



## Former National Fireworks Site Public Meeting

- Update on Recent Site Activities
- Discussion of Phase III Remedial Action Plan

Hanover High School

September 24, 2019

# Update on the Ongoing Munitions Response

- Munitions removal work began in late May of 2017
- Being conducted as an Immediate Response Action (IRA) under the Massachusetts Contingency Plan (MCP)
- More than 13,370 explosive or potentially explosive items have been removed and destroyed
- More than 77,400 pieces of munitions debris (12.4 tons) have been removed
- Completed munitions removal activities in the two most contaminated areas associated with the Former Test Range and the historical Cold Waste Disposal Area
- Performed a significant amount of characterization, excavation and removal in the Open Space Disposal Area, the Marsh Upland Area (MUA) and other disposal areas
- Developing plans for munitions response in the rest of the southern portion of the Site

# Explosive Munitions Items Found at the Site that Required Detonation (Through August 2019)

<b>Projectiles, Grenades and Mortars (#)</b>	<b>Primers, Fuses and Detonators (#)</b>	<b>Flares, Incendiaries, Land Mines and Other (#)</b>
20mm Projectiles (>5,000)	Primers (>800)	Flares
37mm Projectiles (~40)	Grenade fuses	Incendiary Bombs (~100)
40mm Projectiles (~150)	Mortar fuses	Bounding Land Mines
Various Projectiles with Tracers (>5,000)	Bomb Fuses	Gravel Mines (~200)
40mm Grenades (>300)	Various other fuzes (>5,000)	Pipe Bomb
Hand and Rifle Grenades	Burster tubes (~175)	Bomb Live Unit (BLU) Cluster Fragmentation Bomb
60mm Mortars (~20)	Booster caps	Cartridge Activated Devices (CADs)
81mm Mortars (~200)	Squibs (~70)	Red Phosphorus
2.75 in Rocket	Explosive Bolt (~30)	
3.5 in Rocket		

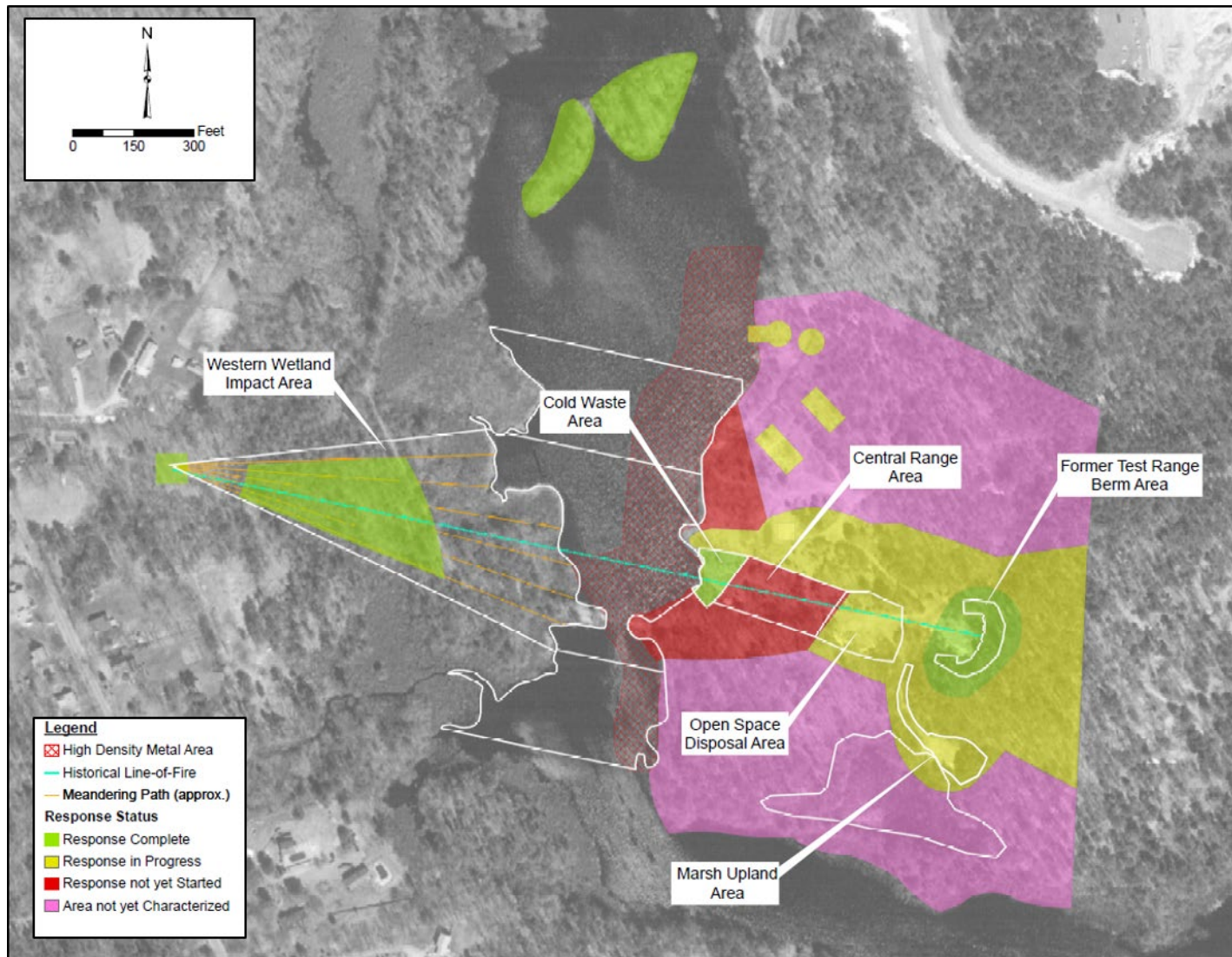
**Inert items of other munitions types also found**

