

Corrective Action Plan

Former Chemfab Facility

1030 Water Street

North Bennington, Vermont

SMS Site #20164630

Prepared for
Saint-Gobain Performance Plastics

March 9, 2020



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Certifications

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March 9, 2020

Date

Abbreviations

bgs	below the ground surface
CAP	Corrective Action Plan
CAAI	Corrective Action Area I
CAAI	Corrective Action Area II
CSM	Conceptual Site Model
ECAA	Evaluation of Corrective Action Alternatives
iRULE	Investigation and Remediation of Contaminated Properties
OUA	Operable Unit A
OUB	Operable Unit B
OUC	Operable Unit C
PCBs	metals, and polychlorinated biphenyls
PFAS	per- and poly-fluoroalkylated substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonate
POET	point-of-entry treatment
SMS	Site Management Section
SVOCs	semi-volatile organic compounds
VOCs	volatile organic compounds
VT 67A	Vermont State Highway 67A
VTANR	Vermont, Agency of Natural Resources
VTDEC	Vermont Department of Environmental Conservation

Executive Summary

This report presents the Corrective Action Plan (CAP) for the former Chemfab facility located at 1030 Water Street (Site) in the Village of North Bennington, Vermont (Figure 1). The Site has been identified by the Vermont Department of Environmental Conservation (VTDEC) and Site Management Section (SMS) as Site #20164630, and work is being completed in accordance with the requirements of the Consent Order between the State of Vermont, Agency of Natural Resources (VTANR) and Saint-Gobain Performance Plastics Corporation (Saint-Gobain) dated April 8, 2019 (Consent Order). This report satisfies the requirements of Appendix A1, Section VI, paragraph 15 of the Consent Order as related to Water Street.

The potential sensitive receptors identified in the Site Investigation Report (Barr, 2018a) include:

- sediment within process sewer catch basins,
- groundwater beneath the Site, and
- building materials with potential accumulation of per- and poly-fluoroalkylated substances (PFAS) residues.

Further assessment of the process sewers indicated there are no direct discharges from the process sumps and further evaluation of corrective actions is not warranted (Barr, 2019). The groundwater at and surrounding the Site is addressed by actions specified within the Consent Order that include installing water lines, performing ongoing water well monitoring, and/or installing and maintaining point-of-entry treatment (POET) systems. Accordingly, this CAP focuses upon building materials inside the facility.

Four building material corrective action alternatives were considered as part of the Evaluation of Corrective Action Alternatives (ECAA; Barr, 2019): 1) no action; 2) selected removal, offsite disposal, and cleaning; 3) encapsulate and institutional control; and 4) building demolition. Based on the overall protection of human health and the environment, the permanence provided by removing and cleaning select building materials, lower environmental impact during implementation, and greater community acceptance, Alternative 2 (selected removal, offsite disposal, and cleaning) was the corrective action selected for building materials.

Potential corrective actions were evaluated against the criteria in Chapter 35-603 of the Investigation and Remediation of Contaminated Properties (iRULE) to mitigate the impact of hazardous materials, specifically PFAS, to sensitive receptors to the extent feasible as required by the Consent Order.

This CAP describes the plan for building material corrective actions. Building material corrective actions can be completed within a 6-month duration following initiation with no long-term monitoring or maintenance requirements.

1 Introduction

This report presents the Corrective Action Plan (CAP) for the former Chemfab facility building located at 1030 Water Street (Site) in the Village of North Bennington, Vermont (Figure 1). The Site has been identified by the Vermont Department of Environmental Conservation (VTDEC) and Site Management Section (SMS) as Site #20164630, and work is being completed in accordance with the requirements of the Consent Order between the State of Vermont, Agency of Natural Resources (VTANR) and Saint-Gobain Performance Plastics Corporation (Saint-Gobain) dated April 8, 2019 (Consent Order). This report satisfies the requirements of Appendix A1, Section VI, paragraph 15 of the Consent Order as related to Water Street.

1.1 Site Location and Description

The Site is located at 1030 Water Street in the Village of North Bennington, Vermont (Figure 1) with latitude and longitude coordinates of 42.914286°N and 73.246135°W, respectively. The Site consists of two separate parcels, a 1.67-acre parcel located north of Vermont State Highway 67A (VT 67A), also referred to as North Bennington Road, and a 3-acre parcel located south of VT 67A,

The northern parcel includes an approximately 46,300-square foot warehouse with an outdoor parking lot and two loading dock areas. The former fabric treatment area was located in the central portion of the building. The approximate locations of Site features including roof vents (cupolas) and stacks, wastewater sewers, and stormwater sewer are shown on Figure 2. The Site building is contiguous with the building to the north but was constructed more recently.

Commercial and residential properties are located north of the Site, Paran Creek and residential properties are located east of the Site, the southern parcel and the Walloomsac River are located south of the Site, and VT 67A and residential properties are located west of the Site. A parcel map is provided as Figure 3.

1.2 Site History

The land use at the Site has been industrial since the early 1800s when it was used as a cotton mill. By the early 1900s, H.C. White Co. purchased the Site, and the northern parcel was used as a lumberyard and a manufacturing facility that included the production of Kiddie Kars and school furniture. By 1941, the Site was purchased by Vermont Gravure and Lithographic Corp. and later Polygraphic Co. of America, Inc. During that time, it appears that the Site was primarily used for employee parking and truck loading based on historical aerial photographs. The current Site building was constructed after Polygraphic's ownership.

In 1978, Chemical Fabrics Corporation (Chemfab) began operating at the Site. Saint-Gobain purchased the Site in 2000 and operations continued until February 2002, when the plant closed. Operations at the Site included the coating of fiberglass fabric with materials that may have contained PFAS. Coated fabrics were then drawn through vertical drying ovens where the coating was cured onto the fabric (Chemfab, 1986). The facility had up to 12 drying towers which vented through stacks in the roof. Wastewater was collected in concrete tanks constructed on the plant floor; no underground holding tanks were used for wastewater

storage (Chemfab, 1987). A chemical storage area was located in the basement of the adjacent building to the north and was serviced by a floor drain and sump that discharged east of the building into Paran Creek.

1.3 Updated Conceptual Site Model

The Conceptual Site Model (CSM) was developed based on investigation activities conducted at the Site. This CSM describes Site conditions and the potential for releases resulting from the fabric treatment process.

1.3.1 Land Use

The northern portion of the Site consists of a vacant warehouse with paved parking and open space. A two-floor office area is located in the southwest corner of the warehouse. An approximately 8-inch thick concrete floor is present beneath the former fabric manufacturing area. Steel support columns are present along the exterior walls and in two north-south rows within the building. An off-site basement located in the adjacent building to the north of the Site was used for chemical storage (Figure 2). The roof was reportedly constructed with a metal and membrane roofing system, but the corrugated metal has been removed from most of the building. The building is locked to prevent unauthorized access.

1.3.2 Site Utilities

Site utilities manage stormwater and wastewater at the Site. Sheet flow and roof drains direct precipitation to the west and east of the building. The roof drains on the east side of the building discharge directly to Paran Creek, and the roof drains on the west side direct flow to a shallow ditch and stormwater catch basins adjacent to Water Street before discharging to Paran Creek (Figure 2).

One sump pit located on the west side of the main floor of the building discharges to the wastewater sewer beneath Water Street. Off-site basement floor drains discharge to Paran Creek.

1.3.3 Geology

The Site is located in the Northeastern Appalachians groundwater region which is characterized by rolling topography that primarily reflects the weathered bedrock surface with glacial and fluvial landforms mantling the bedrock (Randall et al., 1988). Near surface soil consists primarily of sand and gravel from glacial drift or alluvial deposits. Fill and reworked native sand and gravel is present beneath the building.

The bedrock in the area consists of folded and faulted metamorphosed sedimentary rocks with low primary porosity due to the rock matrix. The uppermost bedrock unit is limestone/dolomite of the Clarendon Springs or Shelburne Formation (Kim, 2017). Bedrock is encountered between 10 to 20 feet below the ground surface (bgs) at the Site, with the exception of bedrock in the vicinity of Paran Creek which is present at greater depth.

1.3.4 Hydrology

The Site is located within the north-south trending valley through which Paran Creek flows. The topography of the Site is generally flat and slopes gently to the south with the exception of the steep banks of Paran Creek. Paran Creek flows into the Walloomsac River south of the Site.

Groundwater is first encountered in the unconsolidated sand and gravel unit between approximately 5 and 15 feet bgs. Groundwater flow in the unconsolidated unit is to the east-southeast towards Paran Creek and the Walloomsac River.

1.3.5 Site Constituents of Interest

The primary constituents of interest at the Site are PFAS based on their likely presence in some dispersions / surfactants used during fabric treatment. Perfluorooctanoic acid (PFOA) is generally detected at concentrations one to four orders of magnitude higher in soil and groundwater than other individual PFAS compounds at the Site, including perfluorooctanesulfonate (PFOS).

Fuel oil and smaller quantities of lubricants, solvents, paints, and electrical transformer oils were historically used at the Site. Based on this historical use, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and polychlorinated biphenyls (PCBs) were also evaluated during site investigation activities. These parameters have not been detected in soil or groundwater samples above the performance criteria with the exception of naturally occurring metals and chloroform, a suspected laboratory contaminant.

1.3.5.1 Fate and Transport

The dispersant solution was handled in batches using drums, tubs, and above-ground piping during the fabric treatment process. The concrete floor within the building remains in good condition and there is no indication of preferential pathways for liquids to discharge to the environment, although operational releases and handling near the sumps or storage areas could have potentially contributed to localized impacts to the soil, groundwater, and surface water.

Residues are believed to have accumulated on building surfaces exposed to vapors from the production process within the former fabrication area. Potential transport mechanisms for residues off these surfaces include: 1) sprinkler system operation and migration with water, and 2) physical removal of residues through equipment, personnel, or material movement.

During drying and curing of fabrics, a portion of the PFOA driven off the fabric may have been emitted from the facility's stacks and transported by air dispersion and deposition processes. Further discussion of potential PFOA emissions, transport, and deposition is provided in the CSM Site Investigation Report (Barr, 2018a) and briefly summarized below.

PFOA deposited on the surface and near-surface soil may have been transported into the subsurface by infiltrating precipitation. The presence of the building and pavement minimizes potential infiltration at the Site. The rate of potential PFOA transport in the subsurface has been shown to be controlled primarily by adsorption onto organic matter in the subsurface material, specifically organic carbon (Zareitalabad et al.,

2013). While sorption onto organic matter will slow the transport of PFOA in subsurface media, PFOA is highly soluble and resistant to degradation resulting in persistence in subsurface media. Contaminant distribution for soil, groundwater, and building materials is further characterized in the Site Investigation Report (Barr, 2018c).

1.3.6 Potential Receptors

Three potential sensitive receptors were identified as detailed in the Site Investigation Report (Barr, 2018c):

- Sediment within process sewer catch basins,
- Groundwater beneath the Site, and
- Building materials with potential accumulation of PFAS residues.

As part of the Evaluation of Corrective Action Alternatives (ECAA; Barr, 2019), further assessment of the process sewers was performed. This assessment indicated there are no direct discharges from the process sumps and further evaluation of corrective actions is not warranted (Barr, 2019).

Additionally, the ECAA evaluated shallow soil beneath the floor of the Site building. Since the submittal of the ECAA, however, the State has updated its soil standards for PFAS. Based on the current soil standard, no soil samples collected at the Site are above the applicable soil standards, and therefore, corrective actions for soil are not necessary. As stated in the Consent Order, the performance standard for soil is the current Vermont soil standard.

1.4 Evaluation of Corrective Actions

Potential corrective actions for the building materials and groundwater were evaluated against the criteria in Chapter 35-603 of the iRULE (VTDEC, 2019) as described in the ECAA (Barr, 2019). The selected remedies include:

- Building Materials - selected removal, cleaning, and disposal
- Groundwater - installation of municipal water line extensions in Corrective Action Areas I and II (CAAI and CAII) Operable Units A and C (OUA and OUC) and point-of-entry treatment (POET) systems in CAAI and CAII Operable Unit B (OUB).

This CAP describes the plan for building material corrective actions. Groundwater beneath the Site is being addressed by the CAAI and CAII OUA CAP (VTDEC, 2017 and 2019a), as defined in the Consent Order.

1.5 Public Notice

A parcel map showing the Site and adjacent properties is provided as Figure 3. Parcels 05113865007 05113864968 are the only properties impacted by corrective actions. A public notice will be provided to the property owners of Parcels 05113865007 and 05113864968 (information provided below).

Parcel ID: 05113865007

Owner: 1030 Water Street Associates LLC
Address: 1030 Water Street
Contact: Walter Friedman
Email address: 1030water@gmail.com
Phone: 516-592-1176

Parcel ID: 05113864968
Owner: HRH Management LLC
Address: 940 Water Street
Contact: Rod Lloyd-Williams
Email address: hrloydwilliams@yahoo.com
Phone: 802-347-1831

2 Performance Standard

In consultation with VTANR, a performance standard was developed consistent with the corrective action objectives and current regulatory standards. Completion of corrective actions will be demonstrated using industry standard evaluation methods.

2.1 Corrective Action Objectives

The objective of corrective actions is to mitigate the impact of hazardous materials, specifically PFAS, to sensitive receptors to the extent feasible as required by the Consent Order and detailed in Chapter 35-603 of the iRULE (VTDEC, 2019). The corrective action of selective removal, disposal, and cleaning removes impacted residues on building materials to mitigate potential exposure. Corrective actions will be completed within the corrective action area and the office area (Figure 2).

2.2 Regulatory Standards

A review of potentially applicable regulatory standards was conducted that considered the Consent Order and iRULE (VTDEC, 2019). There are no promulgated standards for PFAS concentrations in or on building materials.

2.3 Demonstration of Completion

PFOA is a constituent in many building materials used in homes, offices, commercial, and industrial buildings (EPA, 2009). The direct contact exposure pathway is not a pathway of concern (ATSDR, 2017) and no quantitative estimates of the absorption of PFOA through dermal exposure have been identified (ATSDR, 2018). There are no promulgated standards that assess risk of PFAS exposure from building materials.

Removing building materials and cleaning hard surfaces of residues within the building is being conducted to satisfy the corrective action objectives of treating environmental media to the extent practicable and removing / disposing environmental media consistent with Chapter 35-603 of the iRULE (VTDEC, 2019).

The building material corrective actions will be complete when visual inspections indicate that cleaning has removed the residues consistent with bench testing conducted at the Site (Appendix A). Estimates of mass removal indicate that selective removal, disposal, and cleaning to a visual standard will remove the vast majority (>95%) of the PFOA mass (Appendix A) remaining within the building. Visual inspections are an industry standard practice to assess performance during cleaning at commercial / industrial buildings and are representative of cleaning to the extent practicable using industry standard techniques. Active remediation will be finished when post-cleaning inspections indicate a passed visual inspection result, as indicated by removal of residues. Visual inspections will be conducted by an environmental professional and documented with photographs. Each area that passes the visual inspection will remain accessible for a minimum of one week for joint inspection by VTDEC as detailed in the Building Material Corrective Action Specifications (Appendix B).

The corrective action area will be divided into subject areas for building cleaning as identified by the cleaning contractor. Subject areas will be less than 400 square feet in area and will consist of a single building material type (e.g. concrete floor, corrugated metal wall, or steel I-beam). The results of the visual inspection, photographs of the cleaned areas, and subject area dimensions will be documented by an environmental professional.

Building material corrective actions can be completed in less than 6 months and no long-term monitoring will be required.

After completing the corrective actions, the potential risk to sensitive receptors will be addressed by the removal of the PFAS residues and the building will be ready for future occupancy without institutional controls or restrictions related to PFAS-impacted building materials. In addition, building cleaning mitigates the potential transport of PFAS residues outside of the building.

3 Permits

An evaluation of potential local, state, and federal permits was completed for the building materials corrective actions. Implementing corrective actions will be completed in accordance with the identified permit requirements.

Pursuant to 10 V.S.A. § 6602(16)(A)(iv), building materials impacted with PFAS are considered a hazardous material. Waste transport and disposal will be conducted in accordance with local, state, and federal regulations as detailed in Section 026110 of the Building Material Corrective Action Specifications (Appendix B).

The corrective action contractor will be trained to handle hazardous substances (OSHA 1910.120) and asbestos containing materials (VRAC, VSA Title 18, Chapter 26) and will have current licensure/certification to complete the work. Exclusion zones will be established, as necessary, to separate work that includes handling PFAS and asbestos containing materials from workers without the applicable training.

4 Remedial Construction Plan

Building material corrective actions consist of six primary activities:

- 1) abating asbestos materials to provide access for building material cleaning;
- 2) removing and disposing insulation from the ceiling and walls in the corrective action area;
- 3) removing and disposing carpet and ceiling tiles from the office area and manually washing the floors and walls within the office area;
- 4) cleaning the floor, structural steel supports, walls, and ceilings within the corrective action area;
- 5) containing and treating cleaning fluids and disposing solid waste generated from cleaning activities; and
- 6) replacing in-kind building materials that were removed as part of the corrective action, including: insulation on the ceiling and walls within the former fabrication area and paint removed during the cleaning activities.

The activities will generally be completed in the order presented above; however, activities will be conducted concurrently as feasible.

Asbestos abatement (activity 1) will be conducted with a Vermont-licensed asbestos contractor entity. Further details on the asbestos abatement requirements are provided in Section 028213 of the Building Material Corrective Action Specifications (Appendix B).

Removal and disposal of insulation (activity 2) will be conducted using standard construction practices by workers with the appropriate OSHA training. Insulation on the walls and ceiling of the corrective action area will be removed and managed for offsite disposal as detailed in Section 024119 of the Building Material Corrective Action Specifications (Appendix B). Utility services will be maintained during removal insulation.

Removal and disposal of carpet and ceiling tiles from the office area on the southwest portion of the building (activity 3) will be conducted using standard construction practices by workers with the appropriate OSHA training. Interior walls within the office area are constructed of drywall and will be washed manually to remove accumulated dust. Tile floors and flooring beneath the carpeted areas within the office area will also be washed manually. Asbestos abatement will be conducted in the office area as part of activity 1 for materials that will be removed or need to be removed to complete the cleaning in the office area.

An evaluation of cleaning alternatives (Appendix A) indicates that use of a pressure washer using hot water is the most effective method for removing residues (activity 4). The pressure washer will be capable of providing water at a pressure of at least 3500 psi and a temperature of 125 degrees Fahrenheit. The water will be sprayed at an oblique angle to the surface being cleaned with the pressure washer approximately 1 to 2 feet from the surface. Cleaning will be conducted on the hard surfaces within the corrective action area following removal of insulation, including concrete floor, structural steel supports, concrete walls, steel walls (currently covered by insulation), and the ceiling.

Cleaning will be conducted in a manner that prevents run-off or spraying of cleaning water onto clean areas and prohibits solid debris generated during cleaning activities from contacting clean areas. Where the pressure washer alone does not remove PFAS residues to the performance standard, degreasers and manual removal methods will augment the pressure washing cleaning approach. The degreaser will be DynaChem-500 or equivalent. Cleaning will be conducted until the area meets the requirements for the visual inspection which will include representatives of Saint-Gobain and VTDEC. The visual performance standard includes cleaning until de minimus residues, globules, or surface staining consistent with post-cleaning observations from bench-scale testing are achieved (Appendix A). Further details on building cleaning and visual inspection procedures are provided in Section 024121 of the Building Material Corrective Action Specifications (Appendix B).

Managing cleaning fluids and disposing solid wastes (activity 5) consists of containing and treating the cleaning fluids for reuse, disposing cleaning fluids when finished with interior building cleaning and disposing solids from building cleaning activities. Cleaning fluids will be contained using a combination of physical barriers (plastic sheeting, sandbags, etc.) temporarily installed to accommodate the interior building structures. A barrier will be installed around Sump01 (Drawing C-101) to prevent discharge to manhole SMH-5. Cleaning fluids will be conveyed to storage tanks or frac tanks using a combination of pumps, vacuums, and/or manual recovery (e.g. squeegee). The cleaning fluids will be stored for water treatment prior to reuse.

The water treatment system will consist of a solids filter and granulated activated carbon filtration or approved equivalent. Treated water must meet the Vermont Groundwater Enforcement Standard of 20 parts per trillion for targeted PFAS prior to reuse. Solids removed from cleaning fluids and insulation will be disposed at a permitted Resource Conservation and Recovery Act (RCRA) Subtitle C landfill with a leachate collection and treatment system capable of removing PFAS. A notification will be provided to VTDEC following selection of a disposal facility. Further details for waste handling, transportation, and disposal is provided in Section 026110 of the Building Material Corrective Action Specifications (Appendix B).

Replacing insulation (activity 6) within the corrective action area will be conducted to re-insulate the building to pre-removal conditions. Insulation and vapor barrier system will be installed as detailed in Section 072116 of the Building Material Corrective Action Specifications (Appendix B). Structural steel surfaces cleaned within the corrective action area will be painted with two coats of primer as detailed in Section 099114 of the Building Material Corrective Action Specifications (Appendix B). Building improvements beyond the removal / cleaning of building materials and replacing the insulation will not be completed as part of corrective actions. Replacement in-kind will be completed for building materials impacted by the corrective actions. A summary of building material corrective actions is provided on Figure 4.

5 Waste Management Plan

Waste management will include removal, transport, and disposal of building materials, and containment, storage, treatment, and disposal of cleaning fluids. Pursuant to 10 V.S.A. § 6602(16)(A)(iv), building material impacted with PFAS is considered a hazardous material. Waste transport and disposal will be conducted in accordance with local, state, and federal regulations. Solid waste generated during corrective actions will be sent to a permitted RCRA Subtitle C landfill with a leachate collection and treatment system capable of removing PFAS. Water generated during corrective actions, following treatment and reuse, will be sent to a permitted disposal facility capable of removing PFAS. VTDEC will be notified of selected disposal facilities following contractor selection. Details on waste management are provided in Section 026110 of the Building Material Corrective Action Specifications (Appendix B).

6 Implementation Schedule

The schedule for implementation is partially weather dependent due to the handling, storage, and treatment of cleaning fluids during building cleaning. Existing infrastructure is staged outside of the Site building for management and treatment of cleaning fluids.

The general schedule below is the anticipated timing for major aspects of the corrective action implementation. When a contractor is selected, they will have input on the activity sequencing to complete the implementation by June 1, 2020; therefore, this schedule may be revised. Saint-Gobain will provide VTDEC a more specific schedule when a contractor is selected, and the activity sequencing is established with the contractor's input.

- April 2020 – begin corrective actions with asbestos abatement and insulation removal; complete removing and disposing insulation; and begin pressure washing hard surfaces
- May 2020 – finish pressure washing hard surfaces; complete treatment and discharge of cleaning fluids; and begin insulation installation
- June 2020 – finish insulation installation
- June 2020 – submit Corrective Action Construction Completion Report to VTDEC

7 Corrective Action Operation and Maintenance Plan

Remediation will take approximately 2 to 3 months to complete and no ongoing operation and maintenance will be necessary following implementation of the corrective actions.

8 Institutional Control Plan

No institutional controls will be needed following implementation of the building material corrective actions.

9 QA/QC Plan

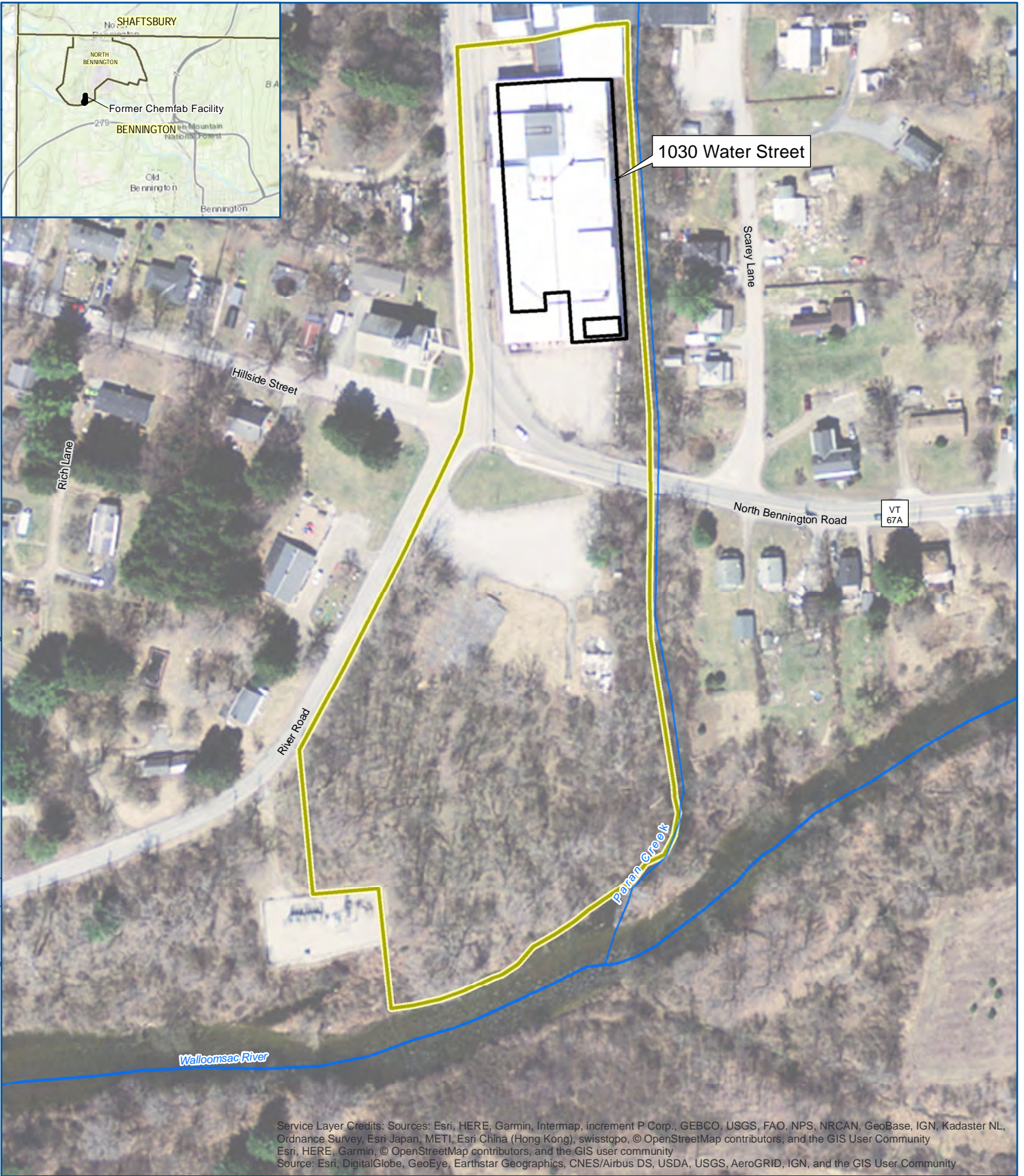
Standard commercial/industrial cleaning procedures will be used throughout the building material corrective actions with inspections conducted throughout the work as specified in Section 024121 of the Building Material Corrective Action Specifications (Appendix B).

