

**DRAFT DECLARATION FOR THE  
EXPLANATION OF SIGNIFICANT DIFFERENCES  
ELY COPPER MINE SUPERFUND SITE  
OPERABLE UNIT 1  
VERSHIRE, VERMONT  
July 2019**

**EPA is seeking comments on the proposed changes to the 2011 Record of Decision. The proposed changes are described in this draft ESD. EPA is specifically soliciting public comment on its draft determination that the remedy, as modified by this ESD, is now the Least Environmentally Damaging Practicable Alternative to address the protection of wetland resources on the Site. EPA is also providing notice of additional impacts to historic resources. This draft ESD contains directions for providing comments to EPA. Once EPA receives all comments, and responds to them in a document called a Responsiveness Summary, EPA will decide whether to issue the draft ESD as a Final ESD, modify the remedy change based on the comments received and issue the Final ESD, or propose a different remedy change in a new draft ESD.**

Please send any comments on the proposed changes to the 2011 OU1 Ely Copper Mine Record of Decision to [hathaway.ed@epa.gov](mailto:hathaway.ed@epa.gov) or Edward Hathaway, USEPA New England Region, ME/VT/CT Superfund Section, Mailcode: 07-1, 5 Post Office Square, Suite 100, Boston, MA 02109-3912 by the close of business on September 10, 2019.

**Site Name and Location**

Ely Copper Mine Superfund Site  
Vershire, Orange County, Vermont  
VTD988366571  
Site ID No: 0102065  
Operable Unit 1

**Lead Agency**

United States Environmental Protection Agency

**Support Agency**

Vermont Department of Environmental Conservation

**Statement of Purpose**

This Explanation of Significant Differences (2019 ESD) to the Operable Unit 1 (OU1) 2011 Record of Decision (ROD) for the Ely Copper Mine Superfund Site (Site) is being issued to document changes to the OU1 Remedial Action that was described in the 2011 OU1 ROD. EPA is required to publish this ESD pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42

U.S.C. § 9617(c), and the National Contingency Plan (NCP) at 40 C.F.R. § 300.435(c)(2)(i). The U.S. Environmental Protection Agency (EPA) developed this decision document after consulting with the Vermont Department of Environmental Conservation (VTDEC), which submitted a letter of concurrence in support of the remedy change on [Date](Attachment A).

EPA provided the public with an explanation of the proposed changes to the 2011 ROD in a fact sheet that was posted on the EPA website on July 1, 2019 and at a public information meeting held August 19, 2019. EPA also met with the Vershire Selectboard on July 23, 2019 and the West Fairlee Selectboard on August 19, 2019 to discuss the Ely Copper Mine Site, including the changes to the 2011 ROD.

### **Statutory Basis for Issuance of this 2019 ESD**

Pursuant to Section 117(c) of CERCLA, as amended, 42 U.S.C. § 9617(c), and the NCP at 40 C.F.R. § 300.435(c)(2)(i), if EPA determines that the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that site, EPA shall publish an Explanation of Significant Differences and the reasons such changes are being made. According to 40 C.F.R. § 300.435(c)(2)(i), and EPA guidance (Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-23-P, July 1999), an Explanation of Significant Differences, rather than a ROD Amendment, is appropriate where the adjustments being made to the ROD are significant but do not fundamentally alter the remedy with respect to scope, performance or cost. EPA has determined that the adjustments to the 2011 ROD provided in this ESD are significant but do not fundamentally alter the overall remedy for the Site with respect to scope, performance, or cost. Therefore, this ESD is being properly issued.

### **Background**

The Ely Copper Mine Superfund Site (the Site) is an abandoned copper mine located in Vershire, Orange County, Vermont and encompasses approximately 350 acres where historic mining activities took place, including about 30 acres of waste material containing an estimated 172,000 tons of waste rock, tailings, ore roast beds, slag heaps, and smelter wastes. The Site also includes over 3,000 linear feet of Underground Mine Workings along with the associated shafts and adits. No buildings remain at the Site. Remnant foundations, pads, and stone walls, including a 1,400 foot-long smoke flue, demark the location of former Site structures including a former flotation mill and the smelter plant. The Site has been determined to be eligible for listing in the National Register of Historic Places by EPA in consultation with the State Historic Preservation Officer (SHPO). The underground workings at the Ely Copper Mine are a hibernacula for the federally threatened Northern Long-Eared Bat as well as several state listed threatened and endangered bats.

The Ely Copper Mine is one of three major historic copper mines, the other two being the Elizabeth Mine and Pike Hill Copper Mine, within a 20-mile long area from south to north that comprise the Vermont Copper Belt. Ely Copper Mine was among the top ten copper producing operations in the United States for a period of its history, with an average annual production of 500 tons of ingot copper and an estimated total copper production of 20,000 tons. The Ely Copper Mine ore body was discovered in 1813 and explored in the 1830s. Significant mine

activities began in 1853 and lasted until 1905. In 1917, the Ely-Copperfield Association of New York, NY attempted to recover copper from the mine dumps with construction of a flotation separation mill which operated for a short period until the end of World War I, when the price of copper fell, closing the operation. In 1949-1950, attempts were made to recover copper from the mine waste piles and 60,000 tons of waste rock/ore was transported to the Elizabeth Mine for processing.

EPA began the remedial investigation and feasibility study (RI/FS) at the Site in 2001. The OU1 RI/FS was completed in September 2011 at the time of the OU1 ROD. A supplemental RI was performed for OU2 and OU3 from 2011 to 2015 to focus on the Underground Workings. The OU2 and OU3 ROD was signed in June 2016. The OU4 RI/FS is ongoing.

## **Overview of the 2019 ESD**

This ESD documents the following changes to the 2011 ROD:

- Expanding the waste consolidation and cover system at the Ore Roast Bed to include the material that would have been placed in an area identified in the 2011 OU1 ROD as the West Cell area. This allows for one area for waste consolidation and installation of a single cover system rather than the two separate locations identified in the 2011 OU1 ROD. The combined area will be referred to as the Valley Cell Area (VCA).
- The OU1 final Remedial Design has updated the estimated volume of material to be excavated and consolidated to approximately 140,000 cubic yards of waste rock, tailing, and sediment as compared to the original estimate of the 111,000 cubic yards in the 2011 OU1 ROD.
- The future land use assumption is being changed from residential use to non-residential use due to the reasonably anticipated future uses of the Site.
- Because of the above land use change, the 2011 OU1 ROD requirement for interim land use restrictions, to be implemented to prevent exposure to contaminated soil and waste during the period prior to the implementation of the cleanup action, is being made a permanent requirement to address contamination being left in place that would pose a human health risk if the property was subject to residential use. In addition, the scope of the institutional controls described in the ROD has changed to restrict residential use throughout the property and prevent disturbance to components of the remedy (including the VCA). Waste is being left in place in some areas of the Site that has the potential to generate limited amounts of acid mine drainage, rather than it being removed and capped under the VCA, in order to comply with the Endangered Species Act (15 U.S.C. § 1531 et seq.) as it relates to the federally-threatened Northern Long-Eared Bat.
- The site-specific cleanup levels for soil are being adjusted to reflect the change to the future land use assumptions. The risk evaluation assumption regarding the number of days an individual may come into contact with the mine waste will be revised from 350 days per year as cited in the 2011 ROD for the future residential land use scenario to 104 days per year as cited in the 2011 ROD for the current recreational use.
- Based on the change in the future exposure scenario in the risk evaluation from residential to recreational, the soil cleanup levels for cobalt, copper, and iron are being

revised from 24 mg/kg, 629 mg/kg, and 44,800 mg/kg to 81 mg/kg, 2,139 mg/kg, and 152,320 mg/kg, respectively.

