DRAFT PRELIMINARY ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES
W.W. CROSS SITE, JAFFREY, NH
OCTOBER 2023

1. Introduction & Background

1.a. Site Description & History

1.a.i. Site Name and Location

W.W. Cross Site, 39 Webster Street, Jaffrey, NH (the Site).

1.a.ii. Site Description

The Site comprises one 11.29-acre parcel identified as 39 Webster Street. The Site is improved with one 97,914-square foot former commercial/industrial building. The building was built in 1915, and used as the W.W. Cross Factory, which manufactured tacks and fasteners for the upholstery, carpeting and shoe industry. In 2020, a fire impacted the eastern and central portions of the building which have since been demolished.

Paved parking areas are located to the southwest and west of the Site building. A grassy area is located directly east of the Site building that serves as a cap for a waste tack landfill, and two retaining ponds are located on the eastern end of the Site separated by an earthen berm. The remainder of the exterior portions are wooded.

The Site building is connected to Town of Jaffrey water and wastewater services, but they are not currently active. All other utilities have been disconnected to the Site.

1.a.iii. Site History

The Site was first developed with the original Site building (today the northernmost section) by W.W. Cross circa 1924. Under the initial building configuration, the factory occupied the northeastern most portion of the building. By 1941, the Site building had been expanded to the south, increasing the factory space with added storage in the southwest. Factory space was further expanded by 1953. These additions created a building footprint similar to present day.

By 1953, a boiler room was added to the west of the side building. Between 1955 and 1975, a separate aboveground storage tank (AST) structure was built adjacent to the boiler room. Between 1975 and 1999, an eastern portion of the building was demolished. By 2000, W.W. Cross had vacated the Site. Between 2007 and 2012, the building was used by various commercial businesses after being divided into tenant commercial spaces. On June 21, 2020, a five-alarm fire occurred at the Site severely damaging the eastern portion (roughly an eighth) of the building.

1.b. Prior Site Assessment Findings

Since 1982, several environmental investigations have been conducted for the Site and associated W.W. Cross operations. In 2022, Credere prepared a Site-Specific Quality Assurance Project Plan (SSQAPP), as part of the Town of Jaffrey's Brownfield Assessment Program, that described Site conditions, established a preliminary conceptual Site model (CSM), defined assessment objectives, outlined proposed samples and justification, provided field activity methodology, and established the regulatory criteria for the Site. In accordance with the SSQAPP, Credere conducted a Phase II Environmental Site Assessment (ESA) for the Site in 2023, which concluded the following based on the following established objectives:

Objective #1 – Further delineate the tetrachloroethylene (PCE) plume previously identified at the Site in the eastern portion of the building area

Exceedances of New Hampshire Ambient Groundwater Quality Standard (AGQS) for PCE were identified at two on-Site monitoring wells (MW-6D and MW-102). In the remaining six (6) sampled monitoring wells (MW-2, MW-103, MW-203, CA-MW-302, CA-MW-303, and CA-MW-304) PCE in groundwater was not detected above or equal to the New Hampshire AGQS.

Objective #1 was achieved, as the plume of PCE was better defined with the recent groundwater sampling data set. While the source of this plume is likely a former plating room, low concentrations of PCE exist between this room and tack pile area. Additionally, it appears that offsite/upgradient source(s) of PCE have not significantly comingled with this source.

Objective #2 – Sample for 1,4-dioxane with improved data quality for further understanding of the comingled plume

An exceedance of the New Hampshire AGQS for 1,4-dioxane was identified at one on-Site monitoring well (MW-2), and detections below the AGQS were identified in two other monitoring wells (CA-MW-303, and CA-MW-304). It appears that 1,4-dioxane is generally localized to the vicinity of MW-2 and MW-6D, and concentrations have demonstrated decreasing concentrations since 2019. Based on the results of this assessment, Objective #2 was achieved.

Objective #3 – Further delineate the horizontal and vertical extents of polycyclic aromatic hydrocarbons (PAHs) previously identified under, and in the general area of, the southwest portion of the Site building.

