GALES FERRY INTERMODAL

PRESENTATION TO LEDYARD PLANNING & ZONING COMMISSION

Introduction of Applicant’s team members

- Harry Heller, Esq. & Andrew McCoy, Heller, Heller and McCoy, Counsel
- David George, Heritage Consultants, Cultural Resources Coordinator for the Project
- George Andrews, PE/LEP, Loureiro Engineering Associates, Principal Engineer
- Jeff Slade, Senior Geologist, PG, Continental Placer/Adirondack Geologic Services
- Tim Harmon & Kevin Godfrey, Maine Drilling and Blasting
- Scott Hesketh, PE, F.A.Hesketh & Associates, Inc.
- Steven E. MacCormack, MacCormack Appraisal Services
- Ken Kaliski, PE, INCE Board Cert., RSG
- Suzanne Pisano, PE, and Dr. John Martin, CIH, Verdantas
- Scott McKenna, Certified Safety Professional
- Dr. Cathy Aimone Martin, Aimone Martin Associates LLC
- Gregory Poole, Sauls Seismic
- Alan Perrault/Chase Davis, Gales Ferry Intermodal LLC
- Mike Cherry, Community Liaison

GALES FERRY
INTERMODAL

Today’s vision is tomorrow’s reality.

Opportunities are a **moment in time.**

VERDANTAS, LLC

AIR MODELING

Suzanne Pisano, PE, LEED AP, TURP
36 years experience

Questions - Responses

- **What are all of our “safety factors” in the modelling?**

- National primary ambient air quality standards
- For NAAQS: Fence-line receptors are required to be spaced no greater than every 25 meters along the property. We placed receptors every 20 meters along the fence line, and additionally extended out to a distance of 80 meters from the fence line
- A 1/3 arc-second (~10m resolution) dataset was used, which is the highest resolution available for the Ledyard, Connecticut region as compared to the ~30m resolution, which is also viable for NAAQS models and often used because it processes faster
- Blasting emissions were modeled as occurring 2 times a day for 2 back-to-back days a week, simultaneously with all other process emissions operating at the same time
- Process emissions were modeled as occurring 24 hours a day, 365 days a year, at 100% capacity. The emission factors are calculated by way of AP-42 formulas for Crushed Stone Processing

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Questions - Responses

- **What is the source of particulate generated by a lawn mower as utilized in my example?**
  - Particulate generated by a typical lawn mower includes No2, pollen and particularly dust when mowing on dry soil.
- **Nighttime Concentration- Dust concentration at night is zero. Are the modeled concentrations averaging the high daytime values with the zeroes?**
  - No. Emission factors for the operations were calculated by way of AP-42 formula RespoRespRs, which solve for annual emissions based upon production values (i.e., tons-per-year of dust was calculated based upon the proposed tons of production per year).
  - Once the tons-per-year emissions value was calculated, it was converted to pounds-per-hour (lbs/hr) emission factor for the site operations.
  - As the startup/stop times of operations are not precise, the model conservatively assumes that this baseline pound-per-hour emission factor is emitted constantly (8,760 hrs/yr).
  - Blasting was modeled as variable emissions sources occurring over a short period of time.

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Questions - Responses

- **Are vehicle emissions from diesel combustion included in the model? How are these emissions regulated.**

  - The particulate generated from the driving of the vehicles and mobile equipment are included in the model but not from diesel combustion.
  - Otherwise, road vehicles are regulated under a separate set of federal rules, depending on whether the vehicle is classified as a passenger car, or light/medium/heavy-duty trucks.
  - Road vehicles are not permanent emission sources onsite, so they are subject to facility air permitting.
  - The only overlap between the National Ambient Air Quality Standards (NAAQS) and on-road transportation vehicles (mobile equipment) is that in "nonattainment areas" . **This is not the case for Connecticut.**

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Questions - Responses

- **What permits might apply to the facility?**
  - Multi-Sector General Permit (Stormwater) – CTDEEP – Is required if there is a point source discharge of stormwater.
  - State Air Permit– CTDEEP - not anticipated, as site air emissions will be below state and federal permit thresholds.
  - Construction Permits/Construction Stormwater Permit/Approvals – Town of Ledyard

- **Which agencies will have permitting or regulatory authority over the site?**
  - In addition to the above, Department of Transportation for applicable shipping regulations, OSHA/MSHA for worker safety and Connecticut DEEP.

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Questions - Responses

- **How did we pick the weather stations for background levels?**
  - Background data for PM_{10} and $PM_{2.5}$ were obtained from the closest and/or most representative air monitoring sites to the Facility.
  - The Fort Griswold Station, located in Groton, was the closest station for $PM_{2.5}$.
  - Since PM_{10} is not monitored at the Fort Griswold Station, the Criscuolo Park Station, in New Haven was used as the source of the PM_{10} background data.
  - Sea breezes are very common in the Ledyard area, so the coastal Criscuolo station was determined as the most representative.
  - We discussed location usage with CTDEEP, and they confirmed they would request these points to be used for modelling if required for permitting.

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Questions - Responses

- **Does the weather data include pressure?**
  - Yes. AERMET requires surface station pressure for some of its computations. This is included in the meteorological data that is input into the model. Calculations are performed by the AERMOD program.
- **Are the NAAQS required?**
  - Yes. NAAQS are the Clean Air Act standards for “ambient air”, which is defined as “that portion of the atmosphere, external to buildings, to which the general public has access”

VERDANTAS, LLC

COMMUNITY AIR & NOISE MONITORING PLAN

Dr. John Martin, CIH
29 years experience

Plan Overview and Objective

- Identify and mitigate the potential for dust and noise migration to off-site locations.

