

TOWN OF BRISTOL

Zoning Permit Application

Office Use Only

Permit #: 25-300

Parcel #: 090227

Zoning District RAS

Date Received: 5/29/2025

Fee Paid: \$150⁰⁰ #20021

The undersigned hereby applies for a Zoning Permit for the following use, to be issued on the basis of the representations contained herein, of which the applicant swears to be true.

Type of permit requested: Building/Development Subdivision Temporary Use
 Conditional Use Access Other _____

Applicant Name: Josh Masterson Landowner Name: Masterson's Development Properties, LLC

Address: 2600 Lower Notch Road Phone #: 802-349-6955

Location of Property: On Lower Notch RD between Vincent Rd & Many Waters Rd

Description of Proposal: Conditional Use approval for a topsoil screening and stockpiling operation on the 1.65 acre gravel area located on Lot 2 (13.50 acres). See the attached cover letter and conditional use application form.

Dimensions: Lot size: 2 acre min. Frontage on street: 200'
Setback from street: 80' Rear yard setback: 25'
Side yard setbacks: 25' & _____
Building width: _____ Building length: _____
Building height: _____ Square Footage: 5,000 Primary / 2,000 accessory

The applicant (or owner) should submit as attachments to this application a dimensioned site plan or sketch (which need not be to scale) showing the location of the proposed structure with respect to the property boundaries, or the proposed alterations to the boundaries of the property in the case of a subdivision.

If the proposed project requires the installation of a new or substantially replaced wastewater/sewage disposal system, the applicant should also submit a copy of a soils test report for the property and a septic system design prepared by a certified Site Technician B or a professional Sanitary or Civil Engineer currently registered and licensed to practice in the State of Vermont.

Signature of Applicant:  Date: 5/29/2025

Signature of Landowner:  Date: 5/29/2025

All permit application fees must be paid and above information received before any action on your application may be taken. Permit application fees are non-refundable.

Zoning permit to take effect 15 days from date of issuance. Once a zoning permit has taken effect, applicants shall have two years from the date it becomes effective to substantially complete the activities subject to the permit and to secure a certificate of compliance documenting the projects substantial completion. If the applicant fails to substantially complete the activity authorized within the two-year period, the Zoning Permit shall become null and void. The applicant will need to reapply to complete any activities.

TOWN OF BRISTOL

Zoning Permit Application

Permit Decision

Any activity for which a zoning permit is required and which involves the construction or modification of a driveway intersection with a public right of way shall require, as part of the zoning permit, approval of such construction or modification.

Access Permit Granted: YES NO NOT REQUIRED Permit # _____

If State permit(s) are required, copies must be submitted to the Town.

State Permit(s) Granted: YES NO NOT REQUIRED Permit # _____

Upon the basis of the representations contained above this application is:

(A) Found to meet the official zoning ordinances of the Town of Bristol and is hereby **APPROVED**.

Zoning Administrator

Date

(B) Found **NOT** to meet the official zoning ordinance of the Town of Bristol and is hereby **NOT APPROVED** for the following reason(s):

Zoning Administrator

Date

(C) Forwarded to the below Appropriate Municipal Body:

Design Review Commission

Development Review Board
~~Planning Commission~~

For the following reason(s):

Business yard activity - requires DRB approval for a conditional use

Mansen

Zoning Administrator

6/11/2025

Date

An interested person may appeal any decision by the Administrative Officer within 15 days of the date of such decision.

It shall be unlawful to use or occupy, or permit the occupancy of any land or structure or part thereof until the Zoning Administrator issues a Certificate of Occupancy stating that the proposed use of the structure or land complies with the requirements of these Regulations.

Conditional Use Application

**Masterson's Development Properties, LLC
2600 Lower Notch Road
Bristol, Vermont**

MMES Project #19-1057

May 29, 2025

Prepared For:

**Mr. Kevin Brown
Bristol DRB Chairman
1 South Street
PO Box 249
Bristol, Vermont 05443**



ENVIRONMENTAL SERVICES

Bristol, Vermont • 802-453-5100

Prepared By:

**Greg McKenney, P.E.
Senior Engineer**

greg@murray-mastersonenv.com



ENVIRONMENTAL SERVICES

May 29, 2025

Mr. Kevin Brown,
Bristol DRB Chairman
1 South Street
PO Box 249
Bristol, VT 05443

RE: Masterson Land Development Properties, LLC
2600 Lower Notch Road
Bristol, Vermont
MMES Project #19-1057

Dear Mr. Brown,

I am providing a Conditional Use Zoning Permit Application for a topsoil screening and stockpiling operation on the 13.5 acre parcel (Lot 2) located at 2600 Lower Notch Road in Bristol, Vermont. Lot 1 and 2 recently underwent a boundary line adjustment, so conditional use approval #23-301 and the activities proposed in this application will occur on Lot 2. I am submitting this on behalf of Masterson's Development Properties, LLC (Applicant) and Josh Masterson (Registered Agent for MDP). This application comes following the Notice of Violation Letter Received by the applicant dated October 30, 2024.

In response to the specific violations outlined in the Letter, I am providing the following statements.

1. The expanded business yard was not part of Conditional Use Permit 23-301, and therefore the Applicant is seeking a conditional use approval from the Board for a Topsoil Screening and Stockpiling Yard. The application materials are enclosed.
2. The applicant ceased moving the soil stockpile following the receipt of this letter and is seeking to rectify the current violation, by seeking a conditional use approval for topsoil screening and stockpiling in the business yard.
3. The sightlines at the drive entrance have been cleared to the north, and to the south (on the portions of land owned by the applicant) and have been approved by the Town Zoning Administrator (ZA)
4. The ZA issued a Certificate of Compliance (COC) following the completion of the sight line clearing on April 17, 2025.

If you have any questions regarding this application, feel free to contact me at (802) 453-5100.

Sincerely,
Murray & Masterson Environmental Services, LLC

A handwritten signature in black ink, appearing to read "G. McKenney", is written over the typed name.

Greg McKenney, P.E.
Senior Engineer

greg@murray-mastersonenv.com

SECTION 353: APPLICATION FOR CONDITIONAL USE APPROVAL

The applicant shall submit to the Z.A., by filing an application in the Town Clerk's office, at least 25 days prior to the regular meeting of the Development Review Board, one electronic (PDF) version of the application and supporting documents and one (1) paper copy of an application or letter summarizing the proposed conditional use, which addresses all elements of this article, and all other information necessary to illustrate compliance with these Regulations and for the Development Review Board to make its decision including:

1. Property identification numbers of the property taken from the latest tax records; name and address of the owner of record and the owners of adjoining lands; name and address of person or firm preparing the map; scale of map of at least 1" = 200', north point, and date.
See The survey plat (Attachment A) and the Engineering Plan Set (Attachment B)
2. An accurate map of the property showing existing features, including contours, structures, large trees, streets, utility easements, rights-of-way, land use and deed restrictions.
See Attachment A & B.
3. Map, showing proposed structure locations and land use areas, streets, driveways, traffic circulation, parking and loading spaces and pedestrian walks, landscaping plans, including site grading, landscape design, and screening, including depicting distances from structures to property lines.
See attachment B.
4. A narrative description of the project

Project Overview

The applicant is seeking a Conditional Use Approval for the use of a topsoil stockpiling and screening yard on the existing 13.5 acre parcel owned by Masterson Land Development Properties, LLC. The business yard (or contractors' yard), which is located on the same parcel, currently serves the applicant's business, Masterson & Son Excavation, LLC. The proposed topsoil screening & stockpiling use would also serve the applicant's business. Hours of operation for the Stockpile yard would be from 7am-5pm Monday – Friday.

The stockpile operation will occur in the southwestern corner of the property over 550' west of the existing contractors yard, on a separate 1.65 acre gravel area (Stockpile Yard). This area is 50' lower in elevation than the existing contractor yard. The stockpile yard will be buffered by the existing wood line on the south and west. To the east is the upward sloping hillside, and to the north the landscape remains open for 700' before reaching the tree line at the adjacent landowner's property.

The intent of the topsoil stockpile yard is to store material taken from an offsite location, dry the material by leaving it wind-rowed, run the material through a screen/sieve and stockpile the processed soil where it would await export to another jobsite. The applicant is seeking approval to operate the screening and stockpiling yard for 300 hours per year (thirty 10-hr business days). This includes days trucking material into the site, moving material, screening material, moving/stockpiling processed topsoil, and trucking offsite. The applicant is seeking approval for an annual turnover of material up to 1,000 c.y.

Traffic

The estimated annual amount of material to be imported, stockpiled, screened and exported is 1,000 cubic yards. Using 14-yard dump trucks to import 1,000 yards of material to the site would generate 144 one-way trips. In addition, exporting 1,000cy with 14-yard dump trucks would generate another 144 one-way trips. A one-way trip is either a truck passing into the site or passing out of the site.

As conditioned in the Conditional Use Application #2023-301 Notice of Decision, all Dump truck traffic will enter and exit the site from the south.

Noise

The applicant is providing a Noise Analysis Report (Attachment C) as part of this application, performed by Eddie Duncan of Paxwood Acoustics. In summary the applicant has designated specific areas in the stockpiling yard for unloading trucks and for screening topsoil that does not result in decibel levels exceeding 70dB at the property line or 55dB at any residence. These areas will be demarcated at the stockpile yard with permanent signs.

Attachments

Attachment A – Survey Plat

Attachment B – Engineering Plan Set

Attachment C – Noise Analysis Report

Attachment D – Traffic Impact Assessment Technical Memorandum

Note, the Traffic Impact assessment was generated for Conditional Use Application 23-301, so sections of the report are irrelevant to this application, however this application references Lower Notch Road's Level of Service and traffic data so it has been included for reference.

5. Construction sequence and time schedule for completion of each phase for buildings, parking spaces, and landscaped areas of the entire development.
The construction effort will consist of installing the proposed stormwater features and placing the signs.
The construction effort will take an estimated 4 weeks.
6. A description of energy utilization and conservation measures for each heated structure.
No structures are proposed as part of this conditional use.
7. A description of the hours of operation.
The proposed activities, including trucking material into the site or screening topsoil would occur between 7am-5pm, M-F.
8. A description of signs, lighting and steps taken to mitigate against noise created by the proposed use.
Proposed signs are shown in the stockpile yard. No permanent site lighting is proposed. Portions of the site remain wooded, which will help lessen noise impacts.
9. Other information necessary as evidence to satisfy either the general or specific review criteria contained in Section 355 below as requested by the Development Review Board.

SECTION 355: GENERAL CRITERIA FOR REVIEW

When determining the appropriateness of a proposed conditional use, the Development Review Board shall determine that the development or use will not result in an undue adverse impact on any of the following:

1. Capacity of Community Facilities. A conditional use shall not overburden or exhaust existing or planned municipal facilities or services.

The proposed project will not result in overburdened facilities or services. The project will serve an existing Bristol based business. The project will create additional trips on Lower Notch Road, but as indicated in the Traffic Impact Assessment (Attachment D) and the *Notice of Decisions: Conditional Use Application #23-301*, Lower Notch Road has an 'A' Level of Service, which has adequate capacity to facilitate the de minimis amount of traffic generated from this proposed use.

2. Character of the Area. A conditional use may not, by its nature, scale, or conduct, cause an undue adverse change to the character of the area, as the area would exist if fully developed in accordance with the Town Plan. To that end, the conditional use shall meet the dimensional setback requirements for the district, the sign standards indicated in Article VII, and any other performance standards specified in these Regulations.

The proposed application does not cause an undue adverse change to the character of the area for the following reasons.

- The RA 5 Zoning district aims to provide rural living and resourced based small businesses by allowing a conditional use approval for Business Yards, Extraction, Sawmills & Lumberyards. As ruled in the *Notice of Decisions: Conditional Use Application #23-301*, screening soils is an allowed use and therefore the proposed activities in this application do not constitute an undue adverse change.
- The scale of the operation is such that actual business days of hauling, screening, and moving material would not exceed 30 business days. This limited operation does not constitute an undue adverse change.
- The traffic generated from the project does not exhaust road capacities. With existing annual average daily traffic estimated at 224 vehicles per day, adding an estimated 388 trips annually is almost negligible and therefore does not cause an undue adverse change.
- The sound levels generated at the property from topsoil screening and tailgate closures does not exceed industry standards of 70dB at the property line or 55dB at an adjacent residence and therefore does not create an undue adverse change.

3. Traffic Impacts The estimated traffic generated by a conditional use shall not exhaust or exceed the capacity of the road to accept increased traffic unless the applicant agrees to a condition requiring the applicant to upgrade the road.

The proposed project will generate an estimated 388 annual one-way trips. 288 trips are designated for dump trucks to import and export material. This accounts for a dump truck entering with a load, leaving with an empty truck (2 trips), then later entering the site empty and leaving with a load of topsoil (2 trips). An additional 100 one-way trips are anticipated for employees in pickup trucks to access the site to process the topsoil.

4. Compliance with Regulations. A conditional use must comply with Regulations in effect at the time of submission of the application.

It is our opinion that the activities proposed in this application comply with the Town of Bristol Land Use Regulations.

5. Renewable Energy Resources. A conditional use shall not excessively inhibit or restrict access to or the use of renewable natural resources (including, but not necessarily limited to, water and sunlight) for energy generation.

The project does not inhibit or restrict the access of renewable natural resources. The proposed activities will protect water resources by screening sediments in the forebay, and infiltrating stormwater runoff via a drainage basin.

SECTION 356: SITE SPECIFIC CRITERIA FOR REVIEW

In addition to any conditions stemming from its review of the general criteria listed in SECTION 355, the Development Review Board may make such additional requirements as it deems necessary with respect to the specific standards regarding site plan review and Articles IV-VIII of these Regulations or as it deems reasonable and necessary to implement the purpose of the Act and these Regulations.

