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, Health & Safety
- 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.

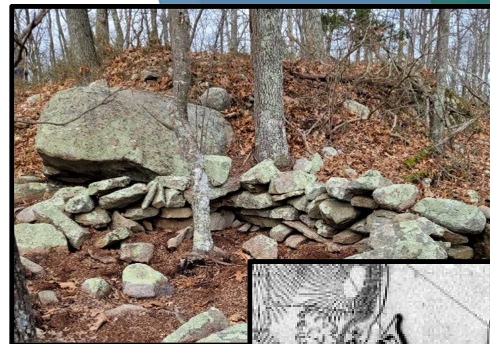
Opportunities are a **moment in time**.

HERITAGE CONSULANTS, LLC

Cultural Context

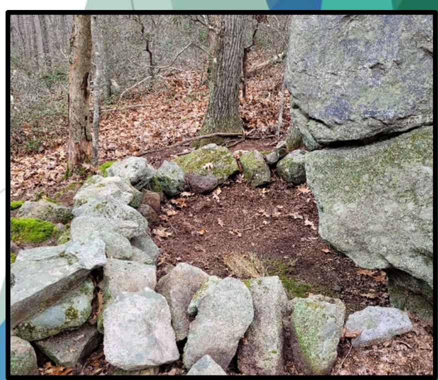
David George, Heritage Consultants
Cultural Resources Coordinator for the Project
34 years experience

Cultural Context of the Project Area
Archaeological Survey of the Project Area



- The Allyn Cemetery will remain undisturbed and accessible
- Mount Decatur is the historical location of Fort Decatur
- Archaeological survey identified Fort Decatur and a Sentry Post
- Report submitted to State Historic Preservation Office (SHPO)
- Project sponsor has met twice with SHPO to consider Project effects
- Heritage Consultants, LLC has completed multiple rounds of field work on the mountain and continues to work with SHPO

HERITAGE CONSULTANTS



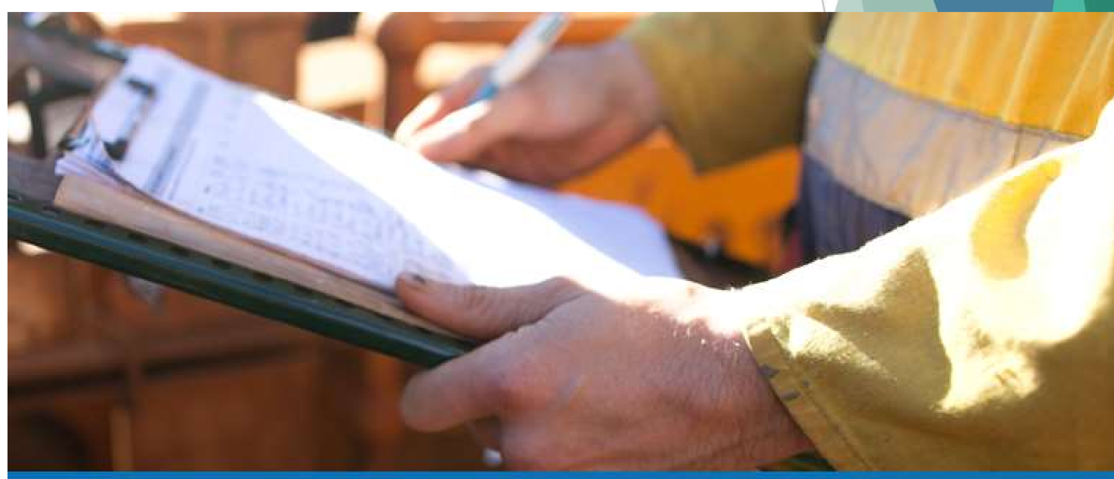
LOUREIRO

Site and Civil Engineering

George Andrews, PE/LEP
Principal Engineer
38 years experience

Site Preparations

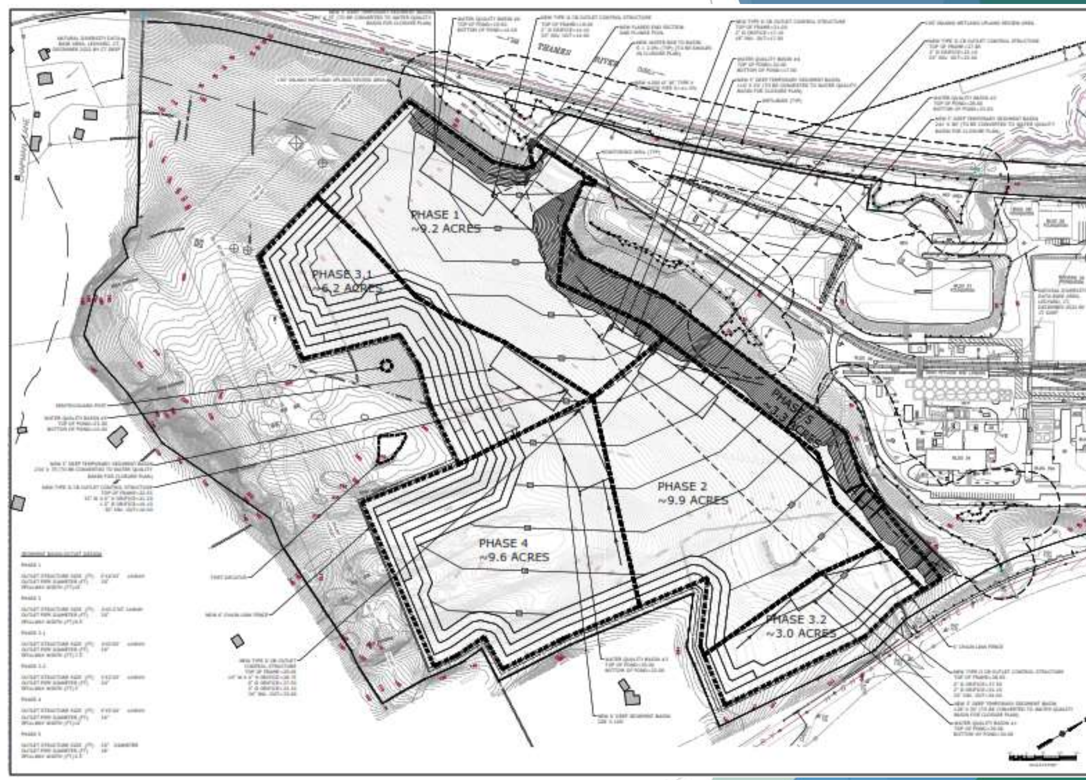
- Coordination with town and acquisition of permits
- Bonding with town
- Preconstruction meeting – soil erosion and sediment controls
- DEEP Construction Stormwater Permit registration
- Construction of the processing area with interim cap
- Erection of processing equipment
- Rail crossing
- Perimeter fence



Loureiro

Excavation Preparations Phase 1

- Clearing the subject area
  - Suitable logs removed from the site
  - Remainder chipped and retained for erosion control or removed from site
- Erosion controls installed intermittently as felling allows
- Temporary sediment trap established at the entrance
- Roots grubbed from the site and ground or disposed of off-site



Loureiro

Excavation Activities

- Topsoil/subsoil stripped, and material hauled to the A-1 stockpile area
  - Temporary seeding on topsoil stockpile
  - Posi-lock or equivalent on subsoil stockpile
  - Double row of mulch sock around stockpiles
- Substratum stripped and material stockpiled in a berm in processing area, remainder shipped off-site via truck/rail
  - Double row of mulch sock around stockpile
- Stormwater confined to the work area
- May be pumped, if necessary, through Frac or dirt-bag

Loureiro

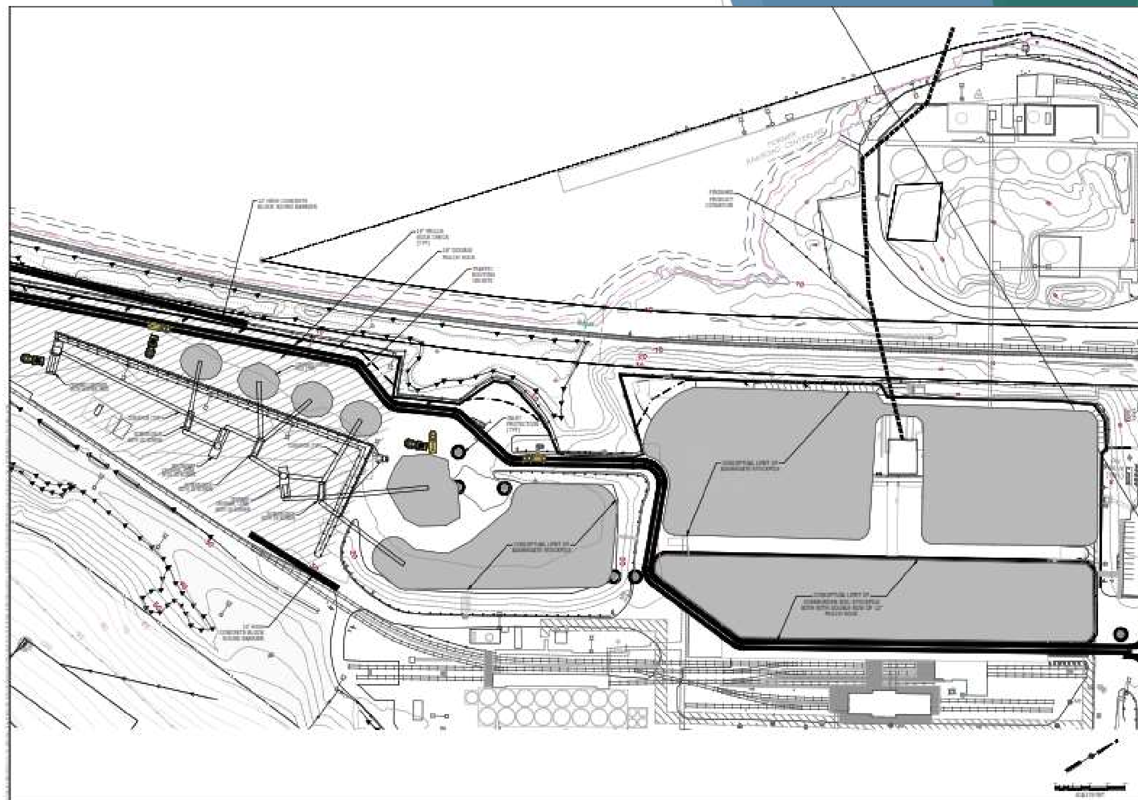
Blasting Activities

- Once bedrock is exposed, begin with blasting operations
- Drilling and blasting – prewetting to mitigate dust generation
- Larger monoliths retained for riprap – remainder to processing
- Material transfer from the blast area to the processing area
  - By front-end loaders
  - By off-road dump trucks
- Material deposited in stockpile in the processing area

Loureiro

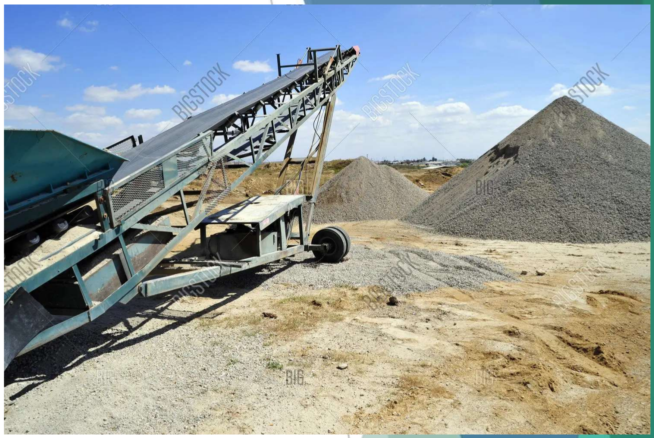
Material Processing

- Primary crushing
  - Misting for dust control
- Secondary and tertiary crushing for material gradation
  - Misting for dust control
- Material transfer for stockpiling
  - By front-end loaders
  - By off-road dump trucks
- Stockpiles maintained on-site within the processing area inside of the perimeter erosion controls



Loureiro

Material Transfer for Barge Transportation



- Trucking (typically larger aggregate materials – resiliency size riprap):
  - Off-road dump trucks/flat-beds loaded at the stockpile area
  - Trucks transport material to the pier
  - Perimeter erosion controls set at pier
  - Spill plates erected to mitigate spillage
  - Hydraulic clamshell buckets used to transfer into barges

- Conveyor (smaller aggregates): [This approach is new to the project]
  - Conveyor loaded within the processing area
  - Conveyors transport material to the pier and directly into the barges
  - Conveyors equipped with spill trays
  - Hydraulic clamshell buckets used to spread material within the barge

Interim Stabilization of Phase 1

- Final Phase 1 area brought to grade
- Stabilized with crushed stone surface
- Sediment ponds constructed and swales/water bars shaped
- Move primary crusher to Phase 1 area
- Erect conveyor from new primary crushing area to secondary and tertiary processing area