Exceedances of New Hampshire Soil Remediation Standards (SRSs) for PAHs were identified at three soil borings advanced on Site (CA-SB-02, CA-SB-03, and B117R). Two soil borings (CA-SB-08 and CA-SB-09) could not be completed due to safety concerns related to the stability of the building. Objective #3 was achieved, as the horizontal extent of PAHs were further delineated to the southwest and beyond the constraints of the building; however, the extents were not delineated to the north due to building instability concerns. Under prior environmental assessment work, exceedances of the New Hampshire SRSs were identified in ten (10) soil borings advanced at the Site (B12, B26, B104, B107, B109, B110, B111/R, B117/R, CA-SB-02 and CA-SB-03).

Objective #4 – Further refine the horizontal and vertical delineation of cadmium below the former plating room pit/wastewater treatment area

Due to the building instability, Objective #4 could not be fully executed; however, the vertical extent of cadmium was confirmed to the depth of refusal. The horizontal extents of cadmium remain a data gap.

Objective #5 – Inventory and update the map of asbestos containing material (ACM) locations since the building fire and Environmental Protection Agency (EPA) Removal Action, conduct additional asbestos sampling as warranted to comply with state regulations,

sample potential polychlorinated biphenyl (PCB)-containing building materials, and delineate previously identified lead in soil

The known ACMs within the building were inventoried and updated to document post-fire and EPA removal action conditions. Supplemental asbestos sampling was also conducted, and suspect PCB-containing building materials (if identified) were sampled.

Under this sampling event, additional ACMs were not identified; however, based on prior reporting, ACMs that are known to remain include mastics in the office area, 9-inch floor tiles in Rooms 2 and 4, 13 fire doors throughout the building, window glazing, caulk, and roofing materials on the exterior, and vermiculite in the AST bunker.

Three (3) excluded PCB Bulk Product Waste materials were identified in the building (i.e., materials with concentrations greater than 1 milligram per kilogram [mg/kg] but less than 50 mg/kg). Identified PCB-containing materials include white paint in Room 16A, blue over silver paint in Room 16A, and residual mixed mastics in the former gym office. Three samples required elevated reporting limits due to matrix interference of the sample material. Due to the elevated reporting limit, it is inconclusive if these materials exceed 1 mg/kg. These materials should be conservatively considered to contain a concentration of PCBs above 1 mg/kg but below 50 mg/kg, or resampled. These include dark gray over white foundation paint on the interior foundation walls, multi-layered paint in the Room 4 bathroom, and black mastic in the Room 4 bathroom.

Lead was identified below the New Hampshire SRS across the Site. As such, the lead in soil impacts were confined to previously identified locations on the northern side of the building.

Based on the results of this assessment, Objective #5 was achieved.

Objective #6 – Assess the presence of the historical Underground Storage Tank (UST) beneath the building

A ground penetrating radar (GPR) survey was performed where a historical UST was suspected to be located. No anomalies large enough to represent a UST were identified in the GPR study area, suggesting that no tanks are present in this area of the building. Based on the results of this assessment, Objective # 6 was achieved.

Objective #7 – Assess surface soil surrounding the transformer pad for the presence of PCBs

Surface soil samples collected from around the transformer pad were found to have detectable levels of PCBs in most of the samples, although no detections were above the New Hampshire SRS. Objective #7 was achieved, and it does not appear that a significant release of PCBs has occurred in the area of the transformers.

Objective #8 – Assess broader areas of Site surface soils for general impacts related to historical industrial operations

PAHs exceeding the New Hampshire SRSs were identified in shallow soils (0-2 feet) at three soil borings advanced on Site (CA-SB-18, CA-SB-22, and CA-SB-23). PAHs below the New Hampshire SRSs were also detected in shallow samples collected from two (2) soil borings (CA-SB-20 and CA-SB-21). Two background samples (CA-SACM-18 through CA-SB-27) had detections of arsenic, barium, chromium, and lead below the New Hampshire SRS. Based on the sample results, historical industrial operations appear to have impacted shallow Site soil, with PAHs exceeding the New Hampshire SRS in places, and metals below New Hampshire SRS. These soils will require management during future redevelopment of the Site. The PAH detections in background samples do not coincide with observed anthropogenic materials, excluding them from being considered a background condition in accordance with Env-Or 602.03. Based on the results of this assessment, Objective # 8 was achieved.

