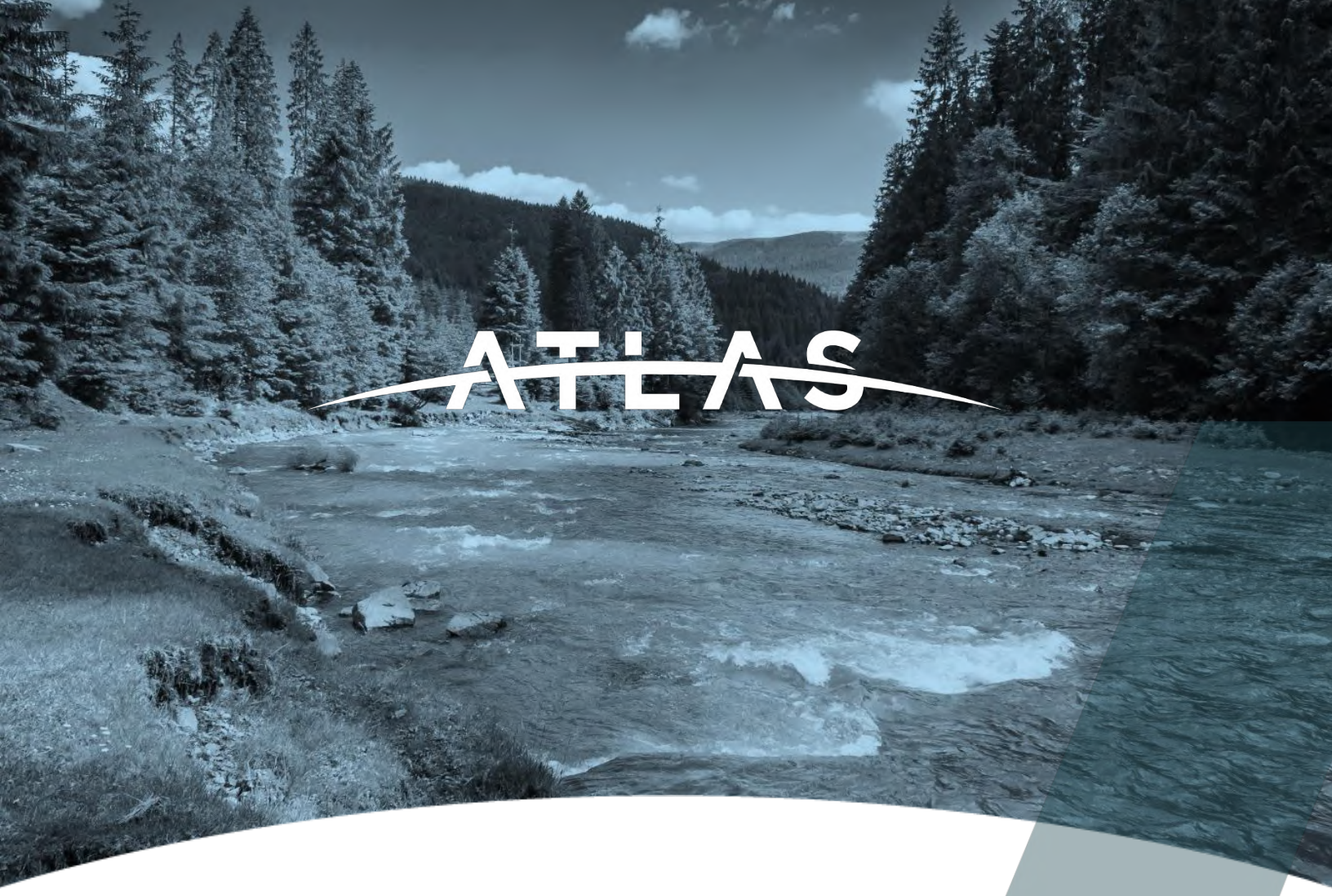

CORRECTIVE ACTION PLAN

10TH CAVALRY COMPLEX

33, 81, 123 Ethan Allen Avenue
Colchester, VT 05439
SMS Site #2021-5014

PREPARED FOR:

Dan Albrecht
Chittenden County Regional Planning Commission
Senior Planner
110 West Canal Street, Suite 202
Winooski, Vermont 05404-2109

Sue Cobb
Evernorth
100 Bank Street, Suite 400
Burlington, Vermont 05401

PREPARED BY:

Atlas Technical Consultants LLC
51 Knight Lane
Williston, VT 05495

This report prepared for the CCRPC is made possible in part by a grant from the State of VT through the ACCD, Department of Economic Development

September 7, 2022

51 Knight Lane
Williston, VT 05495
(802) 862-1980 | oneatlas.com

September 7, 2022

DAN ALBRECHT
CHITTENDEN COUNTY REGIONAL PLANNING COMMISSION
SENIOR PLANNER
110 WEST CANAL STREET, SUITE 202
WINOOSKI, VERMONT 05404-2109

SANDRA SILLA
EVERNORTH
100 BANK STREET, SUITE 400
BURLINGTON, VERMONT 05401

Subject: **Corrective Action Plan**
10th Cavalry Complex
33, 81, 123 Ethan Allen Avenue, Colchester, VT 05439
SMS Site #2021-5014

Dear Mr. Albrecht and Ms. Silla,

Atlas Technical Consultants, LLC (formerly ATC Group Services, LLC) is pleased to provide the Chittenden County Regional Planning Commission (CCRPC) this *Corrective Action Plan and Amendment* for the 10th Cavalry Complex at 33, 81, 123 Ethan Allen Avenue in Colchester, VT (SMS Site #2021-5014).

This report has been prepared by the employees of Atlas Technical Consultants, LLC whose signatures appear below. Requests for information on the contents of this report should be directed to these individuals. I certify under penalty of perjury that I am an environmental professional and that all content contained within this deliverable is to the best of my knowledge true and correct.

Prepared by:

Erik Urch
Senior Project Manager

Joseph J. Hayes, CPG, PG
Vermont Operations Manager

Nate Berube, P.E.
Professional Engineer
VT License #74152

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EXECUTIVE SUMMARY

On behalf of the Chittenden County Regional Planning Commission, (CCRPC) and Evernorth, Atlas Technical Consultants, LLC (formerly ATC Group Services, LLC), has prepared this Corrective Action Plan (CAP) for a portion of the 10th Cavalry Complex located at 33, 81, 123 Ethan Allen Avenue in Colchester, VT (SMS Site #2021-5014) in accordance with the Vermont Department of Environmental Conservation (VTDEC) Investigation and Remediation of Contaminated Properties Rule (IRule, 2019). Evernorth plans to purchase the property from Saint Michaels College and renovate the Site into a 64-unit housing complex and has entered into the VTDEC Brownfields Reuse and Environmental Liability Limitation Act (BRELLA) Program. This for the CCRPC is made possible by a grant from the State of Vermont through the Agency of Commerce and Community Development (ACCD), Department of Economic Development.

The objective of this CAP is to properly manage contaminated soils that have been impacted by urban fills and contaminated building materials through excavation, offsite disposal and capping. Six regulated soil volumes have been determined through prior investigations, including one area contaminated with polycyclic aromatic hydrocarbons (PAHs), two areas contaminated with polychlorinated biphenyls (PCBs), and four areas contaminated with lead. Two uncharacterized soil volumes that will be excavated to install facility stormwater and dumpster storage features will also be addressed through temporary stockpiling and waste characterization. A description of proposed corrective action activities associated with contaminated building materials, including PCBs, Lead, and Asbestos Containing Materials (ACM) is provided as Addendum 1 of this CAP.

Removal and replacement of the contaminated soil volumes with delivered clean fill will remove the direct contact exposure risk to hazardous materials in soil. Any areas that exceed applicable standards beyond the proposed excavation limits will be capped with an engineered barrier as appropriate and annual inspections will be performed by the facility under operational conditions to verify the integrity of the caps. Following successful completion of the corrective actions, a Corrective Action Completion Report will be prepared and submitted with the expectation that the Site will receive a Certificate of Completion (COC) in accordance with BRELLA requirements with final determination by VTDEC.

1. INTRODUCTION

Atlas Technical Consultants, LLC (formerly ATC Group Services, LLC) on behalf of the Chittenden County Regional Planning Commission, (CCRPC, Client) and Evernorth, presents this Corrective Action Plan (CAP) for a portion of the 10th Cavalry Complex located at 33, 81, 123 Ethan Allen Avenue in Colchester, VT (SMS Site #2021-5014). The Site includes three buildings (Hamel Hall, Purtill Hall and DuPont Hall) and surrounding grounds that are part of a larger parcel of land owned by St. Michael's College which contains thirteen buildings in total, as well as paved parking areas and roadways. Evernorth plans to purchase the property from Saint Michaels College and renovate the Site into a 64-unit housing complex and has entered into the VTDEC Brownfields Reuse and Environmental Liability Limitation Act (BRELLA) Program. This for the CCRPC is made possible by a grant from the State of Vermont through the Agency of Commerce and Community Development (ACCD), Department of Economic Development.

Prior site investigations determined that hazardous materials are present above regulatory standards in Site soils and building materials. These areas require corrective action that should be performed following removal of contaminated building materials but prior to redevelopment site work. The objective of the corrective action is to mitigate the impact of hazardous materials to sensitive receptors to the maximum extent practicable by implementing removal and proper disposal of contaminated media, by use of engineered controls to contain hazardous materials, if needed, and by use of institutional controls, if needed.

2. CONCEPTUAL SITE MODEL

2.1 Site Infrastructure, Historical Land Uses, and Adjacent Properties

The Site is approximately 2.4 acres in area and is developed with three currently unoccupied buildings, including Hamel, Purtill, and Dupont Halls, all of which were originally constructed in 1903. Exterior areas consist of greenspace with some sidewalks. Site topography is generally flat with a slight slope toward the west. Prior to building renovation in the 1980's, the property was used for military housing. One hazardous site (County Apartments, which includes Vermont PBS, Site #2016-4664) abuts the Site to the east across Ethan Allen Avenue.

2.2 Source(s), Release(s) & Prior Investigations

ATC completed a Phase I ESA, dated November 30, 2020, which identified the abutting County Apartments BRELLA Site (#2015-4664) as a *recognized environmental condition (REC).* This property includes the Vermont PBS building located at 204 Ethan Allen Avenue to the east across Ethan Allen Avenue, which has documented vapor-phase subsurface contamination which exceeds current Resident Vapor Intrusion Standards (VIS). This was determined to be both a REC and vapor encroachment condition (VEC) based on the potential migration of vapors onto the Site via preferential pathways such as buried utility conduits, fills and/or via partitioning from contaminated groundwater, and subsequent potential impacts to indoor air.

This REC was addressed during site investigations via installation and sampling of three soil vapor points (VP-1, VP-2, and VP-3), which included one exterior vapor point (VP-1) installed to five feet below ground surface (fbgs) and two subslab soil vapor points within the basement of the DuPont building (VP-2 and VP-3). Results indicated that no soil

vapors exceeded the applicable VIS for Subslab Soil Gas for Resident scenarios (SSSG-R).

The Phase I ESA also identified Business Environmental Risks (BERs), including the closure of three #2 fuel oil underground storage tanks (USTs) at the property with no analysis of soils at the time of closure. This was considered a BER and a data gap due to non-compliance with current UST closure standards.

These BERs were addressed during site investigations via a geophysical survey that located the former/current UST areas, soil borings/soil sampling (SB-1 through SB-6), and the installation and sampling of groundwater monitoring wells (MW-1, MW-2 and MW-3). Results indicated that no contaminants were detected in soil above Vermont Soil Standards for Resident scenarios (VSS-R) and no contaminants were detected in groundwater. See **Figure 2** for the sampling locations.

Also, according to the Vermont Agency of Natural Resources (ANR) Natural Resources Atlas (NRA), the Site is located in an urban soils background area (USBA), which indicates surface soils and/or fills may contain polycyclic aromatic hydrocarbons (PAHs), arsenic and/or lead that exceed the relevant standards (defined as development soils by IRule). These compounds are naturally occurring or have been deposited in urban environments due to anthropogenic activities (i.e. burning fossil fuels and leaded gasoline).

This BER was addressed during site investigations via surface soil sampling (D-1 through D-9) throughout the Site to provide representative coverage in the absence of a specific point source. Results indicated that all locations were below the applicable VSS for Urban Background (UB) with the exception of D-7. The horizontal and vertical extent in this area was defined via soil borings D7-1 through D7-9. See **Figure 3**.

It should be noted that the Phase I ESA also identified additional BERs associated with Linnehan Hall, including the 1998 closure of a UST with no analysis of tank grave soils, and a utility elevator which has not been properly closed; however, this building has been excluded from the redevelopment project and as such, any environmental concerns associated with this building are not addressed in this investigation as it is not part of the Site.

As discussed earlier, building materials testing for ACM and PCBs was performed by Atlas for each of the three buildings (Hamell Hall, Purtill Hall, and DuPont) and results indicate the presence of both in select materials that require abatement/remediation. Building material abatement design details are provided as **Amendment 1** of this CAP. In addition, testing results indicated that exterior building materials contained PCBs which presented a risk of impact to surrounding surface soils. Details are provided below:

PCBs were detected in exterior building materials on all three buildings, including caulk, glazes, paints and cements. These results were utilized to target soil sampling for PCBs during site investigations (SS-1 through SS-20), which revealed the presence of PCBs in soils in above applicable standards in only two areas outside the western wings of Purtill Hall (SS-12 and SS-16), where soils exceeded the EPA High Occupancy Standard (EPA-HOV) and VSS-R, respectively. See **Figure 4**.

Lead sampling in building materials and drip line soils was completed by EverGreen Environmental Health & Safety, Inc. (EverGreen) on behalf of the Vermont Housing and Conservation Board (VHCB).

> In summary, lead was detected in both building materials and drip line soils. In particular, the soil results include composite sampling and averaging of results for each building in accordance with Housing and Urban Development (HUD) rules whereas the average concentration of lead in soils was 322 milligrams per kilogram (mg/kg) around Hamel Hall, 524 mg/kg around Purtill Hall, and 1,303 mg/kg around DuPont. See **Figure 5**.
>
> In addition, lead sampling previously conducted during the development soils effort indicated that no samples exceeded VSS-R (400 mg/kg). However, the so-called "Rule of 20" (100 mg/kg for lead) that indicates potential toxicity under transport and disposal rules (RCRA) was exceeded in two of the samples (D8-ALT and SB-7/D9) at concentrations of 333 and 105 mg/kg, respectively. TCLP sampling would be required to further evaluate toxicity in accordance with RCRA if the soils represented by these samples require transport and disposal. The same may apply with the composites outlined above, which will be updated with future discrete sampling outlined Section 6.3. See **Figure 5**.

Refer to **Appendix A** for summary tables from site investigation activities. Refer to **Figure 6** for a contaminated soil management figure that utilizes the site investigation data to formulate regulated soil areas that form the basis of this CAP.

2.3 Site Geology and Hydrogeology

Bedrock geology is mapped on NRA as predominantly light gray to white and bluish gray streaked calcite marble and massive white and green streaked calcite marble with locally present intermediate dolostone beds within the Vermont Valley Sequence and Middlebury Synclinorium belt of the Shelburne Marble and of Lower Ordovician age. No outcrops were observed and the bedrock surface is expected to be greater than 200 feet based on review of the closest offsite supply well completion report (see Section 2.5 for additional details).

Surficial geology is mapped on NRA as pebbly marine sand associated with Champlain Sea deposits. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) indicates soils are mapped as Adams and Windsor loamy sands with 0 to 5 percent slopes. As stated earlier, the Site is located with an USBA.

Depth to groundwater is between 12 and 15 feet below ground surface (fbgs) and appears to flow to the south based on groundwater elevation contours of Site monitoring wells; however, this cannot be verified with certainty without additional monitoring wells since the configuration of the existing monitoring well network is linear and lacking spatial variability. Furthermore, regional groundwater flow appears to flow to the west based on topography although the Site may be at or near a hydraulic divide between two separate drainage areas (Winooski River to the southeast and Sunderland Brook to the northwest).

2.4 Contaminant Fate and Transport

Contaminants of concern that have been evaluated at the Site include volatile organic compounds (VOCs) from potential UST releases and from offsite vapor migration, PAHs, arsenic and lead

associated with development soils, and PCBs and lead associated with building materials. No VOCs were identified in soils or groundwater related to the USTs and VOCs associated with offsite vapor migration from the Vermont PBS building were below applicable standards. PAHs were identified in surface soils across the Site but only exceeded the applicable standard (UB) in one sample, and the regulated volume has been defined. No known source of PAHs has been identified on-site and the depth of exceedance indicates urban fills. In general, PAHs are hydrophobic and will tend to adsorb to shallow soil particles under typical site conditions. PCBs and lead have been detected in exterior building materials and have impacted surface soils adjacent to the buildings. PCB soil impact is limited to two areas outside the western wings of Purtill Hall. Lead impact to soils is more prevalent along the drip line of all three buildings. PCBs and lead are also generally hydrophobic and will tend to adsorb to shallow soil particles under typical site conditions.

2.5 Sensitive Receptors and Exposure Pathways

Sensitive receptors evaluated during this investigation include soil, groundwater, soil vapor and indoor air. There is currently a direct contact exposure risk to development soils in areas that exceed the urban background concentration which requires corrective actions to reduce the risk. No contaminants in groundwater have been detected above Vermont Groundwater Enforcement Standards (VGES) and the Site and surrounding area are served by municipal drinking water. Therefore, there is no known risk of ingestion based on the current dataset. Although VOCs were detected in soil vapor, no detections were above Resident Vapor Intrusion Standards (VIS) and therefore, there is no known risk of vapor intrusion and inhalation based on the current dataset. However, vapor intrusion is a dynamic phenomenon as atmospheric parameters (barometric pressure, solar heating, etc.) and building conditions (insulation, heating, cooling processes, etc.) can cause fluctuations in air movement, resulting in dynamic conditions over time.

3. PUBLIC NOTICE

A list of the persons who will receive notice for this corrective action, including contact names, addresses, email addresses, where available, and phone numbers are tabulated in **Appendix B**. The public notice form that will be filled out and submitted to these recipients following VTDEC request to do so is also included.

4. PERFORMANCE STANDARDS

The objective of the corrective action is to remove the direct contact exposure risk to contaminated soils and to appropriately manage contaminated soils slated for excavation to accommodate the redevelopment project. This will be achieved through excavation and offsite disposal of contaminated soils and capping. The cleanup goal is to achieve Site closure by obtaining a Certificate of Completion (COC) designation from VTDEC following completion of the corrective action measures outlined herein. Land use restrictions (LUR) would be required in the event residual contamination is left in the ground.

Regulated volumes that were determined based on the results of site investigations are depicted on **Figure 6**. With the exception of PAHs, these are conservative estimates based on limited sampling data available in the PCBs and lead areas. Additional delineation will be performed t further refine regulated soil volumes in these areas as outlined in Section 6.3 and to obviate the need for post-excavation performance sampling. Additional PCB and lead soil sampling results

will be compared to VSS-R and the regulated soil volumes will be adjusted as applicable. See Section 6.3 for additional details.

5. PERMITS

A list of all local, state and federal permits required for the project and current status is provided below:

- Dig Safe Systems, Inc. - Pending
- Town of Colchester, Final Plan Approval with Development Review Board Signoff - issued December 10, 2021
- State of Vermont Operational Stormwater Discharge Permit 9050 - Issued December 16, 2021 (#9319-9050)
- State of Vermont Wastewater System and Potable Water Supply Permit - Issued March 10, 2022 (#WW-C-0860)
- State of Vermont Act 250 Permit - Pending fee payment
- State of Vermont Division of Fire Safety Construction Permit - Pending
- Town of Colchester Building Permit - Pending

6. REMEDIAL CONSTRUCTION PLAN

The corrective actions are designed to remove regulated soil volumes by excavating contaminated soils for offsite disposal, and replacing those soils with clean fill. This shall be completed *following* any exterior building materials abatement to avoid potential cross-contamination. This will also allow the overall site work to move forward unhindered *following* the correction action as all hazardous materials will be removed from contaminated media.

This CAP and associated building material abatement Amendment will be provided in the project bidding and construction documents to ensure the selected General Contractor (GC) is notified of the details of the required corrective action, and includes these provisions into their project. All corrective action construction activities will be overseen by an Environmental Professional (EP) to confirm strict adherence to this plan.

6.1 Health and Safety Requirements

All workers handling contaminated soils shall possess OSHA Hazardous Waste Operations (HAZWOPER) certifications. Different levels of training are required, based on the tasks to be performed, and thus the potential exposure to hazardous materials at the job site. A Site-Specific Health and Safety Plan (HASP) as required by 29 CFR1910.120 is provided as **Appendix C**. The GC will be responsible for the implementation of the HASP and for ensuring all subcontractors and other personnel working at the Site are OSHA-compliant.

The GC and other site workers are responsible for full compliance with the Vermont Occupational Safety & Health Agency (VOSHA) on the Project, evaluations and personal protective equipment (PPE) for its employees as required for this project, including but not limited to Job Safety Analysis, personal exposure monitoring, written health and safety program, medical monitoring and issuing of personal protective equipment. The Site Superintendent for the GC, as well as equipment operators and any workers entering the excavation, will need to be current on the 40-hour HAZWOPER training regardless of the OSHA requirements.

6.2 Existing Monitoring Well and Soil Vapor Point Decommissioning

The EC shall oversee the proper abandonment of the three existing monitoring wells (MW-1, MW-2, and MW-3) by an environmental drilling firm. For each well, the roadboxes shall be removed, the PVC bottom cap shall be punctured, and the well annulus shall be grouted through the PVC as it is retracted. If the PVC cannot be removed it shall be cut below grade and grouted in place. All surfaces shall be completed to match the surrounding material with topsoil and seeded.

The EC shall oversee the removal of exterior soil vapor point VP-1 by removing the roadbox and pulling the tubing and vapor implant from the ground. Any remaining annulus shall be filled with granular bentonite and the surface shall be replaced to match the surrounding material with topsoil and seeded. The EC shall oversee the removal of subslab soil vapor points VP-2 and VP-3 by removing the Vapor Pins™ utilizing the manufacturer-provided removal tool. The core holes shall then be sealed with hydraulic cement.

6.3 Additional Delineation

The regulated soil volumes depicted on **Figure 6** are conservative estimates based on best available site investigation data, which is limited in some areas. As such, additional pre-characterization (soil borings and soil sampling) will be completed by the EP to further refine the degree and extent of contamination in these areas in an attempt to reduce waste volumes. The EP shall submit a sampling plan to VTDEC for comment/approval prior to field work and submit a brief summary report outlining the results after completion. The report shall include any adjustments to the regulated soil areas/volumes based on the new data, which shall be approved by VTDEC prior to moving forward with corrective actions. The additional investigation will also be utilized to complete waste characterization/waste profiling requirements outlined later in Section 7 prior to performing correction actions. This will allow the contaminated soils to be "live-loaded" in lieu of temporary stockpiling which will reduce soil handling costs.

For estimating purposes, this CAP assumes the additional investigation will include one soil boring advanced utilizing direct push technology (DPT) by an environmental drilling contractor under direction of the EP to two fbgs for every 25 linear feet (LF) within the lead contaminated areas. The borings will be advanced along two lines parallel to the buildings, including every 50 feet approximately five feet off the building (Line A), and every 50 feet approximately 10 feet off the building (Line B), and offset from Line A. Since approximately 1,145 total linear feet (LF) of lead-contaminated soils straddle the three buildings along the drip edge based on prior investigations (see **Figure 6**), this equates to 46 soil borings. Two soil samples will be collected from each boring at 0-0.5 fbgs and 1.5-2 fbgs and duplicate samples will be collected at a rate of 5% for a total of 97 soil samples for lead. An additional five soil borings will be advanced to two fbgs within both PCB contaminated soil areas, two soil samples will be collected in each boring as above, and duplicate samples will be collected at a rate of 5% for a total of 21 soil samples for PCBs.

All soil samples will be stored on ice and submitted under chain of custody to an environmental laboratory for analysis of lead by EPA Method 6010 or PCBs by EPA Method 8082 with soxhlet extraction as outlined above. Additional soil aliquots will be collected from each regulated soil area for waste characterization analyses outlined later in Section 7.0. All drilling spoils will be returned to the subsurface and no investigation derived waste (IDW) is anticipated. All surfaces will be replaced in kind by removing and reinstalling the sod plug. All locations will be pre-marked, Digsafe will be contacted, and a private utility location survey will be performed to verify underground utilities not covered by Digsafe. Additional soil borings and soil sampling may be required based on the results of this investigation to meet the objective of pre-characterizing the regulated soil volumes prior removal, and to obviate the need for post-excavation performance sampling.

As stated earlier, PAHs were previously defined during prior site investigations, so no additional borings/samples are proposed in this area with the exception of three borings within the known regulated volume (see **Figure 6**) to collect waste characterization samples outlined in Section 7.

6.4 Traffic Control

The GC shall ensure that any traffic control that may be required to facilitate the corrective actions comply with specifications set forth in the construction documents.

6.5 Contaminated Soil Excavations

Under the direction of the EP, the GC shall perform contaminated soil excavations and handling as outlined below:

- Excavate materials in a manner that minimizes fugitive dust and particulate emissions. If visible particulate emissions are generated during soils and materials excavation, utilize various and appropriate methods (including wetting or appropriate tarps or covers) to ensure that visible dust and particulate emissions are contained within the excavation itself, and that such emissions do not migrate outside the immediate excavation.

- Inspect all excavations for the presence of unforeseen subsurface conditions. Such unforeseen conditions might include the presence of concrete vaults, USTs, dry wells, or large diameter concrete or steel piping. Should the presence of unforeseen conditions be identified by the EP, such conditions shall be immediately brought to the attention of VTDEC for further inspection, documentation, and a determination as to additional work, if any, as required.

- If solid waste is encountered during the course of excavation activities, coordinate a staging area for the segregation of soils and solid waste. Solid waste shall be removed from the excavated soils and stockpiled separately at the temporary staging area pending offsite disposal. Following the segregation of any solid waste, the remaining soil shall be returned to the excavation or added to the contaminated soil waste stream as appropriate and under the direction of the EP.

- Load and dump soils and fill materials onsite in a manner that minimizes the generation of visible emissions. This will likely require that excavated materials are sufficiently moist such that visible emissions, if any, are present only within the dump body or loader bucket.

- If visible particulate emissions are generated during the loading, handling or transportation of soils, the GC shall utilize various and appropriate methods (including wetting and/or appropriate tarps or covers) to ensure that visible dust and particulate emissions are contained within the dump body or excavation bucket.

- Closely monitor and maintain dust and erosion control measures to ensure that site soils and fill are not tracked off the property and that such materials do not migrate off the property through water or wind erosion.

- Minimize truck idling time.

- Inspect all site work equipment, including all excavators, loaders, dump trucks and other mobile or stationary equipment on a daily basis and the equipment shall be maintained in such a manner as to minimize the potential for a release of petroleum fuels or oils on the Site. In addition, use other construction-related fluids including glues, epoxy, and concrete form oil, for their intended purpose only and these materials shall be stored in such a manner as to minimize the potential for a release to the environment.

- Report any release of motor fuels, oils, or construction-related fluids to the Site to the EP immediately. Maintain a spill clean-up kit onsite and shall be prepared to respond with its own resources or subcontracted services to clean-up a spill/release of petroleum products and/or chemicals.

- Instruct transporters, all of which will be appropriately permitted to haul non-hazardous solid waste, of the best management practices (BMPs) for the transportation of such materials, including proper tarping of dump bodies or recycling/roll-off containers. Any entity hauling soils offsite shall be compliant with any applicable local, State, and Federal permits or other regulatory requirements. All loose materials shall be removed from truck bodies, earth moving equipment and roll-off containers prior to such equipment leaving the Site.

- If the materials are wet, appropriate measures should be taken to prevent leakage to the ground surface. Install appropriate anti-tracking measures (e.g. anti-tracking pads, coarse gravel, etc.) at the offsite staging area to ensure that all vehicles and mobile equipment that have entered the storage area do not track soils and fill materials from the storage area out onto adjacent public roadways at any time.

- Any equipment or tools that come in contact with contaminated materials shall be decontaminated prior to leaving the Site. Decontamination shall consist of scraping loose any contaminated materials from the equipment and pressure washing. The water used for pressure washing shall be allowed to seep back into the ground at the excavation. Additional details are provided in the HASP.

- Dewatering is not anticipated to complete the corrective actions due to the expected depth of excavations (1.5 fbgs) relative to depth to groundwater at the Site (12-15 fbgs). Due to the limited volume of excavations, it is anticipated that all open excavations in

contaminated areas will be backfilled or covered on a daily basis, thereby mitigating any potential ponding of surface waters from potential precipitation events.

- Contact the EP who will notify the VTDEC if odorous and/or discolored soils are encountered which may indicate the presence of previously unknown contamination. Under the direction of the EP and VTDEC, the soils will be segregated and polyencapsulated onsite, sampled, waste profiled and managed onsite or offsite as required in accordance with Section 7 based on sampling and profiling results.

- In the event any relic USTs are discovered during the excavations, notify the EP immediately. The EP will arrange proper closure of the UST in accordance with VTDEC's *UST Closure and Site Assessment Requirements* dated June 2010.

The GC under the direction of the EP will excavate six regulated soil areas previously determined during site investigations and depicted on **Figure 6**, including one PAH, two PCB, and four lead soil areas. These areas may be updated based on the results of the additional delineation outlined in Section 6.3. The GC under the direction of the EP will complete two additional excavations to install two stormwater infiltration/dumpster storage features (IB1 and IB2), the soils of which are currently uncharacterized. Refer to **Table T1** for excavation details provided below:

TABLE T1:
SOIL EXCAVATION DETAILS

Excavation Area	Area (SF)	Depth (FT)	Volume (CY)	Corrected Volume (CY) w/15 "Fluff"
1. PAH Soils Area	369	1.5	21	25
2. PCB Soils Area #1	724	1.5	41	48
3. PCB Soils Area #2	1055	1.5	59	68
4. Hamel Lead Soils Area	1988	1.5	111	128
5. Purtill Lead Soils Area	1269	1.5	71	82
6. DuPont Lead Soils Area	2513	1.5	140	161
7. IB1/Dumpster Area	--	--	50	58
8. IB2/Dumpster Area	--	--	70	81
			Total:	651

The GC shall "live-load" the pre-characterized contaminated soils associated with Areas 1 through 6 into dump trucks and haul them directly to the offsite disposal location under bill of lading (see Section 7 for additional details). The GC shall load the soils associated with Areas 7 and 8 to a temporary stockpiling area (ex-situ temporarily staged soils). A preliminary location is depicted on **Figure 6** and the VTDEC-required soil stockpile request form is provided in **Appendix D**. The soil staging area shall meet IRule requirements for temporary storage outlined in the form, including but not limited to, sensitive receptor setbacks, polyencapsulation, and access restriction requirements. The preliminary locations depicted on **Figure 6** meets the setback requirements based on initial desktop review; however, this should be verified by EP during CAP preparation prior to stockpiling. The individual soil volumes for both areas shall be segregated in the

stockpiling area to allow specific waste characterization of each for offsite facility acceptance (see Section 7). Co-mingling of soils is prohibited.

6.6 Decontamination Procedures

Any equipment or tools that come in contact with contaminated soil will need to be decontaminated if they leave the regulated soil areas or at the end of site work. Decontamination procedures will consist of pressure washing. The water used for pressure washing will be allowed to seep back into the ground within the contaminated areas.

7. WASTE MANAGEMENT

The EP shall collect one composite soil sample for waste characterization from each of the eight soil volumes. For Area #1, three soil borings will be collected in the know regulated volume as outlined above and soils will be combined into a composite sample. For Areas #2 through 6, a composite sample will be collected by combining in-situ aliquots collected during the additional investigations outlined above. For Areas #7-8, composite samples will be collected from the ex-situ temporarily-staged soils. The sampling will be performed in accordance with VTDEC guidance documents.

All composite samples will be stored on ice and submitted under chain of custody to a certified environmental laboratory for full waste characterization analyses. The results will be submitted to the disposal facility[1] with a completed waste profile for facility acceptance. Refer to **Appendix E** for typical waste profile requirements. This CAP assumes the soils will be non-hazardous. Additional sampling and coordination would be required if any of the soils turn out to be hazardous. Following facility acceptance the soils shall be loaded by the GC and hauled to the disposal facility under bill of lading by permitted and licensed waste haulers. Any disposal receipts and/or waste manifests for all waste transported for offsite disposal shall be provided to the EP for inclusion in the final report.

8. IMPLEMENTATION SCHEDULE

The CAP approval process typically includes 30 days for VTDEC to review the draft CAP and then a 30 day public comment period following VTDEC's approval of the draft CAP. Once the 30 day public comment period has been met, through the State's Environmental Notice Bulletin (ENB), the CAP will be final and implementation can commence. The schedule for the implementation of the CAP will be determined following completion of the EP/GC bidding and selection process, although a preliminary schedule that may be subject to change is outlined below.

- August/September 2022: Complete construction documents
- September/October 2022: Bid building abatement
- December 2022/Jan 2023: Bid construction/corrective action
- January/February 2023: Abatement/corrective action implementation

The timeline for completion of abatement and construction is to be determined. The EP shall submit the CAP completion report within 90 days of completion of CAP activities.

[1] This CAP assumes NEWSVT Landfill in Coventry, VT.

9. CORRECTIVE ACTION OPERATION & MAINTENANCE PLAN

Since the corrective actions are designed to remove all known hazardous materials in soil and building materials, no post-excavation operation and maintenance (O&M) requirements are anticipated, with the potential exception of annual inspections as follows: in the event any post-excavation bottom of excavation samples exceed applicable standards, and a geotextile indicator fabric is emplaced at 1.5 fbgs to demarcate clean fill from in-situ contaminated soils, annual inspections should be performed to confirm the integrity of the barrier is not compromised due to storms, burrowing beasts, utility work, etc. An inspection form is provided in **Appendix F**. This is further outlined in conjunction with institutional controls in the next section.

10. INSTITUTIONAL CONTROL PLAN

Since all existing monitoring wells and soil vapor points will be removed as part of the corrective action, no long term soil vapor or groundwater monitoring activities will be completed following construction. Any residual soil contaminants beneath potential engineered soil caps following construction will be clearly documented in the COC and annual inspections will be performed in accordance with details outlined in the previous section.

11. REDEVELOPMENT & REUSE PLAN

The redevelopment project will include the renovation of the three existing buildings for residential units, and will include surface infrastructure, underground utility and stormwater management upgrades. Refer to **Appendix G** for the latest site/civil plan set.

12. QUALITY ASSURANCE/QUALITY CONTROL PLAN

The collection of environmental media samples will be performed in accordance with the EP's Standard Operating Procedures (SOPs), which can be provided upon request. The analyses of environmental media samples will be completed in accordance with the certified environmental laboratory's SOPs and EPA methodology, which can be provided upon request. Co-located duplicate soil samples will be collected for each contaminant of concern for 5% of the total samples for quality assurance/quality control (QA/QC) purposes. No trip blanks are expected since VOCs are not a contaminant of concern.

13. COST ESTIMATE

Cost estimates for implementing the CAP are included in **Appendix H**. These costs may be updated following the bid and selection process.

14. CONTRACTORS & SUBCONTRACTORS

The contractors and subcontractors that will be implementing the CAP are unknown at this time, save Engleberth Construction, Inc. (Engleberth) of Colchester, VT (802-655-0100), who will be the General Contractor. An administrative addendum to the CAP documenting additional contractor/subcontractor information will be provided following completion of the project bidding and selection process.

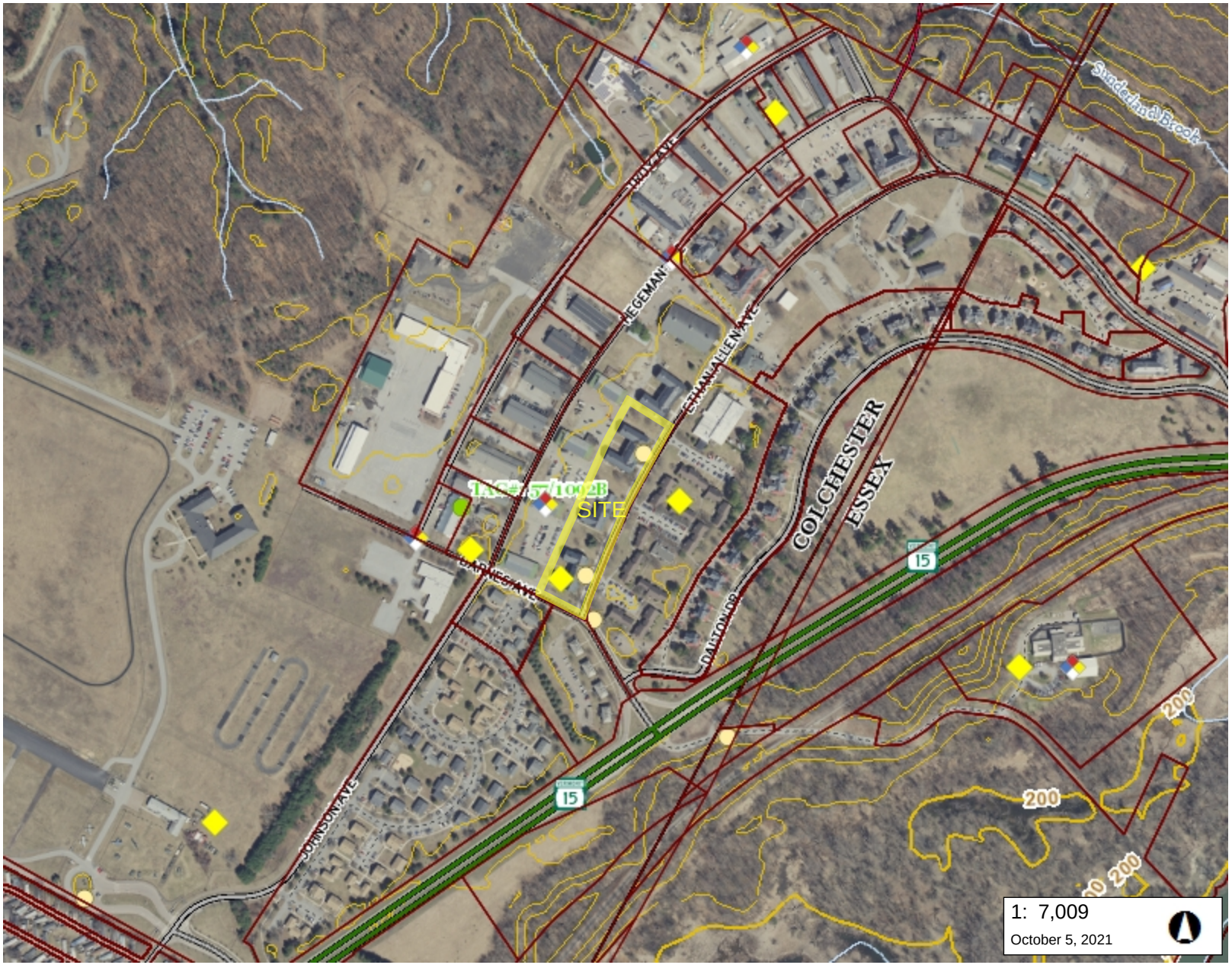
FIGURES

VERMONT

Figure 1 - Vicinity Map

Vermont Agency of Natural Resources

vermont.gov



LEGEND

- Hazardous Site
- Hazardous Waste Generators
- Brownfields
- Salvage Yard
- Aboveground Storage Tank
- Underground Storage Tank (w
- Dry Cleaner
- Private Wells
  - Incorrectly Located
  - GPS Located
  - Screen Digitized
  - E911 Address Matched
  - Welldriller/Clarion
  - Unknown Location Method
- Ground Water SPA
  - Active
  - Proposed
  - Inactive
- Parcels (standardized)
- Roads
  - Interstate
  - US Highway; 1
  - State Highway
  - Town Highway (Class 1)
  - Town Highway (Class 2,3)
  - Town Highway (Class 4)
  - State Forest Trail
  - National Forest Trail

NOTES

10th Cavalry Complex
Colchester, VT

356.0 0 178.00 356.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 584 Ft. 1cm = 70 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

H:\2022\1 OTHER OFFICES\VERMONT\EVERNORTH\280EM00832-SITE.DWG, FIG2

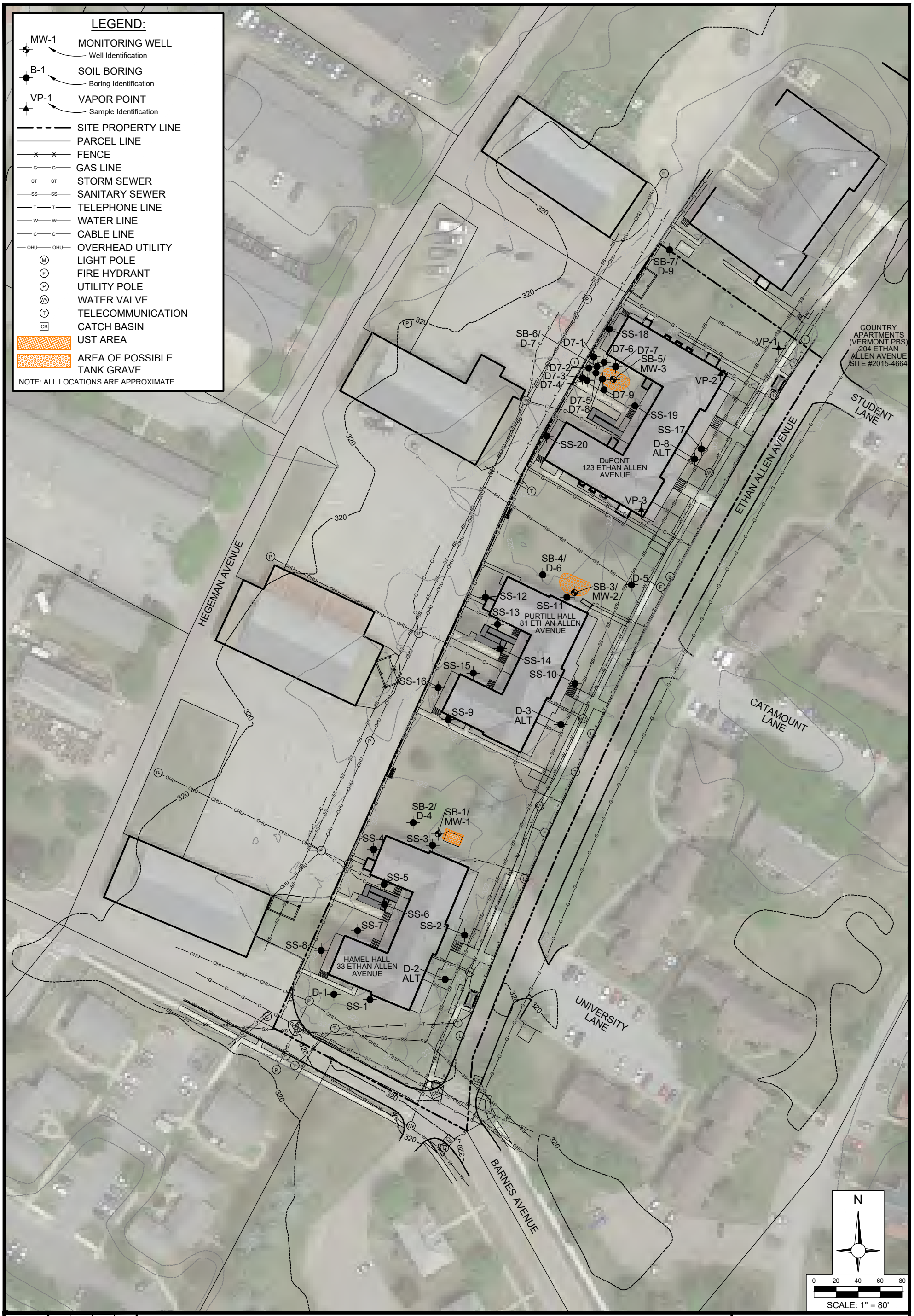


Figure: 2

Project Number: 280EM00780
Date: 02/02/2022
Drn. By: DH
Ckd. By: EU
Scale: AS SHOWN

SITE MAP

EVERNORTH
10TH CAVALRY COMPLEX
33, 81, 123 ETHAN ALLEN AVENUE
COLCHESTER, VERMONT

ATLAS

H:\2022\1 OTHER OFFICES\VERMONT\EVERNORTH\280EM00832-COC.DWG, FIG3

LEGEND:

- MW-1 — MONITORING WELL (Well Identification)
- B-1 — SOIL BORING (Boring Identification)
- VP-1 — VAPOR POINT (Sample Identification)
- SITE PROPERTY LINE
- PARCEL LINE
- FENCE
- GAS LINE
- STORM SEWER
- SANITARY SEWER
- TELEPHONE LINE
- WATER LINE
- CABLE LINE
- OVERHEAD UTILITY
- LIGHT POLE
- FIRE HYDRANT
- UTILITY POLE
- WATER VALVE
- TELECOMMUNICATION
- CATCH BASIN
- UST AREA
- AREA OF POSSIBLE TANK GRAVE

214 = POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs) REPORTED AS BENZO(a)PYRENE (BaP) TOXICITY EQUIVALENCE QUOTIENT (TEQ) IN MICROGRAMS PER KILOGRAM (µg/kg) IN SURFACE SOILS (0-18").
GREEN VALUES ARE BELOW VERMONT SOIL STANDARD (VVS) RESIDENT (70 µg/kg)
BLUE VALUES ARE ABOVE VSS RESIDENT (70 µg/kg)
ORANGE VALUES ARE ABOVE URBAN BACKGROUND (580 µg/kg)
RED VALUES ARE ABOVE VSS NON-RESIDENT (1,540 µg/kg)

SB-6/ D-7 752(0-1.5') D7-2 157(0-0.5') 561(0.5-1') D7-1 123(0-0.5') 331(0.5-1') D7-6 225(0-0.5') 303(0.5-1') D7-7 1,810(0-0.5') 156(0.5-1') D7-3 191(0-0.5') 2,001(0.5-1') 252(1-1.5') D7-5 71.1(0-0.5') 87(0.5-1') D7-8 76(0-0.5') 144(0.5-1') SB-5/ MW-3 D7-4 252(0-0.5') 384(0.5-1') D7-9 287(0-0.5') 93(0.5-1') SS-18 SS-19

SB-7/ D-9 214

SB-6/ D-7 SS-18 D7-1 D7-6 D7-7 SB-5/ MW-3 D7-2 D7-3 D7-4 D7-9 D7-5 D7-8 SS-19 SS-17 SS-20 D-8 ALT 106 VP-1 VP-2 VP-3

COUNTRY APARTMENTS (VERMONT PBS) 204 ETHAN ALLEN AVENUE SITE #2015-4664

DuPONT 123 ETHAN ALLEN AVENUE

SB-4/ D-6 63.5 D-5 121 SB-3/ MW-2 SS-12 SS-11 SS-13 PURTILL HALL 81 ETHAN ALLEN AVENUE SS-14 SS-15 SS-10 SS-16 SS-9 D-3 ALT 99.6

SB-2/ D-4 135 SB-1/ MW-1 SS-4 SS-3 SS-5 SS-6 SS-2 SS-7 SS-8 HAMEL HALL 33 ETHAN ALLEN AVENUE D-2 ALT 70.2 D-1 37.5 SS-1

HEGEMAN AVENUE
ETHAN ALLEN AVENUE
STUDENT LANE
CATAMOUNT LANE
UNIVERSITY LANE
BARNES AVENUE

320 323 322

N

0 20 40 60 80
SCALE: 1" = 80'

Figure: 3

Project Number: 280EM00780
Date: 02/03/2022
Drn. By: DH
Ckd. By: EU
Scale: AS SHOWN

CONTMINANT DISTRIBUTION MAP - PAHs IN SURFACE SOILS

EVERNORTH
10TH CAVALRY COMPLEX
33, 81, 123 ETHAN ALLEN AVENUE
COLCHESTER, VERMONT

ATLAS

H:\2022\1 OTHER OFFICES\VERMONT\EVERNORTH\280EM00832-PCB.DWG, FIG4

LEGEND:

- MW-1 — MONITORING WELL (Well Identification)
- B-1 — SOIL BORING (Boring Identification)
- VP-1 — VAPOR POINT (Sample Identification)
- SITE PROPERTY LINE
- PARCEL LINE
- FENCE
- GAS LINE
- STORM SEWER
- SANITARY SEWER
- TELEPHONE LINE
- WATER LINE
- CABLE LINE
- OVERHEAD UTILITY
- LIGHT POLE
- FIRE HYDRANT
- UTILITY POLE
- WATER VALVE
- TELECOMMUNICATION
- CATCH BASIN
- UST AREA
- AREA OF POSSIBLE TANK GRAVE

SS-1 THROUGH SS-20 ARE SHALLOW PCB SOIL SAMPLING LOCATIONS.
SAMPLE DEPTHS ARE 1-6" EXCEPT SS-17 (0-6"), SS-18 (2-8"), SS-19 (1-7"), AND SS-20 (1-7").
1,310 = PCB (AROCHLOR-1254) CONCENTRATION IN SOIL (µg/kg)
µg/kg = MICROGRAMS PER KILOGRAM
ND = NOT DETECTED ABOVE PROVIDED METHOD DETECTION LIMIT (MDL)
PCB = POLYCHLORINATED BIPHENYLS
J = ESTIMATED VALUE BETWEEN THE LABORATORY REPORTING AND METHOD DETECTION LIMITS.
GREEN VALUES ARE BELOW VERMONT SOIL STANDARDS FOR RESIDENT SOILS (VSS-R) RESIDENT (144 µg/kg)
BLUE VALUES ARE ABOVE VSS-R (144 µg/kg)
ORANGE VALUES ARE ABOVE VSS FOR NON-RESIDENT SOILS (680 µg/kg)
RED VALUES ARE ABOVE EPA HIGH OCCUPANCY STANDARD (EPA-HOV) (1,000 µg/kg)

HEGEMAN AVENUE
ETHAN ALLEN AVENUE
STUDENT LANE
CATAMOUNT LANE
UNIVERSITY LANE
BARNES AVENUE
COUNTRY APARTMENTS (VERMONT PBS) 204 ETHAN ALLEN AVENUE SITE #2015-4664
DuPONT 123 ETHAN ALLEN AVENUE
PURTILL HALL 81 ETHAN ALLEN AVENUE
HAMEL HALL 33 ETHAN ALLEN AVENUE

SB-7/D-9; SB-6/D-7; D7-1; SS-18 ND<29; D7-6; D7-7; SB-5/MW-3; D7-2; D7-3; D7-4; D7-9; D7-5; D7-8; SS-19 ND<30; SS-17 ND<30; D-8 ALT; SS-20 ND<28; VP-1; VP-2; VP-3; SB-4/D-6; D-5; SB-3/MW-2; SS-12 1,310; SS-11 ND<29; SS-13 43.7J; SS-14 ND<30; SS-15 ND<30; SS-16 154; SS-10 67.2; D-3 ALT; SS-9 ND<31; SB-2/D-4; SB-1/MW-1; SS-3 56.5; SS-4 ND<30; SS-5 ND<30; SS-6 ND<30; SS-7 ND<30; SS-2 ND<30; SS-8 ND<29; D-2 ALT; D-1; SS-1 ND<31

320

N

0 20 40 60 80

SCALE: 1" = 80'

CONTMINANT DISTRIBUTION MAP - PCBs (AROCHLOR-1254) IN SOIL

EVERNORTH
10TH CAVALRY COMPLEX
33, 81, 123 ETHAN ALLEN AVENUE
COLCHESTER, VERMONT

Figure:	Project Number:	Date:	Drn. By:	Ckd. By:	Scale:
4	280EM00780	02/03/2022	DH	EU	AS SHOWN

ATLAS

H:\2022\1 OTHER OFFICES\VERMONT\EVERNORTH\280EM00861-LEAD.DWG, FIG5

LEGEND:

- 31A — SOIL SAMPLE (Composite Sample Identification)
- D1 — SOIL BORING (Boring Identification)
- SITE PROPERTY LINE
- PARCEL LINE
- FENCE
- GAS LINE
- STORM SEWER
- SANITARY SEWER
- TELEPHONE LINE
- WATER LINE
- CABLE LINE
- OVERHEAD UTILITY
- LIGHT POLE
- FIRE HYDRANT
- UTILITY POLE
- WATER VALVE
- TELECOMMUNICATION
- CATCH BASIN
- UST AREA
- AREA OF POSSIBLE TANK GRAVE

105 = LEAD CONCENTRATION IN SOIL IN MILLIGRAMS PER KILOGRAM (mg/kg).
GREEN VALUES ARE BELOW RCRA "RULE OF 20" (100 mg/kg)
BLUE VALUES EXCEED RCRA "RULE OF 20" (100 mg/kg)
ORANGE VALUES ARE ABOVE VERMONT SOIL STANDARDS FOR RESIDENT SOILS (VSS-R, 400 mgkg)
RED VALUES ARE ABOVE VSS FOR NON-RESIDENTIAL SOILS (VSS-NR, 800 mg/kg)
COMPOSITE SAMPLES WERE COLLECTED IN MAY 2021 BY EVERGREEN ON BEHALF OF VERMONT HOUSING AND CONSERVATION BOARD (VHCB). SOIL BORINGS COMPLETED BY ATC IN AUGUST 2021.