- The removal of the majority of the historic ORD retaining wall due to the expansion of the Ore Roast Bed waste cell to create the VCA.
- Impacts to two small wetlands within the footprint of the VCA.

This 2019 ESD includes the applicable requirements of 50 C.F.R. Part 17(o) as a federal location-specific ARAR. The Main Shaft and the associated Pollard Shaft and Shaft 2 at the Ely Copper Mine are known hibernacula for the Northern Long-Eared Bat (NLEB), a species listed as threatened in accordance with the federal Endangered Species Act (ESA) of 1973, 16 U.S.C. §1531 *et seq.* (listing published in 80 Fed. Reg. 17974 (April 2, 2015)). Final ESA 4(d) rules pertaining to protecting the species and its habitats, went into effect in February 2016 (50 C.F.R. Part 17(o)) after the 2011 ROD. The forested area surrounding the Main Shaft, Pollard Shaft, and Shaft 2 are also documented to be potential summer habitat for the NLEB. As part of the development of the Remedial Design, EPA consulted with the United States Fish and Wildlife Service (USFWS) in accordance with Section 7 of the ESA, 16 U.S.C. §1536, regarding EPA's finding that the OU1 selected remedy is not likely to jeopardize or adversely affect the species given the mitigative measures that will be employed. USFWS concurred with EPA's finding in a letter dated April 2, 2019. EPA will continue to coordinate with the USFWS. This finding also applies to threatened and endangered bat species cited in the 2011 ROD subject to protection under State's Endangered Species law, 10 V.S.A. Ch. 123. The relocation of the waste containment cell from the West Cell to the Valley Cell Area reduces the overall extent of tree clearing and moves the containment cell further from the hibernacula.

The Special Findings in the 2011 ROD regarding the federal Clean Water Act are modified since the consolidation of waste disposal into the single Valley Cell Area will reduce overall wetland impacts from the remedial area. There will be two small areas, totaling about 4,000 sq ft, of new wetland impacts associated with the VCA. The modified remedy has been determined now to be the Least Environmentally Damaging Practicable Alternative under the federal Clean Water Act.

Modification of the remedy as described in this 2019 ESD will result in additional unavoidable direct and indirect impacts on historic features at the Site as compared to the 2011 ROD remedy. The new Valley Cell Area will result in the loss of the majority of the ORB wall with only a small section of the ORB and ORB Retaining Wall preserved in-place. There will also be impacts to several foundations along the east side of Ely Brook. As described in the 2011 ROD, EPA has consulted with the State Historic Preservation Officer regarding any mitigation that may be necessary to address unavoidable adverse effects on prehistoric or historic resources at the Site altered by the remedy as modified by this ESD.

## **Declaration**

For the foregoing reasons and as explained herein, by my signature below, I approve the issuance of the Explanation of Significant Differences for the 2011 ROD at the Ely Copper Mine Superfund Site in Vershire, Vermont and the changes stated therein.

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Bryan Olson, Director  
Superfund and Emergency Management Division  
U.S. Environmental Protection Agency – New England

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Date

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ELY COPPER MINE SUPERFUND SITE  
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Operable Unit 1

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United States Environmental Protection Agency

**Support Agency**

Vermont Department of Environmental Conservation

**I. INTRODUCTION**

This Explanation of Significant Differences (ESD) to the 2011 ROD for the Ely Copper Mine Superfund Site (Site) is being issued to document changes to the OU1 remedy based on the technical evaluations conducted during the remedial design. EPA is required to publish this ESD pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. § 9617(c), and the National Contingency Plan (NCP) at 40 C.F.R. § 300.435(c)(2)(i). The U.S. Environmental Protection Agency (EPA) developed this decision document after consulting with the Vermont Department of Environmental Conservation (VTDEC), which submitted a letter of concurrence in support of the remedy change on [Date]----- (Attachment A).

This ESD documents the following changes to the 2011 ROD:

- Expanding the waste consolidation and cover system at the Ore Roast Bed to include the material that would have been placed in an area identified in the 2011 OU1 ROD as the West Cell area. This allows for one area for waste consolidation and installation of a single cover system rather than the two separate locations identified in the 2011 OU1 ROD. The combined area will be referred to as the Valley Cell Area (VCA).
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- Because of the above land use change, the 2011 OU1 ROD requirement for interim land use restrictions, to be implemented to prevent exposure to contaminated soil and waste during the period prior to the implementation of the cleanup action, is being made a permanent requirement to address contamination being left in place that would pose a human health risk if the property was subject to residential use. In addition, the scope of the institutional controls described in the ROD has changed to restrict residential use throughout the property and prevent disturbance to components of the remedy (including the VCA). Waste is being left in place in some areas of the Site that has the potential to generate limited amounts of acid mine drainage, rather than it being removed and capped under the VCA, in order to comply with the Endangered Species Act (15 U.S.C. § 1531 et seq.) as it relates to the federally-threatened Northern Long-Eared Bat.
- The site-specific cleanup levels for soil are being adjusted to reflect the change to the future land use assumptions. The risk evaluation assumption regarding the number of days an individual may come into contact with the mine waste will be revised from 350 days per year as cited in the 2011 ROD for the future residential land use scenario to 104 days per year as cited in the 2011 ROD for the current recreational use.
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- The removal of the majority of the historic ORD retaining wall due to the expansion of the Ore Roast Bed waste cell to create the VCA.
- Impacts to two small wetlands within the footprint of the VCA.

In accordance with CERCLA Section 117(d), 42 U.S.C. § 9617(d), and the NCP at 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2), this 2019 ESD and its supporting documents will be added to the Administrative Record file for the Site.

The Administrative Record for this 2019 ESD is available for public review at the EPA Region 1 Superfund Records Center in Boston, Massachusetts, at the addresses listed below:

U.S. Environmental Protection Agency  
 Records Center  
 5 Post Office Square, Suite 100  
 Boston, MA 02109  
 617-918-1440  
 Monday-Friday: 9:00 am - 5:00 pm  
 Saturday and Sunday: Closed

The 2019 ESD and administrative record index along with other Site information can be viewed at the Ely Copper Mine website: [www.epa.gov/superfund/ely](http://www.epa.gov/superfund/ely).

## II. SITE HISTORY AND CONTAMINATION

## **Site History**

The Ely Copper Mine Superfund Site (the Site) is an abandoned copper mine located in Vershire, Orange County, Vermont and encompasses approximately 350 acres where historic mining activities took place, including about 30 acres of waste material containing an estimated 172,000 tons of waste rock, tailings, ore roast beds, slag heaps, and smelter wastes. The Site also includes over 3,000 linear feet of Underground Mine Workings along with the associated shafts and adits. No buildings remain at the Site. Remnant foundations, pads, and stone walls, including a 1,400 foot long smoke flue, demark the location of former Site structures including a former flotation mill and the smelter plant. The Site has been determined to be eligible for listing in the National Register of Historic Places by EPA in consultation with the State Historic Preservation Officer (SHPO). The Ely Copper Mine is one of three major historic copper mines, the other two being the Elizabeth Mine and Pike Hill Copper Mine, within a 20 mile long area from south to north that comprise the Vermont Copper Belt. Ely Copper Mine was among the top ten copper producing operations in the United States for a period of its history, with an average annual production of 500 tons of ingot copper and an estimated total copper production of 20,000 tons.