1.c. Contaminants of Potential Concern

Based on the results of Credere's 2023 Phase II ESA and prior environmental investigations, the Contaminants of Potential Concern (COPCs) to be addressed at the Site during future cleanup activities include the following:

- Chlorinated VOCs (CVOCs), i.e., PCE and daughter products in groundwater
- 1,4-Dioxane in groundwater
- PAHs in soils
- Metals (particularly cadmium & arsenic) in soils and groundwater throughout the Site
- Cyanide in soils and groundwater
- Total petroleum hydrocarbons (TPH) in soils
- Per- and polyfluorinated alkyl substances (PFAS) in groundwater
- Asbestos in building materials
- PCBs in building materials
- Lead paint

The following recommendations are made to address this contamination:

- Abate identified ACMs and associated debris within the Site building in accordance with New Hampshire Statute Chapter Env-A 1800 – Asbestos Management and Control.
- Remove and dispose of PCB containing materials within the Site building as excluded PCB Bulk Product Waste at a New Hampshire landfill licensed to accept PCBs over 1 mg/kg.
- Due to the presence of LCP within/on the Site building, LCP materials should be managed in accordance with the OSHA Lead in Construction Standards (29 CFR 1926.62) and proper worker notification be implemented during
- Employ proper health and safety practices and worker notification to prevent exposure to hazardous building materials and other impacted media during building demolition.
- Properly characterize wastes generated during demolition to facilitate proper disposal.
- Following and/or concurrent with building demolition, prepare a Remedial Action Plan to address identified contamination at the Site (beyond what will be removed during the demolition [i.e., building materials/debris]):
    - PAHs within/around the creosote-type release area, and arsenic and cadmium in soil within the building footprint.

  - Potential discharge locations for floor drains, sumps, and sub-slab piping (which may have been connected to process derived wastewater) to determine if release(s) to the subsurface have occurred
  - Removal and disposal of the fuel oil AST and surrounding vermiculite (asbestos) material
  - Removal and disposal of the exterior transformers
- Further characterize Site groundwater as needed and renew the Groundwater Management Permit (GMP) for the W.W. Cross Site

2. Proposed Reuse Plan

The Town's goal for redevelopment of the W.W. Cross Site is to address the key community needs of housing, and lack of access to local food markets and dining options. The Town recently acquired the Site in October 2023, and intends to further support its clean-up for anticipated mixed-use development.

3. Regional and Site Vulnerabilities

According to the US Global Change Research Program (USGCRP), trends for the northeast region of the United States include increased temperatures, increased precipitation with greater variability, increased extreme precipitation events, and rises in sea level. Some of these factors, most specifically increased precipitation that may affect flood waters and stormwater runoff, are most applicable to the cleanup of the site. Based on the nature of the Site and its proposed reuse, changing temperature, rising sea levels, wildfires, changing dates of ground thaw/freezing, changing ecological zone, saltwater intrusion and changing groundwater table are not likely to significantly affect the Site.

4. Applicable Regulations and Cleanup Standards

4.a. Cleanup Oversight Responsibility

The cleanup will be overseen by the New Hampshire Department of Environmental Services (NHDES) Brownfields Department. In addition, all documents prepared for this Site are submitted to the NHDES under Site #198708007.

4.b. Cleanup Standards and Applicable Laws

Cleanup goals will include the following:

- Remediate source areas of soil beneath/surrounding the Site building and eliminate the exposure pathway(s) to remaining Site soils in order to meet the New Hampshire Statute Env-Or 600 Contaminated Site Management SRSs
- Abate ACMs by removal in accordance with the New Hampshire Statute Chapter Env-A 1800 – Asbestos Management and Control
- Properly dispose of lead painted building components and excluded PCB Bulk Product Waste as non-hazardous waste according to New Hampshire Env-Hw 400
- Dispose of universal wastes in accordance with New Hampshire Env-Hw 1100