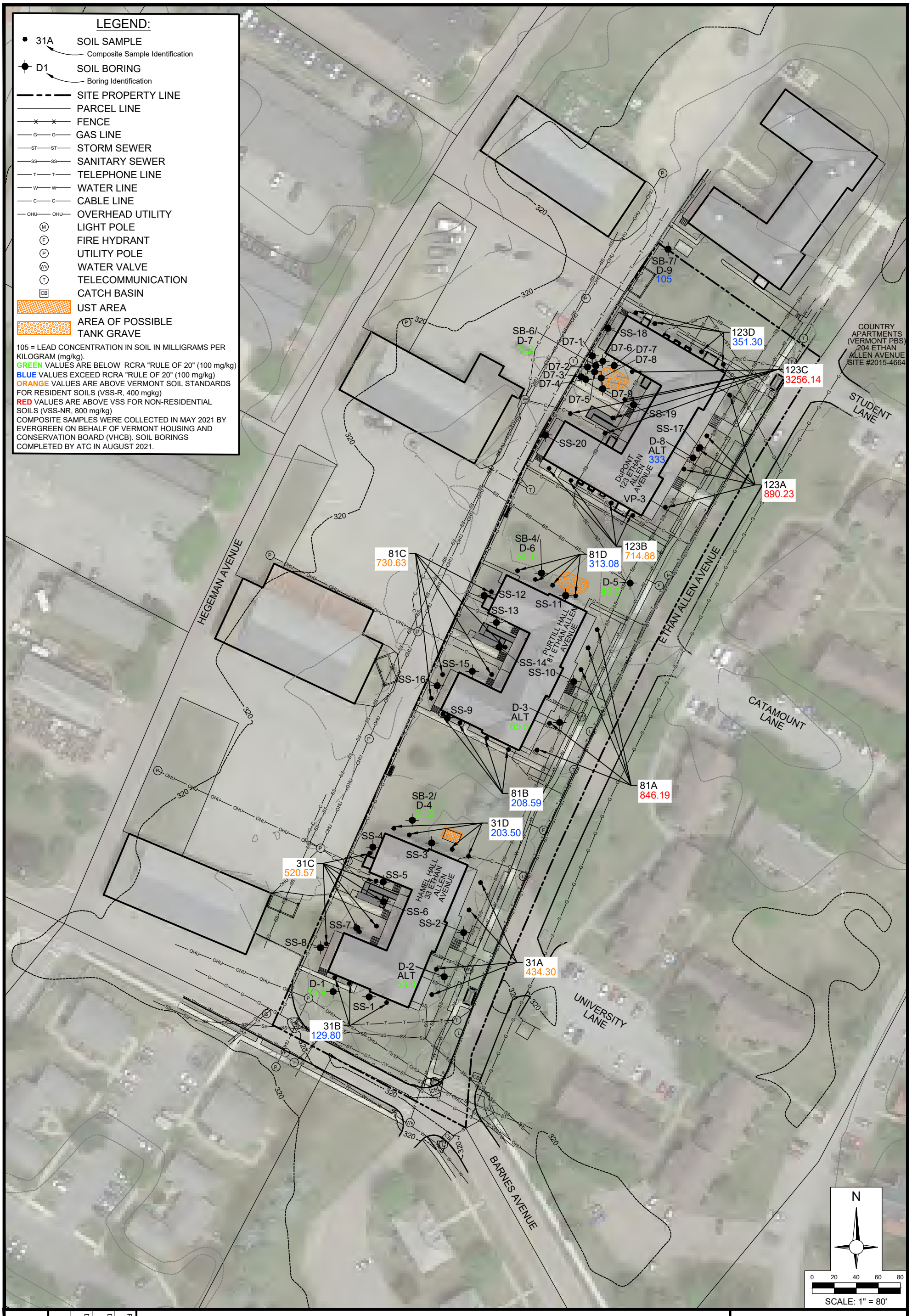


Figure: 5	Project Number: 280EM00861	Date: 03/30/2022	Drn. By: DH / Ckd. By: EU
Scale: AS SHOWN			

CONTAMINANT DISTRIBUTION MAP - LEAD IN SURFACE SOILS

EVERNORTH
10TH CAVALRY COMPLEX
33, 81, 123 ETHAN ALLEN AVENUE
COLCHESTER, VERMONT

ATLAS

H:\2022\1 OTHER OFFICES\VERMONT\EVERNORTH\280EM00861-SITE.DWG, FIG6

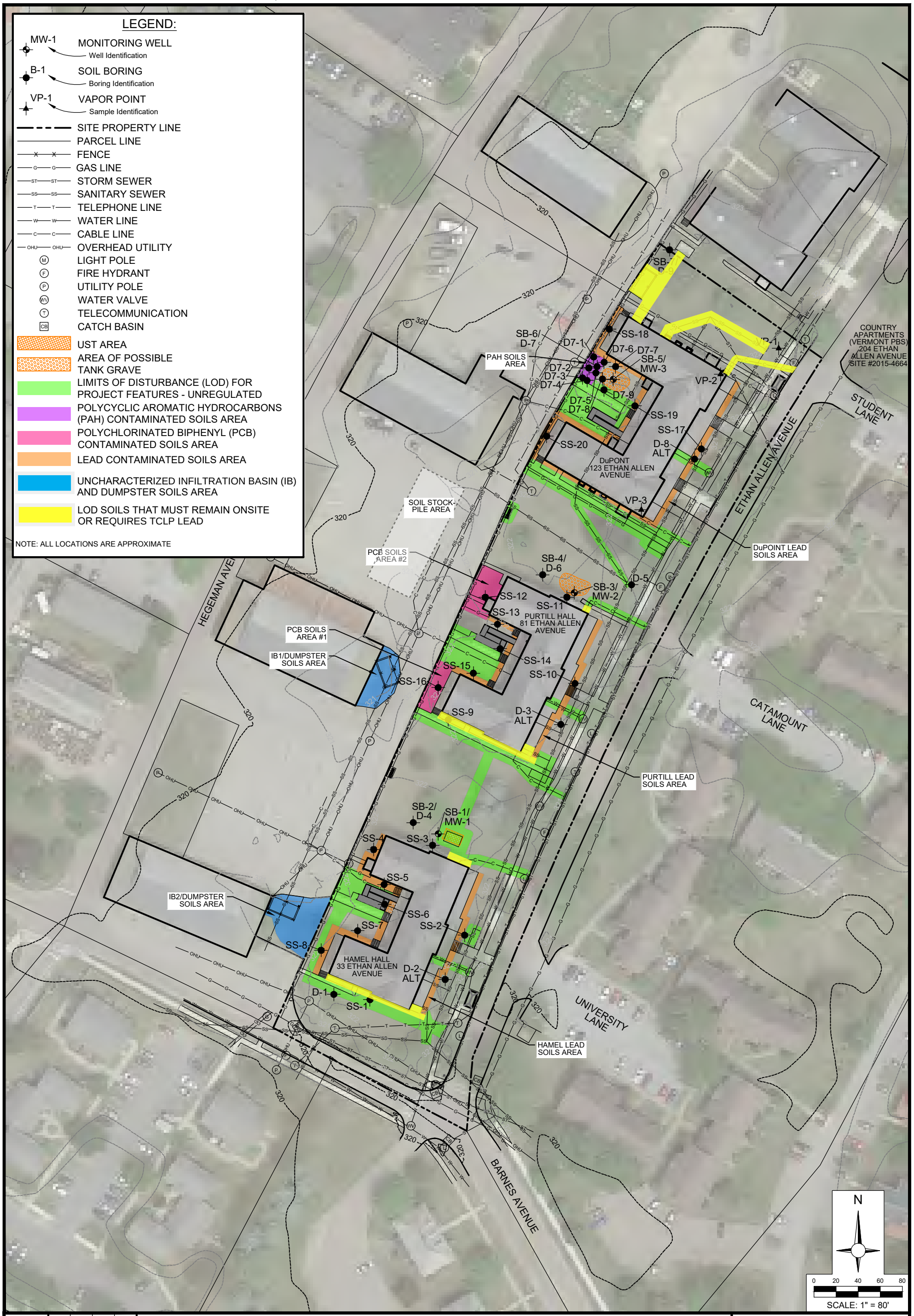


Figure: 6	Project Number: 280EM00861	Drn. By: DH	Ckd. By: EU
Scale: AS SHOWN	Date: 03/16/2022		

CONTAMINATED SOIL MANAGEMENT AREAS

EVERNORTH
10TH CAVALRY COMPLEX
33, 81, 123 ETHAN ALLEN AVENUE
COLCHESTER, VERMONT

ATLAS

APPENDIX A

SITE INVESTIGATION TABLES

SOIL QUALITY RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS
10th CAVALRY, COLCHESTER, VT

Compound	BaP TEQ	Acenaphthene	Acenaphthylene	1-Methylnaphthalene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene (BaP)	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene
VSS Resident	70	NS	NS	NS	NS	NS	TEQ	NS	NS	NS	NS	NS	2,301,000	2,301,000	NS	NS	2,700	NS	NS
Urban Background	580	NS	NS	NS	NS	NS	TEQ	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VSS Non-Resident	1,540	NS	NS	NS	NS	NS	TEQ	NS	NS	NS	NS	NS	26,371,000	26,371,000	NS	NS	16,000	NS	NS
BaP TEF	--	--	--	--	--	0.1	1	0.1	--	0.01	0.01	1	--	--	0.1	--	--	--	--
Sample ID:	**Sample Depth (fbgs):**	**Sample Date:**																		
D1	0-1.5	08/16/21	**37.5**	ND<19.7	ND<19.7	ND<19.7	ND<19.7	**25.0**	**21.8**	**20.2**	ND<19.7	ND<19.7	**23.8**	ND<19.7	**50.6**	ND<19.7	ND<19.7	ND<19.7	ND<19.7	**20.4**	**40.6**
		DUP	ND<21.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	**30.6**	ND<18.7	ND<18.7	ND<18.7	ND<18.7	ND<18.7	**23.7**
		RPD	--	--	--	--	--	--	--	--	--	--	--	--	49%	--	--	--	--	--	53%
D2-ALT	0-1.5	08/16/21	**70.2**	ND<19.9	ND<19.9	ND<19.9	ND<19.9	**58.9**	**46.6**	**40.1**	**30.0**	**43.4**	**52.6**	ND<19.9	**117**	ND<19.9	**27.5**	ND<19.9	ND<19.9	**45.1**	**96.7**
D3-ALT	0-1.5	08/16/21	**99.6**	ND<18.9	ND<18.9	ND<18.9	ND<18.9	**88.2**	**69.6**	**61.9**	**44.8**	**55.7**	**81.0**	ND<18.9	**177**	ND<18.9	**41.8**	ND<18.9	ND<18.9	**66.1**	**141**
SB-2/D4	0-1.5	08/16/21	**135**	ND<17.8	ND<17.8	ND<17.8	**19.5**	**116**	**86.6**	**84.7**	**57.0**	**94.1**	**110**	**21.5**	**214**	ND<17.8	**49.1**	ND<17.8	ND<17.8	**85.8**	**181**
D5	0-1.5	08/16/21	**121**	ND<18.0	ND<18.0	ND<18.0	ND<18.0	**102**	**78.1**	**81.0**	**50.7**	**77.5**	**97.8**	**18.4**	**186**	ND<18.0	**44.3**	ND<18.0	ND<18.0	**67.2**	**141**
SB-4/D6	0-1.5	08/16/21	**63.5**	ND<18.4	ND<18.4	ND<18.4	ND<18.4	**51.3**	**42.1**	**36.6**	**27.7**	**43.4**	**44.1**	ND<18.4	**94.8**	ND<18.4	**25.0**	ND<18.4	ND<18.4	**35.1**	**78.7**
SB-6/D7	0-1.5	08/16/21	**752**	**208**	ND<18.0	**44.9**	**467**	**700**	**498**	**444**	**251**	**446**	**780**	**103**	**1,650**	**170**	**247**	**44.6**	**50.7**	**1,720**	**1,340**
D7-1-0.5	0-0.5	12/28/21	**123**	ND<13	ND<18	NA	ND<22	**72.0**	**79.5**	**115**	**55.4**	**49.1**	**84.0**	**17.3 J**	**134**	ND<17	**58.9**	NA	ND<10	**60.7**	**111**
D7-1-1	0.5-1	12/28/21	**331**	ND<12	**50.7**	NA	**37.8**	**192**	**198**	**298**	**166**	**113**	**212**	**62.2**	**310**	ND<16	**186**	NA	**17.9 J**	**123**	**262**
D7-2-0.5	0-0.5	12/28/21	**157**	**15.1 J**	ND<19	NA	**24.9 J**	**108**	**97.2**	**144**	**73.7**	**60.0**	**113**	**24.2 J**	**201**	ND<17	**87.5**	NA	ND<10	**113**	**171**
D7-2-1	0.5-1	12/28/21	**561**	**51.4**	**45.8**	NA	**88.8**	**365**	**350**	**511**	**269**	**172**	**398**	**86.4**	**734**	**42.2**	**315**	NA	**20.1 J**	**411**	**594**
D7-3-0.5	0-0.5	12/28/21	**191**	ND<12	**28.3 J**	NA	ND<22	**123**	**120**	**184**	**77.9**	**74.7**	**127**	**28.2 J**	**211**	ND<17	**96.1**	NA	ND<10	**80.5**	**179**
D7-3-1	0.5-1	12/28/21	**2,001**	**347**	**89.9**	NA	**444**	**1,460**	**1,270**	**1,780**	**886**	**678**	**1,400**	**278**	**2,940**	**267**	**1,080**	NA	**59.2**	**2,030**	**2,110**
D7-3-1.5	1-1.5	12/28/21	**247**	ND<12	**25.3 J**	NA	**26.8 J**	**160**	**159**	**208**	**104**	**88.9**	**164**	**36.0**	**249**	ND<16	**126**	NA	ND<9.9	**99.6**	**224**
D7-4-0.5	0-0.5	12/28/21	**252**	ND<13	ND<19	NA	**30.4 J**	**171**	**163**	**229**	**101**	**89.5**	**178**	**34.0 J**	**314**	ND<17	**123**	NA	**16.5 J**	**133**	**276**
D7-4-1	0.5-1	12/28/21	**384**	**38.0**	**19.5 J**	NA	**79.8**	**269**	**242**	**323**	**177**	**109**	**260**	**58.1**	**496**	**29.3 J**	**213**	NA	**18.0 J**	**324**	**431**
D7-5-0.5	0-0.5	12/28/21	**71.1**	ND<13	ND<19	NA	ND<23	**51.6**	**47.6**	**61.4**	**31.7 J**	**23.9 J**	**46.3**	ND<16	**84.3**	ND<17	**35.2 J**	NA	ND<10	**44.7**	**79.1**
		DUP	**110**	ND<13	ND<19	NA	**26.7 J**	**86.1**	**77.3**	**96.6**	**43.7**	**40.0**	**80.4**	ND<16	**159**	ND<17	**55.9**	NA	ND<10	**102**	**150**
		RPD	43%	--	--	--	--	50%	48%	45%	32%	50%	54%	--	61%	--	45%	--	--	78%	62%
D7-5-1	0.5-1	12/28/21	**87**	ND<13	ND<20	NA	ND<24	**58.8**	**57.1**	**86.0**	**48.4**	**32.9 J**	**69.0**	ND<17	**111**	ND<18	**62.9**	NA	ND<11	**60.7**	**96.3**
D7-6-0.5	0-0.5	12/28/21	**225**	ND<13	**35.9 J**	NA	**29.5 J**	**139**	**144**	**229**	**94.0**	**80.4**	**157**	**30.2 J**	**265**	ND<18	**115**	NA	**12.1 J**	**129**	**248**
D7-6-1	0.5-1	12/28/21	**303**	ND<15	**40.0 J**	NA	**33.5 J**	**171**	**183**	**272**	**167**	**110**	**208**	**53.5**	**305**	ND<20	**195**	NA	**35.1 J**	**141**	**254**
D7-7-0.5	0-0.5	12/28/21	**18**	ND<12	ND<17	NA	ND<21	**12.4 J**	ND<16	ND<15	ND<17	ND<16	**11.5 J**	ND<15	ND<15	ND<16	ND<16	NA	ND<9.6	ND<11	**16.9 J**
D7-7-1	0.5-1	12/28/21	**156**	ND<13	ND<19	NA	**22.9 J**	**104**	**96.1**	**145**	**82.7**	**43.4**	**112**	**24.1 J**	**173**	ND<17	**97.1**	NA	**30.6 J**	**94.9**	**156**
D7-8-0.5	0-0.5	12/28/21	**76**	ND<12	ND<18	NA	ND<22	**50.3**	**51.1**	**70.6**	**34.7 J**	**31.7 J**	**59.4**	ND<16	**98.5**	ND<16	**42.2**	NA	ND<10	**43.5**	**86.7**
D7-8-1	0.5-1	12/28/21	**144**	ND<12	ND<18	NA	ND<22	**84.9**	**91.8**	**127**	**70.1**	**46.1**	**111**	**21.2 J**	**193**	ND<16	**82.0**	NA	**24.5 J**	**107**	**159**
D7-9-0.5	0-0.5	12/28/21	**287**	ND<13	**24.9 J**	NA	**29.1 J**	**180**	**187**	**266**	**116**	**101**	**188**	**38.8**	**320**	ND<17	**139**	NA	ND<11	**125**	**288**
D7-9-1	0.5-1	12/28/21	**93**	ND<12	**69.7**	NA	ND<21	**67.6**	**55.1**	**86.0**	ND<17	**28.8 J**	**116**	ND<15	**95.6**	ND<15	**58.5**	NA	**179**	**133**	**103**
D8-ALT	0-1.5	08/16/21	**106**	ND<18.8	ND<18.8	ND<18.8	ND<18.8	**107**	**69.9**	**92.8**	**60.4**	**74.9**	**78.1**	ND<18.8	**167**	ND<18.8	**48.9**	ND<18.8	ND<18.8	**59.0**	**145**
SB-7/D9	0-1.5	08/16/21	**214**	ND<19.8	ND<19.8	ND<19.8	**28.1**	**173**	**138**	**119**	**92.4**	**129**	**165**	**35.1**	**287**	ND<19.8	**83.5**	ND<19.8	ND<19.8	**111**	**241**

NOTES:
All results provided in micrograms per kilogram (µg/kg) or parts per billion (ppb), analyzed by EPA Method 8270
Bold values indicate detections
NE = not encountered
VSS = Vermont Soil Standards (IRULE, July 2019)
TEF = Toxicity Equivalency Factor, TEQ = Toxicity Equivalency Quotient
BaP TEQ values were calculated from select PAH analyical concentrations as shown multiplied by the corresponding TEF and summed
TEF compounds that are non-detect were estimated based on half of the provided laboratory limit
BaP TEQ values are compared to VSS for Resident Soils, Non-Resident Soils and Urban Background Values
Green shaded values are below Resident Values
Blue shaded values indicate exceedance of Resident Values
Orange shaded values indicate exceedance of Urban Background Values
Red shaded values indicate exceedance of Non-Resident Values
ND = not detected above stated method detection limit (MDL)
NS = no standard available
NA = not analyzed
J = estimated value below laboratory reporting limit (RL)
fbgs = feet below ground surface
RPD = relative percent difference

SOIL QUALITY RESULTS - PCBs
10th CAVALRY, COLCHESTER, VT

Analyte			Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Arochlor 1268	Arochlor 1262
Sample ID:	**Depth (in):**	**Date:**									
SS-1	1-6"	01/05/22	ND<27	ND<35	ND<36	ND<23	ND<51	ND<31	ND<24	ND<24	ND<37
SS-2	1-6"	01/05/22	ND<29	ND<38	ND<39	ND<25	ND<55	ND<33	ND<26	ND<26	ND<40
SS-3	1-6"	01/05/22	ND<26	ND<35	ND<36	ND<23	ND<50	**56.5**	ND<24	ND<24	ND<36
SS-4	1-6"	01/05/22	ND<26	ND<34	ND<35	ND<23	ND<49	ND<30	ND<24	ND<23	ND<36
SS-5	1-6"	01/05/22	ND<26	ND<35	ND<36	ND<23	ND<50	ND<30	ND<24	ND<24	ND<37
SS-6	1-6"	01/05/22	ND<26	ND<34	ND<35	ND<23	ND<50	ND<30	ND<24	ND<23	ND<36
SS-7	1-6"	01/05/22	ND<26	ND<35	ND<36	ND<23	ND<50	ND<30	ND<24	ND<24	ND<37
SS-8	1-6"	01/05/22	ND<25	ND<34	ND<35	ND<22	ND<48	ND<29	ND<23	ND<23	ND<35
SS-9	1-6"	01/05/22	ND<27	ND<36	ND<37	ND<24	ND<51	ND<31	ND<24	ND<24	ND<38
SS-10	1-6"	01/05/22	ND<27	ND<36	ND<37	ND<24	ND<51	**67.2**	ND<24	ND<24	ND<38
SS-11	1-6"	01/05/22	ND<25	ND<34	ND<35	ND<22	ND<49	ND<29	ND<23	ND<23	ND<36
SS-12	1-6"	01/05/22	ND<26	ND<35	ND<36	ND<23	ND<50	**1,310**	ND<24	ND<24	ND<37
SS-13	1-6"	01/05/22	ND<26	ND<34	ND<35	ND<23	ND<49	**43.7 J**	ND<24	ND<23	ND<36
SS-14	1-6"	01/05/22	ND<26	ND<34	ND<35	ND<23	ND<49	ND<30	ND<23	ND<23	ND<36
SS-15	1-6"	01/05/22	ND<26	ND<35	ND<36	ND<23	ND<50	ND<30	ND<24	ND<24	ND<37
SS-16	1-6"	01/05/22	ND<27	ND<36	ND<37	ND<24	ND<52	**154**	ND<25	ND<25	ND<38
SS-17	0-6"	12/28/21	ND<26	ND<34	ND<35	ND<23	ND<49	ND<30	ND<23	ND<23	ND<36
SS-18	2-8"	12/28/21	ND<25	ND<33	ND<34	ND<22	ND<48	ND<29	ND<23	ND<23	ND<35
SS-19	1-7"	12/28/21	ND<26	ND<34	ND<35	ND<23	ND<50	ND<30	ND<24	ND<23	ND<36
SS-20	1-7"	12/28/21	ND<24	ND<32	ND<33	ND<21	ND<46	ND<28	ND<22	ND<22	ND<34

NOTES:
Polychlorinated biphenyls (PCBs) soil quality results, provided in ug/kg = micrograms per kilogram, analyzed by EPA Method 8082 w/soxhlet extrac
Bold values indicate detections
VSS = Vermont Soil Standards (IRULE, July 2019)
Yellow shaded values indicate exceedance of VSS Resident Values (VSS-R) = 144 ug/kg
Orange shaded values indicate exceedance of VSS Non-Resident Values (VSS-NR) = 680 ug/kg
Red shaded values indicate exceedance of EPA High Occupancy Cleanup Standards (EPA-HOCS) = 1,000 ug/kg
ND = not detected above provided detection limit
ft bgs = feet below ground surface
RPD = relative percent difference

SOIL QUALITY RESULTS - METALS
10th CAVALRY, COLCHESTER, VT

			Analyte	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
			VSS Resident	**16**	**11,247**	**6.9**	**40,223**	**400**	**366**	**237**	**3.1**
			VSS Non-Resident	**16**	**127,382**	**87**	**360,223**	**800**	**4,900**	**2,483**	**3.1**
Sample ID:	**Depth (ft bgs):**	**Date:**									
D1	0-1.5	08/16/21		**4.43**	**20.4**	ND<0.603	**9.59**	**16.9**	ND<1.81	ND<1.81	ND<0.0364
		DUP		**4.15**	**22.5**	ND<0.588	**10.5**	**17.0**	ND<1.76	ND<1.76	ND<0.0337
		RPD		7%	10%	--	9%	1%	--	--	--
D2-ALT	0-1.5	08/16/21		**4.69**	**28.5**	ND<0.621	**11.1**	**53.0**	ND<1.86	ND<1.86	ND<0.0365
D3-ALT	0-1.5	08/16/21		**4.03**	**19.2**	ND<0.572	**10.0**	**65.5**	ND<1.72	ND<1.72	**0.0385**
SB-2/D4	0-1.5	08/16/21		**3.41**	**27.7**	ND<0.575	**9.40**	**21.2**	ND<1.73	ND<1.73	ND<0.0339
D5	0-1.5	08/16/21		**3.92**	**27.4**	ND<0.549	**11.5**	**40.0**	ND<1.65	ND<1.65	ND<0.0343
SB-4/D6	0-1.5	08/16/21		**3.88**	**20.1**	ND<0.586	**9.00**	**30.0**	ND<1.76	ND<1.76	ND<0.0333
SB-6/D7	0-1.5	08/16/21		**3.96**	**14.1**	ND<0.576	**8.98**	**13.2**	ND<1.73	ND<1.73	ND<0.0337
D8-ALT	0-1.5	08/16/21		**6.23**	**36.1**	ND<0.615	**11.2**	**333**	ND<1.85	ND<1.85	**0.111**
SB-7/D9	0-1.5	08/16/21		**4.25**	**39.1**	ND<0.578	**10.7**	**105**	ND<1.73	ND<1.73	**0.0500**

NOTES:
All results provided in milligrams per kilogram (mg/kg) or parts per million (ppm)
All samples analyzed by EPA Methods 6010/7470
Bold values indicate detections
VSS = Vermont Soil Standards (IRULE, July 2019)
Light shaded values indicate exceedance of Resident Values
Dark shaded values indicate exceedance of Non-Resident Values
ND = not detected above provided detection limit
ft bgs = feet below ground surface
RPD = relative percent difference
Lead exceeds RCRA "Rule of 20" (100 mg/kg) in D8-ALT and SB-7/D9
Chromium results assume Chromium III

GROUNDWATER ELEVATION RESULTS
10th CAVALRY, COLCHESTER, VT
8/23/2021

Well I. D.	Ground Elevation (famsl)	TOC Elevation (famsl)	Top of screen (fbgs)	Bottom of screen (fbgs)	Depth to Water (ft below TOC)	Groundwater Elevation (famsl)
MW-1	323.94	323.84	10	20	15.00	308.84
MW-2	322.68	322.46	10	20	13.43	309.03
MW-3	322.74	322.56	10	20	12.71	309.85

NOTES:
Monitoring wells were surveyed by LEG on August 23, 2021
Bench mark was southern bonnet bolt on hydrant
ft amsl = feet above mean sea level
TOC = top of casing

SOIL VAPOR ANALYTICAL RESULTS
10th CAVALRY, COLCHESTER, VT

		Sample ID:	VP-1	VP-2			VP-3
		Sample Depth (ft):	4.5-5	0	Duplicate	RPD	0
		Sample date:	8/25/2021	8/25/2021			8/25/2021
Compound	**SSSG-R**	**SSSG-NR**					
Vinyl chloride	**3.7**	**62**	ND<0.072	ND<0.072	ND<0.072	--	ND<0.072
Chloroethane	**330,000**	**1,200,000**	ND<0.66	ND<0.66	ND<0.66	--	ND<0.66
1,1-Dichloroethene	**6,700**	**23,000**	ND<0.11	ND<0.11	ND<0.11	--	ND<0.11
Methylene chloride	**2,000**	**27,000**	ND<0.59	ND<0.59	ND<0.59	--	**0.91 J**
1,1-Dichloroethane	**21**	**170**	ND<0.12	ND<0.12	ND<0.12	--	ND<0.12
1,2-Dichloroethene, total	**NS**	**NS**	ND<0.71	ND<0.71	ND<0.71	--	ND<0.71
Carbon tetrachloride	**5.7**	**45**	ND<0.20	**0.53 J**	**0.63 J**	17%	**0.36 J**
Benzene	**4.3**	**35**	ND<0.24	ND<0.24	ND<0.24	--	ND<0.24
TCE	**6.7**	**23**	ND<0.13	ND<0.13	ND<0.13	--	ND<0.13
PCE	**21**	**170**	**3.5**	**0.30 J**	**0.28 J**	7%	**0.37 J**
Ethylbenzene	**13**	**110**	ND<0.43	ND<0.43	ND<0.43	--	ND<0.43
Xylene, total	**NS**	**NS**	**2.6**	ND<1.1	ND<1.1	--	ND<1.1
TMBs, total	**2,000**	**7,000**	**9.39 J**	**0.57 J**	**0.56 J**	2%	**0.33 J**
Naphthalene	**1.0**	**8.0**	ND<0.89	ND<0.89	ND<0.89	--	ND<0.89

Notes:

All samples analyzed by EPA Method TO15 and reported in micrograms per cubic meter (ug/m3)

Vapor Intrusion Standards (VIS) are from Appendix A of the Investigation and Remediation of Contaminated Properties Rule, July 2019; subslab soil gas for resident (SSSG-R) and non-resident (SSSG-NR) uses

Shaded values exceed corresponding VIS

ND = Not detected at or above stated laboratory method detection limit (MDL)

NA = Not analyzed

Italicized values indicate MDL exceeds VIS

J = Indicates estimated value below laboratory reportling limit (RL)

D = Result exceeded calibration range (E-flag), so a dilution was run, which results reflect

PCE = tetrachloroethylene or perchlorethylene

TCE = trichloroethylene

TMBs = trimethylbenzenes; includes sum of 1,2,4- and 1,3,5-TMB

APPENDIX B

PUBLIC NOTICE FORM, ABUTTERS LIST

State of Vermont
Department of Environmental Conservation
Waste Management & Prevention Division
Davis Building - 1st Floor, One National Life Drive
Montpelier, VT 05620-3704

OFFICIAL NOTICE

Dear _____,

This is an official notice that a draft Corrective Action Plan (CAP) has been prepared by Atlas Technical Consultants, LLC on behalf of Chittenden County Regional Planning Commission and Evernorth for the 10th Cavalry Complex site. Vermont law requires that adjoining and/or impacted property owners receive notice of this CAP, as well as being provided a 30 day public comment period. The public comment period will start on _____ and end on _____.

The CAP approval process includes a public comment period and an opportunity to request a public meeting. Note that in order to appeal a final CAP approval, comments must be submitted during the public comment period.

To view the draft CAP, please visit the Environmental Notice Bulletin (ENB) at ENB.VERMONT.GOV, and enter the site number: 2021-5014 in the "Permit #" space. Do not include spaces or dashes.

For further information, please visit the following website:
DEC.VERMONT.GOV/PERMITS/ENB/GENERAL.

FOR QUESTIONS CONTACT:
Waste Management & Prevention Division, Sites Management Section (SMS)
SMS Site Manager: Shawn Donovan
SMS Site Manager email address: Shawn.Donovan@vermont.gov
(802) 828-1138

SITE NUMBER

2021-5014

NAME OF POTENTIALLY RESPONSIBLE PARTY

St. Michael's College

LOCATION OF CORRECTIVE ACTION STREET ADDRESS/ROUTE

33, 81, 129 Ethan Allen Avenue

TOWN(S) WHERE PROPOSED CORRECTIVE ACTION WILL TAKE PLACE

Colchester

10th Cavalry Apartments Adjoining Landowners						
Name 1	Name 2	Mailing Address 1	Mailing Address 2	City	State	ZIP
Green Mountain Realty LLC		475 Ethan Allen Ave		Colchester	VT	05446
Ethan Allen Condominium Association Inc.	Attn: Abigail Matchette, Secretary	1002A Ethan Allen Ave		Essex Jct	VT	05452
Dalton Drive Nighborhood Association	Attn: Jennifer Larsen, President	408A Dalton Drive		Colchester	VT	05446
Dalton Drive Nighborhood Association	c/o Scott Michaud	PO Box 1201		Williston	VT	05495
Catamount Lane LLC	C/O Redstone	PO Box 790		Burlington	VT	05402
Catamount Lane LLC		100 Bank Street		Burlington	VT	05401
Coolidge Condominium Association, Inc.	Attn: Alison Joseph, Secretary	15 Coolidge Court Unit 1		Colchester	VT	05446
United States of America	C/O Camp Johnson Attn: Judy Stone	789 National Guard Rd		Colchester	VT	05446-3004
492 Hegeman Avenue LLC		492 Hegeman Ave		Colchester	VT	05446
462 Hegeman Avenue EBT LLC	462 Hegeman Avenue FJT LLC	C/O Frank Von Turkovich	1 National Life Dr M230	Montpelier	VT	05604
State of Vermont	Department of State Buildings & General Services	2 Governor Aiken Ave		Montpelier	VT	05633-5802
William L. Penrod Revocable Trust		364 Hegeman Ave		Colchester	VT	05446
Lawton Realty		4330 N Highway A1A	Altamira 802N	Hutchinson Island	FL	34949
State of Vermont	Department of State Buildings & General Services	2 Governor Aiken Ave		Montpelier	VT	05633-5802
SSV/JGV LLC	C/O David Vaughn	1293 Westman Rd		Cambridge	VT	05444
Fort Apartments Limited Partnership		100 Bank St, Suite 400		Burlington	VT	05401
Joan E. Penrod Revocable Trust	Karen Penrod, Trustee	364 Hegeman Ave		Colchester	VT	05446
Fort Apartments Limited Partnership		100 Bank Street, Suite 400		Burlington	VT	05401
Islamic Society of Vermont Inc.		182 Hegeman Ave 1		Colchester	VT	05446
Penrod Stairways Inc.		183 Hegeman Ave		Colchester	VT	05446
162 Hegeman Avenue LLC		One National Life Drive M230		Montpelier	VT	05602
Fed Inc		166 Hummingbird Lane		South Burlington	VT	05403
K & M LLC		120 Hegeman Ave		Colchester	VT	05406
Champlain Community Services		512 Troy Ave		Colchester	VT	05446
Richard D. Morrison Revocable Trust	Richard D. & Beverly H. Morrison, Trustees	31 Pearl Street		Essex Jct	VT	05452
Green Mountain Realty LLC		475 Ethan Allen Ave		Colchester	VT	05446

APPENDIX C

HEALTH & SAFETY PLAN

Health and Safety Plan

Prepared For:

Evernorth-10th Cavalry

33, 81, 123 Ethan Allen Avenue

Colchester, VT 05446

Atlas Project #: 280EM00780

SMS Site #: 2021-5014

Prepared By:

Atlas Technical Consultants

51 Knight Lane

Williston, VT 05495

REVIEW AND APPROVAL

CLIENT: CCRPC and Evernorth **PROJECT NUMBER:** 280EM00861

SITE NAME: 10th Cavalry Complex **SITE LOCATION:** 33, 81, 123 Ethan Allen Ave, Colchester

PROJECT DESCRIPTION: Contaminated soil excavations and handling for corrective action and post excavation sampling

PREPARED BY: Erik Urch **TITLE:** Sr. Project Manager **DATE:** 4/12/2022

Erik Urch		
Project Manager	**Signature**	**Date**
Erik Gaster		
Reviewer's Name	**Signature**	**Date**

This Health and Safety Plan (HASP) has been written for the use of Atlas and its employees. It may also be used as a guidance document by properly trained and experienced Atlas subcontractors. However, Atlas does not guarantee the health or safety of any person working on this project site.

Due to the potential hazardous nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards which may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury at this site. The health and safety guidelines in this Plan were prepared specifically for this site and should not be used on any other site without prior research by trained health and safety specialists. All site personnel have the authority to "Stop Work" if unsafe conditions are present or discovered during site activities.

Atlas claims no responsibility for use of this plan by others. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if these conditions change.

Table of Contents

EMERGENCY INFORMATION

Site Emergency Numbers	
Police, Fire and Ambulance Emergencies	**911**
CORE Health Networks *(24 hour Injury/Illness Case Management)*	**(855) 282-6331**
Poison Control Center	**(800) 222-1222**
Nationwide Call Before You Dig	**811 (888-DIG-SAFE)**
National Response Center	**(800) 424-8802**
EPA Region # Main Office (enter region #)	**(800) 887-6063**
State Environmental Agency	**(802) 828-1556**

HOSPITAL AND ROUTE INFORMATION

Fanny Allen Campus
790 College Parkway
Colchester, VT 05446-3052
802-847-7559

Approximate travel time is 10-11 minutes.

Directions from Ethan Allen Ave

1. Turn left onto Barnes Ave
2. Turn right onto VT-15 W (1.5 mi)
3. Continue straight onto E Allen St (0.6 mi)
4. Turn left onto US-2 E/US-7 S/Main St
5. Continue straight onto Colchester Ave
6. Turn left onto UVM Medical Center
7. Turn right onto Beaumont Ave

OCCUPATIONAL MEDICAL CLINIC AND ROUTE INFORMATION

Fanny Allen Campus
790 College Parkway
Colchester, VT 05446-3052
802-847-7559

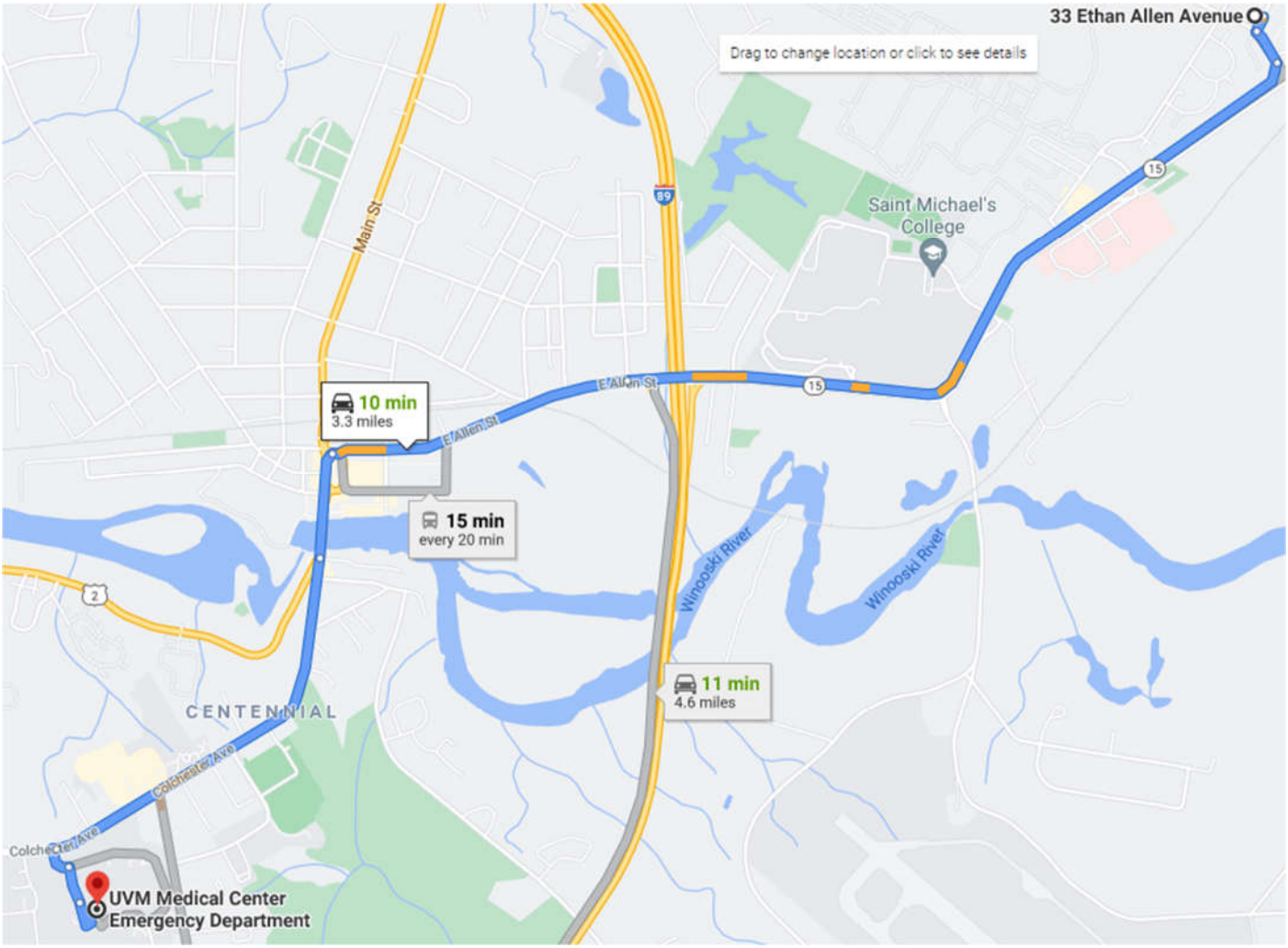
Approximate travel time is 2-3 minutes.

Directions from Ethan Allen Ave

1. Turn left onto Barnes Ave
2. Turn right onto VT-15 W (0.5 mi)
3. Turn left (148 ft)

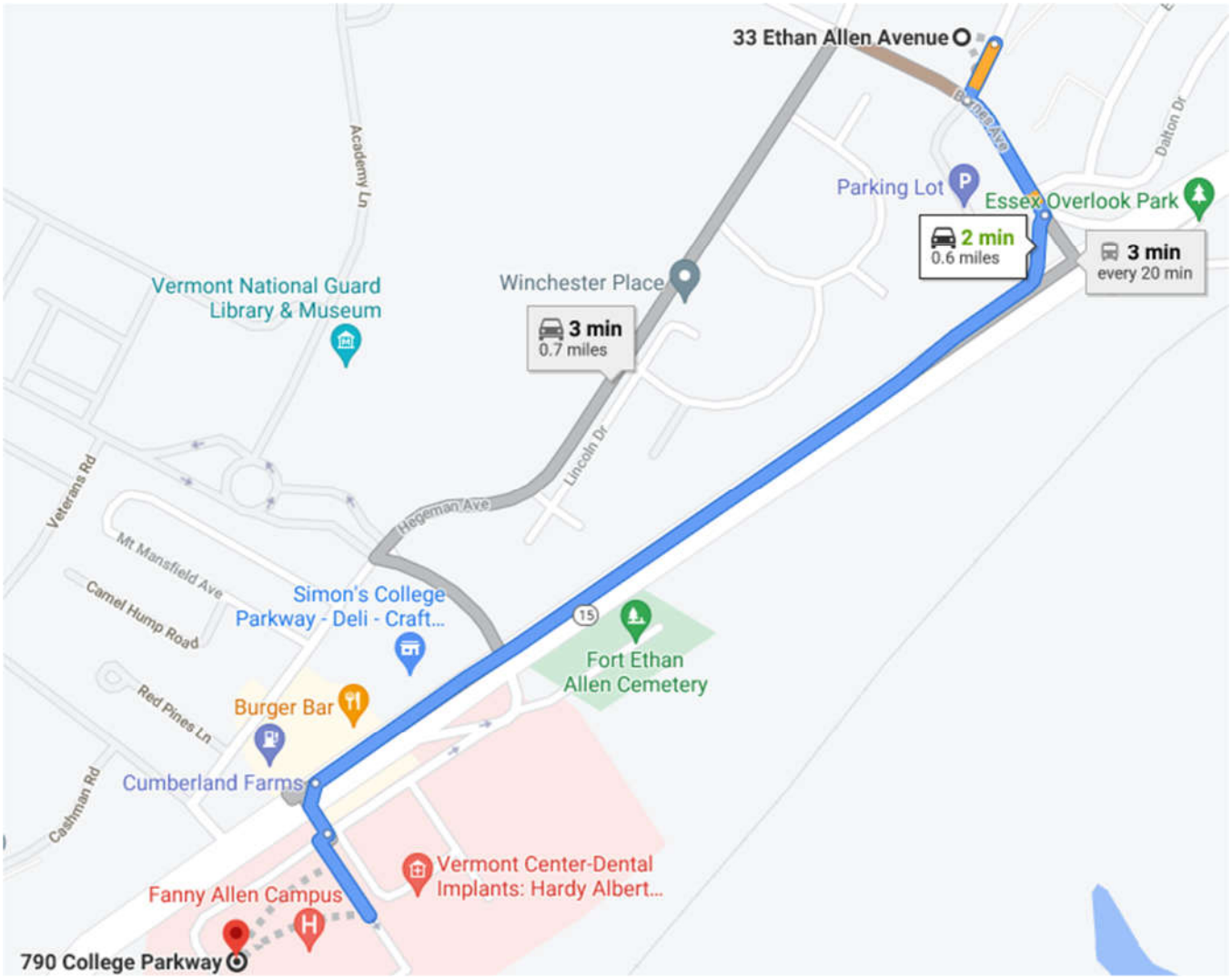
THINK 12
Think Safe | Work Safe | Live Safe

EMERGENCY MEDICAL ROUTE TO HOSPITAL



THINK 12
Think Safe | Work Safe | Live Safe

ROUTE TO OCCUPATIONAL CLINIC



ATLAS

EMERGENCY ASSEMBLY LOCATION

Maintenance Trade Shops parking lot behind Ethan Allen Avenue buildings. Dependent on the site's hazards and work location, the exact location of the emergency assembly location will be communicated during the daily tailgate safety meeting.

FIRST-AID MEASURES

In the event that an employee exhibits symptoms of exposure, contact **CORE Health Networks** immediately for phone assessment of injury/illness. The following procedures will be used:

Class of contaminant: Soils contaminated with PAHs, PCBs and lead

Eye Contact: Flush eye immediately with copious amount of water for a minimum of 15 minutes. Repeat until irritation is eliminated and seek medical attention.

Skin Contact: Wash exposed area with soap and water for at least 15 minutes. If dermatitis or severe reddening occurs, seek medical attention.

Inhalation: Move the person into fresh air. If symptoms persist, seek medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical attention.

IMPORTANT NUMBERS:

Title	Name	Phone Number
Project Manager:	Erik Urch	802-338-5826
Site Safety and Health Officer:	Erik Gaster	802-622-4696
Site Supervisor:	TBD	TBD
Regional Safety Coordinator:	Greg Fiedorowicz	401-302-2822
State Utility Locate Service:	National Call Before You Dig	811

1.0 INTRODUCTION

All personnel and visitors who may enter work areas on this site must comply with the requirements of this Health and Safety Plan (HASP). All site personnel have the authority to "Stop Work" if unsafe conditions are present.

1.1. Scope and Applicability of the Site Health and Safety Plan

This HASP has been prepared by Atlas for the activities associated with Direct Push Drilling, Installation of Monitoring Wells and Sampling of soil/water to identify contamination.

The principal hazardous chemical contaminants in the soil/water at the site are expected to be Petroleum. Appendix B contains Safety Data Sheets (SDS) for the potential onsite contaminates.

The health and safety protocols established in this HASP are based on the Atlas Health and Safety Policy Manual, the Occupational Safety and Health Administration (OSHA) Regulations, past field experiences, specific site conditions, and chemical hazards known or anticipated to be present from available site data. The following HASP is intended solely for use during the proposed activities described in the project documents and technical specifications. Specifications herein are subject to review and revision based on actual conditions encountered in the field during site characterization activities. Such changes must be listed on the HASP List of Approved Amendments and/or Changes (see Appendix C).

Before site operations begin, all employees, including subcontractors for Atlas working on this project site will have read this HASP and all revisions. Such changes must be listed on the HASP List of Approved Amendments and/or Changes (see Appendix C). By signing this form all individuals recognize the requirements of the HASP, known or suspected hazards, and will adhere to the protocols required for the project site.

Before site operations begin, all employees, including subcontractors for Atlas working on this project site will have read this HASP and all revisions. Before work begins, all affected workers will sign the HASP Acknowledgement Form (see Appendix C). By signing this form, all individuals recognize the requirements of the HASP, known or suspected hazards, and will adhere to the protocols required for the project site.

1.2. Historical Overview

The 10th Cavalry Complex is located at 33, 81, and 123 Ethan Allen Avenue in Colchester, VT. Evernorth plans to redevelop the property into a housing complex. The property has been listed as a Hazardous Site by the VTDEC. Site soils are contaminated with PAHs from urban fills, and PCBs and lead from exterior building materials. Building materials are contaminated with PCBs, lead and asbestos.

1.3. Visitors

All visitors to the site must participate in a site H&S discussion that informs them of the hazards at the site and the potential activities that Atlas or its subcontractors are performing. All visitors must sign the Atlas Visitors Log (see Appendix C).

Visitors are not allowed in the work area while work is being performed unless properly trained and are wearing the required PPE.

1.4. Subcontractor Activities

All subcontractors used at the Site require pre-approval in the Atlas Subcontractor Prequalification System or through Atlas' manual subcontractor approval process. Subcontractors are TBD following results of the bidding and selection process.

Subcontractor Details	
Name of Subcontractor:	
Contact Name:	
Contact Phone Number:	
Anticipated Dates Onsite:	
Activities to be Performed:	

2.0 PROJECT ORGANIZATION

The following are specific roles and responsibilities for key site personnel.

2.1. Project Manager (PM)

The Project Manager (PM) has the primary responsibility for the fulfillment of the terms of the contract and overseeing operations for the purpose that includes meeting company legal and safety requirements. It is the PM's responsibility to manage the scope of the project, provide for the H&S of all employees working and communicate with the Client regarding the progress toward project goals. The PM will inform the Regional Safety Coordinator (RSC) of all HASP modifications, violations and incidents. The PM responsibilities include:

- Provide personnel time to read and understand the HASP and complete any training required to work on the project site.
- Conduct project start-up health and safety briefing for onsite personnel and subcontractors.
- Check that each subcontractor is approved in Atlas' subcontractor system and that each subcontractor's site workers have appropriate training.
- Verify Atlas employees are medically cleared and have completed all necessary training.
- That hazards identified during any site audits or while working are corrected. If necessary for immediate hazards, shut down field operations if hazards cannot be corrected or the hazards present an immediate threat to life and health.
- Develop HASP.
- Determine and provide all necessary safety systems and PPE.