Loureiro

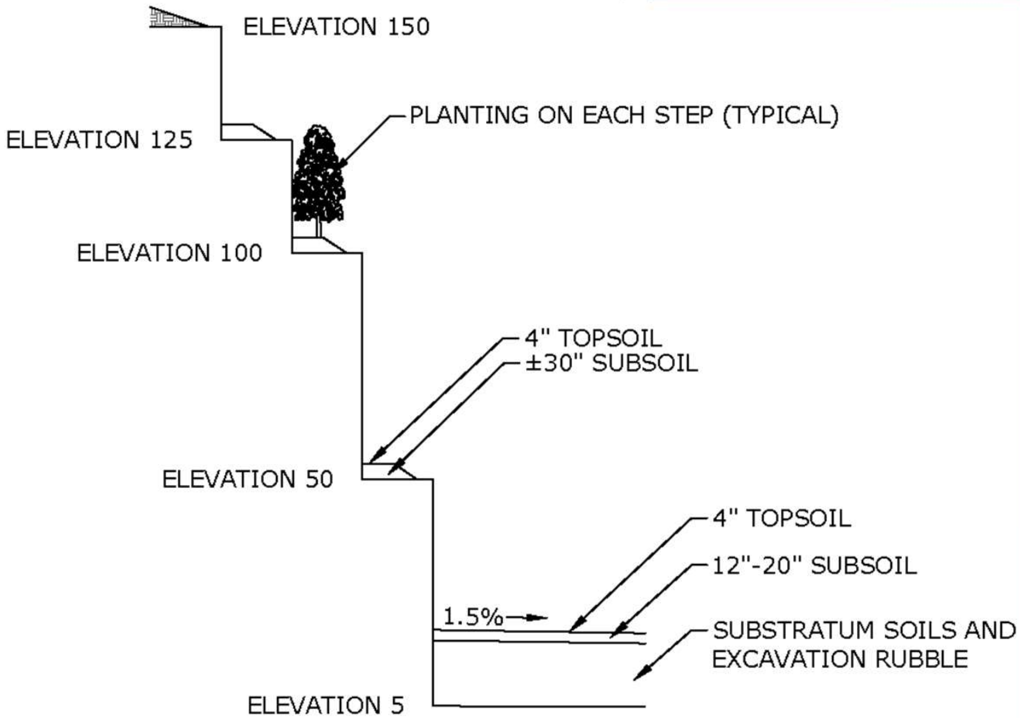
Phases 2 – 4 (Phase 5 is Overburden Only)

- Follows the same procedure, except that a conveyor would transport the smaller blast materials to the processing equipment from the Phase 1 area after primary crushing.
- Conveyor loading within the Phase 1 area
- Process starts over again until Phase 4 is complete
- Phase 5 would be an overburden grading operation only
  - Overburden material shipped off site by truck/rail

Loureiro

Final Surficial Finish

- Final finish of excavation floor will be dressed with subsoil, topsoil and will be seeded – pervious finish
- Excavation benches will be dressed with subsoil, topsoil then landscaped with woody stock and seeded
- All excavating and processing equipment will be removed
- Removal of the interim cap in the processing area

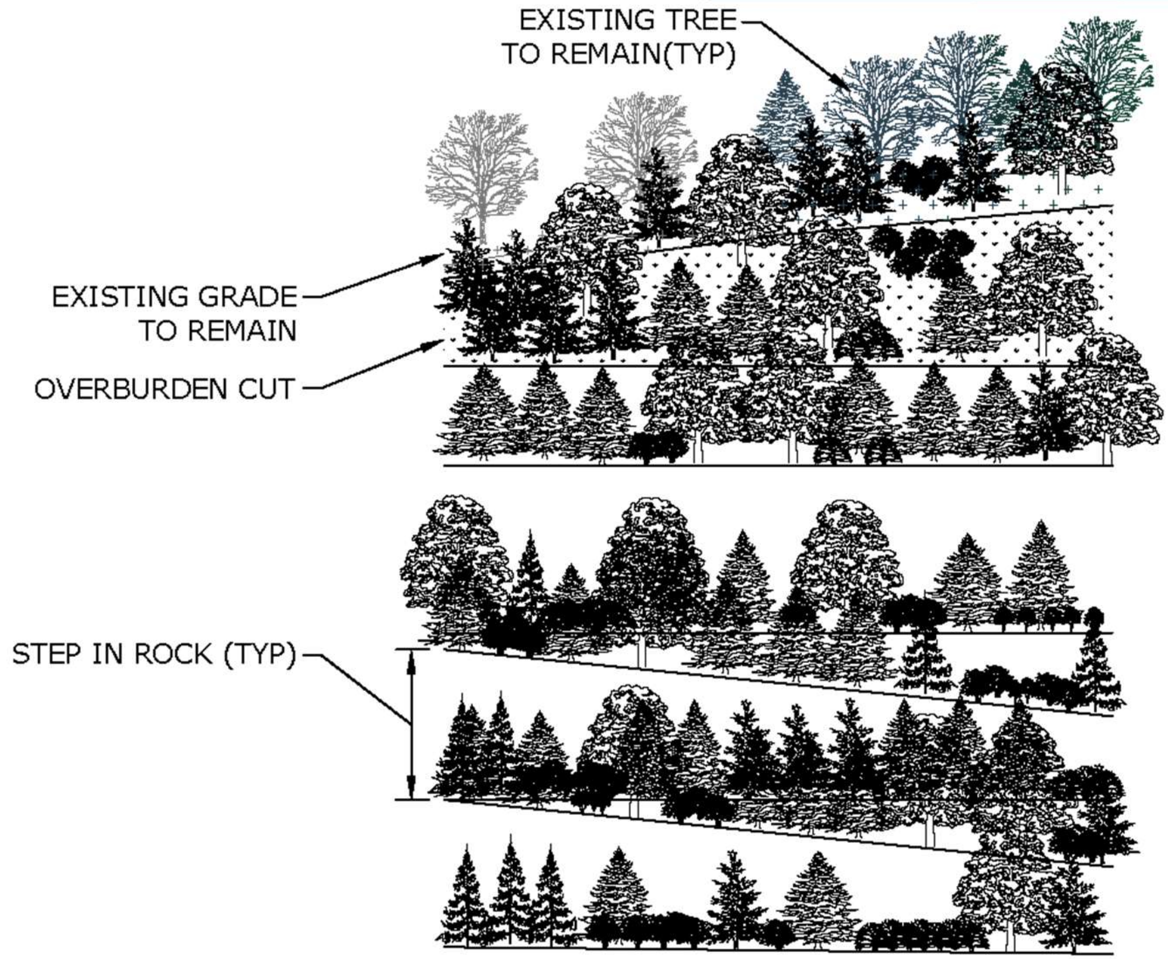


TYPICAL CROSS SECTION EXCERPT
EXCAVATION FLOOR AND WALL

Loureiro

Final Surficial Finish

- Excavation benches will be planted with suitable shrubs and trees to create a more natural canvas across the basted surfaces
- Based upon the proposed final topography, any buildings or appurtenances constructed within the new building envelope would be obscured from view



TYPICAL ROCK BENCH PLANTING: ELEVATION A-A

Loureiro

Soil Erosion & Sediment Controls

- Site is subject to DEEP Construction Stormwater Permit
  - Detailed Stormwater Pollution Prevention Plan
  - Mandatory weekly inspections
  - Mandatory inspections after a rain event that generates a discharge
  - Mandatory reporting to DEEP weekly
- 5 project phases - results in all phases < 10 acres of disturbance (as economically practicable)
- Stabilization of each phase before advancing to the next
- Water bars and mulch socks used for diversion
- 6 permanent sediment basins using the 2023 Soil Erosion & Sediment Control Guidelines
- Basins provide the full water quality volume

Loureiro

Soil Erosion & Sediment Controls

- Outlets to intermittent channel with discharge to same infiltration area as existing conditions
- Once final stabilization is met – transition to detention
- Outcome is a consistent reduction in discharge across the site as tabulated
- Drainage is temporary until site redevelopment is realized
- Soil Erosion & Sediment Control Plan has been enhanced

Loureiro

Grading & Stormwater Management

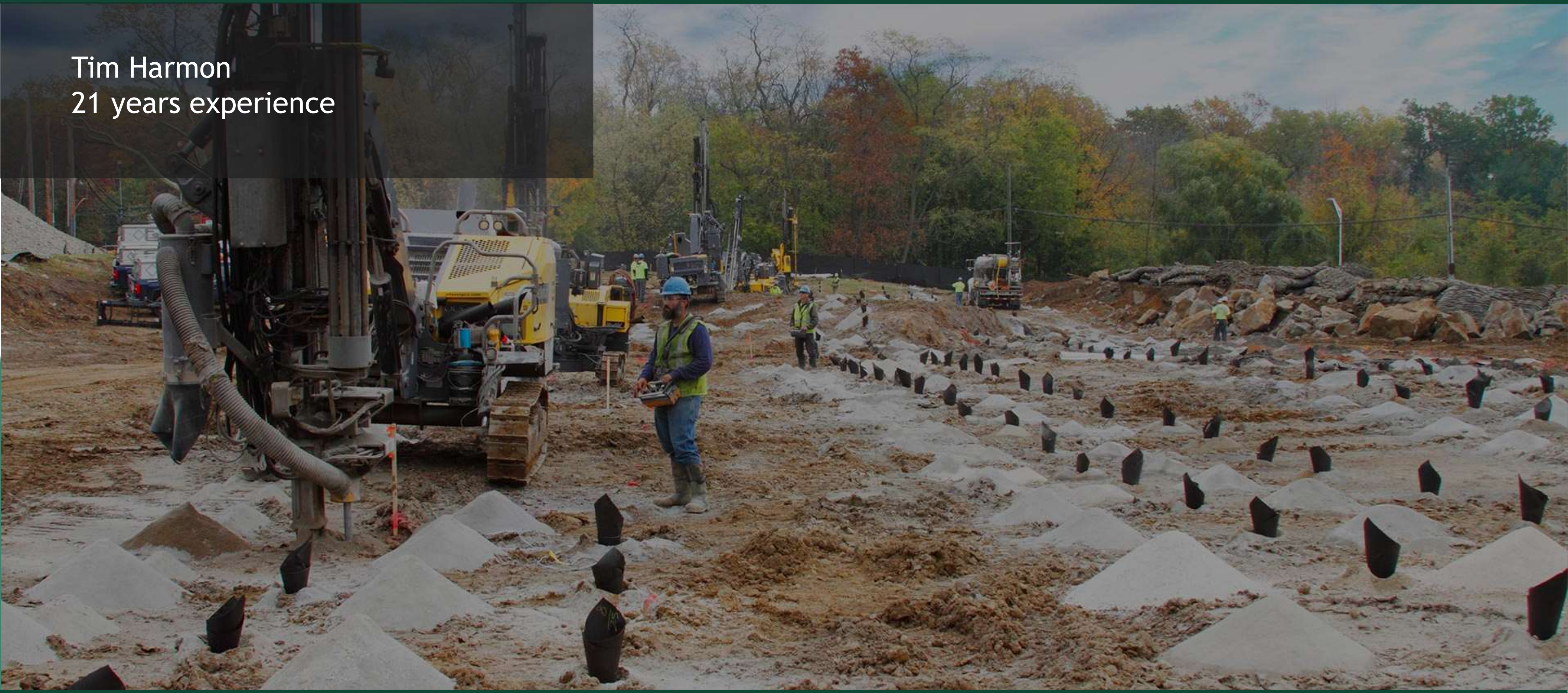
- Bedrock benched at 25'H to 50'V with upper tiers at 25'H to 25'V
- 3 H to 1 V slope in all overburden areas to mitigate erosion
- Fill placed to bring grade back to a 1 ½% interior slope
- Provides overburden soils for foundations and utilities
- Stratified Drift within infiltration areas – excellent infiltration capacity

Table 1 – Peak Flow Comparison, Cubic Feet per Second

	2-Year Event		10-Year Event		25-Year Event		50-year Event		100-year Event	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
West Wetlands (POC 1)	0.69	0.56	7.91	2.88	17.51	11.26	26.55	22.29	37.44	35.89
West Off-Site (POC 2)	0.31	0.17	3.92	1.92	7.82	4.14	11.18	6.16	15.08	8.53
South Off-Site (POC 3)	15.37	10.95	30.07	21.38	39.67	28.19	46.96	33.4	54.78	38.98
Total	16.37	11.68	41.9	26.18	65	43.59	84.69	61.85	107.3	83.4