# Status of Munitions Response Progress by Area

Former Test Range Berm Area	-Response Complete ■
Western Wetland Impact Area	-Response Complete ■
Cold Waste Area	-Response Complete ■
Shoreline / Disposal Pits	-Response In Progress (Munitions) ■
Open Space Disposal Area	-Response In Progress (Munitions and Asbestos) ■
Marsh Upland Area	-Response In Progress (Munitions and Asbestos) ■
Northern Disposal Pits	-Response In Progress (Munitions) ■
Central Range Area	-Response Planned but not Started ■
Work Area Disposal Pit	-Response Planned but not Started ■
Adjacent Areas	
- Eastern Remainder Area	-Response In Progress ■
- Other Adjacent Areas	-Response not Started ■
Work Laydown Areas	-Response not Started ■



# Status of Munitions Response Progress by Area



# Factors Affecting Pace of Progress

- **Former Test Range Berm was contaminated to a greater depth and lateral extent than was initially thought, based on available information, with multiple adjacent areas of buried munitions**
- **Western Wetland Impact Area contained two target areas, not one as originally thought**
  - Each target area had hazardous munitions mixed in with pulverized steel flakes and fragments from the targets that had to be hand-sifted to separate the munitions
- **Discovered multiple areas where munitions were found mixed with asbestos waste**
  - Required the development of a new set of worker safety procedures
- **Discovered an area with small, unidentified buried containers co-mingled with munitions**
  - Required calling the HAZMAT Team and the development of additional worker safety procedures and more complex plans to complete the work

# Work Scheduled for the Fall and Winter

- Investigation of the MUA and removal of any additional containers
- Completion of the MUA munitions response and asbestos clean-up
- Investigation/Clean-Up of the area behind the Former Test Range Berm
- Documenting the completed munitions removals in the Former Test Range Berm Area and the Western Wetland Impact Area
- Mechanical excavation and screening of munitions from the Factory Pond Shoreline/Northern Disposal Pits and associated soil sampling
- Mechanical excavation and screening of munitions from the Work Area Disposal Pit and associated soil sampling