2.2. Site Supervisor

The Site Supervisor is responsible for field operations and reports to the Project Manager and is the onsite coordinator and overseer of operations. It is their duty to supervise the site personnel, coordinate the activities of the subcontractor personnel and verify that the scope of work is followed and modified, when necessary. The Site Supervisor's specific responsibilities include:

- Executing the work plan and schedule as detailed by the Project Manager
- Coordination with the SSHO on health and safety issues
- Ensuring site work compliance with the requirements of the HASP

2.3. Site Safety and Health Officer (SSHO)

The site Safety and Health Officer (SSHO) has the responsibility and authority to implement this HASP and to verify compliance. The SSHO reports to the Project Manager. The SSHO is on-site during all work operations and has the responsibility to halt site work if unsafe conditions are detected or if deviations in the work plan occur. The responsibilities of the SSHO at the site include the following:

- Managing the H&S functions on the site;
- Ensuring compliance with the HASP and use of PPE;
- Conducting daily Tailgate Safety Meetings for site personnel and subcontractors. The following topics should be covered:

  - Hazard Communication (i.e., SDS location, proper PPE to be used, chemical hazards of non-routine tasks).
  - Work zone setup and equipment movement
  - Review of all applicable JSA(s).
  - Discuss tasks to be performed, associated hazards and procedures to protect employees from those hazards.
  - Review site safety requirements.
  - Review site emergency procedures
- Conducting daily safety inspections of the site looking for unsafe acts or conditions and providing corrective action as appropriate.

2.4. Regional Safety Coordinator (RSC)

The Regional Safety Coordinator (RSC) is responsible for providing professional health and safety advice to the project. The RSC will review and provide support for concerns regarding the health and safety of field personnel assigned to this project, including:

- If requested by the Project Manager, review and approval of HASP;
- Review of incident reports, inspections and air monitoring results;
- When required, the RSC will conduct a field audit of the site to evaluate the adequacy of the protective measures and work with the PM to implement any necessary changes.

2.5. Field Personnel

The field personnel include technicians, engineers, scientists, geologists and subcontractors who perform work on this site. Each individual team member will be responsible for understanding and personally complying with the requirements of this HASP. Field personnel will report health and safety violations to either the site Supervisor or the SSHO. H&S responsibilities, as discussed in this HASP that are shared by all site personnel include:

- Complying with the requirements of the HASP
- Reporting unsafe acts or conditions
- Wearing correct PPE for the task
- Stopping any unsafe work
- Following the JSA and/or correct steps for a task.
- Assist other field personnel with being safe and meeting the requirements of this HASP.

3.0 TASK/OPERATION HEALTH AND SAFETY RISK ANALYSIS SUMMARY

This chapter describes the identified and anticipated hazards associated with this site based on the environmental conditions, tasks to be performed and the control measures necessary to protect workers from these hazards. The assessment looked at the general, chemical, physical and biological hazards that may be encountered while working on this site. Using this information, appropriate control methods are selected to eliminate the identified risks or effectively control them.

3.1. Job Safety Analysis (JSA)

The purpose of the JSA is to identify the routine health and safety hazards associated with the routine site tasks and operations. JSAs for the anticipated tasks that will be performed onsite are maintained in Appendix A. A single JSA may be used for a task/operation performed in multiple locations if the hazards, potential exposures and controls are the same at each location. Field personnel are expected to modify JSAs for the site as new hazards are identified and create JSAs if one is not available for a task that will be performed.

3.2. Chemical Exposure Assessment

Hazardous chemicals may be used on the site to support site operations. The Atlas H&S Policy No. 08 – Hazard Communication Program requires Atlas to provide employees, contractors, subcontractors and visitors with information on the health effects of these chemicals and necessary actions to protect against exposure. This information is transmitted through Safety Data Sheets (SDS), container labels, training and a written Hazard Communication Program.

Site activities will adhere to the Program as described in the Atlas Policy. All site personnel, including subcontractors, will be briefed on the Program as part of the site orientation training before starting work. In accordance with this Program, the PM and/or SSHO will check that each chemical brought to the site is accompanied by its SDS. A copy of each SDS will be maintained and be made available to each site personnel who may be potentially exposed to the chemical. In addition, the SSHO will check that all subcontractors bring at least one copy of SDS for each chemical they bring onto the site. The SSHO will also check that all chemical containers brought to the site are labeled as to its contents and appropriate hazard warnings according to the Program. The location of all SDSs will be identified during the daily tailgate safety meeting and may be included in Appendix B of this HASP or maintained in a separate area.

3.3. Potential Chemical Hazards Associated with the Project Site

The following chemical hazard evaluation for the project site is based on historical and previous investigations of the site. The evaluation has been conducted to identify hazardous substances that potentially may be present at the site and to ensure that work activities, PPE and emergency response are consistent with the specific contaminants that could be encountered.

Chemical impacted material has been identified on the site. The potential contaminants that might be encountered during the field activities and exposure limits are listed below.

3.3.1. Table 3-1 Chemical Time Weighted Averages, PEL's and STEL's (if applicable).

Name (Constituent)	PEL	TWA (8hr)	STEL
Arochlor-1254 (PCBs)	none	0.5 mg/m^3	none
Naphthalene	none	10 ppm 50 mg/m^3	**N/E
Lead	50 µg/m^3	30 µg/m^3	**N/E
Commonly Used Chemicals			
Alconox (cleaning/detergent)	**N/E	5 mg/m^3	**N/E

**N/E – Not Established by OSHA or NIOSH.

3.4. Chemical Hazard Exposure Routes

Exposure routes for chemical impacted material:

- Inhalation of dust, vapor, particulates or due to the presence of hazardous materials from soil or ground water.
- Ingestion of soil/water via hand to mouth contact.
- Absorption through the skin from contact with contaminated soil/water.

To protect field personnel, the following procedures will be used as needed:

- Establishment of work zones
- Use of PPE
- Decontamination procedures
- Atmospheric monitoring

3.5. Noise Hazards and Controls

Exposure to high levels of noise may occur when working near heavy equipment, tools and remediation systems. Depending upon the environment surrounding the project site airports, factory machines, etc. may produce high levels of noise. Employees exposed to noise levels in excess of the action level of 85 decibels (A-weighted, Slow Response) will be included in a Hearing Conservation Program according to Atlas H&S Policy No. 47 – Hearing Conservation. The SSHO may evaluate employee noise exposures using a noise survey meter or a noise dosimeter. The RSC may conduct additional noise monitoring to determine the appropriate response to be taken. Employees will be provided with ear plugs and/or earmuffs when exposed to noise levels in excess of the 8-hour Permissible Exposure Limit (PEL) of 90 decibel (A-weighted, Slow Response). This hearing protection must have a Noise Reduction Rating (NRR) to protect hearing in accordance with Policy No. 34 and reduce the exposure level to below 90 dba.

3.6. Biological Hazards

Site activities may expose workers to other hazards such as poisonous plants, insects, animals, and indigenous pathogens. Protective clothing and respiratory protection equipment and training on how to identify poisonous plants, animals and insects, can greatly reduce the chances of exposure. Thoroughly washing any exposed body parts, clothing, and equipment will also protect against infections. If working in wooded/grassy areas, use appropriate insect repellants (containing DEET and/or Permethrin) and apply per the manufacturers' directions.

3.6.1. Poison Oak, Poison Sumac, Poison Ivy

- Avoid contact with plants.
- Use barrier products such as IvyX Pre-contact, IvyBlock, or other products on exposed skin where potential direct contact or contact through clothing is possible. Re-apply periodically throughout the day to exposed skin.
- Cover as much skin as practical; wear long sleeves, long pants, socks, boots, gloves, neckerchiefs, hats and other clothing articles. Wear impermeable gloves over cotton/leather gloves.
- Remove gloves before eating or taking bathroom breaks. Clean hands thoroughly with Tecnu, IvyX post-contact, or other product before eating or bathroom breaks. Ensure you do not touch your face or hands with a contaminated glove or other article of clothing.
- Separate contaminated field clothing and wash in hot water. Heavy contaminations may not be able to be removed and the clothing will need to be discarded.
- Clean all objects that may have urushiol on its surface. Besides clothing, urushiol can stick to many surfaces, including tools and equipment.
- Protect your vehicle interior by placing a large towel or bedsheet over the seats. Wash hands with Tecnu before and after removing contaminated clothes.
- Wash contaminated skin with Tecnu, IvyX Post-contact, or other product immediately. Do not delay since urushiol takes only a few minutes to affect your skin.
- Shower (do not take a bath) and thoroughly wash your entire body with warm, soapy water as soon as possible.
- Dermatitis can present in many forms which include itchy skin, redness or streaks, hives, swelling, small or large blisters or scabs after bursting after urushiol exposure.

3.6.2. Ants

- Look at your surroundings during site setup. If present in large numbers move the work area. If unable to move the work area stop work and contact the PM.
- Workers should take the following steps to prevent fire ant stings and bites:
- Do not disturb or stand on or near ant mounds.
- Be careful when lifting items (including animal carcasses) off the ground, as they may be covered in ants.
- Fire ants may also be found on trees or in water, so always look over the area before starting to work.

3.6.3. Bee/Hornets/Wasp

- Look at your surroundings during site setup. If present in large numbers move the work area. If unable to move the work area stop work and contact the PM.

- Bees, wasps, and hornets are most abundant in the warmer months. Nests and hives may be found in trees, under roof eaves, in attics or on equipment such as ladders.
- Avoid perfumed soaps, shampoos, and deodorants.
- Wear clothing to cover as much of the body as possible.
- Remain calm and still if a single stinging insect is flying around. (Swatting at an insect may cause it to sting.)
- If you are attacked by several stinging insects at once, run to get away from them. (Bees release a chemical when they sting, which may attract other bees.)
- If a bee comes inside your vehicle, stop the car slowly, and open all the windows.
- Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

3.6.4. Ticks

- Avoid vegetation when possible. Stay to the center on trails where the vegetation is the shortest.
- Be especially vigilant if vegetation contacts your body above your knee. Remember that ticks find a place on vegetation to lie in wait until a host comes along and brushes across them.
- Apply CDC-recommended insect repellents: DEET or permethrin according to label directions up to, and above, parts of body and clothing where contact with vegetation occurs.
- DEET is most effective in higher concentrations from 20-30% (Deep Woods OFF! & Cutter Backwoods). Spray directly onto your exposed skin. Apply to face by spraying hands and then wiping on skin avoiding eyes and mouth.
- Reapplication throughout the day is needed since it only works while volatilizing.
- Do not apply DEET to skin underneath clothing.
- Permethrin is more effective at repelling ticks than DEET and is applied to clothing only.
- Re-application each day is not needed since it is effective on clothes for several consecutive days and after laundering. Launder separately from other clothes. Do not apply permethrin to your skin.
- For best protection apply permethrin to clothing, including footwear, socks and hats, and DEET to exposed skin.
- Always tuck shirt into pants and tuck pants into tightly woven socks. Small ticks can crawl through the fabric of some socks. Wear a hat to cover your exposed head.
- Check for ticks on clothing during field work and at every rest break.
- At the end of the day, before entering your vehicle, do a thorough tick check with your field partner.
- Reapply permethrin to clothing to knock down ticks and prevent them from entering the vehicle with you.
- As soon as possible after field work, remove clothing and check yourself before conducting office work. Check again while bathing and changing. Be sure to look closely and feel carefully for small, nymph “seed” ticks on waistline, neck, hairline, behind ears, under arms, and groin.

- Keep field gear and clothing out of living spaces and bag soiled field clothes until washing (separately in hot water).
- If you discover an embedded tick, call Core Health. Nurses there can help you with first aid and remind you of the symptoms to be alert for afterward.

3.6.5. Snakes

- Walk only as fast as you can watch the path ahead. If you see a snake, back away slowly. Most snakes avoid people if possible and bite only when threatened or surprised.
- When working in known snake habitats, snake gaiters must be worn by all site employees.
- Do not place your hands or feet in locations where you cannot see the surrounding area.
- When possible, avoid areas of tall vegetation.
- Tap or poke the ground ahead of you with a walking stick before entering an area where you can't see your feet. Snakes will try to avoid you if given enough warning.
- When in an area known to have snakes, wear long pants and boots. If work must be conducted in areas with tall grass or other cover where snakes may be present, also wear snake gaiters.
- Never handle a snake. Even non-venomous snakes can bite and cause serious injury.

3.6.6. Dogs

- If an unsecured dog is seen on or near the project site, stop work and all employees are to take shelter in a building or vehicle until the dog leaves the area or the dog is secured by authorities or its owner. Contact animal control if the dog does not leave on its own.

3.7. Lightning

Weather conditions can change quickly when working. In the event lightning is seen, thunder is heard, or storm notifications in the area are issued, all outdoor work must stop and all onsite employees are to take shelter inside a building or vehicle. Work can resume 30 minutes after the last observed sign of lightning, sound of thunder and the threat of subsequent storm activity is deemed safe. Before resuming work, onsite employees should contact the Project Manager to determine if additional storm activity will be occurring. The use of online weather activity maps (webpages), weather applications, and public safety notification services, can be very helpful when assessing approaching storms in the area. If storm activity will continue, onsite employees should secure the site and either reschedule work or wait in a building or vehicle until the storm activity (see above) is no longer a threat.

3.8. General Public

When working in unsecured locations onsite employees must setup a work zone that keeps the general public away from or provides a barrier to any hazards created by the work performed onsite.

All employees are expected to treat the general public respectfully and to limit our engagement and interaction. In the event an employee feels threatened by the general public; work must stop, and the employee should seek protection in a building, withdraw from the area and/or contact local authorities. Work should only resume when the threat has been eliminated.

3.9. Hand and Power Tools

In order to complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools introduce a variety of hazards including injury from being struck

by flying objects, cut or struck by the tool, fire and electrocution. Proper PPE must be worn while using these tools. Ground Fault Circuit Interrupters (GFCIs) are required for all portable corded electric tools.

For specific PPE and procedures associated with a tool see the JSA for the task in which the tool is being used and the manufacturer's instruction manual.

3.10. Slip, Trip and Falls

Working in and around the project site will pose slip, trip and fall hazards due to equipment, tools/supplies and slippery surfaces from weather and from activities performed onsite. Good housekeeping must be maintained at all times. Tools and equipment no longer in use must be removed from the work area and secured. Traction control devices must be worn when working on slippery surfaces. A general site walk should be conducted prior to the start of work to identify trip hazards. These identified trip hazards should be correct or visibly marked to warn onsite employees.

3.11. Material Handling

Proper manual lifting of material will be required by site personnel and if not done correctly could result in injury. No one is to lift any object greater than 50 pounds or any object that is large or awkward by themselves. If possible, the use of equipment and tools to help lift and move the material is required.

Employees must be trained on proper lifting techniques prior to arriving at the project site.

3.12. Fire and Explosion

All equipment used to transfer flammable material, including contaminated soil or water must be grounded and bonded to prevent static buildup. An appropriately rated fire extinguisher must be maintained and available for use on site.

3.13. Moving Equipment

Field personnel working in the immediate vicinity of heavy equipment may encounter injuries from contact from the equipment.

Spotters must be used when heavy equipment is used onsite or moving from one location to another and the route and designation discussed with all site personnel prior to movement. Equipment must be equipped with back up alarms.

All site employees must wear at least an ANSI class 2 reflective vest or shirt.

3.14. Vehicular Traffic

Work zones will be established out of local traffic patterns whenever possible and clearly marked. All site personnel must wear high visibility PPE based on the amount and speed of the traffic.

3.15. Heat Stress

All employees and visitors, must adhere to the following procedures when heat stress conditions exist.

The SSHO will have training in first-aid and Cardiopulmonary Resuscitation (CPR), including training in heat-related illnesses. The SSHO must also be trained on the requirements of the Atlas Policy for Industrial Hygiene (Policy No. 31), which contains the requirement for heat stress

monitoring. All workers should be capable of recognizing and treating the signs and symptoms of heat stress conditions. During potential heat stress conditions, ice should be readily available to rapidly cool victims.

Water will be made available at the site for employee fluid replacement. When heat stress is a hazard, employees will be provided with balanced, electrolyte solutions to replace fluid and electrolyte loss. Employees will be provided with replacement fluids at a minimum rate of 8 ounces every 15 to 20 minutes per person.

Acclimatization is a gradual physiological adaptation that improves an individual's ability to tolerate heat stress. Full-heat acclimatization requires up to 3 weeks of continued physical activity under heat-stress conditions similar to those anticipated for the work. Acclimatization loss begins when the work activity in heat stress conditions is discontinued. A noticeable loss usually occurs within 3 – 4 days.

3.16. Rest Breaks

All rest breaks will be taken out of the zone of exclusion in a cooler, shaded, rest area. The frequency of rest breaks will be based on the level of physical activity, temperature and humidity and will be discussed during the daily tailgate meeting. At any time, the frequency of rest breaks can be increased if the SSHO or other site employees determine it to be necessary.

Heat stress and heat strain are conditions resulting from environmental factors including temperature, relative humidity, radiant heat transfer, and air movement, as they are affected by clothing. The primary objective of the heat stress management program is to prevent heat stroke which is life threatening and the most serious of the heat-induced disabilities. Extra caution should be taken for workers who are not acclimated to working in the heat.

The following Heat Stress Index should be used as a guide to evaluate heat stress situations.

3.16.1. Table 3-2: Heat Stress Index

Heat Stress Index									
Temp. °F	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
105°	98°	104°	110°	120°	132°				
102°	97°	101°	108°	117°	125°				
100°	95°	99°	105°	110°	120°	132°			
98°	93°	97°	101°	106°	110°	125°			
96°	91°	95°	98°	104°	108°	120°	128°		
94°	89°	93°	95°	100°	105°	111°	122°		
92°	87°	90°	92°	96°	100°	106°	114°	122°	
90°	85°	88°	90°	92°	96°	100°	106°	114°	122°
88°	82°	86°	87°	89°	93°	95°	100°	106°	115°
86°	80°	84°	85°	87°	90°	92°	96°	100°	109°
84°	78°	81°	83°	85°	86°	89°	91°	95°	99°
82°	77°	79°	80°	81°	84°	86°	89°	91°	95°
80°	75°	77°	78°	79°	81°	83°	85°	86°	89°
78°	72°	75°	77°	78°	79°	80°	81°	83°	85°
76°	70°	72°	75°	76°	77°	77°	77°	78°	79°
74°	68°	70°	73°	74°	75°	75°	75°	76°	77°
NOTES: Add 10° F when protective clothing (use of a respirator and/or chemical protective clothing such as Tyvek, arch flash or flame resistant) is being used; Add 10° F when in direct sunlight.									

HSI Temp	Category	Injury Threat
> 130° F	Extreme Danger	No work unless emergency exists. Contact Atlas RSC and Corporate H&S Group prior to proceeding. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
105°-130° F	Danger	Contact RSC prior to proceeding. Requires strict adherence to ACGIH Heat Stress Guidelines, including use of on-site WBGT equipment. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
90°-105° F	Extreme Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
80°-90° F	Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
< 80° F	Normal Range	Typical conditions for time of year. Little or no danger under normal circumstances. As always, anticipate problems and work safely.

3.17. Cold Stress

This procedure applies to all employees who perform field work in cold environments at risk of cold stress injury and intended to protect workers from the most severe effects of cold stress.

Atlas site employees have been trained in cold stress as part of their HAZWOPER 40-hour initial training, site workers will receive refresher training by the SSHO in cold stress safety and health procedures. The training program will include, as a minimum, instruction in the following areas:

- Proper first-aid treatment
- Proper clothing practices
- Proper eating and drinking habits
- Recognition of impending frostbite
- Recognition of the signs and symptoms of impending hypothermia or excessive cooling of the body when shivering does not occur
- Safe working practices

The SSHO will be trained in first aid, CPR and cold stress conditions.

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. The objective is to prevent the deep body temperature from falling below 96.8° F and to prevent cold injury to body extremities. Two factors influence the development of a cold injury; the ambient temperature, and wind velocity.

The SSHO will monitor environmental conditions by recording ambient temperature and estimated wind-speed. Information contained in Tables 3-3 will be used to evaluate the possibility of hypothermia among workers on-site. No work will be conducted when the temperature and wind speed combine for a temperature of less than -20° F.

Use appropriate cold weather clothing when temperatures are at or below 40°F as exposed skin surfaces must be protected. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against glare and ultraviolet light should be worn in snowy and icy conditions.

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can also be used to shield the work area from the cooling effects of wind.

When frostbite, hypothermia, or other cold stress symptoms are suspected, treat the patient to relieve symptoms or transport them to the medical facility identified in this HASP.

3.17.1. Table 3-3: Hypothermia Evaluation

Estimated Wind Speed (mph)	Actual Temperature Reading (˚F)											
	50˚	**40˚**	**30˚**	**20˚**	**10˚**	**0˚**	**-10˚**	**-20˚**	**-30˚**	**-40˚**	**-50˚**	**-60˚**
	Equivalent chill Temperature (˚ F)											
Calm	50˚	40˚	30˚	20˚	10˚	0˚	-10˚	-20˚	-30˚	-40˚	-50˚	-60˚
5 mph	48˚	37˚	27˚	16˚	6˚	-5˚	-15˚	-26˚	-36˚	-47˚	-57˚	-68˚
10 mph	40˚	28˚	16˚	4˚	-9˚	-24˚	-33˚	-46˚	-58˚	-70˚	-83˚	-95˚
15 mph	36˚	22˚	9˚	-5˚	-18˚	-32˚	-45˚	-58˚	-72˚	-85˚	-99˚	-112˚
20 mph	32˚	18˚	4˚	-10˚	-25˚	-39˚	-53˚	-67˚	-82˚	-96˚	-110˚	-121˚
25 mph	30˚	16˚	0˚	-15˚	-29˚	-44˚	-59˚	-74˚	-88˚	-104˚	-118˚	-133˚
30 mph	28˚	13˚	-2˚	-18˚	-33˚	-48˚	-63˚	-79˚	-94˚	-109˚	-125˚	-140˚
35 mph	27˚	11˚	-4˚	-20˚	-35˚	-51˚	-67˚	-82˚	-98˚	-113˚	-129˚	-145˚
40 mph	26˚	10˚	-6˚	-21˚	-37˚	-53˚	-69˚	-85˚	-100˚	-116˚	-132˚	-148˚
(Wind speeds > 40 mph have little additional effect)	**LITTLE DANGER** If < hour with dry skin. Maximum danger of false sense of security				**INCREASING DANGER** Danger from freezing of exposed flesh within one minute.			**GREAT DANGER** Flesh may freeze within 30 seconds.				
	Trench foot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA

4.0 AIR MONITORING AND PERSONAL PROTECTIVE EQUIPMENT

4.1. Site Air Monitoring Requirements

To prevent exposure to hazardous atmospheres and aid in the selection of respiratory protection, monitoring for the presence of airborne contaminants will occur when knowledge of the site indicates their potential presence. One or more of the following direct-reading instruments may be used to aid in this determination;

- Photoionization Detectors (PID) and
- Flame Ionization Detectors (FID) will measure non-specific organic gases and vapors.
- Combustible Gas Indicators (CGI) will detect explosive atmospheres.
- Oxygen (O_2) meters will detect fluctuations in oxygen concentrations.

These instruments should be calibrated or bump tested daily and whenever the readings may be erratic. All readings should be recorded in the field log books according to the monitoring program. All employees responsible for using these devices must be shown how to properly calibrate and configure the equipment. A manual on how to use the equipment must always be maintained with the equipment.

All direct-reading instruments or equipment that are needed to monitor for hazardous atmospheres on this project site are listed in Tables 4-1, 4-2 and 4-3.

The breathing zone of the employee(s) anticipated to have the highest potential for exposure for each task will be monitored using an appropriate combination of some or all of these direct-reading instruments. Air monitoring will occur every 15 minutes during non-intrusive activities, or every 5 feet of penetration during intrusive activities. Site tasks and air monitoring requirements are shown in Table 4-1. Additional site monitoring may occur at the discretion of the SSHO, site supervisor, or RSC.

All air monitoring equipment must be calibrated as per manufacturer's instructions.

If any of the action levels listed in Tables 4-2 or 4-3 are met, work must immediately stop. No employee is authorized to work in conditions that require respiratory protection without first contacting your RSC. If any of the action levels listed in Table 4-2 or 4-3 are met, work must immediately stop. Contact must be made with the PM informing them that the Respiratory Protection Plan, Appendix H will be followed.

4.1.1. Table 4-1: Site Air Monitoring Requirements

Site Activity	Instrument	Frequency	Location	Caution
Direct Push Drilling (if required)	PID	Every 15 minutes or 5 feet of penetration	In breathing zone of person nearest activity	Communicate with equipment operator before sampling
Site Excavation and Construction Activities	CGI	Every 15 minutes or 5 feet of penetration /Ongoing, during soil excavation	In work area near activity	Communicate with equipment operator before sampling

Air monitoring results obtained from the breathing zone during field activities will be recorded in field logbooks on an ongoing basis as part of the standard data that is recorded. The Air Quality Monitoring Record will be completed if a PID reading >10 ppm is measured, see Appendix A.

The action levels were developed using the following assumptions.

- Atlas assumed the primary substance of gasoline is Naphtha with a TWA of 300 ppm.
- The remaining chemical components of gasoline were assumed to each account for 15% of the gasoline mixture.
  - Assumed benzene is one of the components of gasoline.
- The exposure levels to the individual chemicals averaged 50 ppm (TWA).
- The chemical makeup of gasoline used to calculate the action level is based on the current mixture of gasoline prior to release into soil or water.

Air monitoring information will be utilized to evaluate personnel exposure and assess the need for respiratory protection. PID readings measured in the employees breathing zone will be used to determine the level of protection required. PID readings refer to readings above background, which are sustained for at least 5 minutes and are measured during the performance of field tasks.

4.2. Action Levels for Respiratory Protection

The first and foremost means of protecting employees from injuries or exposures is to eliminate the exposure. The general hierarchy for controlling potential exposures is: (1) engineering controls; (2) administrative controls; and (3) the use of PPE. PPE is a means of preventing injury or exposure when exposure elimination and/or other control means are not feasible.

The initial level of protection and the upgrading to respiratory protection action levels at which the PPE will be upgraded are determined based on the identification of specific chemicals expected to be present at a site and the established OSHA Permissible Exposure Levels (PEL) or ACGIH Threshold Limit Values (TLVs), whichever is lower. In the event more than one chemical is expected or exists at a site, the most hazardous chemical will dictate the level of personal protection required. Table 4-2 and -3 shows the action levels for levels of personal protection equipment.

4.2.1. Table 4-2: Action Levels for Petroleum Contaminate Soil/Water

Monitoring Equipment	Hazard	Action Level Above Background	Action
PID/FID	Organic gas/vapor	< 10 ppm	Level D.
		10 to 50 ppm	Level C. Move upwind and continue air monitoring, cease operations, or use detector tube(s) for (contaminant) and reference Table 4-3 below.
		> 50 ppm	Immediate Withdrawal. Contact the PM and RSC for further instructions to proceed.
CGI	Explosive Atmosphere	< 10 % LEL	Level D.
		> 10 % LEL	Immediate Withdrawal. Explosive hazard. Contact the SSHO and RSC for further instructions.

Monitoring Equipment	Hazard	Action Level Above Background	Action
Oxygen Conc. Meter	O_2 Conc.	< 19.5 %	Immediate Withdraw. Combustible gas readings are not accurate below this concentration! Notify SSHO.

4.3. Levels of Protection

The protection levels may include all or some of the following, based on work scope.

4.3.1. Level D:

- See Section 8.0 of this HASP for minimum PPE requirements.

4.3.2. Level C:

- Half-face or full-face, air purifying respirator (NIOSH approved) with organic vapor cartridge. Refer to the Respiratory Protection Plan.
- Disposable, hooded, chemical-resistant clothing*
- Disposable, chemical-resistant outer gloves
- Disposable, inner nitrile gloves (8 mil minimum)
- Chemical-resistant boots with steel toe
- Disposable boot covers*
- Hard hat*
- Goggle
- Face Shield*
- Coveralls*
- Hearing protection*

4.4. Respiratory Protection

Respiratory protection requirements for employees are described in detail within Appendix H - Respiratory Protection Plan. Basic rules of respiratory usage are listed below:

- Facial hair that contacts or interferes with the seal of the mask-to-face is not allowed on personnel required to wear respirators.
- Respirator cartridges should be replaced after approximately 8-hours of continuous or intermittent usage, unless otherwise noted. Cartridges should also be replaced if they become damaged, after the expiration date is exceeded, if breakthrough (smell and/or taste) occurs or if filters become clogged causing resistance to breathing.
- Contact lenses may be worn when respiratory protection is required, in conjunction with additional eye protection to protect against particles or splashes, provided there is no interference with the respirator seal and the chemical in the atmosphere does not prevent their use.
- Respirators must be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators will be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- After donning, personnel should perform a positive and negative user fit-check to determine if a good seal has been achieved.
- Any employee assigned a respirator or required to wear a respirator will receive an annual medical evaluation, annual respirator fit test and receive respiratory protection training.

5.0 HEALTH SURVEILLANCE PROGRAM

5.1. Employee Medical Examinations

All Atlas employees involved in work at this site will participate in Atlas' Medical Surveillance Program administered by Atlas' medical management provider. Atlas has worked with its medical

provider to develop a medical exam that evaluates employees for potential chemical exposure. The medical examinations provided to Atlas employees meet the requirements in 29 CFR 1910.120(f).

Any subcontractors or visitors that will work in an area where there is potential for exposure to onsite contaminates must also undergo a medical exam that meets 29 CFR 1910.120(f) and be cleared by a physician to work.

When respirators are required as determined by section 4.0 of this HASP, each employee will also have current respirator clearance.

The PM for this project site is responsible for checking on the medical clearance for any Atlas employee working on this site.

A post-project, follow-up exam may be required if an exposure incident is reported or an employee shows specific symptoms associated with the known or suspected hazardous chemicals. The RSC and the Project Manager will determine when post-project exams are required.

6.0 SITE SECURITY AND CONTROL

6.1. Work Zones

Restricted site areas will include, but not necessarily be limited to, the following zones:

- Exclusion Zone or Hot Zone - any area where contamination is either known or likely to be present in concentrations that could pose a threat to human health and safety or that potential for harm to personnel exists because of the type of work activities being conducted. Appropriate PPE and warning signs should be utilized in this area.
- Contamination Reduction Zone - any area where workers conduct personal and equipment decontamination.
- Support Zone - areas where access is controlled, but the chance to encounter hazardous materials or conditions are minimal.

Access to the work zones will be controlled by work zone delineators (e.g. traffic cones, flags, vehicles, DOT approved devices, temporary or permanent fencing, and/or safety barrier tape). Additionally, Atlas employees should follow the requirements of Atlas Policy No. 49, Work Zones in Traffic Areas for additional information. The delineation of the work zone will be discussed during the tailgate safety meeting.

In the event on-site personnel must upgrade their personal protective equipment, the work zones may require substantial modification in order to provide for the safety of nearby personnel not associated with this work. Any upgrade level will be communicated by the site supervisor to the PM. The PM will then inform the RSC of this occurrence.

6.2. Buddy System

The buddy system is preferred when working on this project site. The Buddy System means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of emergency.

6.3. Site Communication

Site communication may be in the form of hand signals, voice, or other communication devices. All forms of communication should be understood by all workers and discussed during the daily tailgate meeting prior to starting work.

7.0 DECONTAMINATION PROCEDURES

All personnel and equipment must undergo appropriate decontaminated prior to leaving the project site. The decontamination of personnel and equipment will be performed within the exclusion and contamination reduction zones. The SSHO will visually watch the decontamination process and verify it is completed. The decontamination solution to be used onsite:

- Alconox/Liquinox and water for removal of low-molecular weight hydrocarbons, inorganic compounds, salts, some organic acids, and other polar compounds.
- Dilute acids (vinegar) for removal of basic (caustic) compounds, amines, and hydrazines.
- Dilute bases (soaps and detergents) for removal of acidic compounds, phenols, thiols, and some nitro and sulfonic compounds.
- Organic solvents for removal of nonpolar compounds (organic).

The hands and face of each employee must be thoroughly washed upon leaving the work area. Trash receptacles will be provided for all disposable PPE.

Field equipment will be decontaminated according to the work plan. This may include manual removal of gross contamination with shovels or other tools, followed by a high-pressure, hot water sprayer. Decontamination with high-pressure and hot water poses the possibility of a splash and/or mist inhalation hazard, the task should be performed using Level D personal protective equipment with a face shield at a minimum.

Field tool including split-barrel soil samplers, brass liners, and sample knives and trowels will be decontaminated. The field tools may be scrubbed visually clean using the decontamination solution with a stiff, long-bristled scrub brush. Following scrubbing with the decontamination solution, the tools may be rinsed with distilled water or isopropyl alcohol.

All materials and equipment used for decontamination should be disposed of in accordance with local, State, and/or Federal Regulations. Clothing, tools, buckets, brushes, and all other equipment that is contaminated must be properly packaged and stored on the site until disposal arrangements are finalized. Clothing not completely decontaminated on-site should be secured in plastic bags before being removed from the site and taken to an appropriate cleaning facility.

8.0 STANDARD OPERATING PROCEDURES (SOPS)

As tasks are performed, the JSA must be reviewed by all onsite workers to identify additional precautions that must be taken. Any changes to the SOPs must be approved by the PM and RSC.

At a minimum, the following PPE must be worn at all times by all workers and visitors to this project site:

- Hard hat
- Long pants
- Shirt with sleeves
- Safety glasses

- Safety toed boots with ankle support
- Work gloves – the type of gloves worn may change based on task being performed.
- ANSI Class 2 safety vest (other garments, jackets, and shirts that meet the class 2 requirements may be worn in place of the safety vest).
- See JSA for task to be performed for specifics on type of PPE and any additional PPE.

The following SOPs will apply when working on this project site:

- Eating, drinking, chewing gum, tobacco products or any item that could facilitate hand-to-mouth transfer of contaminates are prohibited in the exclusion and contamination reduction zone or in any area known to be contaminated. Personnel must wash their hands and face and remove any contaminated PPE before handling these items.
- When decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- Contact with contaminated or suspected contaminated surfaces should be avoided. When possible, do not walk through puddles, leachate or discolored surfaces; kneel on the ground; lean, sit, or place equipment on drums, containers, or the ground.
- All personnel and visitors must be familiar with SOPs and any additional instructions and information contained in this HASP. All employees, visitors and subcontractors will read and sign an acknowledgement of the HASP before entering the site.
- All personnel must be or will be made aware of symptoms for heat or cold related illnesses.
- All personnel will be made aware of the location of the SDSs for the chemicals on-site.
- All loose clothing, jewelry, hair, or other items that could be caught in moving parts or snagged on equipment must be secured.
- All personnel going to the site must be trained on all tasks they are expected to perform and thoroughly briefed on anticipated hazards, equipment, safety practices, emergency procedures, and communications needed for this project site.
- Personnel on the site must use the buddy system when engaged in Level C, B or A work tasks. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.
- Personnel unfamiliar with a task must stop work and verify how to perform the task safely.
- All personnel have the responsibility to stop anyone from performing an unsafe act or stop work if they see a safety hazard.
- Warning signals for site evacuation must be established by the SSHO and discussed during the tailgate safety meeting. A clear unobstructed entrance and exit must be maintained.
- Personnel and equipment in any contaminated area should be minimized.
- Work areas for various operational activities will be established, defined and discussed during the tailgate safety meeting.
- Procedures for leaving a contaminated area will be planned and implemented during the daily tailgate safety meeting. Work areas and decontamination procedures will be established based on expected tasks to be performed.
- Daily and ongoing inspections of site operations will be conducted by the SSHO to check compliance with this HASP. If changes in operations are necessary, the HASP must be modified to reflect these changes.

- All hand and power tools will be inspected prior to use and removed from the work area when no longer needed.
- Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be according to Atlas H&S Policy No. 19 – Fire Protection.
- Site tailgate safety meetings will be held daily to discuss anticipated site conditions and daily activities. This meeting will be summarized on the Tailgate Safety Meeting Form, see Appendix C.
- A GFCI will be used on any extension cord or plugged in item.

9.0 CONTINGENCY PLAN

There are numerous potential emergency situations that may occur while working on this project site. If an emergency does occur, it is important that employees stop work and as soon as reasonably possible contact the PM. All emergency procedures including location of stop switches, emergency equipment and muster location must be discussed during the tailgate safety meeting and with all visitors.

9.1. Medical Emergencies

The name, address, telephone number, travel distance, and travel time to the nearest medical treatment facility are found in the Emergency Information section of this HASP. A map and direction for locating the facility is also available in the Emergency Information section.

An emergency first-aid kit will be readily accessible and identified on the site, and personnel will have CPR and first-aid training. Location of the first aid kit will be identified and discussed during the daily tailgate meeting. The first-aid kit will contain equipment necessary to protect employees against exposure to bloodborne pathogens. All employees must receive bloodborne pathogens training and if requested could receive Hepatitis B vaccinations according to the Atlas H&S Policy No. 15 – Bloodborne Pathogens if exposed to bodily fluids.

Any person who becomes ill or injured in the exclusion zone must be decontaminated as well as possible with consideration to which risk will be greater, the spread of contamination or the health of the individual. If the injury or illness is minor, full decontamination should be completed and first-aid administered before transport. If the patient's condition is serious, at least partial decontamination should be completed.

The following steps should be followed if an injury or illness case occurs regardless of severity of the injury:

- Check the area to make sure the scene is safe.
- Assess the employee’s condition and if life threatening or if your training dictates call 911.
  - If 911 is called, Core Health should be contacted after talking with 911.
  - Emergency personnel must be informed if potential chemical contamination is suspected. If possible, initiate decontamination procedures to prevent contamination of responding personnel.
- Call Core Health, if the injury is not life threatening for first aid guidance.
  - A fellow employee may call for the injured employee.
  - Provide your name, Office and phone number.

  - If provided with first aid advice from Core Health, employees are authorized to secure (go to Walgreens, CVS, etc.) the items recommended by the nurse to treat the injury.
  - It is important for the injured employee to follow the advice of the nurse even when not at work (evenings, weekends).
- Begin providing first-aid using universal precautions while using proper PPE.
- If Core Health directs the injured employee to an occupational clinic for evaluation have a fellow employee drive them.
  - If someone is not available to transport the injured employee to the clinic, please let Core Health know. Based on the injury the injured employee may be able to drive themselves, but only after speaking with Core Health.
- Contact the PM as soon as it can be done safely or once the situation is stable.
  - If you cannot reach your manager, call the Office Manager or Branch Safety Officer.
  - Provide a detailed description of what and how the injury occurred. A fellow employee may make this call also.
- Complete and submit a written account of the injury within 24 hours to the Atlas incident reporting system.

9.2. Emergency Equipment

1. Eyewash containers or equipment will be available onsite.
2. First Aid Kit
3. A multipurpose dry chemical (Class A, B, and C) fire extinguisher, rated not less than 2A:10B:C, will be maintained on the site. Atlas employees are not trained in firefighting techniques and use of a fire extinguisher should be limited to cases of small or incipient stage fires. Always ensure you have an exit before attempting to fight a fire, notification has been completed and help is on the way.

9.3. Site Evacuation Conditions

The following conditions will necessitate the cessation of field work in the area of concern, withdrawal from the work area and revisions to this HASP:

- Fires and/or explosions
- The atmospheric conditions listed in Table 4-2 of this HASP are met.
- Flammable atmosphere readings above 10 percent LEL
- Oxygen readings above 23.5 percent oxygen concentration
- Oxygen readings at or below 19.5 percent oxygen concentration
- PID readings over 50 ppm sustained for more than 5 minutes

9.4. Gas Line, Electrical Line or Chemical Line Strike

In the event of a strike or potential strike all operations must stop and equipment turned off if safe to do so.

Onsite employees must immediately contact 911 or onsite emergency response and begin evacuation of the surrounding areas if there is no area alarm.

Once emergency services have been notified and all site personnel evacuated including the surround areas, contact the PM.

9.5. Non-Atlas Emergencies

In the event that an emergency occurs onsite that was not caused by project work, but may affect the safety of onsite staff all work must stop. If safe to do so, the site should be secured and employees moved to a safe location.

These events may include but are not limited to:

- General public medical emergency
- Vehicle incident
- Police activity – violence/theft

9.6. Emergency Communication System

Emergency contacts and telephone numbers are provided at the beginning of this HASP. Employees will be provided with a communication device for onsite and offsite communications. These devices may include radios or mobile telephones. If an emergency occurs on-site, the site supervisor is responsible for checking that the appropriate emergency contact has been notified. At the time of the emergency response, the site supervisor or designee will brief the emergency personnel on the status of the emergency, including site conditions.

Field personnel may need to use hand signals if there are noisy working conditions on the site. Any use of hand signals should be discussed during the tailgate safety meeting.

9.7. Emergency Response Follow-Up

If there is an incident or emergency response, the SSHO will notify the PM and RSC. The PM or BSO must complete an Incident Report through the company's Incident Management System. Prior to resuming work, a site safety meeting will be held to discuss the circumstances surrounding the incident and what should be done to prevent a re-occurrence.

10.0 TRAINING

It is the responsibility of the PM and each subcontractor's supervising manager to determine if Atlas and subcontractor employees meet these training requirements.

10.1. General Training Requirements

All Atlas and subcontractor employees working on this project site will have received, at a minimum, the following training prior to arrival.

- PPE use
- All tools and equipment to be used by the employee
- Hazard Communication
- Proper housekeeping
- Slip, trip and fall prevention
- Fire extinguisher training
- Temperature – Heat and Cold injuries/illnesses
- Safe lifting
- Noise
- CPR/First Aid

10.2. Hazwoper

All Atlas and subcontractor employees that work in the project exclusion zone, decontamination area or may be exposed to onsite contaminates must have completed the 40-hour training requirement of 29 CFR 1910.120(e) (Hazwoper) and maintain that training by completing an annual 8 hour Hazwoper refresher training.

10.3. Site Supervisor's Training

Onsite supervisors on this project who are directly responsible for or who supervise workers must complete, in addition to the initial 40-hour Hazwoper training, 8 additional hours of specialized supervisory training in compliance with the OSHA regulations.

10.4. Site Safety Training and Briefing Topics

The SSHO will conduct site-specific health and safety briefing (tailgate safety meeting) for field personnel before the start of all field work. All site workers including the site supervisor, Atlas employees and subcontractor personnel must attend. At the conclusion of the meeting, personnel are to sign the HASP Agreement and Acknowledgement Form and Tailgate Safety Meeting Form found in Appendix C.

As additional people are assigned to the site, it is the responsibility of the SSHO to ensure that new personnel are briefed on health and safety protocols and ensure that they have reviewed and signed the HASP Agreement and Acknowledgement Form.

The Tailgate Safety Meeting will cover:

- Site-specific health and safety procedures
- Client-specific health and safety policies and procedures
- Incidents and reporting
- JSA for tasks to be performed
- Health effects of various chemicals used on the site
- Emergency response actions pertaining to operations on-site
- Contents of this HASP

Additionally, daily site tailgate safety meetings will review past activities, plan the day's tasks, understand any near-miss and "lessons learned", establish safe working procedures for anticipated hazards and provide pertinent safety and health training and motivation.

10.5. Visitors

All visitors entering the designated work zones will be subject to all applicable health and safety requirements during field operations at this site. All visitors to a work site will be given the opportunity to review the HASP, will be escorted at all times, and will be required to stay a safe distance from site activities. The site supervisor and/or the SSHO will be responsible for briefing all visitors on the site hazards, site safety precautions, and the site emergency response plan.

APPENDIX A

Job Safety Analyses (JSA)

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Excavating contaminated soil	11/3/2020	2/10/2005	1 of 5

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☐ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☒ IMPACT RESISTANT GLOVE LEVEL: 3	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☐ CHEMICAL RESISTANT GLOVE:		☐ OTHER:
☐ FACE SHIELD	☐ HEARING PROTECTION	☐ GOGGLES:	☐ OTHER:
REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☒ AIR MONITORING: PID	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Entering/Exiting excavator	• Falls	• Face the surface of the equipment and use the manufacturer's designed hand and foot holds to climb in and out of the cab of the equipment using three points of contact. • Set park brake, turn equipment off, and lock controls before leaving the equipment • Always maintain three points of contacting when climbing in or out of the equipment. • Never jump off the equipment.
Moving excavator	• Co-workers, contact with pedestrian	• Use mirrors to watch for people. • Only approach the equipment after the operator has removed their hand from the control and indicated that it is safe to approach. • Do not operate the machine while pedestrians or employees are in the swing radius of the excavation arm. • Stay alert and use a spotter. • All employees must wear a high visibility traffic vest.
	• Non-Essential (unauthorized personnel)	• Establish an adequate work zone. • Minimize entry of all non-essential (unauthorized personnel) into the work zone.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT		
	• Vehicles	• Use mirrors to watch for traffic. • Do not operate machine while traffic is passing. • Use a spotter.
Remove contaminated soil	• Striking under ground utilities • Unidentified utilities	• Prior to digging the State's one call service must be contacted at least 48 hours before start of operations. • A private locating company should be used to identify any on-site underground utilities. • A valid ticket must be obtained and within dates. • Review as built drawings of the area. • Use a spotter to help identify any areas that appear to have back fill. • Stop if pea gravel or back fill is encountered! • Use a scrapping motion by digging 3 – 4 inches at a time for the first 5 feet.
	• Overhead hazards	• Spotter must be used when the equipment is operating or moved. Identify all overhead utilities or structures before moving equipment into position. • Must maintain a minimum of 10 feet from all overhead utility lines.
	• Contact with hazardous material	• Wear nitrile gloves under leather, cotton, or craftsman gloves. • Wear safety glasses
	• Hazardous atmosphere	• Monitor the environment for hazardous and explosive environments with a PID, FID or 4 gas monitor. • Stop work if 10 PPM is reached in the breathing zone and sustained for 5 minutes.
	• Falls into excavation	• All personnel should maintain a distance of 2 feet from the edge of the excavation. • Setup an exclusion zone around the excavation 3 feet from the edge.
	• Excavation collapse	• Competent Person for excavations must be on site to evaluate soil type. No one can enter the excavation until the Competent Person approves and performs a documented inspection. • Sloping, benching, or shoring must be used if the

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Excavating contaminated soil	11/3/2020	2/10/2005	3 of 5

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT		
		Competent Person directs it or if the excavation exceeds 5 feet or more. • There should be no standing water in the excavation. • Limit the amount of time someone must be in an excavation. • Ladders or a means of safely climbing in and out of the excavation must used if the excavation is greater than 4 feet and place every 25 feet. The competent person may require ladders or another means of ingress and egress at depths less than 4 feet. • Spoil piles should be kept at least 2 feet from the edge of the excavation. • Daily inspections of the excavation must be conducted by the Competent Person. • Heavy equipment is not allowed any closer than 2 feet from the edge of the excavation.
Remove contaminated soil.	• Equipment tipping over	• Only qualified operators are allowed to operate the equipment. • The operator should always check the of operation before moving the equipment grade, elevation change, and weak ground conditions. • Operate the equipment from operator seat only. • Seat belt must be worn at all times when ever in the cab of the equipment. • The operator should know and respect the safe limits of the equipment. Use caution when operating on inclines. • Do not undermine machine • Move machine slowly over rough terrain. • Stay back from steep slopes and soft shoulders. • The equipment should remain at least two feet from the edge of the excavation. • A spotter should be used at all times while the equipment is in operation.
	Equipment Failure	• Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. • Replace any hoses or connections that appear to be

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Excavating contaminated soil	11/3/2020	2/10/2005	4 of 5

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT		
		weak or leaking.
	Blowing dust	• Water should be used to wet the soil and keep dust down. • The site safety officer should evaluate the weather conditions to determine if the windy conditions warrant stopping work. • Wear goggles during windy, dusty conditions.

STOP WORK

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Please explain additional steps, changes or amendments to this JSA in the provided space below. Prior to starting work ensure that all employees understand and agree with the changes in this JSA.

By signing this JSA form, you are acknowledging that you have read, reviewed and understand the job steps, potential hazardous conditions and unsafe conditions and the safe procedures, preventative measures required to perform the task safely and the requirement to Stop Work when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP.

Print Name	Signature	Company	Date

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☒ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☐ IMPACT RESISTANT GLOVE LEVEL:	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☐ CHEMICAL RESISTANT GLOVE:		☐ OTHER:
☐ FACE SHIELD	☒ HEARING PROTECTION	☒ GOGGLES:	☐ OTHER:
REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☐ AIR MONITORING: **Choose an item.**	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Enter/Exit Truck	• Falls	• Face Truck. • Set park brake and lock controls before leaving machine. • Use three point of contact while mounting and dismounting the truck by holding handles provide and using wheel step. • Never jump from truck.
Drive Truck to Water Tank.	• Vehicles	• Stay alert & use defensive driving techniques. • Use mirrors or a spotter if backing into filling area. • Do not travel more than the posted speed limit or 5mph.
	• Pedestrians	• Use mirrors to watch for pedestrians. • Stay alert. • Yield to all pedestrians.
Fill Tank on Truck	• Falls	• Face Truck • Set park brake and lock controls before leaving machine • Use three point of contact while mounting and dismounting the truck by holding handles provide and using wheel step. • Never jump from truck • Use established manufactured hand holds and foot holds.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
Dust Suppression	8/12/2020	04/15/2020	2 of 3

	• Hand Injuries – Cuts and Pinches	• Wear work gloves. • Never place hands in between areas where they can become pinched or stuck. • Do not place hand between objects on tank.
Fill Tank on Truck	• Hose Whipping • Overfilling the tank	• Make sure water is off and secure both ends of hose before turning on water. • Pay attention while filling the tank and do not overfill the tank causing a tip over.
Spray Water on Roads	• Pedestrians	• Use mirrors to watch for pedestrians • Stay alert and maintain distance from pedestrians. • Yield to all pedestrians. • Turn water off when pedestrians approach.
	• Vehicles	• Use mirrors to watch for pedestrians • Stay alert and keep distance from pedestrians.
Spray Water on Soil Piles	• Hand Injuries – Cuts and pinches	• Wear cut resistant gloves. • Watch hand and finger placement. • Do not place hand between objects where they can become stuck or pinched.
	• Hose Whipping	• Make sure water is off and secure both ends of hose before turning on water. • Pay attention while filling the tank and do not overfill the tank causing a tip over. • Brace yourself securely while holding hose.
	• Slip, Trips, Falls	• Wear steel toed boots with ankle support. • Watch foot placement. • Do not walk while spraying

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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STOP WORK

Atlas and Subcontractor employees must stop work and contact off-site senior personnel when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP. The JSA should be modified with new steps, hazards, and safe procedures agreed upon by all Atlas and Subcontractor employees at the project site and approved by off-site senior personnel. Documentation of the modification and review by all affected personnel must take place.

Please explain additional steps, changes or amendments to this JSA in the provided space below. Prior to starting work ensure that all employees understand and agree with the changes in this JSA.

By signing this JSA form, you are acknowledging that you have read, reviewed and understand the job steps, potential hazardous conditions and unsafe conditions and the safe procedures, preventative measures required to perform the task safely and the requirement to Stop Work when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP.

Print Name	Signature	Company	Date

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☒ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☐ IMPACT RESISTANT GLOVE LEVEL:	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☐ CHEMICAL RESISTANT GLOVE:		☐ OTHER:
☐ FACE SHIELD	☒ HEARING PROTECTION	☐ GOGGLES:	☐ OTHER:
REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☐ AIR MONITORING: Choose an item.	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

STOP WORK

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1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Transportation of Heavy Equipment to and from the project Site	• See JSA Driving	• See JSA Driving
Unload Heavy Equipment	• See JSA Unloading Heavy Equipment	• See JSA Unloading Heavy Equipment
Moving Heavy Equipment at the Project Site	• Pedestrians/Vehicles	• Onsite personnel should wear traffic reflective vest. • Spotters must be used whenever the equipment is being operated. • Backup alarm is required on heavy equipment.
	• Tipping Over	• Only qualified operators on equipment. • Check area of operation before moving machine. • No riders on equipment or in bucket. • Lower bucket and lock controls before leaving machine. • Operate machine from operator seat only. • Know safe limits of machine. • Wear seat belt. • Use caution when operating on inclines. • Do not undermine machine.