- Remove and dispose of out-of-service 20,000-gallon No. 6 fuel oil AST in accordance with Env-Hw 300
- Remove and dispose of six out of service exterior transformers in accordance with New Hampshire Env-Hw 400

5. Cleanup Alternatives

5.a. Presumptive Remedial Measures

Fire damage to the Site building and its subsequent deterioration have compromised the structural integrity and prevented a complete delineation of the impacted soils beneath the building footprint. In addition, asbestos, LCPs and PCB-containing paints remain within unstable areas of the buildings, and exposed areas provide a direct pathway for release(s) to the environment. The building cannot be restored and reused for any purpose, and without removal, the environmental contaminants identified in **Section 1.c** cannot be addressed; therefore, demolition and removal of the Site building and associated structures is the only viable option. The following are considered presumptive remedial measures that do not require evaluation of alternatives.

5.a.i. Building Demolition (Including Asbestos Abatement, PCB and Lead Paint Building Component Removal, and Transformer Removal)

In accordance with Env-A-1800, prior to any demolition, all ACM is required to be properly abated. In sections of the Site building which are not safe to access for abatement, that portion of the building will be demolished, and the entire waste stream will be disposed of as asbestos-containing waste. In conjunction with this phase, remaining universal wastes will be segregated and properly handled and disposed of. The remaining 20,000-gallon No. 6 fuel oil AST, and six out of service exterior transformers will also be properly removed and disposed.

Following asbestos abatement, the remaining building demolition will proceed and LCPs and excluded PCB Bulk Product materials will be managed and disposed of as non-hazardous waste according to New Hampshire Env-Hw-400.

Presumptive Cost: $1,400,000

5.b. Comparison of Remaining Alternatives

Considering the prior implementation of the above presumptive remedies, the remaining contamination to address is soil contamination that may require limited additional characterization due to impacted soils being located under discrete sections of the building. Once the building is removed, a supplemental characterization/pre-design investigation will be completed to further define the extent of PAHs within/around the creosote-type release areas, and arsenic and cadmium impacted soils within the building footprint. Additionally, since impacts are not known, no alternatives were evaluated associated with any hypothetical issues related to floor drains and discharge pipes that have not yet been identified; and once the building/slab is removed, will require further evaluation.

The remedial actions selected for the Site should minimize the potential for human exposure and/or improper disposal of COPCs at the Site. Multiple remedial alternatives are available to address the identified COPCs at the Site. However, based on past experience at sites with similar contaminants and conditions, alternatives were pre-screened for general advantages and disadvantages and the following remedial alternatives were selected for further evaluation and comparison:

- Alternative #1 – No Action
- Alternative #2 – Selective removal of contaminated soil for offsite disposal, installation of an engineered barrier, and institutional controls
- Alternative #3 – Complete removal and proper disposal of contaminated soil/fill from the Site
- Alternative #4 – Installation of an engineered barrier on all contaminated soil and institutional controls

5.b.i. Evaluation of Alternatives

The comparison and evaluation of the remedial alternatives has been conducted using the five criteria listed below in order of importance:

1. Risk reduction and effectiveness (including consideration of continued effectiveness in a changing climate)
2. Feasibility and ease of implementation
3. Cost effectiveness
4. Green remediation potential
5. Estimated time to reach "No Further Action"

Risk Reduction and Effectiveness

- Alternative #1 – No Action does nothing to reduce risk of exposure to contaminants at the Site; therefore, **this alternative does not meet threshold criteria for further consideration and will not be further evaluated**.
- Alternative #2 – Selective removal of contaminated soil for offsite disposal, installation of an engineered barrier, and institutional controls are effective at reducing risk because it uses a well-tested approach to preventing exposure by adding a barrier between human activities and the contamination. This alternative's effectiveness relies on the integrity of the engineered barrier, which may be impacted by changing climate conditions, such as increased flooding or erosion during severe weather events.
- Alternative #3 – Complete removal and proper disposal of contaminated soil/fill from the Site is the most effective at reducing risk of exposure because it eliminates the source. This alternative is also the most continually effective and resilient for similar reasons.
- Alternative #4 – Installation of an engineered barrier on all contaminated soil and institutional controls is similarly protective for reasons discussed under Alternative #2; however, this alternative relies heavily on the integrity of the engineered barrier and leaves a source area susceptible to exposure as a result of severe weather events.

