods

References

American National Standards Institute (ANSI). 2020. *Quantities and Procedures for Description and Measurement of Environmental Sound – Part 4: Noise Assessment and Prediction of Long-Term Community Response*. ANSI/ASA S12.9-2005/Part 4 (R2020).

American National Standards Institute (ANSI). 2018. *Quantities and Procedures for Description and Measurement of Environmental Sound – Part 3: Short-term Measurements with an Observer Present*. ANSI/ASA S12.9-2013/Part 3 (R2018).

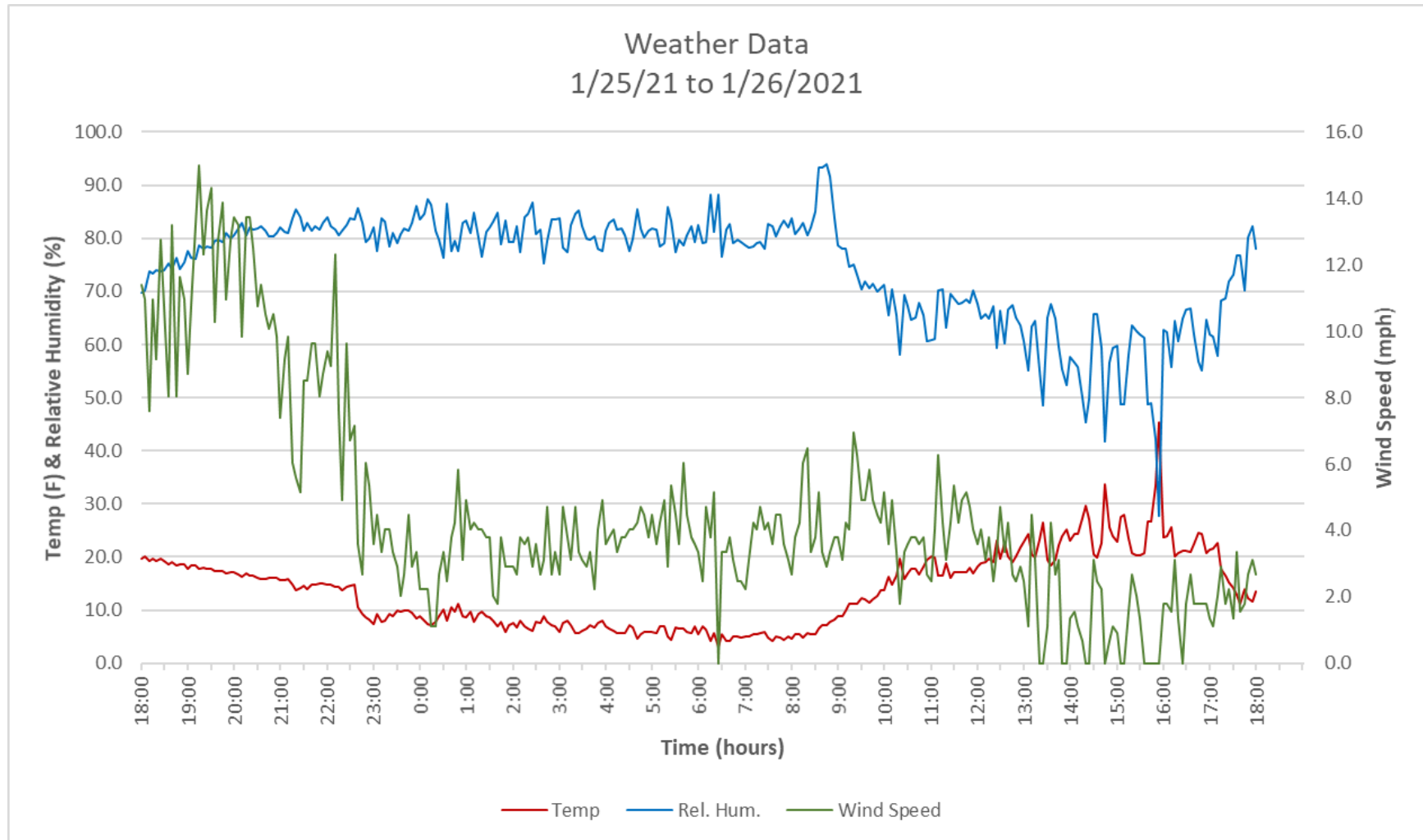
American National Standards Institute (ANSI). 2017. *Quantities and Procedures for Description and Measurement of Environmental Sound – Part 5: Sound Level Descriptors for Determination of Compatible Land Use*. ANSI/ASA S12.9-2007 (R2017).