JOB SAFETY ANALYSIS (JSA)

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		• Move machine slowly over rough terrain • Do not move heavy loads to outer limits of machine • Stay back from steep slopes and soft shoulders
	• Overhead Hazards	• Spotter must be used whenever moving heavy equipment onsite. • Driver and spotter should walk the travel path and discuss the movement of the equipment.
Moving Heavy Equipment at the Project Site.	• Heavy Equipment	• Spotters must be used at all times when heavy equipment is being operated. • All onsite personnel must wear safety reflective vest. • Operator must follow spotters hand signals and remove hands from controls when not working. • Site personnel should only approach the spotter • Backup alarm is required on heavy equipment.
Remove Soil	• Slips, Trips, Falls	• Maintain housekeeping. • Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. • If on pavement or concrete sweep up loose sand, dirt or rock • Wear slip resistant steel toed boots. • Keep foot wear clean of mud and other debris. • Setup areas away from snow and ice. • If ice is present wear yak-traks on boots.
Remove Soil	• Pedestrians	• Caution tape or snow fence should be used to surround the entire site. • Onsite personnel must wear traffic reflective vest. • Never lift, swing, or move load over anyone or equipment • Keep windows clean • Keep ground personnel in view
	• Entrapment	• Competent Person must be on site to evaluate soil type and document inspection (daily) of safe entry. • No one can enter the trench until the competent person approves. • Sloping, benching or shoring must be used if the Competent Person directs it or if the trench exceeds 5 feet or more.

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		• There should be no standing water in the trench. • Limit the amount of time someone must be in a trench. • Ladders or a means of safely climbing in and out of the trench must used if the trench is greater than 4 feet and place every 25 feet. The competent person may require ladders or another means at depths less than 4 feet. • Spoil piles should be kept at least 2 feet from the edge of the trench. • Heavy equipment not allowed any closer than 2 feet from the edge of the trench.
Remove Soil	• Noise	• Hearing protection is required in the exclusion zone when heavy equipment is in use.
	• Underground Utilities	• The State's One Call Service should be contacted at least 2 days prior to the start of the project. • A private locator is required and Atlas staff should be onsite while private locator is working. • For the first five (5) feet the equipment operator shall use a technique of scraping the ground to a depth of not more than 3 inches at a time. This technique allows the equipment operator to "feel" the presence of an unmarked utility line. • A spotter must be used to help visually identify utility lines. • If pea gravel, fill material, or refusal is encountered stop operations and report the incident to the Project Manager and Branch Safety Officer. • Hand digging within 18 inches of marked utility lines is required.
Remove Soil	• Overhead Utilities	• All over head utilities must be identified before work begins. • There should be at least 10 feet distance between the heavy equipment and the utility line. • See HASP for more information on clearance.
	• See JSA Loading Soil with End Loader	• See JSA Loading Soil with End Loader
Loading Soil for Removal	• See JSA for Soil Removal	• See JSA for Soil Removal.

JOB SAFETY ANALYSIS (JSA)

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Please explain additional steps, changes or amendments to this JSA in the provided space below. Prior to starting work ensure that all employees understand and agree with the changes in this JSA.

By signing this JSA form, you are acknowledging that you have read, reviewed and understand the job steps, potential hazardous conditions and unsafe conditions and the safe procedures, preventative measures required to perform the task safely and the requirement to Stop Work when a change in condition, process, or job phase develops on the project site that is not addressed by this JSA or within the project specific HASP.

Print Name	Signature	Company	Date

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MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT			
☒ REFLECTIVE VEST	☒ LONG PANTS	☐ AIR PURIFYING RESPIRATOR:	☐ OTHER:
☒ HARD HAT	☒ CUT RESISTANT GLOVE LEVEL: 3	☐ SUPPLIED AIR RESPIRATOR	☐ OTHER:
☒ SAFETY TOED BOOTS	☐ IMPACT RESISTANT GLOVE LEVEL:	☐ CHEMICAL RESISTANT CLOTHING:	☐ OTHER:
☒ SAFETY GLASSES	☒ CHEMICAL RESISTANT GLOVE: Nitrile		☐ OTHER:
☐ FACE SHIELD	☒ HEARING PROTECTION	☐ GOGGLES:	☐ OTHER:
REQUIRED TOOLS / EQUIPMENT / SUPPLIES			
☐ DRINKING WATER	☐ RATCHET WITH EXTENSION	☐ OTHER:	☐ OTHER:
☐ BUG REPELLENT	☐ WELL MAGNET	☐ OTHER:	☐ OTHER:
☒ TRAFFIC CONTROL DEVICES	☒ AIR MONITORING: PID	☐ OTHER:	☐ OTHER:
☐ LADDER	☐ LOCKOUT/TAGOUT EQUIPMENT	☐ OTHER:	☐ OTHER:

STOP WORK

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1) JOB STEPS	2) POTENTIAL HAZARDOUS CONDITIONS / UNSAFE PRACTICES	3) SAFE PROCEDURES and PREVENTATIVE MEASURES
Site Setup	• See JSA Site Setup	• See JSA Site Setup
Move Equipment into Place on Project Site	• Pedestrians • Other Vehicles • Overhead Obstacles • Damage to Private Property	• Don PPE • Back-up alarm must be operational on equipment. • All employees/workers in the area should wear a traffic reflective vest. • When backing equipment into place a spotter must be used. • Spotter must have on traffic safety vest. • Equipment driver should yield to other vehicles. • Driver and spotter should walk the travel path and discuss the movement of the equipment.
Concrete/Asphalt Cutting	• See JSA Cutting Concrete or Asphalt	• See JSA Cutting Concrete or Asphalt
Clearing Five Feet Below Ground	• See JSA Air Knifing or Hand Augering	• See JSA Air Knifing or Hand Augering

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Raising and Lowering of the Mast	• Equipment Failure • Overhead Utilities • Overhead Obstacles • Falling Objects • Rig Tipping Over	• Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. • A spotter will be used as the driller raises the mast to ensure that the path of the mast does not come in contact with overhead lines. • Setup drill rig at least 10 feet from overhead power lines. • Position the rig to avoid overhead power lines as defined by the voltage and local zoning requirements. • A spotter will be used as the driller raises the mast to ensure that overhangs, tree branches or canopies are not in the path of the mast. • Have everyone stand clear of the mast. • Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. • Do not allow employees on the deck of the drill rig when the mast is being raised. • Only the driller should be next to the drill rig when raising the mast. • Inform all personnel before raising the mast. • Do not drive with mast in the raised position. • If the ground appears unstable, a qualified individual should determine if it is safe to place the drill rig at that site. • Set all brakes, put gearboxes in neutral, and disengage all hoist levers. • Set riggers/stabilizers prior to raising the mast. • Level and stabilized the drill rig before raising.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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Connecting and Disconnecting Drill Piping	• Back Injuries from Lifting Drill piping and other Heavy Objects • Contact with Contaminated Soil • Rolling/Moving Drill Rod in the Stack • Hand Injuries – Cuts, Pinches, Fractures or Crushed • Noise • Slips, Trips, Falls	• Use proper lifting procedures – avoid lifting with the back and twisting. • If over 50 pounds or awkward ask for assistance. • Use a cart or wheelbarrow to move material into place. • Always take the drill rod on top of the others. • Move slowly and watch the other rods to see if they will shift. • Use the right tool for the job. • Be aware of hand placement – do not place hands in the path of hammers, knifes or between objects. • Communicate your intentions to others involved. Make sure they understand where and what you will be doing before you do it. • Never put hands under hammer while it is moving towards the drill rod. Lock the lifting mechanism in place and lower the hammer towards the drill rod. Once in position remove hands from the controls and release lifting mechanism and secure to top of drill rod. • Keep hands off of hammer while it is moving. Do not “ride” the hammer as it is going up by holding onto it with your hand(s). • Maintain housekeeping. • Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. • If on pavement or concrete sweep up loose sand, dirt or rock before lifting or moving equipment. • Continue to clean and remove cuttings from drilling area. • Pickup tools that are not needed and place out of the way. • Walk your pathway before carrying an item. • Maintain three points of contact when climbing up and down. Always face the climbing surface.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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Connecting and Disconnecting Drill Piping	• Equipment Failure • Dropping Drill Rod • Hydraulic Hose Breaking • Moving Hammer/Mast	• Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. • Keep all unnecessary employees away from the area. • Keep gloves clean and dry. Replace if needed. • Use two hands while handling the drill rod. • Do not use your foot to hold the drill rod in the ground while removing the drill rod. Use a clamp to secure the down hole rod while removing sections. • Check all lines and connections for cracks, tears or weakness prior to start of operations. • Maintain lines in a manner that would prevent deterioration. • Remove and replace all lines that show wear and tear. • A safe zone should be established around the mast that represents an area the no one should be in while the hammer/mast is in motion. • When walking around the hammer/mast, watch for movement and potential contact with your head and shoulders. • Set up work area with enough area so that there is room to walk around the hammer/mast while it is in motion.
Hammering Drill Rod into Ground	• Back Injuries from Lifting Pipe Casing and Other Heavy Objects • Contact with Contaminated Soil • Hammer/Mast Footer • Contact with Underground Utilities • Hand Injuries – Cuts, Pinches, Fractures or Crushed • Noise • Slips, Trips, Falls • Equipment Failure • Hazardous Atmosphere • Moving Hammer • Hydraulic Hose Breaking	• Use proper lifting procedures – avoid lifting with the back and twisting. • If over 50 pounds or awkward ask for assistance. • Use a cart or wheelbarrow to move material into place. • Do not place your feet on the mast footer while in operation. • Keep mast footer on the ground. If the footer raises up, stop hammering and lower footer back to the ground. • Wear safety toed boots. • Keep feet away from footer area and be aware of feet placement. • Contact the state's one call service at least 48 hours prior to digging. • Use private locator company. • Look at existing site plans prior to beginning work to determine potential location of underground utilities. • Watch for pea gravel or fill material. • Stay at least 5 feet away from all marked utility lines. • Ensure all affected utilities are marked or have no conflict.

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		• Never put hands under hammer while it is moving towards the drill rod. Lock the lifting mechanism in place and lower the hammer towards the drill rod. Once in position remove hands from the controls and release lifting mechanism and secure to top of drill rod. • Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. • Continue to clean and remove cuttings from drilling area. • Maintain three points of contact when climbing up and down. Always face the climbing surface. • Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. • Keep all unnecessary employees away from the area. • Monitor the environment using a PID. • Use a respirator if levels of contaminates exceed the action level. • A safe zone should be established around the mast that represents an area the no one should be in while the hammer/mast is in motion. • When walking around the hammer/mast, watch for movement and potential contact with your head and shoulders. • Setup work area with enough area so that there is room to walk around the hammer/mast while it is in motion. • Check all lines and connections for cracks, tears or weakness prior to start of operations. • Maintain lines in a manner that would prevent deterioration. • Remove and replace all lines that show wear and tear.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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Soil Sampling	• Hot Tools • Stuck Acetate Sleeve • Chemical Contact • Soil Sample Under Pressure – Flying Debris	• Keep all metal tools and sampling equipment out of direct contact with the sun. Keep in shade. • Use the hydraulic ram to extrude the stuck sleeve. If there is not a ram, replace the sampling rod. • Keep the ball check free of debris to ensure proper operation. Check the operation of the ball check prior to connecting to the drill for sampling. • When removing the drive tip from the sample rod do not stand directly in front, stand to the side, and remove slowly. • Listen for a hissing sound coming from the sample rod. • Expanding clay may cause this to occur. Prior to drilling, the potential for expanding clay should be determined and the need for adjust sampling protocols with the driller discussed.
Soil Sampling	• Hand Injuries • Back Injuries • Tripping Hazards	• Seek assistance if the sampler is difficult to open or remove. • Secure drill rod sampler in a vise grip while removing sample tube. • Use the sample tube liner cutter while secure in sample tray to cut the liner and expose the soil sample. • Sample liner is sharp when cut. Only handle the liner with cotton, leather or craftsman gloves. Nitriles alone will not provide protection. • Avoid setting tools and other equipment on the ground. Set at waist level. Setup sample prep area on the back of tailgate or on a portable table. • Do not twist your body while using the liner cutter. Face one end of the liner and pull the liner cutter towards you. Step back and pull again until sample is exposed. • Maintain a clear path between the sample location and the preparation area.

JOB SAFETY ANALYSIS (JSA)

DESCRIPTION OF JOB:	REVISION DATE:	JSA CREATED ON:	PAGE:
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Debris Removal	• Moving Hammer • Equipment Failure	• A safe zone should be established around the mast that represents an area the no one should be in while the hammer/mast is in motion. • When walking around the hammer/mast, watch for movement and potential contact with your head and shoulders. • Wear hard hat. • Setup work area with enough area so that there is room to walk around the hammer/mast while it is in motion. • Perform and document daily inspection of all cabling, hydraulics, motors, fluid levels and hoses. • Keep all unnecessary employees away from the area.
Debris Removal	• Hazardous Atmosphere • Back Injuries • Slips, Trips, Falls • Hand Injuries • Noise	• Monitor the environment using a PID. • Use a respirator if levels of contaminates exceed the action level. • Prior to work starting identify potential hazardous air contaminates. • Follow safe lifting procedures of lifting with the legs not the back. • Use a cart or wheelbarrow to move materials around the project site. • Set up work zone with enough room for staging of equipment and supplies such that there are aisle ways for walking and working. • Continue to clean and remove cuttings from drilling area. • Pickup tools that are not needed and place out of the way. • Always face where you are walking. • Always watch hand placement – do not place your hand in direct path of a tool. • Communicate your intentions to others involved. Make sure they understand where and what you will be doing before you do it.
Drum Handling	• See JSA Drum Handling	• See JSA Drum Handling
Decon	• See JSA Decon	• See JSA Decon

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STOP WORK

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Print Name	Signature	Company	Date

APPENDIX B

Chemical Hazard Information

Safety Data Sheets (SDS)

Lead

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 12/15/2014 Revision date: 12/15/2014 Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance

CAS No : 7439-92-1

Formula : Pb

Synonyms : C.I. 77575, in massive state / elemental lead, in massive state / glover, in massive state

BIG no : 10073

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Solder
Battery: component
Construction
Electrodes

1.3. Details of the supplier of the safety data sheet

GSC International, Inc.
1747 N. Deffer Drive
Nixa,
MO 65714
United States of America

Tel: 417-374-7431
Fax: 417-374-7442
Email: info@gscinternationalinc.com

1.4. Emergency telephone number

Country	Organization/Company	Address	Emergency number
MEXICO	Servicio de Informacion Toxicologica Sintox	Tintoreto #32 Edif. a Desp. Col. Nochebuena Mixcoac México, D.F.	1 800 009 2800 +52 55 5611 2634 /+52 55 5598 9095
UNITED STATES OF AMERICA	American Association of Poison Control Centers		1-800-222-1222

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Acute Tox. 4 (Oral)	H302
Acute Tox. 4 (Inhalation)	H332
Carc. 1B	H350
Repr. 1A	H360
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS07 GHS08 GHS09

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H302+H332 - Harmful if swallowed or if inhaled
H350 - May cause cancer
H360 - May damage fertility or the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure

H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe dust, fume
P264 - Wash hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308+P313 - If exposed or concerned: Get medical advice/attention
P314 - Get medical advice/attention if you feel unwell
P501 - Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification (GHS-US)
Lead (Main constituent)	(CAS No) 7439-92-1	> 99,9	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Carc. 1B, H350 Repr. 1A, H360 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

4.1. Description of first aid measures

First-aid measures general : If you feel unwell, seek medical advice. IF exposed or concerned: Get medical advice/attention. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Not applicable. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after skin contact : Not applicable. Wash skin with plenty of water.

First-aid measures after eye contact : Not applicable. Rinse eyes with water as a precaution.

First-aid measures after ingestion : Not applicable. Rinse mouth. Call a poison center/doctor/physician if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Adapt extinguishing media to the environment.

Unsuitable extinguishing media : No unsuitable extinguishing media known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : DIRECT FIRE HAZARD. Non combustible.

Explosion hazard	:	DIRECT EXPLOSION HAZARD. No data available on direct explosion hazard. INDIRECT EXPLOSION HAZARD. No data available on indirect explosion hazard.
Reactivity	:	On burning: formation of metallic fumes. Oxidizes on exposure to air.

5.3. Advice for firefighters

Precautionary measures fire	:	Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to heat: have neighborhood close doors and windows.
Firefighting instructions	:	Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.
Protection during firefighting	:	Heat/fire exposure: compressed air/oxygen apparatus. Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment	:	Gloves. Protective clothing. See "Material-Handling" to select protective clothing.
Emergency procedures	:	Mark the danger area. No naked flames.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Prevent soil and water pollution. Prevent spreading in sewers. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Not applicable. Collect spillage.
Methods for cleaning up	:	Recover mechanically the product. Pick-up the material. Take collected spill to manufacturer/competent authority. Notify authorities if product enters sewers or public waters.
Other information	:	Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Meet the legal requirements. Do not discharge the waste into the drain. Handle unclean empty containers as full ones. Observe strict hygiene. Measure the concentration in the atmosphere. Carry out operations in the open/under local exhaust/ventilation or with respiratory protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust, fume. Use only outdoors or in a well-ventilated area. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Wear personal protective equipment. Floors, walls and other surfaces in the hazard area must be cleaned regularly.
Hygiene measures	:	Separate working clothes from town clothes. Launder separately. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Does not require any specific or particular technical measures. Comply with applicable regulations.
Storage conditions	:	Store locked up. Store in a well-ventilated place. Keep cool.
Incompatible materials	:	Strong acids, strong bases and oxidation agents.
Heat-ignition	:	KEEP SUBSTANCE AWAY FROM: heat sources.
Prohibitions on mixed storage	:	KEEP SUBSTANCE AWAY FROM: oxidizing agents. Strong acids. Strong bases.
Storage area	:	Meet the legal requirements.
Special rules on packaging	:	SPECIAL REQUIREMENTS: closing. correctly labeled. meet the legal requirements. Secure fragile packaging in solid containers.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Lead (7439-92-1)		
ACGIH	ACGIH TWA (mg/m³)	0,05 mg/m³
ACGIH	Remark (ACGIH)	CNS & PNS impair
OSHA	Not applicable	

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Ensure good ventilation of the work station.

Personal protective equipment : Protective goggles. Gloves.

Materials for protective clothing : GIVE EXCELLENT RESISTANCE: No data available. GIVE GOOD RESISTANCE: butyl rubber. PVC. GIVE LESS RESISTANCE: No data available. GIVE POOR RESISTANCE: No data available.

Hand protection : protective gloves.

Eye protection : Safety glasses.

Skin and body protection : Not required for normal conditions of use.

Respiratory protection : Wear respiratory protection.

Environmental exposure controls : Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid

Appearance : Metal.

Molecular mass : 207,20 g/mol

Color : White to blue-grey

Odor : Odorless

Odor threshold : No data available

pH : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Melting point : 327 °C

Freezing point : No data available

Boiling point : 1740 °C

Flash point : Not applicable

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Flammability (solid, gas) : No data available

Vapor pressure : < 0,1 hPa

Relative vapor density at 20 °C : No data available

Relative density : 11,3

Specific gravity / density : 11340 kg/m³

Solubility : insoluble in water. Substance sinks in water. Soluble in nitric acid. Insoluble in organic solvents. Water: < 0,1 g/100ml

Log Pow : 0,73 (Estimated value)

Log Kow : No data available

Viscosity, kinematic	:	Not applicable
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Explosive limits	:	No data available

9.2. Other information

VOC content : Not applicable (inorganic)

SECTION 10: Stability and reactivity

10.1. Reactivity

On burning: formation of metallic fumes. Oxidizes on exposure to air.

10.2. Chemical stability

Unstable on exposure to air.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Acids. Bases.

10.6. Hazardous decomposition products

Thermal decomposition generates : fume.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Harmful if swallowed. Inhalation: Harmful if inhaled.

Lead (\f)7439-92-1	
LD50 oral rat	> 2000 mg/kg body weight (Rat; Weight of evidence)
LD50 dermal rat	> 2000 mg/kg body weight (Rat; Experimental value; OECD 402: Acute Dermal Toxicity)
ATE US (oral)	500,000 mg/kg body weight
ATE US (gases)	4500,000 ppmV/4h
ATE US (vapors)	11,000 mg/l/4h
ATE US (dust, mist)	1,500 mg/l/4h
Additional information	Lead massive metal is not considered to be acutely toxic. It is not easily inhaled or ingested, and if it is accidentally ingested normally passes through the gastrointestinal system without significant absorption into the body. Lead is not easily absorbed through the skin.

Skin corrosion/irritation : Not classified
(Based on available data, the classification criteria are not met)

Serious eye damage/irritation : Not classified
(Based on available data, the classification criteria are not met)

Respiratory or skin sensitization : Not classified
(Based on available data, the classification criteria are not met)

Germ cell mutagenicity : Not classified
(Based on available data, the classification criteria are not met)

Carcinogenicity : May cause cancer.

Lead (7439-92-1)	
Additional information	There is some evidence that inorganic lead compounds may have a carcinogenic effect, and they have been classified by IARC as probably carcinogenic to humans. However, it is considered that this classification does not apply to lead in articles, given the very low bioavailability of metallic lead. Carcinogenicity studies of lead metal powder have been negative. Epidemiology studies of workers exposed to inorganic lead compounds have found a limited association with stomach cancer. IARC has concluded that lead metal is possibly carcinogenic to humans (Group aB).
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	3 - Reasonably anticipated to be Human Carcinogen

Reproductive toxicity : May damage fertility or the unborn child.

Specific target organ toxicity (single exposure) : Not classified

(Based on available data, the classification criteria are not met)

Specific target organ toxicity (repeated exposure) : May cause damage to organs through prolonged or repeated exposure.

Lead (7439-92-1)	
Additional information	Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Although inhalation and ingestion of lead in massive form are unlikely, poor hygiene practises may result in hand to mouth transfer which maybe significant over a prolonged period of time. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the haemotopoetic (blood) system, kidney function, reproductive function and the central nervous system.

Aspiration hazard : Not classified

(Based on available data, the classification criteria are not met)

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Dangerous for the environment. Very toxic to aquatic life with long lasting effects.

Ecology - air : Not dangerous for the ozone layer (Regulation (EC) No 1005/2009). Not included in the list of fluorinated greenhouse gases (Regulation (EC) No 842/2006). TA-Luft Klasse 5.2.2/II.

Ecology - water : No water pollutant (surface water). Maximum concentration in drinking water: 0.010 mg/l (lead) (Directive 98/83/EC). Highly toxic to aquatic organisms.

Lead (7439-92-1)	
LC50 fish 1	2,8 (0,44 - 542) mg/l (96h) Coughlan, D.J., S.P. Gloss, and J. Kubota 1986. Acute and Sub-Chronic Toxicity of Lead to the Early Life Stages of Small mouth Bass (Micropterus dolomieui). Water Air Soil Pollut. 28(3/4):265-275
EC50 Daphnia 1	4,46 (0,53 - 5,1) mg/l (48h) Govindarajan, S., C.P. Valsaraj, R. Mohan, V. Hariprasad, and R. Ramasubramanian 1993. Toxicity of Heavy Metals in Aquaculture Organisms: Penaeus indicus, Perna viridis, Artemia salina and Skeletonema costatum. Pollut.Res. 12(3):187-189

12.2. Persistence and degradability

Lead (7439-92-1)	
Persistence and degradability	Biodegradability: Not applicable. No (test)data available on mobility of the substance.
ThOD	Not applicable (inorganic)

12.3. Bioaccumulative potential

Lead (7439-92-1)	
Log Pow	0,73 (Estimated value)
Bioaccumulative potential	Low bioaccumulation potential (Log Kow < 4).

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on ozone layer :

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Reuse or recycle following decontamination. Remove to an authorized dump (Class I). Do not discharge into surface water (2000/60/EC, Council decision 2455/2001/EC, O.J. L331 of 15/12/2001).

Additional information : LWCA (the Netherlands): KGA category 05. Hazardous waste according to Directive 2008/98/EC.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN3077 Environmentally hazardous substances, solid, n.o.s. Lead(7439-92-1), 9, III

UN-No.(DOT) : UN3077

Proper Shipping Name (DOT) : Environmentally hazardous substances, solid, n.o.s.
Lead(7439-92-1)

Department of Transportation (DOT) Hazard Classes : 9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140

Hazard labels (DOT) : 9 - Class 9 (Miscellaneous dangerous materials)

DOT Symbols : G - Identifies PSN requiring a technical name

Packing group (DOT) : III - Minor Danger

DOT Special Provisions (49 CFR 172.102)	:	8 - A hazardous substance that is not a hazardous waste may be shipped under the shipping description “Other regulated substances, liquid or solid, n.o.s.”, as appropriate. In addition, for solid materials, special provision B54 applies. 146 - This description may be used for a material that poses a hazard to the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in 171.8 of this subchapter, or any hazard class as defined in Part 173 of this subchapter, if it is designated as environmentally hazardous by the Competent Authority of the country of origin, transit or destination. 335 - Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as “Environmentally hazardous substances, solid, n.o.s,” UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leak-proof when used as bulk packaging. A112 - Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg: a. Metal: 11A, 11B, 11N, 21A, 21B and 21N b. Rigid plastics: 11H1, 11H2, 21H1 and 21H2 c. Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2 d. Fiberboard: 11G e. Wooden: 11C, 11D and 11F (with inner liners) f. Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner). B54 - Open-top, sift-proof rail cars are also authorized. IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2). IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner. N20 - A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle. T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2) TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	155
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	213
DOT Packaging Bulk (49 CFR 173.xxx)	:	240
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	No limit
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	No limit
DOT Vessel Stowage Location	:	A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.

Additional information

Other information : No supplementary information available.

ADR

No additional information available

Transport by sea

UN-No. (IMDG)	:	3077
Proper Shipping Name (IMDG)	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Class (IMDG)	:	9 - Miscellaneous dangerous compounds
Packing group (IMDG)	:	III - substances presenting low danger

Air transport

UN-No.(IATA)	:	3077
Proper Shipping Name (IATA)	:	Environmentally hazardous substance, solid, n.o.s.
Class (IATA)	:	9 - Miscellaneous Dangerous Goods
Packing group (IATA)	:	III - Minor Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Lead (7439-92-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313 Not listed on the United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	10 lb

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Repr. 1A	H360Df
Acute Tox. 4 (Inhalation)	H332
Acute Tox. 4 (Oral)	H302
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Repr.Cat.1; R61
Repr.Cat.3; R62
Xn; R20/22
R33
N; R50/53

Full text of R-phrases: see section 16

15.2.2. National regulations

Lead (7439-92-1)
Listed on IARC (International Agency for Research on Cancer) Listed as carcinogen on NTP (National Toxicology Program)

15.3. US State regulations

No additional information available

SECTION 16: Other information

Revision date	:	12/15/2014

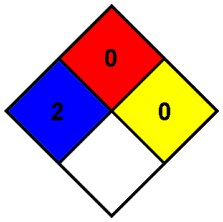
Full text of H-phrases:

Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Carc. 1B	Carcinogenicity Category 1B
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H302	Harmful if swallowed
H332	Harmful if inhaled
H350	May cause cancer
H360	May damage fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : * Chronic Hazard - Chronic (long-term) health effects may result from repeated overexposure

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

Personal Protection : B

SDS US (GHS HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

Polycyclic Aromatic Hydrocarbons Standard Mixture

High-Purity Standards

Chemwatch Hazard Alert Code: **4**

Catalogue number: **PAH-HM16C**
Version No: **1.1**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **06/05/2017**
Print Date: **06/05/2017**
S.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	Polycyclic Aromatic Hydrocarbons Standard Mixture
Synonyms	PAH-HM16C
Proper shipping name	Dichloromethane
Other means of identification	PAH-HM16C

Recommended use of the chemical and restrictions on use

Relevant identified uses	Use according to manufacturer's directions.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	High-Purity Standards
Address	PO Box 41727 SC 29423 United States
Telephone	843-767-7900
Fax	843-767-7906
Website	highpuritystandards.com
Email	Not Available

Emergency phone number

Association / Organisation	INFOTRAC
Emergency telephone numbers	1-800-535-5053
Other emergency telephone numbers	1-352-323-3500

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

Classification	Carcinogenicity Category 1B, Skin Sensitizer Category 1, Germ cell mutagenicity Category 1B, Reproductive Toxicity Category 1B, Acute Aquatic Hazard Category 1, Chronic Aquatic Hazard Category 1

Label elements

Hazard pictogram(s)	
SIGNAL WORD	**DANGER**

Hazard statement(s)

H350	May cause cancer.
H317	May cause an allergic skin reaction.
H340	May cause genetic defects.
H360	May damage fertility or the unborn child.
H410	Very toxic to aquatic life with long lasting effects.

Continued...

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/attention.

Precautionary statement(s) Storage

P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
75-09-2	balance	methylene chloride
83-32-9	0.2	acenaphthene
208-96-8	0.2	acenaphthylene
120-12-7	0.2	anthracene
56-55-3	0.2	benz[a]anthracene
50-32-8	0.2	benz[a]pyrene
205-99-2	0.2	benzo[b]fluoranthene
191-24-2	0.2	benzo[ghi]perylene
207-08-9	0.2	benzo[k]fluoranthene
218-01-9	0.2	chrysene
53-70-3	0.2	dibenz[a,h]anthracene
206-44-0	0.2	fluoranthene
86-73-7	0.2	fluorene
193-39-5	0.2	indeno[1,2,3-cd]pyrene
91-20-3	0.2	naphthalene
85-01-8	0.2	phenanthrene
129-00-0	0.2	pyrene

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Most important symptoms and effects, both acute and delayed

Continued...

See Section 11

Indication of any immediate medical attention and special treatment needed

for naphthalene intoxication: Naphthalene requires hepatic and microsomal activation prior to the production of toxic effects. Liver microsomes catalyse the initial synthesis of the reactive 1,2-epoxide intermediate which is subsequently oxidised to naphthalene dihydrodiol and alpha-naphthol. The 2-naphthoquinones are thought to produce haemolysis, the 1,2-naphthoquinones are thought to be responsible for producing cataracts in rabbits, and the glutathione-adducts of naphthalene-1,2-oxide are probably responsible for pulmonary toxicity. Suggested treatment regime:

- Induce emesis and/or perform gastric lavage with large amounts of warm water where oral poisoning is suspected.
- Instill a saline cathartic such as magnesium or sodium sulfate in water (15 to 30g).
- Demulcents such as milk, egg white, gelatin, or other protein solutions may be useful after the stomach is emptied but oils should be avoided because they promote absorption.
- If eyes/skin contaminated, flush with warm water followed by the application of a bland ointment.
- Severe anaemia, due to haemolysis, may require small repeated blood transfusions, preferably with red cells from a non-sensitive individual.
- Where intravascular haemolysis, with haemoglobinuria occurs, protect the kidneys by promoting a brisk flow of dilute urine with, for example, an osmotic diuretic such as mannitol. It may be useful to alkalinise the urine with small amounts of sodium bicarbonate but many researchers doubt whether this prevents blockage of the renal tubules.
- Use supportive measures in the case of acute renal failure. GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, 5th Ed.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

Special protective equipment and precautions for fire-fighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Use fire fighting procedures suitable for surrounding area. ▸ **DO NOT** approach containers suspected to be hot. ▸ Cool fire exposed containers with water spray from a protected location. ▸ If safe to do so, remove containers from path of fire. ▸ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. May emit poisonous fumes.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite. ▸ Wipe up. ▸ Place in a suitable, labelled container for waste disposal.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by all means available, spillage from entering drains or water courses. ▸ Consider evacuation (or protect in place). ▸ No smoking, naked lights or ignition sources. ▸ Increase ventilation. ▸ Stop leak if safe to do so. ▸ Water spray or fog may be used to disperse / absorb vapour. ▸ Contain or absorb spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Collect solid residues and seal in labelled drums for disposal. ▸ Wash area and prevent runoff into drains. ▸ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▸ If contamination of drains or waterways occurs, advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs.

Continued...

	▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ **DO NOT** allow material to contact humans, exposed food or food utensils. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. ▸ **DO NOT** allow clothing wet with material to stay in contact with skin
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks. For low viscosity materials ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.): ▸ Removable head packaging; ▸ Cans with friction closures and ▸ low pressure tubes and cartridges may be used. - Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *. - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.
Storage incompatibility	None known

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z1	methylene chloride	Methylene chloride	50 ppm	Not Available	Not Available	See Table Z-2
US OSHA Permissible Exposure Levels (PELs) - Table Z2	methylene chloride	Methylene Chloride	Not Available	Not Available	Not Available	See 1919.52.
US NIOSH Recommended Exposure Limits (RELs)	methylene chloride	Dichloromethane, Methylene dichloride	Not Available	Not Available	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	methylene chloride	Dichloromethane	Not Available	Not Available	Not Available	TLV® Basis: COHb-emia; CNS impair; BEI
US ACGIH Threshold Limit Values (TLV)	benz[a]anthracene	Benz[a]anthracene	Not Available	Not Available	Not Available	TLV® Basis: Skin cancer; BEIP
US ACGIH Threshold Limit Values (TLV)	benz[a]pyrene	Benzo[a]pyrene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BElp
US ACGIH Threshold Limit Values (TLV)	benzo[b]fluoranthene	Benzo[b]fluoranthene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BElp
US ACGIH Threshold Limit Values (TLV)	chrysene	Chrysene	Not Available	Not Available	Not Available	TLV® Basis: Cancer; BElp
US OSHA Permissible Exposure Levels (PELs) - Table Z1	naphthalene	Naphthalene	50 mg/m3 / 10 ppm	75 mg/m3 / 15 ppm	Not Available	TLV® Basis: URT irr; cataracts; hemolytic anemia
US NIOSH Recommended Exposure Limits (RELs)	naphthalene	Naphthalin, Tar camphor, White tar	50 mg/m3 / 10 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	naphthalene	Naphthalene	10 ppm	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Continued...

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
methylene chloride	Methylene chloride; (Dichloromethane)	Not Available	Not Available	Not Available
acenaphthene	Acenaphthene	3.6 mg/m3	40 mg/m3	240 mg/m3
acenaphthylene	Acenaphthylene	10 mg/m3	110 mg/m3	660 mg/m3
anthracene	Anthracene	48 mg/m3	530 mg/m3	3,200 mg/m3
benz[a]anthracene	Benzo(a)anthracene	1.2 mg/m3	13 mg/m3	79 mg/m3
benz[a]pyrene	Benzo(a)pyrene; (Coal tar pitch volatiles)	0.6 mg/m3	120 mg/m3	700 mg/m3
benzo[b]fluoranthene	Benz(e)acephenanthrylene; (Benzo(b)fluoroanthene)	0.12 mg/m3	1.3 mg/m3	7.9 mg/m3
benzo[ghi]perylene	Benzo(ghi)perylene	30 mg/m3	330 mg/m3	2,000 mg/m3
chrysene	Chrysene	0.6 mg/m3	12 mg/m3	69 mg/m3
dibenz[a,h]anthracene	Dibenza(a,h)anthracene	0.093 mg/m3	1 mg/m3	2.9 mg/m3
fluoranthene	Fluoranthene	4.1 mg/m3	45 mg/m3	400 mg/m3
fluorene	Fluorene, 9H-	6.6 mg/m3	72 mg/m3	430 mg/m3
indeno[1,2,3-cd]pyrene	Indeno(1,2,3-cd)pyrene	1.2 mg/m3	13 mg/m3	79 mg/m3
naphthalene	Naphthalene	15 ppm	83 ppm	500 ppm
phenanthrene	Phenanthrene	2.1 mg/m3	23 mg/m3	360 mg/m3
pyrene	Pyrene	0.15 mg/m3	1.7 mg/m3	7.5 mg/m3

Ingredient	Original IDLH	Revised IDLH
methylene chloride	10,000 ppm	2,000 ppm
acenaphthene	Not Available	Not Available
acenaphthylene	Not Available	Not Available
anthracene	Not Available	Not Available
benz[a]anthracene	Not Available	Not Available
benz[a]pyrene	Not Available	Not Available
benzo[b]fluoranthene	Not Available	Not Available
benzo[ghi]perylene	Not Available	Not Available
benzo[k]fluoranthene	Not Available	Not Available
chrysene	Not Available	Not Available
dibenz[a,h]anthracene	Not Available	Not Available
fluoranthene	Not Available	Not Available
fluorene	Not Available	Not Available
indeno[1,2,3-cd]pyrene	Not Available	Not Available
naphthalene	500 ppm	250 ppm
phenanthrene	Not Available	Not Available
pyrene	Not Available	Not Available

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

- Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area.
- Work should be undertaken in an isolated system such as a "glove-box" . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.
- Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.
- Open-vessel systems are prohibited.
- Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.
- Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.
- For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).
- Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.
- Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 0.76 m/sec with a minimum of 0.64 m/sec. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed.

Personal protection

Continued...

Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber **NOTE:** ▸ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▸ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: · frequency and duration of contact, · chemical resistance of glove material, · glove thickness and · dexterity Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent). · When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. · Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. · Contaminated gloves should be replaced. For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: · Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. · Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Body protection	See Other protection below
Other protection	▸ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] ▸ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent] ▸ Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely. ▸ Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. ▸ Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
Thermal hazards	Not Available

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	colorless

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available

Continued...

Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. Inhalation of naphthalene vapour is linked with headache, loss of appetite, nausea, damage to the eyes and kidneys. According to animal testing, long term exposure may cause excessive weakness and increased salivation, weight loss,difficulty breathing, collapse, and evidence of damage to the skin, liver and lungs.
Ingestion	Accidental ingestion of the material may be damaging to the health of the individual. Ingestion of naphthalene and related compounds may produce abdominal cramps with nausea, vomiting, diarrhoea, headache, profuse sweating, listlessness, confusion, and in severe poisonings, coma with or without convulsions. Irritation of the bladder may also occur, producing urgency, painful urination, and the passage of brown or black urine with or without albumin or casts.
Skin Contact	Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons. Workers sensitised to naphthalene and related compounds show an inflammation of the skin with scaling and reddening. Some individuals show an allergic reaction. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Long term exposure to naphthalene has produced clouding of the lens (cataracts) in workers.
Chronic	Inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population. Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information. Based on experiments and other information, there is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited. Ample evidence exists from experimentation that reduced human fertility is directly caused by exposure to the material. Animal testing indicates that inhalation of naphthalene may increase the incidence of respiratory tumours and may aggravate chronic inflammation. Polycyclic aromatic hydrocarbons are found in a number of materials such as coal tar, tobacco smoke, petroleum and air pollution. Some substituted derivatives have been identified as extremely liable to cause cancer, especially that of the lung and genito-urinary tract.

Polycyclic Aromatic Hydrocarbons Standard Mixture	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
methylene chloride	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Eye(rabbit): 162 mg - moderate
	Inhalation (mouse) LC50: 25200 ppm/7hr[2]	Eye(rabbit): 500 mg/24hr - mild
	Oral (rat) LD50: 985 mg/kg[2]	Skin (rabbit): 100mg/24hr-moderate
		Skin (rabbit): 810 mg/24hr-SEVERE
acenaphthene	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

Continued...

acenaphthylene

TOXICITY	IRRITATION
Oral (mouse) LD50: 1760 mg/kg[2]	Not Available

anthracene

TOXICITY	IRRITATION
Oral (mouse) LD50: 4900 mg/kg[2]	Not Available

benz[a]anthracene

TOXICITY	IRRITATION
Not Available	Not Available

benz[a]pyrene

TOXICITY	IRRITATION
Not Available	Skin (mouse): 0.014 mg - mild

benzo[b]fluoranthene

TOXICITY	IRRITATION
Not Available	Not Available

benzo[ghi]perylene

TOXICITY	IRRITATION
Not Available	Not Available

benzo[k]fluoranthene

TOXICITY	IRRITATION
Not Available	Not Available

chrysene

TOXICITY	IRRITATION
Not Available	Not Available

dibenz[a,h]anthracene

TOXICITY	IRRITATION
Not Available	Not Available

fluoranthene

TOXICITY	IRRITATION
Dermal (rabbit) LD50: 3180 mg/kg[2]	Not Available
Oral (rat) LD50: 2000 mg/kgd[2]	

fluorene

TOXICITY	IRRITATION
Not Available	Not Available

indeno[1,2,3-cd]pyrene

TOXICITY	IRRITATION
Not Available	Not Available

naphthalene

TOXICITY	IRRITATION
dermal (rat) LD50: >2500 mg/kg[2]	Eye (rabbit): 100 mg - mild
Oral (rat) LD50: 490 mg/kg[2]	Skin (rabbit):495 mg (open) - mild

phenanthrene

TOXICITY	IRRITATION
Oral (mouse) LD50: 700 mg/kgd[2]	Not Available

pyrene

TOXICITY	IRRITATION
Oral (rat) LD50: 2700 mg/kgd[2]	Skin (rabbit): 500 mg/24h - mild

Legend: *1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

METHYLENE CHLORIDE

The material may produce moderate eye irritation leading to inflammation.
The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of

Continued...

	vesicles, scaling and thickening of the skin. Inhalation (human) TCLo: 500 ppm/ 1 y - I Eye(rabbit): 10 mg - mild
ANTHRACENE	Oral (rat) TDLo: 20000 m g/kg/79w -I Skin (mouse): 0.118 mg - mild Equivocal tumorigen by RTECS criteria
BENZ[A]PYRENE	The following information refers to contact allergens as a group and may not be specific to this product. **WARNING:** This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS**. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).
BENZO[B]FLUORANTHENE	Lung, kidney, skin tumors and tumors at site of application recorded.
BENZO[K]FLUORANTHENE	Tumours at site of application.
CHRYSENE	Target organs in include skin (tumours at site of application).
FLUORANTHENE	Equivocal tumorigen bt RTECS criteria. Tumors at site of application recorded.
NAPHTHALENE	The material may be irritating to the eye, with prolonged contact causing inflammation.
PHENANTHRENE	Tumors at site of application. Neoplastic and tumorigenic by RTECS criteria.
PYRENE	Conjunctival irritation, excitement and muscle contraction recorded.
METHYLENE CHLORIDE & DIBENZ[A,H]ANTHRACENE	**WARNING:** This substance has been classified by the IARC as Group 2A: Probably Carcinogenic to Humans.
ACENAPHTHENE & ACENAPHTHYLENE & ANTHRACENE & FLUORANTHENE & PHENANTHRENE & PYRENE	Asthma-like symptoms may continue for months or even years after exposure to the material ends.
ACENAPHTHENE & BENZO[B]FLUORANTHENE & BENZO[GHI]PERYLENE & BENZO[K]FLUORANTHENE & DIBENZ[A,H]ANTHRACENE & INDENO[1,2,3-CD]PYRENE	No significant acute toxicological data identified in literature search.
ACENAPHTHENE & ANTHRACENE & BENZO[GHI]PERYLENE & FLUORANTHENE & FLUORENE & PHENANTHRENE & PYRENE	The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans.
ANTHRACENE & BENZ[A]PYRENE & NAPHTHALENE & PYRENE	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
ANTHRACENE & BENZO[B]FLUORANTHENE & BENZO[GHI]PERYLENE & BENZO[K]FLUORANTHENE & CHRYSENE & DIBENZ[A,H]ANTHRACENE & FLUORANTHENE & INDENO[1,2,3-CD]PYRENE & PHENANTHRENE & PYRENE	**NOTE:** Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
BENZ[A]ANTHRACENE & BENZO[B]FLUORANTHENE & BENZO[K]FLUORANTHENE & CHRYSENE & INDENO[1,2,3-CD]PYRENE & NAPHTHALENE	**WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
BENZ[A]ANTHRACENE & BENZ[A]PYRENE & BENZO[B]FLUORANTHENE & BENZO[K]FLUORANTHENE & DIBENZ[A,H]ANTHRACENE & INDENO[1,2,3-CD]PYRENE	Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [*National Toxicology Program: U.S. Dep.*

Acute Toxicity	⊘	**Carcinogenicity**	✔
Skin Irritation/Corrosion	⊘	**Reproductivity**	✔
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	✔	**STOT - Repeated Exposure**	⊘
Mutagenicity	✔	**Aspiration Hazard**	⊘

Legend: ✘ *– Data available but does not fill the criteria for classification*
✔ *– Data available to make classification*

Continued...

– Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Polycyclic Aromatic Hydrocarbons Standard Mixture

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

methylene chloride

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	=13.1mg/L	1
EC50	48	Crustacea	=108.5mg/L	1
EC50	96	Algae or other aquatic plants	161.874mg/L	3
EC50	384	Crustacea	10.334mg/L	3
NOEC	96	Algae or other aquatic plants	56mg/L	4

acenaphthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.58mg/L	4
EC50	48	Crustacea	1.275mg/L	4
EC50	96	Algae or other aquatic plants	0.5mg/L	1
EC50	384	Crustacea	0.178mg/L	3
NOEC	768	Fish	0.208-0.226mg/L	1

acenaphthylene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.991mg/L	3
EC50	96	Algae or other aquatic plants	1.450mg/L	3
EC50	384	Crustacea	0.249mg/L	3

anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.00127mg/L	4
EC50	48	Crustacea	0.01119096mg/L	4
EC50	72	Algae or other aquatic plants	>0.0078mg/L	2
BCF	48	Fish	1.0mg/L	4
EC50	24	Crustacea	ca.0.0012mg/L	2
NOEC	22	Algae or other aquatic plants	0.0015-0.0017mg/L	2

benz[a]anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.083mg/L	3
EC50	48	Crustacea	0.000958776mg/L	4
EC50	96	Algae or other aquatic plants	0.087mg/L	3
BCF	24	Crustacea	0.006mg/L	4
EC50	48	Crustacea	0.0014815372mg/L	4

benz[a]pyrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.026mg/L	3
EC50	48	Crustacea	0.0009815248mg/L	4
EC50	72	Algae or other aquatic plants	0.005mg/L	4
BCF	12	Fish	7.51mg/L	4
EC50	48	Crustacea	0.0016249408mg/L	4
NOEC	360	Fish	0.00102mg/L	4

benzo[b]fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.026mg/L	3
EC50	96	Algae or other aquatic plants	0.029mg/L	3
EC50	384	Crustacea	0.011mg/L	3

Continued...

benzo[ghi]perylene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.008mg/L	3
EC50	48	Crustacea	0.0001326432mg/L	4
EC50	96	Algae or other aquatic plants	0.010mg/L	3
BCF	24	Crustacea	0.0002mg/L	4
EC50	48	Crustacea	0.0010418018mg/L	4

benzo[k]fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
BCF	24	Crustacea	0.0014mg/L	4
NOEC	144	Fish	0.01mg/L	4

chrysene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.083mg/L	3
EC50	96	Algae or other aquatic plants	0.087mg/L	3
BCF	240	Crustacea	0.00136968mg/L	4
EC50	384	Crustacea	0.027mg/L	3
NOEC	2016	Fish	0.116331488mg/L	4

dibenz[a,h]anthracene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.008mg/L	3
EC50	48	Crustacea	0.0005510934mg/L	4
EC50	96	Algae or other aquatic plants	0.010mg/L	3
BCF	6	Crustacea	0.00072mg/L	4
EC50	48	Crustacea	0.001558648mg/L	4
NOEC	144	Fish	0.01mg/L	4

fluoranthene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.0001mg/L	4
EC50	48	Crustacea	0.003984522mg/L	4
EC50	72	Algae or other aquatic plants	0.103mg/L	4
BCF	672	Crustacea	0.125mg/L	4
EC10	144	Crustacea	0.0078mg/L	4
NOEC	744	Crustacea	0.0006mg/L	4

fluorene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.76mg/L	4
EC50	48	Crustacea	0.212mg/L	4
EC50	96	Algae or other aquatic plants	1.346mg/L	3
BCF	576	Crustacea	1.055mg/L	4
EC50	384	Crustacea	0.238mg/L	3
NOEC	336	Crustacea	0.0625mg/L	4

indeno[1,2,3-cd]pyrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

naphthalene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.213mg/L	4
EC50	48	Crustacea	1.6mg/L	4
EC50	72	Algae or other aquatic plants	ca.0.4mg/L	1
BCF	12	Fish	10.2mg/L	4
EC50	0.05	Crustacea	0.000000085mg/L	4
NOEC	48	Fish	0.012817mg/L	4

phenanthrene

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.234mg/L	4

Continued...