1. Applicant shall demonstrate that the circulation between the site and the street network is adequate to accommodate the traffic proposed. Parking and loading facilities should conform to the standards contained in Article VII, SECTIONS 710-720 of these Regulations. Parking shall be located to the rear or interior side (side not fronting on a public road) of buildings, unless otherwise permitted by the Development Review Board due to site conditions which would prevent the reasonable use of the property if this standard were strictly enforced. Large, uninterrupted expanses of parking shall be avoided.

The driveway entrance constructed for this lot provides adequate turning radius in and out of the property. Dump trucks access the site by taking Rt 116, Notch Road, and Lower Notch Road, all of which are asphalt. The traffic generated from the site should create little to no impact to existing traffic patterns. There is no street parking or loading facilities. Parking at the contractor yard is not visible from adjacent structures.

2. Safe pedestrian connections to on-site parking areas, and to existing or planned pedestrian facilities located on adjacent properties and/or along public roads, shall be provided. Access points at property edges shall be coordinated with existing and planned development to provide pedestrian connections between uses.

Aside from the roadway itself (Lower Notch Road), there are no sidewalks or public trails that this property or project would connect to. Additionally given the nature of the proposed conditional use, pedestrian connections are not necessary.

3. Applicant shall demonstrate that they have incorporated landscaping features (trees, shrubs, fences, walls, gardens, open space or other features) into a design to reduce any impacts their use of the property might have on neighboring properties and that will enhance the appeal of the use proposed. Parcels shall incorporate street trees along the highway frontage to establish a canopy and provide traffic calming.

The stockpile yard is not visible from an adjacent residence or road. It is bordered to the south and west by the existing wood line. In addition to the west, all the stumps and debris from clearing the property are piled up along the length of the topsoil yard, creating an additional buffer. To the east is an upward sloping hillside where the existing lay down yard sits. The project area is open to the north for 700'+/-, where it becomes wooded.

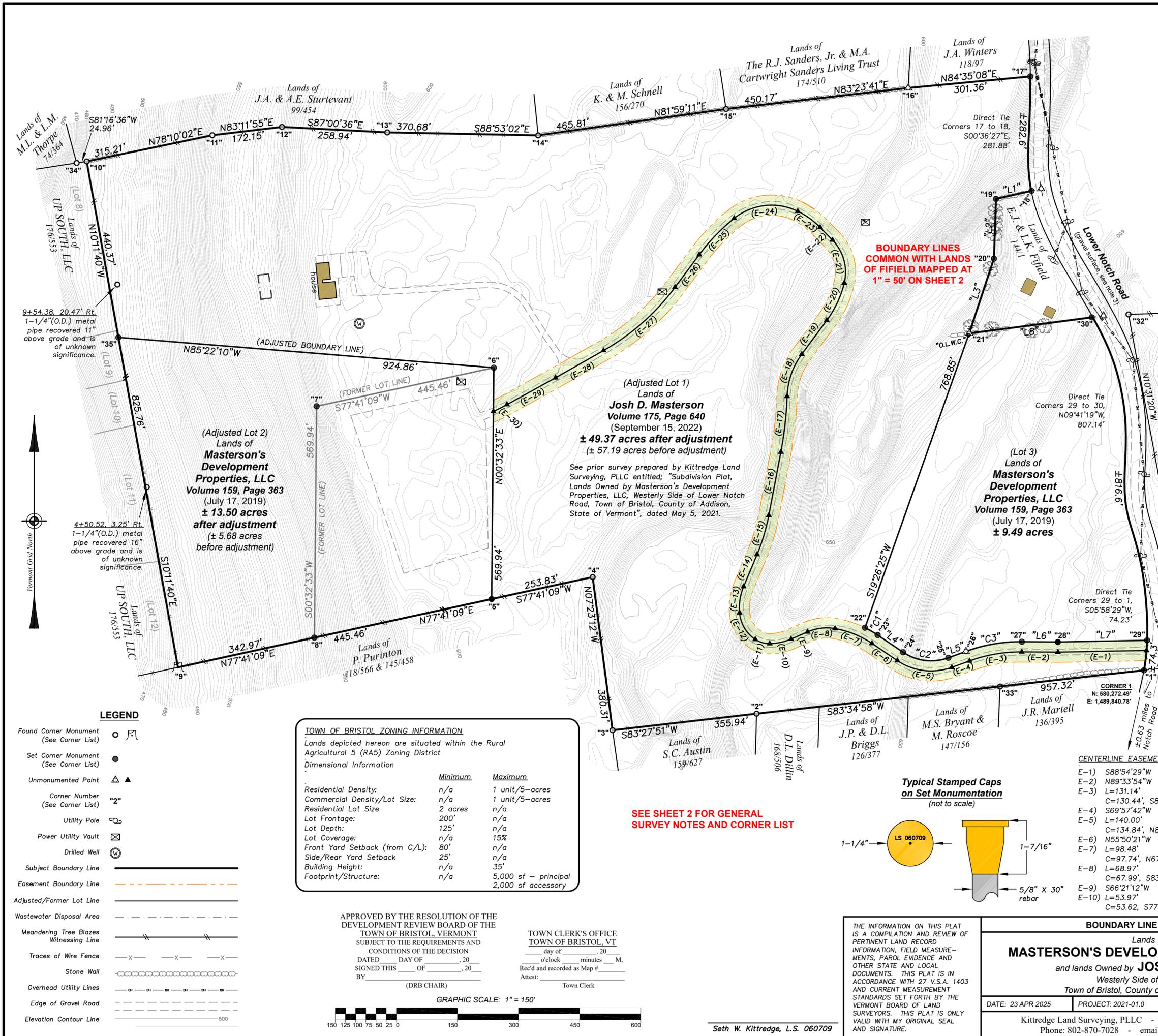
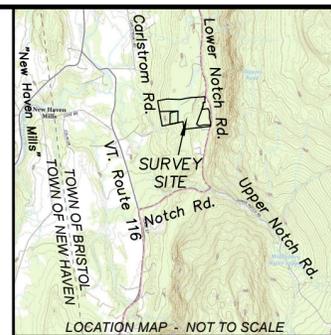
4. The outdoor storage of trash shall be screened or hidden from public view.
The entire project area is outside of the public view.
5. Building design. The applicant should demonstrate how the structure they are proposing fits within and adds to the character of the area in which it is proposed. New construction should be compatible in design, scale, mass and height with the significant buildings within the immediate area.
There are no Proposed buildings as part of this application.
6. For lots located within the Village Planning Area, buildings and associated site design, shall reinforce, rather than destabilize, a defined streetscape. Buildings should be oriented to front upon the road. However, where the placement of a building along the front setback is not practical due to preexisting site conditions, the site plan should incorporate landscaping features, such as low walls and planting materials, along the setback line to create a transition between the public right-of-way and the site.
N/A
7. Applicants should demonstrate that they incorporated reasonable energy conservation measures for commercial structures into the structures proposed.
There are no proposed structures as part of this application.
8. Applicant shall demonstrate that they comply with all stormwater requirements of the State of Vermont and have adequately addressed drainage on the site so as not to create ponding on or off the site and that they have not rerouted the flow of storm or surface water so as to cause ponding or flooding problems for neighboring properties.
The Applicant is in the process of amending the existing stormwater permit (#9379-9050) to include the increased impervious area.
9. Exterior lighting should conform to the standards contained in SECTION 752 of these Regulations.
No Proposed lighting.
10. Noise should be regulated in accordance with SECTION 751 of these Regulations.
The Applicant has provided a Noise Assessment Report (Attachment C), which outlines how the proposed activity complies with Section 751 of the Regulations.

11. Signs should conform to the standards contained in SECTIONS 740-748 of these Regulations.
No Proposed Signs along the street as part of this project. Proposed signs within the yard are as shown on the attached Plan Set (Sheet C-1)
12. Hours of operation should conform to the standards contain in SECTION 754 of these Regulations.
The proposed hours of operation for the stockpile yard are 7a-5pm M-F.
13. Within Bristol's overlay districts, the Development Review Board may also require the applicant to demonstrate compliance with additional criteria applied within that overlay district as described in SECTION 395.

The town inventory map indicates the Flood Hazard Overlay extends onto the Project Parcel, however this is incorrectly mapped. The VT ANR Atlas also indicates there is a stream that flows north to south through the property, but that is not the case. Jaron Borg, River Management Engineer with the VT DEC Rivers Management Program provided a statement indicating there is no observable surface flows or stream channel indicators. Either way, the mapped Flood Hazard Overlay is not within the project area. This information can be made available if necessary.

Attachment A

Survey Plat



LINE & CURVE COURSES

L1)	S77°10'05"W	89.51'
L2)	S01°59'05"W	147.30'
L3)	S18°15'54"W	193.81'
L4)	S55°50'21"E	75.29'
L5)	N69°57'42"E	46.14'
L6)	S89°33'54"E	88.38'
L7)	N88°54'29"E	219.17'
L8)	S82°31'48"W	303.69'
C1)	L=36.09'	R=257.15'
	C=36.06'	S59°51'31"E
C2)	L=116.35'	R=123.00'
	C=112.06'	S82°56'18"E
C3)	L=140.07'	R=392.00'
	C=139.33'	N80°11'54"E

(Adjusted Lot 1)
Lands of
Josh D. Masterson
Volume 175, Page 640
(September 15, 2022)
± 49.37 acres after adjustment
(± 57.19 acres before adjustment)

(Adjusted Lot 2)
Lands of
Masterson's Development Properties, LLC
Volume 159, Page 363
(July 17, 2019)
± 13.50 acres after adjustment
(± 5.68 acres before adjustment)

(Lot 3)
Lands of
Masterson's Development Properties, LLC
Volume 159, Page 363
(July 17, 2019)
± 9.49 acres

See prior survey prepared by Kittredge Land Surveying, PLLC entitled; "Subdivision Plat, Lands Owned by Masterson's Development Properties, LLC, Westerly Side of Lower Notch Road, Town of Bristol, County of Addison, State of Vermont", dated May 5, 2021.



LEGEND

- Found Corner Monument (See Corner List)
- Set Corner Monument (See Corner List)
- Unmonumented Point
- Corner Number (See Corner List) **"2"**
- Utility Pole
- Power Utility Vault
- Drilled Well
- Subject Boundary Line
- Easement Boundary Line
- Adjusted/Former Lot Line
- Wastewater Disposal Area
- Meandering Tree Blazes Witnessing Line
- Traces of Wire Fence
- Stone Wall
- Overhead Utility Lines
- Edge of Gravel Road
- Elevation Contour Line

TOWN OF BRISTOL ZONING INFORMATION

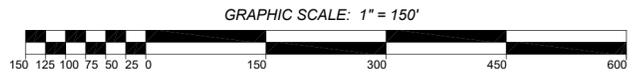
Lands depicted hereon are situated within the Rural Agricultural 5 (RA5) Zoning District

Dimensional Information

	Minimum	Maximum
Residential Density:	n/a	1 unit/5-acres
Commercial Density/Lot Size:	n/a	1 unit/5-acres
Residential Lot Size:	2 acres	n/a
Lot Frontage:	200'	n/a
Lot Depth:	125'	n/a
Lot Coverage:	n/a	15%
Front Yard Setback (from C/L):	80'	n/a
Side/Rear Yard Setback:	25'	n/a
Building Height:	n/a	35'
Footprint/Structure:	n/a	5,000 sf - principal 2,000 sf accessory

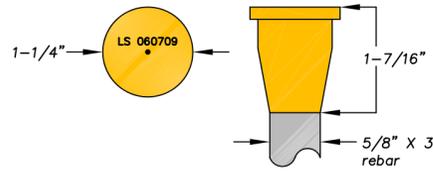
APPROVED BY THE RESOLUTION OF THE
DEVELOPMENT REVIEW BOARD OF THE
TOWN OF BRISTOL, VERMONT
SUBJECT TO THE REQUIREMENTS AND
CONDITIONS OF THE DECISION
DATED _____ DAY OF _____, 20____
SIGNED THIS _____ OF _____, 20____
BY _____ (DRB CHAIR)

TOWN CLERK'S OFFICE
TOWN OF BRISTOL, VT
_____ day of _____, 20____
_____ o'clock _____ minutes _____ M.
Rec'd and recorded as Map # _____
Attest: _____ Town Clerk



SEE SHEET 2 FOR GENERAL SURVEY NOTES AND CORNER LIST

Typical Stamped Caps on Set Monumentation
(not to scale)



CENTERLINE EASEMENT COURSES

E-1)	S88°54'29"W	217.61'
E-2)	N89°33'54"W	88.72'
E-3)	L=131.14'	R=367.00'
	C=130.44'	S80°11'54"W
E-4)	S69°57'42"W	46.14'
E-5)	L=140.00'	R=148.00'
	C=134.84'	N82°56'18"W
E-6)	N55°50'21"W	75.29'
E-7)	L=98.48'	R=232.15'
	C=97.74'	N67°59'27"W
E-8)	L=68.97'	R=117.95'
	C=67.99'	S83°06'16"W
E-9)	S66°21'12"W	44.24'
E-10)	L=53.97'	R=134.98'
	C=53.62'	S77°48'33"W
E-11)	L=37.58'	R=62.19'
	C=37.01'	N73°25'23"W
E-12)	L=78.78'	R=88.07'
	C=76.18'	N30°29'09"W
E-13)	L=65.99'	R=137.50'
	C=65.36'	N08°53'20"E
E-14)	N22°38'17"E	85.56'
E-15)	L=100.61'	R=484.56'
	C=100.43'	N16°41'23"E
E-16)	N10°44'29"E	158.70'
E-17)	L=138.52'	R=908.01'
	C=138.38'	N06°22'16"E
E-18)	L=111.75'	R=186.24'
	C=110.08'	N19°11'26"E
E-19)	N36°22'49"E	103.31'
E-20)	L=102.15'	R=256.69'
	C=101.47'	N24°58'49"E
E-21)	L=114.74'	R=113.74'
	C=109.94'	N15°19'14"W
E-22)	N44°13'17"W	43.16'
E-23)	L=68.26'	R=198.66'
	C=67.93'	N54°03'54"W
E-24)	L=165.74'	R=146.17'
	C=157.01'	S83°36'58"W
E-25)	L=124.35'	R=485.68'
	C=124.01'	S43°48'21"W
E-26)	S36°28'17"W	100.01'
E-27)	L=236.52'	R=567.75'
	C=234.81'	S48°24'21"W
E-28)	S60°20'25"W	135.44'
E-29)	S61°02'46"W	136.39'
E-30)	L=37.40'	R=402.93'
	C=37.38'	S62°59'56"W