Loureiro

MAINE DRILLING AND BLASTING



Tim Harmon
21 years experience

Company Overview

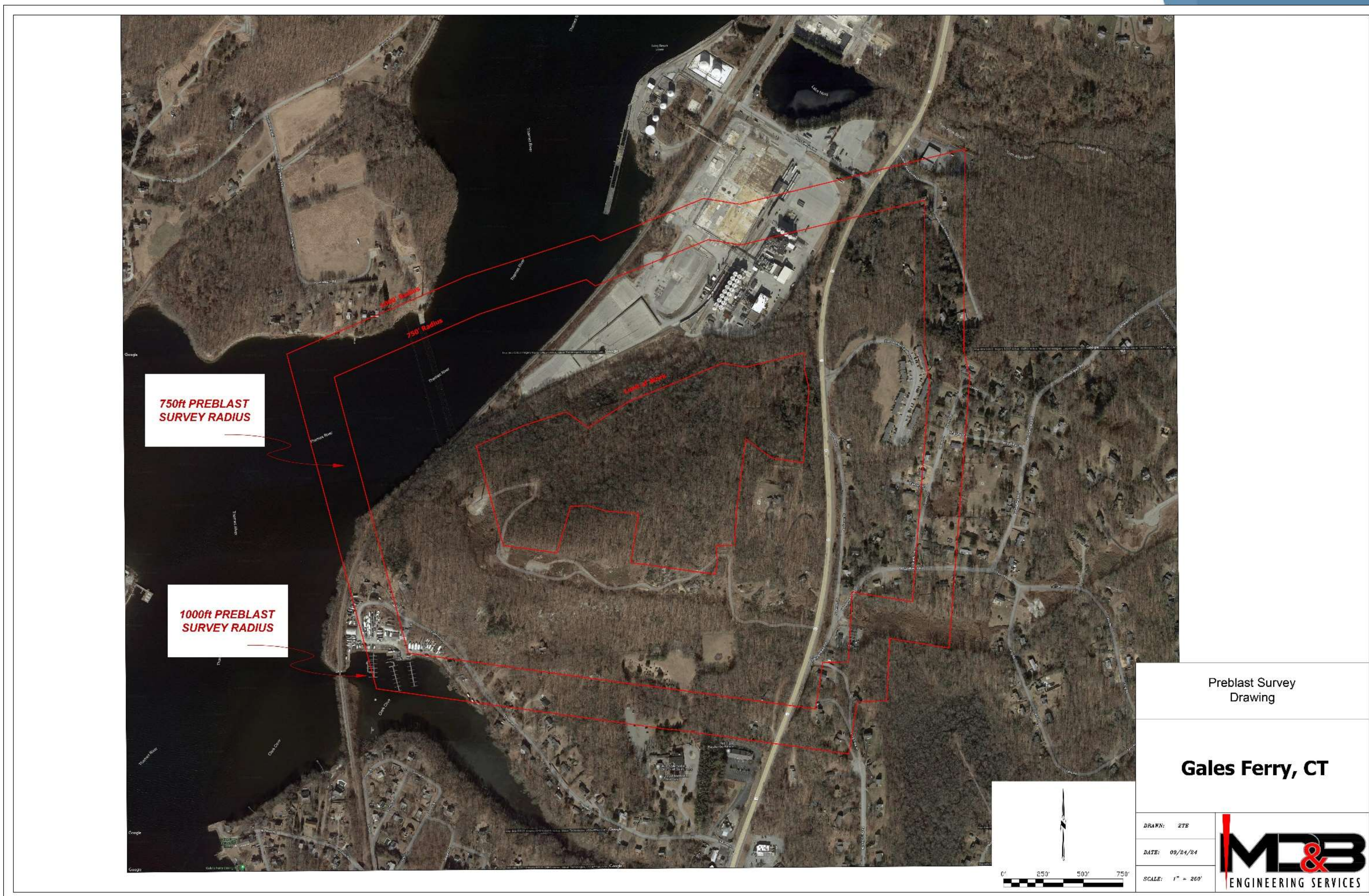
- 58 Years in business
- Diversified throughout the East Coast & Mid Atlantic Region
- 14 Operating divisions
- Local offices, teams and autonomy
- Most experienced drilling and blasting company in the Northeast
- Engineering and Technical Services departments

Blasting Safety

- Pre-Blast Planning
- Hazard Assessment
- Our most important responsibility in working on any jobsite is to identify potential hazards before the project starts.

Pre-Blast Planning / Condition Survey

- Vibration can be perceived at levels as low as 1/100th of the safe level for residential structure.
- When vibration generated from a new blasting operation is initially felt, the natural response of a homeowner will often be a focused inspection of his or her home that will reveal pre-existing but unnoticed cracks (generated by natural environmental forces).
- These pre-existing defects will not be attributed to the project if they are pre-identified in a survey.
- The inspection also identifies surrounding activity, operation or process that the proposed work may need coordination with.


750ft PREBLAST SURVEY RADIUS
1000ft PREBLAST SURVEY RADIUS
750' Radius
Preblast Survey Drawing
Gales Ferry, CT
DRAWN: ZTE
DATE: 09/24/24
SCALE: 1" = 250'
0' 250' 500' 750'
MD&B ENGINEERING SERVICES

Pre-Blast Planning

Blast Design:

- Blast Location
- Distance to Structures
- Geology
- Vibration Estimate Calculations

Pre-Blast Planning

Pre-Blast Design Analysis is used to scale the blast geometry and charge, based on proximity to structure and safe vibration limits

Maine Drilling & Blasting

Pre-Blast Design and Vibration Analysis

Design Name: Gales Ferry

Date: 7/31/2024

Deepest Hole	
Represents the maximum lbs allowed vs. the closest structure	
Desired Scale Distance	24
Actual Distance	650 ft
Max Charge Weight	733.51 lbs
Actual vs Allowed Calculations	
Max Hole Depth	50 ft
Stemming Between Decks	0 ft
Top Stemming	8 ft
Diameter of Hole/Product	4 in
Density	1.26 g/cc
Lbs/ft	6.8645 lbs/ft
Max Allowed Feet of Powder/Delay	42 ft
Decks Required?	No
Actual Total ft. of Product	42 ft
Actual Total lb's of Product/Hole	288.31 lbs
Actual Feet of Product/Deck	42 ft
Actual Lbs/Deck	288.31 lbs
Powder Factor	1.442 lbs/cyd
Yardage per hole	199.94 cyd's
Sq.Ft Per Hole	107.97 sq. ft
Square Pattern	10.39 ft
Burden	9 ft
Spacing	12 ft

Shallowest Hole	
Represents the maximum lbs allowed vs. the closest structure	
Desired Scale Distance	24
Actual Distance	650 ft
Max Charge Weight	733.51 lbs
Actual vs Allowed Calculations	
Max Hole Depth	30 ft
Stemming Between Decks	0 ft
Top Stemming	7 ft
Diameter of Hole/Product	4 in
Density	1.26 g/cc
Lbs/ft	6.8645 lbs/ft
Max Allowed Feet of Powder/Delay	23 ft
Decks Required?	No
Actual Total ft. of Product	23 ft
Actual Total lb's of Product/Hole	157.88 lbs
Actual Feet of Product/Deck	23 ft
Actual Lbs/Deck	157.88 lbs
Powder Factor	1.435 lbs/cyd
Yardage per hole	110.02 cyd's
Sq.Ft Per Hole	99.02 sq. ft
Square Pattern	9.95 ft
Burden	9 ft
Spacing	11 ft

Primary Blast Vibration Analysis

Holes or Decks/Delay Factor	Max lbs/delay	Max ft/delay	Slope:	-1.6		
1	288.31	42		K Value	K Value	K Value
Structure	**Distance**	**Scale Distance**		100	160	242
Structure 1 Distance	650	38.28	Est. PPV	0.293	0.469	0.71
Structure 2 Distance	700	41.23	Est. PPV	0.26	0.417	0.63
Structure 3 Distance	800	47.12	Est. PPV	0.21	0.337	0.509
Structure 4 Distance	900	53	Est. PPV	0.174	0.279	0.422
Structure 5 Distance	1000	58.89	Est. PPV	0.147	0.236	0.356

Alternate Blast Vibration Analysis

Slope	-1.6	
Scale Distance	51.73	
Actual Distance	650	
	K Value	Est. PPV
	100	0.181
	160	0.29
	242	0.438

Pre-Blast Planning

- Safety is the first and foremost priority throughout the entire project.
- Each blast is closely coordinated with local officials and job site management personnel.
- If necessary, nearby property owners and other projects underway are alerted and monitored at the time of the blast to ensure absolute safety for all. Roadway traffic is also controlled if deemed necessary.

MD&B

Measuring Ground and Air Response

Ground Response:

- When an explosive is detonated in rock, energy is released. Some of that energy is absorbed by the rock and transmitted through the ground in the form of a seismic wave.

- As the seismic wave travels outward from its source, ground particles respond. These particles move back and forth ever so slightly, quickly returning back to their original rest position after the seismic wave passes. We sense this oscillation as vibration.

Measuring Ground and Air Response

Air Response (AIR OVERPRESSURE):

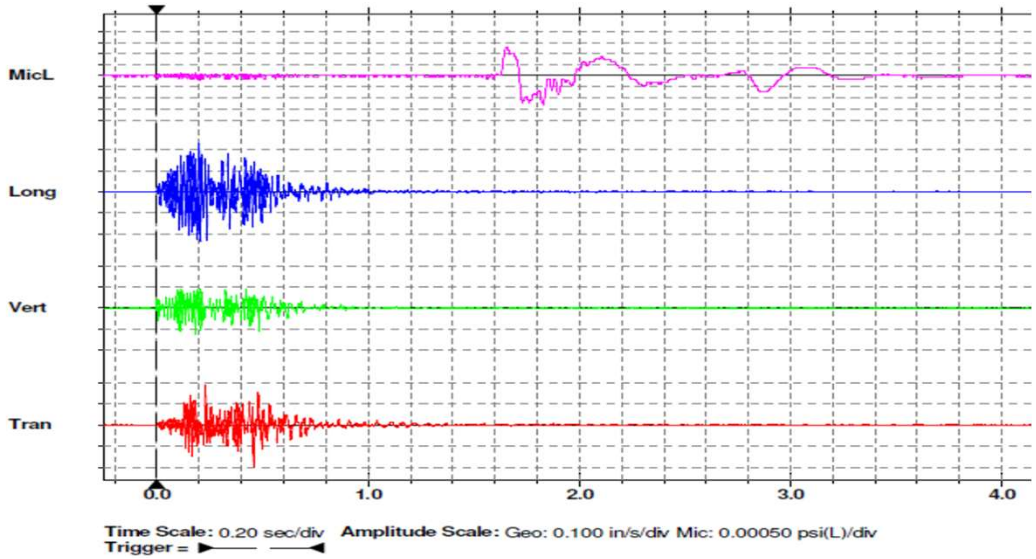
- An airborne pressure pulse resulting from the detonation of explosives. Air blast may be caused by the displacement of the material being blasted or the release of expanding gas into the air.

- Can best be described as distant thunder.

Measuring Ground and Air Response

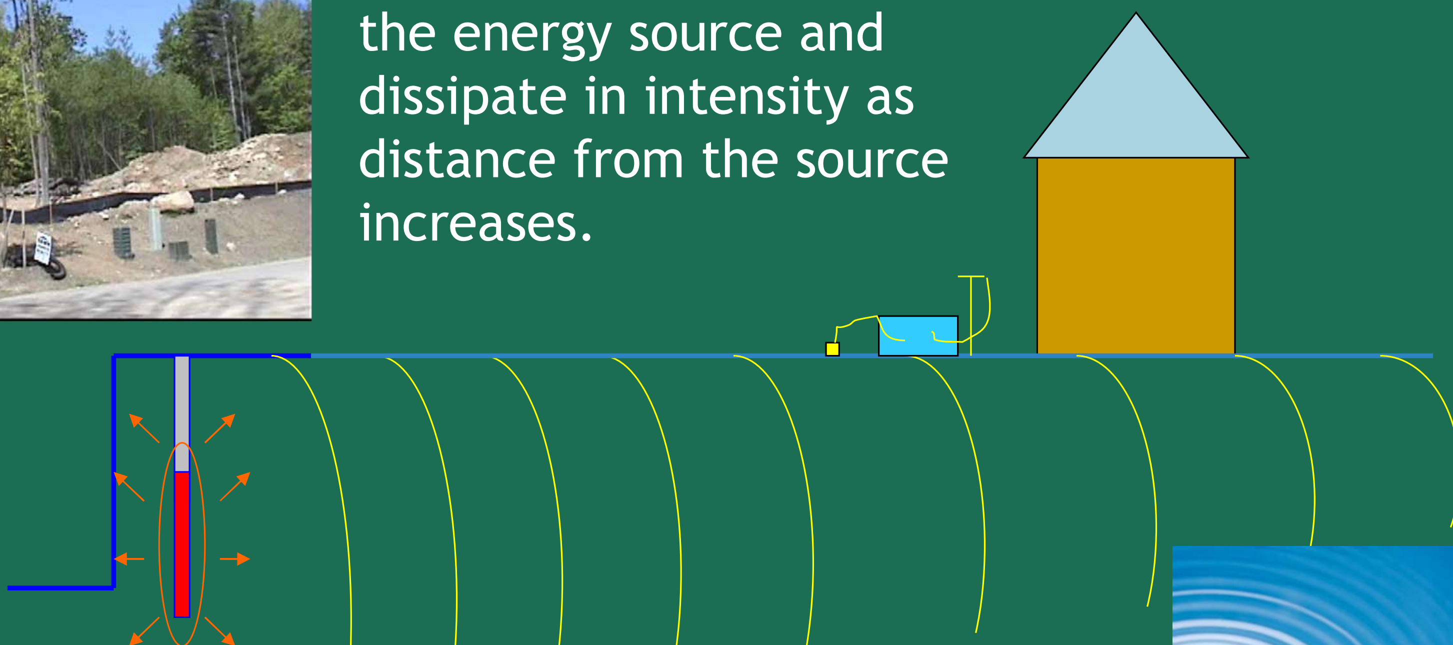
Seismograph Monitoring:

- Provides a permanent record documenting air and ground response



Measuring Ground and Air Response

Energy waves radiate from the energy source and dissipate in intensity as distance from the source increases.