- Realtime Monitoring Program
  - Determine particulate emissions during operations and advise site Environmental, Health, and Safety (EHS) personnel on effectiveness of on-site controls
  - Establish a threshold for the introduction of mitigation measures if exceedance of maximum regulatory limits is detected

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Noise Limits & Monitoring

STATE LIMITS

Connecticut Regulation maximum allowable levels of continuous noise in industrial and residential areas:

- Day Time 7AM-10PM: 61 decibels (dBA)
- Impulse Noise is limited to 100 dB at any time in any area, and 80 dB in class A (residential) areas at night.

SITE MONITORING AND LIMIT

The limit for noise for the site will be measurements obtained using a sound level meter that exceeds **allowable thresholds** during the daytime operation.

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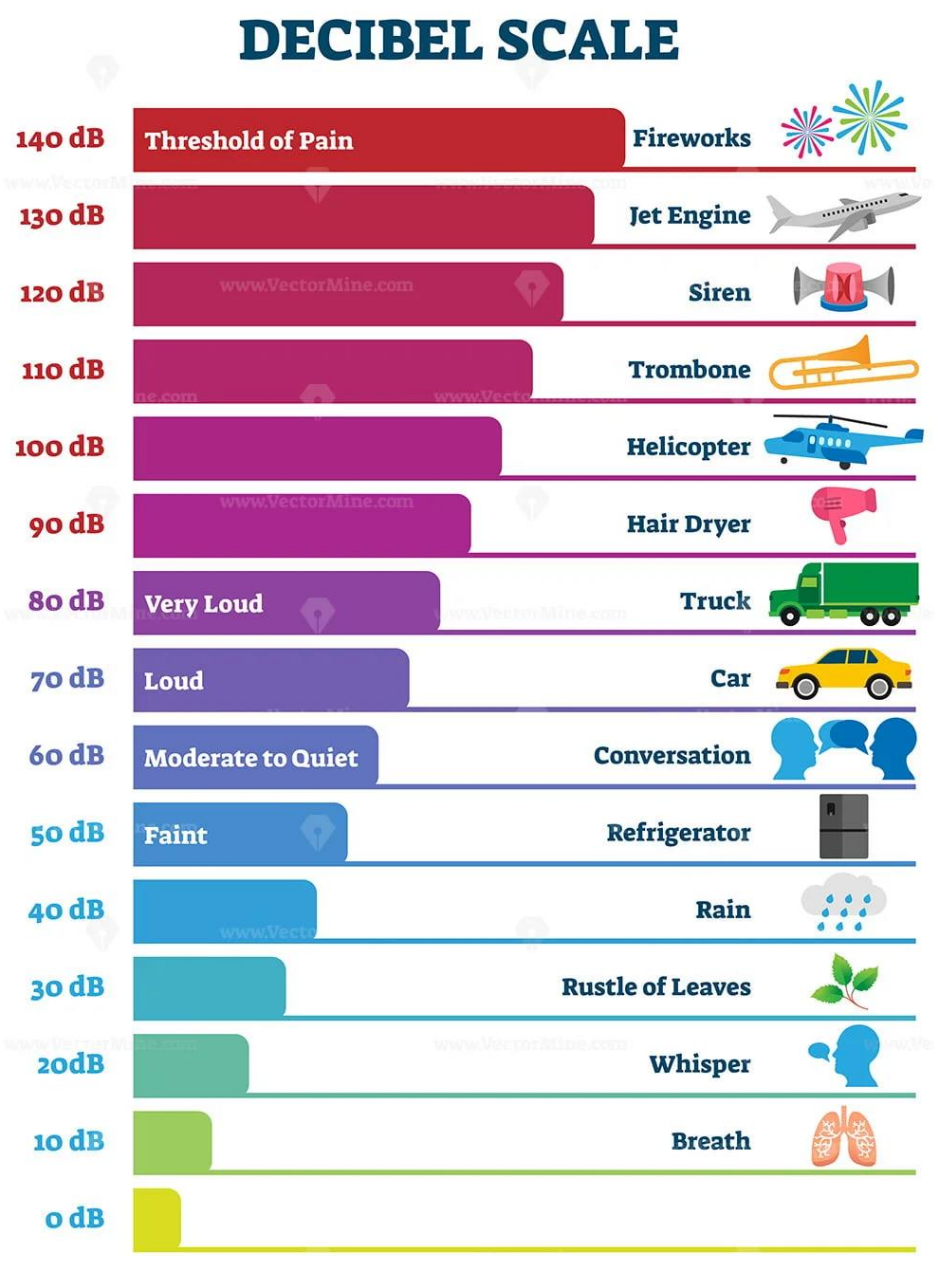

Noise Limits & Monitoring

- The range of noise we can hear varies by about 10 orders of magnitude
- This is somewhat cumbersome to deal with quantitatively
- Noise data is condensed into a more manageable, logarithmic scale.
- Adding noise levels is not a linear process. 60 dB + 60 dB ≠120 dB.
  60 dB + 60 dB = 63 db

Difference Between Two Levels to Be Added	Amount to Add to Higher Level to Find the Sum
0–1 dB	*3 dB*
2–4 dB	*2 dB*
5–9 dB	*1 dB*
10 dB	*0 dB*

Dust Limits & Monitoring

PERSONAL MONITORING AND LIMITS

Each personal dust monitoring instrument shall be programmed with an alarm threshold of 15 times less than the Occupational Safety and Health Administration's (OSHA) Permissible Exposure Limit (PEL) which will alert Site personnel that dust concentrations have reached the Site established personal dust action level.

PERIMETER MONITORING AND LIMITS

OSHA's PEL is 15,000 micrograms per cubic meter (µg/m3), averaged over an eight-hour period.

Perimeter dust action level of 100 ($\mu g/m^3$)

- Implement additional dust control measures.

Perimeter dust permissible level 150 ($\mu g/m^3$)*

- Stop work until better dust control solutions are implemented.