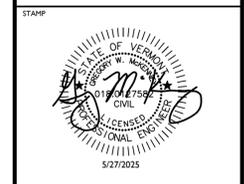
BOUNDARY LINE ADJUSTMENT PLAT

Lands Owned by
MASTERSON'S DEVELOPMENT PROPERTIES, LLC
and lands Owned by **JOSH D. MASTERSON**
Westerly Side of Lower Notch Road
Town of Bristol, County of Addison, State of Vermont

DATE: 23 APR 2025 PROJECT: 2021-01-0 SCALE: 1" = 150' SHEET 1 of 2
Kittredge Land Surveying, PLLC - 28 Thomas Circle Vergennes, Vt. 05491
Phone: 802-870-7028 - email: info@kittredgelandsurveying.com

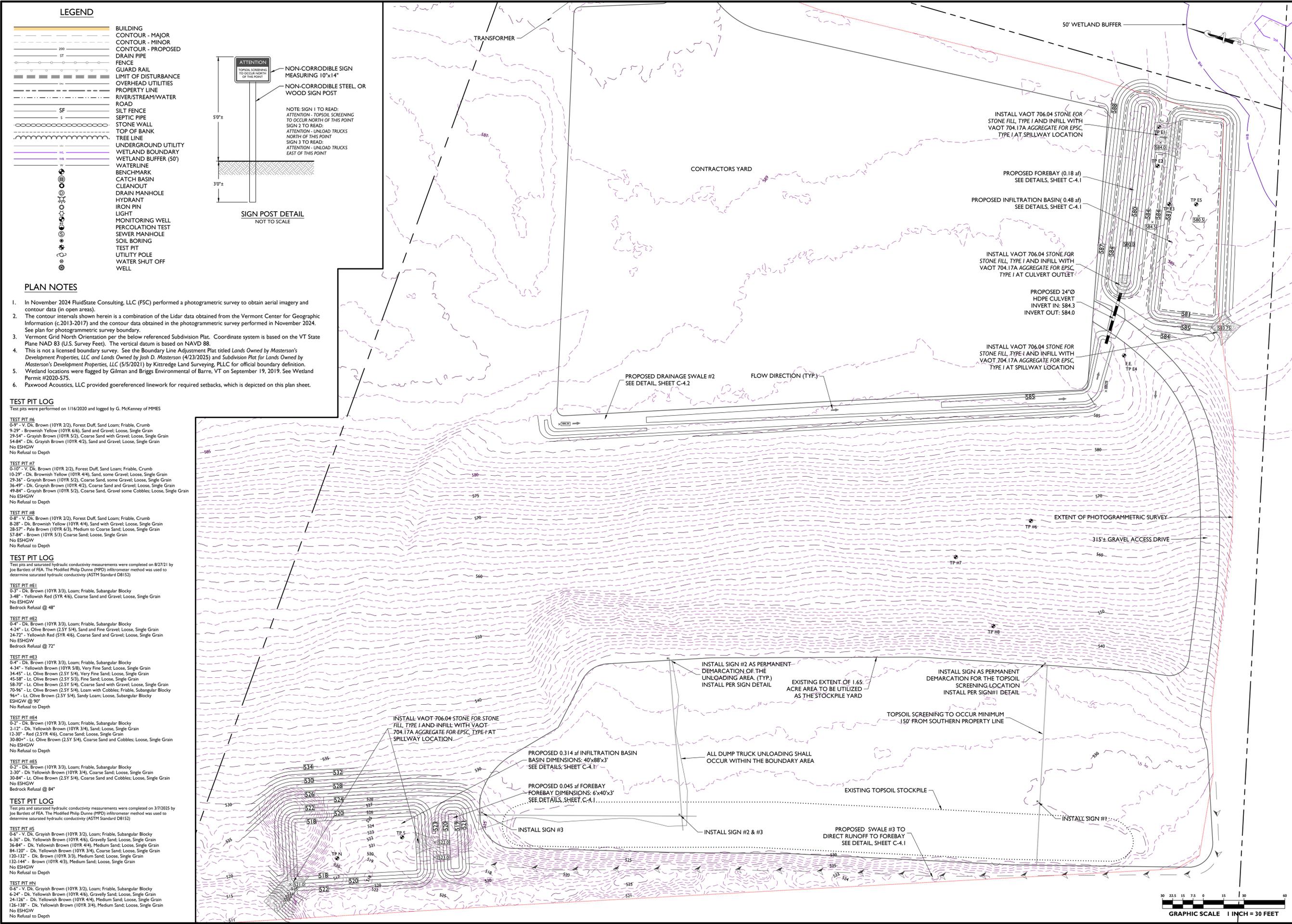
Attachment B

Engineering Plan Set



REVISIONS	DATE	NOTES

DATE: 5/27/2025 DRAWN BY: GWM
 SCALE: 1" = 30' CHECKED BY: DAM
 PROJECT #: 19-1057 APPROVED BY: GWM



LEGEND

[Symbol]	BUILDING
[Symbol]	CONTOUR - MAJOR
[Symbol]	CONTOUR - MINOR
[Symbol]	CONTOUR - PROPOSED
[Symbol]	DRAIN PIPE
[Symbol]	FENCE
[Symbol]	GUARD RAIL
[Symbol]	LIMIT OF DISTURBANCE
[Symbol]	OVERHEAD UTILITIES
[Symbol]	PROPERTY LINE
[Symbol]	RIVER/STREAM/WATER
[Symbol]	ROAD
[Symbol]	SILT FENCE
[Symbol]	SEPTIC PIPE
[Symbol]	STONE WALL
[Symbol]	TOP OF BANK
[Symbol]	TREE LINE
[Symbol]	UNDERGROUND UTILITY
[Symbol]	WETLAND BOUNDARY
[Symbol]	WETLAND BUFFER (50')
[Symbol]	WATERLINE
[Symbol]	BENCHMARK
[Symbol]	CATCH BASIN
[Symbol]	CLEANOUT
[Symbol]	DRAIN MANHOLE
[Symbol]	HYDRANT
[Symbol]	IRON PIN
[Symbol]	LIGHT
[Symbol]	MONITORING WELL
[Symbol]	PERCOLATION TEST
[Symbol]	SEWER MANHOLE
[Symbol]	SOIL BORING
[Symbol]	TEST PIT
[Symbol]	UTILITY POLE
[Symbol]	WATER SHUT OFF
[Symbol]	WELL

- PLAN NOTES**
- In November 2024 FluidState Consulting, LLC (FSC) performed a photogrammetric survey to obtain aerial imagery and contour data (in open areas).
 - The contour intervals shown herein is a combination of the Lidar data obtained from the Vermont Center for Geographic Information (c.2013-2017) and the contour data obtained in the photogrammetric survey performed in November 2024. See plan for photogrammetric survey boundary.
 - Vermont Grid North Orientation per the below referenced Subdivision Plat. Coordinate system is based on the VT State Plane NAD 83 (U.S. Survey Feet). The vertical datum is based on NAVD 88.
 - This is not a licensed boundary survey. See the Boundary Line Adjustment Plat titled *Lands Owned by Masterson's Development Properties, LLC and Lands Owned by Josh D. Masterson (4/23/2025)* and *Subdivision Plat for Lands Owned by Masterson's Development Properties, LLC (5/5/2021)* by Kittredge Land Surveying, PLLC for official boundary definition.
 - Wetland locations were flagged by Gilman and Briggs Environmental of Barre, VT on September 19, 2019. See Wetland Permit #2020-575.
 - Paxwood Acoustics, LLC provided goereferenced linework for required setbacks, which is depicted on this plan sheet.

TEST PIT LOG

Test pits were performed on 1/16/2020 and logged by G. McKenney of MMES

TEST PIT #6
 0-5' - V. Dk. Brown (10YR 2/2), Forest Duff, Sand Loam; Friable, Crumb
 9-29" - Brownish Yellow (10YR 6/4), Sand and Gravel; Loose, Single Grain
 29-54" - Grayish Brown (10YR 5/2), Coarse Sand with Gravel; Loose, Single Grain
 54-84" - Dk. Grayish Brown (10YR 4/2), Sand and Gravel; Loose, Single Grain
 No ESHGW
 No Refusal to Depth

TEST PIT #7
 0-10" - V. Dk. Brown (10YR 2/2), Forest Duff, Sand Loam; Friable, Crumb
 10-29" - Dk. Brownish Yellow (10YR 4/4), Sand, some Gravel; Loose, Single Grain
 29-36" - Grayish Brown (10YR 5/2), Coarse Sand, some Gravel; Loose, Single Grain
 36-49" - Dk. Grayish Brown (10YR 4/2), Coarse Sand and Gravel; Loose, Single Grain
 49-84" - Grayish Brown (10YR 5/2), Coarse Sand, Gravel some Cobbles; Loose, Single Grain
 No ESHGW
 No Refusal to Depth

TEST PIT #8
 0-8" - V. Dk. Brown (10YR 2/2), Forest Duff, Sand Loam; Friable, Crumb
 8-29" - Dk. Brownish Yellow (10YR 4/4), Sand with Gravel; Loose, Single Grain
 28-57" - Pale Brown (10YR 6/3), Medium to Coarse Sand; Loose, Single Grain
 57-84" - Brown (10YR 5/3) Coarse Sand; Loose, Single Grain
 No ESHGW
 No Refusal to Depth

TEST PIT LOG
 Test pits and saturated hydraulic conductivity measurements were completed on 8/27/21 by Joe Bartlett of FEA. The Modified Philip Dunne (MPD) infiltrometer method was used to determine saturated hydraulic conductivity (ASTM Standard D8152)

TEST PIT #E1
 0-3" - Dk. Brown (10YR 3/3), Loam; Friable, Subangular Blocky
 3-48" - Yellowish Red (5YR 4/6), Coarse Sand and Gravel; Loose, Single Grain
 No ESHGW
 Bedrock Refusal @ 48"

TEST PIT #E2
 0-4" - Dk. Brown (10YR 3/3), Loam; Friable, Subangular Blocky
 4-24" - Lt. Olive Brown (2.5Y 5/4), Sand and Fine Gravel; Loose, Single Grain
 24-72" - Yellowish Red (5YR 4/6), Coarse Sand and Gravel; Loose, Single Grain
 No ESHGW
 Bedrock Refusal @ 72"

TEST PIT #E3
 0-4" - Dk. Brown (10YR 3/3), Loam; Friable, Subangular Blocky
 4-34" - Yellowish Brown (10YR 5/8), Very Fine Sand; Loose, Single Grain
 34-45" - Lt. Olive Brown (2.5Y 5/4), Very Fine Sand; Loose, Single Grain
 45-58" - Lt. Olive Brown (2.5Y 5/3), Fine Sand; Loose, Single Grain
 58-70" - Lt. Olive Brown (2.5Y 5/4), Coarse Sand with Gravel; Loose, Single Grain
 70-96" - Lt. Olive Brown (2.5Y 5/4), Loam with Cobbles; Friable, Subangular Blocky
 96"- - Lt. Olive Brown (2.5Y 5/4), Sandy Loam; Loose, Subangular Blocky
 ESHGW @ 90"
 No Refusal to Depth

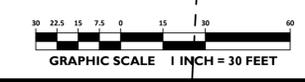
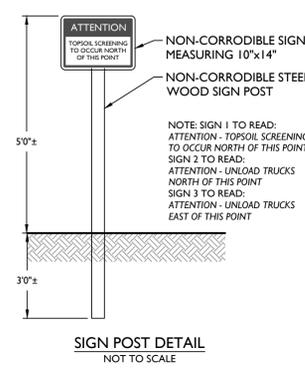
TEST PIT #E4
 0-2" - Dk. Brown (10YR 3/3), Loam; Friable, Subangular Blocky
 2-12" - Dk. Yellowish Brown (10YR 3/4), Sand; Loose, Single Grain
 12-30" - Red (2.5YR 4/6), Coarse Sand; Loose, Single Grain
 30-80" - Lt. Olive Brown (2.5Y 5/4), Coarse Sand and Cobbles; Loose, Single Grain
 No ESHGW
 No Refusal to Depth

TEST PIT #E5
 0-2" - Dk. Brown (10YR 3/3), Loam; Friable, Subangular Blocky
 2-30" - Dk. Yellowish Brown (10YR 3/4), Coarse Sand; Loose, Single Grain
 30-84" - Lt. Olive Brown (2.5Y 5/4), Coarse Sand and Cobbles; Loose, Single Grain
 No ESHGW
 Bedrock Refusal @ 84"

TEST PIT LOG
 Test pits and saturated hydraulic conductivity measurements were completed on 3/7/2025 by Joe Bartlett of FEA. The Modified Philip Dunne (MPD) infiltrometer method was used to determine saturated hydraulic conductivity (ASTM Standard D8152)

TEST PIT #S
 0-4" - V. Dk. Grayish Brown (10YR 3/2), Loam; Friable, Subangular Blocky
 6-36" - Dk. Yellowish Brown (10YR 4/6), Gravelly Sand; Loose, Single Grain
 36-84" - Dk. Yellowish Brown (10YR 4/4), Medium Sand; Loose, Single Grain
 84-120" - Dk. Yellowish Brown (10YR 3/4), Coarse Sand; Loose, Single Grain
 120-132" - Dk. Brown (10YR 3/3), Medium Sand; Loose, Single Grain
 132-144" - Brown (10YR 4/3), Medium Sand; Loose, Single Grain
 No ESHGW
 No Refusal to Depth

TEST PIT #N
 0-4" - V. Dk. Grayish Brown (10YR 3/2), Loam; Friable, Subangular Blocky
 6-24" - Dk. Yellowish Brown (10YR 4/6), Gravelly Sand; Loose, Single Grain
 24-126" - Dk. Yellowish Brown (10YR 4/4), Medium Sand; Loose, Single Grain
 126-138" - Dk. Yellowish Brown (10YR 3/4), Medium Sand; Loose, Single Grain
 No ESHGW
 No Refusal to Depth



Attachment C

Noise Assessment Report



Noise Assessment Report

2/18/2025

Topsoil Storage & Screening

Masterson & Son Excavation LLC



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1.0 Introduction

Masterson & Son Excavation, LLC (“Applicant”) currently operates a contractor yard at 2600 Lower Notch Road in Bristol, Vermont. They are planning to add a topsoil storage and processing area at the back of the parcel, west of the contractor yard (“Project”). Paxwood Acoustics was retained by the Applicant to conduct a noise assessment of the proposed Project.