	EC50	48	Crustacea	0.117mg/L	4
	EC50	72	Algae or other aquatic plants	0.324mg/L	4
	BCF	24	Algae or other aquatic plants	1mg/L	4
	EC50	96	Fish	0.049mg/L	4
	NOEC	2160	Fish	0.005mg/L	4

pyrene	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.249mg/L	3
	EC50	48	Crustacea	0.004327936mg/L	4
	EC50	96	Algae or other aquatic plants	0.256mg/L	3
	BCF	24	Algae or other aquatic plants	0.5mg/L	4
	EC50	24	Crustacea	>=0.003- <=0.03mg/L	2
	NOEC	168	Fish	0.0152mg/L	4

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
For naphthalene:
Environmental Fate: Naphthalene may be reach surface water and soil through transportation in water or being carried by air. Most airborne naphthalene is in a vapour form and hence deposition is expected to be slow. A minimal amount of naphthalene emitted to the air is transported to other environmental components mostly by dry deposition. Naphthalene in surface water may volatililize into the atmosphere, depending on environmental condiditons. It remains in solution in water, with only small amounts associated with suspended material and benthic sediments. While naphthalene is readily volatilized from aerated soils, it adheres to soils with a high organic content. Adsorption to aquifer material reduces transportation of naphthalene through groundwater, and the presence of nonionic organic compounds such as tetrachloroethene may enhance sorption to materials that contain low carbon content. Bioconcentration of naphthalene is moderate in aquatic organisms. It is readily metabolized by fish, and invertebrates that are placed in pollutant free water rapidly eliminate any traces of the pollutant. While bioaccumulation in the food chain is unlikely, exposure of cows and chickens to naphthalene could lead to naphthalene being present in milk and eggs. While the data on the transport and partitioning of methylnaphthalenes in the environment is limited, the characteristics of these chemicals are similar to naphthalene, so they are expected to behave in a similar manner to naphthalene in the environment, and produce the same effects on aquatic organisms. Biodegradation of naphthalene occurs relatively quickly in aquatic systems. Methylnaphthalenes are biodegraded under aerobic conditions after adaptation. Degradation rates are highest in water constantly polluted with petroleum. Naphthalene biodegradation rates are higher in sediment than in the water column above it. Methylnaphthalenes biodegrades more slowly. Reported half-lives in sediments were 46 weeks for 1-methylnaphthalene and ranged from 14 to 50 weeks for 2-methylnaphthalene. In soils, the potential for biodegradation is an important factor for biological remediation of soil. Studies on biodegradation of PAHs suggest that adsorption to the organic matter significantly reduces the bioavailability for microorganisms, and thus the biodegradability, of PAHs, including naphthalene. Biodegradation is accomplished through the action of aerobic microorganisms and is reduced in anaerobic soil conditions. Naphthalene biodegrades to carbon dioxide in aerobic soils, with salicylate as an intermediate product. Abiotic degradation of naphthalene seldom occurs in soils. As with naphthalene, 1-Methylnaphthalene is easily volatilised from aerated soil, and the biodegradation half-life averages between 1.7 and 2.2 days.
Ecotoxicity: Acute toxicity data on naphthalene for several fish species (freshwater and marine), show 96h LC50 values range from 1.8 to 7.8 mg/L. Comparable results were obtained with other vertebrates (amphibians). From chronic toxicity tests, a precise NOEL is not clearly determined. A NOEC of 0.12 mg/L was observed in a 40 days test on juvenile pink salmon, but 50% mortality at 0.11 mg/L was calculated for trout fry exposed during hatching.Several data are also available for invertebrates, showing 48h EC50 values ranging from 2.1 to 24 mg/L. While chronic data on freshwater invertebrates and algae are questionable, a 50% photosynthesis reduction was observed at 2.8 mg/L in 4 hours experiments.QSAR prediction models give results consistent with experimental short-term data on fish daphnia and algae.
For Polycyclic Aromatic Hydrocarbons (PAH's):
Environmental Fate: A general rule for biodegradation of PAHs is that parent compounds tend to degrade faster than alkylated analogs. Less is known about the biodegradability of resins and asphaltenes, but the current knowledge suggests these are not very biodegradable and will persist in the environment for a long time. The more hydrophobic a compound, the greater the partitioning to non-aqueous phases.
Atmospheric Fate: PAHs travel through the atmosphere as a gas or attached to dust particles. They are carried by air currents and deposited by dry or wet (rain, dew, etc.) deposition.
Aquatic Fate: When deposited in water PAHs sink to the bottom of lakes and rivers. Some will move though the soil to contaminate groundwater. PAHs are ubiquitous in the marine environment, occurring at their highest environmental concentrations around urban centres. The availability of organic carbon controls, to a large extent, the partitioning behaviour of PAHs in sediment. Mixed microbial populations in sediment/water systems may degrade some PAHs, with degradation progressively decreasing with increasing molecular weight.
Terrestrial Fate: The rate of degradation is dependent on nutrient content and the bacterial community in soil. PAHs in soils undergo a weathering process such that the lighter chain fractions are removed (primarily by volatilization). Heavier fractions bind to soil organic matter and remain behind in the top soil horizon. As the mixture of PAHs age, bioavailability changes as the fraction remaining bind more tightly. In general, the more soluble a PAH, the higher the uptake by plants while the reverse is true for uptake by earthworms and uptake in the gastrointestinal tract of animals.
Ecotoxicity: The primary mode of toxicity for PAHs in soil dwelling terrestrial invertebrates is non-specific non-polar narcosis. The uptake of PAHs by earthworms occurs primarily by direct contact with the soluble phase of soil solution. Microbial degradation of PAHs is a key process in soils. Biodegradation of PAHs may take place over a period of weeks to months. The lipid (fat) phase, of all organisms, contains the highest levels of PAHs. Accumulation of PAHs occurs in all marine organisms, however; there is a wide range in tissue concentrations resulting from variable environmental concentrations, level and time of exposure, and species ability to metabolize these compounds. In fish, bile and liver accumulate the highest levels of PAH and metabolites. In invertebrates, the highest concentrations can be found in the internal organs, such as the liver and pancreas; tissue concentrations appear to follow seasonal cycles which may be related to variations in lipid content or spawning cycles.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
methylene chloride	LOW (Half-life = 56 days)	HIGH (Half-life = 191 days)
acenaphthene	HIGH (Half-life = 204 days)	LOW (Half-life = 0.37 days)
acenaphthylene	MEDIUM (Half-life = 120 days)	LOW (Half-life = 0.05 days)
anthracene	HIGH (Half-life = 920 days)	LOW (Half-life = 0.21 days)
benz[a]anthracene	HIGH (Half-life = 1360 days)	LOW (Half-life = 0.33 days)
benz[a]pyrene	HIGH (Half-life = 1060 days)	LOW (Half-life = 0.18 days)
benzo[b]fluoranthene	HIGH (Half-life = 1220 days)	LOW (Half-life = 0.6 days)
benzo[ghi]perylene	HIGH (Half-life = 1300 days)	LOW (Half-life = 0.13 days)
benzo[k]fluoranthene	HIGH (Half-life = 4280 days)	LOW (Half-life = 0.46 days)
chrysene	HIGH (Half-life = 2000 days)	LOW (Half-life = 0.33 days)

Continued...

dibenz[a,h]anthracene	HIGH (Half-life = 1880 days)	LOW (Half-life = 0.18 days)
fluoranthene	HIGH (Half-life = 880 days)	LOW (Half-life = 0.84 days)
fluorene	MEDIUM (Half-life = 120 days)	LOW (Half-life = 2.84 days)
indeno[1,2,3-cd]pyrene	HIGH (Half-life = 1460 days)	LOW (Half-life = 0.26 days)
naphthalene	HIGH (Half-life = 258 days)	LOW (Half-life = 1.23 days)
phenanthrene	HIGH (Half-life = 400 days)	LOW (Half-life = 0.84 days)
pyrene	HIGH (Half-life = 3800 days)	LOW (Half-life = 0.33 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
methylene chloride	LOW (BCF = 40)
acenaphthene	LOW (BCF = 387)
acenaphthylene	MEDIUM (BCF = 545)
anthracene	HIGH (BCF = 10500)
benz[a]anthracene	HIGH (LogKOW = 5.76)
benz[a]pyrene	HIGH (LogKOW = 6.13)
benzo[b]fluoranthene	HIGH (LogKOW = 5.78)
benzo[ghi]perylene	HIGH (LogKOW = 6.697)
chrysene	HIGH (LogKOW = 5.81)
dibenz[a,h]anthracene	HIGH (LogKOW = 6.697)
fluoranthene	HIGH (LogKOW = 5.16)
fluorene	MEDIUM (BCF = 830)
naphthalene	HIGH (BCF = 18000)
phenanthrene	MEDIUM (LogKOW = 4.46)
pyrene	HIGH (LogKOW = 4.88)

Mobility in soil

Ingredient	Mobility
methylene chloride	LOW (KOC = 23.74)
acenaphthene	LOW (KOC = 6123)
acenaphthylene	LOW (KOC = 6123)
anthracene	LOW (KOC = 20400)
benz[a]anthracene	LOW (KOC = 231300)
benz[a]pyrene	LOW (KOC = 786800)
benzo[b]fluoranthene	LOW (KOC = 803100)
benzo[ghi]perylene	LOW (KOC = 2676000)
chrysene	LOW (KOC = 236100)
dibenz[a,h]anthracene	LOW (KOC = 2622000)
fluoranthene	LOW (KOC = 70850)
fluorene	LOW (KOC = 11290)
naphthalene	LOW (KOC = 1837)
phenanthrene	LOW (KOC = 20830)
pyrene	LOW (KOC = 69410)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

Continued...

	▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	

Land transport (DOT)

UN number	1593
UN proper shipping name	Dichloromethane
Transport hazard class(es)	Class: 6.1 Subrisk: Not Applicable
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Hazard Label: 6.1 Special provisions: IB3, IP8, N36, T7, TP2

Air transport (ICAO-IATA / DGR)

UN number	1593
UN proper shipping name	Dichloromethane
Transport hazard class(es)	ICAO/IATA Class: 6.1 ICAO / IATA Subrisk: Not Applicable ERG Code: 6L
Packing group	III
Environmental hazard	Not Applicable
Special precautions for user	Special provisions: Not Applicable Cargo Only Packing Instructions: 663 Cargo Only Maximum Qty / Pack: 220 L Passenger and Cargo Packing Instructions: 655 Passenger and Cargo Maximum Qty / Pack: 60 L Passenger and Cargo Limited Quantity Packing Instructions: Y642 Passenger and Cargo Limited Maximum Qty / Pack: 2 L

Sea transport (IMDG-Code / GGVSee)

UN number	1593
UN proper shipping name	DICHLOROMETHANE
Transport hazard class(es)	IMDG Class: 6.1 IMDG Subrisk: Not Applicable
Packing group	III
Environmental hazard	Marine Pollutant
Special precautions for user	EMS Number: F-A, S-A Special provisions: Not Applicable Limited Quantities: 5 L

Continued...

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

METHYLENE CHLORIDE(75-09-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Acceptable Maximum Peak Concentrations
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Carcinogens Listing
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US OSHA Permissible Exposure Levels (PELs) - Table Z2
US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA New Chemical Exposure Limits (NCEL)

ACENAPHTHENE(83-32-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ACENAPHTHYLENE(208-96-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ANTHRACENE(120-12-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZ[A]ANTHRACENE(56-55-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZ[A]PYRENE(50-32-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BENZO[B]FLUORANTHENE(205-99-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.

BENZO[GHI]PERYLENE(191-24-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List

BENZO[K]FLUORANTHENE(207-08-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California Proposition 65 - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity

CHRYSENE(218-01-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

DIBENZ[A,H]ANTHRACENE(53-70-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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FLUORANTHENE(206-44-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

FLUORENE(86-73-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Massachusetts - Right To Know Listed Chemicals
US - Pennsylvania - Hazardous Substance List
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

INDENO[1,2,3-CD]PYRENE(193-39-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California Proposition 65 - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Pennsylvania - Hazardous Substance List
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

NAPHTHALENE(91-20-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Rhode Island Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 14th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

PHENANTHRENE(85-01-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

PYRENE(129-00-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Massachusetts - Right To Know Listed Chemicals
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Pennsylvania - Hazardous Substance List
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - Priority Pollutants
US CWA (Clean Water Act) - Toxic Pollutants
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

Federal Regulations

Continued...

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES

Immediate (acute) health hazard	Yes
Delayed (chronic) health hazard	Yes
Fire hazard	No
Pressure hazard	No
Reactivity hazard	No

US. EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)

Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg
Dichloromethane	1000	454
Acenaphthene	100	45.4
Acenaphthylene	5000	2270
Anthracene	5000	2270
Benz[a]anthracene	10	4.54
Benzo[a]pyrene	1	0.454
Benzo[b]fluoranthene	1	0.454
Benzo[ghi]perylene	5000	2270
Benzo(k)fluoranthene	5000	2270
Chrysene	100	45.4
Dibenz[a,h]anthracene	1	0.454
Fluoranthene	100	45.4
Fluorene	5000	2270
Indeno(1,2,3-cd)pyrene	100	45.4
Naphthalene	100	45.4
Phenanthrene	5000	2270
Pyrene	5000	2270

State Regulations

US. CALIFORNIA PROPOSITION 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm

US - CALIFORNIA PREPOSITION 65 - CARCINOGENS & REPRODUCTIVE TOXICITY (CRT): LISTED SUBSTANCE

Dichloromethane (Methylene chloride), Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenz[a,h]anthracene, Indeno[1,2,3-cd]pyrene, Naphthalene Listed

National Inventory	Status
Australia - AICS	Y
Canada - DSL	N (fluoranthene; benz[a]anthracene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
Canada - NDSL	N (benz[a]pyrene; acenaphthene; pyrene; naphthalene; chrysene; phenanthrene; methylene chloride; fluorene; benzo[k]fluoranthene; benzo[b]fluoranthene; benzo[ghi]perylene; anthracene)
China - IECSC	N (chrysene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (benz[a]pyrene; pyrene; fluoranthene; chrysene; benz[a]anthracene; phenanthrene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
Korea - KECI	N (fluoranthene; benz[a]anthracene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; acenaphthylene; benzo[b]fluoranthene; benzo[ghi]perylene)
New Zealand - NZIoC	Y
Philippines - PICCS	N (fluoranthene; chrysene; benz[a]anthracene; dibenz[a,h]anthracene; indeno[1,2,3-cd]pyrene; benzo[k]fluoranthene; benzo[b]fluoranthene; benzo[ghi]perylene)
USA - TSCA	N (benzo[k]fluoranthene; benzo[b]fluoranthene; benzo[ghi]perylene)
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average

Continued...

PC－STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

Date of Issue:
27 May 2015

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 3090
SRM Name: Aroclors in Transformer Oil
Other Means of Identification: Not Applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is a set of six different solutions of individual Aroclors in transformer oil and consists of six 2-mL ampoules, each containing approximately 1.2 mL of each of the following SRMs: SRM 3075, Aroclor 1016 in Transformer Oil; SRM 3076, Aroclor 1232 in Transformer Oil; SRM 3077, Aroclor 1242 in Transformer Oil; SRM 3078, Aroclor 1248 in Transformer Oil; SRM 3079, Aroclor 1254 in Transformer Oil; and SRM 3080; Aroclor 1260 in Transformer Oil. This SRM is intended primarily for calibrating chromatographic instrumentation and methods of analysis used for the determination of Aroclors and polychlorinated biphenyls (PCBs) in transformer oil.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. HAZARDS IDENTIFICATION

Classification

Physical Hazard:	Not classified.	
Health Hazard:	Carcinogenicity	Category 1B
	Reproductive Toxicity	Category 2
	Aspiration Hazard	Category 1

Label Elements

Symbol

Signal Word

DANGER

Hazard Statement(s)

H304	May be fatal if swallowed and enters airways.
H350	May cause cancer <inhalation, ingestion>.
H361	Suspected of damaging fertility or the unborn child.

Precautionary Statement(s):

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P280	Wear protective gloves, protective clothing, and eye protection.
P308+P313	If exposed or concerned: Get medical attention.
P301+P310	If swallowed: Immediately call a doctor.

P331 Do NOT induce vomiting.

P405 Store locked up.

P501 Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Aroclor 1260 in transformer oil.

Other Designations:

Transformer oil (hydrotreated light naphthenic distillate (petroleum), hydraulic petroleum oil, distillates, petroleum).

Aroclor 1232: PCB 1232; chlorodiphenyl (32 % Cl); polychlorinated biphenyl; chlorobiphenyls; PCB; PCBs.

Aroclor 1242: PCB 1242; chlorodiphenyl (42 % Cl); polychlorinated biphenyl; chlorobiphenyls; PCB; PCBs.

Aroclor 1248: PCB 1248; chlorodiphenyl (48 % Cl); polychlorinated biphenyl; chlorobiphenyls; PCB; PCBs.

Aroclor 1254: PCB 1254; chlorodiphenyl (54 % Cl); polychlorinated biphenyl; chlorobiphenyls; PCB; PCBs.

Aroclor 1260: PCB 1260; chlorodiphenyl (60 % Cl); polychlorinated biphenyl; chlorobiphenyls; PCB; PCBs.

Components are listed in compliance with OSHA 29 CFR 1910.1200.

Hazardous Component(s)	CAS Number	EC Number[(a)] (EINECS)	Nominal Mass Concentration (%)
SRM 3075			
Transformer Oil	64742-53-6	265-156-6	>99.99
SRM 3076			
Transformer Oil	64742-53-6	265-156-6	balance
Aroclor 1232	11141-16-5	215-648-1	0.43
SRM 3077			
Transformer Oil	64742-53-6	265-156-6	balance
Aroclor 1242	53469-21-9	215-648-1	0.41
SRM 3078			
Transformer Oil	64742-53-6	265-156-6	balance
Aroclor 1248	12672-29-6	215-648-1	0.37
SRM 3079			
Transformer Oil	64742-53-6	265-156-6	balance
Aroclor 1254	11097-69-1	215-648-1	0.36
SRM 3080			
Transformer Oil	64742-53-6	265-156-6	balance
Aroclor 1260	11096-82-5	215-648-1	0.11

[(a)] EC Number as PCB, polychlorinated biphenyl

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash exposed skin with soap and water for at least 15 minutes. Seek medical attention if needed.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Aspiration hazard. Do not induce vomiting. If vomiting occurs, keep head lower than hips to prevent aspiration. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Irritation, dizziness, nausea, coughing, and aspiration.

Indication of any immediate medical attention and special treatment needed, if necessary: Not applicable.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Slight fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, carbon dioxide, regular foam.
Unsuitable: Straight streams of water.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2 Fire = 1 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Absorb spilled material with sand or non-combustible material and collect in appropriate container for disposal. Keep out of water supplies and sewers.

7. HANDLING AND STORAGE

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handle in accordance with all current regulations and standards. The storage floor must be impermeable and form a collecting basin so that, in the event of an accident spillage, the liquid cannot spread beyond the storage area.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Transformer oil: No occupational exposure limits established.

Aroclors: NIOSH (TWA): 0.001 mg/m^3 (related to 1,1'-Biphenyl, chloro derivatives)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection Measures: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties	**Transformer oil (>99 %)**
Appearance (physical state, color, etc.):	clear, yellow liquid
Molecular Formula:	not applicable
Molar Mass (g/mol):	not applicable
Odor:	not available
Odor threshold:	not available
pH:	not available
Evaporation rate:	not available
Melting point/freezing point:	–55 °C (–67 °F)
Pour point:	–40 °C (–40 °F)
Density:	0.8912 g/mL at 22 °C[(b)]
Vapor Pressure:	0.1 mmHg 20 °C[(a)]
Vapor Density (air = 1):	>5 at 101 kPa[(a)]
Kinematic Viscosity:	12 cSt (12 mm^2/s) at 40 °C
Solubility(ies):	insoluble in water
Partition coefficient (n-octanol/water):	>6.5[(a)]
Thermal Stability Properties	
Autoignition Temperature:	>315 °C (599 °F)[(a)]
Thermal Decomposition:	not available
Initial boiling point and boiling range:	260 °C to 371 °C (500 °F to 700 °F)
Explosive Limits, LEL:	not available
Explosive Limits, UEL:	not available
Flash Point:	>145 °C (293 °F)[(a)]
Flammability (solid, gas):	not applicable

[(a)] Physical property listed in the NIST Certificate of Analysis. Values are not certified.
[(b)] Vendor supplied health and safety information.

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid excessive heat; high energy ignition sources.

Incompatible Materials: Oxidizers.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of carbon, sulfur oxides, aldehydes.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Dizziness, nausea, coughing.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Acute exposure to high levels of vapor from transformer oil may cause central nervous system depression, headache, dizziness, nausea, vomiting, anorexia, incoordination and unconsciousness. Prolonged or repeated exposure may cause irritation. Short term exposure to Aroclors may cause irritation or liver damage; long term exposure may cause rash, itching, hair loss, digestive issues, headache, dizziness, impotence, coma, and cancer.

Skin Contact: Short term and long term contact with transformer oil may cause skin irritation and dermatitis. Short-term exposure to Aroclors may cause skin irritation or liver damage; long term exposure to Aroclors may cause same effects as for inhalation, plus hair loss and reproductive effects.

Eye Contact: Acute exposure of liquid or vapor may cause irritation.

Ingestion: Acute ingestion of transformer oil may cause abdominal pain, nausea, and vomiting. Small amounts of oil aspirated during ingestion or vomiting may cause lung damage; no information available for long-term exposure to transformer oil. Short term exposure to Aroclors may cause liver damage; long term exposure to Aroclors may cause same effects as for inhalation, plus hyperactivity, menstrual disorders, reproductive effects.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.

Component: Transformer oil
Rat, Oral LD50: >5000 mg/kg
Rat, Inhalation LC50: 2180 mg/m^3 (4 h)
Rabbit, Skin LD50: >2000 mg/kg

Component: Aroclor 1232
Rat, Oral LD50: 4470 mg/kg

Component: Aroclor 1242
Rat, Oral LD50: 4250 mg/kg

Component: Aroclor 1248
Rat, Oral LD50: 11000 mg/kg

Component: Aroclor 1254
Rat, Oral LD50: 1010 mg/kg

Component: Aroclor 1260
Rat, Oral LD50: 1315 mg/kg

Skin Corrosion/Irritation: Not classified.
Transformer oil, Rabbit, skin: 0.5 mL/24 h, moderate

Serious Eye Damage/ Eye Irritation: Not classified.
Transformer oil, Rabbit, eye: 0.1 mL, mild

Respiratory Sensitization: No data available; not classified.

Skin Sensitization: No data available; not classified.

Germ Cell Mutagenicity: No data available; not classified.

Carcinogenicity: Category 1B

Listed as a Carcinogen/Potential Carcinogen X Yes _____ No

Transformer oil is not listed by NTP, IARC, or OSHA as a carcinogen/potential carcinogen.

Aroclors are is listed by NTP as *reasonably anticipated to be a human carcinogen* (as PCB, polychlorinated biphenyl, CAS number 1336-36-3) and by IARC as Group 1, c*arcinogenic to humans* (related to Polychlorinated biphenyls).

Reproductive Toxicity: Category 2

Aroclors: Overexposure has resulted in decreased birth weight in offspring of exposed mothers. Significant exposure to PCBs that reach the fetus can cause teratogenic effects.

Component: Aroclor 1232
Oral Rat TDLo: 420 mg/kg TDLo (21 days)

Component: Aroclor 1242
Oral Rat TDLo: 945 mg/kg TDLo (prior to copulation, 36 week)

Component: Aroclor 1248
Monkey, Oral TDLo: 32 mg/kg (pregnant 1-23 week, 91 days)

Component: Aroclor 1254
Oral Mammal TDLo - species unspecified: 14 mg/kg, prior to copulation 30 day(s)

Component: Aroclor 1260
Oral Rat TDLo: 210 mg/kg, pregnant 14-20 days

STOT, Single Exposure: No data available; not classified.

STOT, Repeated Exposure: Not classified; this SRM contains less than 1 % of Aroclor, a Category 2 target organ toxicant.

Aspiration Hazard: Category 1
Transformer oil is a human aspiration toxicity hazard.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Transformer oil:	Fish, Rainbow Trout (*Oncorhynchus mykiss*) LC50: >5000 mg/L (96 h) Invertebrate, Water flea (*Daphnia magna*) EC50: >1000 mg/L (48 h)
Aroclor 1232:	No data available.
Aroclor 1242:	Fish, Fathead minnow (*Pimephales promelas*) LC50 (flow-through, newly hatched): 0.015 mg/L (96 h)
Aroclor 1248:	No data available.
Aroclor 1254:	No data available.
Aroclor 1260:	No data available.

Persistence and Degradability: Has the potential to biodegradable.

Bioaccumulative Potential: No data available

Mobility in Soil: Expected to migrate from land to water and vice versa.

Other Adverse effects: Keep out of water supplies.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: This material is not regulated by IATA or DOT.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Aroclors 1 lb. (0.454 kg) final RQ.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Aroclors, 0.1 % supplier notification limit (related or polychlorinated biphenyls).

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes.
CHRONIC HEALTH:	Yes.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:

California Proposition 65:

> WARNING! This product contains a chemical (Aroclors 1232, 1242, 1248, 1254 and 1260, related to PCBs) known to the state of California to cause cancer, reproductive, and/or developmental effects.

U.S. TSCA Inventory: Transformer oil is listed.

TSCA 12(b), Export Notification: Aroclors 1232, 1242, 1248, 1254 and 1260 is listed in Section 6, 50 ppm de minimus concentration (see 40 CFR 761, related to polychlorinated biphenyls).

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 27 May 2015

Sources: ChemADVISOR, Inc., SDS, *Aroclor 1232*, 20 March 2015

ChemADVISOR, Inc., SDS, *Aroclor 1242*, 20 March 2015

ChemADVISOR, Inc., SDS, *Aroclor 1248*, 20 March 2015

ChemADVISOR, Inc., SDS, *Aroclor 1254*, 20 March 2015

ChemADVISOR, Inc., SDS, *Aroclor 1260*, 20 March 2015.

ChemADVISOR, Inc., SDS, *Transformer Oil*, 20 March 2015.

Vendor MSDS, Exxon Mobile Corporation, UNIVOLT N 61 B, 30 May 2014.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	RM	Reference Material
LC50	Lethal Concentration	STEL	Short Term Exposure Limit
LD50	Median Lethal Dose or Lethal Dose, 50 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.

APPENDIX C

List of Approved Amendments/Changes

HASP Acknowledgement/Agreement Form

Visitors Log

Tailgate Safety Meeting Form

Air Quality Monitoring Record

Equipment Calibration Log

THINK 12
Think Safe | Work Safe | Live Safe

HEALTH AND SAFETY PLAN (HASP)

List of Approved Amendments/Changes

Date	Name	Signature	Changes/Comments	Section Added

ATLAS

HEALTH AND SAFETY PLAN (HASP)

Acknowledgement/Agreement Form

(All Atlas, Subcontractor & Client Personnel Must Sign)

Client site Name: _____ Project site No: _____

Atlas Project No.: _____ Task No: _____

I acknowledge I have reviewed a copy of the Health and Safety Plan for this project, understand it, and agree to comply with all of its provisions. I also understand I could be prohibited by the site Health and Safety Coordinator or other Atlas personnel from working on this project for not complying with any aspect of this Health and Safety Plan:

PRINT NAME	SIGNATURE	COMPANY	DATE

THINK 12
Think Safe | Work Safe | Live Safe

Visitors Log

Client site Name: _____ **Project Site #:** _____

Atlas Project #: _____ **Task #:** _____

PRINT NAME	SIGNATURE	COMPANY	DATE

ATLAS

Tailgate Safety Meeting Form

Site Name & Number: _____

Atlas Project Number: _____

Work Being Performed: _____

Date & Time of Meeting: _____

Name of Presenter: _____

NOTE: On the initial day of the project, the Project Manager or designee should conduct a visual inspection of the project site prior to the Tailgate Safety Meeting. This inspection should include a review of project site equipment, hazards, specific job tasks, activities or operations to be performed for that day. These specific items must be covered during the Tailgate Safety Meeting. For subsequent days, any changes to the site or operations must be covered in the Tailgate Safety Meeting. In addition, "Task-Specific" Job Safety Analysis (JSA) for the tasks/activities at the project site must be integrated into the HASP and Tailgate discussions. Tailgate Meetings should be performed each day. Employees, client representatives and subcontractors must review the Tailgate Safety Meeting, be briefed on the topics and acknowledge the HSE topics by signing this form. Individuals not fluent in the English language must have the site's health safety and environmental requirements translated to them.

Itemize the Specific Topics Discussed (if more space is needed use the back of this page):

☐ Emergency Evacuation area(s) ☐ Eye Wash / First Aid Kit / Fire Extinguisher ☐ HASP Location ☐ Hospital Route

5 KEY SAFETY CONCEPTS -

☐ **How is everyone feeling?** (Get a response) **Is everyone Rested & Mentally alert?** FOCUS IS KEY to staying injury free.

☐ **Watch out for & Coach your Coworkers** (COMMUNICATE HAZARDS when recognized).

☐ **No Improvising** – Use the proper tool for the job (Stop and Discuss ANY variance with Atlas)

☐ **No Willful Unsafe Acts** – Enjoy the day, but no horseplay or anything unsafe.

☐ **Everyone has STOP WORK authority** – USE IT whenever people aren't focused, for all near-misses and hazards.

☐ PPE is required at all times within Exclusion zone (Set the example, call out non-compliance/stop work). ☐ Proper PPE? (check)

☐ 50 lbs. or awkward, get lifting help. ☐ Eating, Drinking and use of Cell Phones in Designated Area Only.

☐ Spotters Needed for Backing Equipment. ☐ We will follow the Safe Work Plan for the work and initial each page. Major changes will need official approvals through Mark Wallinga and Jenn Williams. ☐ Use 3 part communication as we work today

☐ Caution crossing street (Use crosswalks - HAZARDS ARE HIGH). ☐ Today's Weather _____, Drink Fluids!

☐ Caution dealing with public (Irate/unstable pedestrians, customers, locals. Be aware, be courteous, don't antagonize).

☐ Keep Emotions in check. Communicate, Take Breaks when stressed, pushed, tired, not focused! (5 minute break or job shut down?)

☐ Maintain Housekeeping ☐ No FOBKs (**What else? Are there other items we haven't considered?)**

☐ **Subcontractor** – Discuss scope of work, JSA, Daily Tasks (What are we doing? What are the Hazards? What could go wrong?)

☐ JSA Reviewed? ☐ Changes to task? Get approval first. Use the GO-CARD. Contact supervisor if solutions are clear.

☐ Headcount? _____ (First time employees onsite [Sign HASP, PPE check, discuss site specifics and client expectations]).

☐ Any Shared Learning? (Site's SIRs/Hazards) ☐ Equipment Inspections ☐ Communication & Focus is Key.

☐ Everyone needs to sign the following documents: HASP, JSA and Tailgate Safety Meeting Form. ☐ Recognition to employees –if you see something, say something!

❑ **Client Requirements** - By checking the box to the left, the presenter of the Tailgate Meeting acknowledges that all client-specific requirements have been completed for both Atlas and Subcontractor employees.

***List the JSAs reviewed below. *What extra hazards are present on this site on this day?**

JSA:			

**Continued on next page.*

Tailgate Safety Meeting Form (Pg. 2)

JSAs Reviewed and Modification Documentation (If modification not required please note):

***By signing this Tailgate Safety Meeting form, you are acknowledging that you have read, reviewed and understand the health and safety topics discussed on this form.**

Daily Safety Tailgate Meeting Participants (Use the back of this form if needed)			
Print Name	**Signature**	**Company**	**Date**

***Tailgate Presenter must sign below that all information above was covered with all personnel on site.**

Print Name	Signature	Company	Date

THINK 12
Think Safe | Work Safe | Live Safe

Air Quality Monitoring Record

Date	Time	Location	Instrument	Concentration (Units)	Sampled By

ATLAS

APPENDIX D

SOIL STOCKPILE REQUEST FORM

VERMONT

AGENCY OF NATURAL RESOURCES

State of Vermont
Department of Environmental Conservation
Waste Management & Prevention Division
1 National Life Drive – Davis 1
Montpelier, VT 05620-3704
(802) 828-1138

MANAGEMENT OF NON-HAZARDOUS CONTAMINATED SOIL REQUEST FORM
July 2021

This form is to be used to assist in the compliance with the Investigation and Remediation of Contaminated Properties Rule (IRule) §35-803. This form takes the place of the ANR Off-site Soil Treatment Form and is to be used for the movement, stockpiling, treatment, or disposal of non-hazardous contaminated soils, both on-site and off-site. This form should be included with Soil Management Plans and Corrective Action Plans, as applicable. DEC Site Manager approval must be received, as signified by signature in Section 4, prior to the initiation of soil management work.

Section 1. General Information

Soil Source Site Name: _____

Address: _____

Facility ID#: _____and/or **Spill #**: _____and/or **SMS Site #**: _____

Will soils be temporarily stockpiled on-site or off-site for more than 90 days or between December 1st and April 1st?
__**Yes** ___**No** **if Yes, date range**: _____ to _____.

Disposal Facility: _____

Quantity of Soils: _____ cubic yards

Soil Contaminants: _____

Check proposed soil management scenario below:

☐ Soil will be live loaded and transported to disposal facility. **If yes, skip to Section 4.**
☐ Soil to be temporarily stored on/off site, then transported to disposal facility. **If yes, complete entire form**.
☐ Soil is Staying On-Site for Treatment. **If yes, complete entire form**.
☐ Soil is Destined for Off-Site Stockpile, Management and Treatment. **If yes, complete entire form.**

Section 2. Soil Stockpile Siting Criteria Checklist

☐ There are no potable drinking water supplies within 300-foot radius of the Soil Stockpile. This limit may need to be extended if water supplies are shown to be hydraulically down gradient.

☐ Soil Stockpile is not within zone one or two of a groundwater source protection area.

☐ *There are no sensitive environments within 100 feet of the treatment location including, but not limited to:

- Waterways (e.g., stream, river, lake, pond, wetland or floodplain zone);
- State or Federally listed threatened or endangered species or habitat;
- Class I or II groundwater zone;
- Residence; or
- Property boundary

- ☐ Public access to the soil is prohibited through posting no trespassing or other means approved by Secretary.
- ☐ If the owner of the soil stockpiling parcel is different from the soil generator, written approval from the landowner that also grants access to the Secretary, has been obtained before stockpiling begins.
- ☐ **The municipality in which the soils will be stockpiled or treated has been notified in writing of the soil stockpiling or treatment location. If applicable, local permits should be obtained. M**unicipal approval documents (letter, permit, etc.) attached.**
- ☐ ANR Atlas generated Map including the latitude and longitude of the location in decimal degrees where the soil will be stockpiled. Minimum acceptable accuracy is plus-or-minus 15 feet. **Map attached.**

*If setback criteria from sensitive receptors cannot be achieved, please provide written explanation.
**This is a requirement for off-site stockpiling of soils only.

Section 3. Ownership Information

Location of Soil Stockpile		**Generator/Owner of Soil/Responsible Party**	
Street Address	_____	Street Address	_____
	_____		_____
Company Name	_____	Company Name	_____
Landowner Name	_____	Owner Name	_____
Landowner Phone #	_____	Owner Phone #	_____
Landowner email	_____	Owner email	_____

Section 4. Signature Section

Responsible Party:

As the party responsible for compliance with the Investigation and Remediation of Contaminated Properties Rule and applicable statutes, I hereby certify that the representations made on this form are to the best of my knowledge true and correct.

_____ _____
Name of Owner/Operator Representative (printed) Company Title

_____ _____
Signature Date

Landowner:

As landowner of the soil treatment stockpile location, I hereby give approval to the soil generator to stockpile the soil volume cited above at the above referenced location. In addition, I hereby grant property access to DEC investigators for the purpose of inspecting the Soil Stockpile at any reasonable time.

_____
Print Name

_____ _____
Signature Date

DEC Site Manager Approval:

_____
Print Name

_____ _____
Signature of DEC Site Manager Date of Approval

APPENDIX E

WASTE PROFILE FORM

Special Waste Characterization Profile

I. Requested Facility *Choose all that apply*

- ☐ **Massachusetts:** Southbridge (Southbridge, MA)
- ☐ **Maine:** Hawk Ridge (Unity, ME)
- ☐ **Maine:** Juniper Ridge (Old Town, ME)
- ☐ **New Hampshire:** NCES (Bethlehem, NH)
- ☐ **Pennsylvania:** McKean (Mt. Jewett, PA)
- ☐ **Vermont:** NEWSVT (Coventry, VT)
- ☐ **New York:** Chemung County (Lowman, NY)
- ☐ **New York:** Clinton County (Morrisonville, NY)
- ☐ **New York:** Grasslands (Chateaugay, NY)
- ☐ **New York:** Hyland (Angelica, NY)
- ☐ **New York:** Ontario County (Stanley, NY)
- ☐ **Other:** _____

II. Generator

Name: _____

Mailing Address: _____

City: _____ State: _____ ZIP Code: _____

Contact Name: _____ Title: _____

Phone: _____ Fax: _____ Email: _____

III. Bill To Customer ☐ *Same as Generator above*

Company Name: _____

Billing Address: _____

City: _____ State: _____ ZIP Code: _____

Contact Name: _____ Title: _____

Phone: _____ Fax: _____ Email: _____

IV. Consultant/Representative

Company Name: _____

Contact Name: _____ Title: _____

Phone: _____ Fax: _____ Email: _____

V. Delivery and Quantity ☐ ***One-Time Event*** *or* ☐ ***On-Going (Annually)***

Amount to Be Delivered (Estimated): _____ ☐ Tons ☐ Cubic Yards ☐ Other: _____

Density of Waste (Approximate): _____ Pounds/Cubic Yard

Delivery Vehicle: ☐ Roll-off ☐ Packer Truck ☐ Tractor Trailer ☐ Vac Truck ☐ Other: _____

Hauler Name: _____

Mailing Address: _____ Phone: _____

Transporter Permit #: _____ (for State of Disposal)

Previous Disposal Facility (Name): _____

Application Was Submitted to/Approved by Another Disposal Facility (Name): _____

VI. Waste Stream Information

Common Waste Name: _____

Location or Address of Waste Generation Site: _____

City: _____ State: _____ ZIP Code: _____ County: _____

Site Type: ☐ Industrial/Manufacturing ☐ Commercial ☐ Residential
☐ Institutional ☐ Municipal ☐ Other: _____

a. Waste Generation Process ☐ *Check if detailed Process Description is attached as a separate document*

Describe the site and waste generating process. Please be as detailed as possible. Include a process flow diagram if available.

b. Waste Description ☐ *Check if detailed Waste Description is attached as a separate document*

Describe the source of contaminants and materials used to generate the waste. Please be as specific and detailed as possible.

Describe all hazardous or nuisance properties associated with the waste:

Describe any special handling or disposal procedures:

Consistency at 70°F: ☐ Solid; ☐ Semi-Solid; ☐ Sludge; ☐ Liquid; ☐ Powder; ☐ Other _____

Ignitable (per 40 CFR 261.21): ☐ Yes ☐ No

Reactive (per 40 CFR 261.23): ☐ Yes ☐ No

Free Liquids: ☐ Yes ☐ No

% Solids: _____

Odor: _____

pH Range: _____

Is the waste an EPA listed hazardous waste under 40 CFR 261? ☐ Yes ☐ No

Is the waste non-hazardous waste from a CERCLA site? ☐ Yes ☐ No

Is the waste considered hazardous in the state of origin or the state of disposal? ☐ Yes ☐ No

Is the waste a treated hazardous waste, a de-listed hazardous waste or subject to land disposal restrictions (LDR) under 40 CFR 268, Subpart D? ☐ Yes ☐ No

c. Analytical Data

*At a minimum, full RCRA waste characterization analysis is required (§ 40 CFR 261) unless the applicant provides acceptable justification for submittal of less comprehensive data. The **generator** is responsible for proper waste characterization.*

Is representative waste characterization analysis attached?

☐ Yes → Please complete Appendix A of profile form.

☐ No → Please provide detailed explanation supporting the use of generator knowledge in lieu of analysis:

VII. Generator Certification

I hereby certify that (1) I am the duly authorized representative of the generator; (2) all information submitted on this form and on supplemental materials is true and accurate; (3) the information provided herein, including any supplemental information, such as laboratory analytical, SDS, etc., accurately describes the waste stream to be delivered to the facility and that all known or suspected hazards have been disclosed; (4) Casella can contact the laboratory directly to discuss our attached waste stream. I understand that once the waste stream is approved by Casella based on this information, any deviation in the source, composition, constituents or characteristics of the waste stream from the information described herein, may render the waste stream unacceptable for disposal, at the sole discretion of Casella. I further understand that any deviation from the information contained herein will require immediate notification to the disposal facility and cessation of disposal.

Signature (Generator): _____

Name (Print): _____ Company: _____

Title: _____ Date: _____

Appendix A

Additional Waste Stream Information

It is the Generator's responsibility to properly characterize the waste and demonstrate it is classified as non-hazardous by State and Federal regulations.

1. Samples

Samples collected and analyzed for waste characterization should be done in accordance with the EPA SW-846 Guidance Document and most recent approved EPA Method(s) for solid wastes.

Number of Samples: ____ Grab ____ Composite

Sample Source: ____ Boring(s) ____ Test Pit(s) ____ Stockpiles(s) ____ Core ____ Container

Soil/remediation projects must include a site map indicating area of excavation and sample locations.

2. Analysis

Please indicate all chemical analysis provided to support waste characterization. All testing must be performed by a laboratory certified in the State the waste is to be disposed in, where applicable.

Laboratory Name: _____ Laboratory Accreditation #: _____

Applicable Laboratory Report ID #'s: _____

Minimum Requirements

- ☐ TCLP RCRA 8 Metals
- ☐ TCLP Volatile Organic Compounds (VOCs)
- ☐ TCLP Semi-Volatile Organic Compounds (SVOCs)
- ☐ TCLP Herbicides
- ☐ TCLP Pesticides
- ☐ Reactive Sulfide
- ☐ Reactive Cyanide
- ☐ Total PCBs
- ☐ % Solids (Moisture Content)
- ☐ Free Liquids (Paint Filter)
- ☐ Corrosivity by pH
- ☐ Ignitability / Flashpoint

Additional Requirements

- ☐ Total TPH [1]
- ☐ Total PAH's [1]
- ☐ Total Organic Halogens (TOX)
- ☐ Total BTEX
- ☐ TCLP Copper [2]
- ☐ TCLP Nickel [2]
- ☐ TCLP Zinc [2]
- ☐ TCLP Vanadium [3]
- ☐ Total Sulfur/Sulfate
- ☐ TCLP PCBs
- ☐ Total Dioxins & Furans

Total Analysis AND Water Leaching Procedure (ASTM) Method D3987

- ☐ COD [2]
- ☐ Total Solids [2]
- ☐ Total Volatile Solids [2]
- ☐ Oil and Grease or Petroleum Hydrocarbons [2]
- ☐ Ammonia-Nitrogen [2]

Other

- ☐ Radiological analysis: U-238, RA-226, RA-228, TH-232, and K-40 by EPA test procedure 901.1 dry weight analysis expressed in pCi/g.
- ☐ Gamma field scans on the material and expressed in uR/hr or uRem/hr.
- ☐ Safety Data Sheets (SDS)
- ☐ Other_____

3. Generator Knowledge Statement

If the chemical analysis provided does not meet the minimum requirements, please provide an analysis waiver request with justification based on generator's knowledge of the process generating the waste.

1 VT only
2 PA only
3 ME only

APPENDIX F

ANNUAL INSPECTION FORM

VERMONT

LAND USE RESTRICTIONS – ANNUAL INSTITUTIONAL CONTROL INSPECTION FORM

Our records indicate that this property maintains institutional or engineering controls associated with a land use restriction. Please indicate the state of the following controls, as applicable, on the property.

SMS Site #: _____

Owner Name: _____

Site/Property Name: _____

Site/Property Address: _____

	YES	NO	COMMENTS
Paved Caps:			
1. Is there any cracking, fractures, or breaking of the pavement?	◯	◯	_____
2. Has the pavement been punctured, providing a risk of direct contact?	◯	◯	_____
Buildings/Structures:			
1. Are there visible cracks or fractures in the foundation?	◯	◯	_____
2. Have there been additions or improvements to the structure?	◯	◯	_____
3. Has there been standing water or flood in the basement of the structure (since receipt of the Certificate of Completion)?	◯	◯	_____
Sub-slab Depressurization System (SSD):			
1. Has the SSD been operational and appropriately maintained for the past year, as described in the Certificate of Completion?	◯	◯	_____
Soil/Grass Caps:			
1. Is there any evidence of erosion?	◯	◯	_____
2. Are monitoring wells at the site damaged, un-locatable, or otherwise in unacceptable condition?	◯	◯	_____
3. Have survey pins been repositioned or removed?	◯	◯	_____
4. Is there any evidence of burrowing wildlife?	◯	◯	_____
5. Are there bare spots larger than 3 square feet in grassy areas?	◯	◯	_____
6. Has there been any subsurface work conducted on the property?	◯	◯	_____

I certify that I have responded to each of the questions above to the best of my knowledge.

Signature: _____ **Date:** _____

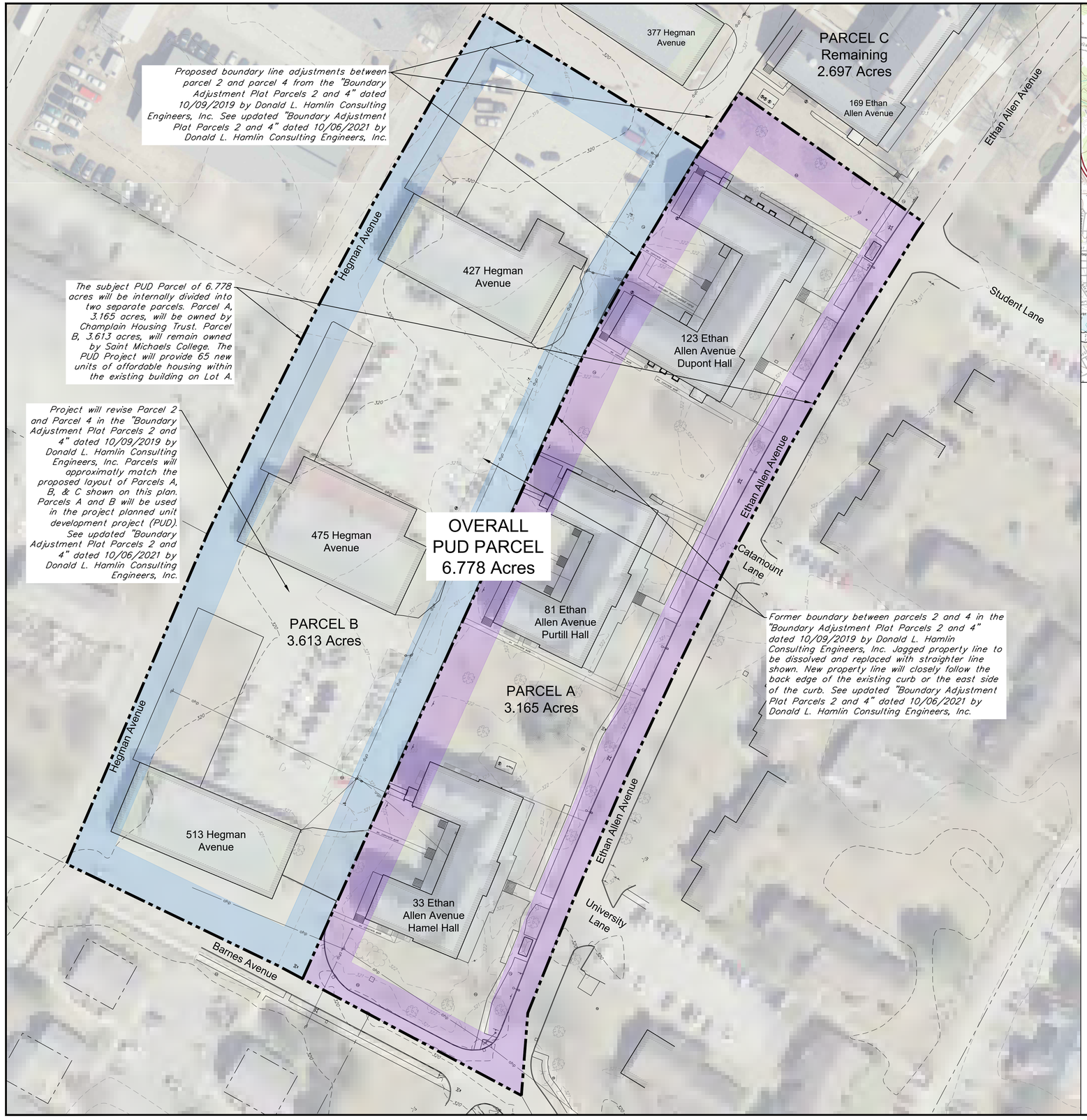
Submit by email or submit original form to the SMS Project Manager at the address listed below:
Vermont Department of Environmental Conservation
Waste Management & Prevention Division/Sites Management Section
1 National Life Drive – Davis 1
Montpelier, VT 05620-3704

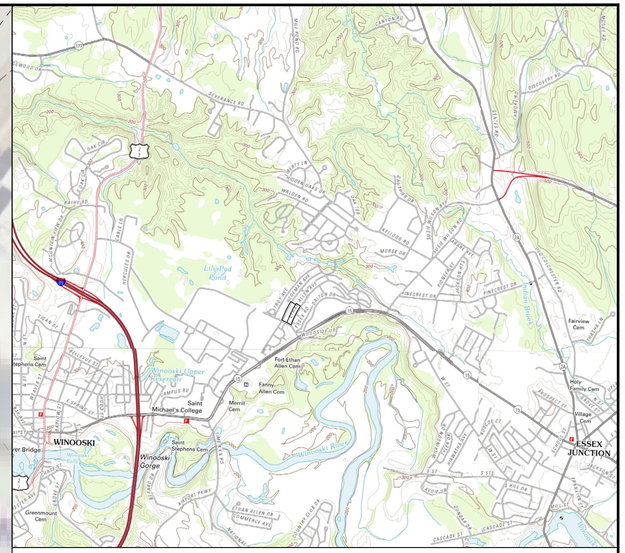
SMS Project Manager: _____

Clear Form

APPENDIX G

CIVIL PLAN SET





LOCATION MAP
SCALE: 1" = ½ MILE

LEGEND

- EXISTING GRADE CONTOUR LINES (5 FOOT INTERVALS)
- EXISTING GRADE CONTOUR LINES (1 FOOT INTERVALS)
- APPROXIMATE PROPERTY LINES

Vermont State Plane Grid North (NAD83)

PLAN NOTES:

1. THIS PLAN IS NOT A BOUNDARY SURVEY. PROJECT PROPERTY LINES ARE SHOWN BASED ON MONUMENTATION FOUND IN THE FIELD AND PLAN TITLED "BOUNDARY ADJUSTMENT PLAT PARCELS 2 AND 4" DATED 10/09/2019 BY DONALD I HAMLIN CONSULTING ENGINEERS, INC. ALL PROPERTY LINES ARE TO BE CONSIDERED APPROXIMATE. SURROUNDING PROPERTY LINES TAKEN FROM DIGITAL TAX MAPPING.
2. THE UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON VISIBLE UTILITIES LOCATED DURING A TOPOGRAPHIC SURVEY PERFORMED BY KREBS & LANSING IN WINTER OF 2020. UNDERGROUND UTILITIES ARE APPROXIMATE AND NOT WARRANTED TO BE EXACT OR COMPLETE. DIG SAFE SHALL BE CONTACTED PRIOR TO ANY EXCAVATION.
3. ELEVATIONS ARE BASED ON GPS OBSERVATIONS THAT REFERENCE THE NAVD 88 VERTICAL DATUM MEASURED IN U.S. SURVEY FOOT.
4. PROJECT HORIZONTAL COORDINATES DERIVED FROM GPS OBSERVATION USING REFERENCE FRAME NAD83 (2011) 2010.00 EPOCH. PROJECT VERTICAL DATUM BASED ON NAVD 88 (GEOID 12A).

10TH CAVALRY APARTMENTS

Ethan Allen Avenue
Colchester, Vermont

KREBS & LANSING CONSULTING ENGINEERS
164 Main Street, Suite 201
Colchester, Vermont 05446
P: (802) 878-0375
www.krebsandlansing.com

ISSUED FOR PERMIT REVIEW
NOT FOR CONSTRUCTION

OWNER:
Saint Michaels College
1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

STAMP:

0' 20' 40' 80' 120'
0" 1" 2" 3"
STANDARD GRAPHIC SCALE (1" = 40')
VALID WHEN PLOTTED ON 24" BY 36" MEDIA

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Project revisions	10/12/21
2.	Changes for State SW Application	10/28/21

DRAWING TITLE:
OVERALL SITE PLAN

DATE ISSUED: 08/06/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 40'
DRAWING NO.: C-1.00 REV. NO.: 2

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg

PARKING CALCULATION

UNIT COUNT:
- TOTAL OF 65 UNITS

REQUIRED PARKING PER COLCHESTER REGULATIONS:
- 2 SPACES PER UNIT PLUS 1 SPACE FOR EVERY 4 UNITS
- (65 UNITS * 2 SPACES/UNIT) + (65 UNITS * 0.25 SPACES/UNITS)
- TOTAL = 147 SPACES

PROPOSED PROJECT PARKING:
- PROJECT WILL PROPOSE 99 SPACES WITH 5 OF THOSE SPACES BEING HANDICAPPED ACCESSIBLE. THIS IS APPROXIMATELY 2/3 OF THE TOTAL WHICH IS REQUIRED.
- ADDITIONAL PARKING SPACES ARE SHOWN ON THE PLAN AS "FOR SAINT MICHAELS COLLEGE (SMC) USE". THOSE SPACES WILL BE USED PRIMARILY BY THE COLLEGE. THE PROJECT WILL WORK WITH SMC IF PARKING BECOMES AND ISSUE.
- PROJECT WILL MEET ALL REQUIREMENTS FOR FUTURE ELECTRIC CAR CHARGING STATIONS.