10 References

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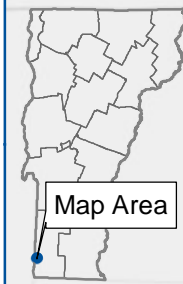
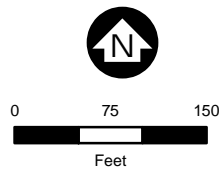
Figures



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 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



-  Site Boundary
-  Corrective Action Area



SITE LOCATION
 Corrective Action Plan
 1030 Water Street
 North Bennington, VT
 Saint-Gobain

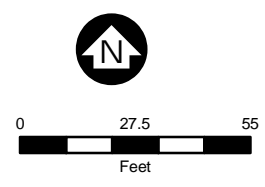
FIGURE 1



Imagery: Saint-Gobain 2017 NAIP 2014

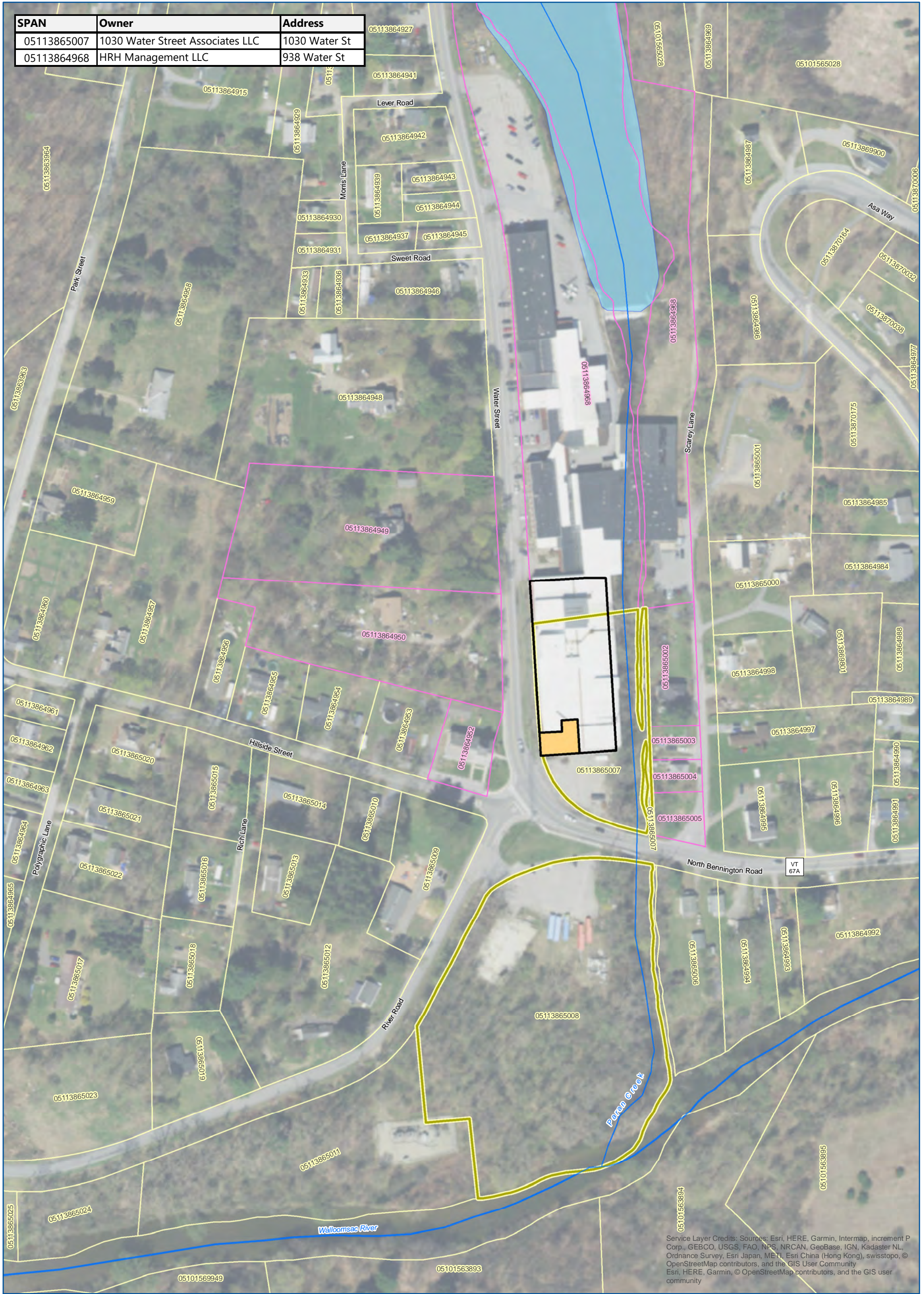


- | | | | |
|---------------|------------------------------|---|--|
| SMH ◆ | Wastewater Manhole | ▭ | Corrective Action Area |
| CB-1 ◆ | Stormwater Catch Basin | ▭ | Off Site Basement Area |
| ◆ | Basement Floor Drain Outfall | ▭ | Building Structures |
| ▽ | Sump | ▭ | Cupola |
| — | Basement Floor Drain | ▭ | Offices |
| — | Wastewater | ▭ | Support Areas |
| — | Stormwater | ○ | Former Stack |
| | | ▭ | Commercial Refrigerator (excluded from Corrective Action Area) |



SITE LAYOUT
 Corrective Action Plan
 1030 Water Street
 North Bennington, VT
 Saint-Gobain
FIGURE 2

SPAN	Owner	Address
05113865007	1030 Water Street Associates LLC	1030 Water St
05113864968	HRH Management LLC	938 Water St



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
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Corrective Action Area

Site Boundary

Parcel Adjacent to Corrective Action

Parcel Boundary

Office Area

0 75 150
Feet

PARCEL MAP
 Corrective Action Plan
 1030 Water Street
 North Bennington, VT
 Saint-Gobain

FIGURE 3



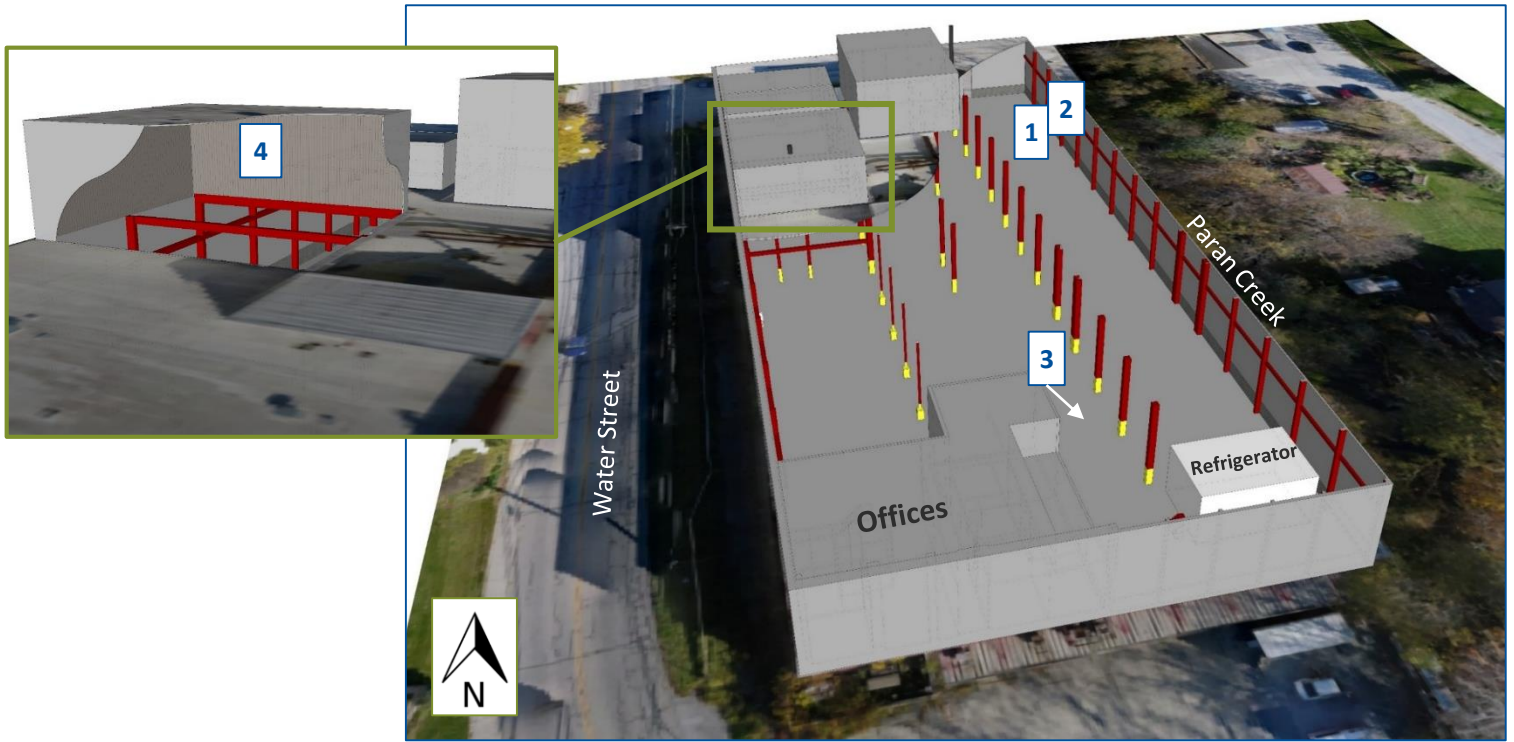


Photo 1: Concrete wall and insulation



Photo 2: Insulation on wall and ceiling



Photo 4: Corrugated sheet metal in cupola

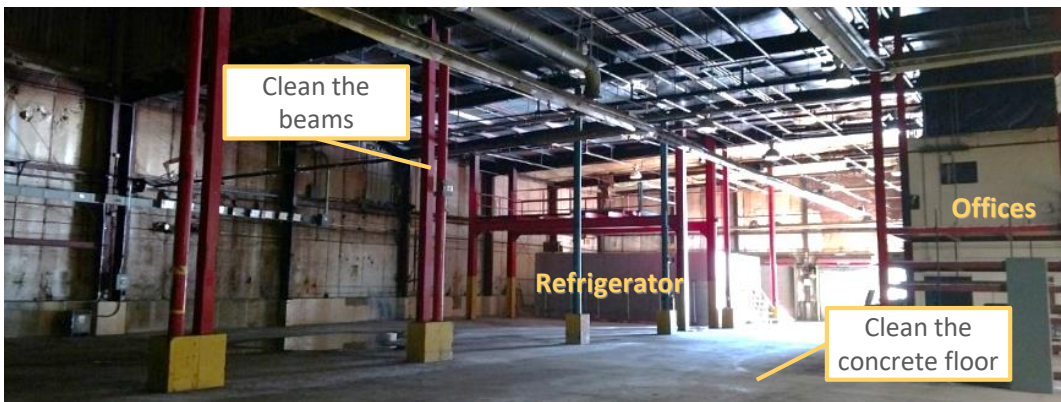
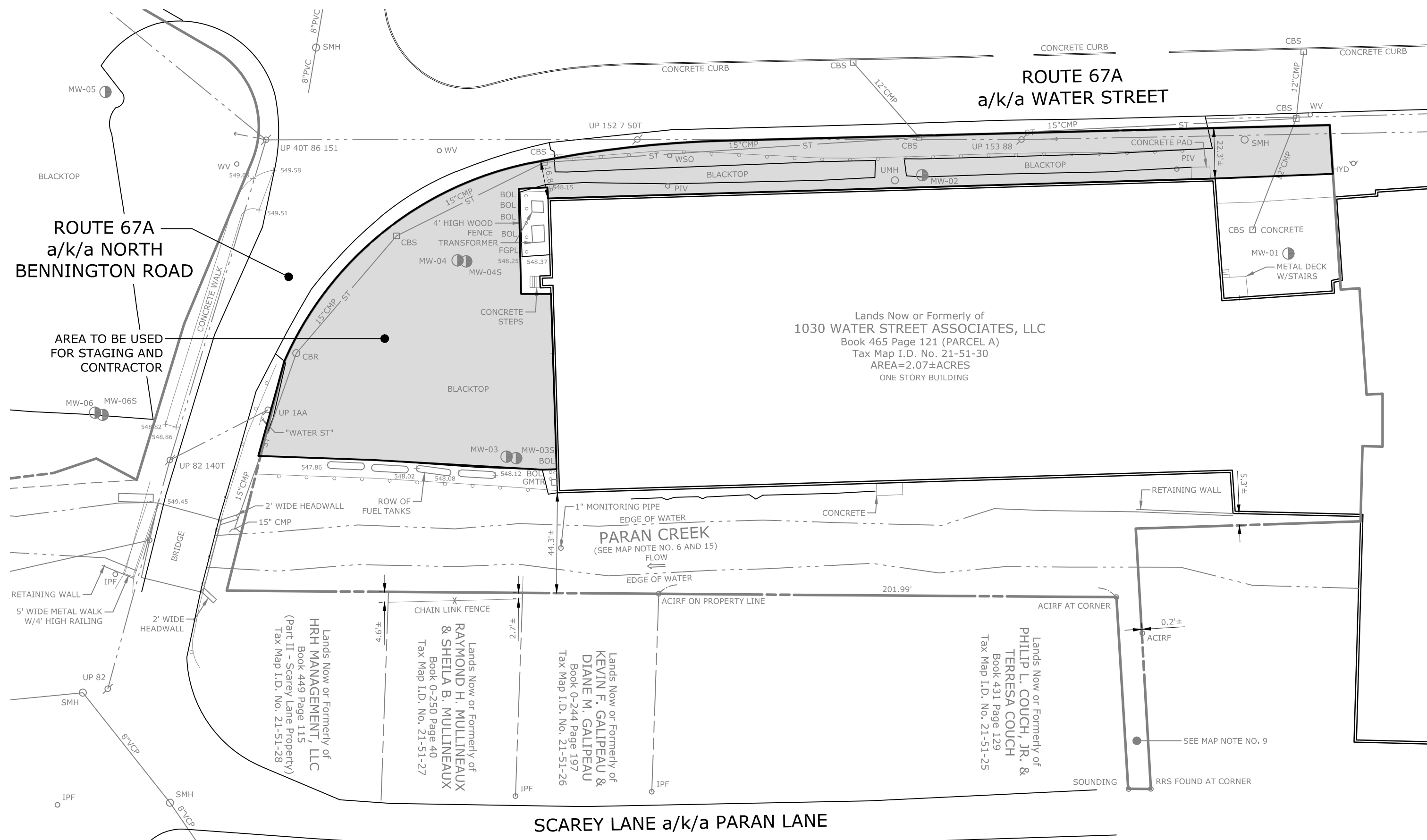


Photo 3: Concrete floor and beams

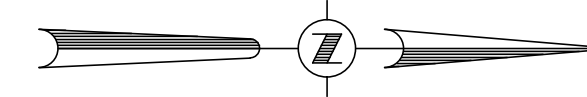
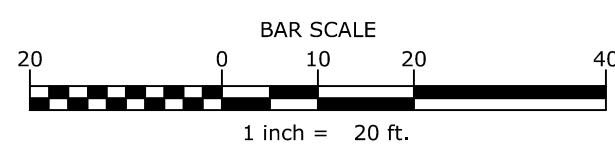


Drawings



SITE PLAN
SCALE: 1"=40'

- GENERAL NOTES:**
1. PROTECT ALL EXISTING CONSTRUCTION TO REMAIN FROM CLEANING ACTIVITIES.
 2. USE APPROPRIATE MEASURES TO COLLECT ALL WATER FROM CLEANING OPERATIONS.
 3. CLEAN ALL EXPOSED SURFACES IN THE WAREHOUSE SPACE WITHIN THE CORRECTIVE ACTION AREA.

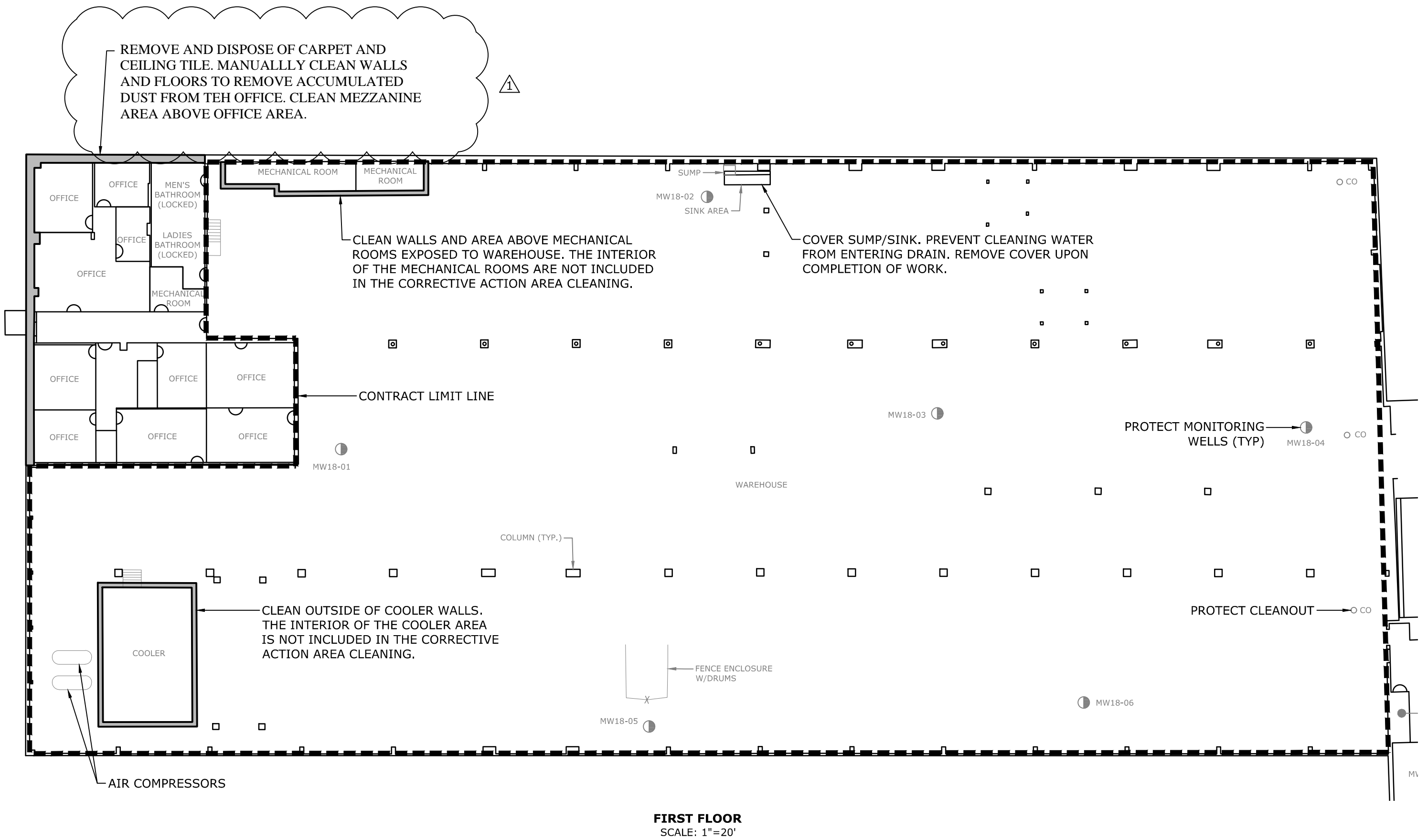
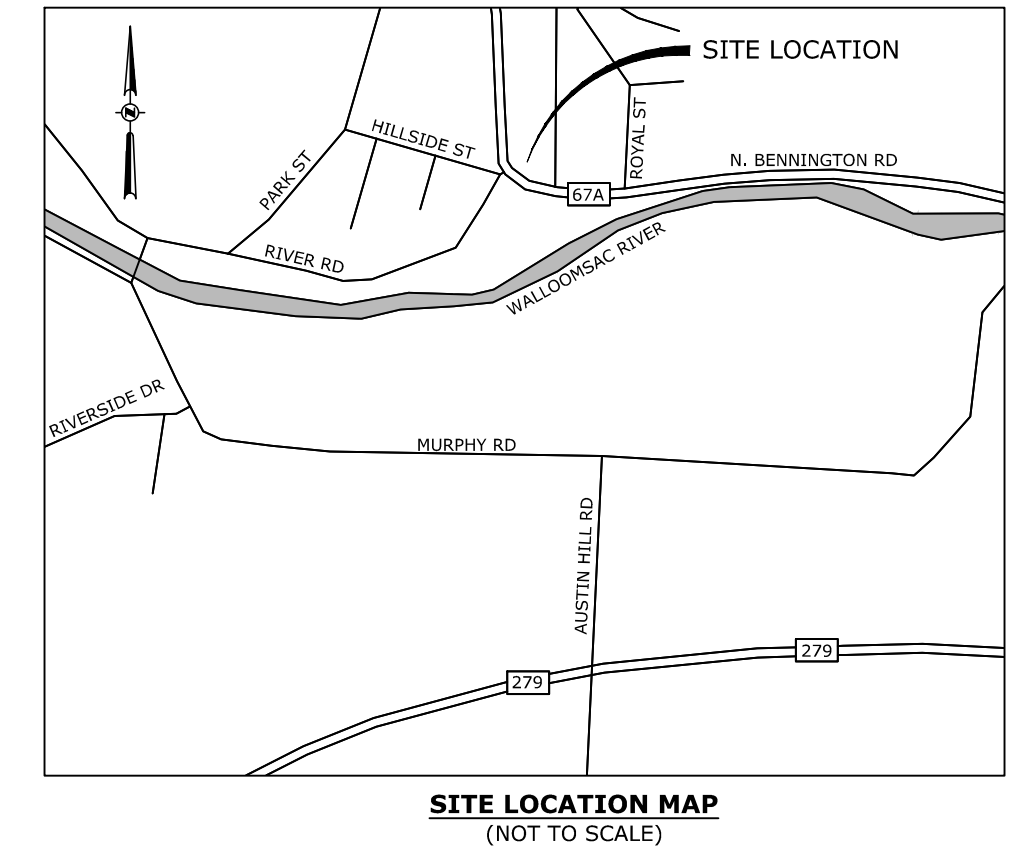


MAP NOTES:

1. Information shown hereon was compiled from an actual field survey conducted during the month of February 2018.
2. North orientation is Grid North and is based on the Vermont State Plane Coordinate System, NAD 83/2011 epoch 2010.00.
3. Topographic information shown hereon was compiled from a combination of data obtained from Leica C-10 3D Laser Scanner, processed through Cyclone 9.1 and conventional field survey techniques conducted during the month of February 2018.
4. The location of underground improvements or encroachments, if any exist, or as shown hereon, are not certified. There may be underground utilities, the existence of which are not known to the undersigned. Size and location of all underground utilities and structures must be verified by the appropriate authorities. 811 Dig Safe Vermont must be notified prior to conducting test borings, excavation and construction.

MAP REFERENCE:

1. "Boundary Survey Lands Now or Formerly of 1030 Water Street Associates, LLC" prepared by C.T. Male Associates, Engineering, Surveying, Agriculture and Landscape Architecture, D.P.C. dated April 12, 2017. C.T. Male Project No. 16.6131, Dwg. No. 17-274.



DATE	REVISIONS RECORD/DESCRIPTION	DRAFTER	CHECK	APPR.
3/5/20	ADDED OFFICE AREA CLEANING	SMW	CRK	CRK

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C.T. MALE ASSOCIATES

DESIGNED: CRK
 DRAFTED: SMW
 CHECKED: CRK
 PROJ. NO: 16.6131
 SCALE: 1"=20'
 DATE: NOV. 27, 2019

CORRECTIVE ACTION AREA CLEANING

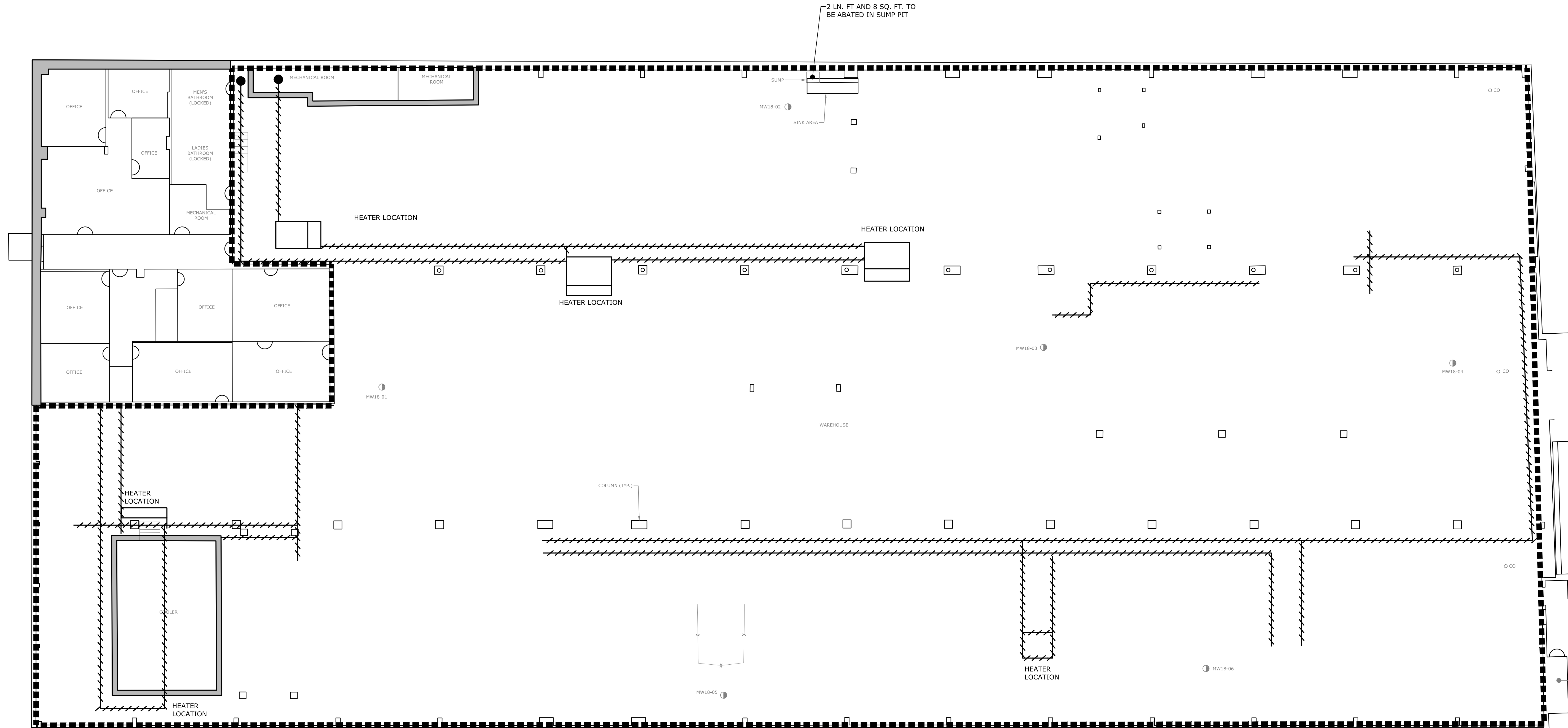
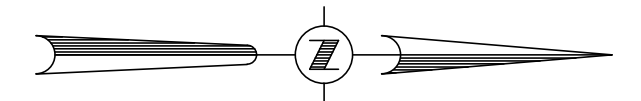
FORMER CHEMFAB BUILDING
1030 WATER STREET

VILLAGE OF NORTH BENNINGTON BENNINGTON COUNTY, NEW YORK

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.

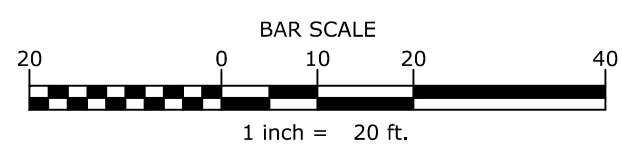
50 CENTURY HILL DRIVE, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

C-101
SHEET 1 OF 2
DWG. NO: 19-0704



NOTE:
 APPROXIMATELY 1,220 LINEAR FEET PIPE INSULATION LOCATED IN THE CORRECTIVE ACTION AREA (LOCATIONS AND QUANTITIES ARE APPROXIMATE).

- LEGEND:**
- CORRECTIVE ACTION AREA
 - VERTICAL ASBESTOS CONTAINING PIPE INSULATION TO BE REMOVED.
 - ASBESTOS CONTAINING PIPE INSULATION TO BE REMOVED (AT CEILING HEIGHT).



DATE	REVISIONS RECORD/DESCRIPTION	DRAFTER	CHECK	APPR.

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW. © 2019 C.T. MALE ASSOCIATES DESIGNED: MJS DRAFTED : SMW CHECKED : MJS PROJ. NO : 16.6131 SCALE : 1"=20' DATE : DEC. 30, 2019	CORRECTIVE ACTION ASBESTOS ABATEMENT FORMER CHEMFAB BUILDING 1030 WATER STREET
	VILLAGE OF NORTH BENNINGTON BENNINGTON COUNTY, NEW YORK C.T. MALE ASSOCIATES Engineering, Surveying, Architecture & Landscape Architecture, D.P.C. 50 CENTURY HILL DRIVE, LATHAM, NY 12110 518.786.7400 * FAX 518.786.7299

C-102
 SHEET 2 OF 2
 DWG. NO: 19-0744

Appendix A

Building Materials Corrective Actions Memorandum

Memorandum

To: Richard Spiese - VTDEC
From: Alec Danielson and Mary Sands – Barr Engineering Co.
Subject: Former Chemfab Facility, 1030 Water Street – Building Materials Corrective Actions
Date: September 25, 2019
Project: 45021004.01
c: Chris Angier – SGPP, Kirk Moline – CT Male

This memorandum summarizes the evaluation of building material cleaning alternatives and performance standards for assessing the effectiveness of cleaning during the proposed corrective action at the Former Chemfab Facility located at 1030 Water Street (Site) in the village of North Bennington Vermont. The Site is identified by the Vermont Department of Environmental Conservation (VTDEC) Site Management Section (SMS) as Site #20164630, and work is being completed in accordance with the requirements of a Consent Order between the State of Vermont, Agency of Natural Resources (VTANR) and Saint-Gobain Performance Plastics Corporation (Saint-Gobain), dated April 8, 2019 (Consent Order).

The Evaluation of Corrective Action Alternatives (ECAA), dated January 29, 2019, was submitted to VTDEC and recommended Selected Removal, Offsite Disposal, and Cleaning of perfluorooctanoic acid (PFOA) within residues observed on building materials (e.g., accumulations on the floor, interior walls, and ceilings, etc.) and/or in residues within soft building materials (e.g., substance within the insulation). In the letter from VTDEC, dated June 4, 2019, VTDEC agreed to the approach of Selected Removal, Offsite Disposal, and Cleaning within the Site building and asked for further testing of building cleaning methodologies to assess removal efficiency of PFOA.

The ECAA recommended a visual performance standard because the majority of the PFOA mass is in the insulation or visible residues and can be addressed by removing the insulation and cleaning the hard surfaces to a visible standard. The PFOA mass on hard surfaces following insulation and visible residue removal represents a minor amount of PFOA within the building and is negligible.

1.0 Building Cleaning Evaluation

A bench test building cleaning evaluation was conducted on June 26 and 27, 2019, to address VTDEC's comments. The evaluation included four cleaning methods: 1) manual removal, 2) hot water pressure washing, 3) degreaser washing, and 4) a combination of hot water pressure washing and degreaser. The cleaning evaluation was conducted at two discrete locations on the concrete floor and two discrete locations on structural steel surfaces. Cleaning methods were evaluated consistent with the approach provided in ASTM E3106 – Standard Guide for Science-Based and Risk-Based Cleaning Process Development and Validation which relies on visual inspection as a primary component for evaluating cleaning methods.

Residues were removed with each cleaning method, and the visual inspections indicated that hot water pressure washing and the combination of hot water pressure washing and degreaser were the most effective cleaning options. Photographs of the building cleaning evaluation are provided in Attachment A.

During the building cleaning evaluation, VTDEC coordinated with Weston & Sampson to collect pre- and post-cleaning wipe samples for PFOA. Based on cleaning removal efficiencies calculated by Weston & Sampson using the wipe sample results, Weston & Sampson also concluded that hot water pressure washing with the degreaser was the most effective cleaning option. The Weston & Sampson wipe results and analysis are provided in Attachment B.