This report includes:

- A description of the Project,
- A discussion of noise standards and guidelines,
- Sound propagation modeling procedure and results,
- A discussion of mitigation plans, and
- Conclusions

In addition, an introduction to acoustics is provided in Appendix A.

2.0 Project Description

The proposed Project is a topsoil storage and processing operation that would be located at 2600 Lower Notch Road in Bristol Vermont. The parcel on which the Project would be located is in the Rural Agriculture 5 (RA-5) zoning district and currently includes an access road, a residence, and the contractor yard. The parcel spans from the eastern property line along Lower Notch Road to the western property line which is set back generally between 2,300 and 2,450 feet at its most western extent. The residence on the property is set back approximately 1,750 feet from Lower Notch Road. The contractor yard lies south of the residence and is set back approximately 1,580 feet to 1,900 feet from Lower Notch Road. Most of the eastern half of the property is forested. The western quarter of the parcel slopes downward away from the contractor yard and residence, towards the western property line. The area along the western property line is forested.

The area around the Project parcel is primarily forested with some open fields to the west and Bristol Cliffs rising above the eastern side of Lower Notch Road. There are residences located to the:

- southeast on Vincent Drive and Lower Notch Road,
- northeast on Many Waters Road and Lower Notch Road,
- southwest on Shermans Lane, and
- northwest on Carlstrom Road.

It is our understanding that before the current operations at the site, the land was owned and managed by A. Johnson Company and was used for timber harvesting.

The existing contractor yard, which is used to store equipment and materials, received conditional use approval in February of 2024. Noise from the contractor yard and a previously proposed topsoil storage operation on the eastern side of the property was analyzed in a noise assessment by RSG in November 2023¹ (“2023 Noise Study”). The 2023 Noise Study is a public document that was included in the local permit application and is available through the Act 250 database (Project #9A0377).

The currently proposed topsoil operation would be located on the western side of the parcel downhill from the contractor yard. The area would be accessed via an access drive down from the southwest corner of the contractor yard. The proposed area for the operation is approximately 160 feet wide (east to west) by 535 feet long (north to south). It would be set back approximately 2,050 feet west of Lower Notch Road, and

¹ RSG, *Contractor Yard & Topsoil Storage Noise Assessment*, Masterson & Son Excavation, LLC, November 2023.

approximately 200 to 230 feet east of the western property line. The area between the topsoil area and the western property line is forested, and would remain forested as part of the Project. A map of the proposed Project showing the proposed topsoil storage area, the existing contractor yard, and the surrounding area is provided in Figure 1.

The proposed Project includes delivery of topsoil to the topsoil storage area, processing topsoil with a screen, and loading and hauling of topsoil to be used offsite. When topsoil is being delivered to the site, material would be unloaded at the north end of the storage area and then moved to storage piles in other parts of the area. This is discussed more in Section 5.0. The Applicant estimates that approximately 72 dump trucks worth of material would be processed through the operation each year. For much of the year, the area would sit dormant while the topsoil is simply stored at the site and occasionally loaded into trucks to be used offsite throughout the year. There will be a period of greater use approximately twice per year, when topsoil is delivered to the site over a period of one to three days. Approximately one to two weeks per year, the topsoil will be processed at the site, which will involve the use of a loader, excavator, and screener.



Figure 1: Map of the Project and Surrounding Area

3.0 Noise Standards & Guidelines

3.1 Local Regulations

The Town of Bristol does not have a specific, quantified sound level limit applicable to the RA-5 zoning district, but it does regulate noise in Section 751 of the Unified Development Regulations², which states:

No noise which is excessive at the property line, represents a significant increase in noise levels in the vicinity of the development and is incompatible with the reasonable use of the surrounding area shall be permitted.

This qualitative framework requires that sound from a proposed use not be incompatible with the surrounding area. And while “a significant increase in noise levels” is not defined, a comparison of existing sound levels with projected sound levels from a proposed operation is to be considered.

3.2 State Regulations

There are no state regulations that set quantitative sound level limits that are applicable to the proposed Project. However, the Project may require an Act 250 permit. We are unaware of any existing permit conditions that set sound level limits for the Project property.

In Act 250, noise is evaluated primarily under Criterion 8, aesthetics via the Quechee Test. The Quechee Test first asks if the proposed use will cause an adverse impact on aesthetics with regard to noise, by comparing the existing character of the area with the future character of the area given the proposed project. If a project is considered to cause an adverse impact on aesthetics with regard to noise, then the second part of the Quechee Test evaluates if the adverse impact is undue by answering three questions:

1. Is the project so out of character with the area that it would offend the sensibilities of the average person? Does it rise to the level of being considered shocking and offensive?
2. Has the applicant failed to take steps to mitigate impacts that a reasonable person would take?
3. Does the project violate a clear, written community standard regarding noise?

² Town of Bristol, Unified Development Regulations, November 3, 2020.

Provided there are no affirmative answers to these three questions, then the adverse impact would not be deemed undue. The most common limit that has been applied in Act 250 to evaluate if a project is unduly adverse is 55 dBA L_{max} at residences and areas of frequent human use during the day. However, the Vermont Superior Court Environmental Division has considered the limit to be a flexible standard depending on the existing context of the area. In some cases, a property line limit of 70 dBA L_{max} has also been applied.

3.3 Compatibility Guidelines – ANSI S12.9 Part 5

In the 2023 Noise Study, ANSI S12.9 Part 5³ was also used to provide additional context regarding land use compatibility since the local noise regulation calls for proposed uses to not be “incompatible with the reasonable use of the surrounding area.” Specifically, Annex A of ANSI S12.9 Part 5 identifies an annual day-night sound level (DNL) of 55 dBA as being compatible with suburban residential areas and up to 60 dBA is listed as marginally compatible. An annual DNL is the average sound level over the course of a year with a 10 dB penalty applied to nighttime (10 PM to 7 AM) sound levels.

This guideline is used in this noise assessment as well to provide additional quantifiable context to the compatibility clause of the local noise regulation.

³ ANSI S12.9 Part 5, Quantities and Procedures for Description and Measurement of Environmental Sound – Part 5: Sound Level Descriptors for Determination of Compatible Land Use, 2007 (R2024).

4.0 Sound Propagation Modeling

4.1 Modeling Procedure

Sound propagation modeling was completed using the modeling software CadnaA made by DataKustik GmbH. CadnaA implements the international sound propagation standard, ISO 9613-2 “Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.” Both CadnaA and the ISO 9613-2 standard are used by noise control professionals across the United States and are regularly relied upon by local and state jurisdictions. The model takes into account source sound emissions, topography, receptor locations, and several other factors. It calculates sound levels for meteorological conditions that are favorable for sound propagation, assuming that all receptors are downwind of the sound sources.

For this assessment, USGS terrain data coupled with onsite grading data provided by the Applicant was used to create the three-dimensional topography throughout the surrounding area. Other site features, including the proposed locations of equipment, were provided by the Applicant.

A total of seven operational scenarios were assessed in the model:

1. Unloading topsoil at the northern end of the storage area which includes a tailgate hitting the dump truck bed to loosen material.
2. Screening topsoil at the northern end of the storage area.
3. Screening topsoil at the southern end of the storage area.
4. Loader loading topsoil into a dump truck at the northern end of the storage area.
5. Loader loading topsoil into a dump truck at the southern end of the storage area.
6. Excavator loading topsoil into a dump truck at the northern end of the storage area.
7. Excavator loading topsoil into a dump truck at the southern end of the storage area.

Model input data and parameters are provided in Appendix B.

Sound levels (L_{max} & L_{eq}) for each scenario were calculated throughout the area at a grid of receptors that were spaced every 10 feet. Each receptor was placed 5 feet above ground level representing the approximate ear height of a listener. Based on the grid of receptors, sound level iso-lines are generated throughout the area so that the projected sound levels can be shown all along the Project property line and the surrounding area. In addition, sound levels were calculated at 56 discrete receptors, primarily residences, in the surrounding areas.

4.2 Model Results

Maps of model results for each scenario are provided in Appendix C and tabular results for each discrete receptor is provided in Appendix D. A summary of the model results at the eight closest discrete receptors to the topsoil storage area is provided in Table 1, along with the highest modeled sound level at the property line for each scenario. Table 1 presents both the maximum sound level (L_{max}) that could occur under each scenario, and the equivalent continuous sound level (L_{eq}) which represents the more typical sound level that would occur over the duration of the period when each scenario is occurring.

Table 1: Summary of Model Results (L_{max} & L_{eq}) for Receptors Closest to the Topsoil Storage Area

Metric	Receptor	Scenario ⁴						
		1	2	3	4	5	6	7
L_{max}	197 Shermans Lane	53	43	43	41	41	35	34
	195 Shermans Lane	53	43	42	41	40	34	33
	194 Shermans Lane	51	41	45	39	43	32	36
	163 Sturtevant Drive	51	41	36	38	34	32	27
	148 Vincent Drive	45	35	39	33	36	26	30
	147 Vincent Drive	51	41	36	39	33	32	26
	128 Vincent Drive	38	27	30	24	27	17	20
	214 Many Waters Rd	48	37	32	34	30	27	23
	Property Line	68	58	70	55	68	49	61
L_{eq}	197 Shermans Lane	39	42	42	28	28	23	22
	195 Shermans Lane	39	42	41	28	27	22	21
	194 Shermans Lane	37	40	44	26	30	20	24
	163 Sturtevant Drive	37	40	35	25	21	20	15
	148 Vincent Drive	31	34	38	20	23	14	18
	147 Vincent Drive	37	40	35	26	20	20	14
	128 Vincent Drive	24	26	29	11	14	5	8
	214 Many Waters Rd	34	36	31	21	17	15	11
	Property Line	54	57	69	42	55	37	49

As shown in Table 1, the maximum sound levels at the closest receptors to the proposed topsoil storage area are less than 55 dBA. The highest projected maximum sound level at an offsite receptor is 53 dBA which could occur on Shermans Lane when topsoil is being unloaded from a dump truck. This would come from the use of a tailgate to loosen material from the truck bed. When the tailgate is not being used, the more typical sound

⁴ The equipment that is operating in each scenario is described on the previous page.

level (L_{eq}) from unloading activities at receptors on Shermans Lane would be approximately 39 dBA.

The highest maximum sound levels from the operation occur at the southern property line, which borders the forested area south of the topsoil storage area. Projected maximum sound levels at the property line are 70 dBA or less from regular operations within the topsoil storage pile area.

4.3 Comments on the 2023 Noise Study

The 2023 Noise Study¹ identified previously in Section 2.0, also provides useful context for the current application. Given that background sound level monitoring was conducted as part of that study, it was unnecessary to conduct additional background sound level monitoring as part of this assessment given that there is no expectation for background sound levels in the area to have changed over the past two years. Those monitoring results showed that daytime equivalent continuous sound levels (L_{eq}) in the area were between 39 and 40 dBA with maximum sound levels (L_{max}) during the day between 34 and 79 dBA. Projected sound levels presented in Section 4.2 are comparable to, or less than these existing background sound levels in the area.

Based on the background sound levels, the estimated existing annual day-night sound level (DNL) from the 2023 Noise Study was 48 dBA which is considered compatible with a suburban residential area per ANSI S12.9 Part 5. That DNL remained unchanged with the previously proposed eastern topsoil operation because of the relatively brief amount of time that the topsoil storage area is actually in use in a given year. That conclusion would hold true for this assessment as well. That is, sound levels from the topsoil operation that is currently proposed would also be considered compatible with a suburban residential area per ANSI S12.9 Part 5.

In addition to the operational sound levels of the currently proposed Project that are reported in Section 4.2, and Appendices C and D of this assessment, the 2023 Noise Study also provides an analysis of truck noise on the access road. Given that, the truck noise analysis is not reproduced in this assessment as it would remain unchanged.

5.0 Planned Mitigation

Two key elements that reduce the potential noise impacts of the Project are the proposed intensity of the use and the setbacks between the Project and area residences.