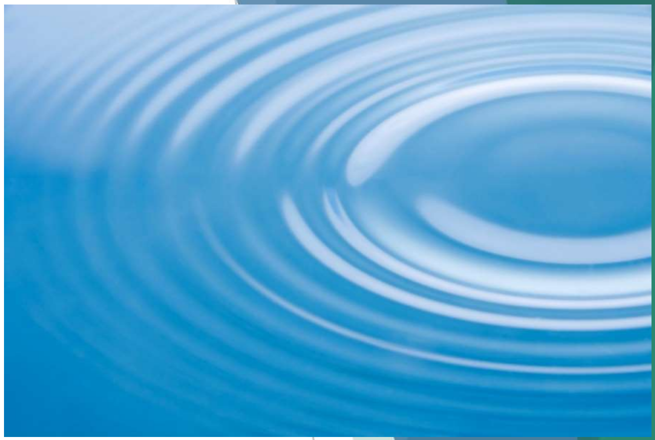


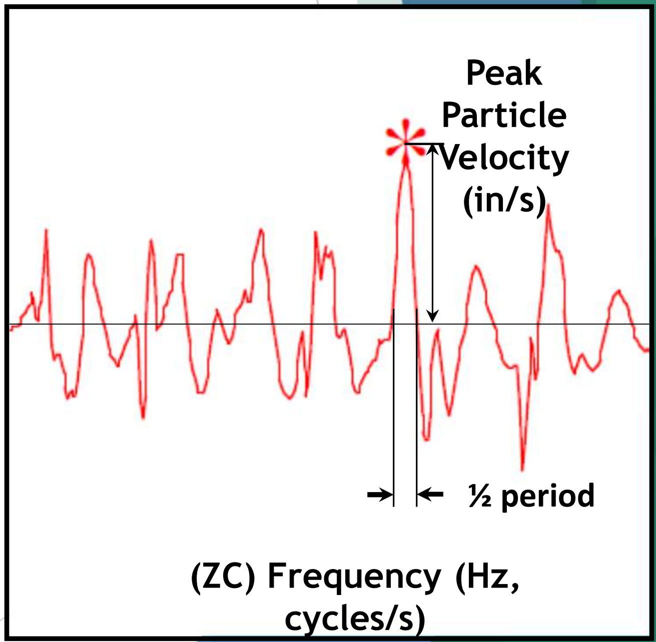
The geology and blast design can influence the rate of deterioration, but as a rule, vibration decreases to one-third of its former value every time the distance doubles.

Measuring Ground and Air Response

Research by the U.S. Bureau of Mines has established safe ground response limits that involve three components of vibration:

- **Particle Velocity:** The speed in inches per second (IPS) the ground is displaced.
- **Frequency:** The number of times the ground moves back and forth in one second.
- **Displacement:** The elastic distance in inches the ground moves from its rest position.





What Research Has Revealed

About Air Response:

- Regulatory bodies recommend a 133 decibel (dB) Air Response Limit based on annoyance level133 dB = to a 27-28 mph wind
- Actual **safe limit 140 dB** (40mph wind)
- Threshold of damage is 151 dB (glass)

What Research Has Revealed

About Ground Response:

- “Safe Limit” 2 IPS (above 40HZ)
- Damage does not occur at 2.1 IPS

What Research Has Revealed

About Ground Response:

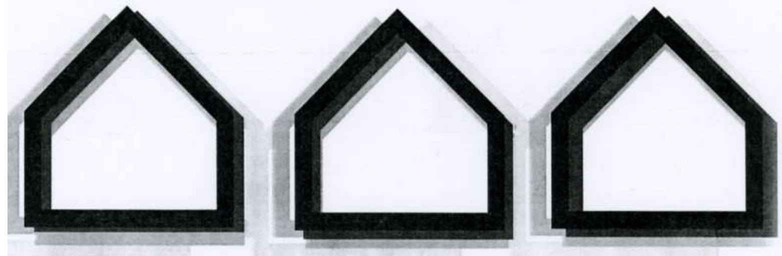
- “Safe Limit” based on weakest building material, old plaster
- Concrete cannot crack before drywall from vibration
- “Safe Limit” for above ground concrete

What Research Has Revealed

About Natural and Human Induced Forces on Structure:

- Temperature change can exert forces greater than 3 IPS on a home
- Humidity change can exert forces greater than 2 IPS on a home
- Wind can exert forces greater than 6 IPS on a home

Natural and Human-Induced



Vibrations in Homes

by David E Siskind

Equivalent vibration velocities based on measurements of house wall responses and/or strains (various sources, in/sec):

From USBM fatigue study test-house in Indiana (RI 8896, Stagg, et all., 1984)	
Slamming of front door	0.15 - 1.9
Jumping on the floor & walking	0.10 - 0.50
Humidity change inside (10 pct)	1.0 - 2.4
Temperature change inside (Δ10°F)	1.0 - 3.2
Wind	0.6 - 2.6
From five homes in Penna (Fang, 1976)	
Temp. and humidity over 7 days	1.75 - 3.1
Auto traffic	0.04 - 0.20
Pushing on the wall	0.025-0.36
From UK studies at Leeds University (White, et al., 1993)	
Outside temperature changes (Δ18°F)	>0.34
Pushing on wall near doorway	0.6 - 1.2
Pushing on wall next to window	2.4
Heel drop and jumping	0.15 - 0.9
From ISEE paper by Simms, et al., 1994	
Closing door	0.3 - 0.45
From Sutherland, et al., 1968	
Wind (50 mph)	1.1 - 6.7
From ISEE paper by Siskind, et al., 1996	
Temperature outside (Δ10°F)	0.5 - 1.7
From Dowding, 1996	
Temperature and humidity	0.75 - 2.6

References

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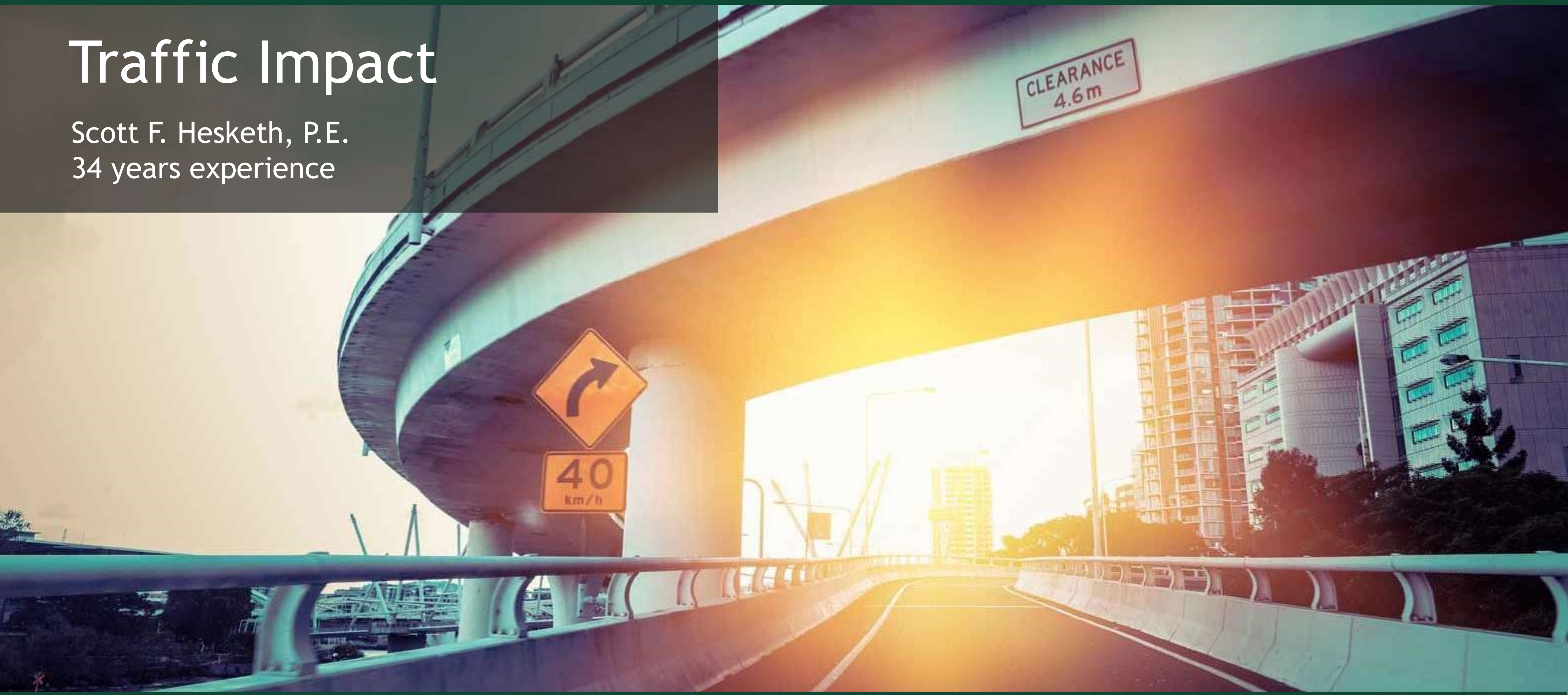
Baldwin Hill Project

F.A. HESKETH & ASSOCIATES, INC.

Traffic Impact

Scott F. Hesketh, P.E.
34 years experience



F.A. Hesketh & Associates, Inc.

- Founded 1976
- Civil Engineers and Land Surveyors
- Specializing in Traffic and Transportation
- Bachelors and Masters of Civil Engineering
- Been with the firm Since 1990 and Manager of Transportation since 2002

FAH
F. A. HESKETH & ASSOCIATES, Inc.
Engineers • Surveyors • Planners • Landscape Architects

Traffic Impact Report

- Traffic Impact Report dated April 2, 2024
- Based on 2024 ConnDOT Counts and 2022 Turning Movement Counts
- Project Related Traffic
  - Limited to 100 Truck Trips per Day (50 in / 50 out)
  - Most product move off-site via rail and barge
  - Peak Hour Volumes of 51 trips, including employees / customers

F. A. HESKETH & ASSOCIATES, Inc.
Engineers • Surveyors • Planners • Landscape Architects

Traffic Impact Report

Capacity Analysis / Reviewed Intersections of:

	AM	PM
▪ Route 12 at 214	LOS B	LOS C
▪ Route 12 at School Driveway	LOS A/D	LOS A/E
▪ Route 12 at Site Driveway	LOS A	LOS A
▪ Route 214 and Military Highway	LOS B	LOS B
▪ Route 214 Hulburt Road	LOS A	LOS A

FAH
F. A. HESKETH & ASSOCIATES, Inc.
Engineers • Surveyors • Planners • Landscape Architects


ROUTE 12
SITE DRIVEWAY

MACCORMACK APPRAISAL SERVICES

MATCHED SALES ANALYSIS

Steven E. MacCormack, Connecticut Certified
General Real Estate Appraiser
26 years experience

MacCormack Appraisal Services

- Founded 2002
- Commercial and Residential Real Estate Appraisal services
- Bachelors of Science and Masters of Education

Matched Sales Analysis

- Matched Sales Analysis dated February 7, 2024

MacCormack Appraisal Services

Matched Sales Analysis

- Assessor's GIS Map
- Subject Property and One Mile Radius

Matched Sales Analysis

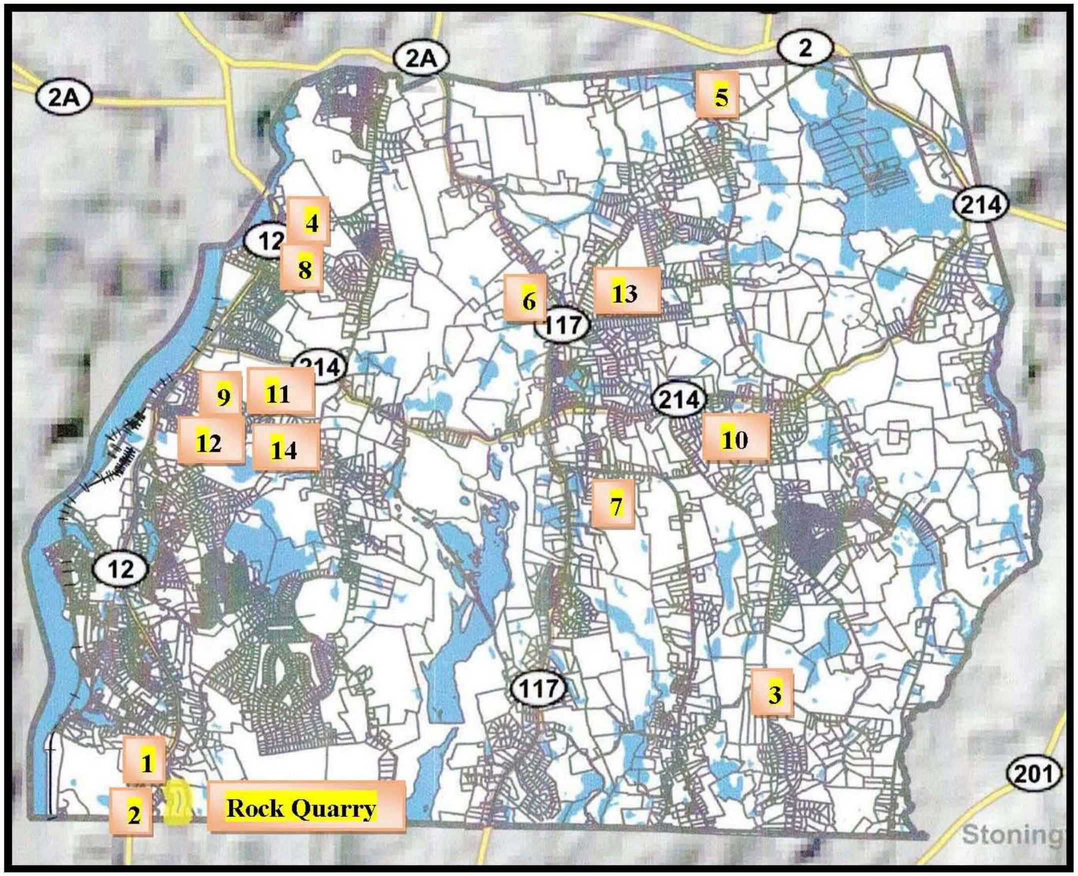
- Comparables Analysis – Ledyard, Connecticut
- Summary of Comparables