# DO NOT TRESPASS!

- Items on the ground or in the shallow subsurface soil can be extremely hazardous
- A uniformed Hanover Police Officer is on-site at all times when clean-up operations are not taking place
- Video surveillance also is taking place
- There continue to be trespassing incidents almost EVERY month
  - Some have resulted in arrests
  - Most have resulted in citations and the issuing of a summons
- Pay attention to the posted signs and stay out of the upland work areas AND Factory Pond





# SOUVENIRS THAT YOU SHOULD NOT HAVE

- Many munitions-related items were taken from the Site in past years as souvenirs
- Some of them may still pose an explosive hazard
  - Some items may still be capable of exploding, burning at a very high temperature, or releasing substances that are toxic
  - Often, the potential hazards can only be recognized by a trained UXO specialist
- **DO NOT** keep these items in your homes, garages or basements
- Notify the Hanover Fire Department if you have items you want to have removed

**DO NOT HANDLE THEM FURTHER OR TRANSPORT THEM YOURSELF**

- See the one-page handout for pictures of Site-related items and instructions for having items picked up at no cost and with no questions asked

# Draft 2019 Phase III Remedial Action Plan

## Updated prior drafts to address a number of important changes:

- Updated “Conceptual Site Model” to reflect:
  - Changes to the amount and spatial distribution of contaminated sediment following the 2010 flooding
  - Discovery of wide-spread presence of explosive and potentially explosive items in the southern portion of the Site and Factory Pond
  - New insights gained from additional site characterization
- Changes to the Massachusetts Contingency Plan (MCP) in 2014
- Updated Remedial Objectives and Numerical Clean-Up Goals for sediment, soil and groundwater
  - Strong preference for clean-up that does not depend on on-site disposal of contamination or munitions
  - Comply with applicable local, state and federal regulatory requirements pertaining to the remedial alternative
  - Achieve updated contaminant concentration remediation goals that are protective of human health and the environment

# Scope of the Final Remedy

**Assumes ongoing IRA for the removal of munitions and munitions-impacted soil from the upland areas will be completed prior to implementation of the Final Remedy**

## **Final Remedy addresses:**

- Munitions response and contaminated sediment removal from Factory Pond
- Contaminated sediment removal from other impacted on-site ponds and streams
- Contaminated soil removal from impacted areas (which also eliminates contaminant migration to groundwater and surface water)
- Reduction of groundwater contaminant concentrations to less than the Upper Concentration Limits