BASIS OF DESIGN FOR POTABLE WATER AND WASTEWATER DESIGN FLOW

EXISTING WATER/WASTEWATER DESIGN FLOW:
- ALL THREE BUILDINGS HAVE A TOTAL OF 166 DORM ROOMS
- PER CONVERSATION WITH THE TOWN OF ESSEX THE FLOWS ALLOCATED FOR THE DORMS WAS 60 GPD PER ROOM
- 166 DORMS * 60 GPD/DORM = 9,960 GPD

PROPOSED UNIT COUNTS:
- 65 TOTAL PROPOSED UNITS - UNITS WILL BE A COMBINATION OF STUDIO AND ONE-BEDROOM APARTMENTS. THERE WILL BE NO MULTI-BEDROOM UNITS

STATE OF VERMONT PROPOSED WASTEWATER DESIGN FLOWS:
- 65 SINGLE UNITS * (140 GPD/SINGLE UNITS) = 9,100 GPD
- TOTAL WASTEWATER DESIGN FLOW = 9,100 GPD

STATE OF VERMONT PROPOSED WATER DESIGN FLOWS:
- 65 SINGLE UNITS * (140 GPD/SINGLE UNITS) = 9,100 GPD
- TOTAL WATER DESIGN FLOW = 9,100 GPD

TOWN OF ESSEX PROPOSED WATER/WASTEWATER FLOWS:
- 65 SINGLE UNITS * (100 GPD/SINGLE & DOUBLE UNITS) = 6,500 GPD
- TOTAL WATER DESIGN FLOW = 6,500 GPD

PROPOSED APARTMENT PROJECT WILL RESULT IN LESS ALLOCATED FLOW THAN PREVIOUS USE.

DISTURBED SOILS CALCULATION

PROPOSED DISTURBED SOIL
- DISTURBANCES FOR CONSTRUCTION EXCAVATION WORK. INSTALLATION OF CONCRETE WALKS, SMOKING AREAS, DUMPSTER LOCATIONS, AND UPGRADES TO UTILITIES = ±25,000 S.F.
- MISC. CONSTRUCTION DISTURBANCE FROM WORKING ON PROJECT = ±10,000 S.F.

TOTAL DISTURBANCE = ±35,000 S.F. (±0.80 ACRES)

PROPOSED PROJECT EFFECT ON PRIME AGRICULTURAL SOILS
- THE ENTIRE PROJECT AREA IS WITHIN ADAMS AND WINDSOR LOAMY SANDS WHICH IS MAPPED AS STATEWIDE PRIME AGRICULTURAL SOILS. ALL EXISTING SOILS ON SITE HAVE BEEN PREVIOUSLY DISTURBED OVER THE CENTURIES OF USE. THIS PROJECT IS LOCATED IN FORT ETHAN ALLEN WHICH HAD BEEN USED BY THE UNITED STATES GOVERNMENT FOR YEARS BEFORE IT WAS PASSED TO SAINT MICHAELS COLLEGE. PREVIOUS UPGRADES TO THE BUILDINGS, BUILDING UTILITIES, PARKING LOTS, WALKWAYS, ETC. HAVE ALL PREVIOUSLY DISTURBED THIS SOIL IN THE SAME MANOR IN WHICH THIS PROJECT PROPOSES. DUE TO THE LEVEL OF PREVIOUS DISTURBANCE IN THE SOIL, THIS PROJECT WILL HAVE NO ADVERSE IMPACT ON PRIME AGRICULTURAL SOILS.

PROJECT TRAFFIC

ALL VALUES CALCULATED BELOW WERE GENERATED USING VALUES PUBLISHED BY THE "INSTITUTE OF TRANSPORTATION ENGINEERS (ITE) TRIP GENERATION MANUAL, 10TH EDITION". VALUES ARE LISTED AS VEHICLE TRIP ENDS (VTE) BASED ON SPECIFIC USES IN THE MANUEL. MANUEL USES USED IN ANALYSIS ARE UNIVERSITY/COLLEGE BASED ON STUDENT POPULATION (MANUAL #550), GENERAL OFFICE BUILDING BASED ON 1,000 S.F. OF GROSS FLOOR AREA (MANUAL #710), AND RESIDENTIAL PLANNED UNIT DEVELOPMENT BASE ON NUMBER OF UNITS (MANUAL #270). WE PERFORMED TWO ANALYSIS OF THE EXISTING CONDITION BECAUSE OF SAINT MICHAELS COLLEGE USE OF THE EXISTING STRUCTURES. BELOW IS THE EVALUATION.

ANALYSIS 1:
- ALL OF THE BUILDINGS AS DORMS
- ALL THREE OF THE BUILDINGS ORIGINAL USE FOR SAINT MICHAELS COLLEGE WAS DORMITORIES

STUDENTS FOR TRAFFIC CALCULATIONS:
- ALL THREE BUILDINGS HAVE A TOTAL OF 166 DORM ROOMS
- ALL DORM ROOMS WERE AT A MINIMUM TWO STUDENT ROOMS
- TOTAL OF 332 STUDENTS FOR THE THREE BUILDINGS
- PROJECT IS USING A CONSERVATIVE ASSUMPTION ON THE AMOUNT OF STUDENTS FOR ALL THREE BUILDINGS. DORMS HAVE BEEN USED TO HOUSE MORE STUDENTS.

EXISTING ANALYSIS 1:TRAFFIC VALUES:
- WEEKDAY AVERAGE VTE = 332 STUDENTS * 1.56 VTE/PER STUDENT = 518 VTE
- WEEKDAY AM PEAK HOUR VTE = 332 STUDENTS * 0.13 VTE/PER STUDENT = 44 VTE
- WEEKDAY PM PEAK HOUR VTE = 332 STUDENTS * 0.14 VTE/PER STUDENT = 47 VTE

ANALYSIS 2:
- HAMEL & PURTILL DORMATORIES AND DUPONT OFFICE SPACE
- MORE RECENTLY HAMEL AND PURTILL HALLS WERE USED BY SAINT MICHAELS COLLEGE AS DORMITORIES. DUPONT HAS BEEN USE FOR OFFICE SPACE BY THE COLLEGE AS WELL AS RENTED OFFICE SPACE.

Vermont State Plane Grid North (NAD83)

STUDENTS FOR TRAFFIC CALCULATIONS:
- HAMEL AND PURTILL HAVE A TOTAL OF 102 DORM ROOMS
- ALL DORM ROOMS WERE AT A MINIMUM TWO STUDENT ROOMS
- TOTAL OF 204 STUDENTS FOR THE TWO BUILDINGS
- PROJECT IS USING A CONSERVATIVE ASSUMPTION ON THE AMOUNT OF STUDENTS FOR ALL THREE BUILDINGS. DORMS HAVE BEEN USED TO HOUSE MORE STUDENTS.

OFFICE BUILDING DETERMINATION:
- DUPONT HAS MORE RECENTLY BEEN USED FOR OFFICE SPACE BY BOTH THE COLLEGE AND ENTITIES THE COLLEGE LEASES SPACE TO.
- GROSS FLOOR AREA OF THE FIRST AND SECOND FLOORS ±20,000 S.F.

EXISTING ANALYSIS 2:TRAFFIC VALUES:
STUDENTS:
- WEEKDAY AVERAGE VTE = 204 STUDENTS * 1.56 VTE/PER STUDENT = 318 VTE
- WEEKDAY AM PEAK HOUR VTE = 204 STUDENTS * 0.13 VTE/PER STUDENT = 27 VTE
- WEEKDAY PM PEAK HOUR VTE = 204 STUDENTS * 0.14 VTE/PER STUDENT = 29 VTE

OFFICE SPACE:
- WEEKDAY AVERAGE VTE = 20,000 S.F. GFA * 9.74 VTE/1,000 S.F. GFA = 195 VTE
- WEEKDAY AM PEAK HOUR VTE = 20,000 S.F. GFA * 1.47 VTE/1,000 S.F. GFA = 29 VTE
- WEEKDAY PM PEAK HOUR VTE = 20,000 S.F. GFA * 1.42 VTE/1,000 S.F. GFA = 28 VTE

TOTAL:
- WEEKDAY AVERAGE VTE = 513 VTE
- WEEKDAY AM PEAK HOUR VTE = 56 VTE
- WEEKDAY PM PEAK HOUR VTE = 57 VTE

PROPOSED TRAFFIC VALUES:
- 65 UNITS WITHIN DEVELOPMENT
- WEEKDAY AVERAGE VTE = 65 UNITS * 7.38 VTE/PER UNIT = 480 VTE
- WEEKDAY AM PEAK HOUR VTE = 65 UNITS * 0.58 VTE/PER UNIT = 38 VTE
- WEEKDAY PM PEAK HOUR VTE = 65 UNITS * 0.72 VTE/PER UNIT = 47 VTE

IN BOTH EVALUATIONS THE EFFECT ON TRAFFIC TO THE PROPOSED CHANGE IN USE HAS REMAINED RELATIVELY THE SAME OR WITH A SLIGHT DECREASE.

IMPERVIOUS SURFACE

EXISTING STUDENTS IMPERVIOUS SURFACE:
- AREA ON SITE = 6.778 ACRES
- OVERALL AREA OF EXISTING IMPERVIOUS ON SITE = 4.51 ACRES

PROPOSED IMPERVIOUS POST CONSTRUCTION:
- THE PROJECT WILL REMOVE SOME OLD IMPERVIOUS SIDEWALKS AND REPLACE THEM WITH EITHER NEW SIDEWALKS OR REVEGETATED.
- OVERALL AREA OF IMPERVIOUS POST CONSTRUCTION ON SITE = 4.63 ACRES
- PROJECT WILL INCREASE THE IMPERVIOUS ON SITE BY ±0.12 ACRES (±5,000 S.F.)

PLAN NOTES:

1. THIS PLAN IS NOT A BOUNDARY SURVEY. PROJECT PROPERTY LINES ARE SHOWN BASED ON MONUMENTATION FOUND IN THE FIELD AND PLAN TITLED "BOUNDARY ADJUSTMENT PLAT PARCELS 2 AND 4" DATED 10/09/2019 BY DONALD I HAMLIN CONSULTING ENGINEERS, INC. ALL PROPERTY LINES ARE TO BE CONSIDERED APPROXIMATE. SURROUNDING PROPERTY LINES TAKEN FROM DIGITAL TAX MAPPING.
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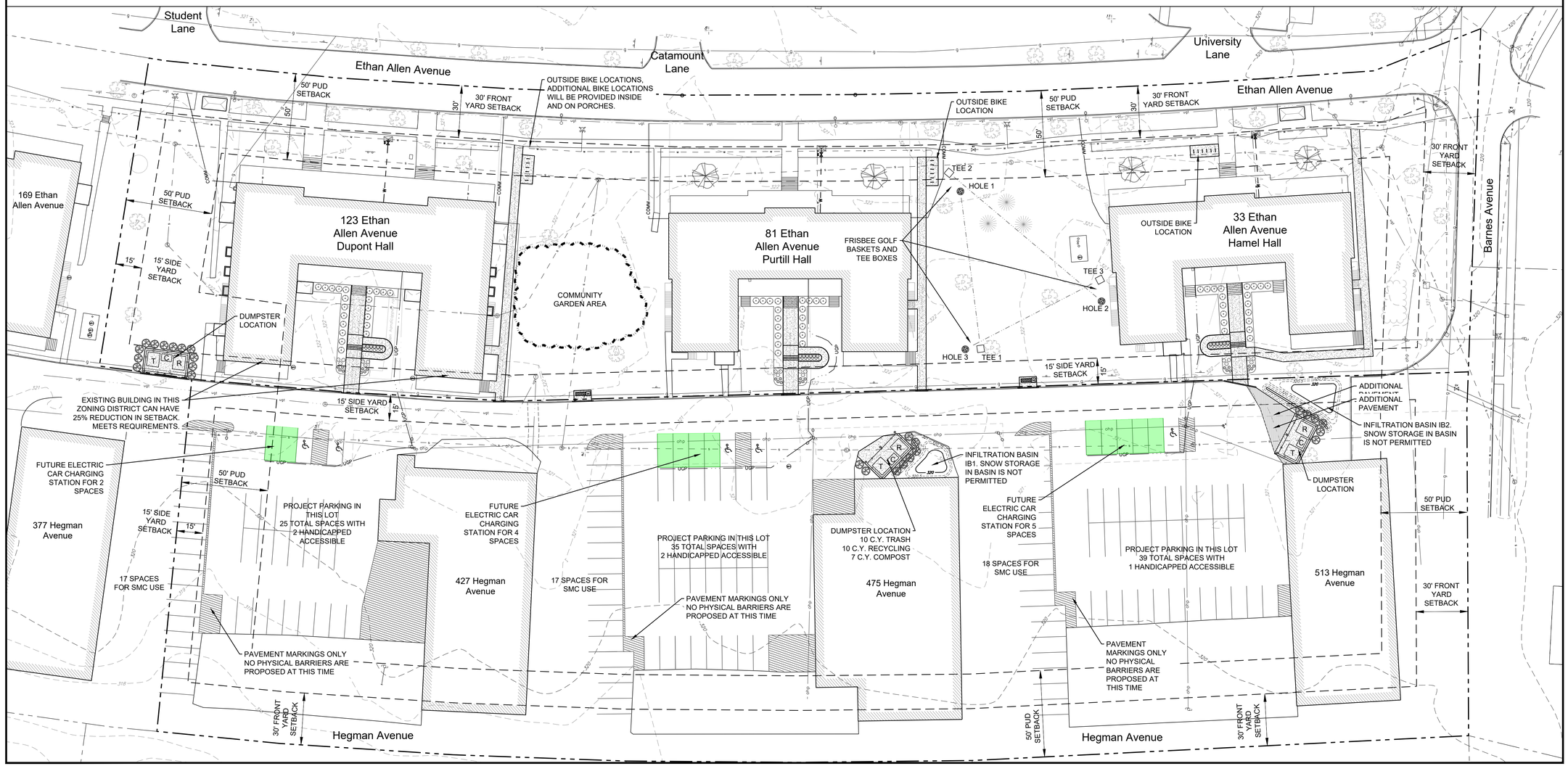


10TH CAVALRY APARTMENTS

Ethan Allen Avenue
Colchester, Vermont

KREBS & LANSING CONSULTING ENGINEERS
164 Main Street, Suite 201
Colchester, Vermont 05446
P: (802) 878-0375
www.krebsandlansing.com

ISSUED FOR PERMIT REVIEW
NOT FOR CONSTRUCTION

OWNER:
Saint Michaels College
1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

STAMP:

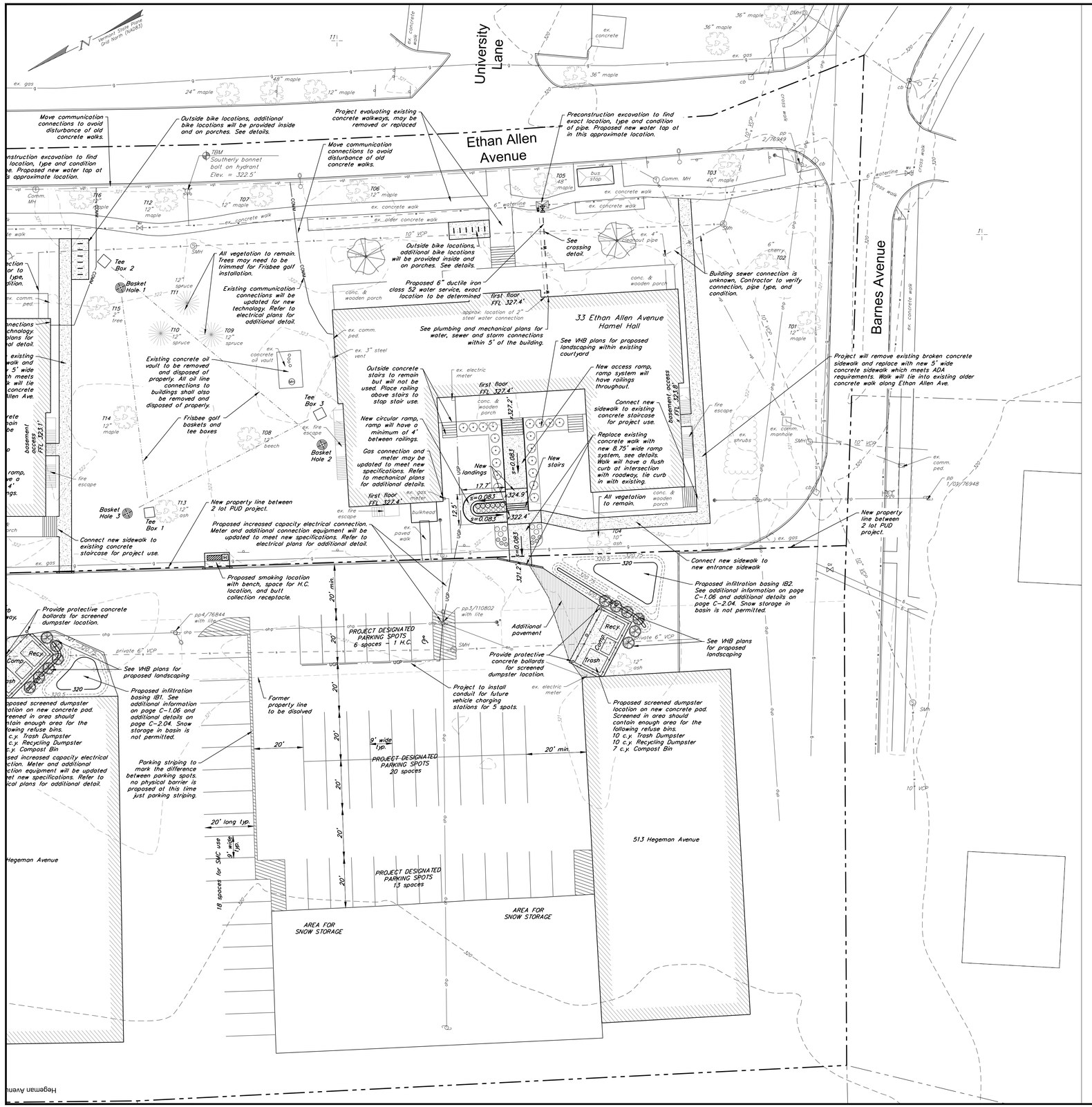
0' 15' 30' 60' 90'
0" 1" 2" 3"
STANDARD GRAPHIC SCALE (1" = 30')
VALID WHEN PLOTTED ON 24" BY 36" MEDIA

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Project revisions	10/12/21
2.	Add sidewalk south of Hamel	10/15/21
3.	Changes for State SW Application	10/28/21
4.	Revision for State SW Application	11/29/21
5.	Add Screening Vegetation	01/14/22

DRAWING TITLE:
PARKING AND CALCULATION PLAN

DATE ISSUED: 08/06/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 30'
DRAWING NO.: C-1.01 REV. NO.: 5

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg



LEGEND

- IRON PIPE / CONCRETE MONUNMENT FOUND
- SURVEY CONTROL POINT
- EXISTING SIGN
- EXISTING OVERHEAD LIGHT
- EXISTING TREELINE
- EXISTING GRADE CONTOUR LINES (5 FOOT INTERVALS)
- EXISTING GRADE CONTOUR LINES (1 FOOT INTERVALS)
- APPROXIMATE PROPERTY LINES
- APPROXIMATE EASEMENTS
- SETBACKS
- EXISTING WIRE FENCE
- EXISTING GAS LINE/VALVE
- EXISTING SEWER LINE/MANHOLE
- EXISTING STORM LINE/MANHOLE/BASIN
- EXISTING OVERHEAD ELECTRIC LINE/POWER POLE
- EXISTING UNDERGROUND POWER
- EXISTING UNDERGROUND COMMUNICATIONS/MANHOLE/PEDESTAL
- EXISTING WATER LINE/HYDRANT/VALVE/SHUTOFF
- PRECONSTRUCTION EXCAVATION
- PROPOSED TREELINE
- PROPOSED GRADE CONTOUR LINES (5 FOOT INTERVALS)
- PROPOSED GRADE CONTOUR LINES (1 FOOT INTERVALS)
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- PROPOSED UNDERGROUND POWER
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- PROPOSED FORCE MAIN

PLAN NOTES:

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OWNER:
Saint Michaels College
1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

STAMP:

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STANDARD GRAPHIC SCALE (1" = 20')
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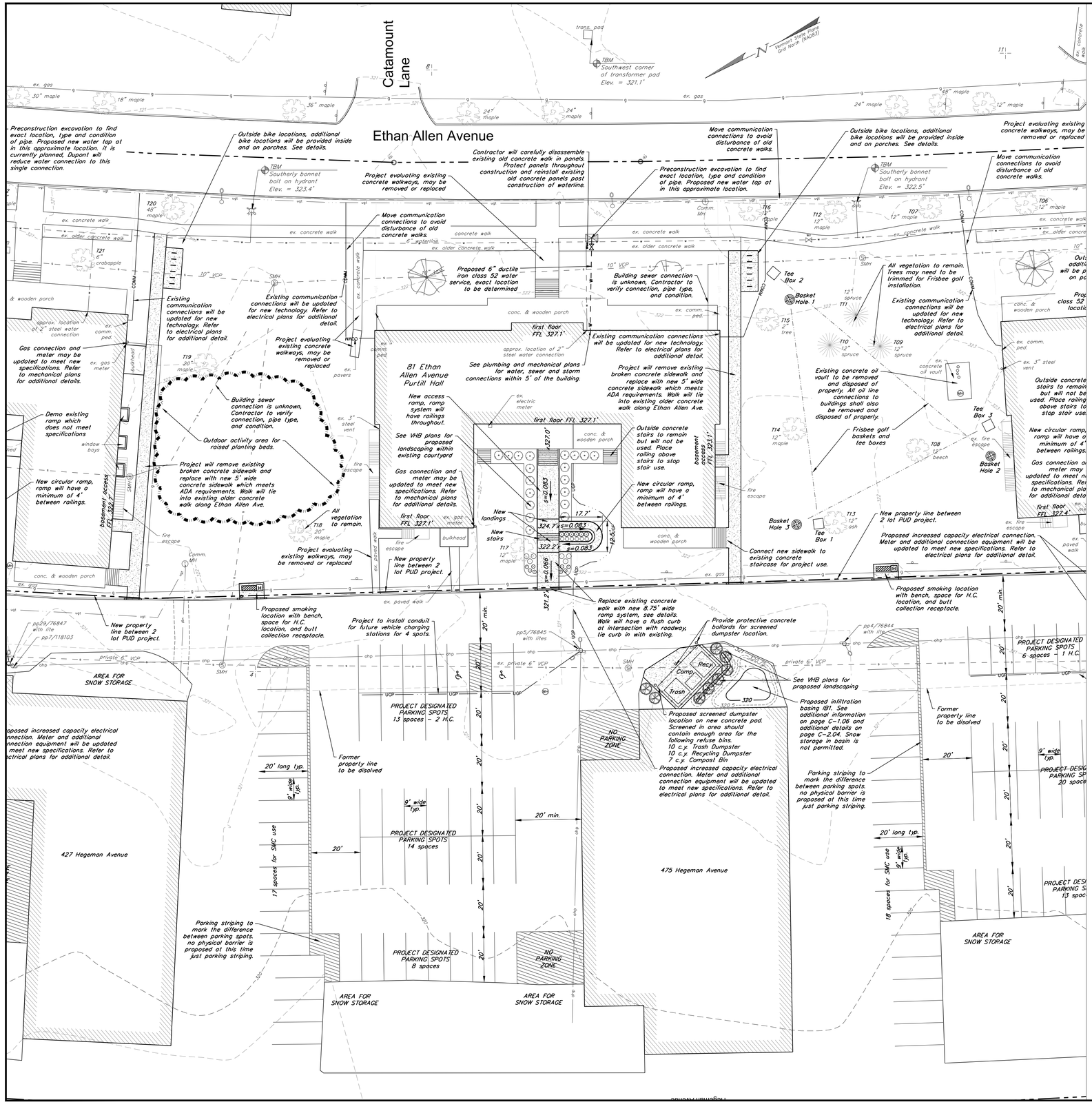
REV. NO.	REVISIONS/COMMENTS	DATE
1.	Project revisions	10/12/21
2.	Add sidewalk south of Hamel	10/15/21
3.	Changes for State SW Application	10/28/21
4.	Revision for State SW Application	11/29/21
5.	Add Screening Vegetation	01/14/22

DRAWING TITLE:
33 ETHAN ALLEN AVENUE
HAMEL HALL
PRELIMINARY SITE PLAN

DATE ISSUED: 08/06/21
DRAWN BY: GTD
CHECKED BY: GTD
PROJECT NO.: 20328
SCALE: 1" = 20'
DRAWING NO.: C-1.02
REV. NO.: 5

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg



LEGEND

- IRON PIPE / CONCRETE MONUMENT FOUND
- SURVEY CONTROL POINT
- EXISTING SIGN
- EXISTING OVERHEAD LIGHT
- EXISTING TREELINE
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OWNER:
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Colchester, Vermont 05439

APPLICANT:
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88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

STAMP:

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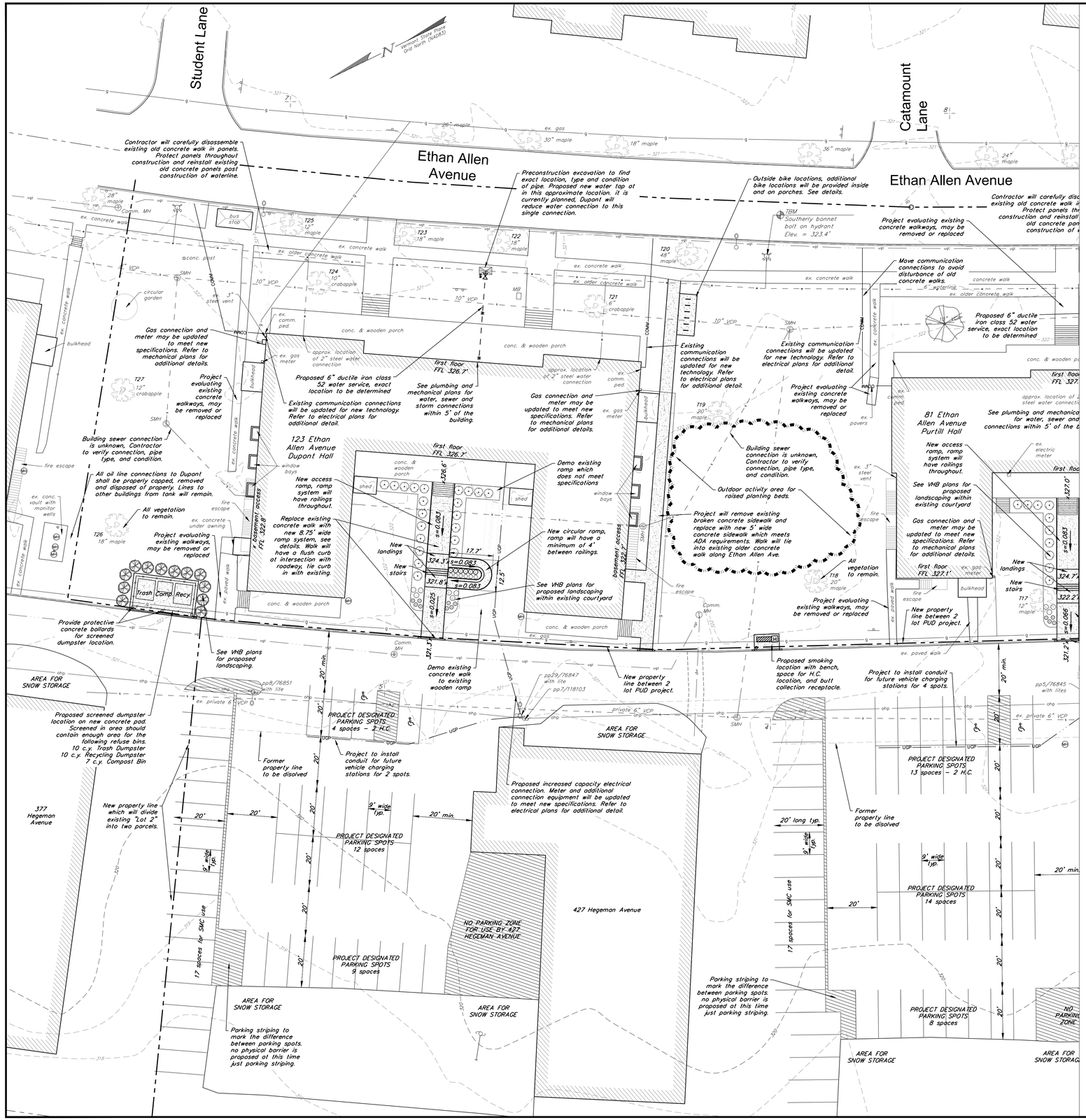
VALID WHEN PLOTTED ON 24" BY 36" MEDIA

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Project revisions	10/12/21
2.	Changes for State SW Application	10/28/21
3.	Revision for State SW Application	11/29/21
4.	Add Screening Vegetation	01/14/22

DRAWING TITLE:
81 ETHAN ALLEN AVENUE
PURTILL HALL
PRELIMINARY SITE PLAN

DATE ISSUED: 08/06/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 20'
DRAWING NO.: C-1.03 REV. NO.: 4

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg



LEGEND

- IRON PIPE / CONCRETE MONUNMENT FOUND
- SURVEY CONTROL POINT
- EXISTING SIGN
- EXISTING OVERHEAD LIGHT
- EXISTING TREELINE
- EXISTING GRADE CONTOUR LINES (5 FOOT INTERVALS)
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APPLICANT:
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88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
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Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
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Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
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Density: 10 Dwelling Unit per Acre

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STANDARD GRAPHIC SCALE (1" = 20')
VALID WHEN PLOTTED ON 24" BY 36" MEDIA

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Project revisions	10/12/21
2.	Changes for State SW Application	10/28/21
3.	Add Screening Vegetation	01/14/22

DRAWING TITLE:
123 ETHAN ALLEN AVENUE
DUPONT HALL
PRELIMINARY SITE PLAN

DATE ISSUED: 08/06/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 20'
DRAWING NO.: C-1.04
REV. NO.: 3

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg

DISTURBED SOILS CALCULATION

PROPOSED DISTURBED SOIL

- DISTURBANCES FOR CONSTRUCTION EXCAVATION WORK. INSTALLATION OF CONCRETE WALKS, SMOKING AREAS, DUMPSTER LOCATIONS, AND UPGRADES TO UTILITIES = ±25,000 S.F.
- MISC. CONSTRUCTION DISTURBANCE FROM WORKING ON PROJECT = ±10,000 S.F.

TOTAL DISTURBANCE = ±35,000 S.F. (±0.80 ACRES)

PROPOSED PROJECT EFFECT ON PRIME AGRICULTURAL SOILS

- THE ENTIRE PROJECT AREA IS WITHIN ADAMS AND WINDSOR LOAMY SANDS WHICH IS MAPPED AS STATEWIDE PRIME AGRICULTURAL SOILS. ALL EXISTING SOILS ON SITE HAVE BEEN PREVIOUSLY DISTURBED OVER THE CENTURIES OF USE. THIS PROJECT IS LOCATED IN FORT ETHAN ALLEN WHICH HAD BEEN USED BY THE UNITED STATES GOVERNMENT FOR YEARS BEFORE IT WAS PASSED TO SAINT MICHAELS COLLEGE. PREVIOUS UPGRADES TO THE BUILDINGS, BUILDING UTILITIES, PARKING LOTS, WALKWAYS, ETC. HAVE ALL PREVIOUSLY DISTURBED THIS SOIL IN THE SAME MANOR IN WHICH THIS PROJECT PROPOSES. DUE TO THE LEVEL OF PREVIOUS DISTURBANCE IN THE SOIL, THIS PROJECT WILL HAVE NO ADVERSE IMPACT ON PRIME AGRICULTURAL SOILS.

LEGEND

- EXISTING GRADE CONTOUR LINES (5 FOOT INTERVALS)
- EXISTING GRADE CONTOUR LINES (1 FOOT INTERVALS)
- APPROXIMATE PROPERTY LINES
- APPROXIMATE LIMITS OF DISTURBANCE (LOD)
- POST-CONSTRUCTION SOIL DEPTH & QUALITY STANDARD VERIFICATION TEST PIT.

RESTORATION NOTES:

1. SEE POST-CONSTRUCTION SOIL DEPTH AND QUALITY NOTES AND ADDITIONAL SOIL RESTORATION NOTES ON DETAIL PAGE C-2.04.
2. CONTRACTOR IS RESPONSIBLE FOR ALL TESTING, DOCUMENTATION, REPORTING, ETC. OUTLINED WITHIN THE NOTES ON C-2.04. FOR BOTH THE PRE-CONSTRUCTION AND POST-CONSTRUCTION CONDITIONS OF THE SOILS. CONTRACTOR TO PROVIDE ALL THE INFORMATION TO THE OWNER AND THE ENGINEER.

PLAN NOTES:

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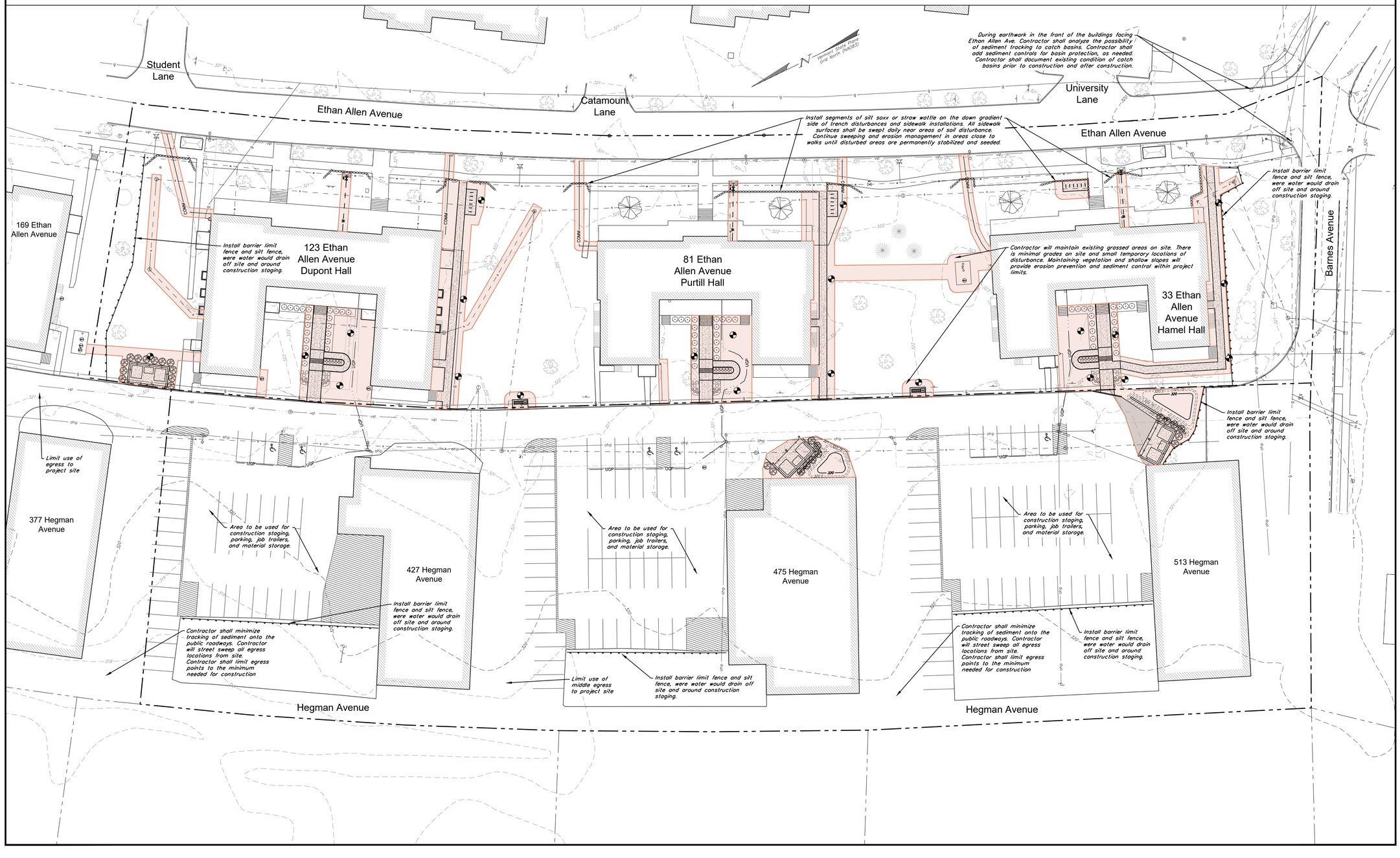

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Density: 10 Dwelling Unit per Acre

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0" 1" 2" 3"
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REV. NO.	REVISIONS/COMMENTS	DATE
1.	Add sidewalk south of Hamel	10/15/21
2.	Changes for State SW Application	10/28/21
3.	Add Screening Vegetation	01/14/22

DRAWING TITLE:
EROSION PREVENTION AND SEDIMENT CONTROL PLAN

DATE ISSUED: 10/12/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 30'
DRAWING NO.: C-1.05 REV. NO.: 3

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg

IMPERVIOUS SURFACE

EXISTING STUDENTS IMPERVIOUS SURFACE:

- AREA ON SITE = 6.778 ACRES
- OVERALL AREA OF EXISTING IMPERVIOUS ON SITE = 4.51 ACRES

PROPOSED IMPERVIOUS POST CONSTRUCTION:

- THE PROJECT WILL REMOVE SOME OLD IMPERVIOUS SIDEWALKS AND REPLACE THEM WITH EITHER NEW SIDEWALKS OR REVEGETATED.
- OVERALL AREA OF IMPERVIOUS POST CONSTRUCTION ON SITE = 4.63 ACRES
- PROJECT WILL INCREASE THE IMPERVIOUS ON SITE BY ±0.12 ACRES (±5,000 S.F.)
- PROJECT WILL ALSO REDEVELOP ±0.05 ACRES OF EXISTING IMPERVIOUS

LEGEND

- EXISTING GRADE CONTOUR LINES (5 FOOT INTERVALS)
- EXISTING GRADE CONTOUR LINES (1 FOOT INTERVALS)
- APPROXIMATE PROPERTY LINES
- DISCONNECTION AREAS
- WATERSHED LIMITS
- PRE & POST DEVELOPMENT TIME OF CONCENTRATION FLOW PATHS

STORMWATER MAINTANCE NOTES

A. FOREBAY PRE-TREATMENT AREAS:
1. MONITOR FOR ACCUMULATION OF SEDIMENT. CLEAN WHEN 50% FULL OR AS NEEDED.
2. INSPECT AND REPAIR ANY NOTED EROSION.

B. DISCONNECTION AREAS
1. INSPECT AND REPAIR ANY EROSION AND RE-SEED BARE SPOTS AS NEEDED
2. NOTHING MAYBE INSTALLED IN THIS AREA IN THE FUTURE, IT MUST REMAIN VEGETATED

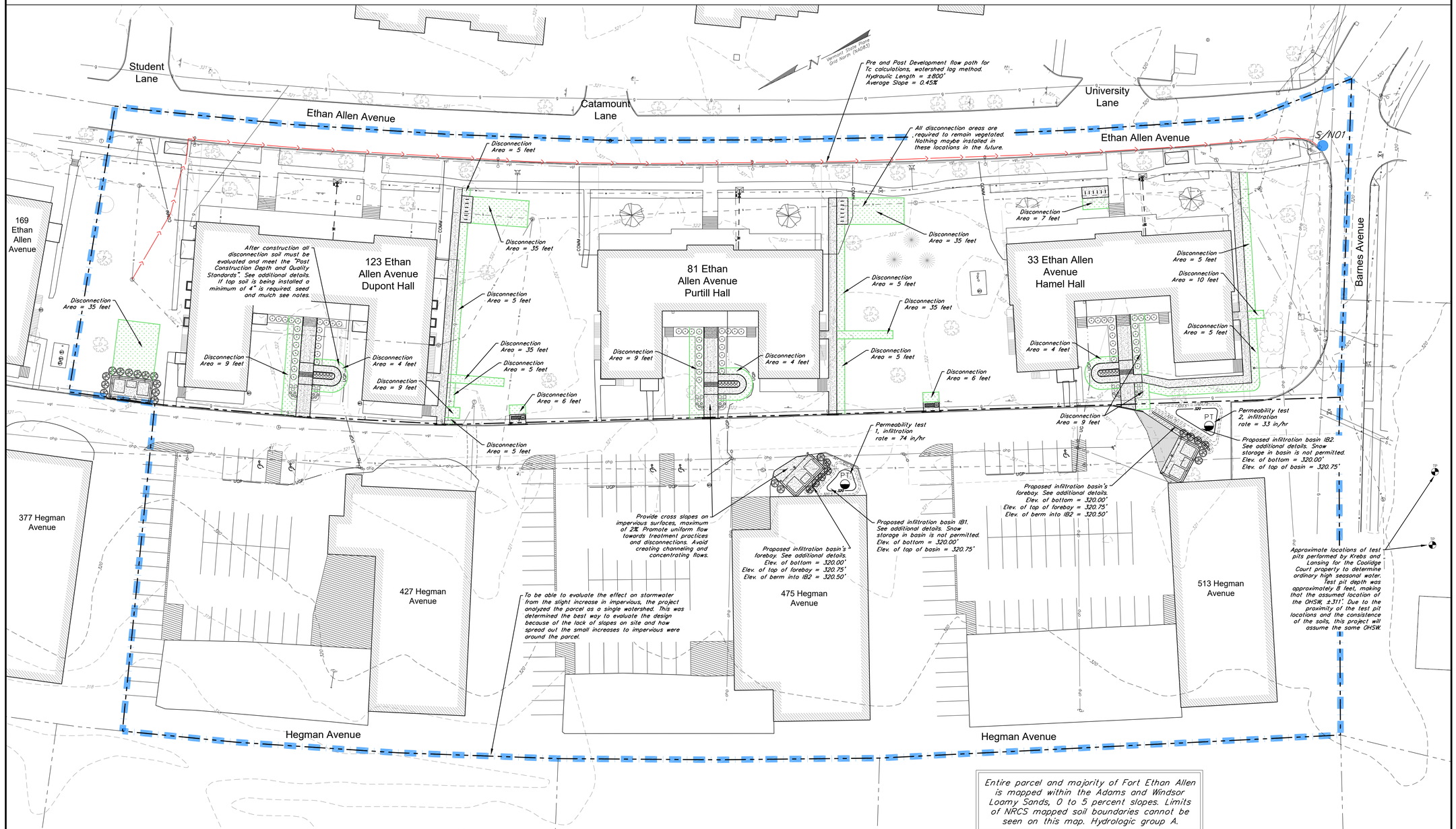
C. INFILTRATION BASIN
1. INSPECT FOR PROLONGED STANDING WATER AFTER RAIN EVENTS
2. INSPECT FOR EROSION, ACCUMULATED SEDIMENT AND ENSURE PLANTS ARE HEALTHY. REMOVE SEDIMENT AND REPLACE PLANTS AS NECESSARY.

STORMWATER SYSTEM MAINTENANCE SCHEDULE

1. THE STORMWATER SYSTEM IS COMPRISED OF ANY PORTION OF THE SITE THAT DIRECTS OR CONVEYS STORMWATER.
2. THE SITE SHALL BE REVIEWED IN THE SPRING (AFTER SNOW MELT AND PRIOR TO JUNE 15TH) TO INCLUDE SWALES, VEGETATION, GRAVEL DRIVES, ETC. AND REPAIRS OR CLEANING WILL BE PERFORMED AS NECESSARY.
3. THE TRASH RACKS IN THE STORMWATER TANK WILL BE INSPECTED ANNUALLY IN THE SPRING TO ENSURE THEY ARE CLEAR OF DEBRIS.
4. IN THE SPRING ALL GRAVELED SURFACES SHALL BE SWEPT/GRADDED FOR DEBRIS AND BUILD UP. ALL COLLECTED DEBRIS SHALL BE DISPOSED OF IN AN UPLAND AREA AND IMMEDIATELY STABILIZED OR DISPOSED AS APPROVED BY THE OWNER.
5. SEE ADDITIONAL MAINTENANCE NOTES ON PAGE C-2.04.

PLAN NOTES:

1. THIS PLAN IS NOT A BOUNDARY SURVEY. PROJECT PROPERTY LINES ARE SHOWN BASED ON MONUMENTATION FOUND IN THE FIELD AND PLAN TITLED "BOUNDARY ADJUSTMENT PLAT PARCELS 2 AND 4" DATED 10/09/2019 BY DONALD I HAMLIN CONSULTING ENGINEERS, INC. ALL PROPERTY LINES ARE TO BE CONSIDERED APPROXIMATE. SURROUNDING PROPERTY LINES TAKEN FROM DIGITAL TAX MAPPING.
2. THE UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON VISIBLE UTILITIES LOCATED DURING A TOPOGRAPHIC SURVEY PERFORMED BY KREBS & LANSING IN WINTER OF 2020. UNDERGROUND UTILITIES ARE APPROXIMATE AND NOT WARRANTED TO BE EXACT OR COMPLETE. DIG SAFE SHALL BE CONTACTED PRIOR TO ANY EXCAVATION.
3. ELEVATIONS ARE BASED ON GPS OBSERVATIONS THAT REFERENCE THE NAVD 88 VERTICAL DATUM MEASURED IN U.S. SURVEY FOOT.
4. PROJECT HORIZONTAL COORDINATES DERIVED FROM GPS OBSERVATION USING REFERENCE FRAME NAD83 (2011) 2010.00 EPOCH. PROJECT VERTICAL DATUM BASED ON NAVD 88 (GEOID 12A).



10TH CAVALRY APARTMENTS

Ethan Allen Avenue
Colchester, Vermont

KREBS & LANSING CONSULTING ENGINEERS
164 Main Street, Suite 201
Colchester, Vermont 05446
P: (802) 878-0375
www.krebsandlansing.com

ISSUED FOR PERMIT REVIEW
NOT FOR CONSTRUCTION

OWNER:
Saint Michaels College
1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

STAMP:

0' 15' 30' 60' 90'
0" 1" 2" 3"
STANDARD GRAPHIC SCALE (1" = 30')
VALID WHEN PLOTTED ON 24" BY 36" MEDIA

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Revision for State SW Application	11/29/21
2.	Add Screening Vegetation	01/14/22

DRAWING TITLE:
STORMWATER DESIGN PLAN

DATE ISSUED: 10/28/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 30'
DRAWING NO.: C-1.06 REV. NO.: 2

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg

GENERAL CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL DISTURBED AREAS BACK TO ORIGINAL CONDITION, INCLUDING BUT NOT LIMITED TO CURBING, SIDEWALKS, ROAD, PARKING AREAS, LANDSCAPING, SITE LIGHTING, ELECTRICAL, AND ETC. ALL ASPHALT SHALL BE SAW-CUT PRIOR TO PAVING.

2. ALL STUMPS, ROCK, AND OTHER NON-APPROVED TRENCH BACKFILL MATERIAL DISCOVERED DURING CONSTRUCTION IS THE EXCLUSIVE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF IN A STATE APPROVED DISPOSAL LOCATION. ALL EXISTING SOILS REUSED FOR FILL SHALL CONFORM TO ALL APPLICABLE SECTIONS OF VTRANS SPECIFICATIONS SECTION 203-EXCAVATION & EMBANKMENTS.CONTRACTOR SHALL REVIEW SOIL INVESTIGATION REPORT AND SOILS LOGS PRIOR TO BID. ANY SOIL REUSED AS FILL UNDER ROADS AND APPLICABLE CONCRETE SIDEWALKS SHALL PASS A SUBGRADE PROOF ROLL WITH A LOADED TANDEM. FILL SOILS THAT DO NOT PASS A SUBGRADE PROOF ROLL SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

3. ALL PASSING SIEVE, PROCTOR, AND COMPACTION TESTING EXPENSES SHALL BE PAID BY OWNER. TESTING COORDINATION, ALL OTHER REQUIRED TESTING, AND EXPENSES FOR FAILED TESTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

4. THE CONTRACTOR SHALL CONTACT THE GREEN MOUNTAIN POWER (GMP) PRIOR TO ANY WORK IN THE VICINITY OF THE EXISTING ELECTRIC CONDUITS.

5. THIS PROJECT WILL LIKELY NOT REQUIRE COVERAGE UNDER AN GENERAL CONSTRUCTION STORMWATER DISCHARGE PERMIT. THE CONTRACTOR WILL STILL FOLLOW RULES, REGULATIONS, AND DIRECTION OUTLINED IN THE STATE OF VERMONT "LOW RISK HANDBOOK FOR EROSION PREVENTION AND SEDIMENT CONTROL" FROM FEBRUARY 2020.THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING, MAINTAINING AND REMOVING ALL EROSION AND SEDIMENT CONTROL DEVICES SHOWN ON THE PLANS OR DETAILS AND, TO THE MAXIMUM EXTENT PRACTICAL, TO MINIMIZE POTENTIAL CONTAMINATION OF STORMWATER RUNOFF FROM THE CONSTRUCTION ACTIVITIES.

6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL "AS-BUILT" MEASUREMENT AND DRAFTING REQUIREMENTS AS OUTLINED ON THE DETAIL SHEETS. ALL TRENCH EXCAVATIONS SHALL REMAIN OPEN UNTIL ALL AS-BUILT SURVEY SHOTS HAVE BEEN TAKEN. PROGRESS RECORD DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER AS INDICATED IN THE RECORD DRAWING SPECIFICATIONS.

7. SEE EROSION CONTROL AND LOGISTICS PLANS FOR LOCATIONS OF STAGING / STORAGE AREAS.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SIGNAGE AND CONSTRUCTION BARRIER/SAFETY FENCING NECESSARY FOR PROVIDING SAFE VEHICULAR AND PEDESTRIAN ACCESS THROUGH OR AROUND THE SITE DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE THIS WITH THE TOWN OF COLCHESTER AND THE COLCHESTER DEPARTMENT OF PUBLIC WORKS.

9. DEFINITION OF "PRECONSTRUCTION EXCAVATION" FOR THESE CONTRACT DOCUMENTS SHALL BE:
THE SITE CONTRACTOR SHALL EXPOSE UTILITIES AND OBTAIN ALL NECESSARY INFORMATION, INCLUDING BUT NOT LIMITED TO, INVERT ELEVATION, SIZE, DEPTH, PIPE TYPE, JOINT LOCATION, ETC. CONTRACTOR SHALL TRANSIT SURVEY THE LOCATION AND ELEVATIONS OF THE UTILITY. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH SKETCHES INDICATING HORIZONTAL AND VERTICAL INFORMATION OF PIPE OR CONDUIT TYPE AND SIZE, CROSS-SECTION INFORMATION, CONCRETE ENCASEMENT INFORMATION (TOP AND BOTTOM ELEVATIONS, WIDTH, ETC.), JOINT LOCATION, ETC. OF EACH REQUIRED EXISTING UNDERGROUND UTILITY. ACCURACY OF HORIZONTAL LOCATION IS WITHIN 1 FOOT, AND ACCURACY OF VERTICAL ELEVATION IS WITHIN 0.02 FT. (1/4"). COORDINATE ALL EXCAVATION WITH TOWN, OWNER, AND ENGINEER. PRECONSTRUCTION EXCAVATIONS SHALL OCCUR PRIOR TO ORDERING STRUCTURES AND PRIOR TO UTILITY CONSTRUCTION TO FACILITATE REDESIGN AND/OR DESIGN CONFIRMATION.

10. THE LOCATION OF THE PRECONSTRUCTION EXCAVATION SYMBOLS DOES NOT NECESSARILY INDICATE THE LOCATION OF THE BURIED UTILITY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIND AND EXPOSE THE UTILITY.

11. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS OF IMPORTING AND PLACING TOPSOIL AND/OR COMPOST NECESSARY TO COMPLETE THE PROJECT. CONTRACTOR SHALL TEST TOPSOIL FOR APPROVAL BY THE OWNER AND ENGINEER.