The Ely Copper Mine ore body was discovered in 1813 and explored in the 1830s. Significant mine activities began in 1853 and lasted until 1905. In 1917, the Ely-Copperfield Association of New York, NY attempted to recover copper from the mine dumps with construction of a flotation separation mill which operated for a short period until the end of World War I, when the price of copper fell, closing the operation. In 1949-1950, attempts were made to recover copper from the mine waste piles and 60,000 tons of waste rock/ore assayed at about 1 percent (%) copper was transported to the Elizabeth Mine for processing.

Since 1950, the Site has been used for timber management and recreational activities, including hunting, snowmobile riding, and horseback riding. The Site is often visited by those interested in the remnants of the mining activities or the Site geology. All-terrain vehicle tracks are observed on several of the waste piles. The Site is privately owned by one entity and is managed for timber, with plans for a maple sugar operation.

## **Operable Units:**

EPA often creates operable units (OUs) to enable cleanup actions to move forward on certain areas of a site while allowing additional investigation in other areas of a site. Four OUs have been created for the Ely Copper Mine Site. The location of the Ely Copper Mine Site and associated OUs are shown on Figure 1.

Operable Unit 1 (OU1) includes the areas that are the primary source of the surface water and sediment contamination that is responsible for the ecological impacts to Ely Brook, Pond 4, Pond 5, and Schoolhouse Brook. These areas are also the major source of soil and groundwater contamination within the OU1 area. The OU1 areas of the Site include:



- Lower Waste Area (LWA) and Upper Waste Area (UWA)- waste rock (sulfide ore-bearing rock) that did not contain enough copper to process;
- Tailings Area (TA)- tailings (finely ground sulfide ore) that were left behind from copper extraction processes at the flotation mill;
- Ore Roast Bed (ORB)- waste rock from ore roasting, a process that makes it easier to remove the copper from the rock; and
- Sediment of Ely Brook, its tributaries, and Pond 4 and Pond 5- eroded mine waste from the Site has built up as bottom sediment, where it leaches metals into the water.

Operable Unit 2 (OU2) includes the Underground Workings on the southern side of Dwight Hill and includes approximately 12 shafts, adits, vents or other openings.

Operable Unit 3 (OU3) includes the Underground Workings on the northern side of Dwight Hill. There are no surface features of OU3.

Operable Unit 4 (OU4) will address all other areas and media at the Site where risks to human health or the environment are present that are not addressed by OU1, OU2, or OU3. The OU4 areas include:

- Smelter/Slag Area- waste rock, oxidized ore, slag and building demolition debris, most of which are associated with on-site smelting operations;
- Sediment of Schoolhouse Brook (SHB) and East Branch of Ompompanoosuc River (EBOR)- eroded mine waste from the Site has built up as bottom sediment, where it leaches metals into the water (a limited area of SHB at its confluence with Ely Brook will be addressed under OU1);
- Site Groundwater- groundwater contaminated by metals and acids that have leached from waste source areas at the Site, excluding the contaminated groundwater associated with the Underground Workings which are part of OU2 and OU3; and
- Surface water of SHB and EBOR- surface water contaminated by metals and acids that have leached from waste source areas at the Site.

### **Contamination:**

The major issue at the Site is acid mine drainage (AMD), which occurs when sulfide mineral-bearing rock and ore are exposed to oxidizing conditions through natural weathering processes. This weathering creates sulfuric acid, which results in the generation of low-pH leachate. This low pH leachate causes many of the metals that were bound in the ore and native soil become soluble and dissolve into the leachate. The leachate from the Site often contains elevated levels of aluminum, cadmium, cobalt, copper, iron, manganese, and zinc that are likely from the locally mined ore. Aluminum and manganese are also contributed by the leaching of metals in the native soil. This leachate flows into Ely Brook, four tributaries to Ely Brook, and Schoolhouse Brook resulting in an increase in the metals concentration and causing impacts to ecological receptors. In addition, the tailings, weathered waste ore, roasted ore, and byproducts generated

from the smelting process (*i.e.*, slag) have been transported from the original areas of deposition by erosion and re-distributed nearby, causing elevated concentrations of metals in the soil adjacent to the waste areas. Some of these materials have been conveyed by overland flow, resulting in elevated concentrations of metals in sediment along these Site drainage ways, including: Ely Brook, four tributaries to Ely Brook, SHB, and the EBOR.

The leaching of metals from the mine waste has also contaminated the groundwater beneath and adjacent to the waste piles and within the Underground Workings.

### **III. THE SELECTED REMEDY**

The selected remedy for 2011 OU1 ROD was identified as “Alternative SC3-Waste containment in the West Cell and in the Ore Roast Bed (ORB)” in the OU1 Feasibility Study and in the OU1 Proposed Plan. Specifically, this remedial action includes: the excavation of contaminated waste rock, soil, and sediment from the Upper Waste Area (UWA), Lower Waste Area (LWA), Ely Brook, including the contaminated riparian soils adjacent to Middle and Lower Ely Brook, the tributaries of Ely Brook, Pond 4, and Pond 5, with the consolidation of this material under a cover system in an on-site containment cell located west of Ely Brook (the West Cell); and the excavation of contaminated tailings from the Tailings Area (TA) and consolidation under a cover system to be installed over the ORB. These remedial measures will remove and isolate OU1 sources of acid rock drainage (ARD) and eliminate direct contact and incidental ingestion of cobalt, copper and iron within the soil, waste rock, tailings, and sediment in OU1. It should be noted that while site groundwater will be addressed in OU4, significant improvement in groundwater quality is anticipated from the cleanup of OU1 areas, which are the major contributing sources to the groundwater contamination.

The selected remedy for OU1 included the following major components:

- Pre-design investigations and studies;
- Clearing and grading of the work area and haul road, including an additional lay-down area for the temporary stockpiling of clean earthen materials removed to create the West Cell (approximately 12 acres), as well as the construction of the haul roads;
- Potential mining of an estimated undeveloped 7.5 acres to obtain the necessary on-site stone and borrow material needed for developing the containment cells, stream stabilization, and restoring barren areas;
- Restoration of the mined areas when the removal is completed (unless all of the required material can be obtained from the clearing and development of the West Cell area);
- Installation of surface water and shallow groundwater diversions as necessary to prevent the flow of surface water or groundwater into the West Cell or ORB cell;
- Installation of a bottom containment liner below the West Cell, if necessary, to ensure that groundwater and surface water are not adversely impacted by residual drainage from the waste material;
- Excavation of waste rock and soil exceeding soil levels (also referred to as Remediation Goals or RGs) of the UWA and LWA and consolidation in the West Cell;
- Treatment of any water generated from the excavation activities, including the dewatering of sediments, saturated soil/waste, or residual drainage from the soil/waste

using pH neutralization to create a neutral pH and filtration and or settling ponds/tanks to remove the metals – discharge of the treated water back to surface waters;