*Applies a one-hundred-fold factor of safety

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Instrumentation

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Soil & Dust Management

Dust generation and emissions control can be achieved primarily with the following techniques:

- Inline misting/spraying soil, roadways and equipment with water.
- No run-off.
- Periodic application of calcium chloride.
- Inactive soil stockpiles shall be covered and secure.
- The surface of un-vegetative or disturbed soil/fill areas shall be wetted with water or other dust suppression agents.

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HEALTH & SAFETY

Scott McKenna, Certified Safety Professional
25 years experience

Health & Safety

- Primary work will begin as the excavation work gets started – safety training for excavation staff, implementation of plans and programs.
- The site will be overseen Federally under MSHA. They will conduct a minimum of two unannounced inspections to the site each year.
- During inspections, inspectors are tasked with looking for unsafe acts or unsafe conditions at these sites and issuing citations for any found.
- Dust and noise exposures are also monitored to assure they stay below the Permissible Exposure Limit (PEL).

Health & Safety

- PEL for respirable crystalline silica is 50 micrograms per cubic meter with an action level of 25 micrograms per cubic meter. Each site is required to monitor their own levels in addition to the sampling that is done federally. Anytime they are over the action level, engineering controls must be administered to bring them back under the action level. PPE is not considered an engineering control.

- Any unsafe conditions can result in withdrawal orders, removal of equipment from service and/or withdrawal of workers.

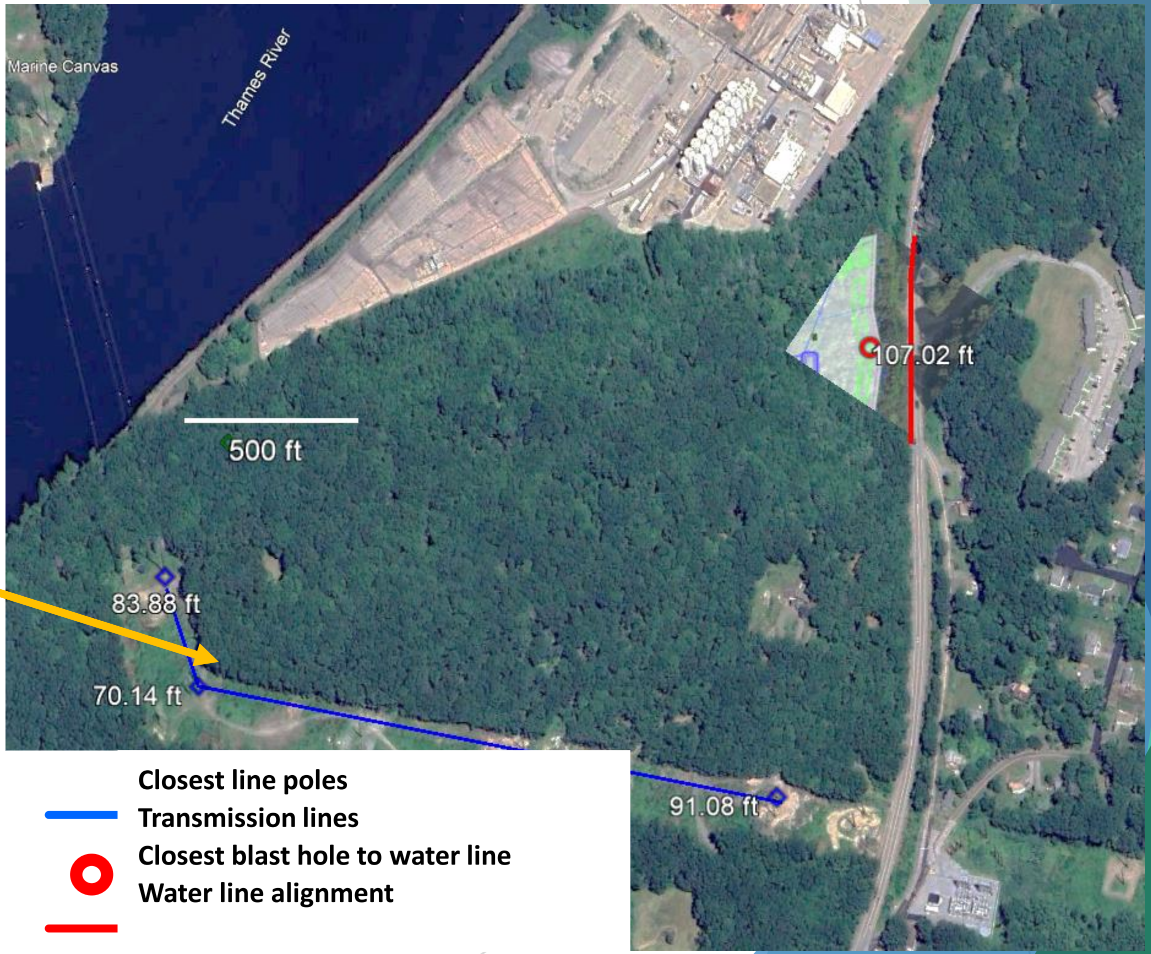
AIMONE-MARTIN ASSOCIATES, LLC

Analysis of Rock Blasting

Dr. Catherine Aimone-Martin
45 years experience

Analysis of Rock Blasting Adjacent to WCPA Water Main and Eversource Transmission Line Towers

- Dr. Cathy Aimone-Martin, President, Aimone-Martin Associates



Scope of Work

- Develop controlled blast designs near utilities with Maine D&B

- Perform analysis on in-ground strains from blast vibrations at pipeline in comparison with allowable wall stresses (calculating a factor of safety)

- Ensure a not-to-exceed ground vibration adjacent to the Eversource easement complying with corporate limits in terms of ground velocity