12. ALL SEWER AND STORM PIPES SHALL BE PVC SDR 35 UNLESS OTHERWISE NOTED.

13. CORE AND BOOT ALL EXISTING STRUCTURES UNLESS OTHERWISE NOTED.

14. ALL NEW CATCH BASINS AND SANITARY SEWER MANHOLE MUST HAVE ONE 6" PRECAST CONCRETE GRADE RING.

15. ALL WATERLINE PIPE SHALL BE DUCTILE IRON CLASS 52. ALL BENDS AND FITTINGS SHALL HAVE REDI-MIX CAST IN PLACE THRUST BLOCKS

16. TEMPORARY GROUNDWATER, STORMWATER, AND SEWER BY-PASS PUMPING AND/OR DIVERSION IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY PUMPS AND EQUIPMENT TO PERFORM THE WORK. OVERNIGHT PUMPING IS NOT ALLOWED.

17. ALL SIDEWALKS SHALL HAVE 2% MAXIMUM CROSS SLOPE. ALL RAMPS AND STAIRS SHALL HAVE A LANDING AT THE BOTTOM WITH A MAXIMUM SLOPE OF 2% FOR 5 FEET.

18. CONTRACTOR TO PIN CONCRETE SIDEWALK/SLABS TO ALL CONTACT POINTS WITH STAIRS, BUILDING, BIKE SLAB, RETAINING WALLS, ETC.

19. CONTRACTOR SHALL MAINTAIN FULL OCCUPANCY AND FIRE DEPARTMENT ACCESS TO ALL SURROUNDING BUILDINGS. COORDINATE ALL TEMPORARY ACCESS WITH THE MUNICIPALITY.

20. BURIED NATURAL GAS IS SHOWN FOR ALIGNMENT PURPOSES ONLY. CONTACT VERMONT GAS SYSTEMS FOR DESIGN AND DETAILS OF NEW GAS LINE. CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXCAVATION, BACKFILL, AND RESTORATION FOR THE CONSTRUCTION OF THE NATURAL GAS LINES. VERMONT GAS SYSTEMS WILL PROVIDE THE PIPING, LABOR TO INSTALL, AND TESTING FOR THE NEW GAS MAIN. COORDINATE WORK AND ALL GAS SHUT DOWN PROCEDURES WITH THE OWNER.

21. REMOVAL OF ALL EROSION CONTROL IS THE RESPONSIBILITY OF THE CONTRACTOR.

22. AT THE END OF THE PROJECT, CLEAN THE SUMPS OF ALL NEW AND EXISTING CATCH BASINS AND STORM MANHOLES WITHIN THE PROJECT LIMITS.

23. ELECTRICAL AND LIGHTING ARE SHOWN FOR ILLUSTRATIVE/COORDINATION PURPOSES ONLY. REFER TO ELECTRICAL PLANS AND SPECIFICATIONS FOR DESIGN.

24. SEE LANDSCAPE AND/OR STRUCTURAL PLANS FOR ALL RETAINING WALLS, UTILITY PADS, STAIRS, EXTERIOR CONCRETE AT DOORS AND SITE INFRASTRUCTURE OVER GARAGE ROOF.

25. REFER TO PLUMBING, MECHANICAL AND/OR FIRE PROTECTION PLANS FOR WATER, SEWER AND STORM DESIGN WITHIN FIVE FEET OF THE BUILDING.

ADDITIONAL CONSTRUCTION NOTES

1. THE METHODS AND MATERIALS OF CONSTRUCTION SHALL CONFORM TO THE LATEST STANDARDS OF THE STATE OF VERMONT AND TOWN OF COLCHESTER, ALL WORK SHALL BE IN CONFORMANCE WITH ALL PERMITS AND APPROVALS ISSUED FOR THE PROJECT. IN CASE OF CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY AS DIRECTED BY ENGINEER. ALL WORK SHALL BE DONE IN A WORKMANLIKE MANNER AND COMPLETED IN THE TIME SPECIFIED BY OWNER.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK AND MATERIALS SHOWN AND REQUIRED TO MAKE THE JOB COMPLETE. THESE DRAWINGS DO NOT SHOW EVERY FITTING OR APPURTENANCE. MATERIALS SHALL BE AS SPECIFIED ON THE DRAWINGS. MANUFACTURER'S PRODUCT SPECIFICATIONS SHALL BE SUBMITTED FOR ALL MATERIALS TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.

3. THE LOCATION AND SIZE OF EXISTING UNDERGROUND UTILITIES IS NOT WARRANTED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL FIELD LOCATE ALL UTILITIES AND SHALL CONTACT THE AFFECTED UTILITY COMPANY, THE ENGINEER AND THE MUNICIPALITY PRIOR TO MAKING ANY HOOK UPS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL EXISTING UTILITIES AND THEIR UNINTERRUPTED SERVICES. ALL OFF-SITE BACKFILL, SHEETING, SHORING, DEWATERING, CLEARING AND GRUBBING, EROSION CONTROL, DUST CONTROL, TRAFFIC CONTROL, GRADING, AND ALL INCIDENTALS SHALL BE INCLUDED AS PART OF THE REQUIRED WORK.

4. REPAIR OF ALL DISTURBED AREAS, GRADING, SEEDING, MULCHING, REPAIR OF ROADS AND CURBS, PAVING, AND OTHER INCIDENTALS ARE INCLUDED AS PART OF THE REQUIRED WORK. ALL DISTURBED AREAS SHALL BE LOAMED AND MULCHED UNTIL PERMANENT GROUND COVER IS ESTABLISHED.

5. THE CONTRACTOR SHALL VERIFY ALL TEMPORARY BENCH MARKS BEFORE USE.

6. THE WORKMEN AND PUBLIC SHALL BE PROTECTED BY THE CONTRACTOR FROM ANY AND ALL HAZARDS CONNECTED WITH THE CONSTRUCTION WORK. OPEN TRENCHES, MATERIALS, OR EQUIPMENT WITHIN THE WORKING LIMITS ARE TO BE GUARDED BY THE USE OF ADEQUATE BARRICADES OR FLAGMEN. ALL BARRICADES LEFT IN POSITION OVERNIGHT ARE TO BE PROPERLY LIGHTED. KEROSENE POTS ARE NOT ACCEPTABLE. WHEN WORK NARROWS THE USABLE PAVEMENT, FLAGMEN SHALL BE EMPLOYED TO AID THE FLOW OF TRAFFIC SO THAT THERE WILL BE NO UNDUE DELAYS. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE SAFETY OF ALL WORKMEN, THE GENERAL PUBLIC AND ALL DAMAGES TO PROPERTY OCCURRING FROM OR UPON THE WORK OCCASIONED BY NEGLIGENCE OR OTHERWISE GROWING OUT OF A FAILURE ON THE PART OF THE CONTRACTOR TO PROTECT PERSONS OR PROPERTY FROM HAZARDS OF OPEN TRENCHES, MATERIALS, OR EQUIPMENT AT ANY TIME OF THE DAY OR NIGHT WITHIN THE WORKING AREA. ALL WORK SHALL BE IN CONFORMANCE TO OSHA REGULATIONS, TITLE 19, PARTS 1926.651 AND 1926.652, AND APPLICABLE TO VOSHA REGULATIONS.

7. THE CONTRACTOR SHALL VERIFY ALL UTILITY INTERSECTIONS AND CONTACT ENGINEER AND OWNER WITH CONFLICTS.

8. THE CONTRACTOR SHALL CALL, DIG SAFE PRIOR TO ANY EXCAVATION.

9. THE CONTRACTOR SHALL COORDINATE FINAL LOCATION AND INVERTS FOR WATER, SEWER, AND STORM BUILDING CONNECTIONS WITH THE ARCHITECT, STRUCTURAL ENGINEER, AND MECHANICAL ENGINEER.

10. ALL NEW SANITARY AND STORM PIPES SHALL BE LAID WITH A LASER TO ELEVATION AND SLOPE AS SHOWN ON THE PLANS.

EPSC GENERAL NOTES:

1. EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) PRACTICES SHALL BE IMPLEMENTED IN ALL AREAS WHERE THERE IS AN INCREASED RISK OF EROSION, AND WHERE THERE IS POTENTIAL FOR DISCHARGE OF STORMWATER RUNOFF (EITHER DIRECT OR INDIRECT) TO A WATER BODY.

2. EPSC MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH DISTURBING ACTIVITIES WITHIN A GIVEN DRAINAGE AREA WITH THE EXCEPTION OF LAND DISTURBANCE THAT MAY RESULT FROM ACCESSING THE AREA(S) WITH EQUIPMENT IN WHICH EPSC MEASURES ARE TO BE INSTALLED. THIS EXCEPTION INCLUDES LAND DISTURBANCE THAT MAY RESULT FROM ACCESS OF EQUIPMENT THAT IS NEEDED FOR:EXPLORATION AND/OR EPSC MEASURE INSTALLATION PHASES OF THE PROJECT. TEMPORARY SEDIMENT BASINS, TEMPORARY SEDIMENT TRAPS, PERIMETER DIKES, TEMPORARY SEDIMENT BARRIERS, AND OTHER TEMPORARY MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE WITH THE EXCEPTION OF THOSE ACTIVITES STATED ABOVE. EARTH DISTURBANCE INCLUDES STUMPING AND GRUBBING OF CLEARED AREAS.

3. EPSC MEASURES SHALL BE INSTALLED PURSUANT TO THE EPSC PLAN, THE 2020 STATE OF VERMONT LOW RISK SITE HANDBOOK FOR EROSION PREVENTION AND SEDIMENT CONTROL, THE 2020 VERMONT EROSION PREVENTION AND SEDIMENT CONTROL STANDARDS AND SPECIFICATIONS, AND/OR ANY OTHER RELEVANT PROJECT PERMITS.

4. ALL PROPOSED CHANGES SHALL BE APPROVED BY THE ON-SITE PLAN COORDINATOR (OSPC) OR HIS/HER DESIGNEE PRIOR TO IMPLEMENTATION.

5. NO CLEARING/LOGGING IS PROPOSED FOR THE PROJECT.

6. PERMISSION MUST BE GRANTED BY VT DEC PRIOR TO USE OF ANY SUPPORT ACTIVITIES OCCURRING OUTSIDE OF THE APPROVED PROJECT BOUNDARIES.

7. ALL PARTIES ASSOCIATED WITH CONSTRUCTION ACTIVITIES WHO MEET EITHER OF THE FOLLOWING TWO CRITERIA OF "PRINCIPAL OPERATOR" MUST OBTAIN COVERAGE UNDER THE CONSTRUCTION STORMWATER DISCHARGE PERMIT FOR THE PROJECT PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES BY THAT OPERATOR:
   A. THE PARTY HAS OPERATIONAL CONTROL OVER CONSTRUCTION PLANS AND SPECIFICATION, INCLUDING BUT NOT LIMITED TO THE ABILITY TO MAKE MODIFICATIONS TO THOSE PLANS AND SPECIFICATIONS; OR
   B. THE PARTY HAS CONTINUOUS DAY-TO-DAY OPERATIONAL CONTROL OF THOSE ACTIVITIES AT THE PROJECT THAT ARE NECESSARY TO ENSURE COMPLIANCE WITH AN EPSC PLAN FOR THE SITE OR OTHER PERMIT CONDITIONS (E.G., THEY ARE AUTHORIZED TO DIRECT WORKERS AT A SITE TO CARRY OUT ACTIVITIES REQUIRED BY THE EPSC PLAN OR COMPLY WITH OTHER PERMIT CONDITIONS).

EPSC CONSTRUCTION NOTES:

1. EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED TO THE EXTENT PRACTICABLE.

2. A VEGETATED BUFFER SHALL BE MAINTAINED FOR WATER BODIES WHERE FEASIBLE (E.G., WETLANDS AND STREAMS).

3. TO THE EXTENT PRACTICABLE, SURFACE FLOW SHALL BE DIVERTED AWAY FROM EXPOSED SOILS VIA DIVERSION BERMS, EARTH DIKES, PERIMETER DIKES/SWALES, TEMPORARY SWALES, WATER BARS, AND/OR CHECK DAMS.

4. RESOURCE AREAS (E.G., WETLANDS, STREAMS, RTE PLANT SPECIES) SHALL BE FLAGGED PRIOR TO ANY CONSTRUCTION RELATED ACTIVITIES OCCURRING WITHIN CLOSE PROXIMITY TO THOSE AREAS.

5. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT VIOLATE WATER QUALITY STANDARDS OR CONTRIBUTE TO EROSION. DEWATERING DETAILS SHALL BE REVIEWED AND APPROVED BY OSPC PRIOR TO USE.

6. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN STEEP SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL (SEE DETAILS), FLUME, OR SLOPE DRAIN STRUCTURE.

7. UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:
   A. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.
   B. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES, WHERE FEASIBLE, BUT NOT IN RESOURCE AREAS.

8. WHERE FEASIBLE, ALL SEDIMENT REMOVED FROM SEDIMENT CONTROL PRACTICES AS PART OF MAINTENANCE SHALL BE DISPOSED OF IN AN AREA THAT IS AT LEAST ONE OF THE FOLLOWING, WITH IMMEDIATE STABILIZATION FOLLOWING DISPOSAL OF MATERIAL:
   A. LESS THAN 5±% SLOPE
   B. AT LEAST 100 FEET FROM ANY DOWNSLOPE WATER BODY OR CONVEYANCE TO A WATER BODY, INCLUDING A DITCH
   C. VEGETATED

9. DISTURBED AREAS BORDERING OR DRAINING TO EXISTING ROADS SHALL HAVE AN APPROPRIATE SEDIMENT BARRIER (E.G., SILT FENCE) SPANNING THE EDGE OF THE DISTURBANCE TO PREVENT WASHING OF SEDIMENT ONTO ROADWAYS OR INTO ROAD DITCHES.

10. IN ADVANCE OF PREDICTED RAINFALL OR SNOWMELT, ALL EPSC MEASURES THAT ARE LOCATED IN ACTIVE AREAS OF EARTH DISTURBANCE SHALL BE INSPECTED AND REPAIRED, AS NEEDED. IF NECESSARY, THIS SHALL INCLUDE TEMPORARY STABILIZATION OF ALL DISTURBED SOILS ON THE SITE IN ADVANCE OF THE ANTICIPATED RUNOFF PERIOD.

11. DUST CONTROL SHALL BE HANDLED VIA WATER APPLICATION TO ROADWAYS AND OTHER AREAS WHERE DUST MAY BE GENERATED.

GENERAL GRADING AND SITE WORK NOTES

1. ALL AREA DISTURBED AND ALL AREAS WITHIN THE CLEARING LIMITS SHALL BE GRADED AND COVERED WITH A MINIMUM OF 6" OF LOAM TOPSOIL. THE AREAS TO BE LOAMED SHALL BE FREE AND CLEAR OF ROOTS, WASTE MATERIAL AND OTHER DELETERIOUS MATERIAL. TOPSOIL SHALL BE SPREAD AND LIGHTLY COMPACTED TO A DEPTH OF 6". TOPSOIL SHALL BE APPROVED BY THE ENGINEER. ALL SIDE SLOPES ARE TO BE LOAMED.

2. ALL TURF ESTABLISHMENT SHALL BE IN ACCORDANCE WITH SECTION 651 OF THE VT STANDARD SPECIFICATIONS 2018 AND THE MUNICIPALITY SPECIFICATIONS. MULCHING SHALL FOLLOW SEEDING BY NO MORE THAN 24 HOURS.

3. ALL CUT SLOPES SHALL BE NO STEEPER THAN 2.0H ON 1.0V. ALL FILL SLOPES SHALL BE NO STEEPER THAN 2.0H ON 1.0V.

4. THE CONTRACTOR SHALL NOT DISTURB ANY GROUND BETWEEN OCTOBER 15TH BETWEEN APRIL 15TH WINTER MONTHS, UNLESS APPROVED BY THE ENGINEER.

5. TEMPORARY SILT FENCE SHALL BE ERECTED PRIOR TO ANY CLEARING OR CONSTRUCTION. FENCING MAY BE ERECTED IN PHASES, BUT IN NO CASE SHALL GROUND DISTURBANCE PROCEED FENCING. SPECIAL AREAS MAY BE DESIGNATED BY THE OWNER FOR PRESERVATION OF EXISTING TREES. THESE AREAS SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSURE NO DAMAGE IS DONE TO DESIGNATED TREES.

6. EXISTING PLANTINGS ARE LOCATED IN GENERAL AREAS AS SHOWN ON THIS PLAN. CONTRACTOR SHALL PROTECT PLANTINGS SO AS NOT TO DAMAGE THESE OR THEIR ROOT SYSTEMS.

7. SLOPE STABILITY BASED UPON UNSATURATED SOIL CONDITIONS. IF DURING CONSTRUCTION SATURATED SOILS ARE ENCOUNTERED, CONTACT THE ENGINEER IMMEDIATELY.

WATER & SEWER CONSTRUCTION NOTES

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CONSTRUCTION OF WATER MAIN, STORM AND SANITARY SEWER SYSTEMS AS SHOWN ON THE PLANS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL NECESSARY ADAPTERS, FITTINGS, ETC. TO MAKE CONNECTIONS TO THE EXISTING AND PROPOSED UNITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK SHOWN OR IMPLIED ON THE PLANS AND/OR REFERENCED IN THE SPECIFICATIONS AND PERMITS. THE CONTRACTOR SHALL SUBMIT, FOR APPROVAL BY THE ENGINEER, ALL TYPES OF MATERIALS AND PRODUCTS USED.

2. THE CONTRACTOR SHALL COORDINATE ALL WORK ON THE WATER SUPPLY SYSTEM WITH THE OWNER, THE TOWN OF COLCHESTER, COLCHESTER PUBLIC WORKS, CHAMPLAIN WATER DISTRICT (CWD), AND THE CIVIL ENGINEER. ALL WATER INSTALLATION WORK AND WATER DISTRIBUTION MATERIALS MUST COMPLY WITH THE CURRENT WPW SPECIFICATIONS.

3. THESE PLANS ARE NOT RESPONSIBLE FOR DESIGN OF WATER AND SEWER SERVICES WITHIN 5 FEET OF THE BUILDING. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR EXTENDING THE SERVICES TO THE PLUMBING AND/OR FIRE SYSTEM CONNECTION WITHIN THE BUILDING. SEE PLUMBING ENGINEER, MECHANICAL ENGINEER AND/OR FIRE PROTECTION PLANS FOR SCOPE, DESIGN AND SPECIFICATIONS WITHIN 5 FT. OF THE BUILDING.

4. CONTRACTOR SHALL PROVIDE ALL NECESSARY FITTINGS AND APPURTENANCES TO COMPLETE THE WATERLINE CONSTRUCTION WORK. THIS INCLUDES TEMPORARY FITTINGS AND GAUGES NECESSARY TO SAFELY COMPLETE THE FLUSHING ACTIVITIES REQUIRED PRIOR TO MAKING CONNECTIONS WITH BUILDING PLUMBING.

5. THE PROJECT SHALL BE CONSTRUCTED, COMPLETED, MAINTAINED, AND OPERATED IN ACCORDANCE WITH THE APPROVED PLANS. NO CHANGES SHALL BE MADE IN THE PROJECT WITH OUT THE WRITTEN APPROVAL OF THE TOWN, CWD, AND THE CIVIL ENGINEER. A COPY OF THE FINAL APPROVED PLANS SHALL BE SUBMITTED TO CWD AND THE TOWN PRIOR TO CONSTRUCTION OF THE WATER SYSTEM IMPROVEMENTS.

6. THE TOWN AND CWD SHALL BE NOTIFIED IN ADVANCE TO INSPECT ALL MECHANICAL JOINTS FITTINGS, MAIN LINE TAPS, APPURTENANCES, THRUST BLOCKS, WATER LINE CROSSINGS, AND TESTING PRIOR TO OCCURRENCE OR BACKFILLING.

7. ALL DOMESTIC SERVICES AND FIRE SPRINKLER SYSTEMS THAT ARE CONNECTED TO THE PUBLIC WATER SYSTEM SHALL BE PROTECTED WITH A BACKFLOW PREVENTION ASSEMBLY, AND AN APPROPRIATE THERMAL EXPANSION SYSTEM. THE MECHANICAL CONTRACTOR SHALL COORDINATE APPROVED BACKFLOW PREVENTION WITH THE TOWN AND CWD.

WATER MAINS

1. APPLIES TO NEW DOMESTIC WATER MAINS AND SERVICES.

2. THE PIPE FOR WATER MAIN SHALL BE CL52 DOUBLE CEMENT LINED DUCTILE IRON. DUCTILE IRON FITTINGS SHALL CONFORM TO AWWA C110, 350 POUNDS WORKING PRESSURE. VALVES SHALL BE MANUFACTURED TO MEET ALL REQUIREMENTS OF AWWA SPECIFICATION C509 OR C515. FOUR-INCH AND SIX-INCH PIPE SHALL HAVE NO LESS THAN 2 BRASS WEDGES INSTALLED AT EACH JOINT. EIGHT-INCH AND 10" PIPE SHALL HAVE NO LESS THAN 3 WEDGES INSTALLED AT EACH JOINT.

3. ALL PIPE SHALL BE INSTALLED IN ACCORDANCE WITH AWWA C600. THE PIPE SHALL BE KEPT FREE OF FOREIGN MATTER AND DEBRIS DURING INSTALLATION. WHEN THE PROCESS OF PIPE LAYING HAS STOPPED, ANY OPEN ENDS OF PIPE SHALL BE PLUGGED. THERE SHALL BE A MINIMUM OF 6'-0" COVER OVER ALL PIPE AND SERVICE LINES. ANY PIPE DEFLECTION SHALL NOT EXCEED FIFTY (50%) PERCENT OF RECOMMENDED MANUFACTURER'S MAXIMUM DEFLECTION. BACKFILL MATERIALS AND PROCEDURES SHALL BE AS DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL SHEETING AND/OR SHORING NECESSARY TO COMPLY WITH OSHA - VOSHA REGULATIONS.

4. THE TESTING OF THE WATER MAIN SHALL CONSIST OF THE TESTING OF ALL INSTALLED PIPE, SERVICES AND HYDRANTS IN ACCORDANCE WITH AWWA C600. THE TESTING SHALL CONSIST OF A PRESSURE TEST AND LEAKAGE TEST. ALL TESTING SHALL BE DONE WITH POTABLE WATER AND IN THE PRESENCE OF THE ENGINEER, REPRESENTATIVES FROM THE MUNICIPALITY AND THE MUNICIPALITY PUBLIC WORKS. THE PRESSURE TEST CONSISTS OF MAINTAINING A MINIMUM INTERNAL PIPE PRESSURE OF 200 PSI FOR TWO (2) HOURS. THE TESTING ALLOWANCE SHALL BE DEFINED AS THE MAXIMUM QUANTITY OF MAKEUP WATER THAT IS ADDED INTO A PIPELINE UNDERGOING HYDROSTATIC PRESSURE TESTING, OR ANY VALVED SECTION THEREOF, IN ORDER TO MAINTAIN PRESSURE WITHIN +/- 5 PSI OF THE SPECIFIED TEST PRESSURE (AFTER THE PIPELINE HAS BEEN FILLED WITH WATER AND THE AIR HAS BEEN EXPELLED). NO PIPE INSTALLATION WILL BE ACCEPTED IF THE QUANTITY OF MAKEUP WATER IS GREATER THAN THAT DETERMINED BY THE FOLLOWING FORMULA:

$$L = \frac{SD\sqrt{P}}{148,000}$$

L = TESTING ALLOWANCE (MAKEUP WATER), IN GALLONS PER HOUR
S = LENGTH OF PIPE TESTED, IN FEET
D = NOMINAL PIPE DIAMETER, IN INCHES
P = AVERAGE TEST PRESSURE DURING THE HYDROSTATIC TEST, IN POUNDS PER SQUARE INCH (GAUGE)

5. CHLORINATING OF THE SYSTEM SHALL BE ACCOMPLISHED AFTER THE WATER MAIN HAS BEEN SUCCESSFULLY PRESSURE TESTED AND THOROUGHLY FLUSHED. DISINFECTING SHALL BE IN ACCORDANCE WITH AWWA C-651. THE DISINFECTING PROCESS SHALL BE DEEMED ACCEPTABLE ONLY AFTER TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES, TAKEN FROM THE FLUSHED AND DISINFECTED MAIN 24 HOURS APART, SHOWS NO EVIDENCE OF BACTERIOLOGICAL CONTAMINATION. FOR PROPER DISINFECTION USE MINIMUM 25 MG/L CHLORINE CONCENTRATION FOR 24 HOURS. THE CONCENTRATION MUST REMAIN ABOVE 10 MG/L. TABLET DISINFECTING IS NOT ACCEPTABLE. DECHLORINATION SHALL BE REQUIRED WHILE FLUSHING THE ORIGINAL CHLORINE FROM THE NEW LINE. COORDINATE WITH THE THE MUNICIPALITY AND THE MUNICIPALITY PUBLIC WORKS REGARDING THE THE DISPOSAL OF THE HIGHLY CHLORINATED WATER FLUSHED FROM THE NEW WATERLINE.

6. THE WATER MAIN SHALL BE THOROUGHLY FLUSHED WITH A MINIMUM FLOW VELOCITY OF 2.5 FT/S TO FLUSH FOREIGN MATERIALS OUT OF THE VALVES AND HYDRANTS. AT LEAST 48 HOURS PRIOR TO WATERLINE FLUSHING, THE CONTRACTOR SHALL CONTACT THE OWNER, MUNICIPALITY FIRE DEPARTMENT, THE DISTRICT WATER SUPPLY COMPANY, AND THE ENGINEER.

SANITARY SEWER

1. ALL SEWER LINES AND MANHOLES SHALL BE THOROUGHLY TESTED BY THE CONTRACTOR IN ACCORDANCE WITH THE ENVIRONMENTAL PROTECTION RULES (04/12/2019).

2. ALL SANITARY MANHOLES SHALL BE VACUUM TESTED IN THE PRESENCE OF THE ENGINEER. THE STRUCTURE SHALL BE TESTED PRIOR TO BACKFILL WITH THE LOWEST SEAM EXPOSED. TEST PROCEDURES AND PRESSURE SHALL BE DETERMINED JOINTLY BY THE LOCAL APPROVAL AGENCY AND THE ENGINEER. FAILURE OF ANY VACUUM TEST SHALL NECESSITATE REPAIR AND/OR REPLACEMENT OF THE STRUCTURE AND RETEST. WATER TESTING MANHOLES IS NOT ACCEPTABLE.

3. ALL SANITARY MAINS SHALL BE AIR TESTED IN THE PRESENCE OF THE ENGINEER. AT A MINIMUM, THE TEST PRESSURE SHALL BE 4 POUNDS PER SQUARE INCH AT THE HIGHEST POINT ALONG THE TEST FOR 4 MINUTES.

4. UTILITY TESTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING SANITARY TESTING AT A MINIMUM OF 24 HOURS PRIOR TO THE TEST. BASED ON AVAILABILITY OF ENGINEER'S STAFF, THE ENGINEER SHALL ACCOMMODATE THE TESTING SCHEDULE WITHIN 24 HOURS OF THE CONTRACTOR REQUESTED TEST DATE/TIME.

5. THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER IF PRE-SCHEDULED TESTING AND/OR WATER/SEWER CONSTRUCTION IS CANCELED. IF CONTRACTOR DOES NOT CONTACT ENGINEER AND ENGINEER VISITS THE SITE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENGINEER'S FEES/MILEAGE FOR SITE VISIT.

ADDITIONAL NOTES AND TESTING REQUIREMENTS

1. IN ADDITION TO THE ABOVE REQUIREMENTS AND APPLIES TO WATER AND SANITARY SEWER.

2. ALL WATER LINES AND SEWER LINES SHALL BE THOROUGHLY TESTED BY THE CONTRACTOR IN ACCORDANCE WITH THE ENVIRONMENTAL PROTECTION RULES (04/12/2019) AND THE CHAPTER 21 WATER SUPPLY RULES (03/17/2020) (THE MORE STRINGENT RULE SHALL APPLY).

3. ALL PRIVATE OR MUNICIPAL WATERLINES SHALL BE TESTED BY THE CONTRACTOR IN ACCORDANCE WITH THE PROCEDURES OUTLINED IN AWWA C600 AND/OR NFPA 24.

4. NO WATER MAIN SHALL BE CLOSER THAN TEN (10) FEET TO ANY SANITARY SEWER OR SANITARY MANHOLE AND FIVE (5) FEET TO ANY CATCH BASIN OR STORM SEWER LINE. PROVIDE MINIMUM OF 18" VERTICAL SEPARATION BETWEEN WATER MAIN AND STORM/SANITARY SEWER CROSSING.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION AS-BUILTS TO SERVICE LOCATIONS, AND ANY WATER MAIN FITTINGS. AS-BUILTS SHALL BE RECORDED IN ACCORDANCE WITH THE OUTLINED PROCEDURES.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ENGINEER AT LEAST 24 HOURS PRIOR TO STARTING CONSTRUCTION ON ANY PORTION OF THE EXTERIOR WATER OR SANITARY SYSTEMS. THIS NOTIFICATION REQUIREMENT SHALL CONTINUE TO THE COMPLETION OF THE WATER AND SANITARY SYSTEMS.

7. UTILITY TESTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING WATER AND SANITARY TESTING, WITH THE ENGINEER AND MUNICIPALITY PUBLIC WORKS, AT A MINIMUM OF 24 HOURS PRIOR TO THE TEST. BASED ON AVAILABILITY OF ENGINEER'S STAFF, THE ENGINEER SHALL ACCOMMODATE THE TESTING SCHEDULE WITHIN 24 HOURS OF THE CONTRACTOR REQUESTED TEST DATE/TIME.

8. THE CONTRACTOR SHALL PRE-TEST WATER FOR 2 HOURS. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF PRE-TEST FAILED.

9. THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER IF PRE-SCHEDULED TESTING AND/OR WATER/SEWER CONSTRUCTION IS CANCELED. IF CONTRACTOR DOES NOT CONTACT ENGINEER AND ENGINEER VISITS THE SITE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENGINEER'S FEES/MILEAGE FOR SITE VISIT.

10. THE CONTRACTOR SHALL COORDINATE WATER/SEWER CONSTRUCTION WITH THE MUNICIPALITY. THE CONTRACTOR SHALL LEAVE THRUST BLOCKS AND OTHER REQUIRED SECTIONS OF NEW LINE EXPOSED UNTIL MUNICIPALITY HAS INSPECTED AND APPROVED IT.

10TH CAVALRY APARTMENTS

Ethan Allen Avenue
Colchester, Vermont

KREBS & LANSING
CONSULTING ENGINEERS
164 Main Street, Suite 201
Colchester, Vermont 05446
P: (802) 878-0375
www.krebsandlansing.com

ISSUED FOR PERMIT REVIEW
NOT FOR CONSTRUCTION

OWNER:
Saint Michaels College
1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

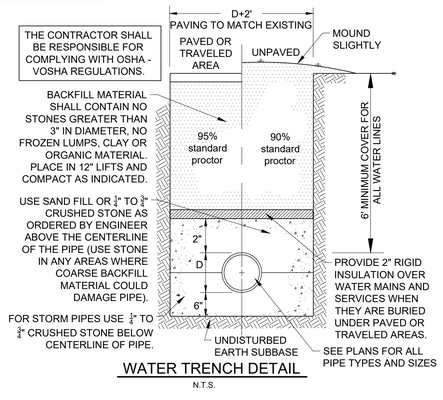
STAMP:

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Changes for State SW Application	10/28/21
2.	Changes for State WW Application	12/17/21

DRAWING TITLE:
DETAILS

DATE ISSUED: 08/06/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 20'
DRAWING NO.: C-2.00
REV. NO.: 2

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg



WATER TRENCH DETAIL

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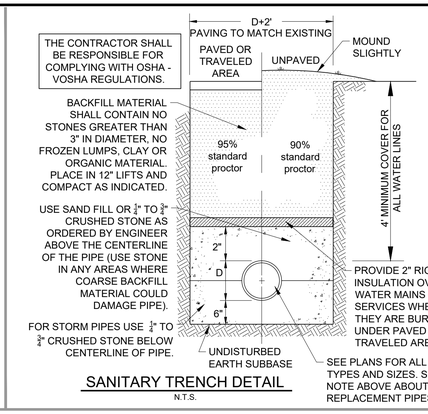


SANITARY TRENCH DETAIL

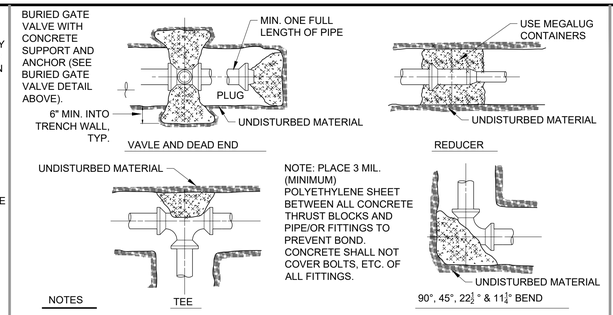
N.T.S.

SEWER LINE REPLACEMENT NOTES

1. EXISTING SEWER CONNECTIONS TO BUILDINGS WERE VIDEO INSPECTED BY P&P SEPTIC SERVICES LATE OCTOBER 2021. ALL PIPES WERE FOUND TO BE IN FAIR CONDITION.
2. EXISTING PIPE SIZE, TYPE AND SLOPE ARE NOT KNOWN AT THIS TIME BUT ASSUMED TO BE 6 INCHES IN DIAMETER.
3. IF PROJECT OWNER DECIDES TO REPLACE THE EXISTING SEWER CONNECTION TO THE BUILDINGS, ALL PIPES AND PIPE CONNECTIONS WILL BE PVC SDR 35 OR APPROVED EQUAL. PIPE SIZE WILL BE DEPENDENT ON EXISTING SLOPES AND WILL FOLLOW THE MINIMUM SLOPE TABLE BELOW. PIPE SIZE WILL NOT BE LESS THAN 6 INCHES IN DIAMETER.

PIPE SIZE AND MINIMUM SLOPE TABLE

PIPE SIZE (IN.)	SLOPE (FT./100 FT.)
6	0.60
8	0.40



NOTES

1. A THRUST BLOCK SHALL BE INSTALLED AT ALL WATER MAIN BENDS, REDUCERS, END CAPS AND TEES.
2. PRECAST THRUST BLOCKS ARE NOT ACCEPTABLE.
3. REDI-MIX CONCRETE (2,500 PSI MIN) MUST BE USED FOR THRUST BLOCKS. SACRETE IS NOT ACCEPTABLE.
4.
5. USE EBAA MEGA-LUG, SIGMA, OR EQUAL, WEDGE-ACTION MECHANICAL JOINT RESTRAINTS WITH TWIST OFF NUTS AT ALL FITTINGS.

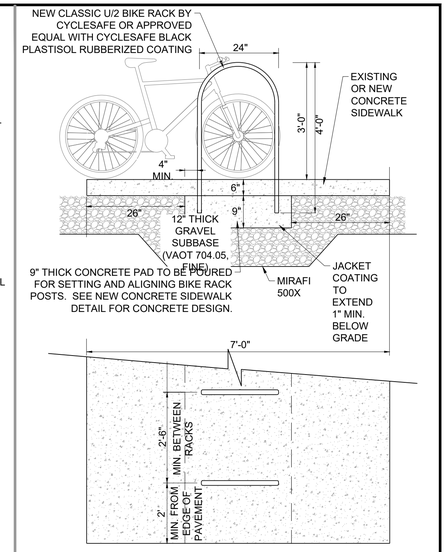
Minimum Area of Bearing Surface of Concrete Thrust Block (in square feet)

3"				4"				6"				8"				12"				SOIL CONDITION	SAFE BEARING LOAD(PSF)
ENDS & TEES	VALV 90° ELB.	REDU 45° ELB.	22.5° ELB.	ENDS & TEES	VALV 90° ELB.	REDU 45° ELB.	22.5° ELB.	ENDS & TEES	VALV 90° ELB.	REDU 45° ELB.	22.5° ELB.	ENDS & TEES	VALV 90° ELB.	REDU 45° ELB.	22.5° ELB.	ENDS & TEES	VALV 90° ELB.	REDU 45° ELB.	22.5° ELB.		
0.5	0.5	0.5	0.5	0.5	1.0	0.5	0.5	1.0	1.5	1.0	0.5	2.0	2.5	1.5	1.0	4.0	5.5	3.0	1.5	Sound shale	10,000
1.0	1.0	1.0	0.5	1.5	2.0	1.0	0.5	3.0	4.0	2.0	1.0	4.5	6.5	3.5	2.0	10.0	14.0	7.5	4.0	Cemented gravel & sand	4,000
1.0	1.0	1.0	0.5	2.0	0.5	1.5	1.0	3.5	5.0	3.0	1.5	6.0	8.5	5.0	2.5	13.0	18.5	10.0	5.0	Coarse & fine compact sand	3,000
1.5	2.5	1.5	1.0	2.5	3.5	2.0	1.0	5.5	7.5	4.0	2.0	9.0	13.0	7.0	3.5	20.0	27.5	15.0	8.0	Medium clay (can be spaded)	2,000
3.0	4.5	2.5	1.5	5.0	7.0	4.0	2.0	10.5	15.0	8.0	4.0	18.0	25.0	14.0	7.0	39.0	55.0	30.0	15.0	Soft clay	1,000

Maximum water pressure = 200 PSI (140,620 kg/m^2)

THRUST BLOCK DETAIL

N.T.S.



BIKE RACK DETAIL

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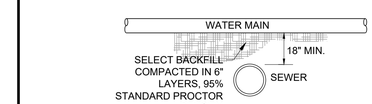


NOTES

1. THE LOCATION OF SEWER MAINS IN RELATION TO WATER MAINS SHALL BE IN ACCORDANCE WITH THE "RECOMMENDED STANDARDS FOR SEWAGE WORKS" SO-CALLED TEN STATE STANDARDS AND WATER SUPPLY RULES.
2. SEWERS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE. IF THIS DISTANCE CANNOT BE OBTAINED, THEN THE PIPES SHALL BE INSTALLED ACCORDING TO EPR, CHAPTER 1, APPENDIX 1A, 11A.
3. 18" SEPARATION SHALL BE MAINTAINED WHETHER WATER IS OVER OR UNDER SEWER. IF THIS DISTANCE CANNOT BE OBTAINED, THEN THE PIPES SHALL BE INSTALLED ACCORDING TO EPR CHAPTER 1, 11B.

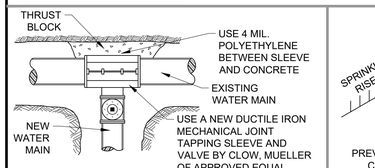
CROSSINGS

SEWERS CROSSING WATER MAINS SHALL BE LAID BENEATH THE WATER MAIN WITH AT LEAST 18 INCHES VERTICAL CLEARANCE BETWEEN THE OUTSIDE OF THE SEWER AND THE OUTSIDE OF THE WATER MAIN. WHEN IT IS POSSIBLE TO MAINTAIN THE 18" VERTICAL SEPARATION:

1. THE CROSSING SHALL BE ARRANGED SO THAT ONE FULL LENGTH OF SEWER IS CENTERED ABOVE OR BELOW THE WATER LINE WITH SEWER JOINTS AS FAR AS POSSIBLE FROM WATER JOINTS;
2. THE SEWER PIPE MUST BE CONSTRUCTED TO WATER MAIN STANDARDS FOR A MINIMUM DISTANCE OF 20 FEET EITHER SIDE OF THE CROSSING OR A TOTAL OF THREE PIPE LENGTHS, WHICHEVER IS GREATER;
3. THE SECTION CONSTRUCTED TO WATER STANDARDS MUST BE PRESSURE TESTED TO MAINTAIN 50 PSI FOR 15 MINUTES WITHOUT LEAKAGE PRIOR TO BACKFILLING BEYOND ONE FOOT ABOVE THE PIPE TO ASSURE WATER TIGHTNESS;
4. WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO PREVENT DAMAGE TO THE WATER MAIN.

WATER AND SEWER CROSSINGS DETAIL

N.T.S.

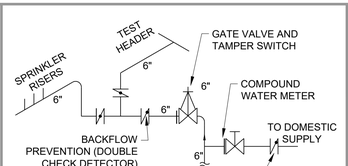


NOTES

1. WET TAP SHALL BE INSTALLED BY PERSONS APPROVED BY THE LOCAL MUNICIPALITY AND CHAMPLAIN WATER DISTRICT.
2. PRIOR TO TAPPING THE MAIN A 200 PSI HYDROSTATIC TEST SHALL BE PERFORMED ON THE VALVE AND SLEEVE ASSEMBLY. THE TEST PRESSURE SHALL BE MAINTAINED FOR AN ADEQUATE AMOUNT OF TIME TO ENSURE NO LEAKAGE AT THE TAPPING SLEEVE ASSEMBLY.

TYPICAL TAPPING SLEEVE AND VALVE

N.T.S.



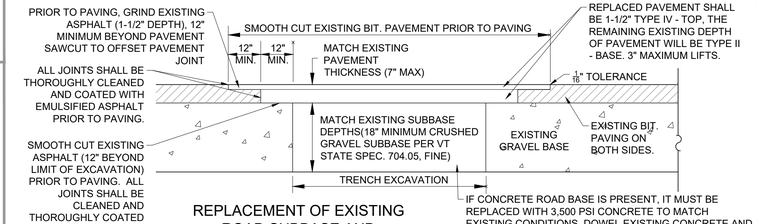
SEE MECHANICAL DRAWINGS FOR COMPLETE DESIGN AND DETAILS OF SPRINKLER SYSTEM, DOMESTIC WATER MUST BE ISOLATED FROM SPRINKLER SYSTEM WITH WATTS SERIES 709DCDA (DOUBLE CHECK DETECTOR ASSEMBLY) OR APPROVED EQUAL.

BACKFLOW PREVENTER SCHEMATIC

N.T.S.

PAVEMENT MARKING NOTES

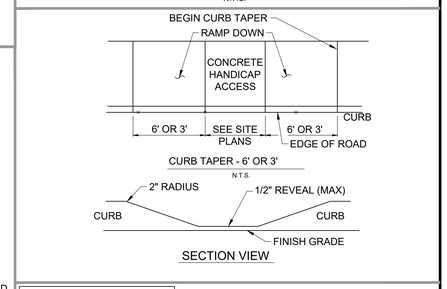
1. TYPICAL CITY OF SOUTH BURLINGTON PARKING SPACE IS 9'-0" CENTER OF LINE TO CENTER OF LINE MARKED WITH 4" WIDE YELLOW OR WHITE PAINT.
2. ADA SPACE IS YELLOW/WHITE STENCIL, YELLOW/WHITE TRIM. COORDINATE EXACT REQUIREMENTS WITH CITY OF SOUTH BURLINGTON.
3. PAINT FOR PAVEMENT MARKINGS SHALL BE HYDROPHAST WATERBORNE TRAFFIC PAINT BY FRANKLIN PAINT COMPANY. IT SHALL BE REFLECTIVE, VOC COMPLIANT FAST DRYING, 100% ACRYLIC WATERBORNE TRAFFIC PAINT. PAINT FOR STOP BARS AND CROSSWALKS SHALL BE WHITE ALL OTHER LINE STRIPING SHALL BE YELLOW. CONFIRM PAINT COLOR WITH CITY OF SOUTH BURLINGTON AND OWNER.
4. TRAFFIC PAINT SHALL BE APPLIED WITH A UNIFORM THICKNESS AND AT A RATE SUCH THAT NO PAVEMENT IS VISIBLE AFTER DRYING. ADDITIONAL PAINT APPLICATION WILL BE REQUIRED IF UNDERLYING PAVEMENT IS VISIBLE.



REPLACEMENT OF EXISTING ROAD SUBBASE AND BITUMINOUS PAVEMENT

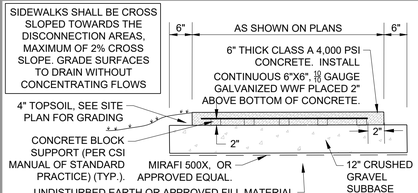
NOTES

1. SET UP AND MAINTAIN SIGNS AND OTHER SAFETY CONTROL DEVICES.
2. RESHAPE HOLE PATCH AREA BY CUTTING WITH A CONCRETE SAW INTO SQUARE OR RECTANGULAR SHAPE AND CUT SIDE FACED VERTICALLY. RESHAPE DOWNWARD SOLID MATERIAL AND AROUND HOLE TO SOUND PAVEMENT.
3. BACKFILL TRENCH IN 6" LIFTS AND COMPACT EACH TO 95% OF MAXIMUM DENSITY OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698 STANDARD PROCTOR.
4. REMOVE ALL LOOSE MATERIAL AND THOROUGHLY SWEEP THE HOLE AREA, CLEAN ANY MUD AND STANDING WATER.
5. APPLY LIQUID ASPHALT TRACK TO VERTICAL FACES IN UNIFORM MANNER. DO NOT PUDDLE TRACK COAT ON BOTTOM HOLE.
6. FILL TOP OF HOLE WITH TYPE IV BITUMINOUS CONCRETE AND COMPACT IN LIFTS NO MORE THAN 2' THICK. EACH LIFT SHOULD BE THOROUGHLY COMPACTED WITH A VIBRATORY PLAT COMPACTOR OR A PORTABLE ROLLER. EXPERIENCE HAS SHOWN THAT 15 TO 20 PASSES WITH THE VIBRATORY ROLLER AND MIX TEMPERATURE ABOVE 250°F (121°C) ARE NECESSARY TO ENSURE GOOD COMPACTION. HAND TAMP SHOULD ONLY BE USED FOR SMALL AREAS LESS THAN 1 S.F.
7. CLEAN UP AREA. DO NOT LEAVE EXCESS FILL OR EXCAVATED MATERIAL ON THE PAVEMENT. REMOVE SAFETY SIGNS.



SECTION VIEW

SIDEWALKS SHALL BE CROSS SLOPED TOWARDS THE DISCONNECTION AREAS, MAXIMUM OF 2% CROSS SLOPE. GRADE SURFACES TO DRAIN WITHOUT CONCENTRATING FLOWS



NEW MULTI-USE CONCRETE SIDEWALK DETAIL

N.T.S.

FOR CONCRETE WALKS 6 FEET WIDE OR LESS

NOTES FOR CONCRETE

1. BROOM FINISH CONCRETE. CONSTRUCTION JOINTS SHALL BE SPACED MAXIMUM 24' IN ALL DIRECTIONS. SAWCUT CONTROL JOINTS 1¼" DEPTH AT INTERVALS EQUAL TO WIDTH OF SIDEWALK.
2. APPLY SPECCHEM CURE SHIELD, CURE & SEAL AGENT TO ALL CONCRETE SURFACES IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
3. CONCRETE CONSTRUCTION AND CURING SHALL CONFORM TO SECTION 618.03 OF THE CURRENT VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
4. CONCRETE MAY NOT BE POURED IF FROST IS PRESENT OR THAWING IN THE SUBGRADE, IF THE TEMPERATURE IS 40° F OR LESS, OR DURING UNSEASONABLE WEATHER CONDITIONS.
5. ALL CONCRETE USED IN THE CONSTRUCTION OF MULTI-USE CONCRETE SHALL BE MADE WITH PORTLAND CEMENT. THE CONCRETE SHALL MEET SECTION 541 OF THE STATE OF VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION, HAVE 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI, AND MEET THE FOLLOWING MIX DESIGN.

MAX. WATER-CEMENT RATIO (LB./LB.)	0.44
MIN. CEMENT FACTOR (LBS/C.Y.)	660
ENTRAINED AIR CONTENT (%)	5 - 7
SLUMP (INCHES, BEFORE ADDING HRWR)	2 - 4

   USE AIR ENTRAINED AGENT CONFORMING TO ASTM C260 WITH 5-7% TOTAL AIR. USE HIGH RANGE WATER REDUCING AGENT CONFORMING TO ASTM C494 IN ALL CONCRETE.

6. CONTRACTOR SHALL POUR AND FINISH ONE SAMPLE PANEL FOR APPROVAL BY OWNER AND ENGINEER. ALL CONCRETE SHALL MATCH THE QUALITY AND APPEARANCE OF THE SAMPLE PANEL. ANY CONCRETE THAT DOES NOT MEET THE STANDARD SHALL BE REMOVED AND REPLACED AT NO COST TO THE OWNER.
7. CONCRETE SHALL BE INSTALLED IN ALTERNATING POURS AT CONSTRUCTION JOINTS. REFER TO CONCRETE CONSTRUCTION JOINT/CONTROL JOINT DETAIL
8. OWNER AND/OR CONTRACTOR IS NOT ALLOWED TO PLACE DEICING MATERIAL ON NEWLY POURED CONCRETE SIDEWALK FOR A PERIOD OF 6 MONTHS.

FIRE SERVICE MAIN

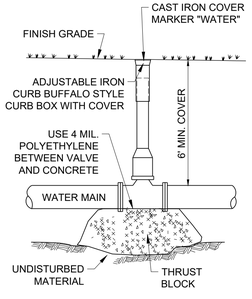
UNDERGROUND PIPING, FROM THE WATER SUPPLY TO THE SYSTEM RISER, AND LEAD-IN CONNECTIONS TO THE SYSTEM RISER SHALL BE COMPLETELY FLUSHED BEFORE THE CONNECTION IS MADE TO DOWNSTREAM FIRE PROTECTION SYSTEM PIPING. ACCEPTABLE WATER MAIN FLUSHING REQUIREMENTS ARE PROVIDED BELOW. PRIOR TO FLUSHING, THE CONTRACTOR SHALL CONTACT THE OWNER, MUNICIPAL FIRE DEPARTMENT, THE DISTRICT WATER SUPPLY COMPANY, AND THE ENGINEER. THE FLUSHING OPERATION SHALL BE CONTINUED FOR A SUFFICIENT TIME TO ENSURE THOROUGH CLEANING. THE MINIMUM RATE OF FLOW SHALL BE NOT LESS THAN ONE OF THE FOLLOWING:

1. HYDRAULICALLY CALCULATED WATER DEMAND FLOW RATE OF THE SYSTEM, INCLUDING ANY HOSE REQUIREMENTS. (PROVIDED BY THE MECHANICAL/SPRINKLER CONSULTANT)
2. FLOW NECESSARY TO PROVIDE A VELOCITY OF 10 FT/SEC (3.1 M/SEC) IN ACCORDANCE WITH THE TABLE.
3. MAXIMUM FLOW RATE AVAILABLE TO THE SYSTEM UNDER FIRE CONDITIONS. FLOW REQUIRED TO PRODUCE A VELOCITY OF 10 FT/SEC (3 M/S) IN PIPES

Pipe Size in.	mm	Flow Rate gpm	L/min
4	102	390	1,476
6	152	880	3,331
8	203	1,560	5,905
10	254	2,440	9,235
12	305	3,520	13,323

NOTES

1. THE CONTRACTOR SHALL CONFIRM ALL VALVE SPECIFICATIONS WITH THE MUNICIPALITY PUBLIC WORKS BEFORE ORDERING.
2. GATE VALVES SHALL BE MEET ALL REQUIREMENTS OF A.W.W.A. C509 AND C515 STANDARDS (LATEST EDITION). VALVES WITH MECHANICAL JOINTS OF SIZES AS REQUIRED ON THE PLANS.
3. ALL VALVES SHALL BE OF CAST OR DUCTILE IRON BODY AND SHALL BE COATED WITH FUSION BONDED EPOXY COMPLYING WITH AWWA C-550 AND BE NSF 61 APPROVED. VALVE SHALL HAVE MANUFACTURER'S NAME, PRESSURE RATING, AND MANUFACTURE DATE CAST ON THE BODY.
4. ALL VALVES SHALL INCLUDE NON-RISING STEM, HIGH STRENGTH BRONZE STEM AND NUT, 100% COATED WEDGE, "O" RING STEM SEALS ABOVE AND BELOW THE THRUST COLLAR, A 2" SQUARE OPERATING NUT, MECHANICAL JOINT ENDS, AND CORROSION RESISTANT STAINLESS STEEL BODY BOLTS AND NUTS.
5. CHECK WITH THE MUNICIPALITY FOR OPENING AND CLOSING ROTATIONS AND MINIMUM WORKING PRESSURE.
6. VALVES SHALL BE EQUIPPED WITH A TWO PIECE, SLIDING TYPE CAST IRON VALVE BOX FOR A MINIMUM 6 FT. OF COVER MATERIAL.