- Dewatering of Ponds 4 and 5 if necessary;
- Excavation of all contaminated sediment exceeding the sediment RG and any waste/soil that may be generating ARD from the Ponds 4 and 5 area and disposal of the sediment, with dewatering if required, into the West Cell;
- Restoration of Ponds 4 and 5 area as native wetland habitat;
- Construction of surface water drainage features to convey water from Ponds 4 and 5 and for the tributaries of Ely Brook that will be excavated;
- Use of minimally invasive extraction methods such as vacuum or hand removal sediments exceeding the sediment RG in Upper Ely Brook;
- Restoration of Upper Ely Brook;
- Monitoring of the Upper Ely Brook to confirm that the sediment RG is achieved;
- Construction of a temporary surface water diversion to allow excavation of sediments above the sediment RG in Middle and Lower Ely Brook;
- Excavation of the sediments above the sediment RG in Middle and Lower Ely Brook, including adjacent the riparian soils that exceed the sediment RG;
- Consolidation of excavated sediment, with dewatering and discharge to Ely Brook if required, with the waste rock and soil in the West Cell;
- Reconstruction of Middle Ely Brook, possibly as a rip-rap armored channel due to the expected slope of the channel;
- Restoration of Lower Ely Brook as a natural stream corridor;
- Installation of a low-permeability cover system on the West Cell that meets relevant and appropriate mine reclamation regulations and risk-based standards to contain and isolate the waste rock, soil, and sediment;
- Excavation of the TA and layering of tailings on the ORB to create the ORB Cell;
- Construction of the ORB Cell with a low permeability cover system and surface water diversions that meets applicable Vermont Solid Waste standards;
- Collection of leachate from the West Cell and ORB Cell, as necessary, and on-site treatment through treatment wetlands and/or settling basins and discharge to surface waters;
- Protection, to the extent practicable, of the historic retaining wall that is adjacent to the ORB, as well as other historic resources present within the Site;
- Restoration of the disturbed areas within the UWA, LWA, ORB, and TA;
- Endangered bat habitat mitigation measures, as required;
- Historic resource assessment and documentation via photographs, mapping, drawing, archaeological data recovery, construction monitoring/recordation, and/or other measures, as required;
- Additional investigation of potential prehistoric features within the Site, as required;
- Installation of monitoring wells to monitoring groundwater around the ORB Cell and West Cell;
- Long-term O&M;
- Use of institutional controls to prevent exposure to contamination within the OU1 area, protect the response action and prevent exposure to contaminants contained in the ORB Cell and West Cell;

- Environmental monitoring to evaluate the performance of the cleanup action and at least yearly compliance monitoring to ensure compliance with the institutional controls; and
- 5-year reviews

The estimated present value cost of the selected remedy as reported in the 2011 OU1 is \$18 million.

#### **IV. BASIS FOR THIS 2019 ESD**

The revisions to the OU1 selected remedy for the Site remedy are an outcome of the Remedial Design. The pre-design investigations and design studies included: a more detailed evaluation of the hydrology of the area identified as the West Cell; a field program to refine the extent of mine waste above the soil cleanup levels; a study to evaluate the use of the Site by threatened and endangered bat species and measures to comply with the suggested best management practices for bat protection; a refinement of the approach to assess the impact and methods to mitigate and avoid impacts to historic resources; methods to address the saturated waste in the Lower Waste Area; and an updated wetland assessment. Based on these pre-design and design investigations and studies to support the final Remedial Design, significant changes are being made to the 2011 ROD to better align the remedy with current and future site conditions and use and endangered species protection at the Site. The specific revisions are discussed in greater detail below.

**Containment Cell Location:** The OU1 on-site containment cell concept has been revised from two distinct containment cells (West Cell and Ore Roast Bed Cell) into one containment cell (Valley Cell Area) as a result of the design of the cleanup action selected in the OU1 2011 Record of Decision. This would involve expanding the waste consolidation and cover system at the Ore Roast Bed Cell to include the material that would have been placed in the 2011 OU1 ROD proposed West Cell area. This allows for one area for waste consolidation and installation of one cover system rather than the two separate waste consolidation areas and cover systems as identified in the 2011 ROD. The combined area will be referred to as the Valley Cell Area (VCA). The 2011 OU1 proposed West Cell and revised 2019 ESD VCA are shown in Figure 2.

This change was based on several critical issues that became apparent as the design for the containment cell in the West Cell location was advanced. These include the discovery of a higher than anticipated water table and the related need to include a substantial under-drain system to prevent the water from saturating the waste material, and the need for a toe buttress to stabilize the West Cell. These features increased the cost, complexity, and material requirements to construct the containment cell in the West Cell area. An optimization analysis was performed to evaluate whether adjusting the West Cell location uphill or combining the West Cell with the Ore Roast Bed Cell would reduce or eliminate these issues. The outcome of the optimization was a decision to expand the Ore Roast Bed cover system to include the containment and covering of all of the waste that has been targeted for the West Cell and Ore Roast Bed Cell. As a result, only one containment cell, the VCA, would be necessary as opposed to the two identified in the 2011 ROD.

The VCA includes the following:

- installation of surface water and shallow groundwater diversions as necessary to prevent the flow of surface water or groundwater into the LWA Cell;
- clearing and grading of 3.0 acres for staging, lay-down areas, and haul roads;
- excavation of approximately 13,100 cubic yards of material from the LWA area and temporary placement in the staging area to allow installation of a portion of the VCA subgrade preparation;
- excavation of OU1 wastes and consolidation in an approximately 6.4 acre containment cell (the VCA);
- clearing and mining (by shallow excavation) of an estimated 4.0 acres from the Green Crow borrow source area to obtain stone and borrow material needed for constructing the VCA and restoring disturbed areas; and
- installation of a low-permeability cover system on the LWA Cell.

The VCA will also move the waste cell further from the bat hibernacula and prevent the clearing of 6 acres of unimpacted forest near the hibernacula, which makes this approach compliant with the Endangered Species Act and best management practices to protect threatened and endangered bat species.

The OU1 remedy components that remain generally unchanged include:

- excavation of waste rock and impacted soil/sediment from: the UWA, the LWA, ORB, TA, Ely Brook, Ely Brook tributaries, and Ponds 4/5 and consolidation of the excavated materials in an on-site containment cell to be capped with a low permeability cover system to contain and isolate the waste rock within the containment cell;
- construction of surface water diversions to redirect the surface water around the waste cell and other disturbed areas;
- removal of impacted sediments in EB-UR by either flushing or via vacuum extraction;
- the EB-LR and EB-MR would be restored as a natural channel;
- Ponds 4 and 5 would be restored as either a rip-rap armored channel or restored to native aquatic habitat as part of a wetland mitigation, and the excavated areas will be restored by grading the slopes to allow for adequate surface water drainage and minimize soil erosion, and establishing ground surface stabilization for the long-term by native vegetation; and
- institutional controls, environmental monitoring, and five-year reviews.

The estimated cost for the OU1 cleanup has increased from \$18 million to \$22 million. This is primarily due to a refinement of the cost estimate through the design process. Based on the details available as a result of the design process, the original 2011 ROD remedy with the West Cell would cost at least an additional \$1 million more than the 2019 ESD VCA remedy approach.

**Land Use Assumptions and Cleanup Levels of Cobalt, Copper, and Iron:** The Site is currently abandoned and unoccupied. Access is restricted by a locked gate at the entrance road although unauthorized trespass use does occur. The Site property is used for recreation (e.g.,

hiking, rock collecting, mining history interpretive walks, horseback riding, snowmobile and ATV riding). Land use in the vicinity of the Site is rural residential and open space. The land surrounding the Site includes residences and forest. The land cover-types consist mostly of mixed hardwood and softwood and softwood-dominated woodlands sloping towards Ely Brook. There is no use of, or exposure to, groundwater within the Site. Subsequent to the 2011 OU1 ROD, EPA and VTDEC entered into settlement agreements which require land use restrictions on the Site. The land use restrictions were accomplished through a Grant of Environmental Restriction and Easement which was in effect as of May 2019. The entire area within OU1, OU2, OU3, and portions of OU4 are now owned by one landowner and cannot be used for residential purposes. The property subject to the Grant of Environmental Restriction and Easement is shown on Figure 3.