Analysis and Findings

Transmission line supports

- Develop blast designs lasting less than 0.5 sec in duration using blasting agent charge weights limiting ground vibrations to less then 1.0 in/s
- Equivalent to 0.005 in of ground displacement

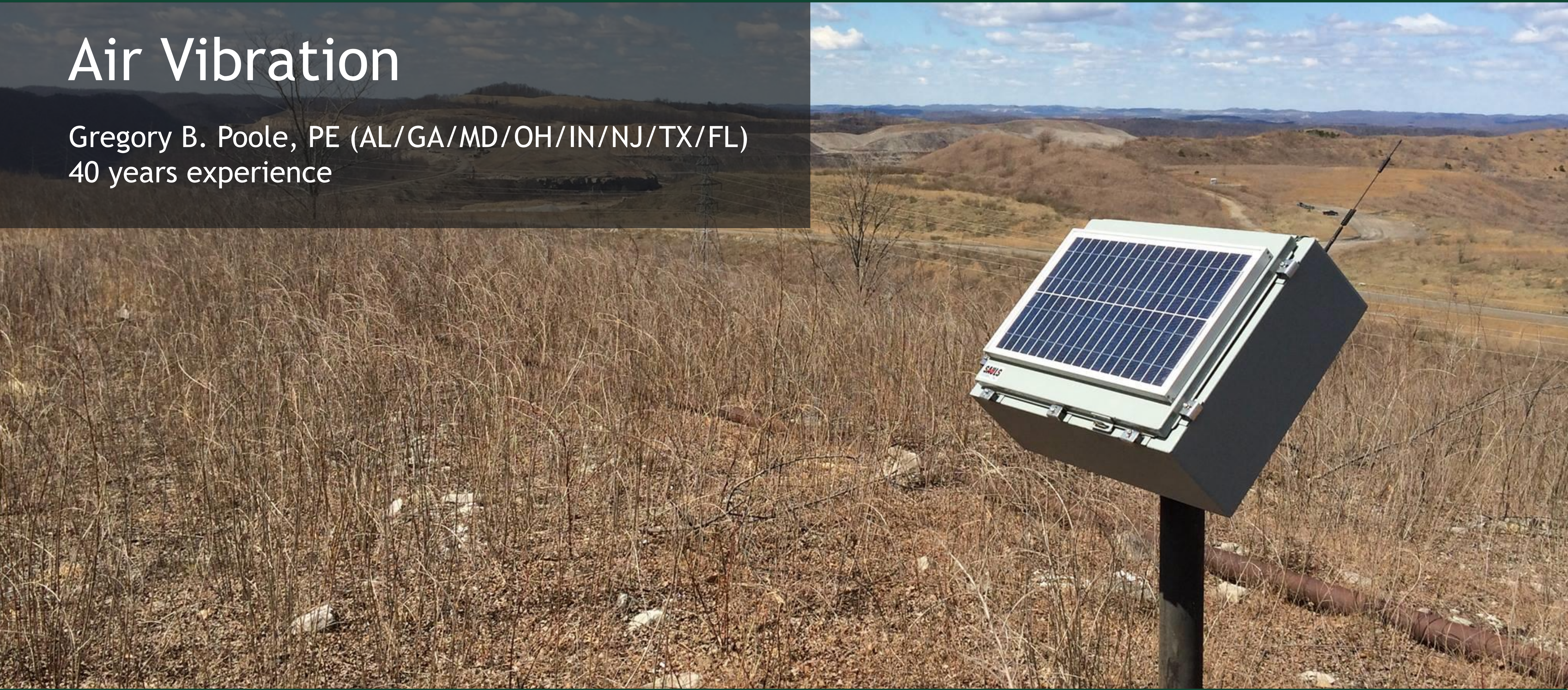
Pipeline

- Using pipeline design equations, normal operating factor of safety is 10 (allowable stress divided by the operating stress)
- Transient (instantaneous) pressure increase from blasting adding to the operating stress may decrease the factor of safety in the worst case to 8.9 well above the 1.2 acceptable for blasting.