# Three Comprehensive Remedial Alternatives Developed and Evaluated

**Alternative 1: Elimination of Substantial Hazards**  
**[Temporary Solution]**

**Alternative 2: Clean-Up to Achieve Project-Specific Remedial Objectives**  
**[Permanent Solution with Conditions]**

**Alternative 3: Clean-Up to Achieve or Approach Background Levels**  
**[Permanent Solution with Conditions]**




# Main Components of Alternatives 2 and 3

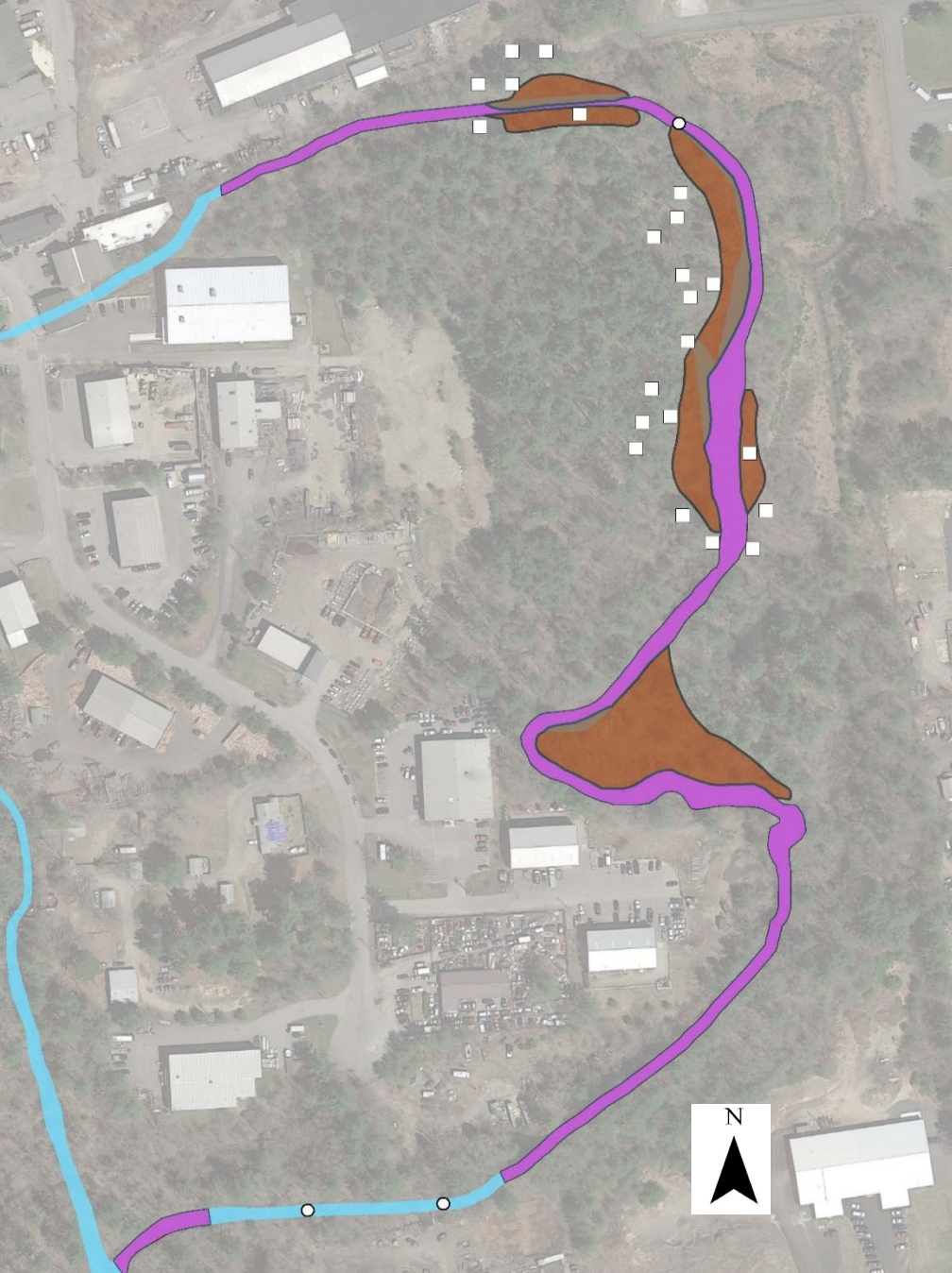
- Developing plans and obtaining permits
- Excavating sediment and soil to achieve the established risk-based contaminant concentration goals
- Removal of metallic items from the pond that may be explosive hazards
- Drying and solidifying the excavated sediment and transporting it to an off-site disposal facility
- Transporting excavated soil not meeting the on-site re-use criteria to a licensed off-site disposal facility
- Controlling and monitoring emissions of contaminants to the air and water
- Confirmatory sediment and soil sampling to demonstrate compliance
- Backfilling and stabilizing the excavations with “clean” material
- Restoring the disturbed areas
- Monitoring the recovery of restoration plantings