5.1 Intensity of Use

Unlike a quarry or gravel pit operation where aggregate material is constantly being produced for a regular stream of customers, the proposed topsoil storage area has a lower intensity of use given the infrequency of noise producing activities from the operation. As a topsoil storage area that is a tangential activity related to the Applicant's excavation business, much of the year will have little to no operations, resulting in little to no sound from the topsoil storage area. As discussed in Section 2.0, much of the activity at the site would occur over a short-duration when topsoil is delivered to the site over a period of one to three days, twice per year, and an approximate one to two-week period when the topsoil will be screened at the site.

5.2 Setbacks

The Project is mitigated, in part, due to the setback distances between the proposed topsoil storage area and residences. These setback distances are larger than those of the topsoil operation that was proposed on the eastern side of the parcel in 2023, resulting in lower projected sound levels from the operation.

5.3 Additional Mitigating Elements

In addition to the larger setbacks, the Applicant is planning to incorporate several other mitigating elements that will help to reduce potential noise impacts of the Project.

Designated Unloading Area

Unloading of topsoil in the storage area from dump truck deliveries will take place in the designated unloading zone at the north end of the storage area. This shifts the use of tailgates to loosen material to an area that is more central to the parcel, providing greater setback from this activity to residences. The planned unloading area is shown in Figure 2. Once material is unloaded in this area, it will be moved to storage piles in other parts of the storage area by a loader or excavator.

Designated Screening Area

During the one to two week period when screening takes place at the site, the screening operation will be set back at least 150 feet from the southern property line. This is shown in Figure 2.

Maintaining Forested Buffer

There is currently a forested buffer on the Applicant's parcel along the western property boundary that varies in depth between 180 and 230 feet between the western property boundary and the topsoil storage area. This forested buffer will remain intact for the life of the Project reducing potential line-of-sight between the topsoil storage area and areas to the west.

There is also a large forested buffer south of the topsoil storage area that is not on the Applicant's property. That forested area will reduce sound levels to the south an additional 4 to 10 dB, approximately, but was not accounted for in the model results presented in Section 4.2.

Temporary Topsoil Storage Piles

While topsoil is being stored at the site, the storage piles themselves may act as berms further reducing sound levels from the activities in the topsoil storage area. The mitigating effects of these temporary topsoil storage piles were not taken into account in the model results presented in Section 4.2.

Unloading During Weekdays

Unloading topsoil material in the storage area will be limited to Monday through Friday 7 AM to 5 PM.



Figure 2: Map Showing the Topsoil Unloading Area and Screener Setback

6.0 Summary & Conclusions

Paxwood Acoustics conducted a noise assessment of the proposed topsoil storage and processing area at 2600 Lower Notch Road in Bristol, Vermont. This noise assessment included identification of the primary Project equipment that can create sound, a discussion of noise standards and community noise guidelines, and sound propagation modeling to project operational sound levels from Project throughout the surrounding area.

As discussed in Section 4.2, the highest projected sound level (L_{max}) at a residence is 53 dBA on Shermans Lane, southwest of the topsoil storage area. Projected sound levels at area residences are generally comparable to or less than existing background sound levels that were monitored in the 2023 Noise Study.

The highest maximum sound levels from the operation occur at the southern property line, which borders the forested area south of the topsoil storage area. Projected maximum sound levels at the property line are 70 dBA or less from regular operations within the topsoil storage pile area.

In addition the estimated annual day-night level (DNL), which is used as an acoustical metric for characterizing land-use compatibility in ANSI S12.9 Part 5, is 48 dBA in the area (See Section 4.3) which is considered compatible with a suburban residential area. Given the relatively low intensity of use from the Project, the annual DNL is expected to be approximately the same as it is currently.

The planned mitigation for the Project, which is discussed in Section 5.0, reduces the potential noise impacts on the surrounding area. Two key mitigating measures are the relatively low intensity of use throughout the year and the setback distances between the proposed topsoil storage area and residences, which are greater than the setbacks associated with the previously proposed topsoil operation on the eastern side of the parcel in 2023.

Appendix A: Introduction to Acoustics

Sound, Sources, and Perception

Sound in air is caused by fluctuations in air pressure which can be due to a variety of sources. The sources of sound can generally be grouped into three major categories: anthropogenic, biogenic, and geophonic. Anthropogenic sounds are human caused sounds such as voices, instruments, vehicles, and mechanical and electrical equipment. Biogenic sounds are those that are caused by organisms such as animal calls or animal interaction with the environment. And lastly geophonic sounds are those caused by the environment itself such as waves hitting a shoreline or wind interacting with plants or other objects.

There are three primary characteristics of sound that affect human perception: frequency which may also be referred to as pitch or tone, amplitude which relates to perceived loudness or volume, and temporal fluctuations, which is to say that sound can change with time.

Frequency

Humans can hear sound over a range of frequencies typically from 20 Hz to 20,000 Hz. While not strictly defined, this range can be divided into three subranges which are described as low frequency (20 Hz to around 250 Hz), mid frequency (around 250 Hz to around 4,000 Hz), and high frequency (around 4,000 Hz to 20,000 Hz). The mid frequency range is where most human speech occurs. More defined ranges of frequency are divided into octave bands (31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and 16 kHz), or even further into 1/3 octave bands which are three smaller bands within each octave band. Sound below 20 Hz is referred to infrasound and is not typically audible to the human ear. Sound above 20,000 Hz is referred to as ultrasound and is also not audible to the human ear.

Most sounds are broadband in nature and contain energy at a range of frequencies. If however, a sound contains notably more energy at a specific frequency compared to the adjacent frequencies, then the sound can be perceived as a tone, such as a note in music.

Amplitude

Humans can hear sound over a wide range of pressures, from approximately 20 micropascals to over 20 million micropascals. Sound can occur outside of this range, but below 20 micropascals is typically inaudible to humans and above 20 million micropascal can cause pain. In acoustics, this wide range of audible sound pressures is compressed using a logarithmic scale to create a range of sound pressure levels from 0 dB (20

micropascals) to 120 dB (20 million micropascals). It is in this logarithmic scale, denoted as decibel or dB, that acousticians and environmental regulations quantify the amplitude of sound.

Temporal Changes

Both frequency and amplitude can change with time. A sound may be constant in both frequency and level, but this is fairly uncommon. If one considers the fluctuation in sounds from people having conversations, birds chirping, or vehicles passing by, it becomes apparent how much sound can change from one instance to the next. It is for this reason that acousticians use a variety of metrics to define and describe sound. These metrics are discussed further below.

Weighting Networks, Sound Pressure Level, and Metrics

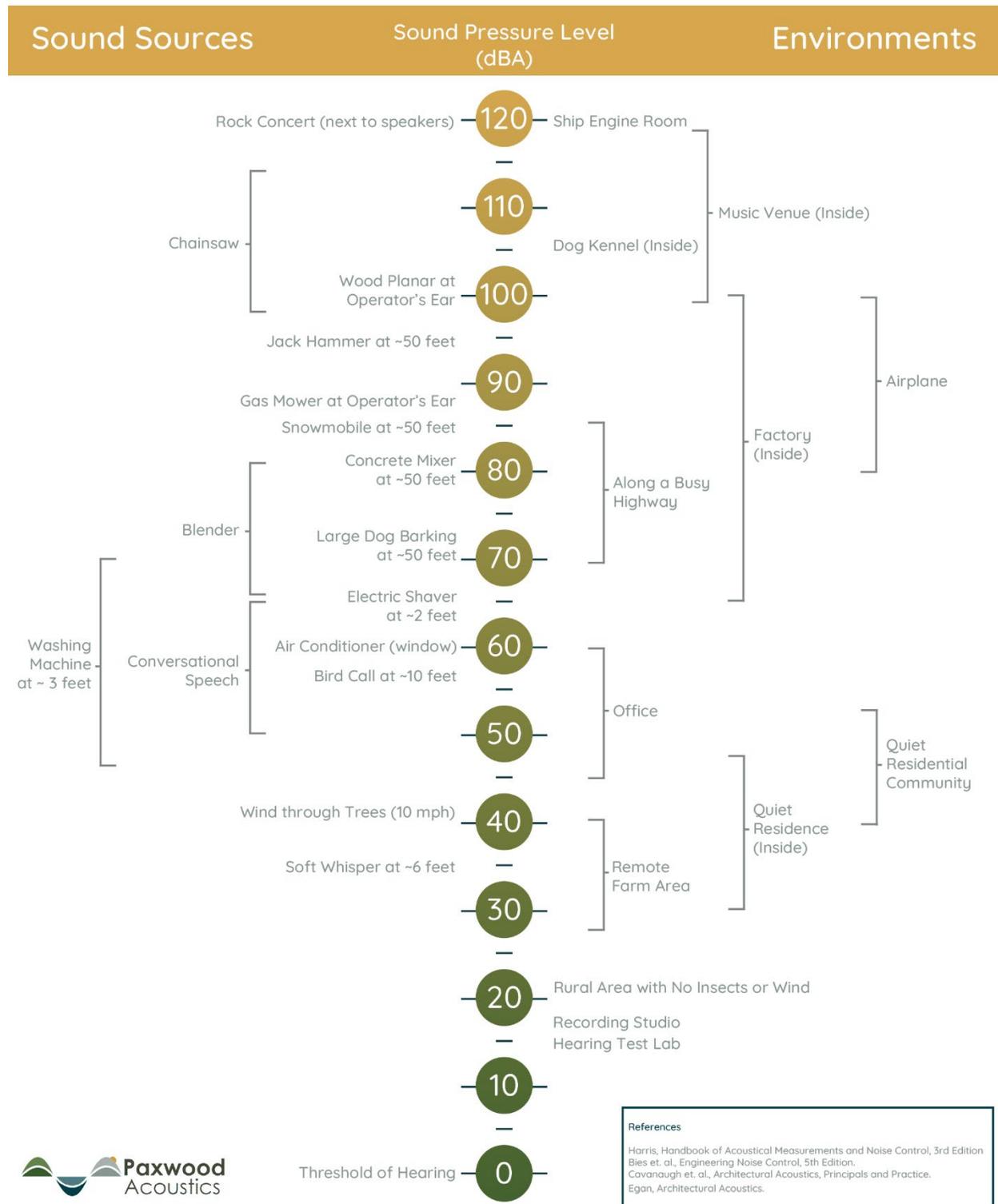
Weighting Networks

Humans are most sensitive to sound between 500 Hz and 5 kHz. Our sensitivity with sound decreases below 500 Hz and above 5 kHz. In order to account for this varying sensitivity, the A-weighting network or filter was developed to mimic the sensitivity of the human ear and how we perceive loudness. A-weighting discounts sound in varying degrees by frequency below 500 Hz and above 5,000 Hz. Between 1,000 Hz and 4,000 Hz, the A-weighting network amplifies sound slightly to account for the increased sensitivity of the human ear in that range. Since the A-weighting network accounts for human sensitivity at difference frequencies, it is widely used in environmental acoustics and most environmental regulations. When a sound level is A-weighted, an “A” is typically added to the end of the abbreviation for decibel: dBA.

There are other weighting networks with different purposes, such as C, G, or Z, but A-weighting is most used in environmental acoustics. If a sound is not weighted or sometimes referred to as unweighted, it is considered Z-weighted or dBZ.

Sound Pressure Level

As was discussed previously, in acoustics, the amplitude of sound is often referred to in terms of sound pressure level. Representative sound pressure levels of some common sound sources and environments are shown in Figure 3. The sound levels presented in Figure 3 are meant to be illustrative, so any specific source or environment may be similar to or fall outside of the ranges shown in the graphic.



References
 Harris, Handbook of Acoustical Measurements and Noise Control, 3rd Edition
 Bies et. al., Engineering Noise Control, 5th Edition.
 Cavanaugh et. al., Architectural Acoustics, Principals and Practice.
 Egan, Architectural Acoustics.

Figure 3: Representative Sound Pressure Levels (dBA) of Common Sound Sources & Environments

Since sound is a logarithmic function, one cannot use regular arithmetic operations to add and subtract sound levels. So, for example, conversational speech typically occurs at a

level between 55 dBA and 65 dBA. If one person is speaking at a level of 60 dBA and another person is also speaking at a level of 60 dBA, the total sound level is not 120 dBA. (And a good thing too, otherwise, two people talking at the same time would quickly approach the threshold of pain, 120 dBA.) Instead, two voices at the same level only causes an increase of 3 dB, so 60 dBA plus 60 dBA equals 63 dBA.

In terms of perception of sound level there are two helpful rules of thumb to be aware of: 1) A change in sound level of 10 dB is perceived as a halving or doubling of loudness, depending on if the amplitude of the sound decreased or increased, and 2) Changes in sound level of less than 3 dB are generally considered not perceptible.

Sound Level Metrics

With sound levels in an environment continuously changing, different sound level metrics are used to describe the sound level versus time. Some common sound level metrics are briefly described below:

- **Equivalent Continuous Sound Level (L_{eq}):** The L_{eq} is the level of the average sound pressure over a specified period of time. It takes into account quieter, long-term sound levels along with louder, short-duration sound levels to provide an overall sound level for a given time period. The louder sound levels, even with a short-duration, can have a strong influence on the L_{eq} . The L_{eq} is often used in environmental acoustics to convey an average representation of the acoustical environment, even though it is influenced more strongly by higher sound levels that occur over the specified interval. An L_{eq} may be as short as 1-second or up to an hour or more depending on the purpose of the quantification.
- **Statistical Sound Levels (L_n):** Statistical sound levels or percentile sound levels describe the level that is exceeded for a specified percentage of time. The L_{10} , for example, is the level that is exceeded 10% of the time. The L_{50} , is the median sound level: half the time the sound level is above the L_{50} and half the time the sound level is below the L_{50} . And the L_{90} is the sound level that is exceeded 90% of the time.
- **Maximum Sound Level (L_{max}):** The phrase “maximum sound level” may be used to describe the maximum L_{eq} or L_n over a given time period, but it can also be used to describe the sound level over a very short-duration typically using either a 1-second time constant which is referred to as slow-response, or a 125-millisecond time constant which is referred to as a fast-response. If the L_{max} metric is being used, it is good practice to note which time constant is being applied by adding the notation S or F to the abbreviation: L_{Smax} or L_{Fmax} . The most appropriate time constant to use depends on the specific context of the quantification.