SAULS SEISMIC, LLC

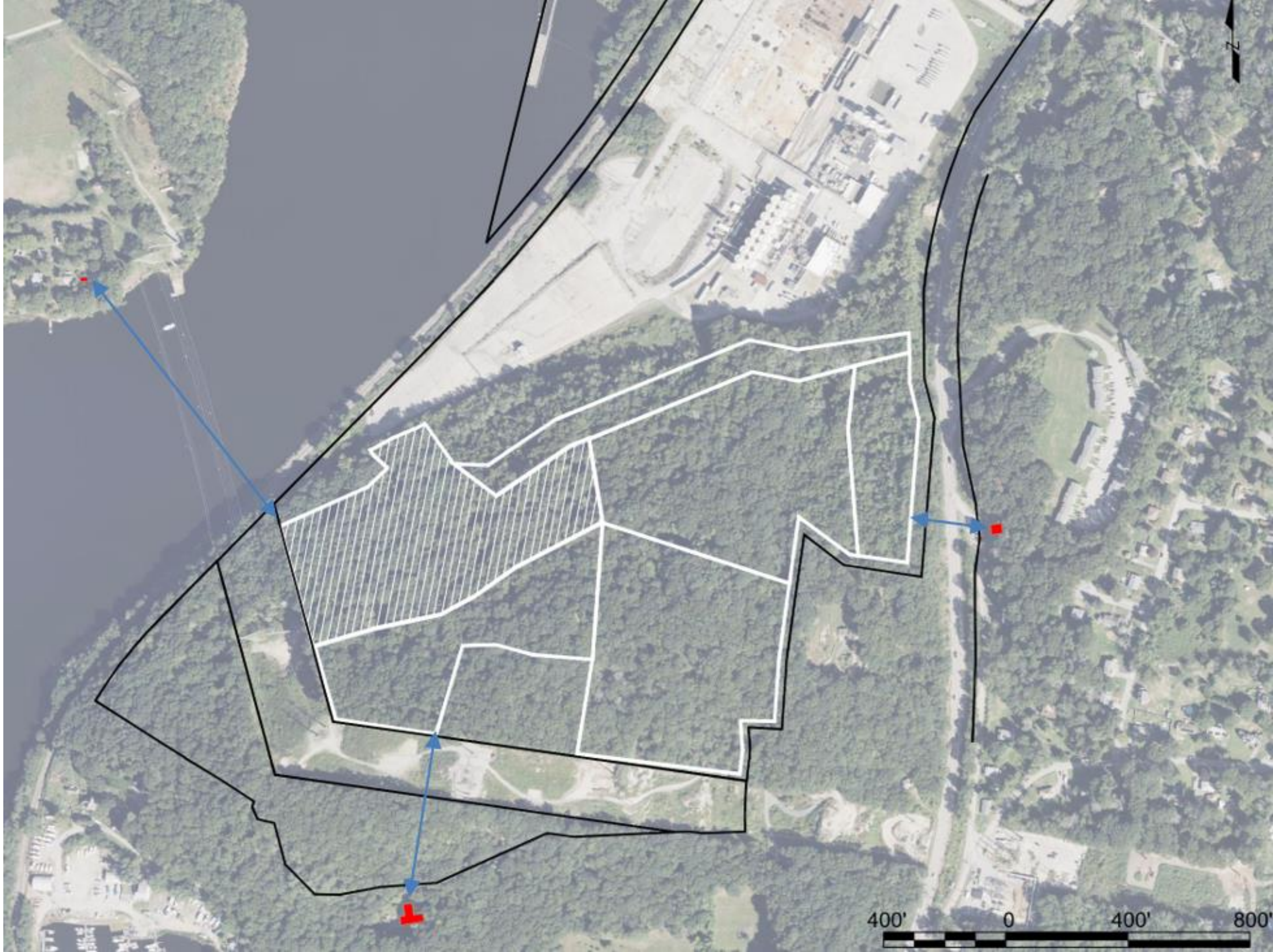
Air Vibration

Gregory B. Poole, PE (AL/GA/MD/OH/IN/NJ/TX/FL)
40 years experience



Sauls Seismic, LLC (Sauls) has reviewed the data submitted to provide expected maximum vibration air overpressure levels from both blasting and site construction activities at the closest off-site homes in each direction from the Gales Ferry project.

22 Anderson Drive
40 Chapman Lane
89 Point Breeze Road

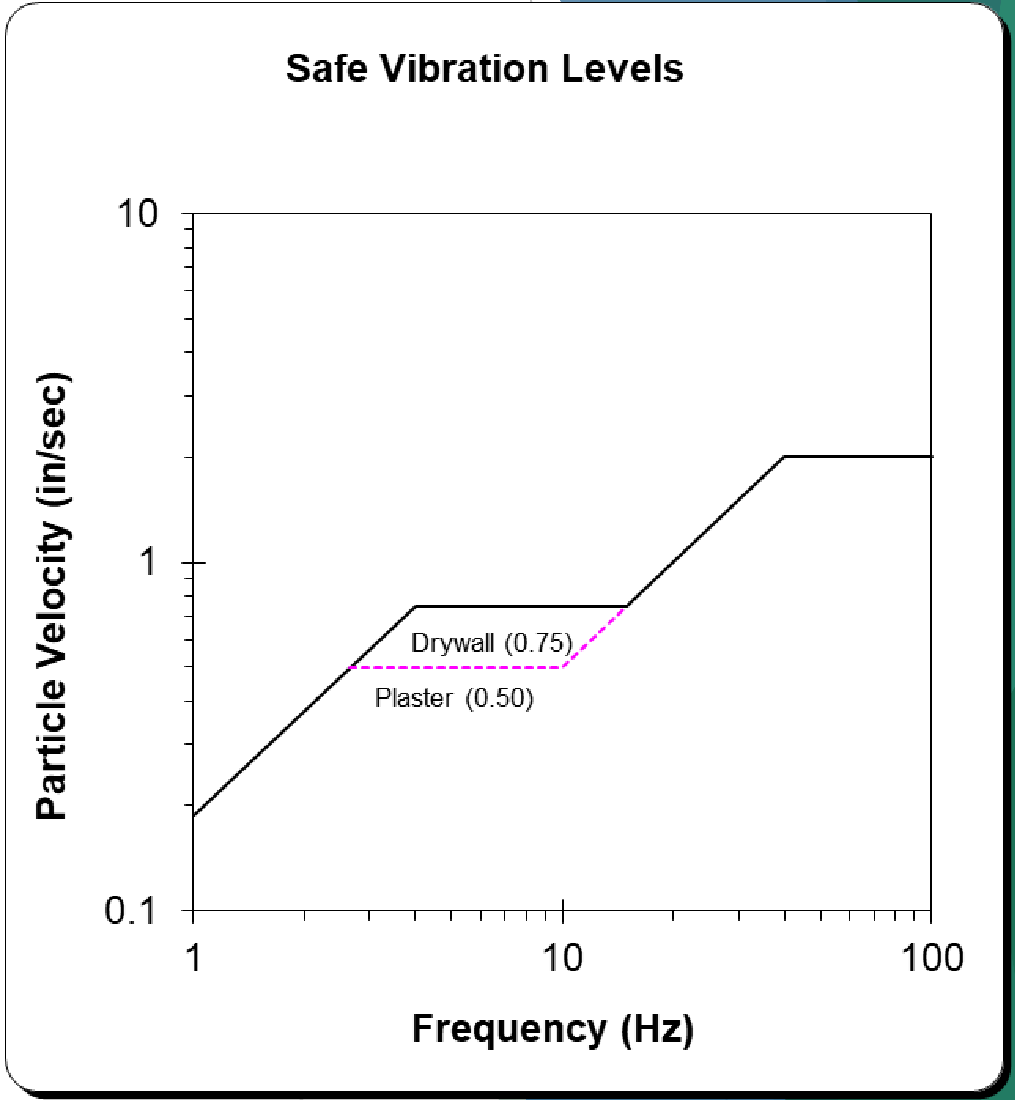


Safe Vibration Limits

"On the average, only minor damage is observed for peak particle velocities of 5.4 inches per second, and major damage is observed for peak particle velocities of 7.6 inches per second."