2.0 Mass Removal Estimates

Barr estimated the PFOA mass removed following building material cleaning and removing the insulation to assess the effectiveness of the proposed remedial action and to evaluate a potential performance standard. There are three primary components to the PFOA mass within the Site building materials:

- 1) the soft building materials (insulation),
- 2) residues present on the floor, ceiling, and structural steel, and
- 3) films adsorbed onto hard building material surfaces (as measured by wipe sample results).

A summary of the estimated mass of PFOA removed is provided in Table 1, along with the assumptions associated with the estimates. Results from the evaluation include:

- Based on the complete removal of the insulation (100%), a total mass of approximately 750 grams (less than 2 pounds) of PFOA, associated with PFOA absorbed onto and into the insulation, is estimated to be removed.
- Based on a removal efficiency calculated by Weston & Sampson, 8 to 13 grams are estimated to be removed from cleaning PFOA adsorbed onto hard building materials. Specifically, Weston & Sampson's bench test building cleaning evaluation using the wipe sample results showed the following PFOA removal efficiencies:
 - Based on 60% PFOA removal, approximately 8 grams of PFOA is estimated to be removed
 - Based on 90% PFOA removal, approximately 12 grams of PFOA is estimated to be removed
 - Based on 99% PFOA removal, approximately 13 grams of PFOA is estimated to be removed
- An estimate of the PFOA mass removed by cleaning the residues was not calculated due to uncertainty associated with the extent of the residue. Based on the visible residue removal achieved during the cleaning evaluation (shown in Attachment A), and since residue is visible and distinct, its removal efficiency is likely to approach complete removal (100%).

The mass removal estimates support that the Selected Removal, Offsite Disposal, and Cleaning Option meets the objective of removing PFOA mass from the building. The majority of the PFOA mass is associated with PFOA absorbed onto and within the insulation and within visible residues which will be removed. The remaining PFOA mass on hard surfaces represents a minor amount of PFOA within the building and is negligible.

3.0 Performance Standard

Two general approaches to determine an appropriate performance standard for building cleaning were considered: 1) best management practices (BMPs) during implementation, and 2) risk-based criteria. A visual performance standard was proposed in the ECAA as a BMP for implementing the building cleaning and is supported by industry standards (ASTM E3106). Findings from the bench test building cleaning evaluation and mass removal estimates confirm a visual performance standard is an appropriate BMP for implementing the building cleaning corrective action based on:

- the mass removed from soft building materials and visible residues is the predominant source of PFOA mass;
- the visual standard effectively assesses the removal of soft building materials and visible residue; and,
- conclusions from the bench test building cleaning evaluation, which were based on visual inspection, align with results from wipe sampling conducted by Weston & Sampson.

Using wipe sampling alone or as an additional measure to evaluate pre- and post-cleaning conditions is not an effective BMP for building materials because it is not representative of the overall efficacy of the remedy as demonstrated by the negligible component of overall PFOA mass removed.

Additionally, there are no promulgated standards or published risk-based criteria associated with direct contact or inhalation of PFOA on building materials and without this, establishing a wipe sample value as a risk-based performance standard would be arbitrary.

4.0 Summary

VTDEC and Saint-Gobain agree that Selected Removal, Offsite Disposal, and Cleaning is the preferred remedy to address the presence of PFOA in the building at the Site. There is also agreement that the most effective cleaning method is the combined use of hot water pressure washing and a degreaser. Site-specific PFOA mass calculations highlight that the vast majority of the PFOA mass (>95%) is eliminated from the building by removing and disposing the insulation and visible residues. Industry standards, such as ASTM E3106, rely on a visual standard to assess cleaning, and this evaluation confirms that it is an appropriate BMP to demonstrate mass removal during building cleaning activities.

In summary, the recommended path forward is to implement Selected Removal, Offsite Disposal, and Cleaning by:

- Using hot water pressure washing on the hard surfaces at the Site and augmenting the pressure washing with a degreaser in discrete areas if pressure washing alone is insufficient, and
- Evaluating the effectiveness of the remedy by visual inspection.

Following review of this memo by VTDEC, a more detailed plan for removing insulation and cleaning hard surfaces will be provided in a Corrective Action Plan that will be submitted to VTDEC SMS for approval.

Table 1
Estimate of PFOA Mass and Removal Quantities
Former Chemfab Facility - 1030 Water Street
Saint-Gobain Performance Plastics

	Pre-Cleaning PFOA Mass (grams)	Removal Efficiency (%)	PFOA Mass Removed (grams)	Removal Efficiency (%)	PFOA Mass Removed (grams)	Removal Efficiency (%)	PFOA Mass Removed (grams)
<i>Bulk Materials</i>							
Wall Insulation	42	100%	42	--	--	--	--
Ceiling Insulation	707	100%	707	--	--	--	--
<i>Subtotal</i>	750	NA	749	--	--	--	--
<i>Wipe Samples</i>							
Floor	7.0	60%	4.2	90%	6.3	99%	6.9
Ceiling	3.1	60%	1.9	90%	2.8	99%	3.1
I-beams	3.1	60%	1.9	90%	2.8	99%	3.1
Wall	0.22	60%	0.13	90%	0.20	99%	0.22
<i>Subtotal</i>	13	NA	8.1	NA	12	NA	13

Assumptions

1. Assumed mass of insulation based on contractor estimate of 10 tons for entire building, split proportionally by surface area for wall and ceiling
2. Assumes insulation samples representative of the insulation on interior and exterior of building
3. Average PFOA concentration for wall insulation based on samples: BL01-A5.0, BL02-A5.0, BL04-A5.0, BL05-A5.0, BL07-A5.0, BL09-A5.0, and BL14-A5.5
4. Average PFOA concentration for ceiling insulation based on samples: BL10-B26.0, BL11-B25.0, and BL12-B28.0
5. Average PFOA floor wipe concentration based on samples: WP15-E, WP16-E, WP17-E, and WP18-E
6. Average PFOA ceiling wipe concentration based on samples: WP10-B35.0, WP11-B42.0, and WP12-B44.5
7. Average PFOA I-beam concentration based on samples: WP01-A8.0, WP01-A16.0, WP01-A23.0, WP02-A8.0, WP02-A16.0, WP02-A23.0, WP04-A8.0, WP04-A16.0, WP04-A23.0, WP05-A8.0, WP05-A16.0, WP05-A23.0, WP07-A8.0, WP07-A16.0, WP07-A23.0, WP09-A8.0, WP09-A16.0, WP09-A23.0, WP10-B11.0, WP10-B23.0, WP10-B33.0, WP11-B16.0, WP11-B24.0, WP11-B41.0, WP12-B15.0, WP12-B30.0, and WP12-B43.0
8. Average PFOA wall concentration based on samples: WP01-A1.5, WP02-A1.5, WP04-A1.5, WP05-A1.5, WP07-A1.5, and WP09-A1.5

PHOTO 1



PHOTO 2



**ATTACHMENT A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS**

1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 3



PHOTO 4

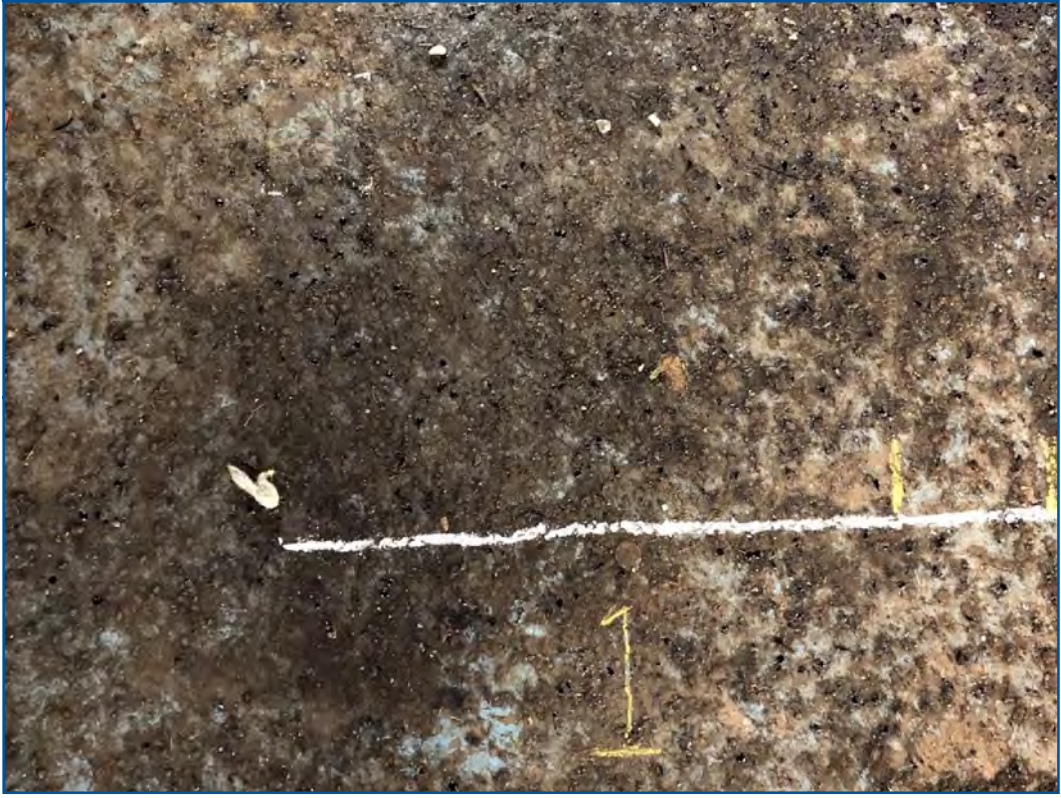


Caption: Weston collecting pre-cleaning wipe sample

APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain

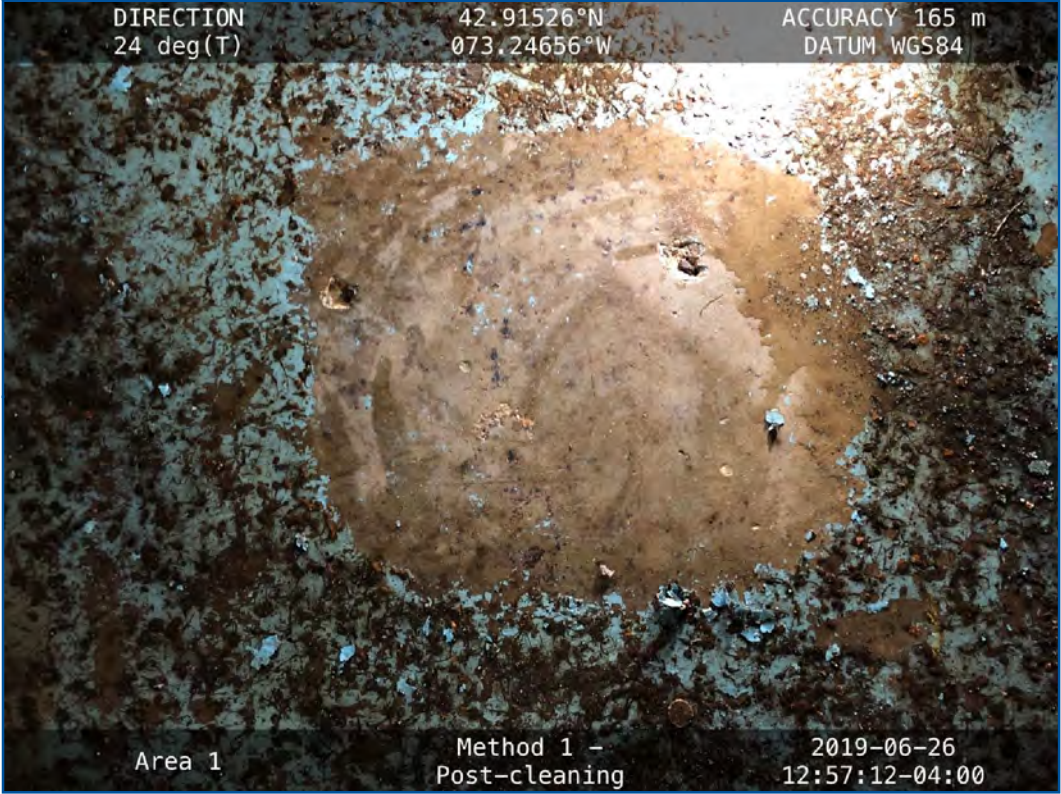


PHOTO 5



Caption: Area 1 - Method 1 - Pre-Cleaning

PHOTO 6



APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
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Saint-Gobain



PHOTO 7

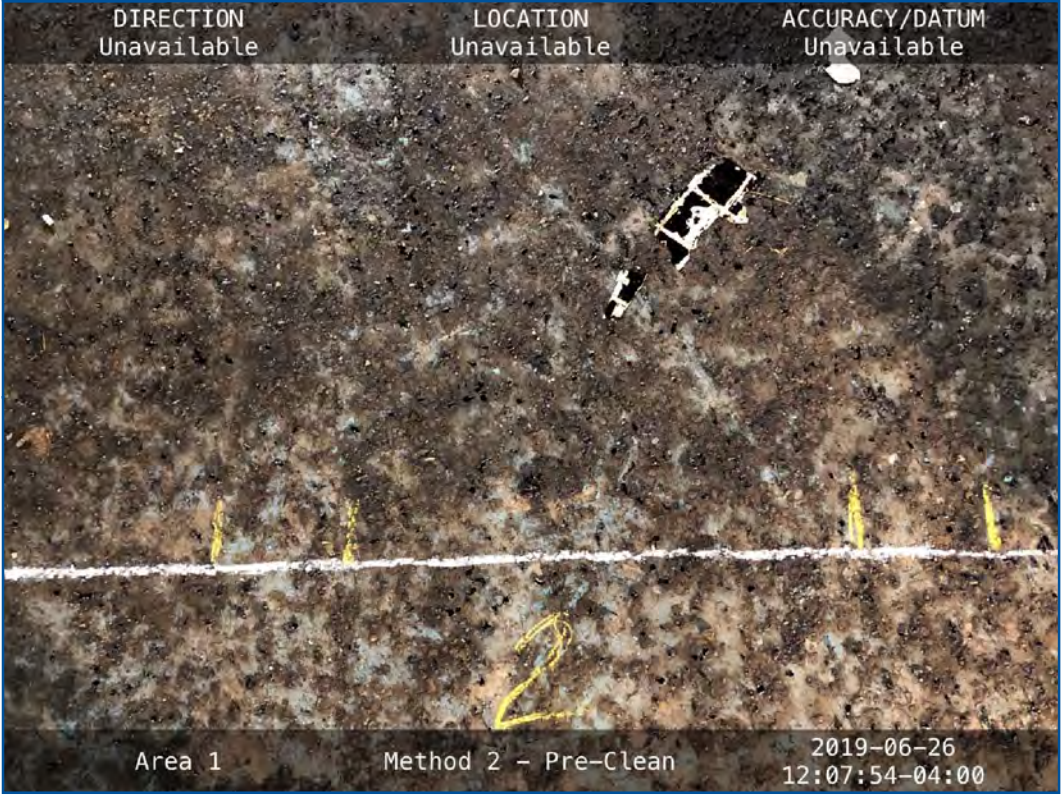


PHOTO 8



APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
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PHOTO 9

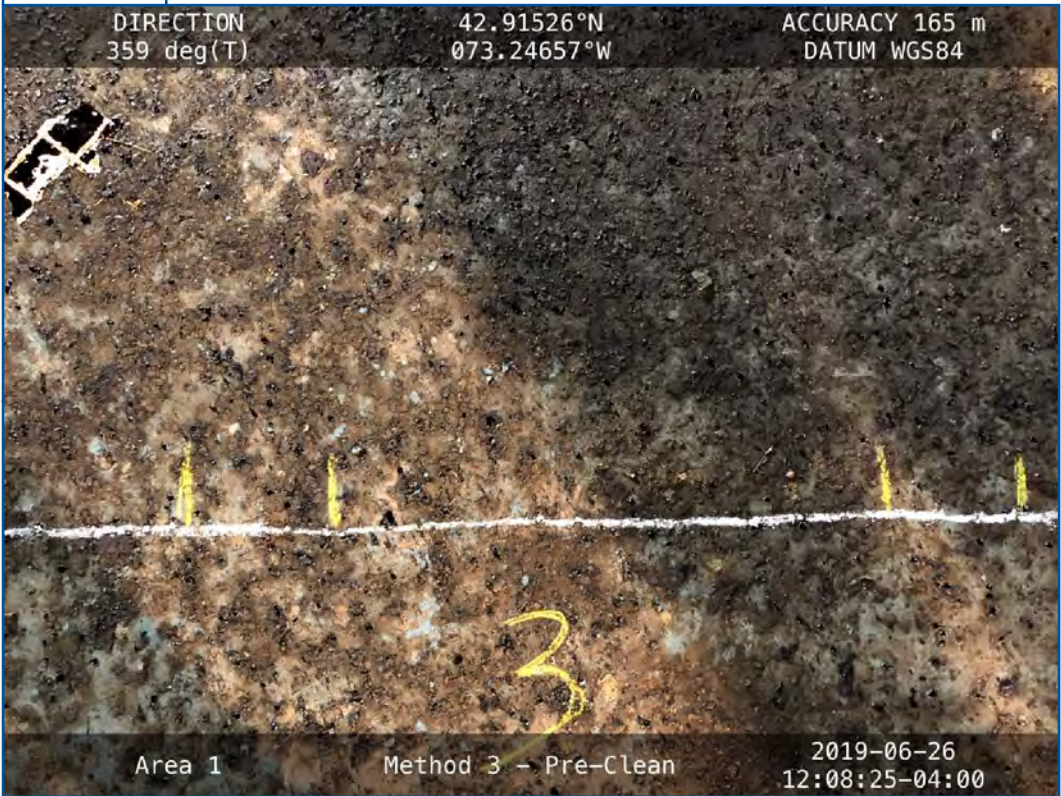
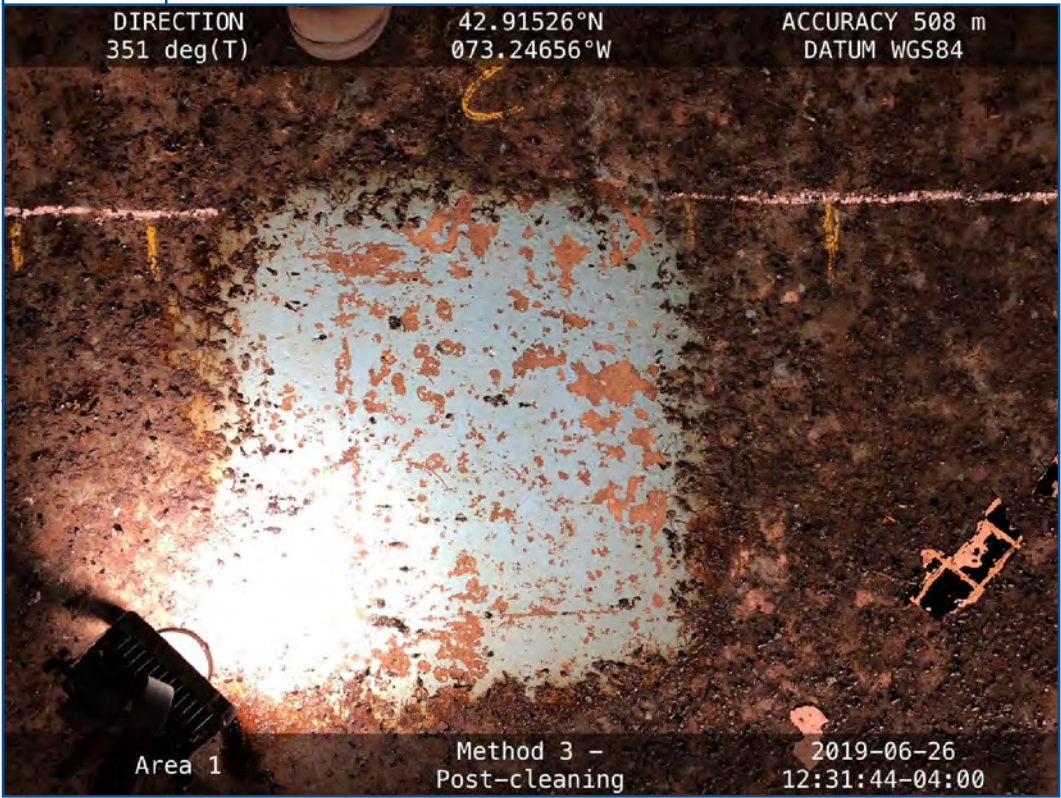


PHOTO 10



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PHOTO 11



PHOTO 12



**APPENDIX A
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PHOTO 13



PHOTO 14



**APPENDIX A
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PHOTO 15

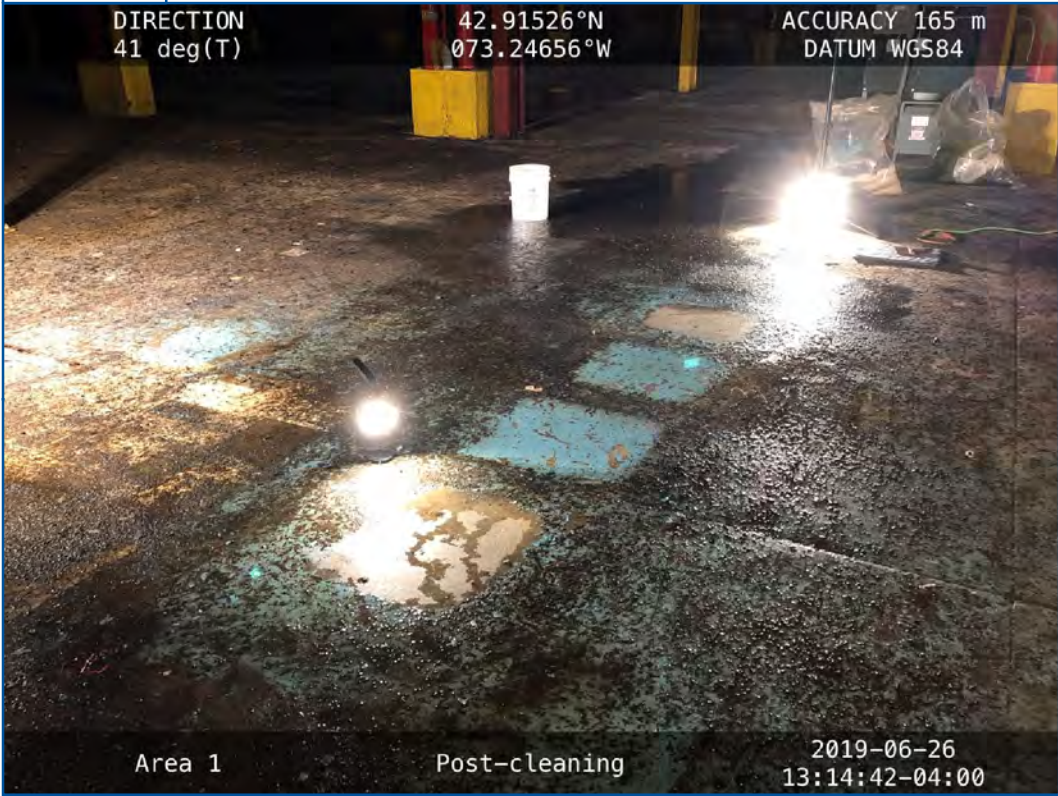


PHOTO 16



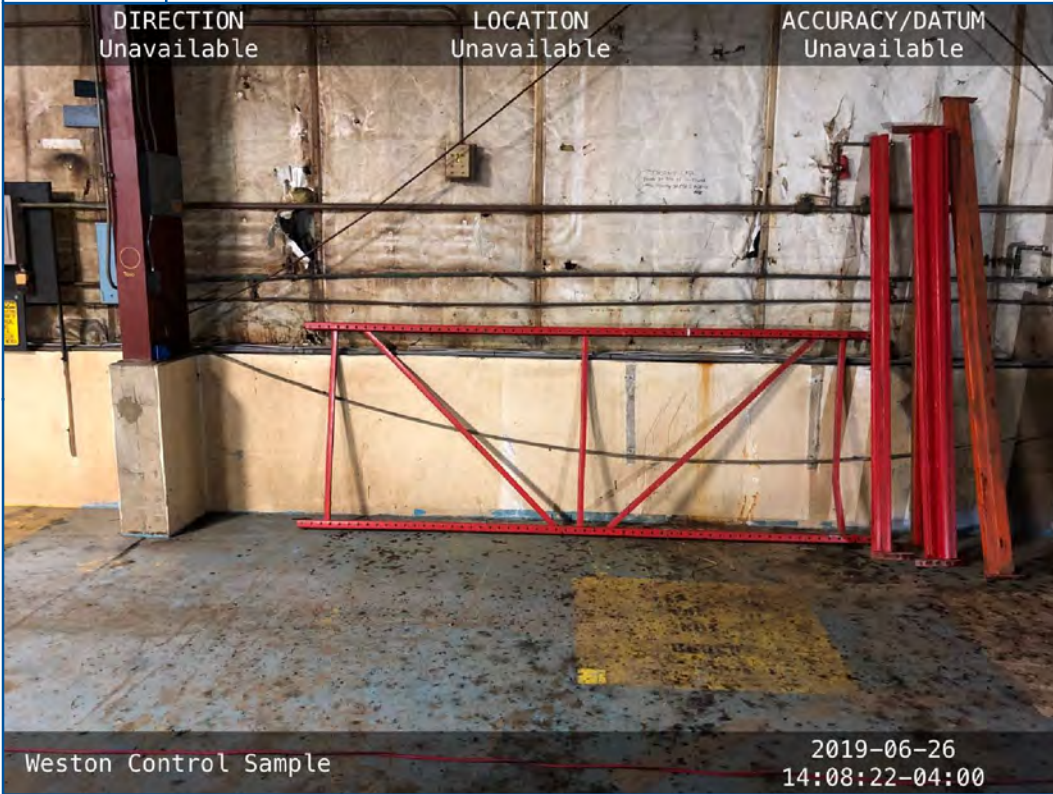
Caption: Weston collecting post-cleaning wipe sample

**APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS**

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North Bennington, VT
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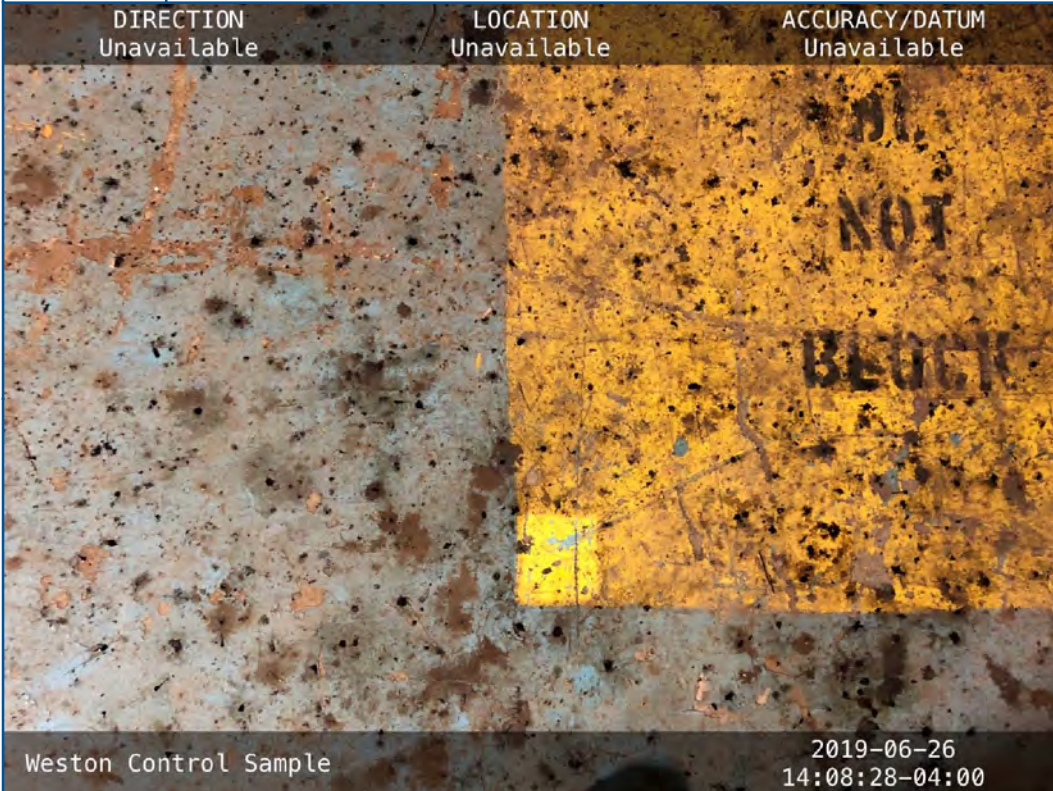


PHOTO 17



Caption: Location of Weston control sample on 6/26

PHOTO 18



Caption: Floor conditions following collection of control sample

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PHOTO 19



PHOTO 20



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BENCH TESTING OF
CLEANING METHODS
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PHOTO 21