The 2011 ROD assumed that the current use of the Site property was non-residential but that future residential use of the Site property was possible. Based on those assumptions, the human health risk assessment for the 2011 OU1 ROD evaluated recreational use as the current risk scenario and residential use as the future risk scenario, to assess the potential risk to individuals exposed to the contamination at the Site. Based on the reasonably anticipated future uses of the property, which include forest management, maple sugar production, limited recreational and historic interpretation visitation, the future land use assumption is being changed from future residential use to non-residential.

This ESD is also changing the 2011 ROD soil cleanup levels to reflect the future non-residential use assumption. The revised soil cleanup levels are based upon with the exposure assumptions used in the 2011 ROD for the current recreational land use scenario. The risk evaluation assumption regarding the number of days an individual may come into contact with mine waste is being changed from 350 days per year cited in the 2011 ROD for the residential use scenario to 104 days per years cited in the 2011 ROD for the current recreational use scenario.

The revised soil cleanup levels are presented below in Table 1.

Analyte	Soil Cleanup Levels in 2011 ROD based on future residential use (mg/kg)	Soil Cleanup Levels based on non-residential future use (mg/kg)	Risk at Remedial Goal HQ/ILCR	Basis
Cobalt	24	81	1	Non-residential exposure that would result in a HI of no greater than one for a child or adult assuming 104 days per year visiting the Site.
Copper	629	2,139	0.2	Non-residential exposure that would result in a HI of no greater than one for a child or adult based on an exposure to both iron and copper and assuming 104 days per year visiting the Site. Both iron and copper have the same target endpoint (gastrointestinal).

Iron	44,800	152,320	0.8	Non-residential exposure that would result in a HI of no greater than one for a child or adult based on an exposure to both iron and copper and assuming 104 days per year visiting the Site. Both iron and copper have the same target endpoint (gastrointestinal).
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The 2011 OU1 ROD assumed that all contaminated soil and waste above the soil cleanup levels would be excavated and consolidated within the containment cells. The final OU1 Remedial Design has limited the extent of tree clearing and provided a buffer zone around bat hibernacula in order to comply with the Endangered Species Act (15 U.S.C. § 1531 *et seq.*) as it relates to the federally-threatened Northern Long-Eared Bat. This will result in some waste being left in place outside the containment cells.

The 2011 OU1 ROD requirement for interim land use restrictions, to be implemented to prevent exposure to contaminated soil and waste during the period prior to the implementation of the cleanup action, is being made a permanent requirement to address contamination being left in place that poses a human health risk. In addition, the scope of the institutional controls described in the ROD has changed to restrict residential use throughout the property. The institutional controls will also include restrictions to prevent disturbance to components of the remedy (including the VCA).

**Wetland Impacts:**

The total extent of wetland impacts for OU1, including the original West Cell, was estimated at 101,380 square feet based on the initial requirements of the 2011 OU ROD. The extent of wetland impacts based on the design which includes the VCA, is reduced to about 97,790 square feet. The wetland impacts associated with the West Cell would have been restored in place, whereas two small wetlands totaling 4,000 square feet (which are included in the 93,790 square feet) within the VCA will be permanently lost and replaced with wetland in another location on the Site. The two small wetland areas that will be lost are shown on Figure 4. The location of the replacement wetland will be determined during the remedial action.

**Historic Impacts:**

The 2011 ROD included a requirement to preserve the ORD Retaining Wall, to the extent practicable. The design process identified that, even if the original ORB Waste Cell was constructed as originally proposed, the ORB Retaining Wall would have to be dismantled and only a portion of the wall would have been reconstructed. The VCA preserves a shorter section of the ORB and ORB Retaining Wall in-place. Based on the overall area of disturbance associated with the VCA, there would be unavoidable impacts to the to the ORB Retaining Wall, the ORB, the East Row Foundations and Foundations 16 and 17. These resources were identified by a historical resource expert and flagged for data recovery mitigation. The extent of historic impacts are shown in Figure 4.

## V. DESCRIPTION OF SIGNIFICANT DIFFERENCES

This ESD documents the following changes to the 2011 OU1 ROD for the Site:

2011 OU1 ROD	Changes resulting from this 2019 ESD
The 2011 ROD identified a location west of Ely Brook, referred to as the “West Cell”, as the location designated for the consolidation of the mine waste.	The expanded Ore Roast Bed location, known as the Valley Cell Area, has been selected as the location to consolidate the mine waste. Based on the technical evaluations during the remedial design, the mine waste and sediment can be consolidated at the Ore Roast Bed area by filling over and downslope of the Ore Roast Bed.
The 2011 OU1 ROD described two separate containment areas. One for the tailing and ore roast bed material and another for the waste rock.	Based on the technical evaluations during the remedial design, only one containment area will be needed.
The 2011 OU1 ROD assumed a current recreational use and a future residential use scenario to establish cleanup levels	The future land use assumption of residential use will be revised to be the same as the current land use assumption, recreational use, as in the 2011 OU1 ROD
The 2011 OU1 ROD identified soil cleanup levels for cobalt, copper, and iron based on residential use assumptions	The cleanup levels for cobalt, copper, and iron have been revised based on a non-residential use scenario. The revised cleanup levels are based on the same frequency of exposure for recreational use as was used in the 2011 ROD.
The 2011 OU1 ROD required land use restrictions to prevent exposure to soil or waste above the soil cleanup levels until the cleanup was implemented.	The 2019 ESD makes the land use restriction to prevent exposure to soil or waste above soil cleanup levels as revised by the 2019 ESD a permanent requirement.
The 2011 OU1 ROD identified the federal Endangered Species Act as a location-specific ARAR.	The ESD adds regulations promulgated under the Endangered Species Act at 50 C.F.R. Part 17(o) after the issuance of the ROD as a location-specific ARAR pertaining to the protection of the federally threatened Northern Long-Eared Bat
EPA determined that the 2011 OU1 ROD remedy was the Least Environmentally Damaging Practicable Alternative for protecting wetland resource under the federal Clean Water Act.	EPA is revising its determination and now finds that the remedy modified by the 2019 ESD has fewer wetland impact so now is the Least Environmentally Damaging Practicable Alternative under the federal Clean Water Act.
Identified certain areas where wetland impacts will occur.	Two new areas of wetland impact will occur as a result of the VCA but the overall wetland impact will be reduced for the OU1 cleanup.
Identified certain areas where historic resources will be impacts and identified that attempt would be made to retain ORB wall	VCA will result in loss of the majority of the ORB wall as the VCA will be an expansion of the ORB Waste Cell.

### Change in Expected Outcomes

There is no change in the expected outcome for the Remedial Action. The expected outcome is that the mine waste that presents an acid mine drainage threat and which also exceeds soil and sediment cleanup levels will be consolidated into an on-site containment cell to prevent leaching and direct contact.

## VI. Support Agency Comments

VTDEC participated with EPA in developing the changes to the remedy as discussed in this ESD. The VTDEC is in agreement with the proposed changes.