"Practical safe criteria for blasts that generate low-frequency ground vibrations are 0.75 in/sec for modern gypsum board houses and 0.50 in/sec for plaster on lath interiors. For frequencies above 40 Hz, a safe particle velocity maximum of 2.0 in/sec is recommended for all houses."

"the most restrictive criteria in existence that are based upon measured structural responses and observations of cracking correlated to specific vibration events. They provide a guaranteed safe level to guide blasting practices and limits suitable for regulations. They account for the widest possible range and worse-case conditions for low-rise residential structures."



Calculated Vibration from Blasting Activities

- Vibration levels from blasting were calculated using the prediction formula from the "Blasters Handbook" by E.I. DuPont de Nemours & Co. This formula is.

  V = 160(R/√W)-1.6

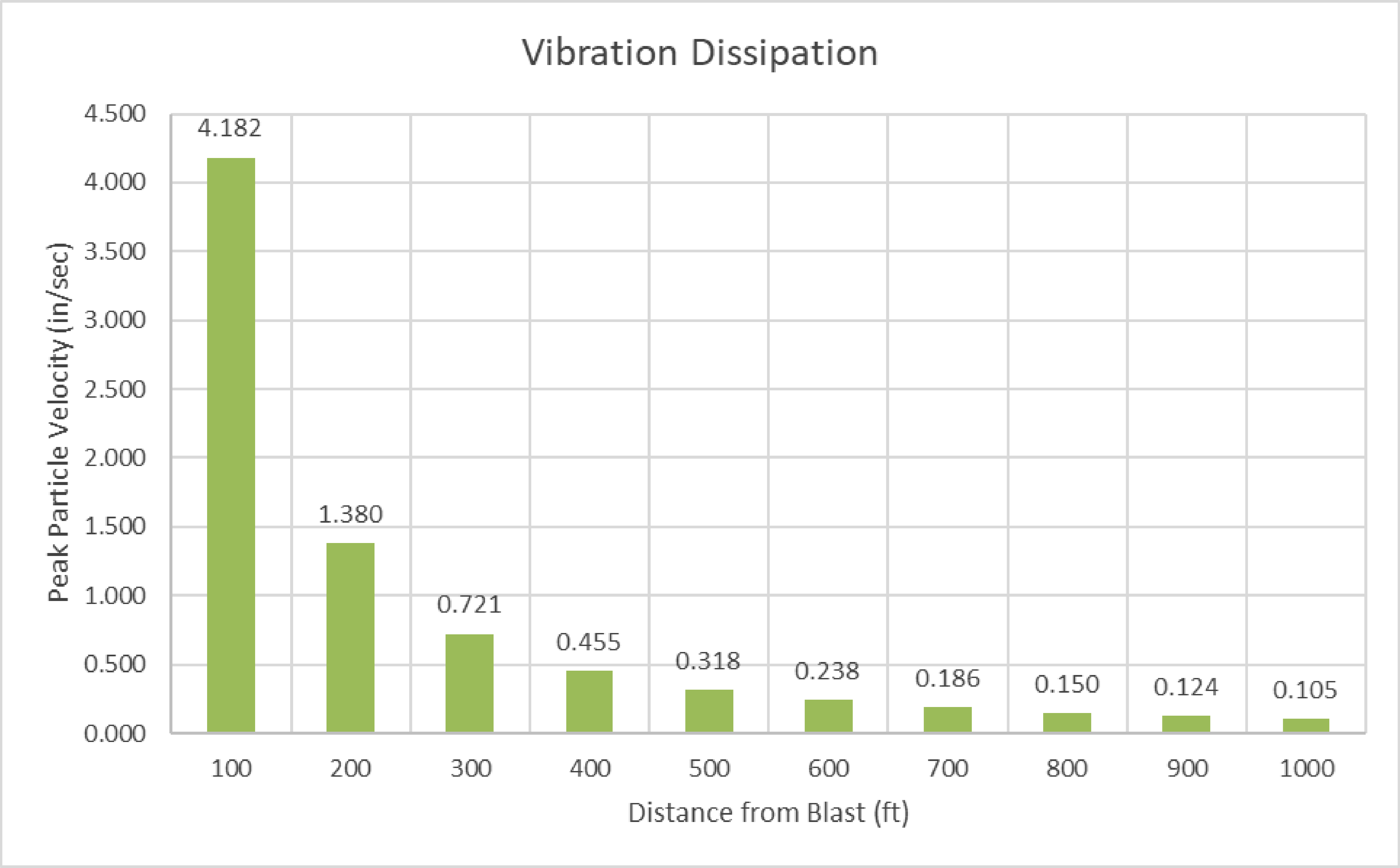
Where:

  V = Peak particle velocity (in/sec)

  R = Distance from blasting (ft)

  W = Maximum weight of explosives per delay (lbs)

Location	Min Distance (ft)	Max/Delay (lbs)	PPV (in/sec)
22 Anderson Drive	260	105.11	0.91
40 Chapman Lane	562	105.11	0.26
89 Point Breeze Road	1018	105.11	0.10


Vibration Dissipation
Peak Particle Velocity (in/sec)
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
4.182
1.380
0.721
0.455
0.318
0.238
0.186
0.150
0.124
0.105
100
200
300
400
500
600
700
800
900
1000
Distance from Blast (ft)

Calculated Vibration from Construction Activities

Construction vibrations were calculated using standard calculations from FTA-VA-90-1003-06 (May 2006) "Transit Noise and Vibration Impact Assessment" by Carl E. Hanson, David A. Towers, and Lance D. Meister sponsored by the U.S. Department of Transportation - Federal Transit Administration (FTA).