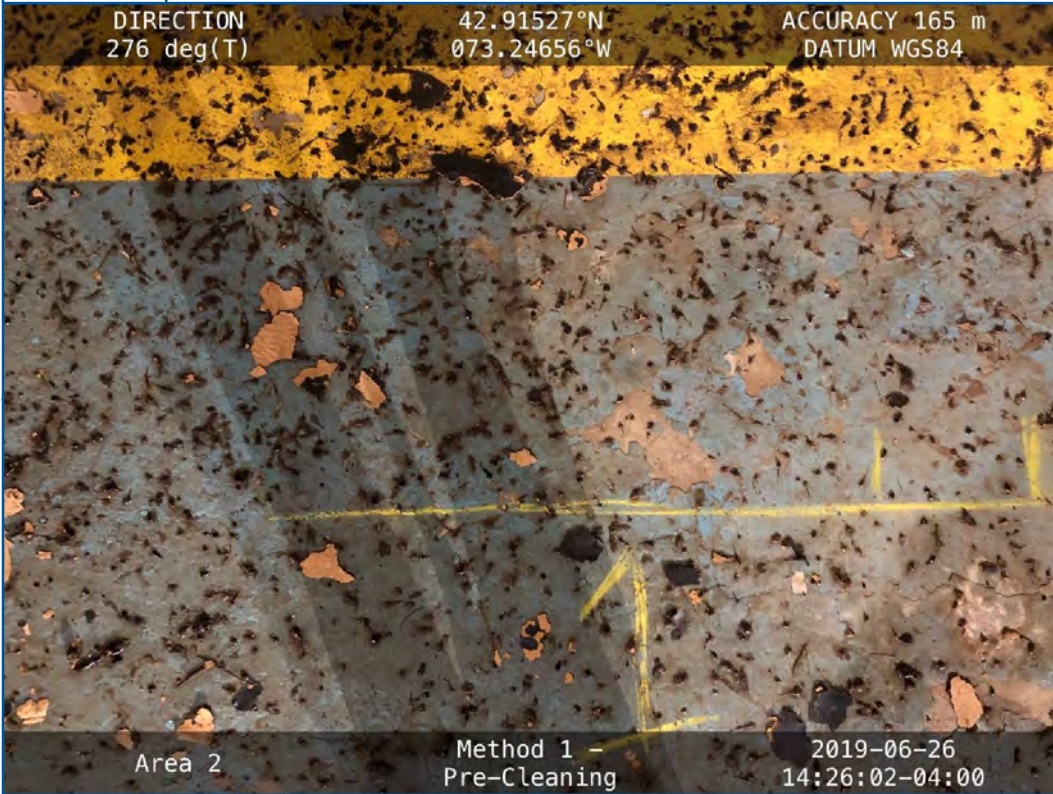


PHOTO 22



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PHOTO 23

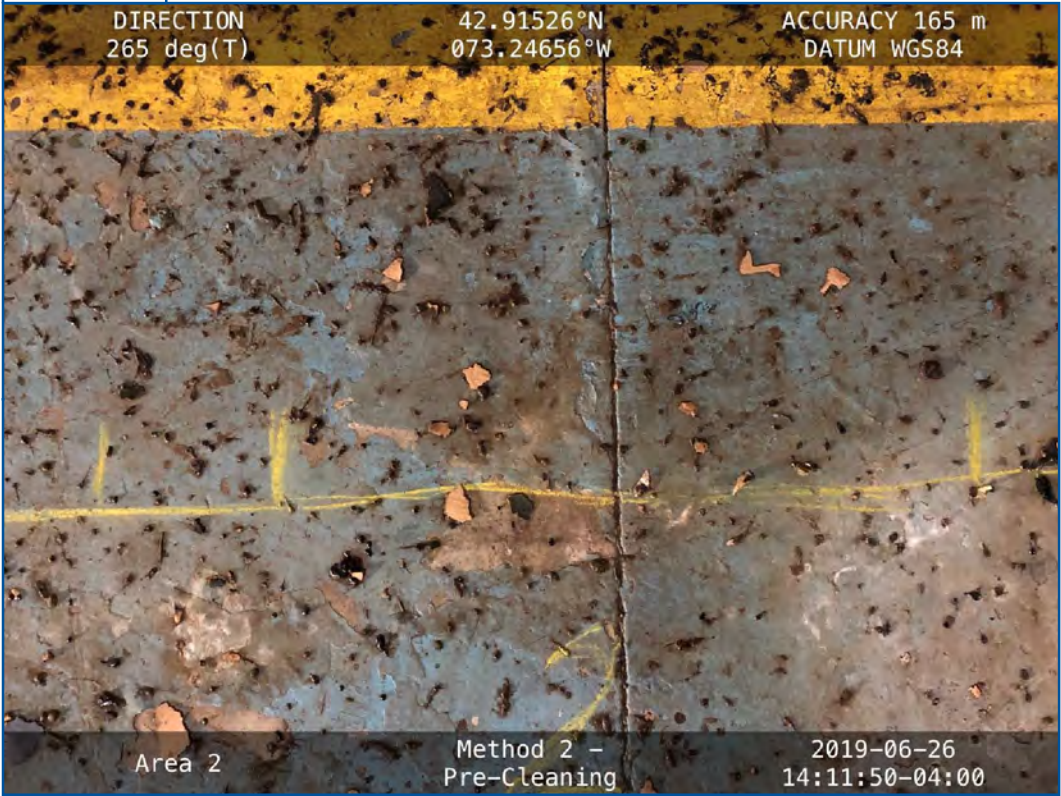


PHOTO 24



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CLEANING METHODS
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PHOTO 25

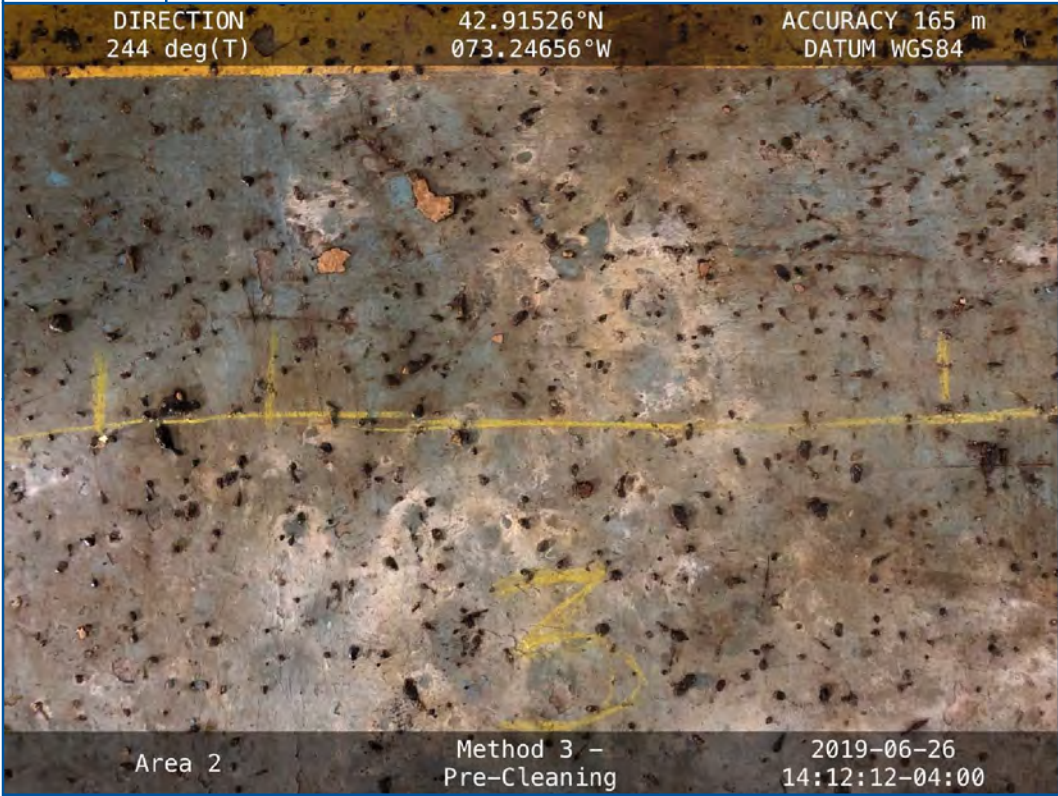


PHOTO 26



**APPENDIX A
PHOTO DOCUMENTATION
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CLEANING METHODS**

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PHOTO 27

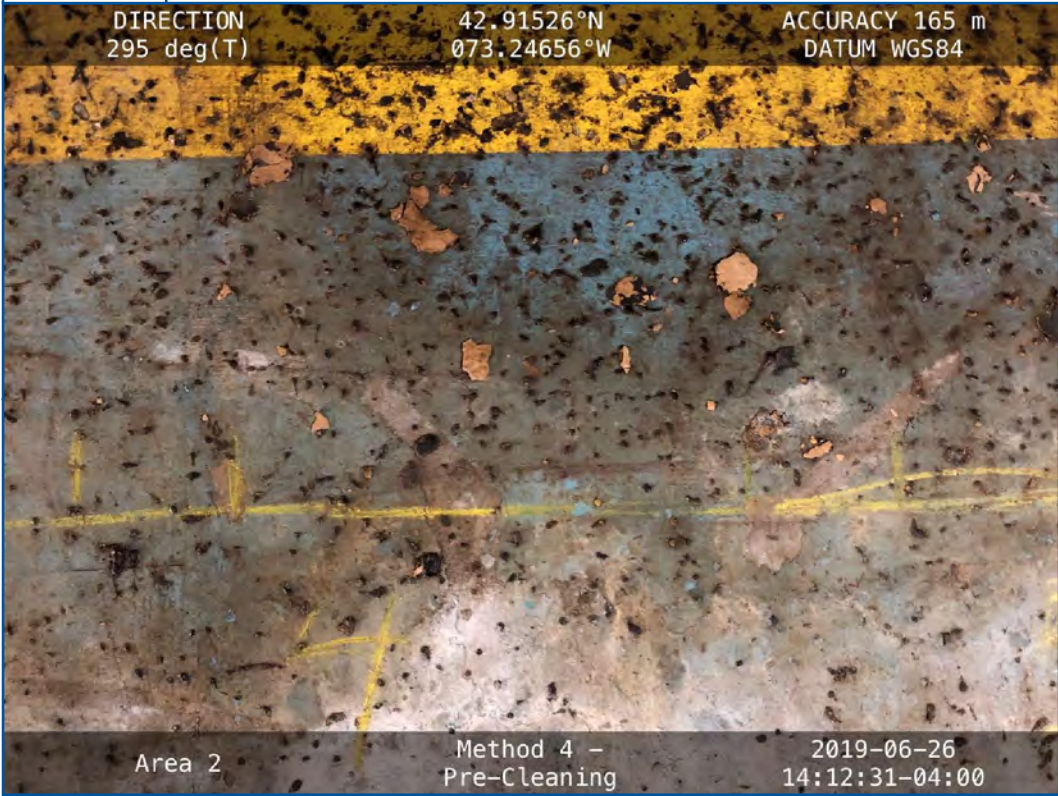


PHOTO 28



**APPENDIX A
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CLEANING METHODS**

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PHOTO 29

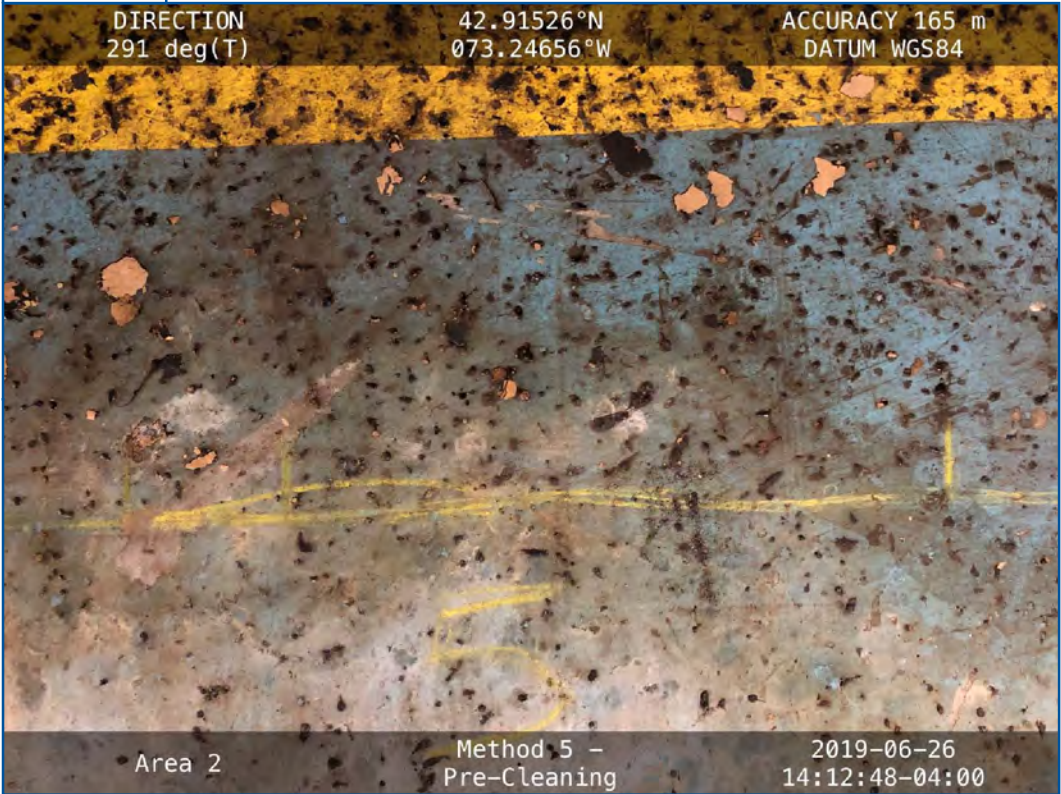


PHOTO 30



APPENDIX A
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CLEANING METHODS
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PHOTO 31

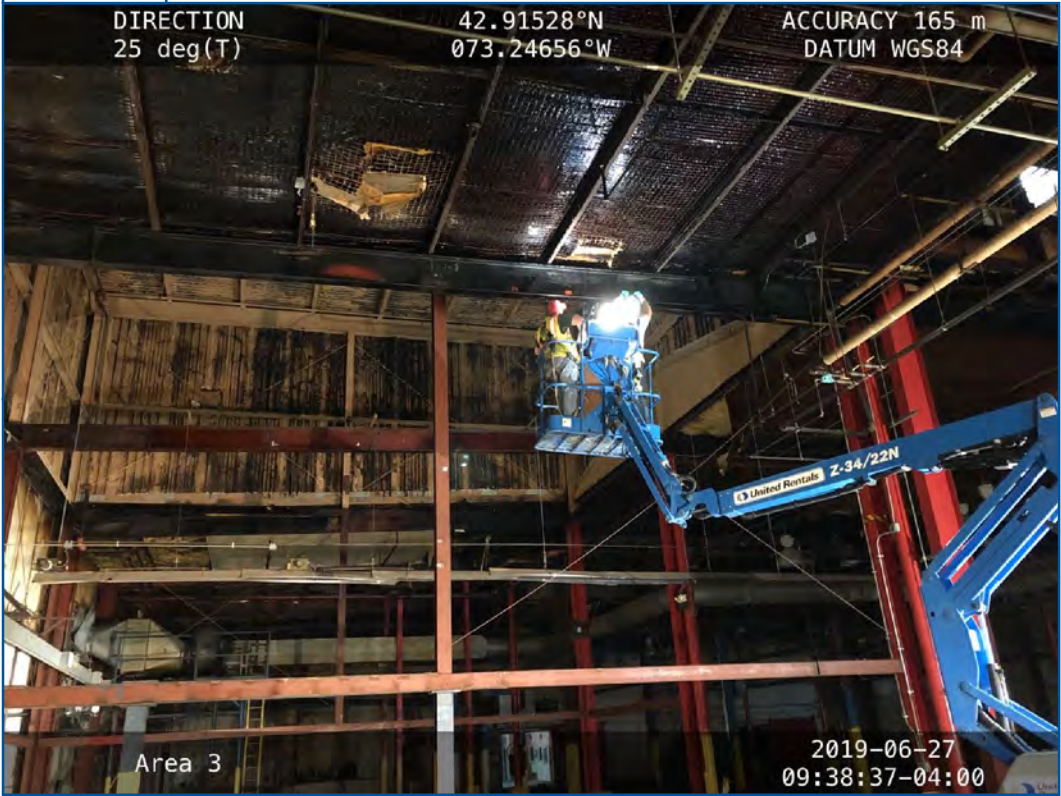


PHOTO 32



APPENDIX A
PHOTO DOCUMENTATION
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CLEANING METHODS
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PHOTO 33

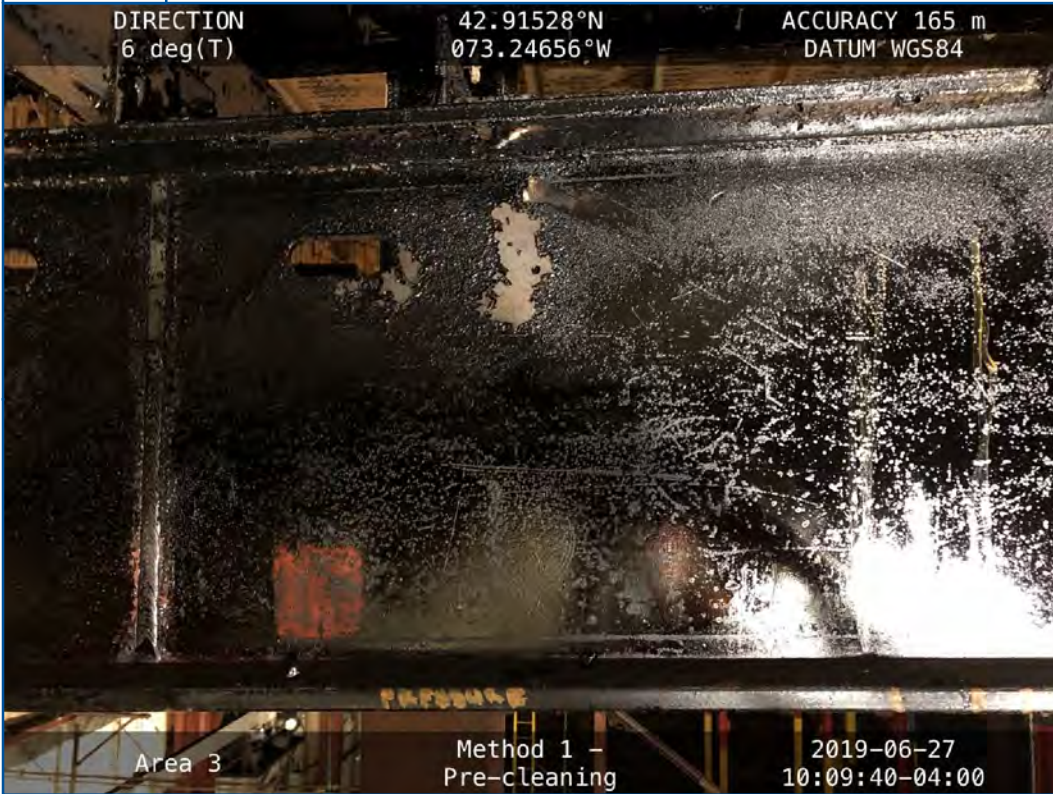
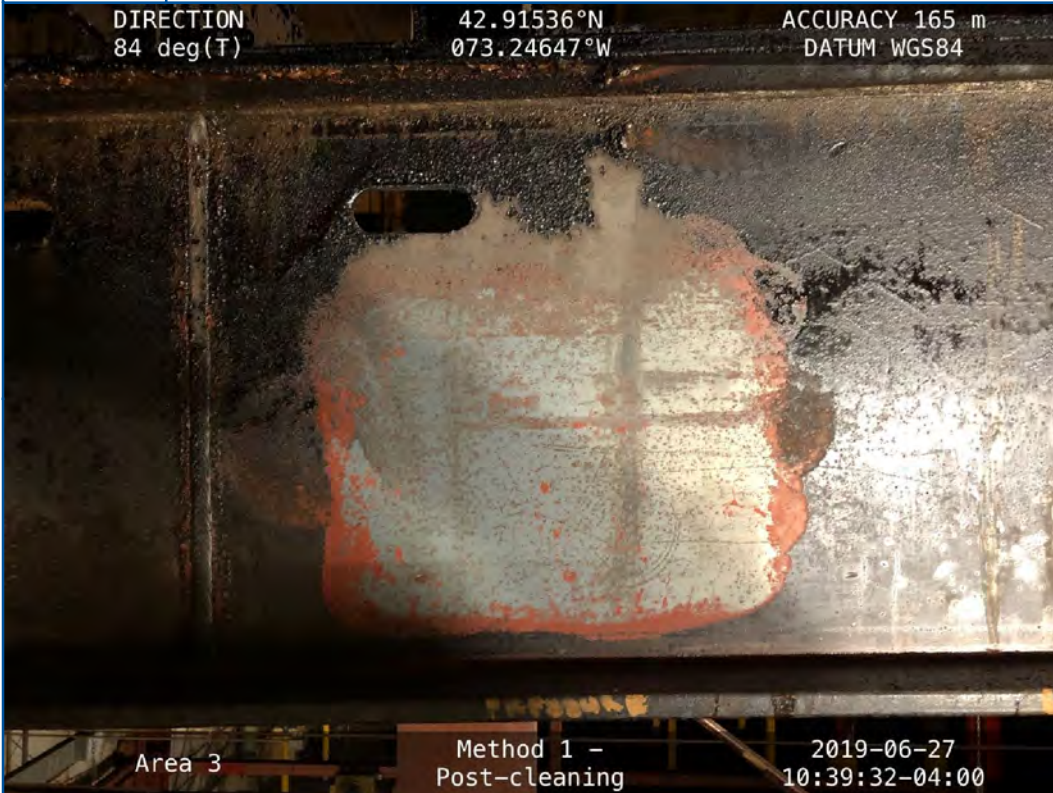


PHOTO 34



APPENDIX A
PHOTO DOCUMENTATION
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CLEANING METHODS
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PHOTO 35

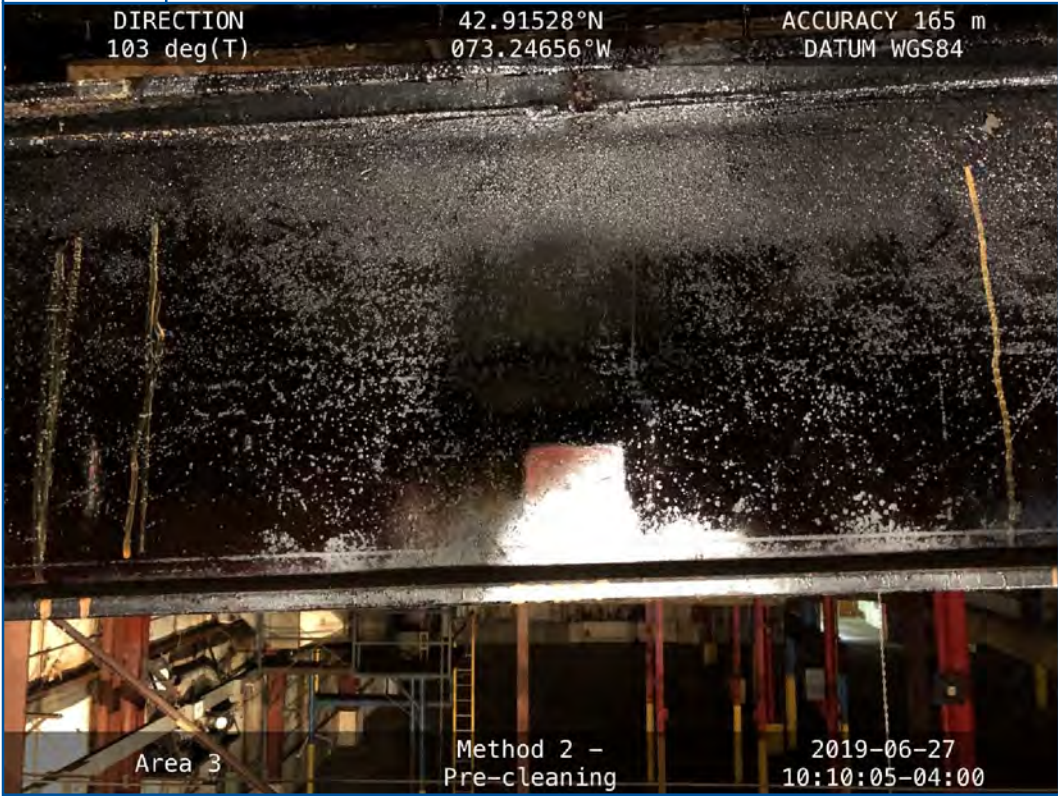
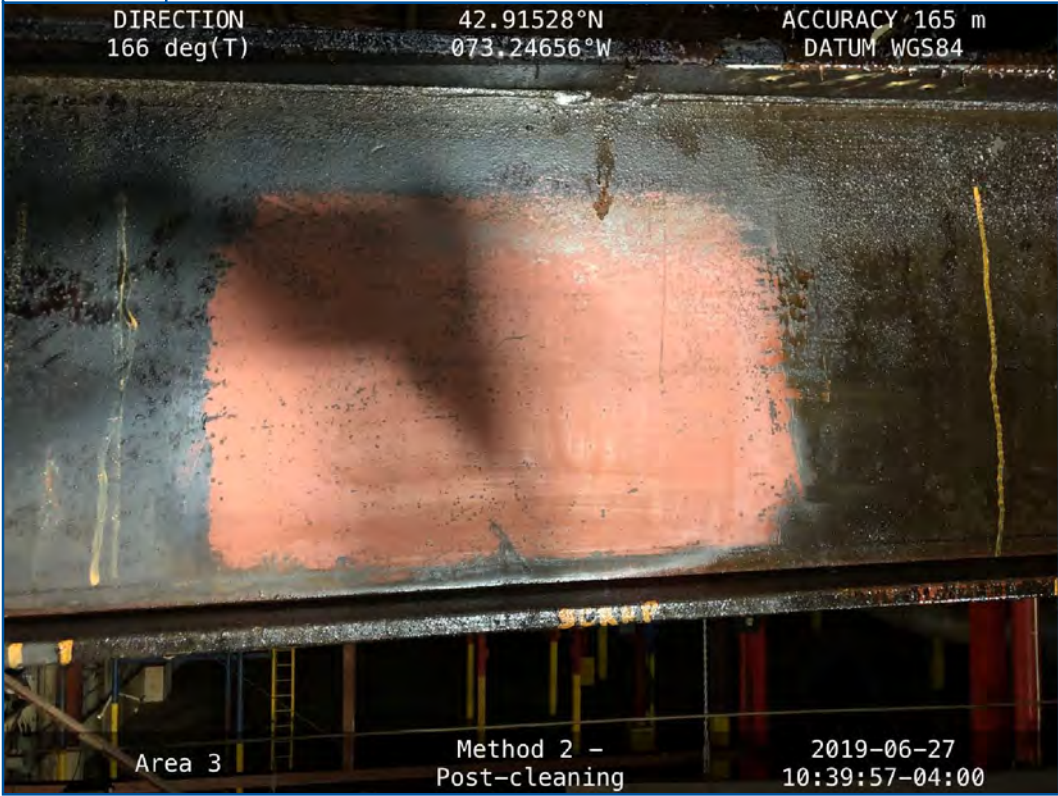