SUMMARY OF COMPARABLES
Ledyard, CT
Rock Quarry @ 1340 Baldwin Hill Road

#	Location Address House Style	Sale Date	Size (SF)	Sale Price	Price / SF	Yr. Built Cond.	Bdrms / Baths	Bsmt. / Garage	Wood Deck Chimney	Land (Acres)	Adj. Price/SF
1	1343 Baldwin Hill Rd. Cape Cod	4/28/23	1,382	$300,000	$217.08	1997 Good	3 / 2	768 SF Fin. No Gar.	190 SF 1	0.93 Sloping	**$217.08**
2	1347 Baldwin Hill Rd. Raised Ranch	11/30/23	1,584	$395,000	$249.37	1999 Good	4 / 2	792 SF Fin. 792 SF G	168 SF 0	0.93 Sloping	**$249.37**
3	450 Pumpkin Hill Rd. Cape Cod	12/28/23	1,386	$309,000	$222.94	1955 Avg.	3 / 2	775 SF UF 360 SF G	No Deck 0	0.41 Level	$245.23
4	73 Stonybrook Road Cape Cod	7/31/23	1,382	$370,000	$267.73	1999 Good	4 / 2	768 SF PF No Gar.	120 SF 0	0.63 Level	$267.73
5	1035 Shewville Road Cape Cod	6/15/23	1,021	$255,000	$249.76	1955 Avg.	3 / 1.5	638 SF UF 240 SF G	No Deck 0	0.30 Level	$274.74
6	893 Col. Ledyard Hwy. Cape Cod	5/23/23	1,248	$184,500	$147.84	1939 Avg.	3 / 1	720 SF UF 252 SF G	No Deck 1	1.57 Level	$162.62
7	20 Center Drive Cape Cod	5/16/23	1,306	$285,000	$218.22	1957 Good	4 / 2	528 SF Fin. 288 SF G	No Deck 0	0.27 Level	$218.22
8	18 Stonybrook Road Raised Ranch	11/21/23	1,338	$400,000	$298.95	1965 Good	3 / 2.5	1,248 SF PF 672 SF G	220 SF 1.5	1.07 Level	$284.00
9	17 West Drive Raised Ranch	11/6/23	1,390	$315,000	$226.62	1961 Good	3 / 2	1,288 SF PF 288 SF G	112 SF 1	0.46 Level	$237.95
10	60 Highland Drive Raised Ranch	10/17/23	1,028	$319,900	$311.19	1965 Good	4 / 2	960 SF PF No Gar.	120 SF 0	0.31 Level	$326.75
11	30 Robinhood Drive Raised Ranch	10/5/23	1,344	$371,000	$276.04	1973 Good	3 / 2	924 SF PF 420 SF G	No Deck 1	0.99 Level	$289.84
12	22 Ledgewood Drive Raised Ranch	8/24/23	1,056	$310,000	$293.56	1963 Good	4 / 1	704 SF PF 264 SF G	100 SF 1	0.26 Level	$308.24
13	5 Silas Deane Road Raised Ranch	9/12/23	1,416	$337,000	$237.99	1970 Avg.	3 / 2.5	648 SF Fin. 672 SF G	No Deck 1.5	0.94 Level	$249.89
14	31 Partridge Hollow Raised Ranch	2/9/23	1,154	$256,500	$222.27	1974 Good	4 / 2	816 SF Fin. 288 SF G	474 SF 1 IG Pool	0.60 Level	$188.93

Matched Sales Analysis

- Comparables Location Map – Ledyard, Connecticut



Matched Sales Analysis

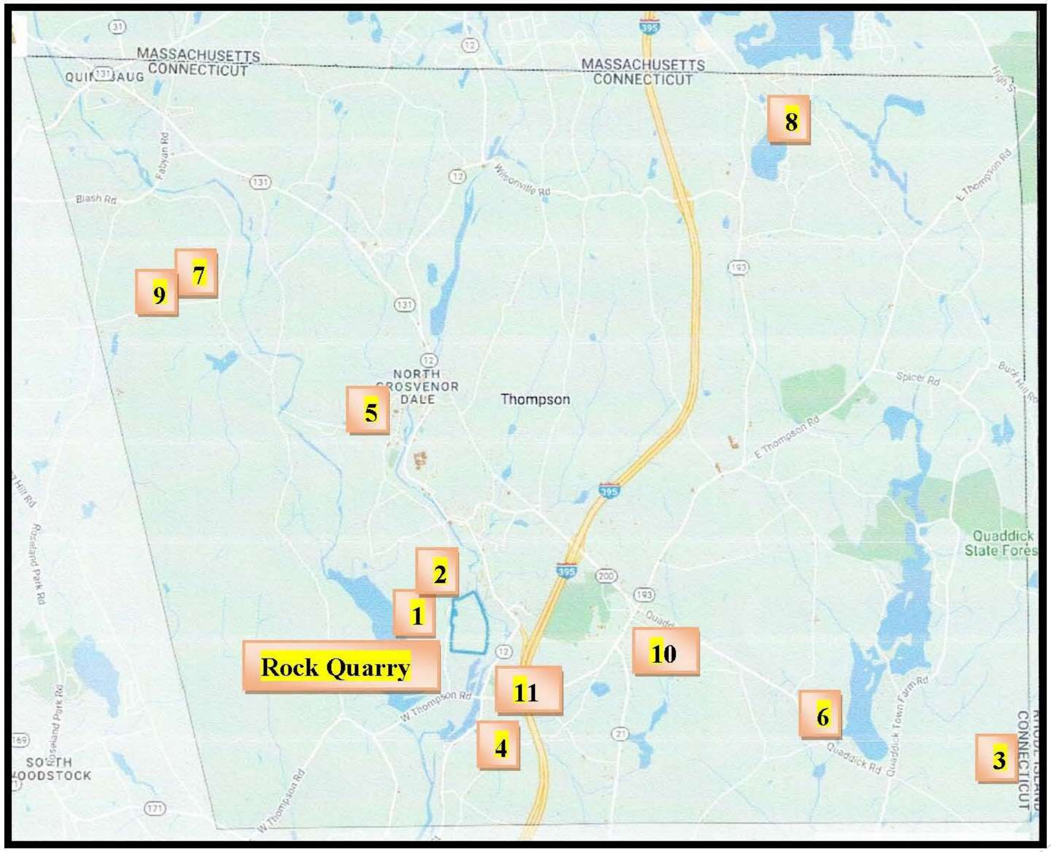
- Comparables Analysis – Thompson CT
- Summary of Comparables

SUMMARY OF COMPARABLES
Thompson, CT
Rock Quarry @ 307 Reardon Road

#	Location Address House Style	Sale Date	Size (SF)	Sale Price	Price / SF	Yr. Built Cond.	Bdrms / Baths	Bsmt. / Garage	Wood Deck Chimney	Land (Acres)	Adj. Price/SF
1	346 Reardon Road Cape Cod	2/27/23	1,487	$410,000	$275.72	1988 Avg.	3 / 2	986 SF UF 575 SF G	368 SF 1	2.50 Level	**$317.08**
2	320 Reardon Road Raised Ranch	12/16/22	2,068	$395,000	$191.01	1974 Avg.	4 / 2.5	1,496 SF PF 572 SF G	Patio 0	1.90 Level	**$219.66**
3	76 Border Trail Ranch	1/19/24	1,674	$363,600	$217.20	1963 Avg.	3 / 2	1,674 SF PF No Gar.	No Deck 0	7.60 Level	$217.20
4	170 Ballard Road Colonial	1/10/24	1,997	$375,000	$187.78	1805 Av.-Gd.	4 / 2	832 SF UF No Gar.	192 SF 0	1.91 Level	$197.17
5	62 Red Bridge Road Colonial	12/22/23	1,836	$265,000	$144.34	1929 Avg.	3 / 1.5	484 SF UF No Gar.	320 SF 1	1.60 Level	$165.99
6	32 Townes Lane Conventional	12/5/23	1,371	$205,000	$149.53	1880 Avg.	2 / 1	740 SF UF 1,428 SF G 320 SF Barn	257 SF 0	4.00 Level	$134.58
7	266 Fabyan Road Ranch	10/27/23	1,902	$265,000	$139.33	1971 Avg.	5 / 1	720 SF UF 320 SF G	40 SF 0	4.99 Level	$139.33
8	38 Sand Dam Road Cape Cod	10/24/23	1,359	$405,000	$298.01	1940 Avg.	2 / 2	486 SF UF 621 SF G	192 SF 0	1.50 Level	$312.91
9	90 Hagstrom Road Ranch	10/11/23	1,494	$330,000	$220.88	1956 Avg.	2 / 1	1,062 SF UF 240 SF G 855 SF Barn	Patio 0	4.00 Sloping	$220.88
10	59 Quaddick Road Split Level (Brick)	8/31/23	1,760	$430,000	$244.32	1969 Av.-Gd.	3 / 2	1,188 SF UF 520 SF G	EF Porch 1.5	4.21 Level	$232.10
11	199 Thompson Road Ranch	8/25/23	864	$292,900	$339.00	1987 Avg.	3 / 1.5	864 SF PF 880 SF G	Patio 0	1.85 Level	$322.05

Matched Sales Analysis

- Comparables Location Map – Thompson, Connecticut



Matched Sales Analysis

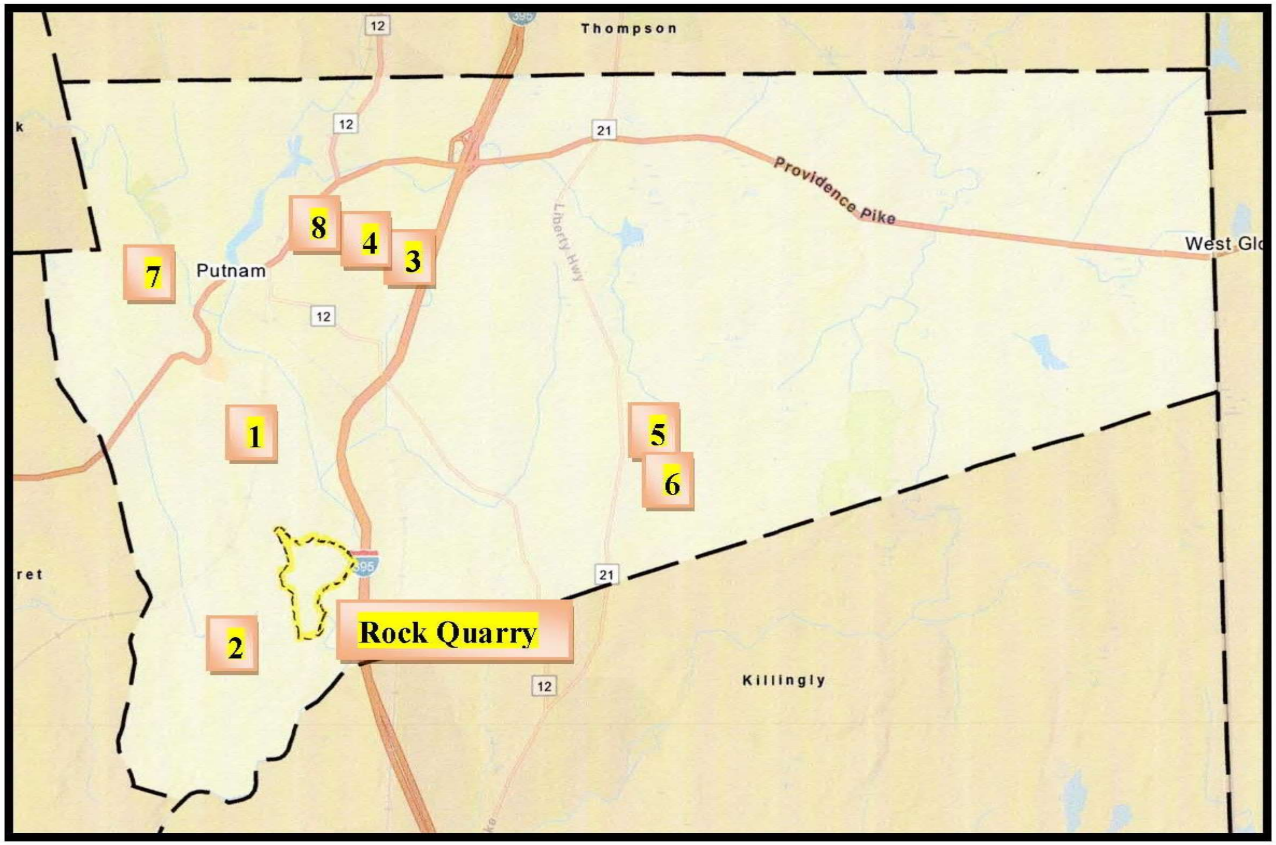
- Comparables Analysis
- Summary of Comparables – Putnam Connecticut