Feasibility and Ease of Implementation

- Alternative #2 – Selective removal of contaminated soil for offsite disposal (i.e., creosote and arsenic/cadmium impacted soils), installation of an engineered barrier over other

PAH/urban fill type soil, and institutional controls requires additional delineation/ characterization of contaminated soil beneath the remaining Site structures. This alternative uses standard excavation and construction techniques, which can be implemented in conjunction with redevelopment, creating efficiency and greater feasibility. Considering the source areas of contaminated soil are easily accessible, this is considered to be easier to implement than Alternative #3.

- Alternative #3 – Complete removal and proper disposal of contaminated soil/fill from the Site could be implemented; however, may require extensive confirmatory sampling and excavation. The complete extent of contamination is presumed to be Site-wide based on the history of industrial operation at the Site. Furthermore, the previously assessed and capped tack pile landfill would remain on site under institutional controls and monitoring. This alternative for soil is feasible but less easy to implement due to the extents of impacted soils.
- Alternative #4 – Installation of an engineered barrier on all contaminated soil and institutional controls would require only limited additional sampling and is the easiest to implement.

<u>Cost Effectiveness</u>

- Alternative #2 – Selective removal of 1,500 tons of contaminated soil for offsite disposal, installation of an engineered barrier, and institutional controls are estimated to cost $200,000
- Alternative #3 – Complete removal and proper disposal of 4,000 tons of contaminated soil/fill from the Site is estimated to cost $700,000
- Alternative #4 – Installation of an engineered barrier on all contaminated soil and institutional controls is estimated to cost $200,000

<u>Green Remediation Potential</u>

- Alternative #2 – Selective removal of contaminated soil for offsite disposal, installation of an engineered barrier, and institutional controls would require a moderate degree of soil trucking and landfill disposal.
- Alternative #3 – Complete removal and proper disposal of contaminated soil/fill from the Site would require the most soil trucking and landfill disposal.
- Alternative #4 – Installation of an engineered barrier on all contaminated soil and institutional controls would require the least soil trucking and landfill disposal, making this the most likely to have potential for green remediation.

The following table summarizes the comparison criteria and alternatives using a relative rank score. The top-ranking score is based on the total number of alternatives presented as part of this ABCA (i.e., 4 alternatives), representing the best option for that comparison criteria:

Alternative	Reduced Risk & Effectiveness*	Feasibility & Ease	Cost Effectiveness	Green Remediation Potential	Time	Total Score (max score 16)
#1 No Action	0	-	-	-	-	0
#2 Select Removal/ Engineered Barrier	3	4	4 ($200,000)	3	=	14
#3 Complete Removal	4	2	2 ($700,000)	2	=	10
#4 Sitewide Engineered Barrier	2	3	4 ($200,000)	4	=	13

0 – indicates threshold criteria not met and alternative is not evaluated, would otherwise represent scores of 1
= indicates no factors suggest the alternative to outweigh another.

Alternatives #2 and #4 are similar in scoring; however, as Alternative #2 allows for improved effectiveness and long-term risk reduction in a changing climate (by removal of contamination) and Alternative #4 likely is not implementable because under New Hampshire law, the creosote and arsenic/cadmium contaminated soils are required to be removed. Therefore, Alternative #2 is the selected alternative because this evaluation criteria is considered more important than the similar cost and green remediation potential that scores higher for Alternative #4.

6. Proposed Cleanup

To implement Alternative #2, the remedial design will further characterize the extent of contamination, particularly below the building footprint, through delineation sampling. Once defined, the contaminated soil will be excavated using standard construction practices for offsite disposal. Throughout areas of the Site with residual contaminated soils (i.e., PAHs/urban fill), surfaces will be covered with an engineered barrier to consist of clean soil cover in landscaped areas or lawns, paved walkway, or building foundations.

Alternative #2 Cleanup Cost = $200,000

Total Cleanup Cost (Presumptive + Alternative #2) = $1,600,000