PHOTO 36



APPENDIX A
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PHOTO 37

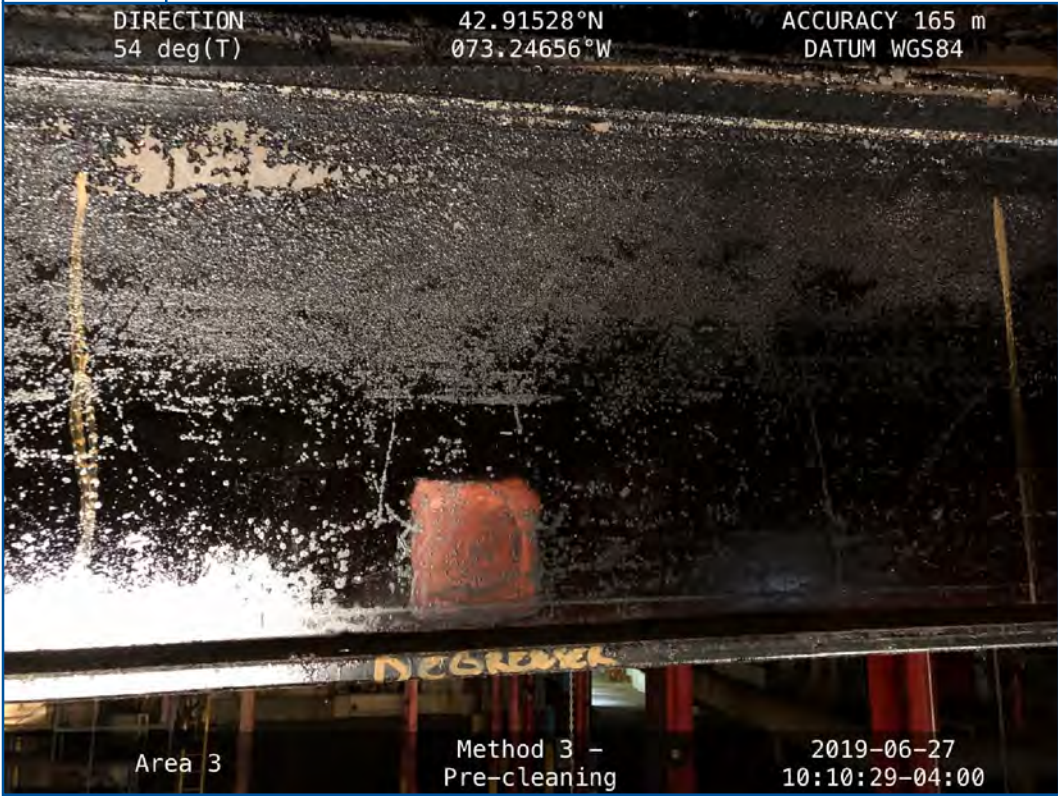
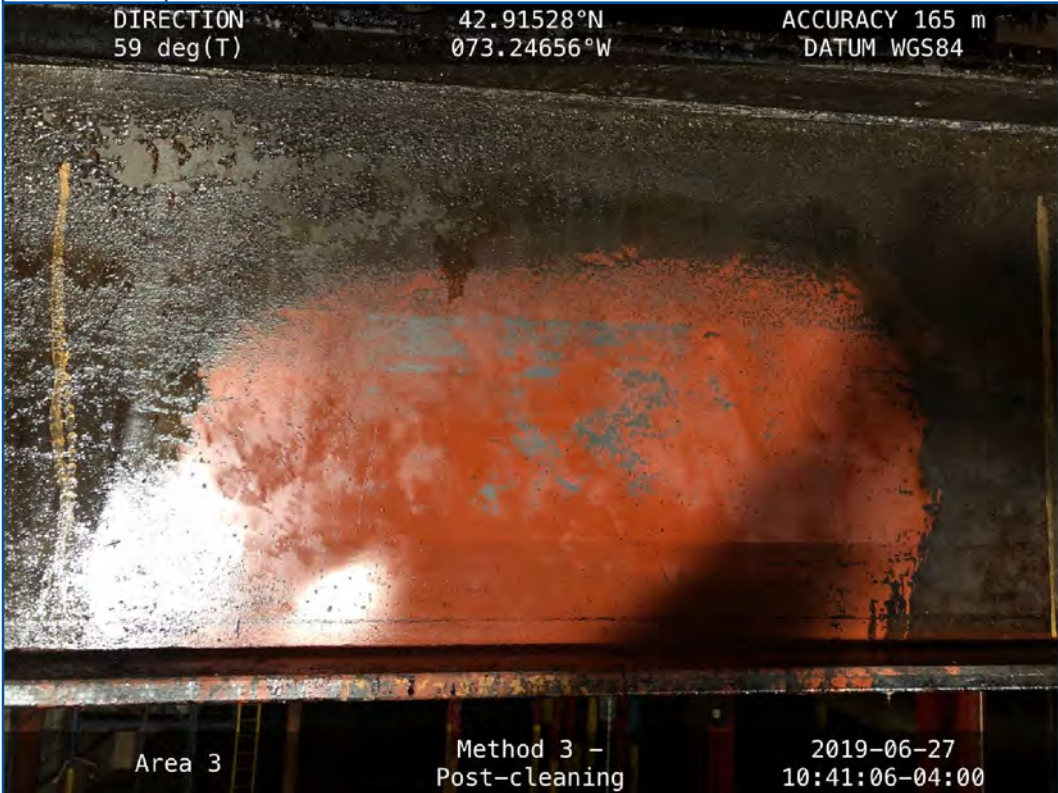


PHOTO 38



APPENDIX A
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PHOTO 39

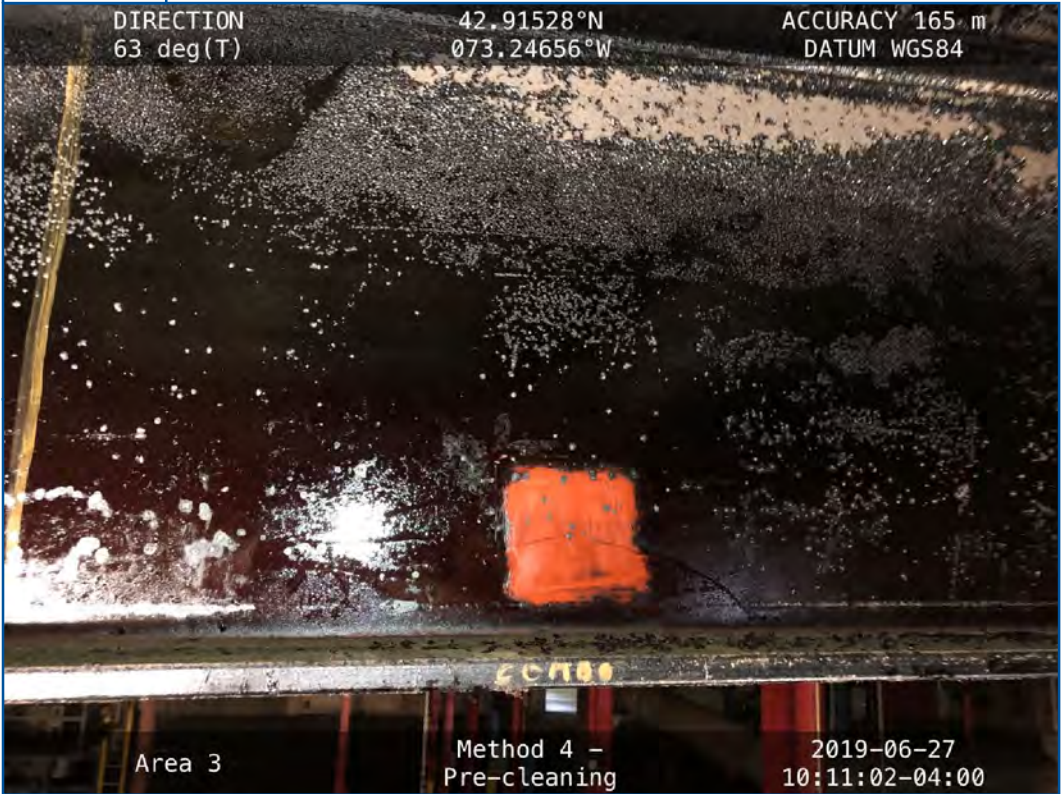
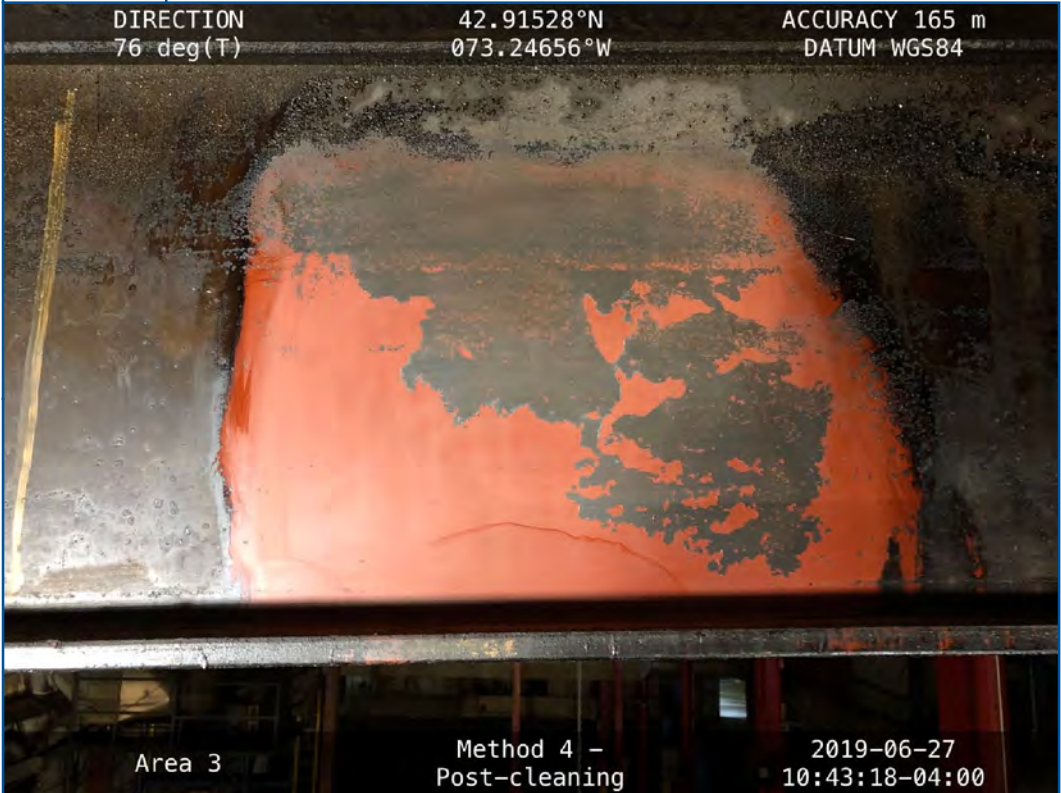


PHOTO 40



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PHOTO 42



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PHOTO 44



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PHOTO 45



PHOTO 46



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PHOTO 48



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1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 49

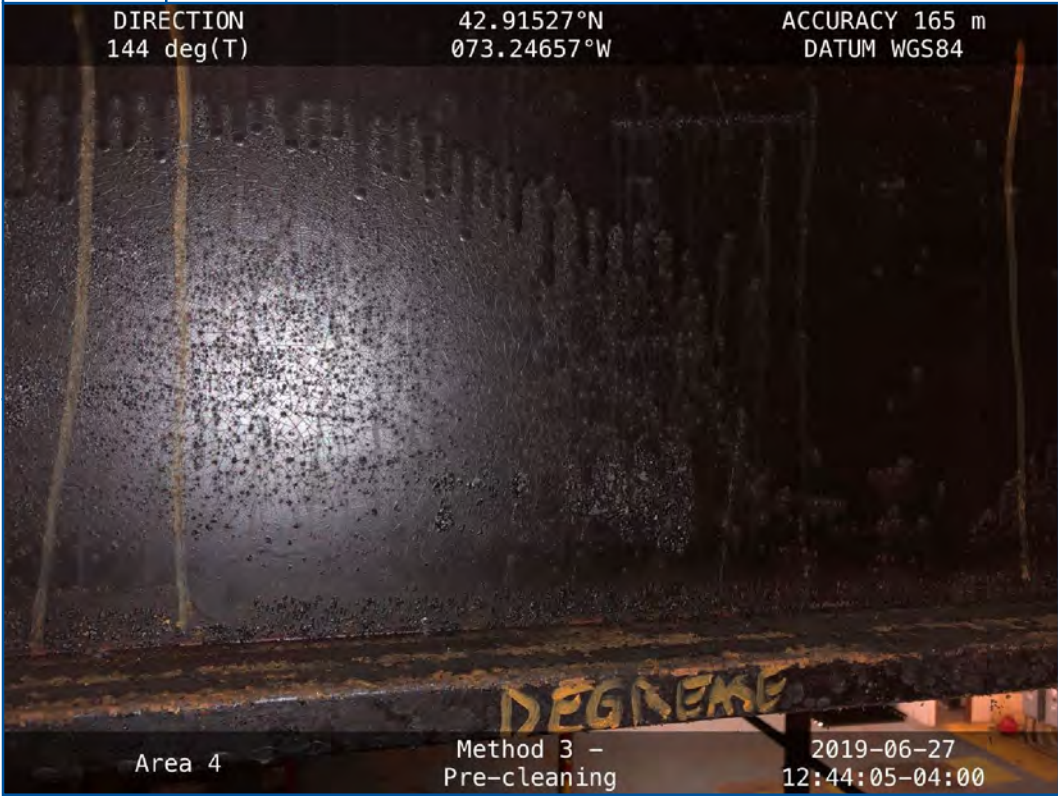


PHOTO 50



APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 51



PHOTO 52



APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 53



PHOTO 54



APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 55

DIRECTION
6 deg(T)

42.91526°N
073.24656°W

ACCURACY 166 m
DATUM WGS84



Area 1

Method 1

2019-06-26
12:52:37-04:00

PHOTO 56

DIRECTION
77 deg(T)

42.91526°N
073.24656°W

ACCURACY 165 m
DATUM WGS84



Area 1

Method 2

2019-06-26
12:34:58-04:00

APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 57



DIRECTION
23 deg(T)

42.91528°N
073.24656°W

ACCURACY 165 m
DATUM WGS84

Area 3

Method 2 and 3

2019-06-27
10:23:28-04:00

PHOTO 58



DIRECTION
59 deg(T)

42.91525°N
073.24650°W

ACCURACY 165 m
DATUM WGS84

Area 1

Method 4

2019-06-26
13:03:20-04:00

APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 59



PHOTO 60



APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 61

DIRECTION
268 deg(T)

42.91526°N
073.24647°W

ACCURACY 165 m
DATUM WGS84



Insulation Area - 2

2019-06-27
08:49:54-04:00

PHOTO 62

DIRECTION
232 deg(T)

42.90454°N
073.19708°W

ACCURACY 5.99 km
DATUM WGS84



Insulation Area - 2

2019-06-27
08:54:15-04:00

APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 63



PHOTO 64



APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



PHOTO 65

DIRECTION
284 deg(T)

42.91528°N
073.24656°W

ACCURACY 451 m
DATUM WGS84



Insulation Area - 4

2019-06-27
09:10:44-04:00

PHOTO 66

DIRECTION
296 deg(T)

42.91528°N
073.24656°W

ACCURACY 165 m
DATUM WGS84



Insulation Area - 4

2019-06-27
09:11:38-04:00

APPENDIX A
PHOTO DOCUMENTATION
BENCH TESTING OF
CLEANING METHODS
1030 Water Street
North Bennington, VT
Saint-Gobain



TASK ORDER REQUEST FORM

PROJECT NAME:	VTDEC – St. Gobain Wipe Sampling					
LOCATION:	1030 Water Street, North Bennington, VT					
TASK DESCRIPTION: <i>(check one)</i>	<input type="checkbox"/>	Phase I ESA	<input type="checkbox"/>	Supplemental Phase II ESA	<input type="checkbox"/>	Groundwater Monitoring
	<input type="checkbox"/>	ECAA	<input type="checkbox"/>	CAP	<input checked="" type="checkbox"/>	Wipe Sampling
TO:	Richard Spiese, Vermont Department of Environmental Conservation					
FROM:	Steven LaRosa, Weston & Sampson Engineers, Inc.					
DATE:	08/05/2019					

Weston & Sampson has completed collection and analysis of wipe samples from multiple surfaces in the St. Gobain facility located at 1030 Water Street in North Bennington as approved in our 06/25/19 task order. The work included collection of samples prior to and after cleaning efforts of discrete concrete floor and steel I-Beam roof support materials. The intent of the surface wipe sampling was to determine the effectiveness of various cleaning methods. In addition several “control”, field blank, equipment blank and neighboring room samples were collected.

SCOPE OF WORK

The wipe samples were collected on June 26 and 27, 2019. The owners contractor selected an area of concrete floor and ceiling I-beam that appeared to be uniformly stained. The flooring area was divided it into 4 roughly 2 foot by 2 foot cleaning test sections. The I-beam test area was roughly 1 foot by 6 feet divided into 4 cleaning test sections.

Four (4) cleaning methods were tested. The methods utilized by the owners contractor were 1) physical scraping with warm water and nylon pads, 2) pressure washing, 3) physical scraping with a degreaser and woven pads and 4) combined pressure washing followed by degreaser.

Pre-cleaning wipe samples were obtained from each test section. Each wipe sample was collected by generally following the EPA Lead Dust Sampling Technician Field Guide. Samples were collected from 10cm x 10cm (100 cm²/4”x4”) areas with a PFAS free gauze impregnated with methanol. The sample area was wiped horizontally in an S-shaped motion, the wipe folded dirty side in, the area wiped vertically, the dirty side folded in again and a final wipe performed concentrating on the edges of the sample area. The wipe was placed in its shipping container, sealed and labelled. A duplicate pre-cleaning sample was obtained from the “scrape” test section.

Following cleaning of each test section, a post-cleaning wipe sample was collected. The post cleaning sample was collected from directly adjacent to the pre-cleaning sample location. The sample collection method was the same as the pre-cleaning sample. A duplicate post-cleaning sample was collected from the “degreaser” test section.

A “control” sample was collected from a 4” x 4” area of the concrete floor from an area distal to the cleaning test area. A total of three (3) wipe samples were collected sequentially from this single location of concrete to determine PFAS sampling efficiency of each media.

Two (2) samples were collected from the “common area” in the 940 Water Street building (wall and I-Beam). The areas sampled appeared to be “original” building surfaces of brick and painted steel.

An equipment blank was collected by wiping the decontaminated plastic template used to define the 4”x4” sampling areas.

A Field Blank was collected by opening a wipe in the airspace of the cleaning/sampling area, refolding and placing back in the shipping container.

Pictures of the sampling and cleaning areas are included in the attached photo log.

Each sample was analyzed at SGS North America utilizing their proprietary extraction and analyses method 537M ID. The laboratory results are attached. The data has been summarized in **Table 1** along with summaries of the PFAS reduction between pre and post cleaning.

RESULTS

Three PFAS were identified above reporting limits in the wipe samples: Perfluorohexanoic acid (PFHxA), Perfluoroheptanoic acid (PFHpA) and Perfluorooctanoic acid (PFOA). PFOA was consistently the highest concentrations reported. Several other PFAS were reported at estimate concentrations below the reporting limits.

The trip blank data indicate a PFOA concentration of 0.005 ug/wipe, several orders of magnitude less than the concentrations reported in the surface wipe samples. The field blank reported higher PFOA concentration of 0.053 ug/wipe, also well below the surface wipe results but above the trip blank concentration. This is likely due to PFOA presence in the interior air on dust. The concentrations of PFOA in the trip and field blanks are not sufficient to impact the usability of the surface wipe samples as indicators of cleaning method effectiveness.

The “Control” samples indicate that PFAS concentrations remained in the same order of magnitude despite sampling the same 10cm x 10 cm block repeatedly. The final sample “Control 3” had the highest PFOA concentration at approximately 85 ug/wipe. This may be due to the template used to define the wipe area sliding slightly or liberation of debris due to repeated solvent exposure.

The concrete floor sample results show an approximate 77% reduction in PFOA concentrations to between 4 and 62 ug/wipe. The one exception is the degreaser area where little PFOA was observed initially and a greater concentration reported after cleaning. The duplicate floor sample was obtained before cleaning from the physically scraped area. The duplicate reported PFAS at approximately twice the original sample (326 ug/wipe vs 166 ug/wipe)

The vertical surface of the I-Beams had lower initial PFOA concentrations and much lower post cleaning concentrations between 0.5 and 4 ug/wipe, equating to an average 94% PFOA concentration reduction. The steel also appeared to be cleaner overall due to its non porous surface and vertical orientation. A duplicate sample was collected after cleaning from the degreaser area and showed excellent correlation

to the original sample.

The “common room” in the adjoining building reported PFOA concentrations of 0.175 ug/wipe from the brick wall and 0.488 ug/wipe from the ceiling I-beam. The photographs of the sample locations attached do show some debris/dirt was removed from each location by the solvent wipes.

CONCLUSIONS

The cleaning efforts utilized on both the concrete floor and I beam test locations all showed reductions of PFAS concentrations in surface wipe samples. The effectiveness of the cleaning on the concrete floor was less than the painted, vertical surface of the i-beam. This is likely due to the higher concentrations of PFAS in the debris and the porous nature of the concrete. Heavy foot traffic and spillage of materials on the floor may also have resulted in penetration of contaminated materials into the concrete matrix. The combination cleaning method of pressure washing and degreasing appears to have been the most effective tested.

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**TABLE 1
WIPE SAMPLE RESULTS**

Analyte	CAS #	Units	FLOOR - AREA 1 SCRAPE		FLOOR - AREA 1 PRESSURE WASH		FLOOR - AREA 1 DEGREASER		FLOOR - AREA 1 COMBINATION	
			BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER
Perfluorobutanoic acid (PFBA)	375-22-4	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluoropentanoic acid (PFPeA)	2706-90-3	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorohexanoic acid (PFHxA)	307-24-4	ug/wipe	1.41	ND/< 0.25	1.88	ND/< 0.10	0.609	ND/< 0.10	1.17	ND/< 0.050
Perfluoroheptanoic acid (PFHpA)	375-85-9	ug/wipe	2.83	0.436 J	4.47	0.180 J	1.17	0.203	1.82	ND/< 0.050
Perfluorooctanoic acid (PFOA)	335-67-1	ug/wipe	162	61.8	113	26.9	6.01 J	24.5	232	4.13
Perfluorononanoic acid (PFNA)	375-95-1	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorodecanoic acid (PFDA)	335-76-2	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorododecanoic acid (PFDoA)	307-55-1	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorotetradecanoic acid (FTeDA)	376-06-7	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	0.279 J	ND/< 0.050
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
Perfluorooctanesulfonamide (PFOSA)	754-91-6	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
N-Methylperfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	2355-31-9	ug/wipe	ND/< 13	ND/< 0.63	ND/< 25	ND/< 0.25	ND/< 13	ND/< 1.3	ND/< 13	ND/< 0.13
N-Ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	2991-50-6	ug/wipe	ND/< 13	ND/< 0.63	ND/< 25	ND/< 0.25	ND/< 13	ND/< 1.3	ND/< 13	ND/< 0.13
4:2 Fluorotelomer sulfonate (4:2 FTS)	757124-72-4	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
6:2 Fluorotelomer sulfonate (6:2 FTS)	27619-97-2	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050
8:2 Fluorotelomer sulfonate (8:2 FTS)	39108-34-4	ug/wipe	ND/< 0.50	ND/< 0.25	ND/< 0.50	ND/< 0.10	ND/< 0.25	ND/< 0.10	ND/< 0.25	ND/< 0.050

Notes:

ND/<1.0 the compound was not detected above the indicated method detection limit

J: compound detected above the method detection limit but below the reporting limit estimated value

BOLD: analyte present above detection limit

Perfluorooctanoic acid (PFOA)	% Reduction	62%	76%	-308%	98%
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Perfluorooctanoic acid (PFOA)	Floor Before Average	128.25	77%
	Floor After Average	29.33	
	Truss Before Average	65.80	94%
	Truss After Average	4.08	

**TABLE 1
WIPE SAMPLE RESULTS**

Analyte	CAS #	Units	IRON TRUSS SCRAPE		IRON TRUSS PRESSURE WASH		IRON TRUSS DEGREASER		IRON TRUSS COMBINATION	
			BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER
Perfluorobutanoic acid (PFBA)	375-22-4	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluoropentanoic acid (PFPeA)	2706-90-3	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorohexanoic acid (PFHxA)	307-24-4	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluoroheptanoic acid (PFHpA)	375-85-9	ug/wipe	ND/< 0.50	ND/< 0.020	0.564 J	ND/< 0.020	0.622 J	0.0594 J	0.258 J	0.0759 J
Perfluorooctanoic acid (PFOA)	335-67-1	ug/wipe	40.9	6.03	51.2	0.541	130	4.80	41.1	4.93
Perfluorononanoic acid (PFNA)	375-95-1	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorodecanoic acid (PFDA)	335-76-2	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorododecanoic acid (PFDoA)	307-55-1	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorotetradecanoic acid (FTeDA)	376-06-7	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluoronanesulfonic acid (PFNS)	68259-12-1	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
Perfluorooctanesulfonamide (PFOSA)	754-91-6	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
N-Methylperfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	2355-31-9	ug/wipe	ND/< 1.3	ND/< 0.050	ND/< 2.5	ND/< 0.050	ND/< 6.3	ND/< 0.13	ND/< 1.3	ND/< 0.13
N-Ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	2991-50-6	ug/wipe	ND/< 1.3	ND/< 0.050	ND/< 2.5	ND/< 0.050	ND/< 6.3	ND/< 0.13	ND/< 1.3	ND/< 0.13
4:2 Fluorotelomer sulfonate (4:2 FTS)	757124-72-4	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
6:2 Fluorotelomer sulfonate (6:2 FTS)	27619-97-2	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050
8:2 Fluorotelomer sulfonate (8:2 FTS)	39108-34-4	ug/wipe	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.020	ND/< 0.50	ND/< 0.050	ND/< 0.25	ND/< 0.050

Notes:

ND/<1.0 the compound was not detected above the indicated method detection limit

J: compound detected above the method detection limit but below the reporting limit estimated value

BOLD: analyte present above detection limit

Perfluorooctanoic acid (PFOA)	% Reduction	85%	99%	96%	88%
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Perfluorooctanoic acid (PFOA)	Floor Before Average
	Floor After Average
	Truss Before Average
	Truss After Average

**TABLE 1
WIPE SAMPLE RESULTS**

Analyte	CAS #	Units	DUPLICATE FLOOR SCRAPE BEFORE	DUPLICATE IRON TRUSS DEGREASER AFTER	COMMON ROOM WALL	COMMON ROOM CEILING	CONTROL 1	CONTROL 2	CONTROL 3	EQUIPMENT BLANK	FIELD BLANK
Perfluorobutanoic acid (PFBA)	375-22-4	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluoropentanoic acid (PFPeA)	2706-90-3	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorohexanoic acid (PFHxA)	307-24-4	ug/wipe	1.11	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	0.200	ND/< 0.0010	ND/< 0.0010
Perfluoroheptanoic acid (PFHpA)	375-85-9	ug/wipe	2.23	ND/< 0.050	ND/< 0.0010	ND/< 0.050	1.20	ND/< 0.50	0.443	ND/< 0.0010	ND/< 0.0010
Perfluorooctanoic acid (PFOA)	335-67-1	ug/wipe	323	3.79	0.175	0.488	75.6	47.7	84.7	0.00539	0.0536
Perfluorononanoic acid (PFNA)	375-95-1	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorodecanoic acid (PFDA)	335-76-2	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorododecanoic acid (PFDoA)	307-55-1	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	0.0576 J	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorotetradecanoic acid (FTeDA)	376-06-7	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	0.0975 J	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
Perfluorooctanesulfonamide (PFOSA)	754-91-6	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
N-Methylperfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	2355-31-9	ug/wipe	ND/< 13.0	ND/< 0.13	ND/< 0.0025	ND/< 0.13	ND/< 13	ND/< 1.3	ND/< 2.5	ND/< 0.0025	ND/< 0.0025
N-Ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	2991-50-6	ug/wipe	ND/< 13.0	ND/< 0.13	ND/< 0.0025	ND/< 0.13	ND/< 13	ND/< 1.3	ND/< 2.5	ND/< 0.0025	ND/< 0.0025
4:2 Fluorotelomer sulfonate (4:2 FTS)	757124-72-4	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
6:2 Fluorotelomer sulfonate (6:2 FTS)	27619-97-2	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010
8:2 Fluorotelomer sulfonate (8:2 FTS)	39108-34-4	ug/wipe	ND/< 0.50	ND/< 0.050	ND/< 0.0010	ND/< 0.050	ND/< 0.50	ND/< 0.50	ND/< 0.10	ND/< 0.0010	ND/< 0.0010

Notes:

ND/<1.0 the compound was not detected above the indicated method detection limit

J: compound detected above the method detection limit but below the reporting limit estimated value

BOLD: analyte present above detection limit

Perfluorooctanoic acid (PFOA)	% Reduction
-------------------------------	-------------

Perfluorooctanoic acid (PFOA)	Floor Before Average
	Floor After Average
	Truss Before Average
	Truss After Average

Photograph Log
Water Street Facility



Photo #1
Concrete Floor Sampling Area



Photo #2
Concrete Floor Being Cleaned

Photograph Log

Water Street Facility



Photo #3
I-Beam Test Area – Pre
Cleaning, after Sampling



Photo #4
I-Beam Test Area – Post
Cleaning



Photo #65
Common Room Wall

Photograph Log

Water Street Facility



Photo #6
Common Room I-Beam

Appendix B

Building Material Corrective Action Specifications

Note: technical specifications relevant to the selected removal and cleaning of building materials are provided. The technical specifications will be incorporated into the contract during contractor selection and authorization.

January 7, 2020
Revised February 24, 2020
Revised March 5, 2020

TECHNICAL SPECIFICATIONS



Water Street Facility Cleaning
Saint-Gobain Performance Plastics
North Bennington
Bennington County, Vermont

Prepared for:

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END OF SECTION 000110

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Demolition and removal of selected portions of building or structure.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store for later disposal.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project Site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.

- B. Engineering Survey: Submit engineering survey of condition of building.

- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control, for water control, and for noise control. Indicate proposed locations and construction of barriers.

- D. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's and other tenant's on-site operations are uninterrupted.
2. Interruption of utility services. None anticipated. Contractor to notify Engineer and submit plan if utility interruptions are planned by Contractor.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building.

- E. Pre-demolition Photographs: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Engineer of discrepancies between existing conditions noted at mandatory pre-bid meeting and/or at the commencement of construction and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- E. Sale of removed items or materials on-site is not permitted.
- F. Storage of removed items on-site is permitted in approved containers while awaiting transport to a permitted disposal facility.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped, if necessary, before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings and pre-construction photographs.
 - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."
 - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. No flame cutting operations are allowed.
 - 5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose in approved containers.
 - 6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

7. Dispose of demolished items and materials promptly. Comply with requirements in Section 026110 "Waste Handling, Transportation, and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's approved storage area prior to transport to permitted disposal facility.
 5. Protect items from damage during transport and storage.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer/Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Insulation: Remove all insulation that has been exposed to PFAS contamination. Store, transport, and dispose in accordance with applicable regulations and the requirements of these contract documents.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site **and dispose of them in an EPA-approved RCRA, Subtitle C permitted landfill and dispose of them according to Section 026110 "Waste Handling, Transportation, and Disposal."**
 1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.7 SELECTIVE DEMOLITION SCHEDULE

- A. Remove: Building insulation. Miscellaneous soft materials that cannot be cleaned may need to be removed and disposed of in a RCRA , Subtitle C permitted landfill. These materials should only be removed and disposed of with written permission of the Engineer.
- B. Existing to Remain: Everything except insulation.