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV (equip) is the peak particle velocity in in/sec of the equipment adjusted for distance

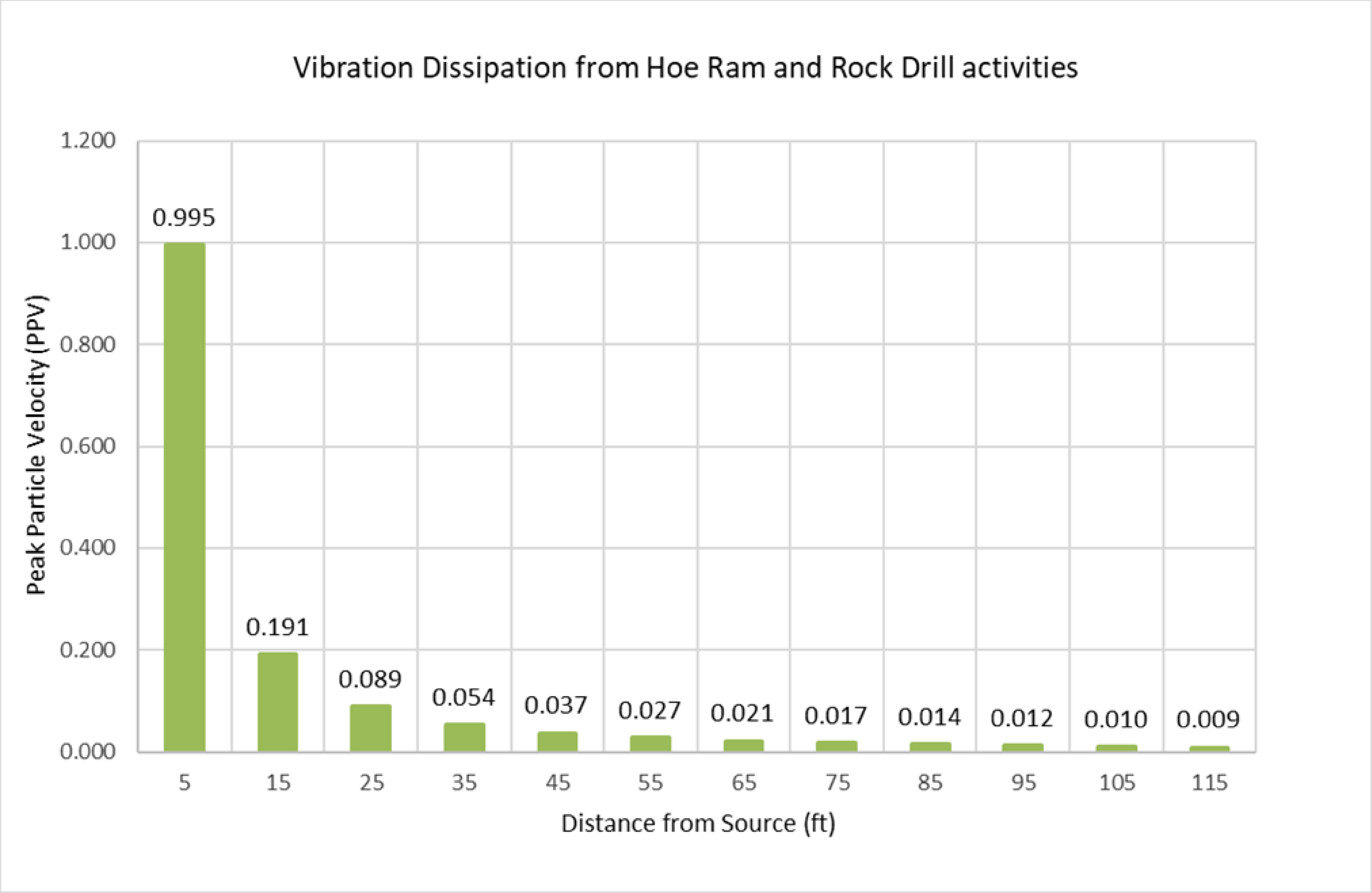
PPV (ref) is the reference vibration level in in/sec at 25 feet from Table 12-2

D is the distance from the equipment to the receiver.

Table 12-2. Vibration Source Levels for Construction Equipment (From measured data.[7,8,9,10])

Equipment		PPV at 25 ft (in/sec)	Approximate L_v† at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

† RMS velocity in decibels (VdB) re 1 micro-inch/second


Vibration Dissipation from Hoe Ram and Rock Drill activities
Peak Particle Velocity (PPV)
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0.995
0.191
0.089
0.054
0.037
0.027
0.021
0.017
0.014
0.012
0.010
0.009
5
15
25
35
45
55
65
75
85
95
105
115
Distance from Source (ft)

Calculated Vibration from Blasting Activities

- The most common regulatory limit for Air Overpressure from blasting is clearly stated by the National Fire Protection Association. “Air overpressure due to blasting operations shall not exceed the maximum limit of 133 dB(L) (0.013 psi) at the location of any building or structure.”
- Damage thresholds for smaller residential-size panes are about 164 dB(L).
- The decibel scale is a logarithmic scale that measures air pressure waves related to the response of the human ear. The force (in pounds per square inch or psi) is more easily understood when considering damage potential. A 130 dB(L) level is about 0.01 psi. An approximate damage threshold of 164 dB(L) is about 0.5 psi – so 50 times higher.
- On a logarithmic scale every 6 dB(L) decrease is cuts the pressure level in half.