## VII. Statutory Determinations

This 2019 ESD includes the applicable requirements of 50 C.F.R. Part 17(o) as a federal location-specific ARAR. The Main Shaft and the associated Pollard Shaft and Shaft 2 at the Ely Copper Mine are known hibernacula for the Northern Long-Eared Bat (NLEB), a species listed as threatened in accordance with the federal Endangered Species Act (ESA) of 1973, 16 U.S.C. §1531 *et seq.* (listing published in 80 Fed. Reg. 17974 (April 2, 2015)). Final ESA 4(d) rules, pertaining to protecting the species and its habitats, went into effect in February 2016 (50 C.F.R. Part 17(o)) after the 2011 ROD. The forested area surrounding the Main Shaft, Pollard Shaft, and Shaft 2 are also documented to be potential summer habitat for the NLEB. As part of the development of the Remedial Design, EPA consulted with the United States Fish and Wildlife Service (USFWS) in accordance with Section 7 of the ESA, 16 U.S.C. §1536, regarding EPA's finding that the OUI selected remedy is not likely to jeopardize or adversely affect the species given the mitigative measures that will be employed. USFWS concurred with EPA's finding in a letter dated April 2, 2019. EPA will continue to coordinate with the USFWS. This finding also applies to threatened and endangered bat species cited in the 2011 ROD subject to protection under State's Endangered Species law, 10 V.S.A. Ch. 123. The relocation of the waste containment cell from the West Cell to the Valley Cell Area reduces the overall extent of tree clearing and moves the containment cell further from the hibernacula.

The Special Findings in the 2011 ROD regarding the federal Clean Water Act are modified since the consolidation of waste disposal into the single Valley Cell Area will reduce overall wetland impacts from the remediation. There will be two small areas, totaling about 4,000 square feet, of new wetland impacts associated with the VCA. The modified remedy has been determined now to be the Least Environmentally Damaging Practicable Alternative under the federal Clean Water Act.

Modification of the remedy as described in this 2019 ESD will result in additional unavoidable direct and indirect impacts on historic features at the Site as compared to the 2011 ROD remedy. The Valley Cell Area layout would result in the loss of the majority of the ORB wall with only a small section of the ORB and ORB Retaining Wall preserved in-place. There will also be impacts to several foundations along the east side of Ely Brook. As described in the 2011 ROD, EPA has consulted with the State Historic Preservation Officer regarding any mitigation that may be necessary to address unavoidable adverse effects on prehistoric or historic resources at the Site altered by the remedy as modified by this ESD.

EPA believes that the remedy as adjusted herein remains protective of human health and the environment and satisfies the requirements of Section 121 of CERCLA, 42 U.S.C. § 9621. The changes made in this ESD are consistent with and do not change the remedial action objectives for the 2011 ROD. The modifications to the remedy described herein will allow the remedy to continue to perform in the most timely and cost-effective manner practicable while meeting all of the statutory requirements of CERCLA.

## **VIII. Public Participation Compliance**

EPA provided a 21-day public comment period on this 2019 ESD from August 20, 2019 through September 10, 2019. A public information meeting was held on August 19, 2019 to explain the changes documented in the Explanation of Significant Differences. As required by 40 C.F.R. §300.435(c)(2)(i)(B), EPA has published a notice of availability and a brief description of this ESD in a major local newspaper of general circulation. The notice of availability, which also solicited for review of the draft 2019 ESD and the Administrative Record, was published in the newspapers on [date]2019 encouraging the public to submit comments on this 2019 ESD. The Draft ESD and supporting Administrative Record were made available to public at the EPA Region 1 Superfund Records Center in Boston, Massachusetts and on-line at [www.epa.gov/superfund/ely](http://www.epa.gov/superfund/ely). EPA received [ xx ] comments on the Draft ESD from the public, which is/are responded to in the Response to Comments (Attachment C).

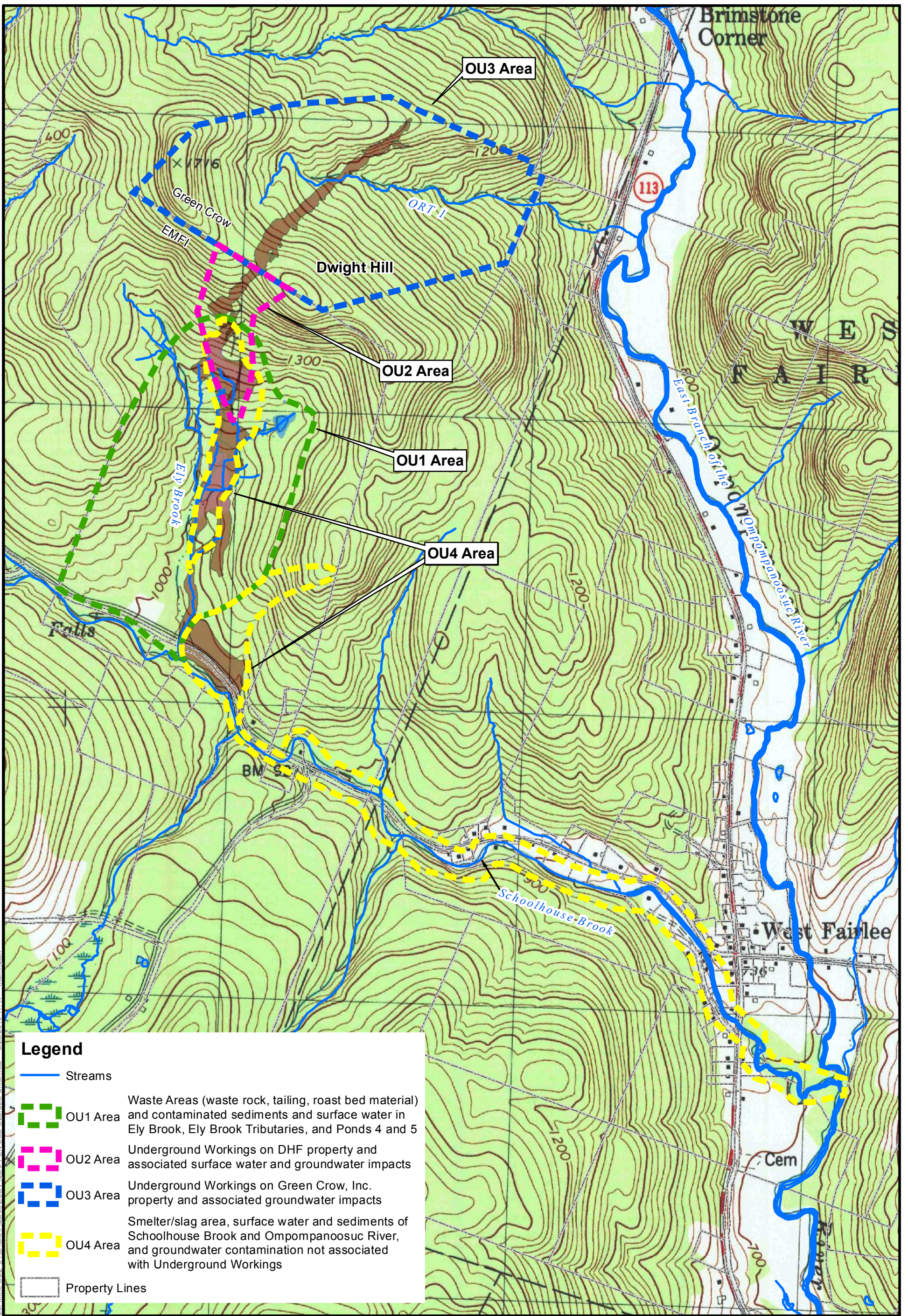
In accordance with Section 117(d) of CERCLA, 42 U.S.C. § 9617(d), and Section 300.825(a) of the NCP, this ESD and supporting documentation shall become part of the Administrative Record for the Site, which is available for public review at the locations identified in the introduction to this document.

following the signing of this ESD.