END OF SECTION 024119

SECTION 02 41 21

INTERIOR BUILDING CLEANING

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Cleaning hard surfaces on the interior of the Corrective Action Area.
 - 2. Inspecting subject areas following interior building cleaning
- B. Related Requirements
 - 1. Section 024219 – Selective Structure Demolition
 - 2. Section 026110 – Waste Handling, Transportation, and Disposal
 - 3. Section 028233 – Removal and Disposal of Asbestos Containing Materials

1.03 REFERENCES [NOT USED]

1.04 DESIGN REQUIREMENTS [NOT USED]

1.05 ACTION SUBMITTALS

- A. Cleaning Action Plan, which must contain the following:
 - 1. Equipment to be used for cleaning, including cut sheets for hot water high pressure washing equipment
 - 2. Information on cleaning products, including a Safety Data Sheet for each proposed cleaning product
 - 3. General description of interior building cleaning process including estimated number of staff, ancillary equipment to be used, and estimated duration of cleaning activities
 - 4. Proposed method for developing subject areas, documenting subject area dimensions, and documenting cleaning progress at each subject area



5. Procedures for collecting and managing water and solids generated from cleaning activities including containment structures to prevent uncontrolled discharge of cleaning fluids to sanitary sewer sump
6. Method of heating the building if cleaning occurs during periods of below-freezing temperatures

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Cleaning equipment and cleaning products must be stored in a dry, temperate conditions to prevent freezing or damage.
- B. Lifting and material handling equipment shall be used as necessary to handle equipment and materials used for cleaning procedures.

1.07 PROJECT CONDITIONS

- A. The interior of the building shall be kept dry and temperate to allow for implementation of cleaning procedures according to these Specifications.

PART 2: PRODUCTS

2.01 HOT WATER HIGH PRESSURE WASHER

- A. It is anticipated that a hot water high pressure washer will be used to complete cleaning of hard surfaces on the interior of the building.
- B. Hot water high pressure washers shall be in good working condition and capable of sustaining continuous run time of at least 10 hours, except for brief downtime periods for refueling and assessing cleaning progress.
- C. Hot water high pressure washers used for the work shall be capable of providing water at a pressure of at least 3500 psi and a temperature of 125 degrees Fahrenheit.
- D. Exhaust from hot water high pressure washers shall be piped outside of the building to prevent exhaust emissions from accumulating in the Corrective Action Area, or the hot water pressure washer shall be staged in a manner that directs exhaust outside of the building.

2.02 CLEANING AGENT

- A. It is anticipated that use of a cleaning agent will be necessary to clean hard surfaces that are heavily impacted with hardened residue.
- B. Cleaning agents shall be DynaChem-500 or Engineer approved equivalent.



2.03 SOURCE WATER

- A. Source water used for cleaning activities shall be from the Village of North Bennington Fire Department.
- B. Contractor shall transport water from the Bennington Fire Department to the building and provide adequate storage at the building for water needed for cleaning activities.
- C. Use of source water shall be limited to 20,000 gallons. Two frac tanks, with the approximate capacity of 20,000 gallons, are currently on-site and can be used by the Contractor at no additional cost.

PART 3: EXECUTION

3.01 INTERIOR BUILDING CLEANING

- A. Soft surfaces, insulation, and asbestos containing material shall be removed according to Section 02 41 19 – Selective Structure Demolition and Section 02 82 33 – Removal and Disposal of Asbestos Containing Materials, respectively.
- B. Waste generated from Selective Structure Demolition and Interior Building Cleaning shall be managed according to Section 02 61 10 Waste Handling, Transportation, and Disposal.
- C. Water generated during cleaning activities should be managed and treated in accordance with Section 02 61 10 Waste Handling, Transportation, and Disposal.
- D. Contractor shall install barriers around the process sewer sump (Sump01) that discharges to manhole SMH-5 and around the active cleaning areas to prevent discharge of cleaning fluids
- E. Contractor shall designate subject areas within the Corrective Action Area targeted for cleaning. Subject areas will be less than 400 square feet in area and consist of a single building material type (e.g. concrete floor, corrugated metal wall, or steel I-beam). The Corrective Action Area will be divided into discrete subject areas to be used to verify if cleaning is complete. Contractor shall document the dimensions of the subject areas.
- F. Spraying areas with water from a hot water high pressure washer shall be the primary means of cleaning hard surfaces on the building interior.
- G. Water shall be sprayed at an approximately 90° angle to the surface being cleaned and from a distance of approximately 1 to 2 feet from the surface.
- H. Cleaning shall be conducted in a manner to allow for collecting water and solids generated from cleaning activities.



- I. Cleaning shall be conducted in a manner that prevents run-off or spraying of cleaning water onto clean subject areas and prohibits solid debris generated during cleaning activities from contacting clean subject areas.
- J. Contractor shall notify Engineer if cleaning agents are needed in specific subject areas to meet the requirements of these Specifications. Engineer will evaluate progress of cleaning in the specified area and notify Contractor if proceeding with the use of a cleaning agent is acceptable.
- K. Subject areas will be considered clean when the subject area meets the requirements of the visual inspection specified in Section 3.02 below.
- L. Contractor shall notify Engineer when Contractor believes cleaning is complete in a subject area.
- M. Contractor shall supply temporary lighting, along with power source for the lighting, around the subject area to allow for visual inspection by Engineer in well-lit conditions as determined by the Engineer.
- N. Engineer will inspect subject areas according to procedures in these Specifications and notify Contractor if the subject area is clean or if additional cleaning is needed to meet the requirements of these Specifications.

3.02 VISUAL INSPECTION PROCEDURES

- A. Engineer will inspect subject areas after being notified by Contractor that cleaning is complete in the given subject area.
- B. Engineer will inspect the subject area for surface residues, hardened globules, or surface staining. Engineer will assign the subject area one of the following categories:
 - 1. No further action required. Engineer identifies de minimus residues, globules, or surface staining consistent with post-cleaning observations from bench-scale testing.
 - 2. Additional corrective action required. Engineer identifies residues, globules, or surface staining remaining on the subject area.
 - a. Contractor shall assess the means and methods to finish cleaning at each subject area following visual inspections.
 - b. Contractor can propose alternative cleaning approaches for subject areas that require additional corrective action following two visual inspections.
- C. Engineer will photograph the subject area to document conditions.
- D. Contractor shall maintain access to subject areas for visual inspection by VTDEC for a minimum of one week following visual inspection by Engineer.
- E. Engineer will maintain a record of the progress of each subject area with dates listed for the following milestones:



1. Cleaning initiated
2. Engineer inspection – no further action
3. VTDEC inspection (if conducted)

END OF SECTION 02 41 21



SECTION 026110

REMEDIATION WASTE HANDLING, TRANSPORTATION, AND DISPOSAL

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Remediation waste handling, transportation, and disposal of all material generated from the interior building cleaning and selective structure demolition activities. Remediation waste includes: insulation, metal and plastic insulation facing, building materials removed during selective structure demolition, waste water, paint chips, solids generated during water treatment, and media used in water treatment.
- B. Related Requirements
 - 1. Section 024119 – Selective Structure Demolition
 - 2. Section 024121 – Interior Building Cleaning
 - 3. Section 028213 – Asbestos Abatement

1.03 REFERENCES

- A. The following are complete titles of references cited in this Section.
 - 1. Waste Characterization Analytical Results from Bench Testing of Cleaning Methods
 - 2. Chapter 12 of the Environmental Protection Rules: GROUNDWATER PROTECTION RULE AND STRATEGY, STATE OF VERMONT, Agency of Natural Resources, Department of Environmental Conservation, Adopted July 6, 2019

1.04 DESIGN REQUIREMENTS [NOT USED]

1.05 ACTION SUBMITTALS

- A. Water Management and Treatment Plan which must contain the following:



1. Equipment, means and methods for management of water from interior building cleaning activities.
 2. The design basis for the water treatment system proposed, including assumptions, basis for any filtration proposed, carbon selection, empty bed contact time, flow rate, surface loading rate, and compounds used to determine operational parameters of the treatment system, based on the Waste Characterization Results provided. Treated water will be reused during building cleaning. Treated water must meet the Vermont Groundwater Enforcement Standard of 20 parts per trillion for targeted PFAS prior to reuse.
 3. Process flow diagram for the proposed water treatment system, including material types, sizes, and manufacturer.
 4. The operation and maintenance plan for the water treatment system. The plan shall include operational data-tracking forms and any utility requirements for the system.
 5. A sampling plan that describes the sampling methods, sample ports, and proposed frequency of sampling.
 6. An estimate of volume of water generated during interior building cleaning activities and proposed water storage.
 7. A description of how water reuse will be coordinated to limit water use to 20,000 gallons.
 8. The proposed location for off-site disposal of water used for cleaning activities following completion of building cleaning activities.
 9. Description of management of solid waste generated from water treatment activities.
- B. Contractor shall submit treatment system operational data from each day of water treatment. Treatment operational data sheets shall be submitted the day following water treatment operations. This data shall include the average flow rate in gallons per minute, total flow, equipment inspection results, and outfall observations.
- C. Solid Waste Management Plan which must contain the following:
1. Methods for collecting and managing solid waste generated from interior building cleaning and selective structure demolition activities.
 2. Proposed disposal facility, including leachate collection and treatment methods, and the date and results of the last audit performed at the facility.
- D. Contractor shall submit all completed waste manifests and weigh tickets from disposal of waste at the approved disposal facility. Contractor shall organize the submittal such that each waste manifest is documented with the corresponding weigh ticket.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. All waste generated from cleaning activities shall be handled in accordance with all applicable local, state, and federal requirements.
- B. Waste generated from interior building cleaning and selective structure demolition activities shall be removed prior to final demobilization.

1.07 PROJECT CONDITIONS

- A. Water management and water treatment equipment shall be staged in an area and under conditions which prevent freezing of water and equipment.
- B. Contractor shall provide Owner any necessary waste characterization and waste manifest forms for signature prior to beginning the Work. Owner, or Owner through Engineer, will provide signed waste characterization and waste manifest forms to Contractor prior to disposal of material. Contractor shall be responsible for coordinating additional waste manifests with Owner, or Owner through Engineer, as needed during the Work. Waste manifests must be completed and signed for all material transported to the disposal facility. All waste manifests must be signed by Owner or designated/authorized representative.

PART 2: PRODUCTS

2.01 FRAC TANKS

- A. Two frac tanks, with the approximate capacity of 20,000 gallons, are currently on-site and can be used by the Contractor at no additional cost. The expectation is that the existing frac tanks will provide necessary storage capacity for the work. One frac tank is provided for storage of untreated water and the other frac tank is provided for storage of treated water. If additional water storage capacity is needed, Contractor shall propose their additional storage in the Water Management and Treatment Plan.

2.02 PUMPS AND PIPING

- A. Contractor shall provide pumps, piping, fittings, valves, and all ancillary materials and equipment (including associated power source) necessary to transfer water from frac tanks through the water treatment system and to the discharge location. Contractor shall size pumps to meet required flow rate, head, and pressure parameters of the water treatment system and Contractor-selected pipe/hose. Pumps shall be capable of handling suspended particles.

2.03 WATER TREATMENT SYSTEM

- A. Contractor shall provide a mobile water treatment system with the following components and characteristics:

1. Water treatment processes which are capable of meeting the Vermont Groundwater Enforcement Standard of 20 parts per trillion for targeted PFAS and providing water suitable for reuse with Contractor cleaning equipment.
2. Pressure gauges and sample ports at the influent and effluent, at a minimum; flow meter and totalizer at effluent; and piping manifolds, reducers, and other ancillary materials and equipment necessary for the operation, monitoring, and maintenance of the treatment system.
3. Impermeable spill containment around and under the treatment system. Pipe or hose connections and joints shall be within spill containment.
4. The system shall be capable of, or adaptable for, operation during adverse weather conditions and during any season.

PART 3: EXECUTION

3.01 SOLID WASTE DISPOSAL

- A. All solid waste generated from inside of the Corrective Action Area for interior building cleaning and selective structure demolition activities, including solid waste generated from water treatment activities (e.g., filters and spent water treatment media), shall be disposed at the approved disposal facility. The approved disposal facility shall be a permitted Resource Conservation and Recovery Act (RCRA) Subtitle C landfill with a leachate collection and treatment system capable of removing PFAS. The disposal facility must be approved by the Engineer prior to transport of any solid waste to the disposal facility.
- B. Contractor shall transport all waste in accordance with all local, state, and federal requirements.
- C. Copies of all waste manifests and weigh tickets from disposal of solid waste shall be provided to Engineer the day after disposal of the material.

3.02 ASBESTOS CONTAINING MATERIALS

- A. Asbestos containing materials shall be removed and disposed in accordance with Section 028213 of these Specifications. Asbestos containing materials shall be assumed to contain PFAS containing materials.

3.03 WATER GENERATED FROM CLEANING ACTIVITIES

- A. The Contractor will be limited to the use of 20,000 gallons of water for cleaning activities.
- B. Water generated during cleaning activities shall be collected, stored on-site, and treated prior to reuse. Following treatment of water, Contractor will be responsible for collecting verification samples to evaluate concentrations compared to Vermont Groundwater Enforcement Standard

of 20 parts per trillion for targeted PFAS. Contractor shall collect treated water characterization samples at a minimum rate of every 10,000 gallons of water.

- C. If sample concentrations are greater than Vermont Groundwater Enforcement Standard of 20 parts per trillion for targeted PFAS before discharge, then water shall be treated again and another verification sample collected and analyzed prior to reuse of the water.
- D. If sample concentrations are less than the Vermont Groundwater Enforcement Standard of 20 parts per trillion for targeted PFAS, then Contractor is allowed to reuse water for cleaning activities.
- E. Once cleaning activities are completed, Contractor shall characterize and dispose water at the approved disposal facility.

3.04 WATER TREATMENT SYSTEM SOLID WASTE

- A. It is anticipated that waste (e.g., spent activated carbon, sediment from frac tank, filters) will be generated from the water treatment process. Contractor shall characterize and dispose any solid waste generated from the water treatment system at the approved disposal facility.

3.05 CONSTRUCTION WASTE MANAGEMENT

- A. Waste not associated with corrective actions and generated outside of the Corrective Action Area (e.g., food scrapes, equipment packaging, etc.) will be considered construction waste and shall be containerized and managed separately from waste generated during corrective actions from within the Corrective Action Area.
- B. Disposal containers for construction waste shall be emptied as needed throughout construction and removed during demobilization activities.
- C. Construction waste shall be disposed at the approved permitted municipal waste disposal facility.

END OF SECTION 026110



SECTION 028213 - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 WORK UNITS

- A. Description/Scope of Work.
- B. Qualifications.
- C. Regulations and Reference Standards.
- D. Submittals.
- E. Notices and Permits.
- F. Medical Requirements.
- G. Training.
- H. Pre-construction Conference.
- I. Delivery and Storage.
- J. Temporary Utilities.

1.2 RELATED REQUIREMENTS

- A. NA

1.3 DESCRIPTION/SCOPE OF WORK

- A. The work covered by these specifications shall consist of furnishing labor, materials, tools, machines, equipment, testing, and notifications and associated fees necessary for the removal of the asbestos containing materials specified herein. Additionally, work required by these specifications includes transportation off-site of the removed ACM to an approved disposal facility; and personnel air monitoring and subsequent laboratory analysis. All ACM waste is assumed to contain PFAS materials also and shall be disposed of as such. Refer to Section 026110 – Waste Handling, Transportation, and Disposal for information related to handling, transportation, and disposal of PFAS containing waste.

This project includes the abatement of asbestos containing materials from the specific areas referenced on Project Drawings at the building located at 1030 Water Street in North Bennington, Vermont. Materials to be abated are listed below.

Corrective Action Work Area – To facilitate PFAS cleaning and remediation activity, approximately 1,220 linear feet of asbestos containing pipe insulation running vertically (in one corner), and horizontally (the majority of overall quantity is at ceiling height of approximately 24 feet). See approximate locations on Project Drawing C-102.

- B. The Contractor shall supply all labor, materials, services, insurance, permits, and equipment necessary to carry out the work in strict accordance with all applicable Federal, State, and Local regulations referenced in this section, and these specifications.
- C. The Owner's Representative is authorized to stop work if, in the judgment of the Owner's Representative, there is substantial non-compliance with the Contract Documents. Such stop work order shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been remedied. Standby time required to resolve the situation shall be at the Contractor's expense.
- D. Work areas in which removals of asbestos materials are taking place shall be maintained as outlined in all applicable regulations.
- E. All submittals and/or variances must be prepared, submitted and approved prior to commencement of work.

1.4 QUALIFICATIONS

- A. Abatement Contractors must be licensed as required by the Vermont Department of Health (VDOH) for the purpose of repairs, removal, encapsulation, enclosure, demolition, and maintenance of structures or components covered by or composed of asbestos containing materials (ACM) in accordance with the provisions of VSA Title 18, Chapter 26 (effective February 1987: Amended November 1995).
- B. Within three days after the opening of bids the Abatement Contractor shall submit the following to the Engineer and Owner:
 - 1. List of projects performed within the past two years, which are similar in scope, magnitude, and complexity.
 - 2. Names and addresses of air monitoring firms, asbestos waste transporter and asbestos waste disposal facility for the above project. Note: Asbestos waste disposal facility must be approved to accept PFAS containing waste.
 - 3. Proof that the Contractor and his employees are certified and/or licensed in accordance with all applicable federal, state and local regulations.
 - 4. A list of equipment that will be used in the performance of the work.
 - 5. The number of years engaged in asbestos work.
 - 6. An outline of the worker training course and medical surveillance program conducted by the Contractor.
 - 7. A basic procedures manual endorsed or authorized by the Contractor describing working procedures, equipment, type of decontamination facilities, respirator program, special removal techniques, etc.
 - 8. The name of and evidence that the project superintendent has completed an EPA, VDOH approved Contractor/supervisor certification course, or equivalent, and has a minimum of one year on-the-job training.
- C. Abatement Contractors shall secure and submit within three (3) days after the opening of Bids a notarized statement, signed by an officer of the company, concerning the following information:
 - 1. A record of any citations issued by Federal, State, Local regulatory agencies or consultants relating to asbestos abatement activity. Include projects, dates, and resolutions.
 - 2. A list of penalties incurred through non-compliance with asbestos abatement project specifications including liquidated damages (within the last two years), overruns in scheduled time limitations and resolutions.
 - 3. Situations in which an asbestos related contract has been terminated including projects, dates and reasons for terminations.
 - 4. A listing of any asbestos-related legal proceedings/ claims in which the Contractor (or employees scheduled to participate in this project) have participated or are currently involved. Include description of role, issue and resolution to date.
 - 5. Answer the question: "Has your firm or its agents been issued a Stop Work Order on any project within the last two years?" If "Yes" provide details as discussed above.

6. Documentation attesting to the Contractor's financial resources available to perform the project.

1.5 REGULATIONS AND REFERENCE STANDARDS

A. General Requirements

1. All work under this contract shall be done in strict accordance with all applicable Federal, State and Local regulations, standards and codes governing asbestos abatement and any other trade work done in conjunction with the abatement.
2. For products and procedures with reference to specified association, trade standards, and/or government regulations, comply with requirements of the standard and the regulations, except when more rigid requirements are specified or are required by applicable codes.
3. The date of the standard and/or regulations is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.
4. Copies of all standards, regulations, codes and other applicable documents including this specification and those listed in Item 1.5-B shall be available at the work site in the clean change area of the worker decontamination system or other area acceptable to the Owner's Representative.
5. Every Contractor shall maintain asbestos project records for at least 30 years pursuant to VSA Title 18, Chapter 26-4.3.1.
Each record shall include:
 - a. The name, address, social security number and asbestos certificate number of the asbestos project supervisor.
 - b. The location and description of the asbestos project.
 - c. The amount of asbestos containing material that was installed, removed, enclosed, applied, encapsulated or disturbed.
 - d. The asbestos project start and completion dates.
 - e. The name and address of the waste disposal site where the asbestos waste material was deposited or disposed of.
 - f. The name and address of any site used for interim storage of asbestos waste materials prior to final deposit or disposal.
 - g. The name and address of the asbestos waste material transporters.
 - h. The names, addresses, and social security numbers of all persons engaged in the asbestos project.
 - i. Any information on required Vermont State forms.

B. Specific Requirements

1. Vermont Statutes (VSA):
 - a. VSA Title 18, Chapter 26.
 - b. VSA Title 18, Chapter 26 – Alternatives to Work Procedures
 - c. Vermont Hazardous Waste Management Regulations (VHWMR).
2. Occupational Safety and Health Administrations (OSHA):
 - a. Title 29 Code of Federal Regulations (CFR) Section 1910.1001 - General Industry Standard for Asbestos.
 - b. 29 CFR Section 1910.134 - Respiratory Protection.
 - c. 29 CFR Section 1926.1101 - Construction Industry Safety and Health Standards for Asbestos.
 - d. 29 CFR Section 1910.2 - Access to Employee Exposure and Medical Records.
 - e. 29 CFR Section 1926.2 Hazard Communication.
 - f. 29 CFR Section 1926.1200 - Specifications for Accident Prevention Signs and Tags.
3. Environmental Protection Agency (EPA):
 - a. Title 40 CFR Part 61 Subparts A and M (Revised Subpart B) - National Emission Standards for Asbestos.
 - b. 40 CFR Part 61.146 - Standard for Demolition and Renovation: Notification Requirements.
 - c. 49 CFR 106, 107, 171-179, "The Transportation Safety Act of 1974, Hazardous Material Transportation Act".

4. American National Standards Institute (ANSI) Publications:
 - a. Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems.
 - b. Z88.2-80 - Practice for Respiratory Protection.
5. National Electrical Code latest edition.
6. All other applicable regulations in effect at the time the work is conducted.

1.6 SUBMITTALS

A. Asbestos Abatement Schedule

1. Submit to the Engineer prior to the start of work, a horizontal bar chart with separate bar for each material type in each building that shows the anticipated start and completion date of the abatement work in the particular building.
2. Update the schedule as necessary.

B. Shop Drawings

1. Submit to the Engineer prior to the commencement of work, shop drawings for layout and construction of decontamination enclosure systems, and barriers for isolation of the work area, location of waste disposal container system required by applicable regulations referenced in this Section.
2. Submit to the Engineer, prior to the commencement of work, shop drawings for service entrance panel, circuit breakers and ground rods, as applicable.

C. Submissions Prior to the Commencement of Work

1. Submit proof satisfactory to the Engineer that required permits, site location and arrangements for transport and disposal of asbestos containing waste materials have been made. Submit name of the disposal facility where asbestos is to be disposed of along with copy of the facility's operating permit indicating they are permitted to accept asbestos waste.
2. Submit documentation satisfactory to the Engineer that the Contractor's employees, including foreman, supervisors and any other company personnel or agents who may be exposed to airborne asbestos fibers or who may be responsible for any aspects of abatement activities, have received adequate training, in accordance with 29 CFR Part 1926.1101 and VSA Title 18, Chapter 26.
 - a. Submit the name, address and telephone number of the company or person that conducted the training.
 - b. Submit a copy of a valid contractor's training certificates and asbestos handling license pursuant to VSA Title 18, Chapter 26.
 - c. Submit a copy of each employee's training certificates and asbestos handling certificate, pursuant to VSA Title 18, Chapter 26.
 - d. Submit a copy of the supervisor's appropriate training certificates and asbestos handling certificate pursuant VSA Title 18, Chapter 26.
 - e. Submit certificates signed by each employee that the employee has received training in the proper handling of materials that contain asbestos; understands the health implications and risks involved, including the illness possible from exposure to airborne asbestos fibers; understands the use and limits of the respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment.
3. Submit a copy of required Asbestos Project Notification notices to the Engineer and Owner prior to submission to agencies, and final copy submitted to agencies.
4. Submit documentation from a physician that all employees or agents who may be exposed to airborne asbestos in excess of background level have been provided with an opportunity to be medically monitored to determine whether they are physically capable of working while wearing the respirator required without suffering adverse health effects. In addition, document that personnel have received medical monitoring as required in OSHA 29 CFR 1926.1101.
5. Submit a list of the Contractor's equipment available for asbestos work, including but not limited to negative air machines, type of respirator intended for use on the job, type "C" supplied air systems, scaffolding, decontamination facilities, disposable clothing, etc.

6. Submit manufacturer's certification that HEPA vacuums, negative pressure ventilation units and other local exhaust ventilation equipment conform to ANSI Z9.2-79. When rental equipment is to be used in abatement areas or to transport asbestos contaminated waste, a written notification concerning intended use of the rental equipment must be provided to the rental agency with a copy submitted to the Engineer.
7. Document NIOSH approvals for all respiratory protective devices utilized on site. Include manufacturer certification of HEPA filtration capabilities for all cartridges and filters.
8. Submit documentation of respirator fit-testing for all Contractor employees and agents who must enter the work area. This fit-testing shall be in accordance with qualitative procedures as detailed in the OSHA Construction Standard 29 CFR 1926.1101.
9. Submit detailed job-specific asbestos abatement plan of the work procedures to be used in the removal of materials containing asbestos prior to conducting the work. Such plan shall include a sketch showing the location, size, and details of asbestos control areas, location and details of the change rooms, layout and location of waste container pass-out airlock system, and locations of local exhaust equipment. The plan shall also include interface of trades involved in the construction, sequencing of asbestos-related work, disposal plan, type of wetting agent to be used, respirators, protective equipment, pressure differential monitoring device, and a detailed description of the method to be employed in order to control air emissions, emergency procedures for fire and medical emergencies, and emergency procedures for the failure of seals.
10. Submit the name and experience record of both the superintendent and foreman. Include evidence of knowledge of applicable regulations; evidence of participation in and successful completion of EPA approved training course in asbestos removal and/or supervision of asbestos related work, and experience with asbestos related work in a supervisory position.
11. Submit MSDS's for all material to be used.
12. Submit name of the independent testing laboratory who will analyze the personal air samples, along with testing laboratory's asbestos license, asbestos analytical certificates, and employee training certificates.
13. Submit the name of the transporter that will be transporting the asbestos containing wastes and submit a copy of Vermont Hazardous Waste Management Regulations (VHWMR) transporter permit.
14. Submit example of completed waste transportation and disposal document (asbestos waste disposal document) of how asbestos waste will be transported and disposed of.

D. Submissions During Asbestos Abatement Activities

1. Submit weekly (or as otherwise required by the Engineer) job progress reports detailing abatement activities. Include review of progress with respect to previously established milestones and schedules, major problems and action taken, injury reports, equipment breakdown and personal air sampling results.
2. Submit copies of all transport manifests, trip tickets and disposal receipts signed by disposal facility for all asbestos waste materials removed from the work area during the abatement process.
3. Submit daily, copies of work site entry log books with information on worker and visitor access and any other significant events which occur during the project.
4. Post in the clean room of the worker decontamination enclosure a list containing the names, addresses, and telephone numbers of the Contractor, the Building Owner, the Engineer, the Asbestos Project Officer, the General Superintendent, the Air Sampling Professionals, the Testing Laboratory and any other personnel who may be required to assist during abatement activities.
5. Submit to Owners Representative results of personal air monitoring for asbestos.

1.7 NOTICES AND PERMITS

A. The Contractor shall provide notification of intent to work on ACM and distribute it as indicated below.

1. At least 10 days prior to beginning work on the asbestos containing materials, send written notification to the Environmental Protection Agency, National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Coordinator, EPA Region 1, 5 Post Office Square, Suite 100, Boston, MA 01219-3912, in accordance with 40 CFR 61.22 (d)(2).

2. At least 10 days prior to beginning work on the asbestos containing materials, send written notification to the Vermont State Department of Health according to the requirements of VSA Title 18, Chapter 26.
 3. Prior to beginning work on the ACM, conduct notifications required by VSA Title 18, Chapter 26.
 4. Obtain applicable permits as required by the local Municipality.
 5. Submit copies of notices to Engineer and Owner.
- B. The notifications shall include the following information at a minimum:
1. Name and Address of Property Owner.
 2. Name and address of removal contractor.
 3. Address and description of the building, including its size and age, amount, in cubic feet, of friable asbestos material to be removed, and the nature of contract work.
 4. Scheduled starting and completion dates for removal.
 5. Procedures that will be employed to comply with EPA regulations.
 6. The name and address of the waste disposal site where asbestos wastes will be deposited.
- C. A separate VDOH notification is required for each building.
- D. Contractor shall possess or obtain an annual "industrial waste hauler permit" specifically for asbestos-containing materials, pursuant to Vermont Hazardous Waste Management Regulations (VHWMR) for transporting of waste asbestos-containing materials to a disposal site or hire a transporter who has the required permits. Asbestos-containing waste materials to be transported shall be packaged in accordance with Environmental Protection Agency and Vermont and US Department of Transportation requirements and as specified herein.
- E. Consult with the local fire/rescue department in the preparation of the Emergency Procedures Plan for fire and medical emergencies. Notify the local fire/rescue department seven (7) days prior to the start of asbestos removal work. Notification shall also be made when the asbestos removal work is complete. Submit copies of notices to Engineer and Owner.
- F. The contractor must display a valid VDOH asbestos handling license pursuant to VSA Title 18, Chapter 26.
- G. The contractor must have and submit proof upon request that any persons employed by the contractor to engage in or supervise work on any asbestos project have the required certificates pursuant to VSA Title 18, Chapter 26.

1.8 MEDICAL REQUIREMENTS

- A. Before exposure to airborne asbestos fibers, provide workers with a comprehensive medical examination as required by 29CFR 1910.1001, and 29 CFR 1926.1101. This examination is not required if adequate records show the employee has been examined as required by 29 CFR 1926.1101 within the past year. The same medical examination shall be given on an annual basis to employees engaged in an occupation involving asbestos fibers and within 30 calendar days before or after the termination of employment in such occupations. Specifically identify x-ray films of asbestos workers to the consulting radiologist and mark medical record jackets with the word "ASBESTOS".
- B. As required by 29 CFR 1926.1101 maintain complete and accurate records of employees' medical examinations for a period of 30 years after termination of employment and make records of the required medical examinations available for inspection and copying to: The Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National Institute for Occupational Safety and Health (NIOSH), authorized representatives of either of them, and an employees physician upon the request of the employee or former employee.