## Locations Requiring Sediment and Soil Removal:

### Eastern Channel Corridor and Adjacent Low-lying Area

#### Legend

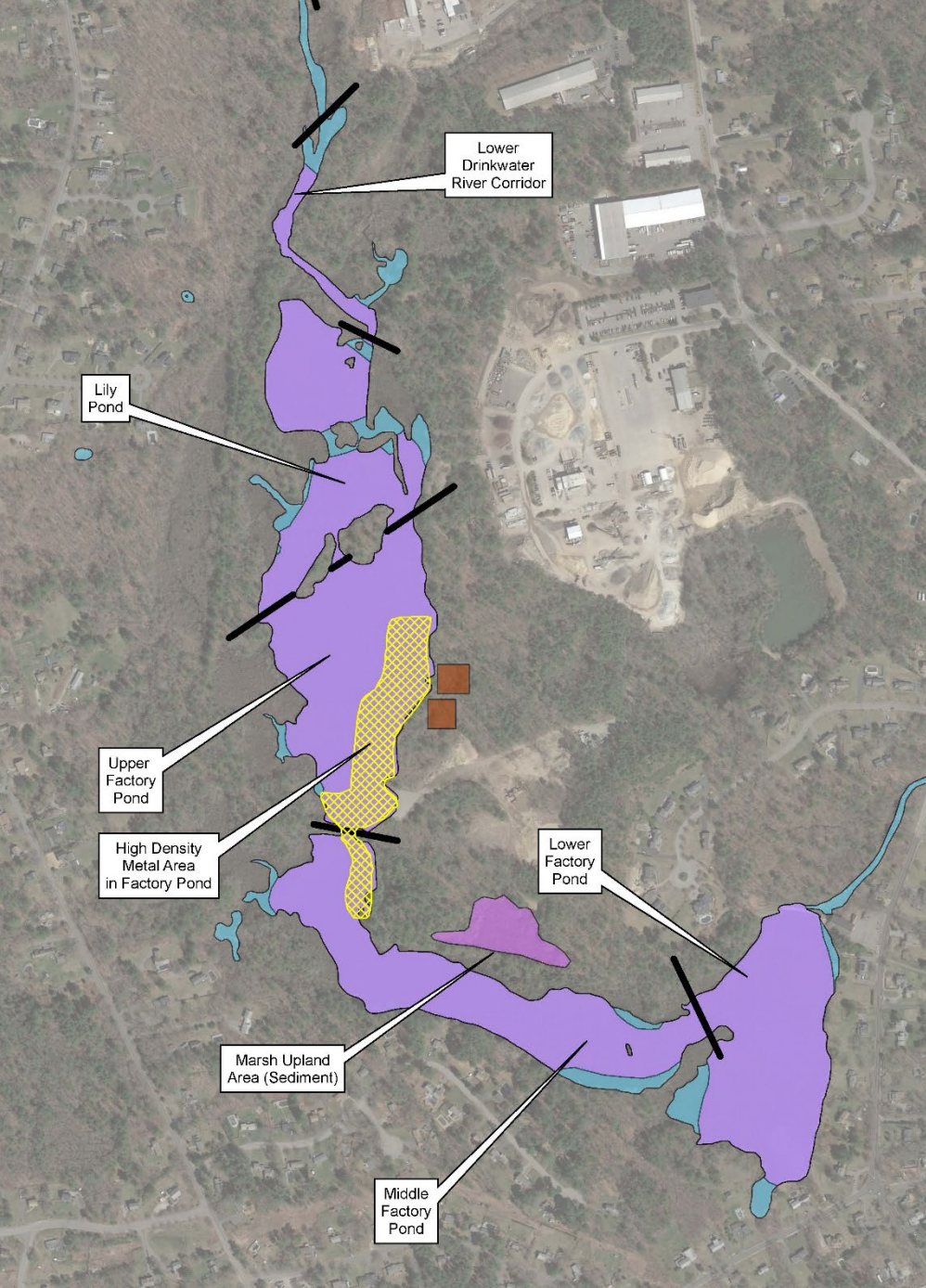
-  Surface Water
-  Sediment Removal
-  Soil Removal