**ATTACHMENT A** – VTDEC Concurrence Letter

**ATTACHMENT B** - Figures

**ATTACHMENT C** – Administrative Record Index

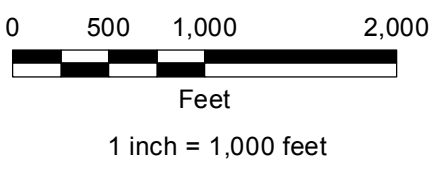


**Legend**

-  Streams
-  OU1 Area  
Waste Areas (waste rock, tailing, roast bed material) and contaminated sediments and surface water in Ely Brook, Ely Brook Tributaries, and Ponds 4 and 5
-  OU2 Area  
Underground Workings on DHF property and associated surface water and groundwater impacts
-  OU3 Area  
Underground Workings on Green Crow, Inc. property and associated groundwater impacts
-  OU4 Area  
Smelter/slag area, surface water and sediments of Schoolhouse Brook and Ompompanoosuc River, and groundwater contamination not associated with Underground Workings
-  Property Lines

**Notes**

1. EMFI = Ely Mine Forest, Inc.
2. Property Lines are from Vermont Center for Geographic Information (VCGI). Topographic map from USGS Vershire, VT quadrangle, revised 1983.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.



**FIGURE 1**

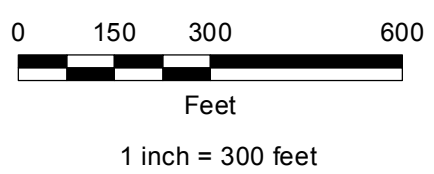
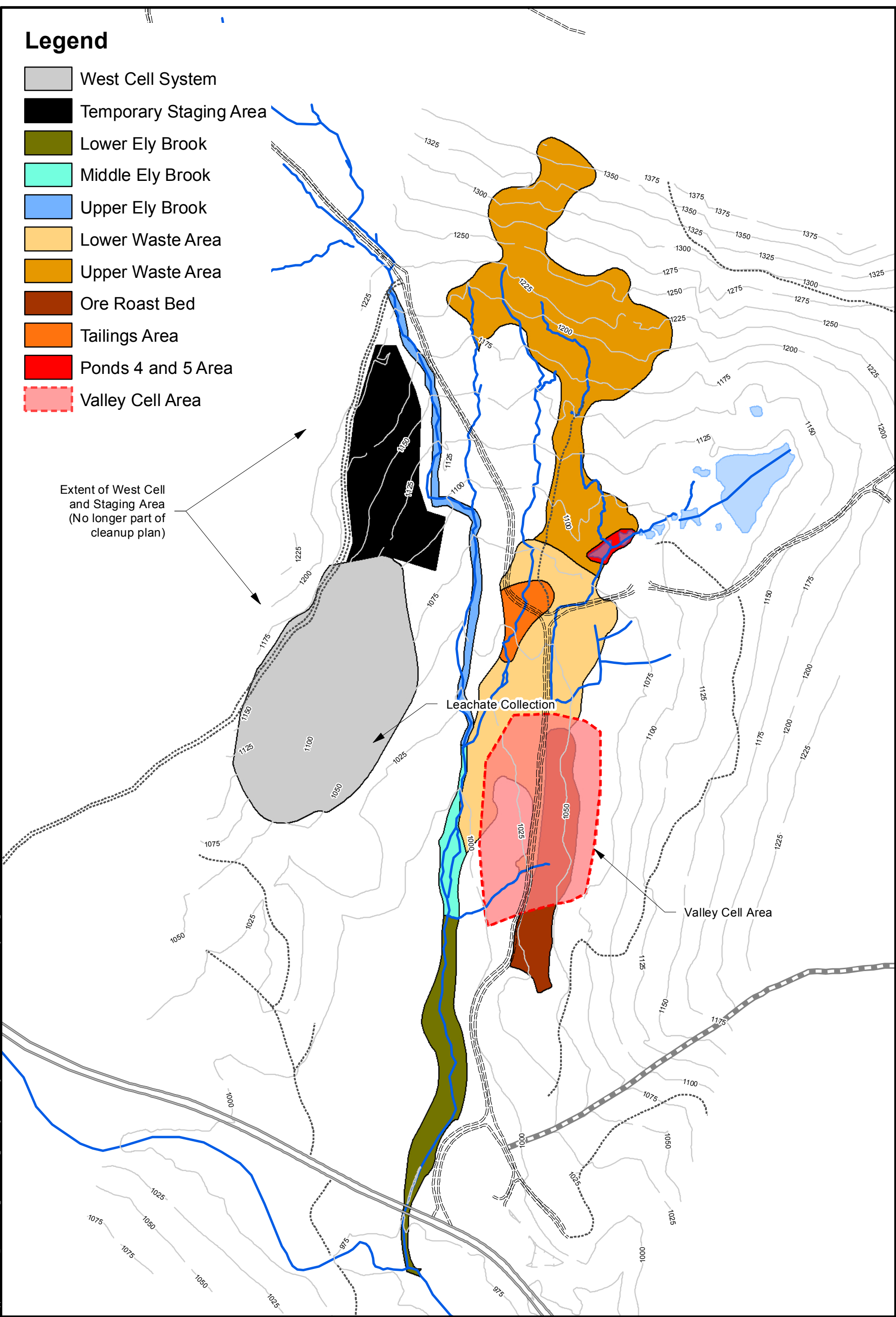
**SITE LOCATION AND OPERABLE UNITS**

R:\180000\_Task Orders\0112 Ely Copper Mine\_OU2\_3.RD\GIS\Figures\ESD\Figure 1 Ely ESD Operable Units.mxd 5/28/2019 11:44:18 am