SUMMARY OF COMPARABLES
Putnam, CT
Rock Quarry @ 150 Technology Park Drive (79 Town Farms Road)

#	Location Address House Style	Sale Date	Size (SF)	Sale Price	Price / SF	Yr. Built Cond.	Bdrms / Baths	Bsmt. / Garage	Wood Deck Chimney	Land (Acres)	Adj. Price/SF
1	10 River Road Victorian	10/11/22	2,361	$387,000	$163.91	1870 Good	4 / 2.5	1,296 SF UF No Gar. 960 SF Barn	105 SF 1	3.10 Level	**$188.50**
2	341 River Road Colonial with Cottage	8/11/23	3,860	$643,000	$166.58	1726 V. Gd.	5 / 4.5	1,504 SF UF 672 SF G 1,920 SF Barns 608 SF Shed	Patio 8	13.34 Sloping	**$166.58**
3	8 Genevieve Street Conventional	1/17/24	2,064	$370,000	$179.26	1867 V. Gd.	4 / 2	1,032 SF UF No Gar.	108 SF 0	0.30 Level	$197.19
4	4 Genevieve Street Conventional	12/14/23	2,180	$325,000	$149.08	1867 Avg.	4 / 1.5	964 SF UF 209 SF	120 SF 0	0.17 Level	$163.99
5	43 Five Mile River Rd. Split Level	11/17/23	2,060	$450,000	$218.45	1963 Good	3 / 3.5	364 SF UF 576 SF G 540 SF Shed	256 SF 1	2.71 Level	$229.37
6	84 Aspinock Road Raised Ranch	11/17/23	2,794	$215,000	$76.95	1979 Fair	5 / 2	120 SF UF No Gar. 200 SF Barn	704 SF 0	2.27 Level	$92.34
7	22 Underwood Road Conventional	10/30/23	3,024	$215,000	$71.10	1860 Fair	6 / 2.5	1,392 SF UF No Gar.	184 SF 0	0.59 Level	$85.32
8	225 School Street Conventional	7/28/23	2,514	$330,000	$131.26	1900 Avg.	4 / 1.5	1,010 SF UF 360 SF G	180 SF 1	0.23 Level	$144.38

Matched Sales Analysis

- Comparables Location Map – Putnam, Connecticut



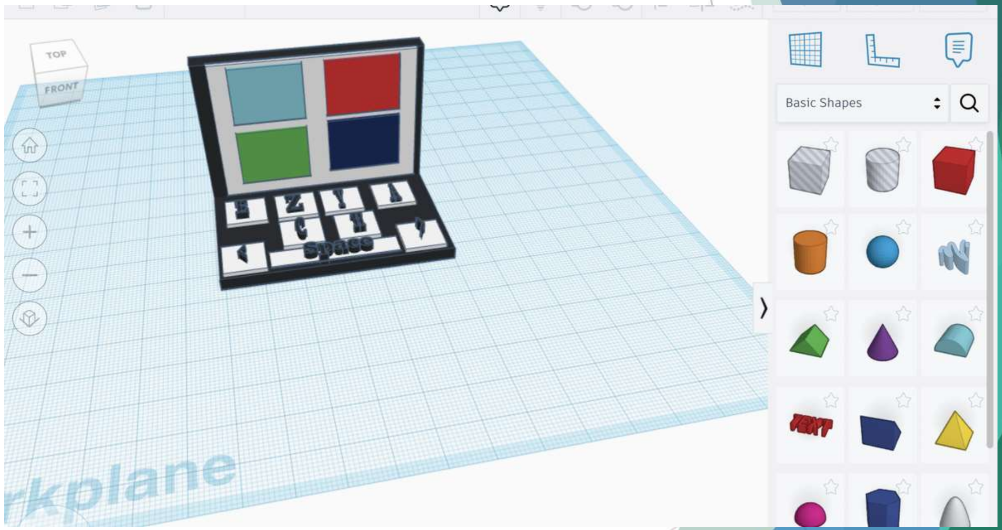
VERDANTAS, LLC

AIR MODELING

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

Overview

- What is the Purpose of Air Emissions Modeling?
- What Was Modeled and How?
- What Were the Results?



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Purpose

I. To calculate predicted actual air emissions from the site activities

II. To model the dispersion of the actual air emissions from the site

III. To evaluate if the predicted air emissions would impact human health through inhalation

Purpose

I. To Calculate the Predicted Air Emissions From the Excavation Activities

1. Look at operational layout (scenarios) to identify worst-case settings (i.e., equipment closest to abutters)

   - Drilling and blasting along property boundary
   - Materials processing equipment remains stationary at base of site
   - Dust generated from truck traffic on-site – routes changed during each phase
   - Aggregate storage piles remains stationary at base of site

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Purpose

2. Compile air emission factors for each type of operation at the site
   - Looking at “particulate” emissions
   - Emission Factors are from the United States Environmental Protection Agency (USEPA) and industry standards used for air permitting throughout the US
   - Factors represent quantity of particulates generated based upon quantity of product processed

3. Calculate equipment specific hourly and annual emission rates
   - Pounds of particulate per hour, day, and year for each operation

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Purpose

II. To Model the Dispersion of the Air Emissions Across the Site

1. Identify property boundaries and potential “receptors” (i.e., where people could be located – home, school, business, etc.)

2. Build a computer model of the operations using a modeling software that is used by the USEPA and State Agencies
   - Intended to describe surface-level concentrations of air emissions based upon the last 5 years of weather data to predict future conditions
   - Incorporates data collected by Connecticut Department of Energy and Environmental Protection (CTDEEP) (weather, wind, topography)
   - Incorporates local site conditions (ambient air concentrations, nearby buildings, emission characteristics like height and quantity)

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Purpose

3. Run the Model for various operating scenarios, assuming maximum capacity

NOTE: The Facility will not be using diesel fired stationary equipment (i.e., generators, engines) but electric. This will cut PM emissions as well as significantly cut nitrous oxide (NOx) emissions from the site (a byproduct of fuel combustion).

4. Add together the results of the modeled air emissions from the site to existing background concentrations – To see potential impact of “adding” the site operations

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Purpose

III. To Evaluate if the Predicted Air Emissions Would Impact Human Health Through Inhalation

Compare model results to United States Environmental Protection Agency (USEPA) Established and State Limits

- National Ambient Air Quality Standards (NAAQS) – concentrations limits set to be protective of human health
- Results that are below the NAAQS, “provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly.” https://www.epa.gov/criteria-air-pollutants/naaqs-table

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What Was Modeled and How?

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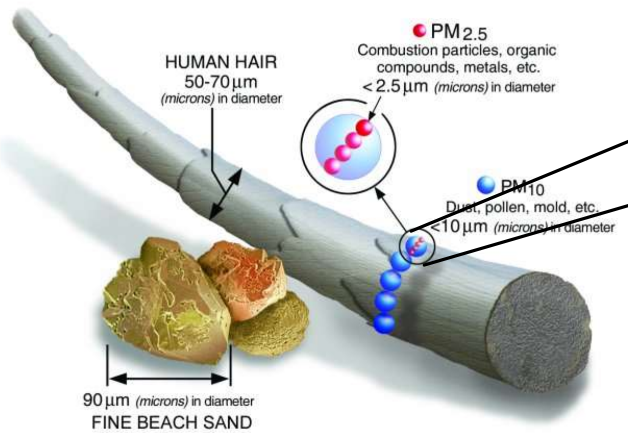
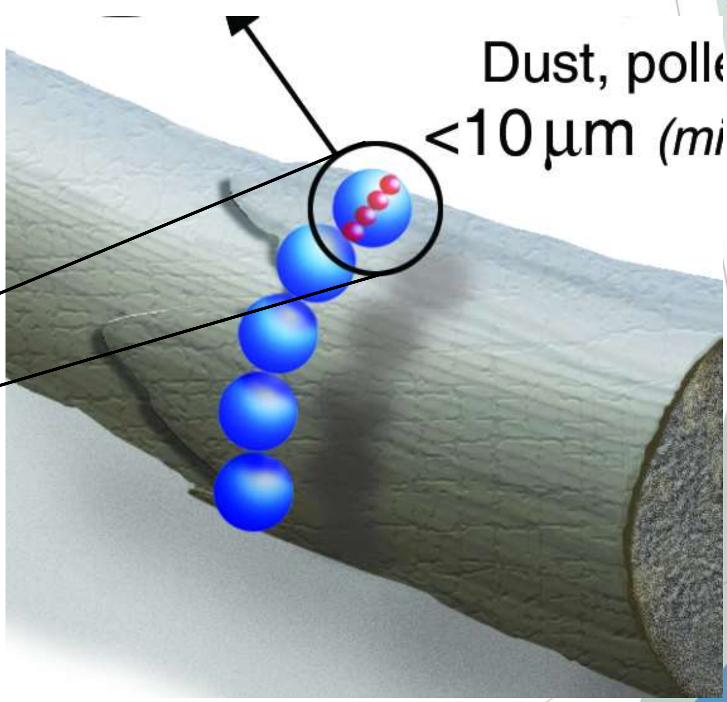
What was Modeled and How?

- Particulate Matter
  - Very small solid and liquid particles dispersed in air
  - PM10 = 10 micrometer diameter
- PM2.5 = 2.5 micrometer diameter
- From USEPA.gov:





μ = micro, or 1 millionth

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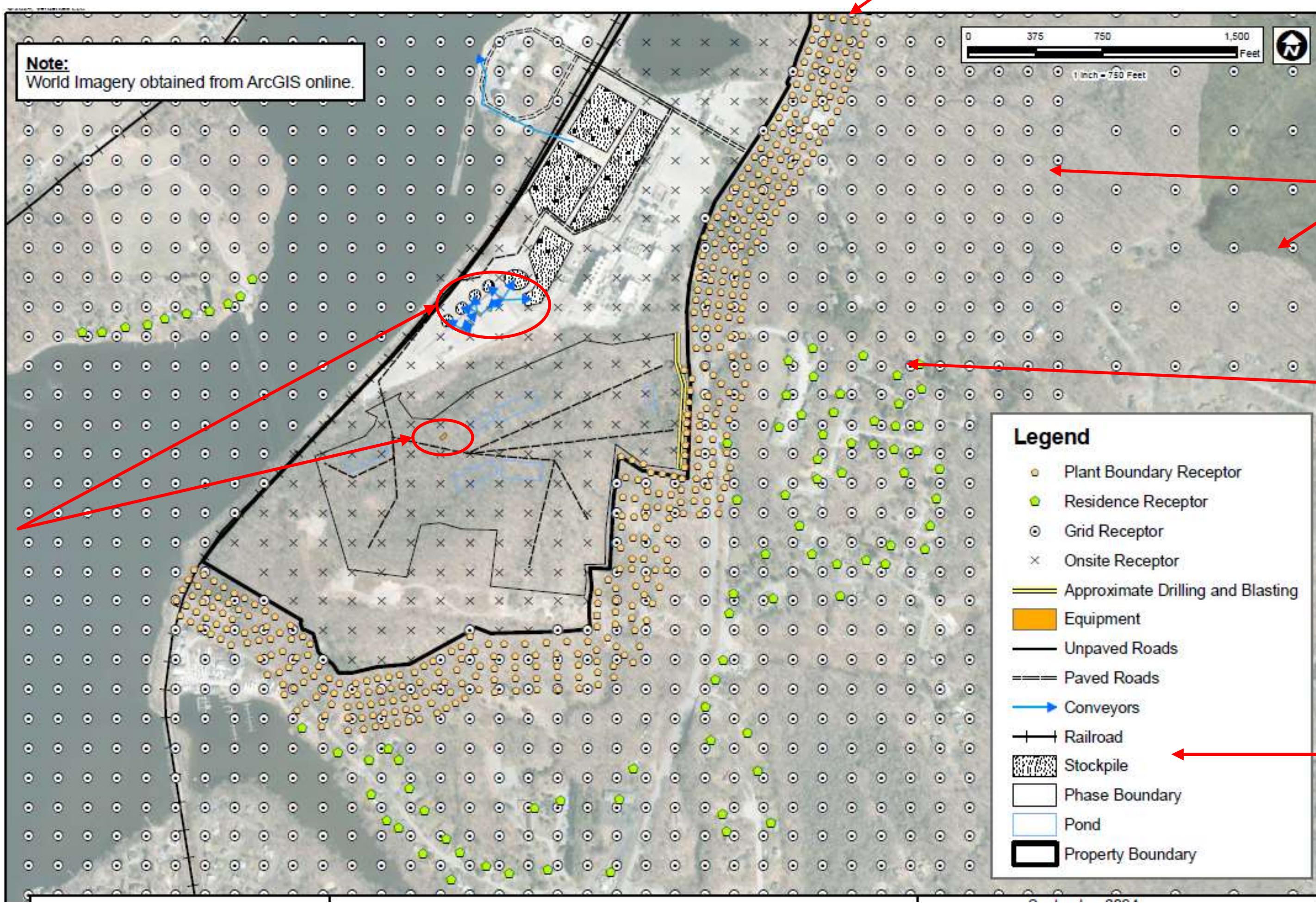
Model Grid / Layout