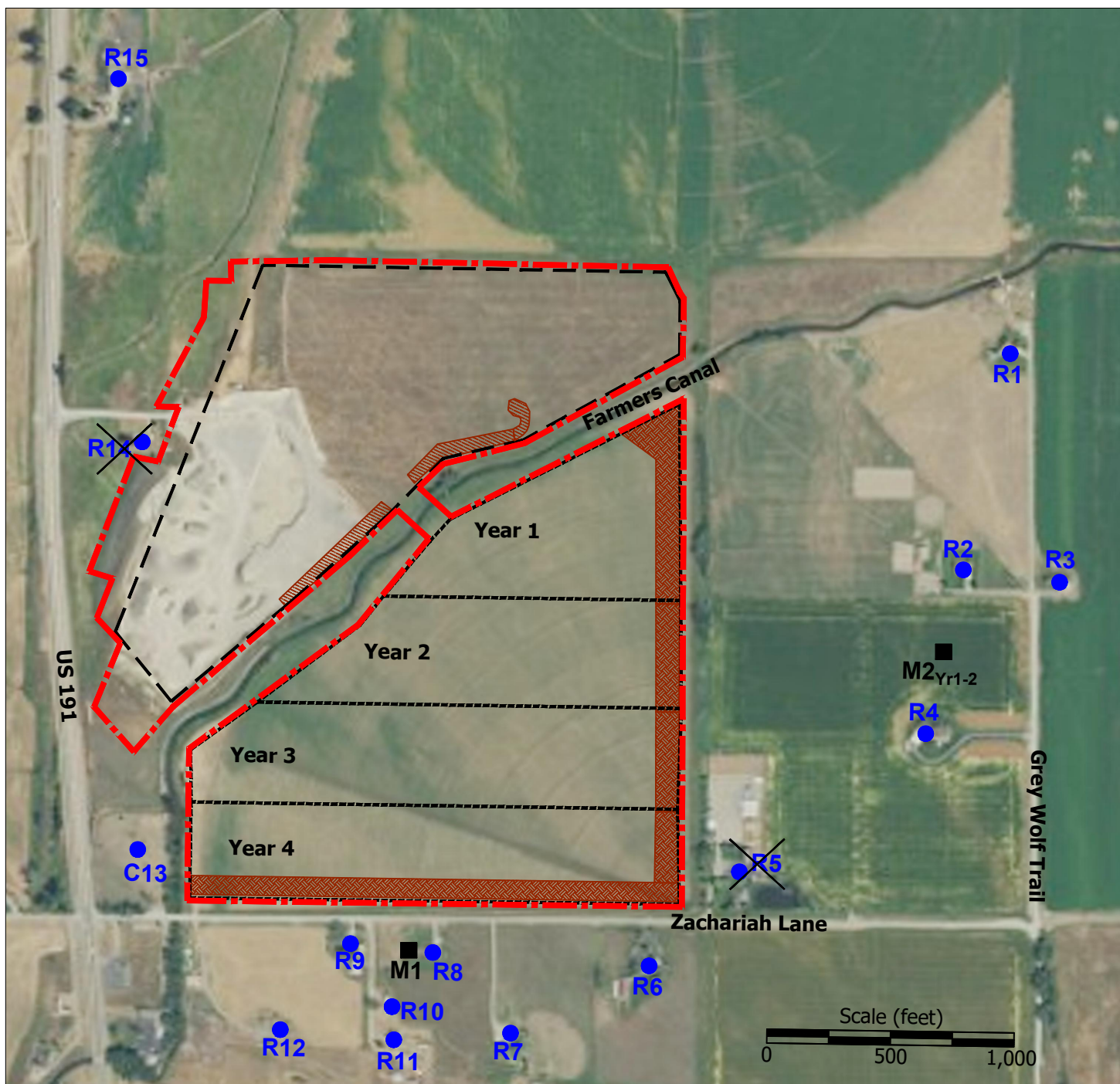
Big Sky Acoustics (BSA). 2020. Amendment #2 Morgan Family LLC Site Environmental Noise Study – Revision 3. October 21.

Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. September.

World Health Organization (WHO). 1999. Guidelines for Community Noise.

ATTACHMENT 1





- - - Boundaries
- - - Existing Morgan pit
- - - - - Amendment Area (by year)
- Existing berm
- Receptor location
- Noise monitoring location
- Berm 12 ft above existing grade
- X Owner/operator residence

FIGURE 1

January 26, 2021

Noise Monitoring and Receptor Locations
TMC Morgan Family LLC Amendment #2