- Day-Night Level (L_{dn}): The L_{dn} is similar to the L_{eq} except that it is specifically applied over an entire day or 24 hour period with a 10 dB penalty applied to sound levels between 10 PM and 7 AM to account for greater sensitivity at night.

Appendix B: Model Settings & Input

Table 2: Sound Propagation Model Settings

Model Parameter	Setting
Ground Attenuation	ISO 9613-2 spectral ground attenuation with a ground factor of 0.5 at the contractor yard and 1.0 elsewhere.
Topography	USGS terrain combined with on-site terrain provided by the Applicant.
Foliage Attenuation	No attenuation due to forest was taken into account off of the Applicant's parcel. Forest on the Applicant's parcel where line-of-sight is blocked from the topsoil storage area was modeled at a height of 33 feet.
Atmospheric Attenuation	Based on 70% relative humidity and 10° C.
Search Radius	6,562 feet (2,000 meters).
Receptor Grid	10 feet by 10 feet throughout the surrounding area at a height of 5 feet.

Table 3: Modeled Point Source

Source	Scenario	Sound Power Level (dBA)		Relative Height (m)	Coordinates (VT State Plane)		Elevation (m)
		L _{max}	L _{eq}		X (m)	Y (m)	
Dump Truck Unloading Topsoil	1	128	114	1.5	453426	177043	163
Screening Topsoil	2	116	115	2	297609	4415922	226
Screening Topsoil	3	116	115	2	297602	4415926	226
Loader Loading Dump Truck	4	114	101	2	297610	4415924	226
Loader Loading Dump Truck	5	114	101	2	297603	4415928	226
Excavator Loading Dump Truck	6	107	95	2	297612	4415926	226
Excavator Loading Dump Truck	7	107	95	2	297605	4415930	226

Table 4: Modeled Sound Power Level (dBZ) by Octave Band Frequency⁵

Source	Full Octave Band Center Frequency (Hz)									Overall (dBA)
	31.5	63	125	250	500	1000	2000	4000	8000	
Dump Truck Unloading Topsoil	128	128	126	128	126	121	119	115	111	128
Screening Topsoil	100	118	108	116	115	110	107	105	101	116
Loader Loading Dump Truck	103	118	107	106	113	108	106	94	87	114
Excavator Loading Dump Truck	90	97	104	100	106	102	98	87	77	107

⁵ The source of the modeled sound power levels is the 2023 Noise Report: RSG, Contractor Yard & Topsoil Storage Noise Assessment, Masterson & Son Excavation, LLC, November 2023.

Appendix C: Maps of Model Results

This appendix provides maps showing the L_{max} results of the sound propagation model for each of the modeled scenarios. In each figure, sound levels are represented by sound level isolines in 1 dB intervals with grey dashed lines while the 5 dB intervals are represented by solid color lines.