## Locations Requiring Sediment and Soil Removal:

## Remainder of the Site



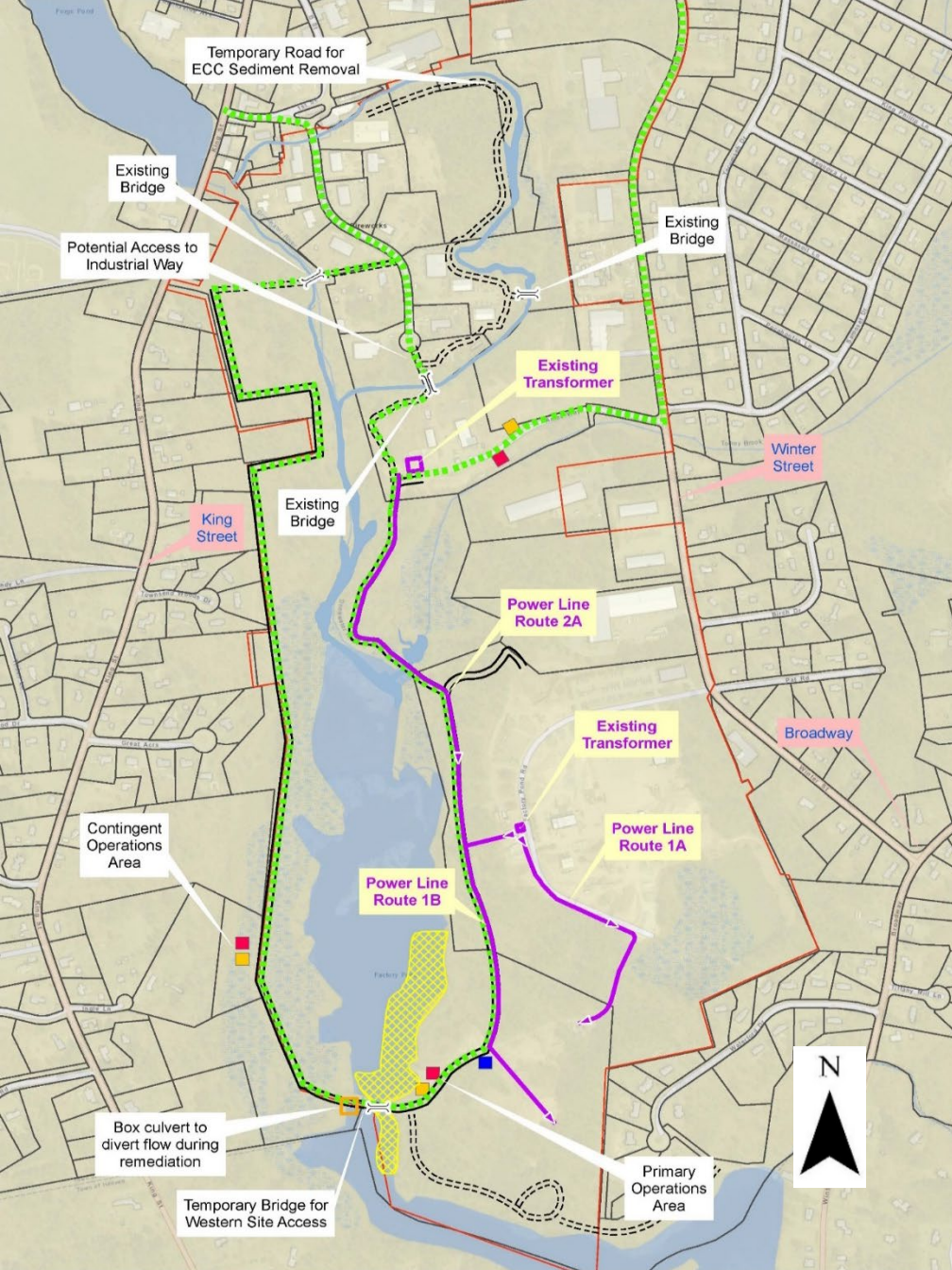
### Legend

- Surface Water
- High Density Metal Area
- Approximate Aquatic Reach Boundary
- Sediment Removal
- Soil Removal



## Conceptual Site Layout for the Clean-Up:

- Electricity Supply
- Truck Access Routes
- Stream Flow Management
- Processing Areas



### Legend

	Project Boundary	<b>Remediation Facility</b>	
	Improved Road		Material Laydown Area
	Temporary Road		Field Headquarters
	Tax Parcel		Water Treatment
	Surface Water		
	High Density Metal Area		
	Possible Truck Routes		
	Possible Power Line Route		
	Bridge		
	Box Culvert		
	Electrical Transformer		