# Legend

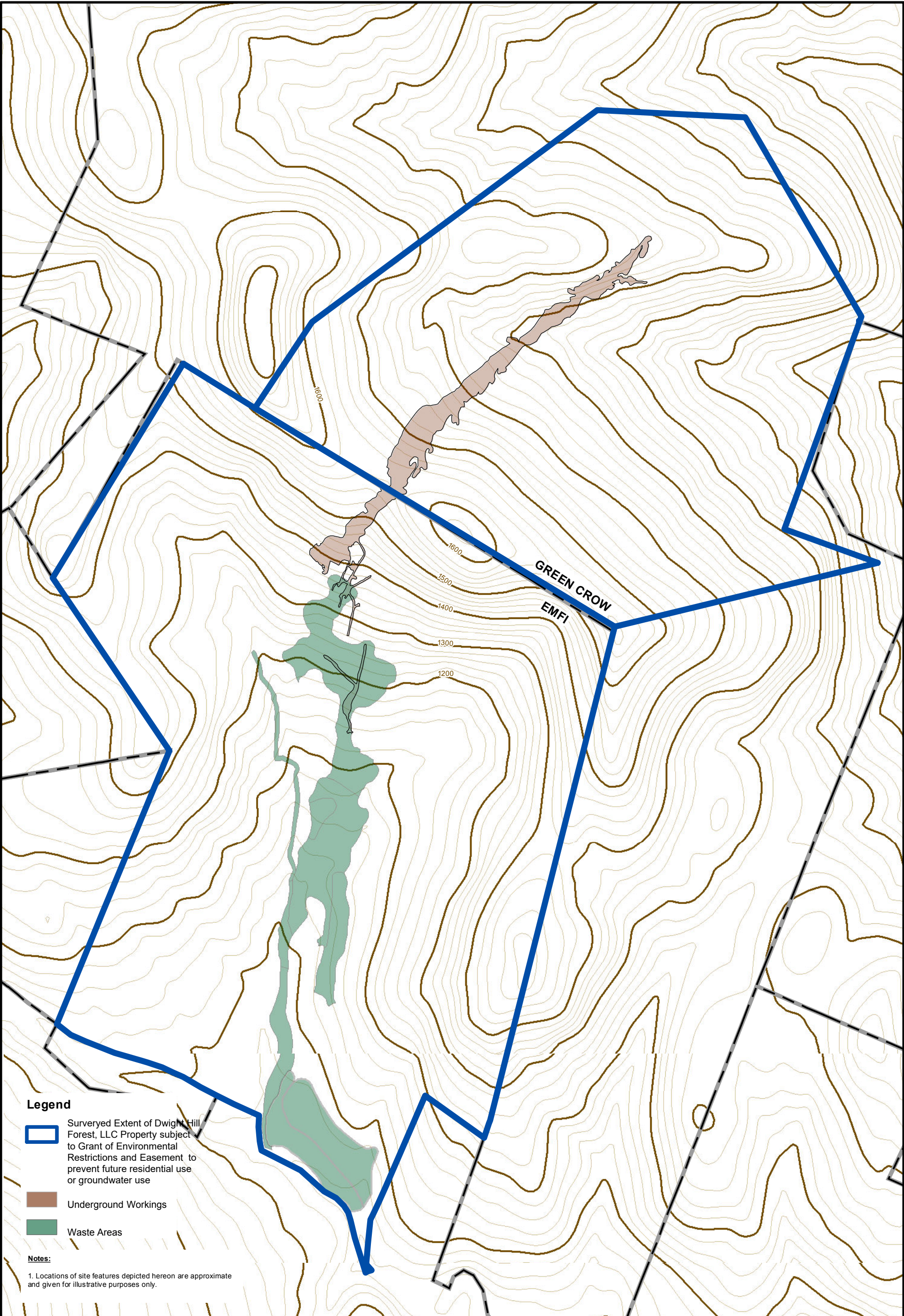
- West Cell System
- Temporary Staging Area
- Lower Ely Brook
- Middle Ely Brook
- Upper Ely Brook
- Lower Waste Area
- Upper Waste Area
- Ore Roast Bed
- Tailings Area
- Ponds 4 and 5 Area
- Valley Cell Area

Extent of West Cell and Staging Area  
(No longer part of cleanup plan)






**FIGURE 2**  
**VALLEY CELL AREA LOCATION AND FORMER WEST CELL LOCATION**

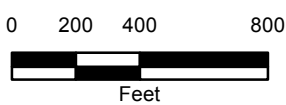
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**Legend**

-  Surveyed Extent of Dwight Hill Forest, LLC Property subject to Grant of Environmental Restrictions and Easement to prevent future residential use or groundwater use
-  Underground Workings
-  Waste Areas

**Notes:**  
 1. Locations of site features depicted hereon are approximate and given for illustrative purposes only.



1 inch = 600 feet



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**FIGURE 3**

EXTENT OF GROUNDWATER AND LAND USE RESTRICTIONS (INSTITUTIONAL CONTROLS FOR OU1, OU2, OU3 AND EARLY ACTION) ELY COPPER MINE SUPERFUND SITE

PREPARED BY: JH  
 PROJECT NO. 80069

CHECKED BY: AB  
 DATE: APRIL 2017

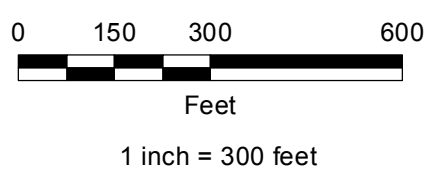
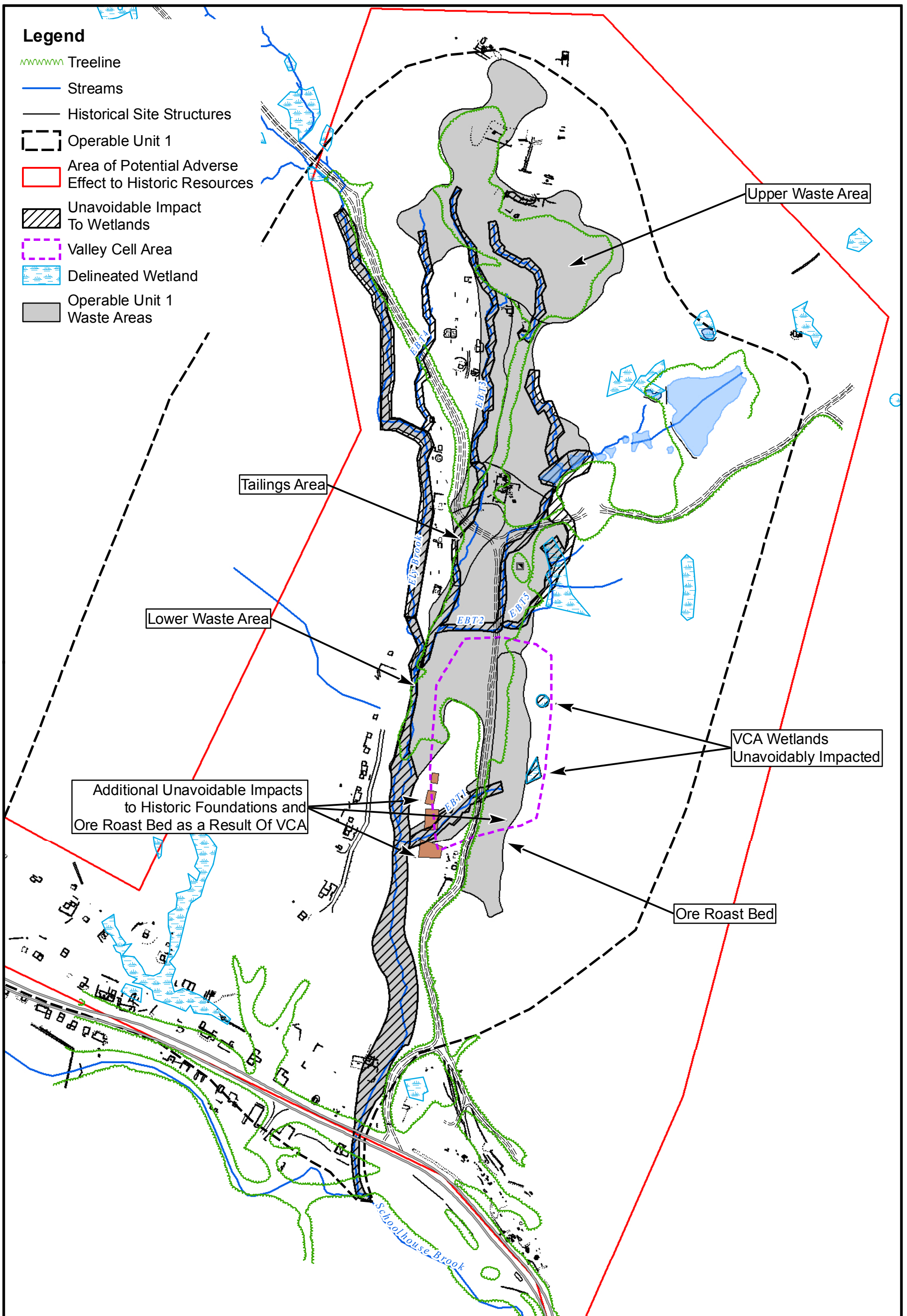


FIGURE 4  
WETLANDS AND HISTORIC  
RESOURCE IMPACTS