- C. Removal Contractor shall furnish the Owner evidence of his firm's medical surveillance program required under 29 CFR 1926.1101.

1.9 TRAINING

- A. Within 3 months prior to assignment to asbestos work, instruct each employee, under the direction of an Industrial Hygienist (IH) with regard to the hazards of asbestos, safety and health precautions, and the use and requirements of protective clothing and equipment. Fully cover engineering and other hazard control techniques and procedures.
- B. Establish a respirator program as required by ANSI Z88.2 and 29 CFR 1910.134, and 29 CFR 1926.1101. Provide respirator training and fit-testing under IH direction. Removal Contractor shall submit to the Owner proof of respirator-training and fit-testing and a description of his firm's respiratory program required under 29 CFR 1926.1101.

1.10 PRECONSTRUCTION CONFERENCE

- A. Prior to start of preparatory Work under this contract, the Removal Contractor may be required to attend a pre-construction conference and walk-through attended by Owner, Architect/Engineer and Air Monitoring and Testing Laboratory's representative.
- B. Agenda for this conference will include but not necessarily be limited to:
 - 1. Contractor's scope of Work, Work plan and schedule.
 - 2. Contractor's safety and health precautions including protective clothing and equipment and decontamination procedures.
 - 3. Contractor's Work procedures including: Methods of job site preparation, wetting agents and procedures, and removal methods; respirator procedures; procedures for decontaminating the objects in the "decontamination and abatement" sections, methods of handling removed material and disposal procedures; cleanup procedures and equipment; signs and labels; fire exists and emergency procedures.
 - 4. Contractor's plan for 24 hour job security both for prevention of theft and for barring entry of curious but unprotected personnel into Work areas.
 - 5. Temporary utilities.
 - 6. Handling of moveable objects.
 - 7. Documentation of compliance with environmental laws and standards.
 - 8. Storage of removed Asbestos Containing Material.

1.11 DELIVERY AND STORAGE

- A. Deliver all materials to the job site in original packages with containers bearing manufacturer's name and label.
- B. Store all materials at the job site in a suitable and designated area. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover. Protect materials from unintended contamination.
- C. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris as herein specified.

1.12 TEMPORARY UTILITIES

- A. Provide temporary electric service with Ground Fault Circuit Interrupters (GFCI) for all electric requirements within the asbestos work area. Provide temporary wiring and "weatherproof" receptacles in sufficient quantity and location to serve all, HEPA vacuum equipment, negative air pressure equipment, tools and air monitoring equipment. The temporary power installation shall conform with the National Electrical Code and all local and state requirements.
- B. Provide temporary lighting with "weatherproof" fixtures for all Work areas including decontamination chambers.
- C. All temporary devices and wiring used in the Work area shall be capable of decontamination procedures including HEPA vacuuming and wet-wiping.
- D. The Contractor will be responsible for providing his own source of temporary valved hot and cold water.

PART 2 - PRODUCTS

2.1 WORK UNITS

- A. Respirators.
- B. Protective Clothing.
- C. Signs and Labels.
- D. Log Books.
- E. Scaffolding.
- F. Chemical Penetrant (Amended Water).
- G. Disposal Bags, Drums, and Storage Bags.
- H. HEPA-Vacuum Equipment.
- I. Power Tools.

2.2 RESPIRATORS

- A. Select respirators from those approved by the Mine Safety and Health Administration (MSHA), and the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.
- B. Respirators shall be fit-tested to personnel by an Industrial Hygienist. Fit-tested respirators shall be permanently marked to identify the individual fitted, and use shall be limited to that individual.
- C. The Contractor shall supply appropriate respirator protection as specified in Table 1 of Paragraph (h) (2) (iii) of 29 CFR Part 1926.1101; and shall ensure that the employees use the respirator needed.
- D. No respirators shall be issued to personnel without such personnel participating in a respirator training program.

- E. High Efficiency Particulate Air (HEPA) respirator filters shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101.
- F. A Storage area for respirators shall be provided by the contractor on the clean room side of any established decontamination chamber where they will be kept in a clean environment.
- G. The Contractor shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day. Filters will be removed and discarded during the decontamination process. Filters cannot be reused. Filters must be changed if breathing becomes difficult.
- H. Filters shall be changed at a minimum of once per day, or as necessary.
- I. Respirator filters shall be stored at the project site in the change room of each work area and must be protected from asbestos exposure prior to use.
- J. Where not in violation of NIOSH and OSHA requirements the contractor shall provide the following minimum respiratory protection to the maximum use concentrations indicated:

<u>OSHA/NIOSH Approved Respiratory Protection</u>	<u>Maximum use Concentrations</u>
Half Mask Air Purifying with HEPA Filters	0.1 f/cc
Full face Air Purifying HEPA filters and quantitative fit test	0.5 f/cc
OSHA/NISH Approved	Maximum Use
Powered air purifying (PAPR)	0.25 f/cc
Supplied Air, Continuous Flow, full face piece, HEPA filter	0.5 f/cc
Full face piece supplied air, pressure demand	10 f/cc
Full face piece, supplied air, pressure demand, with Aux. SCBA, pressure demand or continuous flow	>10 f/cc or unknown concentration

- K. The Contractor shall provide a full-face supplied air respirator operated in the pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus for all employees within the regulated area where Class 1 work defined in 29 CFR Part 1926.1101 is being performed for which a negative exposure assessment has not been produced. Class 1 work is activities involving the removal of thermal system insulation and surfacing asbestos containing material.

2.3 PROTECTIVE CLOTHING

- A. Provide personnel exposed to airborne concentrations of asbestos fibers with fire retarding disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.
- B. Provide sufficient quantities of protective clothing to assure a minimum of four (4) complete disposable outfits per day for each individual performing abatement work.

- C. Eye protection and hard hats shall be provided and made available for all personnel entering any work area.
- D. Authorized visitors
 - 1. The Owner, any representative of the Owner, any party contracting for services on an asbestos project, insurance appraisers or inspectors, utility company representatives, the Commissioner or his/her agents, or any regulatory or other agency having jurisdiction over the project shall be considered an authorized visitor.
 - 2. Authorized visitors shall be provided suitable protective clothing, headgear, eye protection and footwear whenever they are required to enter the work area.
 - 3. The contractor shall have at least two additional Powered Air Purifying Respirators stored on site designated for authorized visitors emergency use only. Appropriate respirator filters for authorized visitors shall be made available by the Contractor.

2.4 SIGNS AND LABELS

- A. Provide danger signs and barrier tapes at all approaches to asbestos control Work areas. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide asbestos danger labels affixed to all asbestos materials, scrap, waste, debris and other products contaminated with asbestos.
 - 1. Provide danger signs in vertical format conforming to 29 CFR 1926.1101 (k)(l), minimum 20" x 14" displaying the following legend in the lower panel:

DANGER
ASBESTOS

CANCER AND LUNG DISEASE
HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORS AND PROTECTIVE
CLOTHING ARE REQUIRED IN THIS
AREA

- 2. Provide pressure-sensitive asbestos DANGER labels of sufficient size to be clearly legible, displaying the following legend:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE

HAZARD

- 3. Provide the following pressure sensitive asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172:

For white asbestos (Chrysotile, Actinolite, Anthophyllite, Tremolite):

RQ HAZARDOUS
SUBSTANCE
WHITE ASBESTOS
CLASS 9 UN2590

For blue asbestos (Crocidolite) or brown asbestos (Amosite):

RQ HAZARDOUS
SUBSTANCE
BLUE ASBESTOS OR BROWN ASBESTOS
CLASS 9 UN2212

4. Provide a pressure sensitive label, of sufficient size to be clearly legible, stating the name of the waste generator and the location at which the waste was generated, for display on all waste containers to be transported off-site, pursuant to 40 CFR Part 61.150.
5. Provide 3" wide yellow barrier tape printed with black lettered "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos work area. Install tape 3' to 4' above finished floor.
6. Provide log-in sign at entrance to clean room. Sign shall be a minimum 12" x 12" in 1 inch Sans Serif Gothic or Block letters with legend:

ALL PERSONS ENTERING WORK AREAS ARE REQUIRED TO SIGN IN

2.5 LOG BOOK AND PROJECT RECORD KEEPING

- A. Provide a permanently bound log book of minimum 8-1/2" x 11" size. Log book shall contain on title page the project name, name, address and phone number of Owner; name, address and phone number of Engineer; name, address and phone number of Abatement Removal Contractor; name, address and phone number of Contractor's Industrial Hygienist; emergency numbers including, but not limited to local Fire/Rescue department. Log book shall contain a list of personnel approved by the Industrial Hygienist for entry into the Work area and shall contain copies of all MSDS sheets.
- B. All entries into the log shall be made in non-washable, permanent ink and such pen shall be strung to or otherwise attached to the log to prevent removal from the log-in area. Under no circumstances shall pencil entries be permitted.

2.6 SCAFFOLDING

- A. Provide all scaffolding and/or staging as necessary to accomplish the Work of this Contract. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA construction industry standards.

2.7 CHEMICAL PENETRANT (AMENDED WATER)

- A. Wet all asbestos-containing materials prior to removal with chemical penetrant mixed and applied in accordance with manufacturer's printed instructions.
- B. Approved Manufacturer:
 1. Arpin Products Co., Inc.
 2. Aquatrols Corp., Aqua-Gro Asbestos Wet
 3. Aramsco Co.

Or an approved equal.

2.8 DISPOSAL BAGS, DRUMS, AND STORAGE BAGS

- A. Provide clear or yellow 6 mil linear polyethylene disposal bags printed with asbestos caution labels. Bags shall be sized to fit within sealable drums for transport to an approved disposal site.

2.9 HEPA VACUUM EQUIPMENT

- A. All dry vacuuming performed under this contract shall be performed with High Efficiency Particulate Absolute (HEPA) filter equipped industrial vacuums conforming to ANSI Z9.2.
- B. Provide tools and specialized equipment including scraping nozzles with integral vacuum hoods connected to a HEPA vacuum with flexible hose.

2.10 POWER TOOLS

- A. Any power tools used to drill, cut into, or otherwise disturb asbestos material shall be equipped with HEPA filtered local exhaust ventilation.

PART 3 - EXECUTION

3.1 WORK UNITS

- A. General Requirements.
- B. Work Area Entrance and Exit Procedures.
- C. Personal Decontamination Enclosure Systems.
- D. Work Area Preparation.
- E. Negative Air Pressure Systems.
- F. Waste Decontamination Enclosure System.
- G. Equipment and Waste Container Decontamination and Removal Procedures.
- H. Post Abatement Cleanup Procedures.
- I. Air Monitoring and Testing.
- J. Personal Air Monitoring.

3.2 GENERAL REQUIREMENTS

- A. Perform asbestos related work in accordance with VSA Title 18, Chapter 26, CFR 61, 29 CFR Part 1910.1001, 29 CFR 1926, the procedures and conditions of any approved VSA Site Specific Variances,

as specified herein. Where more stringent requirements are specified, the Contractor will adhere to the more stringent requirements.

- B. Should the area beyond the asbestos work area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, immediately institute emergency procedures. Contaminated non-work areas shall be isolated and decontaminated in accordance with procedures established for asbestos removal. All costs incurred in decontaminating such non-work areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.
- C. Medical approval and certificates of training shall be on file prior to admittance of any individual to the asbestos control work area. Individuals approved for entry into the work area shall be listed in the log book and sign in prior to entry.
- D. Prior to start of asbestos abatement work, shut down and lock out the electrical service to the work area. Provide temporary electric as specified herein.
- E. Perform all asbestos removal work using wet removal procedures. Mix and apply chemical penetrant in accordance with manufacturer's written instructions. Dry removal procedures are not permitted. Mix surfactant amended water in accordance with manufacturer's instructions for all water used in wet-wiping clean-up operations.
- F. Work procedures pertaining to work area entrance and exit procedures, personal decontamination enclosure systems, work area preparation, negative air pressure systems, handling and removal procedures, waste decontamination enclosure systems, equipment and waste container decontamination, removal procedures and post abatement clean-up procedures delineated in Section 3.3 to 3.10 may be superseded by work procedures required by VSA Title 18, Chapter 26 - Alternatives to Work Practices.

3.3 WORK AREA ENTRANCE AND EXIT PROCEDURES

- A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved as determined by the Engineer:
 - 1. All persons shall enter and exit the work area through the personal decontamination enclosure system. All persons who enter the work area or an enclosure shall sign the entry/exit log, located in the clean room, upon every entry and exit.
 - 2. All persons, before entering the work area, or an enclosure shall read and be familiar with all posted regulations, personal protection requirements, including work area entry and exit procedures, and emergency procedures. The entry/exit log headings shall indicate, and the signatures shall be used to acknowledge that these have been reviewed and understood by all persons prior to entry.
 - 3. All persons shall proceed first to the clean room, remove all street clothing, store these items in clean sealable plastic bags or lockers and don protective whole body clothing, head covering, foot covering and gloves. Use tape to secure sleeves at the wrists and to secure foot coverings at ankles. All persons shall also don OSHA/NIOSH approved respiratory protection. Respirators shall be inspected prior to each use and tested for proper seal using quantitative or qualitative fit checks.
 - 4. Persons wearing designated personal protective equipment shall proceed from the clean room through the shower room to the equipment room, where necessary tools are collected and any additional clothing shall be donned, before entry into the work area.
 - 5. Before leaving the work area, all persons shall remove gross contamination from the outside of respirators and protective clothing by brushing, wet cleaning, and/or HEPA vacuuming.
 - 6. Persons shall proceed to the equipment room, where all coveralls, head covering, foot covering and gloves shall be removed. Disposable clothing shall be deposited into labeled containers for disposal. Reusable contaminated clothing, footwear, head gear and gloves shall be stored in the equipment room when not being used in the work area. Authorized visitors shall not remove respirators during this process.

7. Still wearing respirators, persons shall proceed to the shower area, clean the outside of the respirator and the exposed face area under running water prior to removal of the respirator, and then fully and vigorously shower and shampoo to remove residual asbestos contamination. Respirators shall be washed thoroughly with soap and water. Some types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection shall be disconnected in the equipment room and worn into the shower. A powered air-purifying respirator face piece shall be disconnected from the filter/power pack assembly prior to entering the shower.
8. After showering and drying, all persons shall proceed to the clean room and don clean personal protective equipment before returning to the work area or street clothing if exiting the enclosure.

3.4 PERSONAL DECONTAMINATION ENCLOSURE SYSTEM

Note that the requirements of this section include work beyond what is required by VSA Title 18, Chapter 26. Contractor shall comply with VSA Title 18, Chapter 26 and the requirements of this section.

- A. Enclosure: Personal decontamination enclosure systems shall be provided outside and attached to all locations where persons will enter or exit the work area (**except where remote Personal decontamination enclosure systems are allowed**). Such systems may consist of existing rooms outside of the work area, if the layout is appropriate, that can be enclosed in plastic sheeting and are accessible from the work area. When this situation does not exist, enclosure systems may be constructed out of metal, wood or plastic support. When this area is located outside the structure, and exposed to the weather, the enclosure shall be constructed in accordance with this section and made weather tight.
- B. Rooms and Configuration: The personal decontamination enclosure system for a large project (>260 L.F. or >160 S.F.) shall consist of a clean room, a shower room, and an equipment room, in series, separated from each other and from the work area by three airlocks. For a small project (>25 and <260 L.F. or >10 and <160 S.F.) it shall consist of at least a shower room and a clean room separated from each other by an air lock and from the work area and other areas by curtained doors.
 1. Clean Room: In this room, persons remove and leave all street clothes and put on clean disposable coveralls. Approved respiratory protection equipment is also picked up in this area. **No asbestos contaminated items are permitted in this room.**
 2. Shower Room: This is a separate room used for transit by cleanly dressed people entering the job site from the Change Room and for showering by them after they have undressed in the Equipment Room. **This is a contaminated area.**
 3. Equipment Room: Work equipment, footwear, and all other contaminated work clothing are left here. This is a change and transit room for people. All areas between the Shower Room and Work Area shall be considered part of the Equipment Room. Plastic floor and wall covering is required. **This is a contaminated area.**
- C. Showers: There shall be one shower per six full shift abatement persons calculated on the basis of the largest shift.
- D. Enclosure Security: When the personal decontamination enclosure system is situated near an area of public access, it shall be fully framed, sheathed for safety and constructed to prevent unauthorized entry.
- E. Plastic Sheeting: Personal decontamination enclosure systems constructed at the work site shall utilize at least six mil opaque fire retardant plastic sheeting. At least two layers of six mil reinforced fire retardant plastic sheeting shall be used for the flooring of this area.
- F. Clean Room: The clean room shall be sized to accommodate all authorized persons. Benches and hooks shall be provided for street clothes. Shelves for storing respirators shall also be provided. Clean clothing, replacement filters for respirators, towels and other necessary items shall be provided. The clean room shall not be used for the storage of tools, equipment or materials. It shall not be used for office space. A

lockable door shall be provided to permit access to the clean room from outside the work area or enclosure. It shall be used to secure the work area and decontamination enclosure during off-shift hours.

- G. Shower Room: The shower room shall contain one or more showers. Each shower head shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. Uncontaminated soap, shampoo and towels shall be available at all times. Shower water shall be drained, collected and filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.
- H. Equipment Room: The equipment room shall be used for the storage of equipment and tools after decontamination using a HEPA filtered vacuum and/or wet cleaning. A one day supply of replacement filters, in sealed containers, for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers or surfactant and other materials and equipment that may be required during the abatement project may also be stored here. A walk-off pan filled with water shall be located in the work area just outside the equipment room for persons to clean foot coverings when leaving the work area. A drum lined with a labeled, at least six mil plastic bag for collection of clothing shall be located in this room. Contaminated footwear and work clothes shall be stored in this area.

3.5 WORK AREA PREPARATION

- A. The work area shall be vacated by the occupants prior to work area preparation and until satisfactory clearance air monitoring results have been achieved. **Personal protection shall be worn and proper decontamination procedures shall be followed during the work area preparation.**
- B. Caution signs shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure. Caution signs shall include the following information: "DANGER, ASBESTOS, CANCER AND LUNG DISEASE HAZARD, AUTHORIZED PERSONNEL ONLY, RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA".
- C. Electric Power: Shutdown and lockout electric power to all work areas. The Contractor shall provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through a ground-fault circuit interrupter at the source.
- D. The heating, ventilating, and air conditioning (HVAC) system shall be shutdown and isolated to prevent asbestos contamination and dispersal to other areas of the building or structure.
- E. The personal decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.
- F. Movable objects within the work area shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning, removed prior to asbestos abatement or covered with 2 layers of at least 6 mil fire retardant polyethylene sheeting and sealed with tape. Fixed objects within the work area shall be covered with 2 layers of at least 6 mil fire retardant polyethylene sheeting and sealed with tape.
- G. Pre-cleaning: The work area shall be cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Asbestos material shall not be disturbed during pre-cleaning.

- H. Isolation Barriers - General: Isolation barriers shall be constructed that seal off all openings including but not limited to windows, corridors, doorways, skylights, ducts, grills, diffusers, and other penetrations of the work area during removal of asbestos materials, unless specified otherwise. The isolation barriers shall be constructed using two *independent* layers of at least six mil fire retardant plastic sheeting sealed with tape. Also, all seams in system components that pass through the work area shall be sealed. Doorways and corridors which shall not be used for passage during work shall also be sealed. Isolation barriers shall remain in place until acceptable clearance air monitoring results have been obtained as reviewed and approved by the Engineer.
- I. Isolation Barriers - Specific: Separation of the work area from the remainder of the work site by construction of isolation barriers shall be performed unless specified otherwise.
1. Wall Construction: Walls shall be constructed of wood or metal framing to support barriers in all openings larger than thirty-two square feet, except where any one dimension is one foot or less.
 2. Sheathing Thickness: A sheathing material of a least three-eighths inch thickness shall be applied to the work side of the barrier.
 3. Sealing of Partitions: Edges of the partition shall be caulked at the floor, ceiling, walls and fixtures to form an airtight seal, where applicable.
 4. Plastic Sheeting: The work area side of the partition shall be covered with a double layer of at least six mil (opaque) fire retardant plastic sheeting with staggered joints and sealed.
 5. Plasticizing/Sealing: All floor, wall and ceiling surfaces shall be covered with a minimum of two layers of at least six mil fire retardant plastic sheeting. The floor shall be plasticized first and its plastic sheeting shall extend up the walls a distance of at least twelve inches on all sides. The walls shall be plasticized by applying plastic sheeting from ceiling to floor, thus overlapping the floor sheeting by at least twelve inches. This process shall be repeated for the second layer of plastic sheeting for the floor and walls. All seams within a layer shall be separated by a distance of at least six feet and sealed air tight. All seams between layers shall be staggered.
 6. After isolation barriers are in place, objects such as light fixtures, electrical track, alarm systems, ventilation equipment and other items not previously sealed, shall be removed and HEPA vacuumed. Localized HEPA filtered vacuum equipment shall be used during fixture removal to reduce asbestos dispersal.
 7. Isolation barriers shall remain in place until acceptable clearance air monitoring results have been obtained as reviewed and approved by the Engineer.
- J. Exits: Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes. Emergency procedures shall have priority. Emergency exits shall be clearly marked inside the containment and shall remain unlocked during working activities.

3.6 NEGATIVE AIR PRESSURE SYSTEM

- A. Negative air pressure equipment shall be utilized within all the work areas as required by the referenced regulations and VSA Variances.
- B. The negative air pressure equipment shall operate continuously, twenty-four hours a day, from the start of the abatement work through the cleanup operations and clearance air monitoring.
- C. A negative air pressure, relative to areas outside of the enclosure, shall be maintained at all times in the work area during the asbestos abatement work to ensure that contaminated air in the work area does not escape into an uncontaminated area. Provide a manometer-type or magnetic-type pressure differential monitor with minor scale divisions of 0.02 inch of water and accuracy within plus or minus one percent. Calibrate the manometer daily as recommended by the manufacturer. Furnish manually recorded readings of the pressure differential between locations in the asbestos control area and adjacent areas at the beginning of each workday and every 2 working hours thereafter. Pressure differential readings shall be taken at several points inside the asbestos control area including the furthest point from the negative air pressure equipment. A minimum of -0.02 column inches of water pressure differential, relative to outside pressure shall be maintained as evidenced by manometric measurements.

- D. If more than one primary ventilation unit is installed, the units shall be turned on one at a time and the integrity of wall barriers, for secure attachment or the need for additional reinforcement, shall be checked. Units connected in series shall be considered a single unit for this test. A minimum of one additional unit, having a capacity at least equal to that of the primary unit, shall be installed as a backup to be used during primary unit filter changing and upon primary unit failure.
- E. On electric power failure, abatement shall stop immediately and shall not resume until power is restored and exhaust units are operating fully. On extended power failure, longer than one hour, the decontamination facilities, after the evacuation of all persons from the work area, shall be sealed airtight, until notified by the Owner Representative and/or the State of Vermont, OSHA or EPA. The Contractor shall be responsible for providing emergency power in the event of a power failure in areas of work where the public may be exposed.
- F. Negative pressure ventilation equipment shall be installed and operated to provide at least four air changes in the work area every hour during removal and cleaning and two air changes every hour during clearance testing.
- G. Openings made in the enclosure system to accommodate these units shall be made airtight with tape and/or caulking. Where possible, only the intake and the filter access panel shall remain within the work area to permit filter changing, while minimizing equipment contamination and the likelihood of contamination of non-work areas.
- H. Negative pressure ventilation units shall be exhausted to the outside of the building or structure and away from occupied area. Proper installation, air monitoring and daily inspections shall be conducted to insure that the ducts do not release asbestos into uncontaminated area. Fans, ducts and joints shall comply with the following:
 - 1. Ducts: Ducts, of at least equivalent shape and dimension as that of the negative pressure ventilation exhaust, shall be used to exhaust to the outside of the building or structure.
 - 2. Airtight system: All fans, ducts and joints shall be sealed, braced and supported to maintain an airtight system.
- I. Exhaust location: At no time shall the negative pressure ventilation unit exhaust within 50 feet of a receptor or adversely affect the air intake of the building/structure or other buildings/structures.
- J. A Manometer shall be utilized during the abatement of any OSHA Class I Materials (TSI and Surfacing Materials). A minimum of -0.02 column inches of water pressure differential, relative to outside the work area, shall be maintained within the work area. Once installed and operational, (upon establishment of negative pressure) the Contractor shall document the manometer readings daily, twice per shift, and enter these readings into the Project Record.

3.7 HANDLING AND REMOVAL PROCEDURES

- A. Removal of asbestos containing materials in the building shall be performed in accordance with all applicable federal, state and local regulatory requirements, the proposed procedures and conditions of any Approved VSA Title 18, Chapter 26 – Alternatives to Work Practices.
- B. A waste decontamination enclosure system meeting the requirements of VSA Title 18, Chapter 26 shall be utilized. Upon completion of removal and cleaning, all surfaces shall be encapsulated.
- C. All work area preparation procedures including pre-cleaning shall be performed for all asbestos abatement work.
- D. The asbestos containing material shall be wetted frequently with amended water. Sufficient time shall be allowed for penetration to occur prior to abatement activities. All friable material shall be saturated prior to removal activities.

- E. Asbestos material on detachment from the substrate shall be directly bagged into at least 6 mil plastic bags that are labeled as follows:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

- F. After completion of all stripping work, surfaces from which asbestos material has been removed shall be HEPA vacuumed and/or wet cleaned. Clean up shall proceed as described in Paragraph 3.10 of this Section.
- G. All plastic sheeting, tape, cleaning material, clothing, and all other disposable material or items used in the work area shall be packed into sealable plastic bags (6 mil minimum) with danger labels.

3.8 WASTE DECONTAMINATION ENCLOSURE SYSTEM

Note that the requirements of this section include work beyond what is required by VSA Title 18, Chapter 26. Contractor shall comply with VSA Title 18, Chapter 26 and the requirements of this section.

- A. A waste decontamination enclosure system shall be utilized that consists of a washroom/clean room and a holding area. The washroom/cleanup room shall be constructed with an airlock doorway to the work area and another airlock doorway to the holding area. The holding area shall be constructed with an airlock doorway to the washroom/cleanup room and another lockable door to the outside.
- B. Where there is only one egress from the work area, the holding area of the waste decontamination enclosure system may branch off from the equipment decontamination room, which doubles as a waste washroom, of the personal decontamination enclosure.
- C. The washroom shall be equipped with a drain installed to collect water and deliver it to the shower drain where it shall be filtered in accordance with Item 3.4G of this Section. Waste shall be transferred only during times when the showers are not in use.

3.9 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION AND REMOVAL PROCEDURES

Note that the requirements of this section include work beyond what is required by VSA Title 18, Chapter 26. Contractor shall comply with VSA Title 18, Chapter 26 and the requirements of this section.

- A. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning (with a damp cloth) and/or HEPA vacuuming in the work area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. These work area persons shall not enter the airlock.
- B. These contaminated items shall be removed from the airlock by persons stationed in the washroom during waste removal operations. These washroom persons shall remove gross contamination from the exterior of their respirators and protective clothing by brushing, HEPA vacuuming and/or wet cleaning.
- C. Once in the waste decontamination enclosure system, external surfaces of contaminated containers and equipment shall be cleaned a second time by wet cleaning with a damp cloth.

- D. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated 6 mil (minimum) plastic bags or sheeting as the item's physical characteristics demand, and sealed airtight.
- E. The clean recontainerized items shall be moved into the airlock that leads to the holding area. The washroom persons shall not enter this airlock or the work area until waste removal is finished for that period.
- F. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from uncontaminated areas.
- G. The cleaned containers shall be held in the holding area pending removal. The containers shall be wet cleaned and/or HEPA vacuumed at least once each day. Danger labels with the following information shall be placed on the containers: "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD, BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM".
- H. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.
- I. Where the waste removal enclosure is part of the personal decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short-circuiting and cycling of air outward through the shower and clean room.
- J. Materials used to wipe down and clean the containers shall be handled as asbestos waste.

3.10 POST ABATEMENT CLEAN-UP PROCEDURES

- A. All accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pans, squeegees or shovels. Metal shovels shall not be used to pick up or move waste. HEPA vacuums shall be used to clean up all surfaces after gross clean up.
- B. All surfaces in the work area shall be first wet cleaned using rags, mops and sponges (i.e. first cleaning). To pick up excess liquid and wet debris (where applicable) a wet-purpose shop vacuum may be used and shall be decontaminated prior to removal from the work area.
- C. Cleanings, and asbestos settling times shall be performed in accordance with Vermont State Site-Specific and/or Applicable Variances. Windows, doors, HVAC system vents and all other openings shall remain sealed until satisfactory clearance results are achieved. Decontamination enclosure systems shall remain in place and be utilized.
- D. All containerized waste shall be removed from the work area and the holding area. All tools and equipment shall be removed from the work area and decontaminated.
- E. Clearance air monitoring, as per Paragraph 3.11 of this Section for air sampling and analysis, shall be conducted.
- F. After satisfactory clearance air monitoring results have been achieved, a thin coat of encapsulating agent shall be applied to all surfaces where the asbestos material was removed.
- G. The isolation barriers shall be removed only after satisfactory clearance air monitoring results have been achieved and encapsulation has been completed.