    - 133 dB(L) = Regulatory limit
    - 127 dB(L) = ½ (50%) of limit
    - 121 dB(L) = ¼ (25%) of limit

Calculated Air Overpressure from Blasting Activities

Air Overpressure levels were calculated using the open-air prediction formula from the "Blasters Handbook" by E.I. DuPont de Nemours & Co. This formula is: $PU = 82(R/\sqrt[3]{W})^{-1.2}$

Where
- PU = Predicted airblast for unconfined blast (psi)
- R = Distance from blasting (ft)
- W = Max. weight of explosives per delay (lbs)

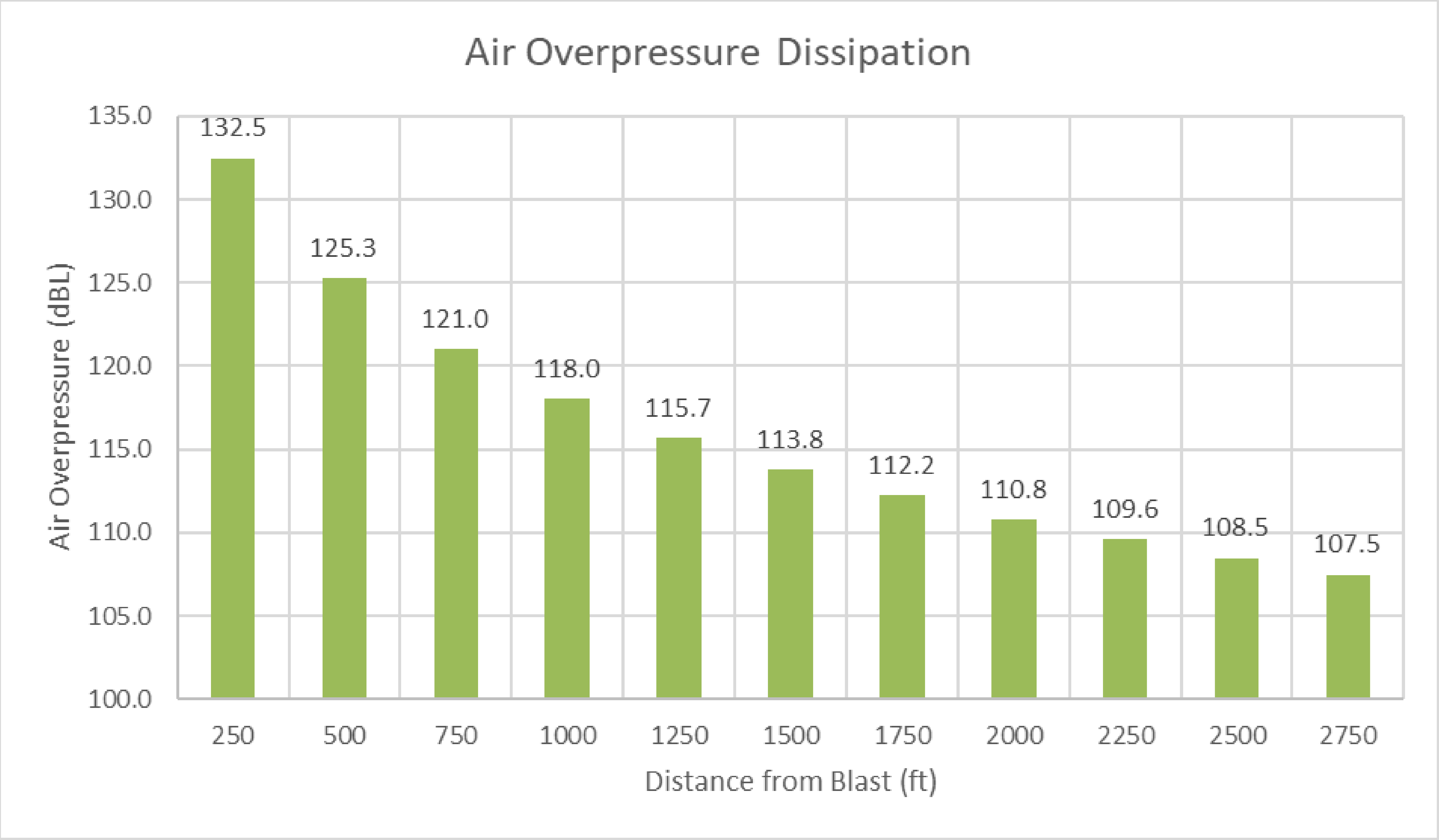
PU is then converted to decibels (dBL) using the formula: $PU(dB) = 100 + 20\log(PU(psi)/0.00029)$

Where
- PU(dB) = Predicted airblast for unconfined blast in decibels (dBL)
- PU(psi) = Predicted airblast for unconfined blast in pounds per square inch (psi)

PU is then reduced by 35 dBL to estimate the confined airblast level in decibels. PC(dBL) = PU(dBL) – 35

Where
- PU(dBL) = Predicted airblast for unconfined blast in decibels (dBL)
- PC(dBL) = Predicted airblast for confined blast in decibels (dBL)

Location	Min Distance (ft)	Max/Delay (lbs)	Airblast (dBL)
22 Anderson Drive	260	105.11	132.24
40 Chapman Lane	562	105.11	124.21
89 Point Breeze Road	1018	105.11	118.02


Air Overpressure Dissipation
Air Overpressure (dBL)
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
132.5
125.3
121.0
118.0
115.7
113.8
112.2
110.8
109.6
108.5
107.5
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
Distance from Blast (ft)

Conclusion

Based on the planned blasting and construction activities and industry standard calculations, vibration levels and air overpressure from blasting and construction activities on this project will remain below regulatory limits and far below threshold damage levels at the adjacent locations.