# MCP Evaluation Criteria

- 1) Comparative effectiveness
- 2) Comparative short-term and long-term reliability
- 3) Comparative difficulty in implementation
- 4) Comparative costs of implementing the alternative
- 5) Comparative risks
- 6) Comparative benefits
- 7) Comparative timeliness
- 8) Relative impact on non-pecuniary interests  
(such as aesthetic values)

# Comparative Evaluation of Alternatives Against MCP Criteria

EVALUATION CRITERION	Alternative 1 Ranking	Alternative 2 Ranking		Alternative 3 Ranking	
Comparative Effectiveness	LOW	HIGH		HIGH	
Comparative Short-Term and Long-Term Reliability	LOW	MODERATE	HIGH	MODERATE	HIGH
Comparative Difficulty in Implementation	HIGH	MODERATE	HIGH	MODERATE	
Comparative Costs of Implementation	NOT ESTIMATED	LOW	MODERATE	LOW	
Comparative Risks	LOW	HIGH		HIGH	
Comparative Benefits	LOW	HIGH		HIGH	
Comparative Timeliness	LOW	HIGH		HIGH	
Relative Impact on Non-Pecuniary Interests	HIGH	MODERATE	HIGH	MODERATE	

HIGH = good performance MODERATE = satisfactory performance; LOW = unsatisfactory performance

# Comparative Evaluation of Alternatives Against Remedial Objectives

## [Example for soil]

REMEDIAL OBJECTIVES - SOIL	Alternative 1 Meets the RO?	Alternative 2 Meets the RO?	Alternative 3 Meets the RO?
1. Does not rely on on-site disposal, contaminant isolation or containment	NO	YES	YES
2. Complies with the applicable regulatory requirements	NO	YES	YES
3. Reduce the concentrations of contaminants to below UCLs	YES (only as a Temporary Solution)	YES	YES
4. Eliminate on-going sources of contamination to groundwater and surface water	NO	YES	YES
5. Reduce or minimize exposure to meet target risk thresholds to the identified current or potential future Site users	NO	YES	YES
6. Reduce the risk of biological harm to the most sensitive environmental species	YES	YES	YES
7. Reduce the concentrations of contaminants in the soil to levels that achieve or approach background	NO	YES	YES

Similar evaluation relative to sediment and groundwater Remedial Objectives

## Estimated Cost/Schedule: Alternatives 2 and 3

Total Projected Cost (2019\$)	Alternative 2	Alternative 3
Central Estimate of Cost	\$92.2M	\$97.1M
Cost Range: -15%/+25%	\$78.4M - \$115M	\$82.5M - \$121M
Cost Breakdown by Component	Alternative 2	Alternative 3
A Pre-Construction, Site Preparation and Field Oversight	17.6%	17.3%
B Dredging and Dredge Material Disposal	40.8%	40.0%
C Upland Excavation and Material Disposal	2.6%	6.9%
D High Density Metal Area in Factory Pond	24.4%	21.9%
E Decontamination, Site Clean-Up and Project Closeout	1.6%	1.5%
F Post-Remediation Restoration and Recovery Monitoring	0.3%	0.3%
G Unexploded Ordnance (UXO) Support	12.7%	12.1%
Projected Duration of Remedy Implementation	Alternative 2	Alternative 3
Remedial Design	1 year	1 year
Permitting, Procurement and Remedial Action	2-3 years	2-3 years



# Public Comment – We Want Your Input

- The public comment period for the Draft Phase III Remedial Action Plan opened on September 10, will run for 45 days, and will close on October 25.
- The Draft Phase III Remedial Action Plan can be accessed at:  
<https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=508218>
- Comments can be submitted in one of three ways:
  1. Written out on a comment index card available on the table at the entrance and we will take them with us
  2. Emailed to: [FireworksRAPComments@tetrattech.com](mailto:FireworksRAPComments@tetrattech.com)
  3. Mailed to: Fireworks RAP Comments  
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