3.11 AIR MONITORING AND TESTING

Note that numbers of samples collected shall be per VSA Title 18, Chapter 26

- A. **Air monitoring will be performed by The Owner or its Representative in accordance with VSA Title 18, Chapter 26.** Air sampling shall be conducted by a **VT Asbestos Project Monitor Technician** who possesses an Asbestos Consultant Certificate issued by the Vermont State Department of Health. The Contractor is expected to fully cooperate with the testing firm.
- B. Passive air sampling shall be conducted prior to abatement, and aggressive air sampling shall be conducted after abatement is complete. Air sampling shall also be conducted during abatement as required by these specifications. Phase Contrast Microscopy (NIOSH Method 7400) is acceptable for analysis of air samples pre, during, and post abatement.
- C. The number of air samples required during abatement inside and outside the work area will depend on the size of the work area and shall meet the requirements of VSA Title 18, Chapter 26. The number of samples to be taken shall be approved by the Engineer prior to the start of the abatement work.
- D. If the Contractor's barriers or other control methods are observed to malfunction and if the Contractor does not correct the problems immediately upon notification, the **VT Asbestos Project Monitor Technician** shall inform the Owner or other authorized representative. In such a situation additional area sampling shall be performed by the independent air monitoring company. The Contractor shall be responsible for costs of the additional testing and analysis.
- E. The air samples shall be analyzed by a laboratory which holds certification by the Vermont State Department of Health's to perform asbestos analysis.
- F. The **VT Asbestos Project Monitor Technician** shall keep a record in a daily log of all on-site observations, and required activities of the Contractor.
- G. The **VT Asbestos Project Monitor Technician** must be on the job site at all times during the abatement work. No abatement or preparation work will occur without the presence of the **VT Asbestos Project Monitor Technician**.
- H. The **VT Asbestos Project Monitor Technician** shall perform a minimum of two inspections within each containment or work area daily.
- I. If the **VT Asbestos Project Monitor Technician** observes irregularities at any time, he/she shall document the observations and shall inform the Owner or other authorized representative having jurisdiction who shall issue a stop work order to the Contractor and have the work area secured until corrective actions have been taken.
- J. Post-Abatement Final Air Clearance Testing
 1. Within 48 hours after final clean-up and before removal of critical barriers, a final air test shall be performed. This test is required to establish safe conditions for removal of critical barriers and to permit reconstruction activity to begin. Sufficient time following clean-up activities shall be allowed so that all surfaces are dry during monitoring.
 2. Samplers shall be placed at random locations around the work area. If the number of rooms within the work area is equivalent to the number of required samples based on the floor area, a sampler shall be placed in each room. When the number of rooms is greater than the required number of samples, a representative sample of rooms shall be selected.
 3. For PCM finals, representative samplers placed outside the work area but within the building shall be located to avoid any air that might escape through the isolation barriers and shall be approximately 50 feet from the entrance to the work area and 25 feet from the isolation barriers.
 4. For TEM finals (IF REQUIRED), the samples shall be positioned at locations representative of the air entering the abatement site.

5. The following aggressive sampling procedures shall be used within the work area during all clearance air monitoring:
 - a. Before starting the sampling pumps use forced air equipment (such as a one horsepower leaf blower) to direct exhaust air against all walls, ceilings, floors, ledges and other surfaces in the work area.
 - 1) This pre-sampling procedure shall take at least five minutes per 1,000 square feet of floor area.
 - 2) At a minimum, place a 20-inch fan 3 feet above the floor in the center of the room. (Use one fan per 10,000 cubic feet of room space.) Place the fan on slow speed and point it toward the ceiling.
 - 3) Start the sampling pumps and sample for the required time or volume.
 - 4) Turn off the pump and then the fan(s) when sampling is complete.
6. Each homogeneous work area which does not meet the clearance criteria shall be thoroughly re-cleaned using wet methods, with the negative pressure ventilation system in operation. New samples shall be collected in the work area as described above. The process shall be repeated until the work site passes the test. Re-cleaning is the responsibility of the contractor and will not be considered for reimbursement.
7. For an asbestos project with more than one homogeneous work area, the release criterion shall be applied to each work area.
8. Preparation and analysis of area samples by PCM shall be by NIOSH Method 7400.
9. (If required) Preparation and analysis of area samples by TEM shall be done by the analysis method set forth in AHERA Regulation 40 CFR Part 763.
10. Clearance and/or Re-occupancy Criteria
 - a. The clearance criteria shall be applied to each homogeneous work area independently.
 - b. For PCM analysis, the clearance level of any work area shall be less than 0.01 f/cc, or the background level, whichever is greater.
 - c. For TEM analysis, the clearance criteria is the average concentration of asbestos on the five Work Area Samples does not exceed the filter background level of 70 structures per square millimeter of filter area.
11. If the first round of post-abatement PCM clearance air samples fail to reach clearance level criteria, the Contractor shall be responsible for the cost of any additional testing and analysis that is necessary.

3.12 PERSONAL AIR MONITORING

- A. The Contractor shall be responsible for conducting personal air monitoring sampling in accordance with applicable rules and regulations.
- B. In addition to the requirements of OSHA 1926.1101, the Contractor shall be required to perform personal air monitoring during every work shift in each work area during which abatement activities occur in order to verify that appropriate respirator protection is being utilized.
- C. Results of the monitoring shall be returned to the site, at least verbally, and posted no later than 24 hours following the time the sample was collected. Written results shall be returned to the site and posted no more than five days after the monitoring was performed.
- D. Personal air samples shall be analyzed by an independent laboratory which holds certification by the Vermont State Department of Health. The Architect/Engineer must approve the laboratory the Contractor intends to use.

PART 4 - ASBESTOS MATERIAL AND WASTE DISPOSAL

4.1 APPLICABLE REGULATIONS

- A. All asbestos waste shall be stored, transported and disposed of per, but not limited to, the following Regulations:
Vermont Hazardous Waste Management Regulations (VHWMR)
USEPA NESHAPS 40 CFR 61.152 and 156
USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007

4.2 TRANSPORTER AND DISPOSAL SITE

- A. The approved disposal facility shall be a permitted Resource Conservation and Recovery Act (RCRA) Subtitle C landfill with a leachate collection and treatment system capable of removing PFAS. The disposal facility must be approved by the Engineer prior to transport of any ACM waste to the disposal facility.
- B. The Contractor shall give 24 hour notification prior to removing any waste from the site. No waste may be taken from the site without authorization from the Owner's Representative.
- C. The Contractor shall have the Transporter give the date and time of arrival at the disposal site.
- D. Upon arrival at the removal site, the Transporter must possess and present to the Owner's Representative a valid Vermont Hazardous Waste Management Regulations (VHWMR) asbestos hauler's permit. The Owner's Representative may verify the authenticity of the hauler's permit with the proper authority.
- E. The Transporter, with the Contractor and the Owner's Representative, shall inspect all material in the transport container prior to taking possession and signing the Asbestos Waste Disposal Document.

4.3 WASTE STORAGE CONTAINER

- A. All waste storage containers shall be fully enclosed and lockable (i.e., enclosed dumpster, 40' trailer, etc.). **NO OPEN CONTAINERS WILL BE ALLOWED** (i.e., open dumpster with canvas cover, etc.).
- B. The container shall be plasticized and sealed with a minimum of one (1) layer of 6 mil. polyethylene on the sides and two (2) layers of 6 mil. polyethylene on the floor.
- C. The container shall be labeled with EPA Danger signage:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

- D. The Vermont Hazardous Waste Management Regulations (VHWMR) Hauler's Permit number shall be on both sides and back of the container.
- E. The container will not be permitted to leave the site without the proper signage.

4.4 WASTE DISPOSAL DOCUMENT

- A. An Asbestos Waste Disposal Document shall be provided by the Contractor.
- B. The Document shall be completed by the Contractor and verified by the Engineer that all the information and amounts are accurate and the proper signatures are in place.
- C. The Document shall have the signatures of the Transporter and the Owner prior to any waste being removed from the site. A copy of the completed Disposal Document shall be retained by the Owner/Engineer and remain on site for inspection.
- D. Upon arrival at the Disposal Facility, the Disposal Document shall be signed by the Disposal Facility Owner or operator to certify receipt of asbestos containing materials covered by the Disposal Document.
- E. The Disposal Facility Owner or operator shall return the Document and dump ticket/weight ticket to the Owner/Engineer.
- F. Copies of the completed Disposal Document are to be sent by the Disposal Facility Owner or operator to the Owner, the Engineer and the Contractor.

END OF SECTION 028213

SECTION 072116 – PRE-ENGINEERED BUILDING BLANKET INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Insulation and vapor barrier liner system for pre-engineered metal buildings.
- B. Related Requirements:
 - 1. None.

1.3 REFERENCES

- A. Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:
 - 1. American Society for Testing of Materials (ASTM):
 - a. ASTM C991 - Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings.
 - b. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
 - c. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - d. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials in Sheet Form (Procedure A).
 - 2. North American Insulation Manufacturers Association (NAIMA):
 - a. NAIMA 202-96(R) (Rev. 2000) STANDARD For Flexible Fiberglass Insulation to be Laminated for Use in Metal Buildings
 - 3. National Fire Protection Association (NFPA):
 - a. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
 - 4. Underwriters Laboratories (UL):
 - a. UL 723 - Test for Surface Burning Characteristics of Building Materials.

1.4 DESIGN REQUIREMENTS

- A. Insulation R-Value of **R-11 Continuous and R-25 Cavity** for installed roof system.
- B. Insulation R-Value of **R-30 Cavity** for installed wall system.

1.5 ACTION SUBMITTALS

- A. Product Data: Provide manufacturer's data for each of the following, including:
 - 1. Roof installation instructions

2. Wall installation instructions
3. Product data sheet
4. Design considerations guide
5. Recycle content certification for fiberglass insulation products – minimum 50% recycled content for all fiberglass insulation materials.

B. Shop Drawings: Provide shop drawings that indicate the following:

1. Liner fabric layout
2. Insulation Layout and cut list.
3. Customer and project information.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products indoors or in a dry, covered area.
- B. Do not open products until ready to use.
- C. Protect products from potential construction site damage.
- D. Use care when opening products as pallets may shift during shipment.
- E. Banding has sharp edges. Wear cut proof gloves when handling.
- F. Wear safety glasses when unpacking materials.

1.7 PROJECT CONDITIONS

- A. For best results, do not install this system outside of the temperature, humidity, ventilation and environmental limits recommended by the manufacturer. Products should be kept covered and dry at temperatures less than 100°F prior to installation.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Product: The performance requirements for the Pre-engineered Building Blanket Insulation system is based upon the following:
 1. OptiLiner® System, by Owens Corning Insulating Systems, LLC, Toledo, OH 43659; www.owenscorning.com.
 - a. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
 2. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Certainteed
 - b. Thermal Design
 - c. Refer to Division 1 Section “Product Requirements” for consideration of an unnamed product by one of the other named manufacturers.
- B. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 PRE_ENGINEERED BUILDING BLANKET INSULATION SYSTEMS

- A. Basis of Design, OptiLiner System, consisting of the following components and material.
1. Unfaced light density fiberglass metal building insulation in the one of the following product categories:
 - a. Owens Corning Certified R Metal Building Insulation
 - 1) Complies with ASTM C991 Type 1.
 - 2) Complies with NAIMA 202-96-REV 2000.
 - 3) Flame Spread Index <25 and Smoke Developed Index <50 when tested in accordance with ASTM E84, NFPA 255 and UL 723.
 - 4) Certified by SCS Global Services to contain a minimum of 65% recycled glass content, 18% pre-consumer and 47% post-consumer.
 - 5) Thermal Resistance: as noted on drawings and listed under Design Requirements.
 - 6) Unfaced.
 - 7) GREENGUARD Indoor Air Quality Certified®.
 - 8) GREENGUARD Gold Certified.
 - b. Owens Corning MBI Plus Metal Building Insulation
 - 1) Flame Spread Index <25 and Smoke Developed Index <50 when tested in accordance with ASTM E 84, NFPA 255 and UL 723.
 - 2) Certified by SCS Global Services to contain a minimum of 65% recycled glass content, 18% pre-consumer and 47% post-consumer.
 - 3) Thermal Resistance: as noted on drawings and listed under Design Requirements..
 - 4) Unfaced.
 - 5) GREENGUARD Indoor Air Quality Certified®.
 - 6) GREENGUARD Gold Certified.
 2. Fabric liner facing/vapor barrier composed of woven high-density polyethylene coated on both sides with polyethylene. Complies with the following:
 - a. ASTM C1136, Types I through Type VI
 - 1) Type I-IV exception for dimensional stability (value is < 2.0%.)
 - b. Perm rating: ≤ 0.02 when tested in accordance with ASTM E 96 Procedure A.
 - c. Flame Spread Index < 25 and Smoke Developed Index < 50 when tested in accordance with ASTM E 84.
 - d. Color:
 - 1) White
 3. Vapor barrier adhesive. Complies with the following:
 - a. Application temperature 10°F to 110° F
 4. Double sided vapor barrier tape. Complies with the following:
 - a. Width 0.75"
 - b. Rubber based and free film
 5. Patch tape. Complies with the following:
 - a. Adhesive added to one side
 - b. Installation temperature from 10°F to 110°F
 - c. 3" width
 6. Metal Banding/Straps. Complies with the following:
 - a. Coated steel
 - b. 1.0" wide
 - c. Structural Steel Grade 50 per ASTM C 653
 - d. Exposed color to match vapor barrier
 - e. Backing – gray
 7. Thermal breaks
 - a. Closed cell polyethylene foam tape for wall applications. Complies with the following:
 - 1) 0.125" thick to 0.375" thick
 - 2) 3.0" wide
 - b. Thermal spacer blocks. Complies with the following:
 - 1) Extruded or expanded polystyrene
 - 2) Minimum width 3.0"

- 3) Thickness 0.5" – 1.0"
- 8. Light gage steel fasteners
 - a. Zinc plated cold forged steel
 - b. Head color to match vapor barrier
 - c. Contain rubber sealing washer
- 9. Heavy gage steel fasteners
 - a. Zinc plated cold forged steel
 - b. Head color to match vapor barrier
 - c. Contain rubber sealing washer
- 10. Insulation Hangars
 - a. Insul-hold insulation hangars

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation. Verify structure, bracing, and concealed building systems have been tested and inspected.
- B. Provide written report listing conditions detrimental to performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install liner system in accordance with manufacturer's installation instructions and approved Shop Drawings.
- B. Purlin and girt attachment surfaces should be clean and dry prior to attaching two-faced tape or sealing adhesive.
- C. Installed fiberglass insulation should fit snugly against purlin and girt walls in the cavity space. Avoid gaps, voids and any excess compression.

3.3 CLEANING

- A. Clean dirt from vapor barrier fabric using a soft cloth with soap and water or non-abrasive household cleaner. Solvent-based cleaners and abrasive pads should be avoided.

3.4 SAFETY PRECAUTIONS

- A. Installation contractor must have a site-specific safety plan and comply with all OSHA applicable local rules and regulations when installing this system.
- B. Workers must use OSHA required fall protection when installing the banded liner system at heights (see OSHA regulations at 29 CFR 1926, Subpart M).
- C. Banding has sharp edges and cut proof gloves should be worn when handling.

3.5 APPENDIX

- A. Refer to the Manufacturers publications for product information, including uses, descriptions, physical properties, performance, specification compliance and application recommendations.

3.6 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072116

SECTION 099114 - STRUCTURAL STEEL PAINTING

PART 1 - GENERAL

1.1 WORK UNITS

- A. Clean, prime and paint all existing structural steel to remain in the project area of the Water Street Facility.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D1648 - Specification for Basic Lead Silico-Chromate.
 - 2. E11 - Wire Cloth Sieves for Testing Purposes.
- B. Federal Specification or Standard (FS):
 - 1. TT-P-375 - Pigment, Indian Red, and Bright Red (Iron Oxide).
 - 2. TT-R-266C - Resin, Alkyd; Solutions.
 - 3. #595a - January 2, 1968 - Topcoat Coloring.
- C. Steel Structures Painting Council (SSPC):
 - 1. SP 6 - Commercial Blast Cleaning.
 - 2. SP 7 - Brush-off Blast Cleaning.
 - 3. Steel Structures Painting Manual (1982 edition), Volume 2.
 - 4. PA-2, Paint Application Specification # 2, Measurement of Dry Paint Thickness with Magnetic Gage.

1.3 SAMPLES

- A. Prepare samples of finishes when requested by Engineer/ Architect. When possible, apply finishes on identical type materials to which they will be applied on job.
- B. Identify each sample as to finish, formula, and color name.

1.4 MAINTENANCE MATERIALS

- A. Leave on premises, where directed by Engineer/Architect, not less than one gallon of each color used.
- B. Containers to be tightly sealed and clearly labeled for identification.

1.5 APPLICATOR'S QUALIFICATIONS

- A. As the successful performance of the coating system specified for this bridge is dependent upon its proper application, the Contractor shall be required to show evidence of previous successful painting applications using the same or similar two component type paint materials. Within ten (10) working days following the letting, the apparent three (3) lowest bidders shall be required to submit their written work resume using the specified or similar type coatings. This resume shall include but not be limited to; the project locations and dates, names and addresses of the contracting agencies, project specifications or plans pertaining to the coating systems and the names and addresses of the manufacturer supplying the coating

materials. This work resume shall be submitted to the Engineer/Architect for evaluation and recommendation prior to authorization to proceed with work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and/or reducing.
- B. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45 degrees F (7 degrees C) in well ventilated area.
- C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.7 ENVIRONMENTAL CONDITIONS

- A. Do not apply finishes in the rain, snow, or when relative humidity is above 85%.
- B. Ensure surface temperatures or the surrounding air temperature is above 40 degrees F (5 degrees C) or 50 degrees F (10 degrees C) for epoxy finishes before applying finishes.
- C. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 45 degrees F (7 degrees C) or 50 degrees F (10 degrees C) for epoxy finishes for 24 hours, during, and 48 hours after application of finishes.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Paint
 - 1. Dull Orange Primer (2 coats): Any manufacturer whose paint meets the following descriptions:

The Pigment shall be composed of:

	<u>Min.</u>	<u>Max.</u>
Basic Lead Silico Chromate ASTM D1648	94.0%	---
Pure Red Iron Oxide - FS TT-P-375, Type 1	---	5.3%
Organo Montmorillonite	0.5%	0.7%

The liquid shall consist of not less than 69% non- volatile vehicle by weight, the balance to be combined drier and thinner. The non-volatile vehicle shall be composed of raw linseed oil and alkyd resin combined in the approximate proportions of 2-1/4:1, respectively by weight, and shall contain a minimum of 7% phthalic anhydride. The alkyd resin, furnished as a solution, shall meet the requirements of FS TT-R-266C, Type I, Class A or B. The drier catalyst shall be 0.02% Cobalt, 0.06% Zirconium and 0.05% Calcium metals, based on the non-volatile vehicle by weight, introduced therein as soluble organic metal salts. Small quantities of grinding and wetting aids may be used if desired.

The paint shall consist of:

	<u>Min.</u>	<u>Max.</u>
Pigment	64.0%	---
Vehicle	---	36.0%
Weight/Gallon, lbs.	15.0%	---
Water	---	0.5%

Coarse particles and skins (total residue retained on 325 sieve based on paint)	4	---
Viscosity at 25 degrees (Stormer-Kreb Units)	69	89

The paint shall dry to light handling in not more than eighteen hours under environmental conditions considered satisfactory for application of paint.

Note: For the greatest effectiveness, the Organo Montmorillonite should be pre-wetted with 30-35% wet Methyl alcohol (95% Methanol -5% water) by weight.

Paint prepared to meet the requirements of this specification will hide the steel surface well when applied at or above the prescribed minimum wet film thickness (3.2 mils) in one coat. Inadequate hiding is a guide that the paint has been sprayed too thinly, not that the paint possesses low hiding power.

The percentages noted relate to mixture by weight.

B. Coatings and Finishes:

1. Products above are manufactured by Tnemec Company, Inc. North Kansas City, Missouri 64116. Below is a list of alternate manufacturers whose selected materials may be substituted for above coatings.
 - a. Cook Paint & Varnish Co., P.O. Box 389, Kansas City, Mo. 64141.
 - b. Dupont Maintenance Finishes, Wilmington Delaware 19898.
 - c. Hempel Marine Paints, Inc. P.O. Box 3279 Curry Ave. Wallington, N.J. 07057.
 - d. Mobile Chemical Co. 901 N. Greenwood Ave. Kankakee, IL 60901.
 - e. P.P.G. Industries 9933 Lawler Ave. Suite 260 Skokie, IL 60077.
 - f. or approved equal.

- C. Cleaning Materials: All materials, natural or man-made, to be used to clean the bridge metal surfaces shall conform to specifications of the Steel Structures Painting Council, including but not limited to silica sand, crushed garnet, mineral grit or manufactured grit.

2.2 COATING THICKNESSES

A. Paint:	Dry Film Thickness	Spreading Rate
1. First dull orange prime coat	2.5 - 3.0 mils	400-600 SF/gal
2. Second dull orange coat	2.5 mils	400-500 SF/gal

PART 3 - EXECUTION

3.1 INSPECTION

- A. Thoroughly examine surfaces scheduled to be painted or repaired prior to commencement of work.
- B. Correct defects and deficiencies in surfaces which may adversely affect work of this section.
- C. Any utility conduit lines found shall be protected at the direction of the Owner before painting starts in that area.

3.2 EQUIPMENT

- A. Prior to the start of and throughout the duration of work the Contractor shall be required to supply the Engineer/ Architect with the following:
1. Air Thermometer, pocket type, 0-200 degrees F, (2).
 2. Surface Thermometer, 0-300 degrees F, (2).
 3. Sling Psychrometer, (2).
 4. Weight per Gallon Cup, (2).
 5. Wet Film Thickness Gage, prong type, (3).
 6. Dry Film Thickness Gage, magnetic type, (1).

Numbers in parentheses designate minimum quantity.

3.3 PROTECTION

- A. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.
- B. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted.
- C. Place cotton waste, cloths, and material which may constitute a fire hazard in closed metal containers and remove daily from site. Prevent spillage of paint and cleaning materials onto the railroad tracks.
- D. Workmen should not proceed to clean or paint until the area has been inspected by the Owner and found to be adequately protected such that no cleaning materials, paints or coatings will fall in the Poesten Kill.

3.4 STEEL SURFACE PREPARATION

- A. All metal surfaces to be painted shall be thoroughly cleaned of rust, mill scale, slag, dirt, oil, or grease and other foreign substances to the degree specified. All cleaned steel surfaces shall be inspected by and approved by the Engineer/Architect prior to the application of paint. Surfaces which do not meet these specification requirements as determined by the Engineer/ Architect, shall be cleaned again at the Contractor's expense. A dry surface upon which light rusting may have formed, after cleaning, shall be considered acceptable.
- B. Surfaces to be cleaned shall be identified in the following manner:
- Category 1: A surface on which the existing paint has deteriorated so that it is necessary to clean the surface to bare steel.
- Category 2: A surface on which the existing paint is in good condition, so that it is only necessary to dull the existing paint and remove the chalking residue. Many surfaces will exhibit conditions as defined by Categories 1 and 2, side by side.
- C. Surface meeting the definition of Category 1 shall be cleaned by Commercial Blast Cleaning, for the removal of all dirt, grease, rust scale, foreign material, and mill scale, rust, old paint and slag to the extent that only slight evidence of shadows, discoloration and tinge, adherent residues of paint remain.

Commercial blast cleaning shall be performed in accordance with SSPC-SP 6.

After blasting operations are completed, all surfaces shall be cleaned of blasting products and other residue by the use of clean soft brushes, or blown off with compressed air, or vacuumed, or water rinsed.

- D. Surfaces meeting the definition of Category 2 shall be cleaned by Brush-Off Blast Cleaning, for rapid removal of oil, grease, dirt, loose rust, loose mill scale, loose paint, and slag. Light rust, mill scale, and paint is sufficiently abraded to provide adhesion of paint. Brush-off cleaning shall be performed in accordance with SSPC-SP 7.

Paint must be tightly adhered to Category 2 surfaces after cleaning operations. Tightly adhere paint is defined as paint which cannot be lifted as a layer when a dull putty knife is inserted beneath it. If the Engineer/Architect determines that paint remaining on the steel surface after cleaning is not tightly adhered, then that paint shall be removed in accordance with the cleaning requirements for Category 1 surfaces, until tight paint is reached.

- E. Cleaned bare metal surfaces shall have all blasting products removed and shall be painted one coat of primer within the same working day as the completion of the blasting operation.
- F. Primer shall be applied in accordance with the requirements of Section 2.01.A.1 or B.1 Surfaces receiving primer must be absolutely dry prior to primer application. Surfaces which are covered with old, tight paint, need not be primed, but will be covered with 2 coats of Gray Paint and 1 coat of Sage Green paint or 2 coats of Epoxoline Coating.

3.5 PAINT PREPARATION

- A. All paint shall be thoroughly mixed prior to application. Preferably, mechanical mixers should be used to thoroughly disperse any settled pigment or solids. When hand mixing is performed, the liquid portion of the paint shall then be slowly poured back into the original container while at the same time dispersing any settled material by stirring with a clean paddle or other suitable instrument. When all settlement has been dispersed, the paint shall be poured several times from one container to the other to insure proper mixture.
- B. No thinning of paint, by the use of solvents or other material shall be allowed, and painters shall not carry or any other way have access to containers of solvent when painting.
 - 1. The quantity of solvent permitted on the job site shall be only the reasonable amount necessary for cleaning equipment, wiping dirt and grease from surfaces to be painted and cleaning of paint spatters.
 - 2. All solvents used for cleaning operations shall conform to Federal, State, and Local air pollution regulations.
 - 3. Unauthorized use of solvents shall result in the repainting of the surface in conformance with the specifications and to the satisfaction of the Owner at the Contractor's expense.
- C. Paints specified are formulated ready for application when delivered to the job site. If during cool weather it is desirable to reduce the consistency so that the paint will flow more freely, the paint may be heated. Heating may be accomplished by placing the container of paint in hot water, wrapping the container with heating coils, using paint heaters or heat exchangers or by other methods approved by the Owner. Heating by open flame shall not be allowed. In no instance shall paint be heated to temperature in excess of 100 degrees F.
- D. Thinning Coatings: Thinning of primer to facilitate its application shall only be allowed if approved by the Architect/Engineer and done in the presence of the Engineer. The type and quantity of thinner shall be in compliance with the paint manufacturers recommendations. Unauthorized use of thinners shall result in repriming the surface in conformance with this specification to the satisfaction of the Architect/Engineer at the Contractors expense.

3.6 APPLICATION METHODS

- A. All paint and coatings shall be applied in a neat and workmanlike manner. Paint shall be applied uniformly at the specified wet film thickness and coatings shall be free of runs, sags, drips, ridges or other defects. Paint may be applied by brushes, or rollers, or air-less spray, or a combination of these methods.
- B. The paint, when applied with brushes, shall be so manipulated by the brush as to produce a uniform even coating. When applying a coating to a previously painted surface, strokes should be made perpendicular to those of the receiving surface to insure adequate anchorage. Brushes shall be of good quality and the length of the exposed bristle shall be equal to or greater than the width of the brush.

Areas which are inaccessible to brushes shall be painted by the use of rollers, or air-less spray equipment, daubers, or sheepskins.

- C. Rollers for the application of paint shall be of such a quality to produce a smooth uniform coating. Roller covers shall be "all-mohair" made from Angora Goat wool; "mohair" made from blends of mohair, wool and/or rayon or as approved by the Owner. Roller nap lengths shall be from 1/2 to 1-1/2 inches.

The roller cover shall be uniformly loaded with paint by rolling on the slanted surface of a tray, framed screen wire or other suitable device. Roller application shall be done at such a pace that no spinning of the roller or throwing off of paint occurs when the roller is lifted from the surface. The paint shall be applied by rolling from a dry to a wet area while varying the direction of the stroke. The paint shall be feathered out by using light pressure at the end.

Areas which are inaccessible to roller application shall be painted by brushes, air-less equipment, or daubers, or sheepskins.

- D. Air-less spray equipment shall be capable of applying paint in a fine, even spray so as to produce a uniform coating. Air-less spray equipment shall consist of a hydraulic pump (air or electric power) mounted over a paint tank, high pressure hoses, spray gun, valves, gages, regulators, screens, traps, and other equipment necessary to satisfactorily complete the work.

Spray painting shall be done by experienced and qualified painters. Painters shall determine the best distance between the spray gun and receiving surface so as to promote uniform coverage and prevent discontinuity of the applied paint film. The spray gun shall be moved uniformly across and perpendicular to the receiving surface. To insure a uniform coating each spray pass should lap the other by 50%. Any sags, drips, air holes, or other film defects shall be immediately corrected by hand brushing.

Areas that are inaccessible to air-less spray application shall be applied by brushes, rollers, daubers or sheepskins.

3.7 TERMINATION OF SPRAYING OR ROLLING OPERATIONS

- A. The Engineer/Architect is empowered to terminate spraying or rolling operations, temporarily or permanently, if he determines that any of the following conditions exist:
1. Satisfactory results are not being obtained.
 2. The required wet film thickness are not being obtained.
 3. Areas not specifically designated to be painted are likely to be affected by the application method.
 4. Areas not specifically designated to be painted are being affected by the application method.
- B. If the Engineer/Architect permanently terminates spraying or rolling operations, he may do so by verbal order but he shall notify the Contractor, in writing, of his reasons for termination, within one week or termination. The Engineer/Architect may temporarily terminate painting operations by verbal orders. If spraying or rolling operations are permanently terminated, the Contractor may apply paint in accordance

with another approved method. No extra compensation will be paid for the substitution of another method of application.

3.8 CLEANING SCHEDULE

- A. All existing structural steel to be painted.

3.9 PAINT SCHEDULE

- A. Paints:
 - 1. Prime all existing structural steel with dull orange primer.
 - 2. Second prime coat all existing structural steel with dull orange primer.

END OF SECTION 099114