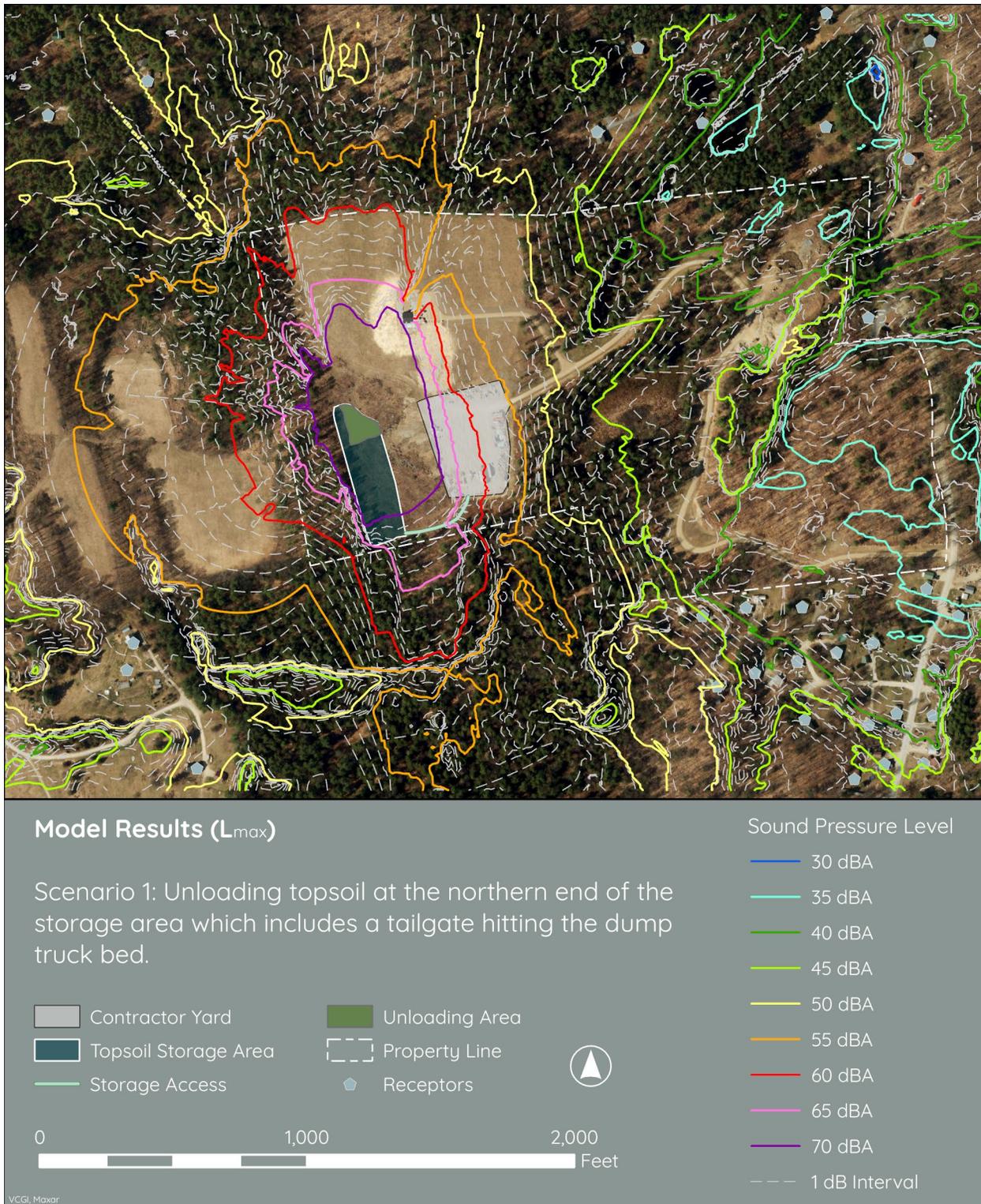


Figure 4: Map of Model Results, Scenario 1, Unloading Topsoil

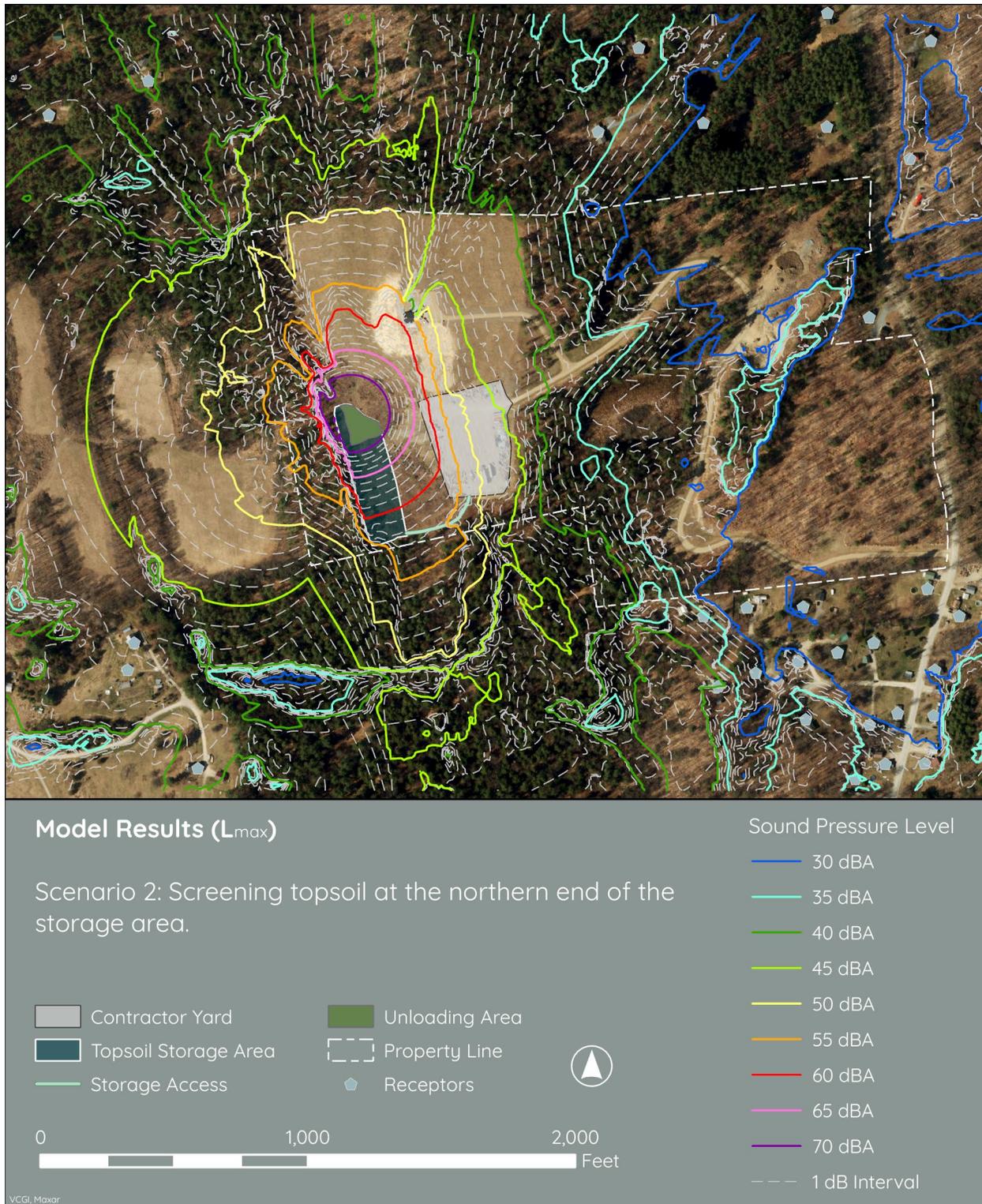


Figure 5: Map of Model Results, Scenario 2, Screening Topsoil, North

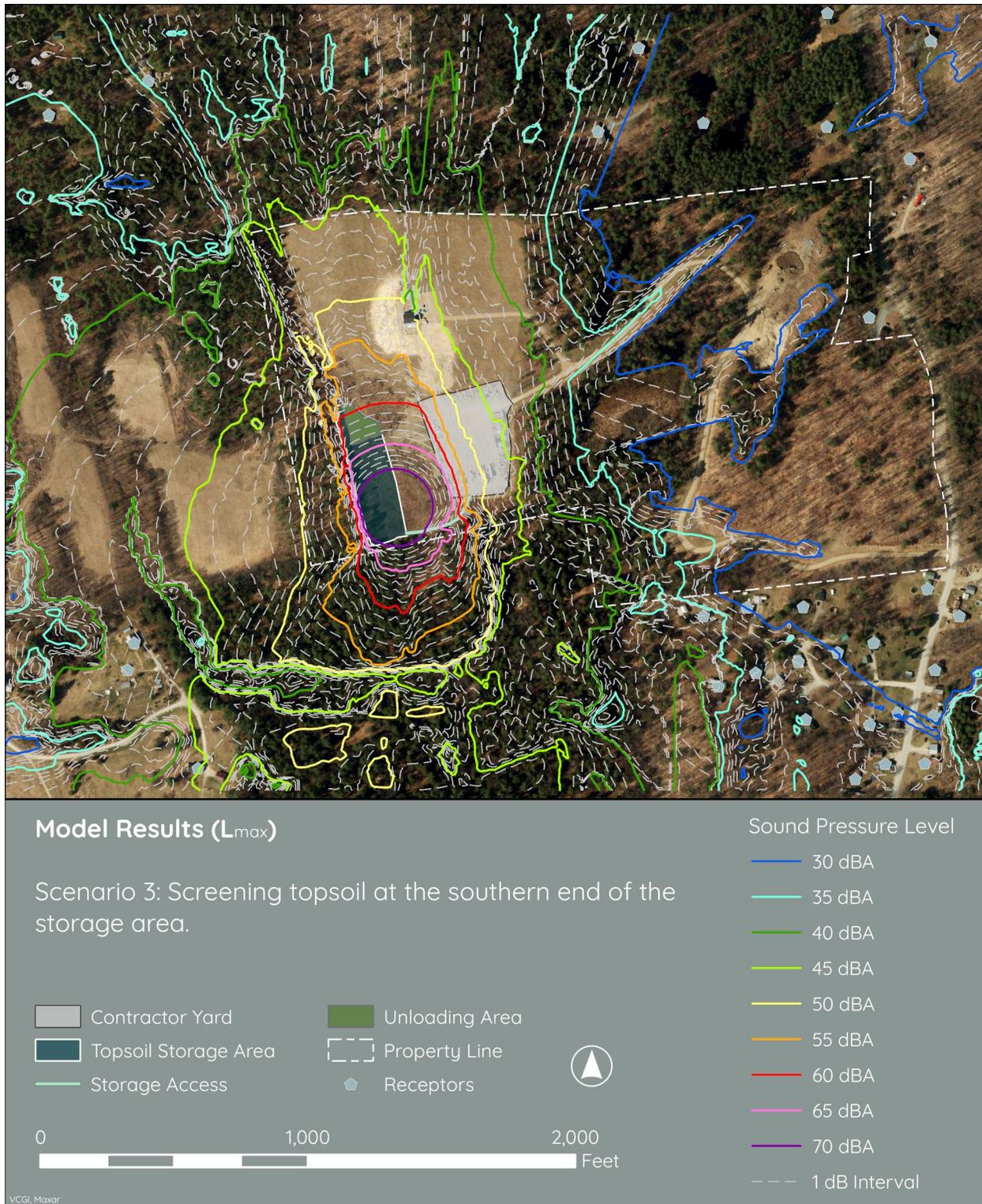


Figure 6: Map of Model Results, Scenario 3, Screening Topsoil, South

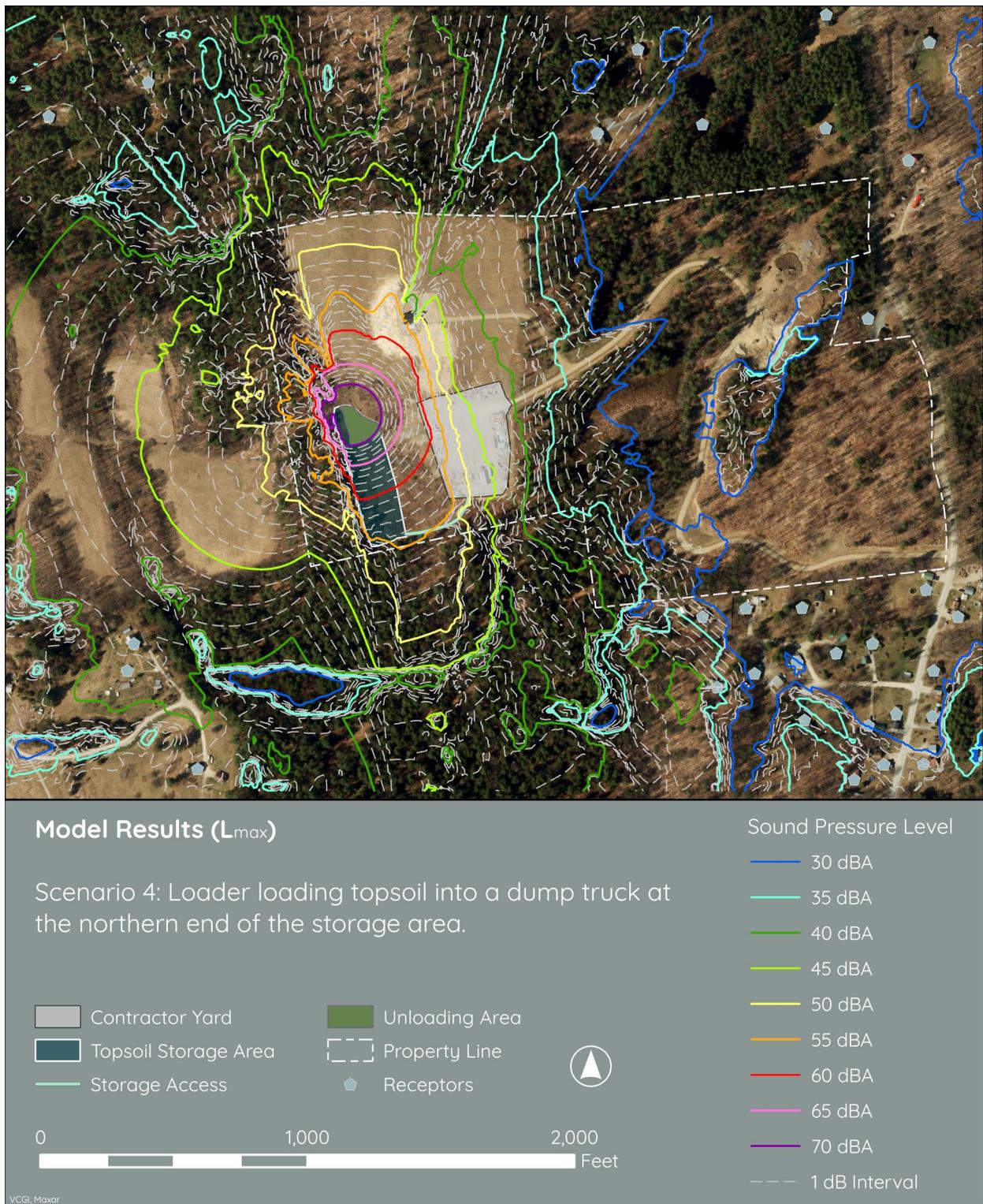


Figure 7: Map of Model Results, Scenario 4, Loader Loading Topsoil, North

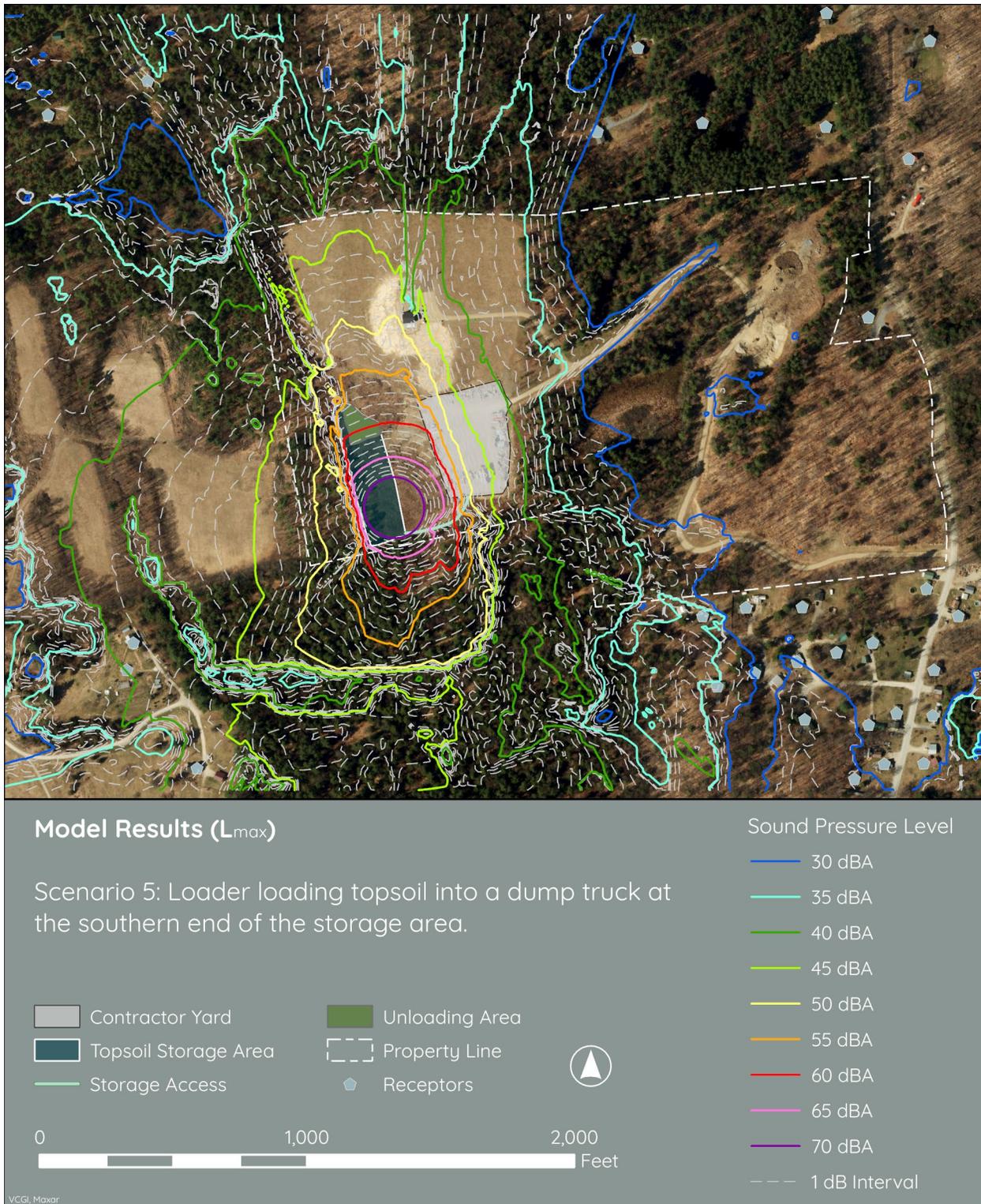


Figure 8: Map of Model Results, Scenario 5, Loader Loading Topsoil, South

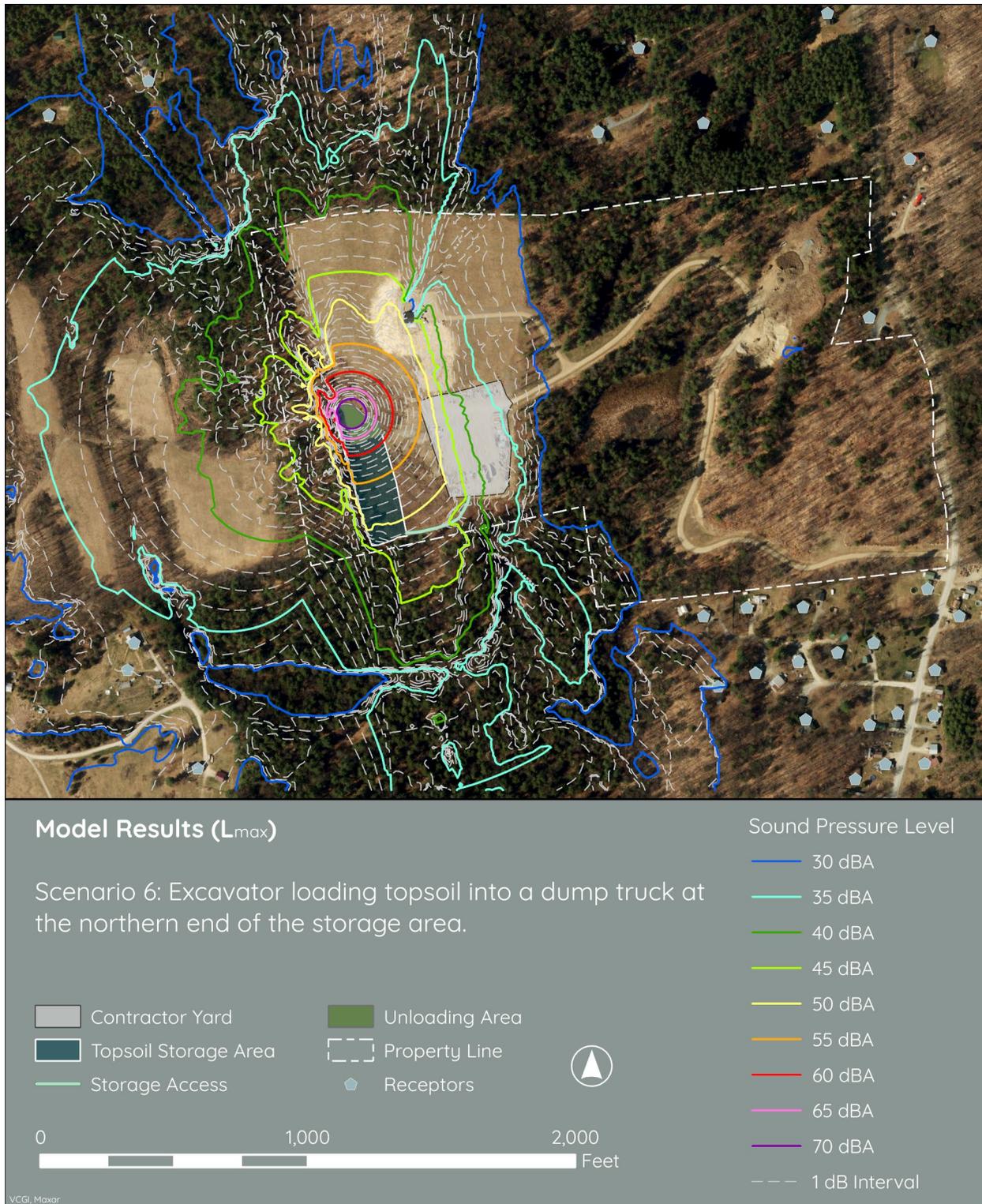


Figure 9: Map of Model Results, Scenario 6, Excavator Loading Topsoil, North

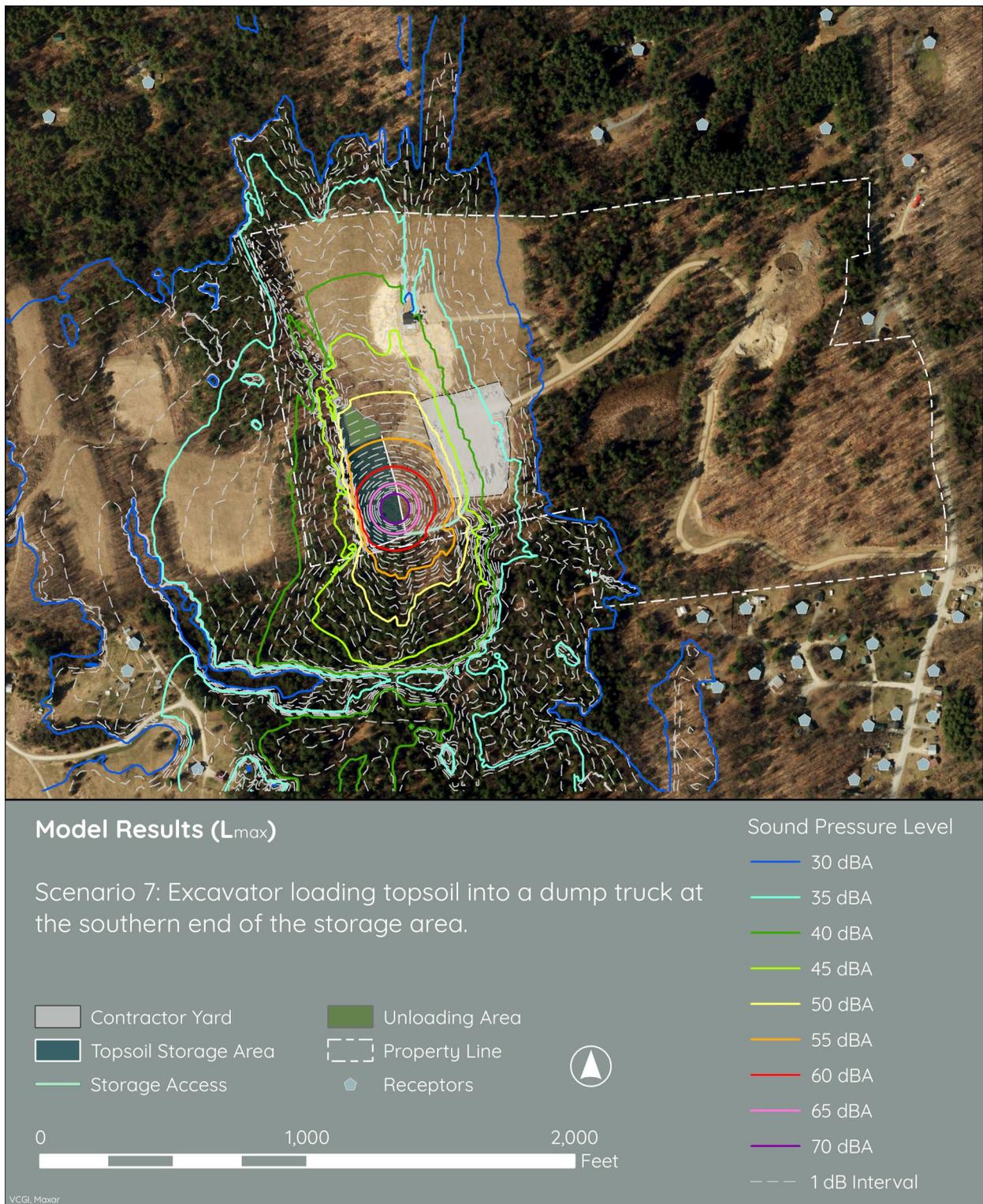


Figure 10: Map of Model Results, Scenario 7, Excavator Loading Topsoil, South

Appendix D: Tabular Model Results

Table 5: Modeled Maximum Sound Pressure Levels (L_{max}) from the Project at Area Receptors

Receptor	Scenario ⁶							VT State Plane Coordinates		Elevation + Receptor Height (m)
	1	2	3	4	5	6	7	X (m)	Y (m)	
197 Shermans Ln	53	43	43	41	41	35	34	453179	176782	131
195 Shermans Ln	53	43	42	41	40	34	33	453171	176751	132
194 Shermans Ln	51	41	45	39	43	32	36	453251	176639	135
163 Sturtevant Dr	51	41	36	38	34	32	27	453195	177423	121
148 Vincent Dr	45	35	39	33	36	26	30	453828	176812	196
147 Vincent Dr	51	41	36	39	33	32	26	453844	176732	197
128 Vincent Dr	38	27	30	24	27	17	20	453877	176822	196
214 Many Waters Rd	48	37	32	34	30	27	23	453708	177365	183
508 Harvey Rd	51	41	38	39	36	32	29	453000	177217	116
103 Sturtevant Dr	50	40	37	38	35	31	28	453266	177661	131
164 Sturtevant Dr	49	39	36	37	33	31	27	453081	177384	117
55 Sturtevant Dr	49	39	37	37	35	30	28	453099	177668	117
80 Shermans Ln	48	38	40	36	38	30	31	453088	176522	114
133 Harvey Rd	48	39	37	37	35	30	29	452848	176724	107
2855 S 116 Rd	48	39	36	37	34	31	27	452664	176940	117
3013 S 116 Rd	48	39	37	37	35	31	28	452722	176717	121
21 Harvey Rd	48	39	37	37	35	31	28	452768	176638	123
3031 S 116 Rd	47	39	36	37	34	30	28	452713	176669	121
2987 S 116 Rd	47	39	36	37	34	30	27	452674	176721	121
87 Carterville Rd	47	37	36	35	33	28	27	453858	176462	193
154 Many Waters Rd	47	36	32	33	29	26	22	453754	177461	183
2830 Lower Notch Rd	47	37	35	35	32	28	26	453990	176501	200
150 Carlstrom Rd	47	37	35	35	33	28	26	452938	177591	108
2800 Lower Notch Rd	46	37	34	35	31	28	25	454007	176573	201
247 Carlstrom Rd	46	37	34	35	32	28	25	452943	177667	107
123 Carlstrom Rd	46	36	35	34	33	28	26	452791	177651	104
3124 S 116 Rd	46	38	36	36	34	29	27	452729	176503	121
3126 S 116 Rd	46	38	36	36	33	29	27	452723	176501	121
3154 S 116 Rd	46	38	35	36	33	30	27	452734	176457	121
2762 Lower Notch Rd	46	35	34	32	31	26	24	454001	176627	200
132 Carlstrom Rd	46	36	35	34	33	27	26	452823	177564	105
35 Vincent Dr	46	36	35	34	32	27	25	453944	176695	200

⁶ The equipment that is operating in each scenario is described in Section 4.1 and in each map presented in Appendix C.

Receptor	Scenario ⁶							VT State Plane Coordinates		Elevation + Receptor Height (m)
	1	2	3	4	5	6	7	X (m)	Y (m)	
2738 Lower Notch Rd	46	35	32	33	29	26	22	454035	176644	202
74 Many Waters Rd	45	34	35	32	33	25	26	453728	177699	185
2725 Lower Notch Rd	44	33	32	31	29	24	22	454080	176644	203
2085 Lower Notch Rd	44	34	32	32	30	25	23	454035	177711	198
2365 Lower Notch Rd	43	32	28	30	25	23	18	454063	177334	199
131 Vincent Dr	43	32	33	29	30	22	23	453887	176748	194
2120 Lower Notch Rd	43	32	28	29	25	22	18	453965	177607	184
2271 Lower Notch Rd	42	32	32	29	29	22	23	454087	177469	200
31 Vincent Dr	42	32	31	29	28	23	21	454017	176688	201
91 Vincent Dr	42	32	33	30	30	23	23	453936	176760	201
27 Many Waters Rd	41	30	27	27	24	20	17	453862	177639	183
175 Many Waters Rd	41	29	25	26	22	19	15	453827	177375	182
98 Vincent Dr	40	30	28	28	25	21	18	453941	176823	201
2180 Lower Notch Rd	39	28	27	26	24	19	17	453969	177500	187
2703 Lower Notch Rd	39	29	30	26	27	19	20	454090	176699	203
2702 Lower Notch Rd	39	28	31	26	28	19	21	454049	176702	202