Boundary receptor grid for higher result resolution



Standard receptor grid

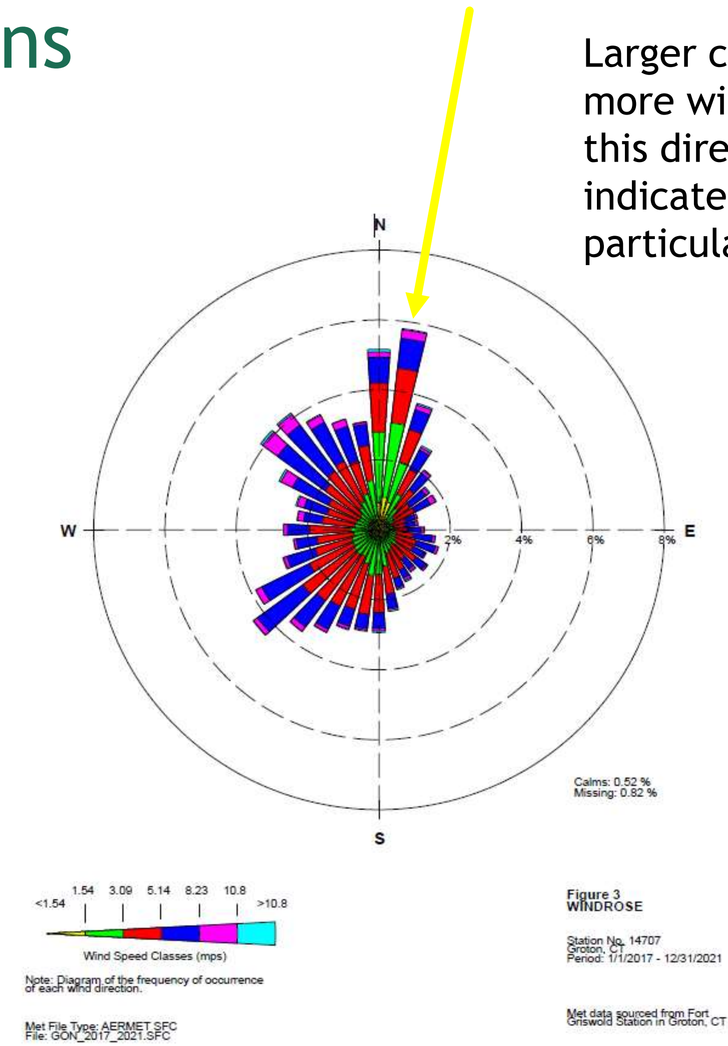
Additional receptors at residence locations

Processing equipment locations

Note: topography adjusted to match planned excavation

Prevailing Wind Conditions

- Major driver for dispersion direction and magnitude
- Closest official weather station: Fort Griswold in Groton, CT
  - ~6 miles downstream on the Thames River
  - Discussion with CTDEEP confirmed to use this station



Larger colored lines means more wind coming from this direction. Colors indicate percentage of a particular wind speed.

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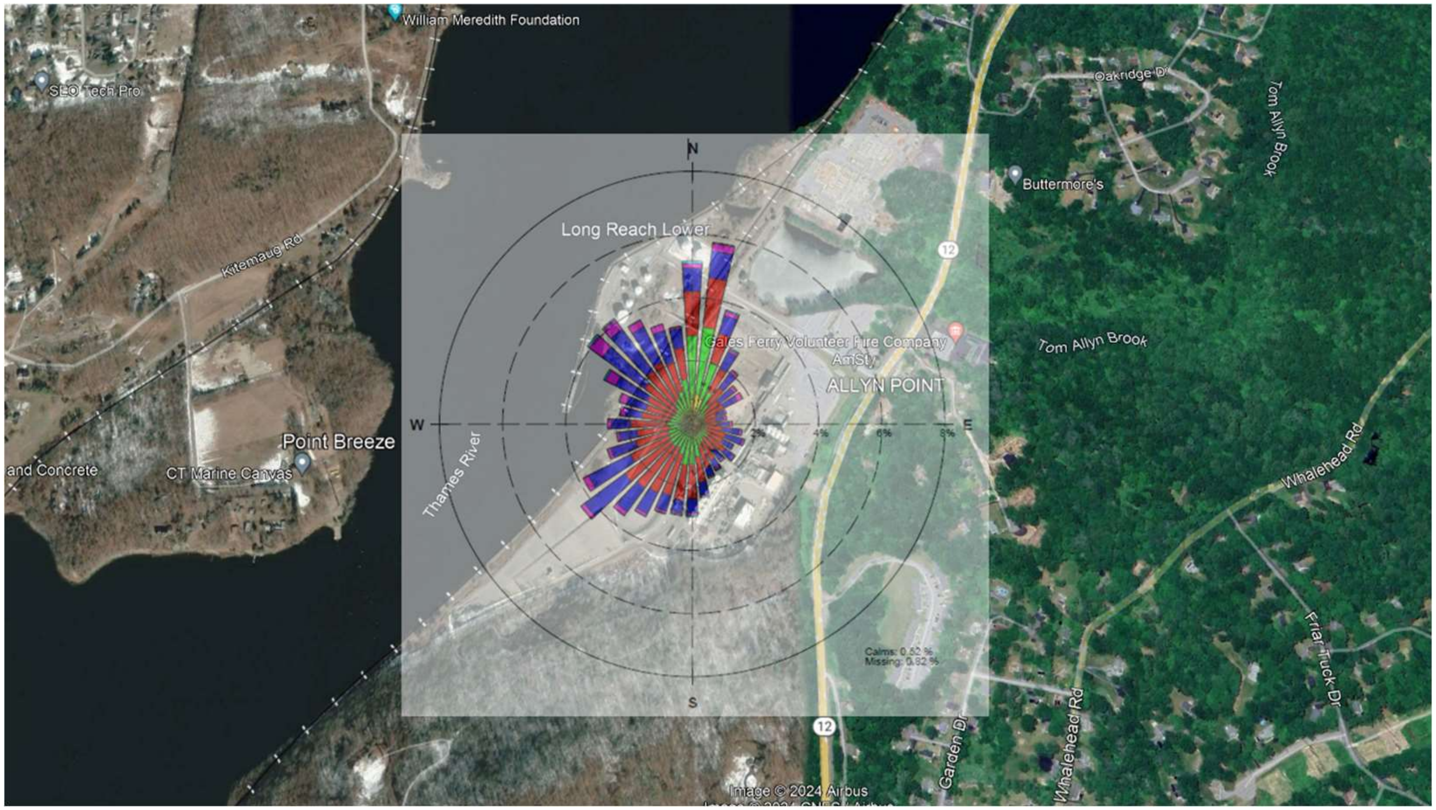
Prevailing Wind Conditions



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What Were The Results?

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What Were The Results?

"Background"

- This is the average particulate level in the region
- Modeled values are added to this number

Model Results Colors

- This is the particulate concentration generated from site operations above the regional background level

Model Figures

- PM2.5 output figures included as examples.

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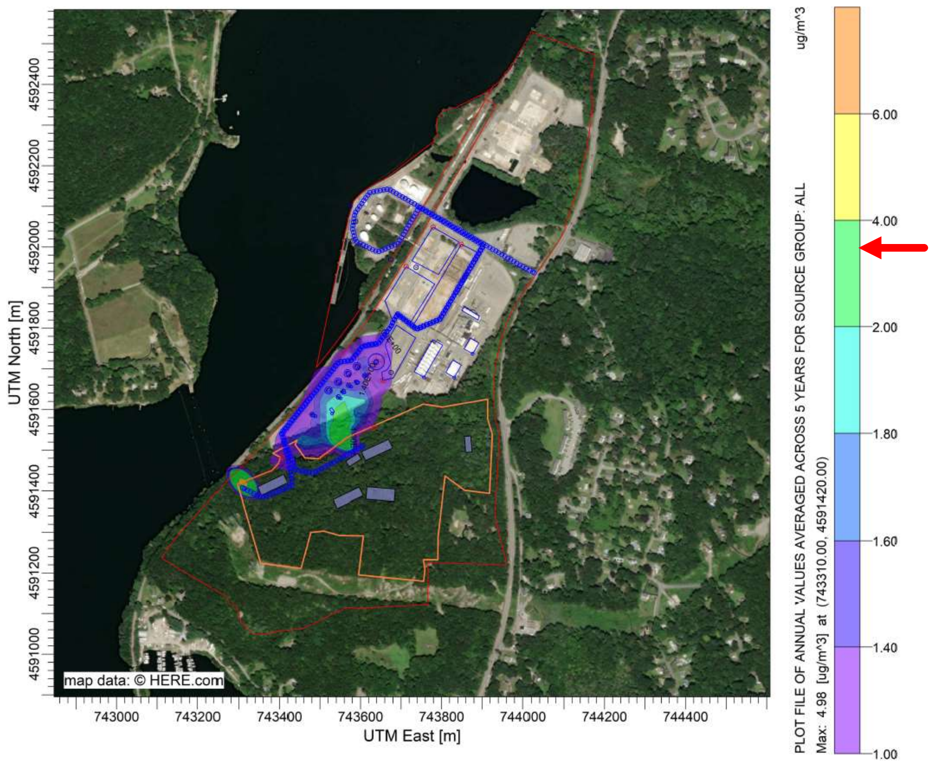
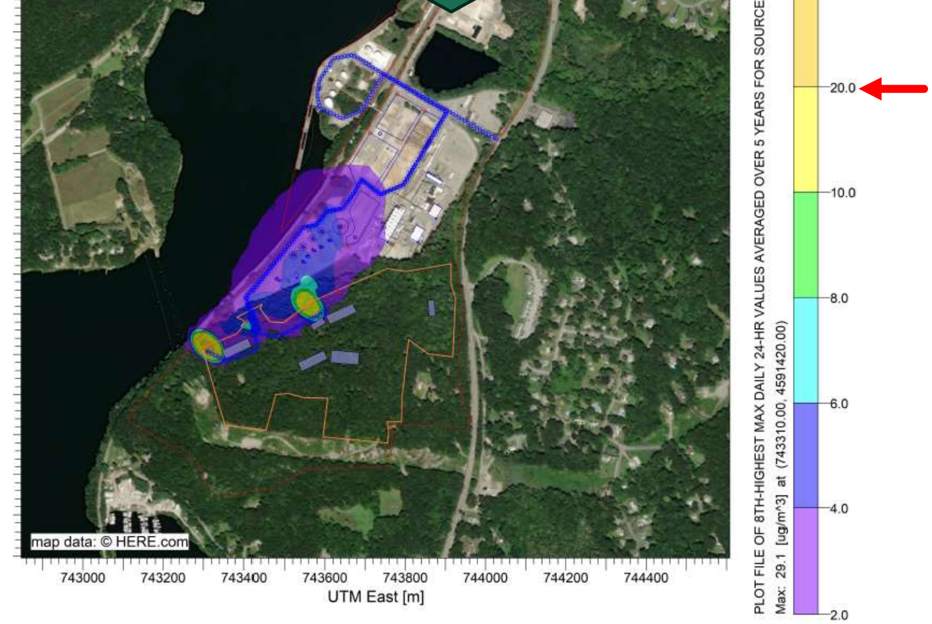
Scenario 1 Results – PM 2.5 Dispersion

Particulates concentrations from site when added to background are below USEPA standards



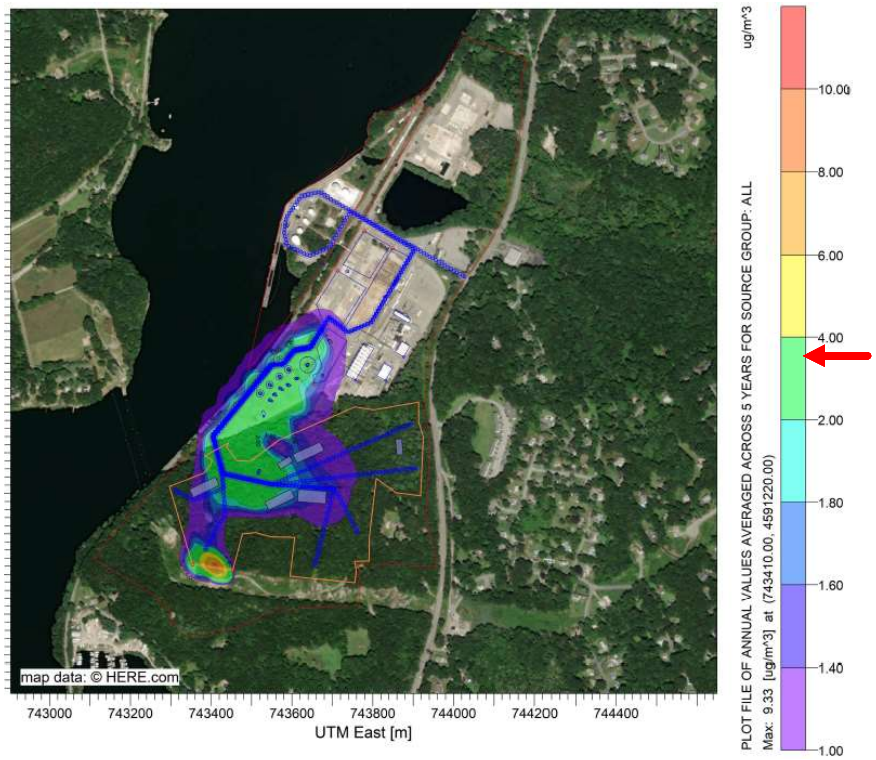
Annual Average Results
Regional Background Concentration: 5.4 μg/m^3
– value must be below 3.6 μg/m^3