2667 Lower Notch Rd	37	26	27	24	23	17	16	454091	176751	204
2400 Lower Notch Rd	37	26	23	22	19	15	12	454017	177153	197
28 Vincent Dr	37	25	31	23	28	16	21	453980	176771	202
2953 S 116 Rd	36	25	24	22	21	15	14	452663	176784	113
26 Vincent Dr	36	25	27	22	24	15	17	454022	176782	202
2621 Lower Notch Rd	36	25	23	22	20	15	13	454119	176813	204
2262 Lower Notch Rd	36	24	23	21	20	14	13	453968	177371	187
2610 Lower Notch Rd	35	24	25	21	21	14	14	454083	176844	203

Table 6: Modeled Equivalent Continuous Sound Pressure Levels (L_{eq}) from the Project at Area Receptors

Receptor	Scenario ⁶							VT State Plane Coordinates		Elevation + Receptor Height (m)
	1	2	3	4	5	6	7	X (m)	Y (m)	
197 Shermans Ln	39	42	42	28	28	23	22	453179	176782	131
195 Shermans Ln	39	42	41	28	27	22	21	453171	176751	132
194 Shermans Ln	37	40	44	26	30	20	24	453251	176639	135
163 Sturtevant Dr	37	40	35	25	21	20	15	453195	177423	121
148 Vincent Dr	31	34	38	20	23	14	18	453828	176812	196
147 Vincent Dr	37	40	35	26	20	20	14	453844	176732	197
128 Vincent Dr	24	26	29	11	14	5	8	453877	176822	196
214 Many Waters Rd	34	36	31	21	17	15	11	453708	177365	183
508 Harvey Rd	37	40	37	26	23	20	17	453000	177217	116

Receptor	Scenario ⁶							VT State Plane Coordinates		Elevation + Receptor Height (m)
	1	2	3	4	5	6	7	X (m)	Y (m)	
103 Sturtevant Dr	36	39	36	25	22	19	16	453266	177661	131
164 Sturtevant Dr	35	38	35	24	20	19	15	453081	177384	117
55 Sturtevant Dr	35	38	36	24	22	18	16	453099	177668	117
80 Shermans Ln	34	37	39	23	25	18	19	453088	176522	114
133 Harvey Rd	34	38	36	24	22	18	17	452848	176724	107
2855 S 116 Rd	34	38	35	24	21	19	15	452664	176940	117
3013 S 116 Rd	34	38	36	24	22	19	16	452722	176717	121
21 Harvey Rd	34	38	36	24	22	19	16	452768	176638	123
3031 S 116 Rd	33	38	35	24	21	18	16	452713	176669	121
2987 S 116 Rd	33	38	35	24	21	18	15	452674	176721	121
87 Carterville Rd	33	36	35	22	20	16	15	453858	176462	193
154 Many Waters Rd	33	35	31	20	16	14	10	453754	177461	183
2830 Lower Notch Rd	33	36	34	22	19	16	14	453990	176501	200
150 Carlstrom Rd	33	36	34	22	20	16	14	452938	177591	108
2800 Lower Notch Rd	32	36	33	22	18	16	13	454007	176573	201
247 Carlstrom Rd	32	36	33	22	19	16	13	452943	177667	107
123 Carlstrom Rd	32	35	34	21	20	16	14	452791	177651	104
3124 S 116 Rd	32	37	35	23	21	17	15	452729	176503	121
3126 S 116 Rd	32	37	35	23	20	17	15	452723	176501	121
3154 S 116 Rd	32	37	34	23	20	18	15	452734	176457	121
2762 Lower Notch Rd	32	34	33	19	18	14	12	454001	176627	200
132 Carlstrom Rd	32	35	34	21	20	15	14	452823	177564	105
35 Vincent Dr	32	35	34	21	19	15	13	453944	176695	200
2738 Lower Notch Rd	32	34	31	20	16	14	10	454035	176644	202
74 Many Waters Rd	31	33	34	19	20	13	14	453728	177699	185
2725 Lower Notch Rd	30	32	31	18	16	12	10	454080	176644	203
2085 Lower Notch Rd	30	33	31	19	17	13	11	454035	177711	198
2365 Lower Notch Rd	29	31	27	17	12	11	6	454063	177334	199
131 Vincent Dr	29	31	32	16	17	10	11	453887	176748	194
2120 Lower Notch Rd	29	31	27	16	12	10	6	453965	177607	184
2271 Lower Notch Rd	28	31	31	16	16	10	11	454087	177469	200
31 Vincent Dr	28	31	30	16	15	11	9	454017	176688	201
91 Vincent Dr	28	31	32	17	17	11	11	453936	176760	201
27 Many Waters Rd	27	29	26	14	11	8	5	453862	177639	183
175 Many Waters Rd	27	28	24	13	9	7	3	453827	177375	182
98 Vincent Dr	26	29	27	15	12	9	6	453941	176823	201
2180 Lower Notch Rd	25	27	26	13	11	7	5	453969	177500	187
2703 Lower Notch Rd	25	28	29	13	14	7	8	454090	176699	203
2702 Lower Notch Rd	25	27	30	13	15	7	9	454049	176702	202

Receptor	Scenario ⁶							VT State Plane Coordinates		Elevation + Receptor Height (m)
	1	2	3	4	5	6	7	X (m)	Y (m)	
2667 Lower Notch Rd	23	25	26	11	10	5	4	454091	176751	204
2400 Lower Notch Rd	23	25	22	9	6	3	0	454017	177153	197
28 Vincent Dr	23	24	30	10	15	4	9	453980	176771	202
2953 S 116 Rd	22	24	23	9	8	3	2	452663	176784	113
26 Vincent Dr	22	24	26	9	11	3	5	454022	176782	202
2621 Lower Notch Rd	22	24	22	9	7	3	1	454119	176813	204
2262 Lower Notch Rd	22	23	22	8	7	2	1	453968	177371	187
2610 Lower Notch Rd	21	23	24	8	8	2	2	454083	176844	203