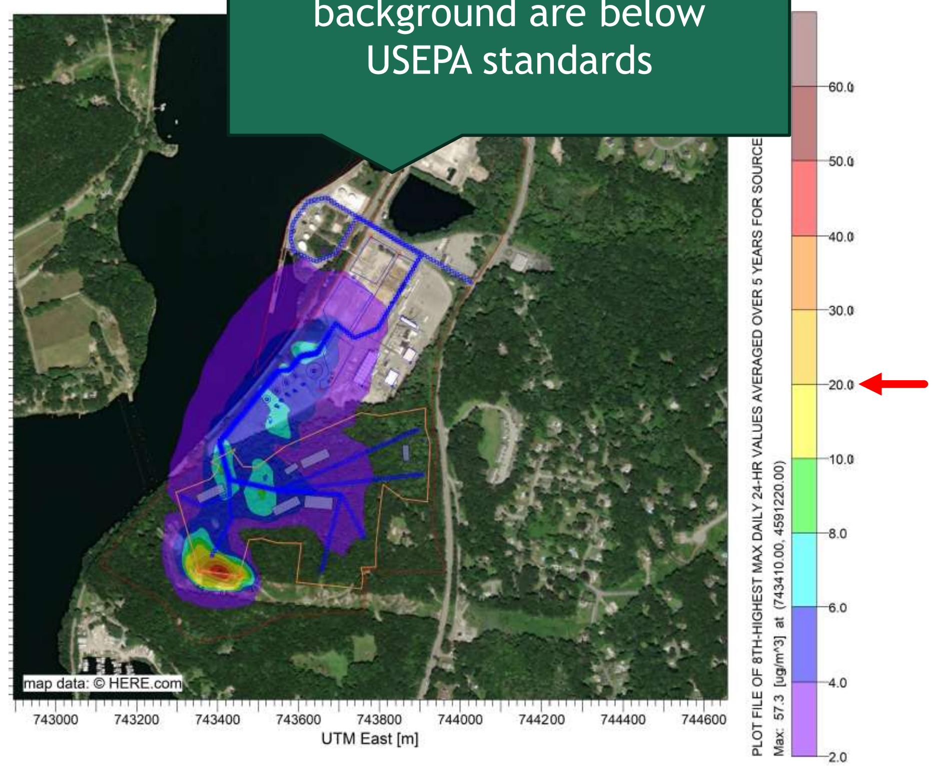
Maximum 24-hour Results
Regional Background Concentration: 15 μg/m^3
– value must be below 20 μg/m^3

Scenario 2 Results – PM 2.5 Dispersion

Particulates concentrations from site when added to background are below USEPA standards



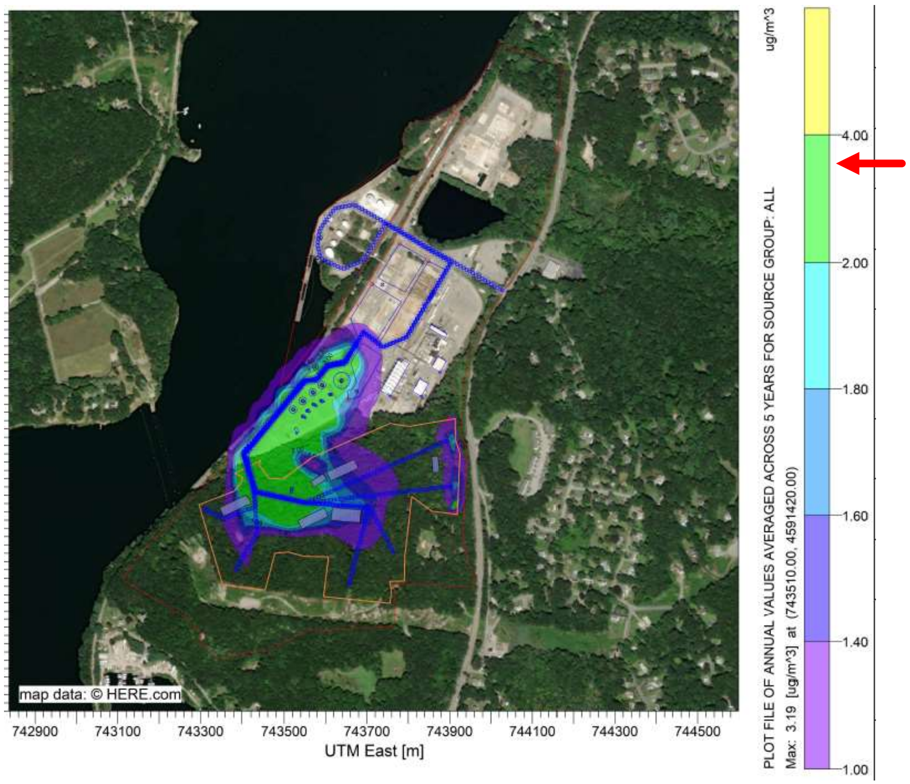
Annual Average Results
Regional Background Concentration: 5.4 µg/m^3
-value must be below 3.6 µg/m^3



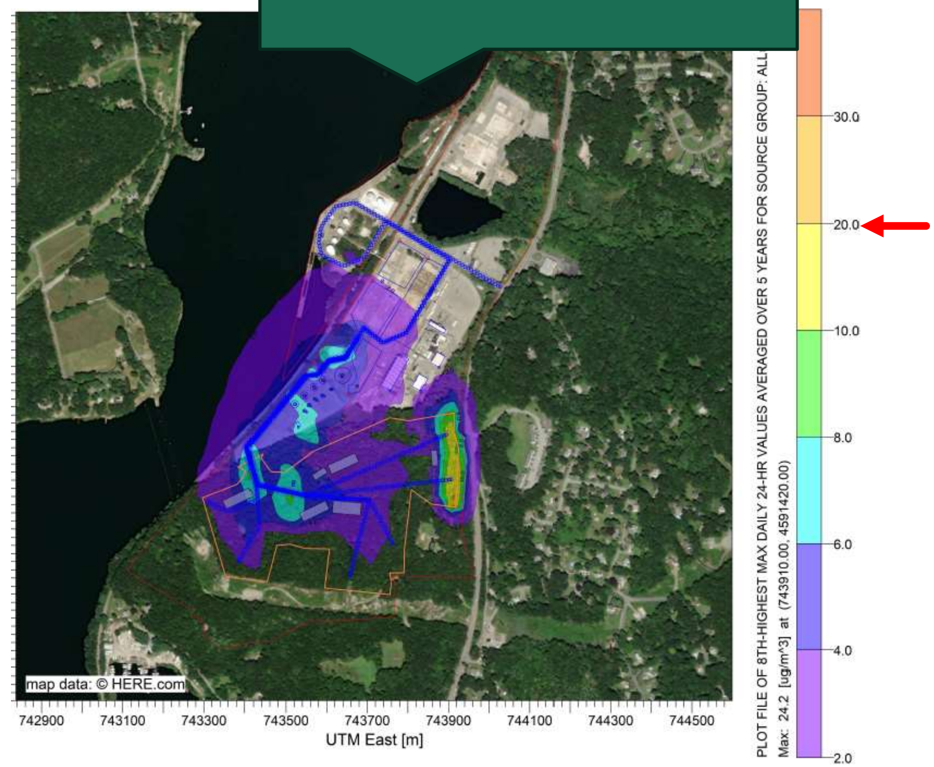
Maximum 24-hour Results
Regional Background Concentration: 15 µg/m^3
– value must be below 20 µg/m^3

Scenario 3 Results – PM 2.5 Dispersion

Particulates concentrations from site when added to background are below USEPA standards



Annual Average Results
Regional Background Concentration: 5.4 μg/m³
-value must be below 3.6 μg/m³



Maximum 24-hour Results
Regional Background Concentration: 15 μg/m³
– value must be below 20 μg/m³

What Were The Results?

	Particulate Matter (2.5 micrograms per cubic meter)	
	Annual Average	24-Hour Average
Scenario 1	6.4	18.9
Scenario 2	7.0	19.5
Scenario 3	7.5	22.5
National Ambient Air Quality Standard	9	35
Below Standard?	YES	YES
	Note: All values in micrograms per cubic meter of air PM2.5 Annual National Ambient Air Quality Standard changed from 12.0 to 9.0 effective May 7, 2024 Values are at property boundary and include background NA = not applicable	

What Were The Results?

	Particulate Matter (10 micrograms per cubic meter)	
	Annual Average	24-Hour Average
Scenario 1	--	95
Scenario 2	--	100
Scenario 3	--	102
National Ambient Air Quality Standard	NA	150
Below Standard?	--	YES
	Note: All values in micrograms per cubic meter of air NA = not applicable	

What Does This Mean?

Do these modeled results exceed Federal National Ambient Air Quality Standards?

- **No, they do not.**
- **These results are within standards to protect human health.**

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What Does This Mean?

Modeled results for nearby residential properties:

- <2 micrograms per cubic meters of PM 2.5 above background

Perspective on particulate emissions:

- 5 horsepower lawnmower generates around **1,500,000 micrograms** per cubic meter of particulate (just from combustion) when used for an hour (using USEPA emissions factors).
- A vehicle driving for 200 feet on a paved road generates approximately **300,000 micrograms** per cubic meter of particulate (using USEPA emissions factors).

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Air Model Results Summary

Do We Stop Here?

- No. Although the results demonstrate that our modeled operations are below USEPA standards, the site will continue to demonstrate this using real-time monitoring

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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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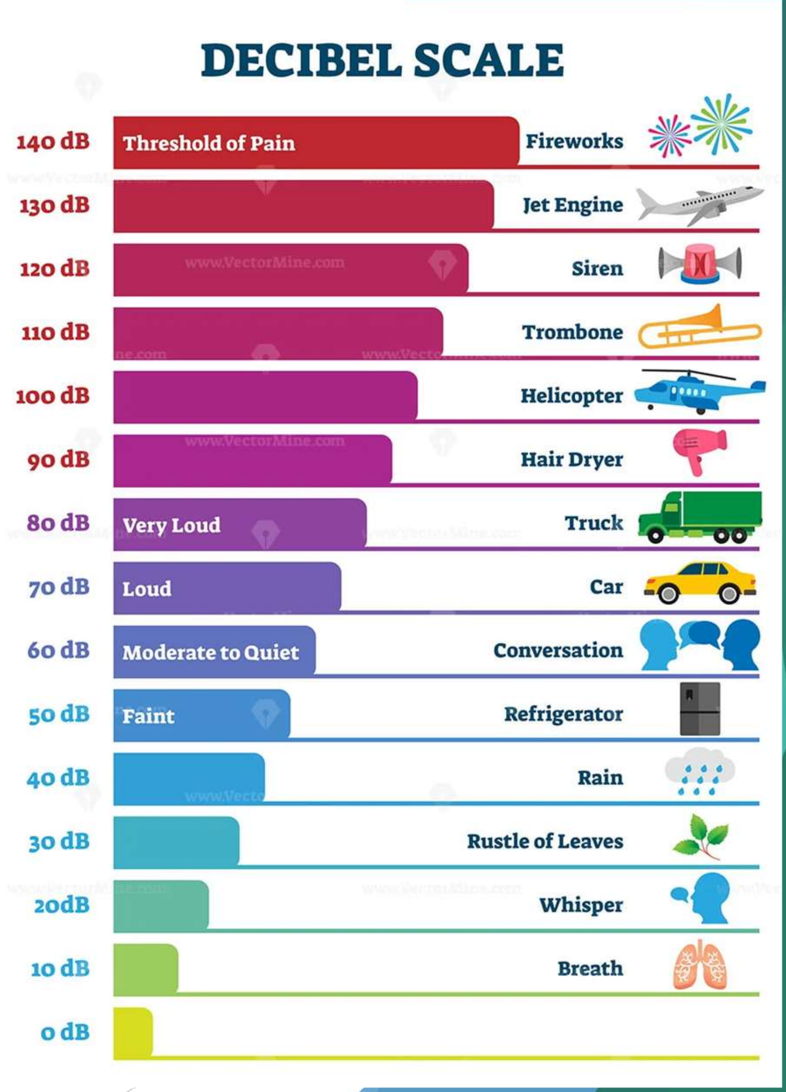

Noise Limits & Monitoring

- 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 (µg/m^3)

- Implement additional dust control measures.

Perimeter dust permissible level 150 (µg/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
25 years experience

Health & Safety

- State and federal agencies ensure excavation health and safety standards.
- A minimum of two unannounced inspections to each 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.
- Any unsafe conditions can result in withdrawal orders, removal of equipment from service and/or withdrawal of workers.