TYPICAL GATE VALVE

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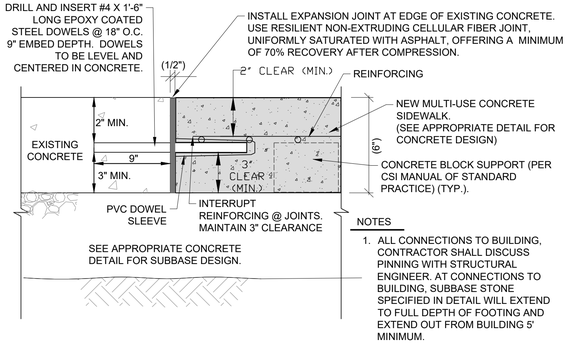

NOTES

1. ALL CONNECTIONS TO BUILDING, CONTRACTOR SHALL DISCUSS PINNING WITH STRUCTURAL ENGINEER. AT CONNECTIONS TO BUILDING, SUBBASE STONE SPECIFIED IN DETAIL WILL EXTEND TO FULL DEPTH OF FOOTING AND EXTEND OUT FROM BUILDING 5' MINIMUM.

CONSTRUCTION JOINT DETAIL FOR CONNECTION TO EXISTING CONCRETE

N.T.S.

CONTRACTOR TO USE THIS PINNING DETAIL TO PIN NEW CONCRETE TO EXISTING CONCRETE (WALK TO WALK, WALK TO BUILDINGS, ETC).

10TH CAVALRY APARTMENTS

Ethan Allen Avenue
Colchester, Vermont

KREBS & LANSING CONSULTING ENGINEERS
164 Main Street, Suite 201
Colchester, Vermont 05446
P: (802) 878-0375
www.krebsandlansing.com

ISSUED FOR PERMIT REVIEW
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OWNER:
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1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

STAMP:

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Changes for State SW Application	10/28/21
2.	Changes for State WW Application	12/17/21

DRAWING TITLE:

DETAILS

DATE ISSUED: 08/06/21
DRAWN BY: GTD
CHECKED BY: GTD
PROJECT NO.: 20328
SCALE: 1" = 20'
DRAWING NO.: C-2.01
REV. NO.: 2

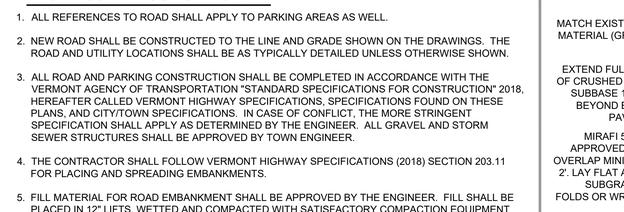
DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg

ROAD CONSTRUCTION NOTES

1. ALL REFERENCES TO ROAD SHALL APPLY TO PARKING AREAS AS WELL.
2. NEW ROAD SHALL BE CONSTRUCTED TO THE LINE AND GRADE SHOWN ON THE DRAWINGS. THE ROAD AND UTILITY LOCATIONS SHALL BE AS TYPICALLY DETAILED UNLESS OTHERWISE SHOWN.
3. ALL ROAD AND PARKING CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE VERMONT AGENCY OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" 2018, HEREAFTER CALLED VERMONT HIGHWAY SPECIFICATIONS. SPECIFICATIONS FOUND ON THESE PLANS, AND CITY/TOWN SPECIFICATIONS. IN CASE OF CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY AS DETERMINED BY THE ENGINEER. ALL GRAVEL AND STORM SEWER STRUCTURES SHALL BE APPROVED BY TOWN ENGINEER.
4. THE CONTRACTOR SHALL FOLLOW VERMONT HIGHWAY SPECIFICATIONS (2018) SECTION 203.11 FOR PLACING AND SPREADING EMBANKMENTS.
5. FILL MATERIAL FOR ROAD EMBANKMENT SHALL BE APPROVED BY THE ENGINEER. FILL SHALL BE PLACED IN 12" LIFTS, WETTED AND COMPACTED WITH SATISFACTORY COMPACTION EQUIPMENT TO 95% OF MAXIMUM DENSITY (STANDARD PROCTOR).
6. ROAD IN FILL SECTIONS SHALL BE PLACED AND COMPACTED A MINIMUM OF 3 FEET ABOVE TOP OF ANY UTILITY TO BE INSTALLED BEFORE TRENCH IS EXCAVATED FOR PIPE PLACEMENT. IN TRENCHES AND CUT SECTIONS, THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SHEETING, SHORING AND BRACING TO MAINTAIN COMPLIANCE WITH ALL OSHA/VOSHA REGULATIONS.
7. METHODS FOR CONSTRUCTION OF SUBGRADE SHALL CONFORM TO VERMONT HIGHWAY SPECIFICATIONS (2018) 203.12 OR AS DETERMINED BY THE ENGINEER.
8. ANY SUBGRADE OR SUBBASE DISTURBED BY CONTRACTOR, OR RENDERED UNSUITABLE BY CONSTRUCTION MACHINERY, SHALL BE REMOVED AND REPLACED WITH APPROVED GRANULAR BACKFILL AT THE CONTRACTOR'S EXPENSE. THE SUBGRADE SHALL BE COMPACTED TO ATTAIN AT LEAST 95% OF THE MAXIMUM DENSITY (STANDARD PROCTOR) BEFORE PLACING ROAD OR EMBANKMENT MATERIALS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF COMPACTION IN THE ROAD AND UTILITY TRENCHES.
10. SAND FILL SHALL CONFORM TO VERMONT HIGHWAY SPECIFICATIONS (2018) 703.03, TABLE 703.03A. GRANULAR BORROW SHALL CONFORM TO THE VERMONT HIGHWAY SPECIFICATIONS 703.04 GRANULAR BORROW, TABLE 703.04A.
11. GRAVEL SUBBASE FOR PAVEMENT SHALL CONFORM TO VERMONT HIGHWAY SPECIFICATIONS (2018) 704.05, TABLE 704.05A, COARSE.
12. LEVELING COURSE SHALL CONFORM TO VERMONT HIGHWAY SPECIFICATIONS (2018) 704.05, TABLE 704.05A, FINE. SHOULDERS SHALL CONFORM TO SECTION 704.12, AGGREGATE FOR SHOULDERS.
13. BITUMINOUS CONCRETE PAVEMENT SHALL CONFORM TO VERMONT HIGHWAY SPECIFICATIONS (2018) SECTION 404 AND 406. BINDER COURSE SHALL BE TYPE II, AND FINISH WEARING COURSE SHALL BE TYPE III OR IV. BASE COURSE PAVING TO BE PLACED FIRST YEAR, SURFACE COURSE TO BE PLACED THE SECOND OR THIRD YEAR, DETERMINED BY THE ENGINEER.
14. EMBANKMENT FILL FOR ROAD AND PARKING SHALL BE A SIEVE SPECIFICATION AS FOLLOWS:

SIEVE	% FINER
4"	100
2"	85-100
#4	60-100
#200	12 MAXIMUM

15. IF PROOF ROLL FAILS, CONTRACTOR SHALL REMOVE THE SITE SOIL AND REPLACE IT WITH SAND WITH THE ABOVE SPEC. UNTIL A PROOF ROLE CAN BE PLACED WITHOUT FAILING. ENGINEER WILL JUDGE PASS/FAILURE OF PROOF ROLE, THIS WILL BE PERFORMED WITHOUT FURTHER COSTS TO THE OWNER.



NEW MULTI-USE CONCRETE SIDEWALK DETAIL

N.T.S.

TO BE USED FOR CONCRETE SIDEWALK THAT IS NOT HEAVY DUTY AND THAT IS WIDER THAN 6'.

SIDEWALKS SHALL BE CROSS SLOPED TOWARDS THE DISCONNECTION AREAS, MAXIMUM OF 2% CROSS SLOPE. GRADE SURFACES TO DRAIN WITHOUT CONCENTRATING FLOWS

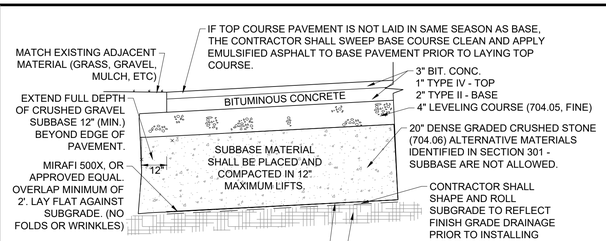
NOTES FOR CONCRETE

1. BROOM FINISH CONCRETE. CONSTRUCTION JOINTS SHALL BE SPACED MAXIMUM 24' IN ALL DIRECTIONS. SAWCUT CONTROL JOINTS 1½" DEPTH AT INTERVALS EQUAL TO WIDTH OF SIDEWALK.
2. CONCRETE SHALL BE WET CURED FOR A MINIMUM OF 7 DAYS WITH WATER AND HYDRACURE S16, OR APPROVED EQUAL, WET CURING COVERS. CURING COVER NEEDS TO BE "SECURED" TO PREVENT TRIPPING HAZARD BY PEDESTRIAN USE.
3. APPLY 2 COATS OF CHEMSTOP WB SILOXANE/SILANE WATER REPELLANT TO ALL CONCRETE SURFACES, PER THE MANUFACTURER'S SPECIFICATIONS. PRODUCT SHALL BE APPLIED AFTER 7 DAY CURING IS COMPLETE.
4. CONCRETE CONSTRUCTION AND CURING SHALL CONFORM TO SECTION 618.03 OF THE CURRENT VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
5. CONCRETE MAY NOT BE POURED IF FROST IS PRESENT OR THAWING IN THE SUBGRADE, IF THE TEMPERATURE IS 40° F OR LESS, OR DURING UNSEASONABLE WEATHER CONDITIONS.
6. ALL CONCRETE USED IN THE CONSTRUCTION OF MULTI-USE CONCRETE SHALL BE MADE WITH PORTLAND CEMENT. THE CONCRETE SHALL MEET SECTION 541 OF THE STATE OF VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION, HAVE 28 DAY COMPRESSIVE STRENGTH OF 5,000 PSI, AND MEET THE FOLLOWING MIX DESIGN.

MAX. WATER-CEMENT RATIO (LB./LB.)	0.44
MIN. CEMENT FACTOR (LBS/C.Y.)	705
ENTRAINED AIR CONTENT (%)	5 - 7
SLUMP (INCHES, BEFORE ADDING HRWR)	2 - 4

   USE AIR ENTRAINED AGENT CONFORMING TO ASTM C260 WITH 5-7% TOTAL AIR. USE HIGH RANGE WATER REDUCING AGENT CONFORMING TO ASTM C494 IN ALL CONCRETE.

7. CONTRACTOR SHALL POUR AND FINISH ONE SAMPLE PANEL FOR APPROVAL BY OWNER AND ENGINEER. ALL CONCRETE SHALL MATCH THE QUALITY AND APPEARANCE OF THE SAMPLE PANEL. ANY CONCRETE THAT DOES NOT MEET THE STANDARD SHALL BE REMOVED AND REPLACED AT NO COST TO THE OWNER.
8. CONCRETE SHALL BE INSTALLED IN ALTERNATING POURS AT CONSTRUCTION JOINTS. REFER TO CONCRETE CONSTRUCTION JOINT/CONTROL JOINT DETAIL
9. OWNER AND/OR CONTRACTOR IS NOT ALLOWED TO PLACE DEICING MATERIAL ON NEWLY PORED CONCRETE SIDEWALK FOR A PERIOD OF 6 MONTHS.



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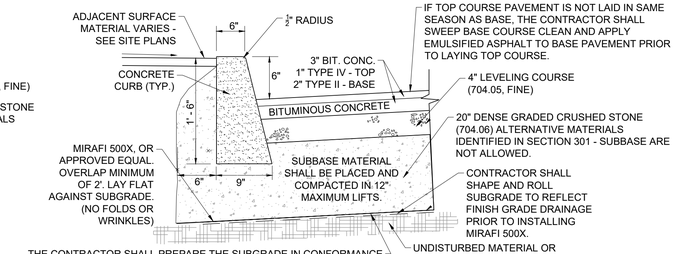


N.T.S.

GRAVEL NOTES

1. THE CONTRACTOR TO TAKE SIEVE ANALYSIS OF GRAVEL AS SOON IT ARRIVES ON SITE.
2. TRAVEL OVER GRAVEL WITH ANY VEHICLE TRACKING SOIL PRIOR TO PLACEMENT OF PAVEMENT IS PROHIBITED.
3. IF GRAVEL IS CONTAMINATED AFTER PLACEMENT, THE SITE CONTRACTOR SHALL BE RESPONSIBLE REMOVAL OF ALL CONTAMINATED GRAVEL AND PAYING FOR ALL RECOMMENDED SIEVE ANALYSIS AS DETERMINED BY THE ENGINEER.

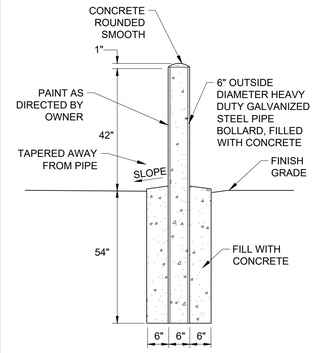
CONTRACTOR SHALL MATCH EXISTING SUBBASE AND PAVEMENT DEPTHS. COORDINATE WITH THE TOWN OF COLCHESTER.

NOTES FOR CONCRETE CURB

1. BROOM FINISH CONCRETE, ALL JOINTS TO BE TOOL FINISHED, EXPANSION/CONTRACTION JOINTS EVERY 20' WITH 1/2" JOINT FILLER, SCORE 1/3 TOTAL DEPTH AT 10' INTERVALS
2. APPLY 2 COATS OF EUCLID EVERCLEAR VOX CURE/SEAL COMPOUND TO ALL CONCRETE SURFACES, PER THE MANUFACTURER'S SPECIFICATIONS.
3. CONCRETE MAY NOT BE POURED IF FROST IS PRESENT OR THAWING IN THE SUBGRADE, IF THE TEMPERATURE IS 40° F OR LESS, OR DURING UNSEASONABLE WEATHER CONDITIONS.
4. CONCRETE CURB RADII LESS THAN 200 FT SHALL BE FORMED WITH FLEXIBLE FORMS. ALL CONCRETE USED IN THE CONSTRUCTION OF CONCRETE CURB SHALL BE AIR ENTRAINED AND MADE WITH PORTLAND CEMENT. THE CONCRETE SHALL MEET SECTION 541 OF THE STATE OF VERMONT STANDARD SPECIFICATION FOR CLASS A CONCRETE AND HAVE 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
5. JOINT FILLER SHALL BE RESILIENT NON-EXTRUDING CELLULAR FIBER JOINT, UNIFORMLY SATURATED WITH ASPHALT, OFFERING A MINIMUM OF 70% RECOVERY AFTER COMPRESSION.
6. THE ENGINEER SHALL BE CONTACTED AT LEAST 24 HOURS PRIOR TO FORMING CONCRETE CURB TO REVIEW LAYOUT.

TYPICAL ROAD CROSS SECTION DETAILS - WITH CONCRETE CURBS AND WITHOUT CURBS

N.T.S.



PIPE BOLLARD DETAIL

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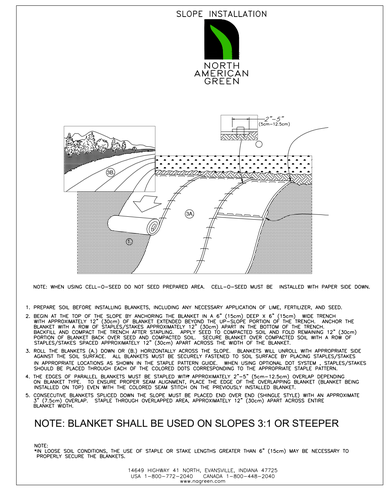


EROSION CONTROL BLANKET

NORTH AMERICAN GREEN S75BN

MATERIAL SPECIFICATIONS:

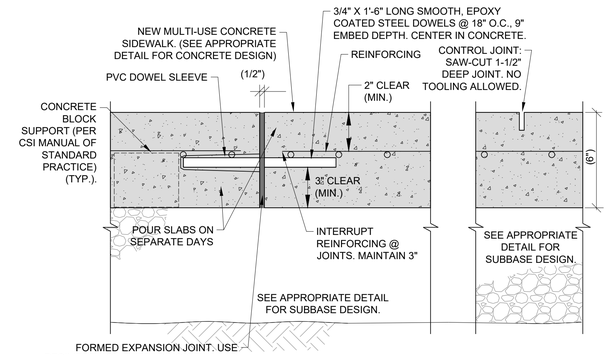
- EROSION CONTROL BLANKET SHALL BE A MACHINE-PRODUCED MAT OF 100% AGRICULTURAL STRAW.
- THE BLANKET SHALL BE OF CONSISTENT THICKNESS WITH THE STRAW EVENLY DISTRIBUTED OVER THE ENTIRE AREA OF THE MAT. THE BLANKET SHALL BE COVERED ON THE TOP SIDE WITH 100% BIODEGRADABLE WOVEN NATURAL ORGANIC FIBER NETTING HAVING AN APPROXIMATE 1/2" X 1" MESH AND BE SEWN TOGETHER WITH BIODEGRADABLE THREAD.
- STRAW EROSION CONTROL BLANKET SHALL BE S75BN AS MANUFACTURED BY NORTH AMERICAN GREEN, INC. (812-867-6632) OR EQUIVALENT. EROSION CONTROL BLANKET SHALL HAVE THE FOLLOWING PROPERTIES:

MATERIAL CONTENT:

- STRAW: 100% (0.50 lbs/sq.yd.)(0.27 kg/m^2)
- NETTING: ONE SIDE ONLY, LENO WOVEN 100% BIODEGRADABLE NATURAL ORGANIC FIBER (APPROX. WEIGHT 9.3 lbs./100 sq. ft.)
- THREAD: BIODEGRADABLE

PHYSICAL SPECIFICATIONS (ROLL):

- WIDTH: 6.67 feet (2.03 m)
- LENGTH: 108 feet (32.92 m)
- WEIGHT: 46.4 lbs. ± 10% (21.05 kg)
- AREA: 80 sq. yd. (50 m^2)



NEW CONCRETE CONSTRUCTION JOINT/CONTROL JOINT DETAIL

N.T.S.

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10TH CAVALRY APARTMENTS

Ethan Allen Avenue
Colchester, Vermont

KREBS & LANSING CONSULTING ENGINEERS
164 Main Street, Suite 201
Colchester, Vermont 05446
P: (802) 878-0375
www.krebsandlansing.com

ISSUED FOR PERMIT REVIEW
NOT FOR CONSTRUCTION

OWNER:
Saint Michaels College
1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

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REV. NO.	REVISIONS/COMMENTS	DATE
1.	Changes for State SW Application	10/28/21

DRAWING TITLE:
DETAILS

DATE ISSUED: 08/06/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: 1" = 20'
DRAWING NO.: C-2.02 REV. NO.: 1

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg

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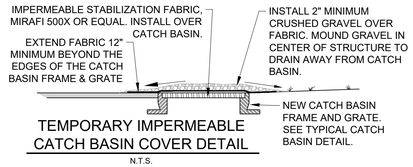

TEMPORARY IMPERMEABLE CATCH BASIN COVER DETAIL

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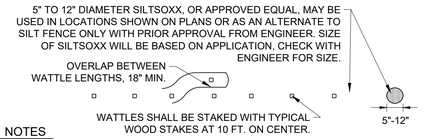


NOTES

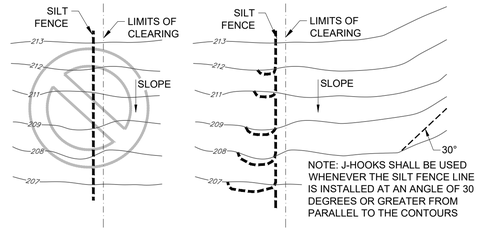
1. CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION, MAINTENANCE, AND REMOVAL OF SILTSOXX IN ALL LOCATIONS SHOWN ON PLANS. SILTSOXX MAY BE LEFT IN PLACE IF THE CONTRACTOR SEEDS AND MULCHES OVER SILTSOXX FOR GROWTH POST CONSTRUCTION.
2. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND ADDITIONAL WATTLES WILL BE ADDED WHEN SEDIMENT REACHES HALF OF PRODUCT HEIGHT.
3. WHEN INSTALLING LENGTHS OF SILTSOXX, LENGTHS WILL OVERLAP BY MINIMUM 18" WHEN TRANSITIONING TO A NEW LENGTH OF SILTSOXX.
4. CONTRACTOR SHALL REFER TO ALL MANUFACTURES SPECIFICATIONS AND DETAILS.
5. SILTSOXX IS A SPECIFIC MANUFACTURER, OTHER MANUFACTURERS WITH EQUAL PRODUCTS MAY BE USED IF APPROVED BY ENGINEER.
6. SILTSOXX CAN BE USED AS A SILT FENCE ALTERNATIVE, WITH PRIOR APPROVAL OF THE ENGINEER.

TYPICAL SILTSOXX SEDIMENT CONTROL

N.T.S.

NOTES

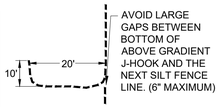
1. PROPER INSTALLATION OF J-HOOKS PROVIDES SILT FENCE THE ABILITY TO TEMPORARILY POND RUNOFF, ALLOWING TIME FOR SEDIMENTS TO SETTLE.
2. LONG RUNS OF SILT FENCE BETWEEN J-HOOKS SHOULD BE AVOIDED REFER TO ADJACENT TABLE FOR PROPER SPACING OF J-HOOKS.
3. J-HOOKS SHOULD BE BUILT ALONG CONTOUR IN A "SMILE" SHAPE WITH A MINIMUM WIDTH OF 20 FEET AND MINIMUM DEPTH OF 10 FEET.
4. ALONG A NARROW RIGHT OF WAY, NARROWER J-HOOKS CAN BE USED WITH A HIGHER SPACING FREQUENCY.



INCORRECT
SILT FENCE INSTALLED PARALLEL TO SLOPE (PERPENDICULAR TO CONTOUR) IN ONE, LONG RUN

CORRECT
SILT FENCE INSTALLED IN SHORTER RUNS WITH J-HOOKS TO AVOID CONCENTRATION OF FLOWS AT ONE LOCATION BY TRAPPING RUNOFF AT MULTIPLE POINTS ALONG A SLOPE.

SLOPE STEEPNESS	MAXIMUM SPACING BETWEEN SILT FENCE J-HOOKS (FT.)
2:1 SLOPE (50%)	25
3:1 SLOPE (33%)	50
4:1 SLOPE (25%)	75
5:1 SLOPE OR FLATTER (50%)	100



TYPICAL SILT FENCE "J-HOOK" CONSTRUCTION

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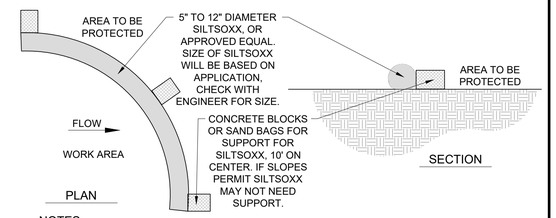
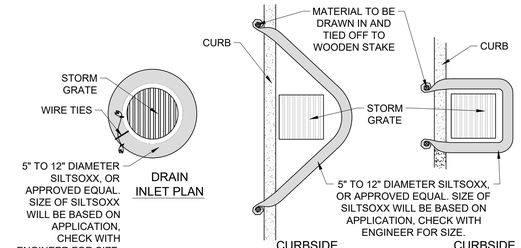


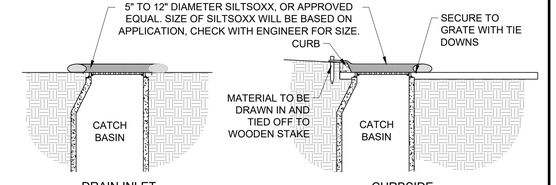
NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION, MAINTENANCE, AND REMOVAL OF SILTSOXX IN ALL LOCATIONS SHOWN ON THE PLANS.
2. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND ADDITIONAL SILTSOXX WILL BE ADDED WHEN SEDIMENT REACHES HALF OF PRODUCT HEIGHT.
3. WHEN INSTALLING LENGTHS OF SILTSOXX, LENGTHS WILL OVERLAP BY MINIMUM 2' WHEN TRANSITIONING TO A NEW LENGTH OF WATTLE.
4. CONTRACTOR SHALL REFER TO ALL MANUFACTURES SPECIFICATIONS AND DETAILS.
5. SILTSOXX IS A SPECIFIC MANUFACTURER, OTHER MANUFACTURERS WITH EQUAL PRODUCTS MAY BE USED IF APPROVED BY ENGINEER.

TYPICAL SILTSOXX INSTALLATION ON PAVEMENT

N.T.S.





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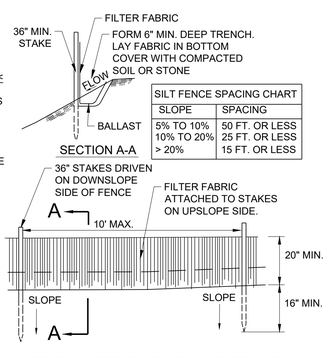
SILTSOXX INLET PROTECTION

N.T.S.

NOTES

1. AT A MINIMUM, EPSC MEASURES MEET VT DEC STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL OR PREVIOUSLY APPROVED INTERCHANGEABLE PRACTICES.
2. PERIMETER CONTROLS SHALL BE UTILIZED IN SMALL AREAS ≤ 1 ACRE. IN AREAS > 1 ACRE, TEMPORARY SEDIMENT TRAPS OR TEMPORARY SEDIMENT BASINS ARE TO BE UTILIZED.
3. PERIMETER CONTROLS SHALL BE INSTALLED ON DOWNSLOPE SIDE OF PLANNED EARTH DISTURBANCE.
4. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO ANY EARTH DISTURBING ACTIVITIES WITHIN UPSLOPE CONTRIBUTING AREA.
5. SILT FENCE SHALL NOT BE USED AS CONSTRUCTION DEMARCATION.
6. SILTSOXX CAN BE USED AS A SILT FENCE ALTERNATIVE, WITH PRIOR APPROVAL OF THE ENGINEER. SEE DETAIL.
7. IF SILT FENCE IS INSTALLED WHEN GROUND IS FROZEN, A GRAVEL, SHOT ROCK, OR SAND BALLAST MUST BE USED.



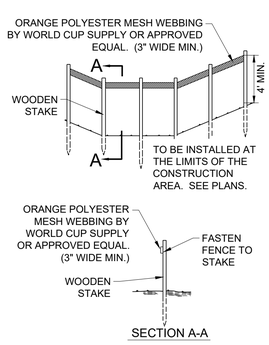
SILT FENCE SPACING CHART	
SLOPE	SPACING
5% TO 10%	50 FT. OR LESS
10% TO 20%	25 FT. OR LESS
> 20%	15 FT. OR LESS

TYPICALTEMPORARY SILT FENCE

N.T.S.

NOTES

1. ACCEPTABLE EPSC MEASURE DETAILS ARE PROVIDED BELOW.
2. AT A MINIMUM, EPSC MEASURES MEET VT DEC STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL OR PREVIOUSLY APPROVED INTERCHANGEABLE PRACTICES.
3. LIMITS OF DISTURBANCE (OR "CONSTRUCTION DEMARCATION") SHALL BE INSTALLED PRIOR TO ANY EARTH DISTURBING ACTIVITIES.
4. BARRIER TAPE/ROPE: FOR USE WHERE PROPOSED DISTURBANCE BORDERS NON-WOODED, VEGETATED AREAS MORE THAN 100 FT FROM THE NEAREST WATER RESOURCE (STREAM, BROOK, LAKE, POND, WETLAND, ETC.). BARRIER TAPE IS HIGH VISIBILITY FIBERGLASS TAPE, MINIMUM 3" IN WIDTH COMMONLY USED IN SKI AREAS FOR DEMARCATING CLOSED AREAS. BARRIER TAPE AND ROPE SHOULD BE ATTACHED TO STAKES, AT A MINIMUM HEIGHT OF 4 FT FROM THE GROUND.
5. MINIMUM 1 TO 2 ROWS OF MESH BARRIER TAPE TO BE INSTALLED ALONG CONSTRUCTION PERIMETER.
6. EACH ROW OF BARRIER TAPE TO BE 3" WIDE MINIMUM.
7. BARRIER TAPE TO BE ORANGE.
8. SECURE BARRIER TAPE TO STAKES OR EXISTING TREE TRUNKS WITH BOTTOM ROW AT 4' DISTANCE FROM GROUND SURFACE (MINIMUM).
9. MAINTAIN AND REPLACE AS NEEDED. REMOVE AT COMPLETION OF PROJECT PER OSPC.
10. IN EVENT THE OSPC DETERMINES BARRIER TAPE IS NOT SUFFICIENT, REPLACE WITH ORANGE CONSTRUCTION FENCE OR SNOW FENCE.



TYPICAL CONSTRUCTION LIMIT BARRIER

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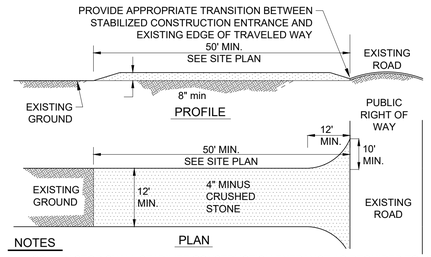


NOTES

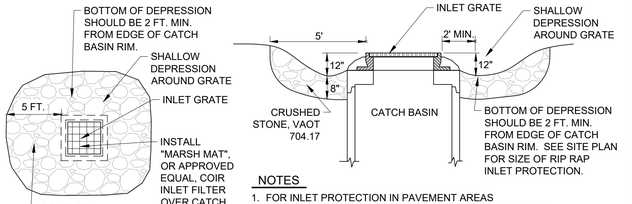
1. CONTRACTOR SHALL STABILIZE CONSTRUCTION ENTRANCE AS REQUIRED TO PREVENT TRACKING OF SEDIMENT OFF-SITE.
2. CONTRACTOR TO USE MIRAFI 500X UNDER STONE FOR TEMPORARY CONSTRUCTION ROADS.
3. CRUSHED STONE SHALL BE ADDED OR REPLACED WHEN 80% OF THE VOIDS ARE FILLED WITH SEDIMENT.
4. STONE SIZE SHALL BE 1-4".
5. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES IS ALLOWED.

STABILIZED CONSTRUCTION ENTRANCE

N.T.S.

GUIDE TO MULCH MATERIALS, RATES, AND USES

	QUALITY STANDARDS	PER 1000 SQ. FT.	PER ACRE	DEPTH OF APPLICATION	REMARKS
WOOD CHIPS OR SHAVINGS	AIR-DRIED. FREE OF OBJECTIONABLE COARSE MATERIAL	500-900 LBS	10-20 TONS	2 - 7"	USED PRIMARILY AROUND SHRUB AND TREE PLANTINGS AND RECREATION TRAILS TO INHIBIT WEED COMPETITION. RESISTANT TO WIND BLOWING. DECOMPOSES SLOWLY.
WOOD FIBER CELLULOSE (PARTLY DIGESTED WOOD FIBERS)	MADE FROM NATURAL WOOD USUALLY WITH GREEN DYE AND DISPERSING AGENT	50 LBS	2,000 LBS.	-	APPLY WITH HYDROMULCHER. NO TIE DOWN REQUIRED. LESS EROSION CONTROL PROVIDED THAN 2 TONS OF HAY OR STRAW.
GRAVEL, CRUSHED STONE OR SLAG	WASHED; SIZE 2B OR 3A - 1½"	9 CU. YDS.	405 CU. YDS.	3"	EXCELLENT MULCH FOR SHORT SLOPES AND AROUND PLANTS AND ORNAMENTALS. USE 2B WHERE SUBJECT TO TRAFFIC. (APPROXIMATELY 2,000 LBS./CU. YD.). FREQUENTLY USED OVER FILTER FABRIC FOR BETTER WEED CONTROL.
HAY OR STRAW	AIR-DRIED; FREE OF UNDESIRABLE SEEDS & COARSE MATERIALS	90-100 LBS 2-3 BALES	2 TONS (100-120 BALES)	COVER ABOUT 90% SURFACE	USE SMALL GRAIN STRAW WHERE MULCH IS MAINTAINED FOR MORE THAN THREE MONTHS. SUBJECT TO WIND BLOWING UNLESS ANCHORED. MOST COMMONLY USED MULCHING MATERIAL. PROVIDES THE BEST MICRO-ENVIRONMENTAL FOR GERMINATING SEEDS.
COMPOST	UP TO 3" PIECES, MODERATELY TO HIGHLY STABLE	3-9 CU. YDS.	134-402 CU. YDS.	1 - 3"	COARSER TEXTURED MULCHES MAY BE MORE EFFECTIVE IN REDUCING WEED GROWTH AND WIND EROSION.
EROSION CONTROL MIX	WELL-GRADED MIXTURE OF PARTICLE SIZES. ORGANIC CONTENT BETWEEN 80-100%, DRY WEIGHT. PARTICLE SIZE SHALL PASS 6" SCREEN (100%)	* SLOPES 3(HZ.):1(VERT.) OR FLATTER = 2 INCH DEPTH PLUS ADDITIONAL 1/2 INCH DEPTH PER 20 FT. OF SLOPE UP TO 100 FT. ** SLOPES BETWEEN 3(HZ.):1(VERT.) AND 2(HZ.):1(VERT.) = 4 INCH DEPTH PLUS ADDITIONAL 1/2 INCH PER 20 FT. OF SLOPE UP TO 100 FT. *** SLOPES STEEPER THAN 2(HZ.):1(VERT.) USE OF EROSION CONTROL MIX AND MULCH DEPTH TO BE REVIEWED AND APPROVED PRIOR TO USE BY OSPC OR EPSC SPECIALIST			COMPRISED OF SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. MAY CONTAIN ROCK < 4" IN DIAMETER. ORGANICS SHALL BE FIBROUS AND ELONGATED. NO LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS.



NOTES

1. FOR INLET PROTECTION IN PAVEMENT AREAS CONTRACTOR MAY ALSO USE SECURED "MARCH MAT OR APPROVED EQUAL, COIR INLET FABRIC OVER CATCH BASIN.
2. TYPICAL FOR ALL INLET GRATES ON SITE.
3. MAINTAIN SHALLOW DEPRESSION AROUND GRATE UNTIL PAVING AND/OR FINAL STABILIZATION HAS OCCURRED.

STONE LINED SUMP INLET PROTECTION

N.T.S.

PERMANENT SEED MIX SHALL BE USED AS EARLY AS PRACTICABLE BETWEEN 5/15 AND 9/15 AND SHALL MEET THE FOLLOWING CRITERIA:

SEED	% WEIGHT
RED FESCUE	50%
SHEEP FESCUE	25%
RED TOP	5%
WHITE CLOVER	10%
ANNUAL RYE	10%

TEMPORARY SEED MIX SHALL BE USED BETWEEN 9/16 AND 5/14 AND SHALL MEET THE FOLLOWING CRITERIA:

SEED	% WEIGHT	%GERMINATION
WINTER RYE	80% MIN.	85% MIN.
RED FESCUE (CREEPING)	4% MIN.	80% MIN.
PERENNIAL RYE GRASS	3% MIN.	90% MIN.
RED CLOVER	3% MIN.	90% MIN.
OTHER CROP GRASS	0.5% MAX.	
NOXIOUS WEED SEED	0.5% MAX.	
INERT MATTER	1% MAX.	

SEEDING SPECIFICATIONS

10TH CAVALRY APARTMENTS

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Colchester, Vermont

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164 Main Street, Suite 201
Colchester, Vermont 05446
P: (802) 878-0375
www.krebsandlansing.com

ISSUED FOR PERMIT REVIEW
NOT FOR CONSTRUCTION

OWNER:
Saint Michaels College
1 Winooski Park
Colchester, Vermont 05439

APPLICANT:
Champlain Housing Trust
88 King Street
Burlington, Vermont 05401

PROPERTY INFORMATION:
Address: 33, 81, & 123 Ethan Allen Avenue
Parcel ID: 20-004000-0000000 (portion of)
SPAN: 153-048-22335 (portion of)
Acreage: ±6.778 Acres
Zoning: General Development 2 (GD2)
Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

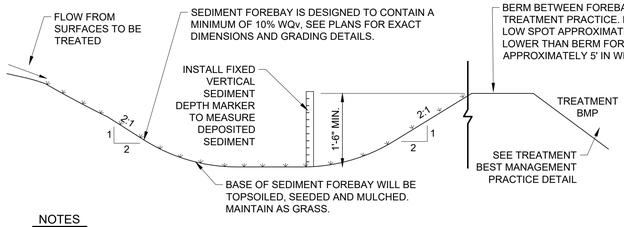
STAMP:

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Changes for State SW Application	10/28/21

DRAWING TITLE:
DETAILS

DATE ISSUED: 08/06/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: N/A
DRAWING NO.: C-2.03 REV. NO.: 1

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg



NOTES

1. APPLY SEED AND MULCH. APPLY UNIFORMLY OVER AREA.
2. CROSS-SECTION SHALL BE EXCAVATED TO NEAT LINES AND GRADES. OVER-EXCAVATED AREAS SHALL BE BACKFILLED WITH MOIST SOIL COMPACTED TO DENSITY OF SURROUNDING MATERIAL.
3. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF IN APPROVED UPLAND AREA (PER OSPC) SUCH THAT IT DOES NOT INTERFERE WITH FUNCTIONING OF SWALE. ALL EXCAVATED SOIL SHALL REMAIN ON SITE.

SEDIMENT FOREBAY DETAIL

N.T.S.

STORMWATER MAINTANCE NOTES

A. FOREBAY PRE-TREATMENT AREAS:
1. MONITOR FOR ACCUMULATION OF SEDIMENT. CLEAN WHEN 50% FULL OR AS NEEDED.
2. INSPECT AND REPAIR ANY NOTED EROSION.

B. DISCONNECTION AREAS
1. INSPECT AND REPAIR ANY EROSION AND RE-SEED BARE SPOTS AS NEEDED
2. NOTHING MAYBE INSTALLED IN THIS AREA IN THE FUTURE, IT MUST REMAIN VEGETATED

C. INFILTRATION BASIN
1. INSPECT FOR PROLONGED STANDING WATER AFTER RAIN EVENTS
2. INSPECT FOR EROSION, ACCUMULATED SEDIMENT AND ENSURE PLANTS ARE HEALTHY. REMOVE SEDIMENT AND REPLACE PLANTS AS NECESSARY.

ADDITIONAL SOILS RESTORATION

1. SOIL DEPTH AND QUALITY SHALL BE ESTABLISHED TOWARDS THE END OF CONSTRUCTION, AND ONCE ESTABLISHED, BE PROTECTED FROM COMPACTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF THE POST CONSTRUCTION SOIL DEPTH AND QUALITY.
3. VERIFICATION SHALL BE VIA A SAMPLING SCHEME THAT INCLUDES NINE 8" DEEP TEST HOLES PER ACRE OF AREA SUBJECT TO THE STANDARD.
4. TEST HOLES SHALL BE EXCAVATED USING ONLY A SHOVEL DRIVEN SOLELY BY THE INSPECTOR'S WEIGHT AND SHALL BE AT LEAST 50 FEET APART FROM EACH OTHER.
5. ALL DISTURBED AREAS WITHIN THE PROJECT LIMITS (LOD) ARE SUBJECT TO THE POST-CONSTRUCTION SOIL DEPTH AND QUALITY STANDARD
6. THERE IS NO PROPOSED EXCAVATION OR RE-GRADING ANTICIPATED WITHIN THE SOLAR ARRAY BEYOND WHAT IS NECESSARY FOR SETTING POSTS AND INSTALLING CONDUIT. IT IS ANTICIPATED THAT SOME GROUND DISTURBANCE WILL OCCUR WITHIN THE ARRAY FROM FREQUENT TRACKING OF EQUIPMENT. THE CONTRACTOR AND ENGINEER SHALL EVALUATE GROUND DISTURBANCE WITHIN THE SOLAR ARRAY AND EITHER:
   - •• CONFIRM THAT SOILS HAVE NOT BEEN EXCESSIVELY COMPACTED VIA TEST PITS AND PHOTO DOCUMENTATION.
   - •• IMPLEMENT THE MEASURES OUTLINED IN THE "POST CONSTRUCTION SOIL DEPTH & QUALITY STANDARD" IF EXCESSIVE COMPACTION HAS OCCURRED.

POST-CONSTRUCTION SOIL DEPTH AND QUALITY NOTES

SOIL RETENTION: RETAIN, IN AN UNDISTURBED STATE, THE DUFF LAYER AND NATIVE TOPSOIL TO THE MAXIMUM EXTENT PRACTICABLE.

SOIL QUALITY: ALL AREAS SUBJECT TO THE STANDARD SHALL DEMONSTRATE THE FOLLOWING:

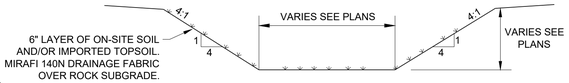
A TOPSOIL LAYER WITH A MINIMUM ORGANIC MATTER CONTENT OF 4% DRY WEIGHT IN PLANTING BEDS AND TURF AREAS. THE TOPSOIL LAYER SHALL HAVE A MINIMUM DEPTH OF 4 INCHES, EXCEPT WHERE TREE ROOTS LIMIT THE DEPTH OF INCORPORATION OF AMENDMENTS NEEDED TO MEET THE CRITERIA.

COMPOST AND OTHER MATERIALS SHALL BE USED THAT MEET THE FOLLOWING REQUIREMENTS:
- THE COMPOST OR OTHER MATERIALS SHALL HAVE A CARBON TO NITROGEN RATIO BELOW 25:1.
- COMPOST SHALL MEET THE DEFINITION OF "COMPOST" IN THE AGENCY'S SOLID WASTE MANAGEMENT RULES OR SHALL MEET THE CONTAMINANT STANDARDS IN THE VERMONT SOLID WASTE MANAGEMENT RULES §6-1104(G)(6- 7), §6-1105(E)(8-9), AND §6-1106(E)(7-9). COMPOST OR OTHER ORGANIC MATERIALS MAY BE AMENDED TO MEET THE FOREGOING REQUIREMENTS.
- EXCEPTIONAL QUALITY BIOSOLIDS (EQ BIOSOLIDS) MAY BE USED AS A SOIL AMENDMENT, AT A MAXIMUM PROPORTION OF 35% OF THE TOTAL SOIL VOLUME, AND SHALL BE WELL MIXED WITH EXISTING SOIL BEFORE OR DURING APPLICATION.
- THE RESULTING SOIL SHALL BE CONDUCIVE TO THE TYPE OF VEGETATION TO BE ESTABLISHED.

THE SOIL QUALITY REQUIREMENTS SHALL BE MET BY USING ONE OR A COMBINATION OF THE FOLLOWING METHODS:
- OPTION 1: LEAVE UNDISTURBED NATIVE VEGETATION AND SOIL, AND PROTECT FROM COMPACTION DURING CONSTRUCTION. FAILURE TO ESTABLISH AND MAINTAIN EXCLUSIONARY CONTROLS AROUND THESE AREAS DURING THE CONSTRUCTION PHASE MAY TRIGGER THE REQUIREMENT TO RESTORE SOILS PER ONE OF THE FOLLOWING OPTIONS.
- OPTION 2: AMEND EXISTING SITE TOPSOIL OR SUBSOIL IN PLACE.
  - a. SCARIFY OR TILL SUBSOILS TO 4 INCHES OF DEPTH OR TO DEPTH NEEDED TO ACHIEVE A TOTAL DEPTH OF 8 INCHES OF UNCOMPACTED SOIL AFTER CALCULATED AMOUNT OF AMENDMENT IS ADDED, EXCEPT FOR WITHIN THE DRIP LINE OF EXISTING TREES, THE ENTIRE SURFACE SHALL BE DISTURBED BY SCARIFICATION;
  - b. AMEND SOIL TO MEET ORGANIC CONTENT REQUIREMENTS:
    1. PRE-APPROVED RATE: PLACE 1 INCH OF COMPOSTED MATERIAL WITH AN ORGANIC MATTER CONTENT BETWEEN 40 AND 65% AND ROTOTILL INTO 3 INCHES OF SOIL, OR
    2. CALCULATED RATE: PLACE CALCULATED AMOUNT OF COMPOSTED MATERIAL OR APPROVED ORGANIC MATERIAL AND ROTOTILL INTO DEPTH OF SOIL NEEDED TO ACHIEVE 4 INCHES OF SETTLED SOIL AT 4% ORGANIC CONTENT. *CONTRACTOR TO PROVIDE CALCULATION AND SITE SKETCH INDICATING AREAS USED FOR CALCULATIONS.
  - c. RAKE BEDS TO SMOOTH AND REMOVE SURFACE ROCKS LARGER THAN 2 INCHES IN DIAMETER; AND
  - d. WATER OR ROLL TO COMPACT SOIL IN TURF AREAS TO 85% OF MAXIMUM DRY DENSITY.
- OPTION 3: REMOVE AND STOCKPILE EXISTING TOPSOIL DURING GRADING.
  - a. STOCKPILE SOIL ON SITE IN A DESIGNATED CONTROLLED AREA, AT LEAST 50 FEET FROM SURFACE WATERS, WETLANDS, FLOODPLAINS, OR OTHER CRITICAL RESOURCE AREAS;
  - b. SCARIFY OR TILL SUBGRADE TO A DEPTH OF 4 INCHES. EXCEPT FOR WITHIN THE DRIP LINE OF EXISTING TREES, THE ENTIRE SURFACE SHALL BE DISTURBED BY SCARIFICATION;
  - c. STOCKPILED TOPSOIL SHALL ALSO BE AMENDED, IF NEEDED, TO MEET THE ORGANIC CONTENT REQUIREMENTS:
    1. PRE-APPROVED RATE: COMPOST SHALL BE INCORPORATED WITH AN ORGANIC MATTER CONTENT BETWEEN 40 AND 65% INTO THE TOPSOIL AT A RATIO 1:3, OR
    2. CALCULATED RATE: INCORPORATE COMPOSTED MATERIAL OR APPROVED ORGANIC MATERIAL AT A CALCULATED RATE TO ACHIEVE 4 INCHES OF SETTLED SOIL AT 4% ORGANIC CONTENT;*
  - d. REPLACE STOCKPILED TOPSOIL PRIOR TO PLANTING, SCREEN TOPSOIL, AND;
  - e. RAKE TO LEVEL, AND REMOVE SURFACE ROCKS LARGER THAN 2 INCHES IN DIAMETER.
  - f. OPTION 4: IMPORT TOPSOIL MIX, OR OTHER MATERIALS FOR MIXING, INCLUDING COMPOST, OF SUFFICIENT ORGANIC CONTENT AND DEPTH.
  - g. SCARIFY OR TILL SUBGRADE TO A DEPTH OF 4 INCHES. EXCEPT FOR WITHIN THE DRIP LINE OF EXISTING TREES, THE ENTIRE SURFACE SHALL BE DISTURBED BY SCARIFICATION;
  - h. PLACE 4 INCHES OF IMPORTED TOPSOIL MIX ON SURFACE. THE IMPORTED TOPSOIL MIX SHALL CONTAIN 4% ORGANIC MATTER. SOILS USED IN THE MIX SHALL BE SAND OR SANDY LOAM AS DEFINED BY THE USDA; SHOP DRAWING SUBMITTAL IS REQUIRED. FIND USDA SIEVE FOR SAND AND SANDY LOAM.
  - i. RAKE BEDS TO SMOOTH AND REMOVE SURFACE ROCKS LARGER THAN 2 INCHES IN DIAMETER;
  - j. WATER OR ROLL TO COMPACT SOIL IN TURF AREAS TO 85% OF MAXIMUM DRY DENSITY.

SOIL MANAGEMENT

- IDENTIFIES AREAS ON THE SITE SUBJECT TO THE STANDARD;
- SOIL DEPTH AND QUALITY SHALL BE ESTABLISHED TOWARDS THE END OF CONSTRUCTION AND ONCE ESTABLISHED, PROTECTED FROM COMPACTION, SUCH AS FROM LARGE MACHINERY, VEHICLE TRAFFIC, AND FROM EROSION;
- AFTER SOIL AMENDMENTS AND PLACEMENT IS COMPLETE, AND PRIOR TO SEEDING AND MULCHING, CONTRACTOR SHALL PERFORM VERIFICATION SAMPLING IN LOCATIONS INDICATED ON SAMPLING PLAN. VERIFICATION SAMPLING SHALL INCLUDE NINE, 8 INCH DEEP (MIN) TEST HOLES PER ACRE OF AREA SUBJECT TO THE STANDARD. TEST HOLES SHALL BE EXCAVATED USING ONLY A SHOVEL DRIVEN SOLELY BY INSPECTOR'S WEIGHT AND SHALL BE AT LEAST 50 FEET APART FROM EACH OTHER.
- A DENSE AND VIGOROUS VEGETATIVE COVER SHALL BE ESTABLISHED OVER TURF AREAS.

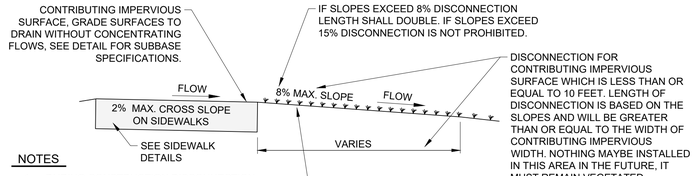


NOTES

1. TYPICAL GRASS SWALE & INFILTRATION BASIN CROSS SECTION. SEE PLAN VIEW FOR LOCATIONS.
2. MAXIMUM SIDE SLOPES TO BE 3:1, PROJECT PROPOSES 4:1.
3. DURING CONSTRUCTION TEMPORARILY SEEDED AND HEAVILY MULCHED. POST CONSTRUCTION CONTRACTOR SHALL RE-GRADE ANY EROSION, REMOVE BUILD UP SEDIMENTS, PERMANENT SEED AND HEAVILY RE-MULCH.
4. CROSS-SECTION SHALL BE EXCAVATED TO NEAT LINES AND GRADES. OVER-EXCAVATED AREAS SHALL BE BACKFILLED WITH MOIST SOIL COMPACTED TO DENSITY OF SURROUNDING MATERIAL.
5. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF IN APPROVED UPLAND AREA (PER OSPC) SUCH THAT IT DOES NOT INTERFERE WITH FUNCTION.
6. STORING SNOW DURING THE WINTER MONTHS IN THE INFILTRATION BASIN IS PROHIBITED. SNOW REMOVAL CONTRACTOR WILL NOT USE THESE AREAS FOR SNOW DISPOSAL.

GRASS SWALE & INFILTRATION BASIN CROSS SECTION

N.T.S.

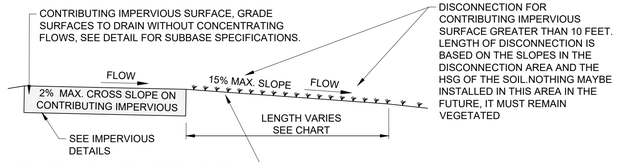


NOTES

1. DURING CONSTRUCTION DISCONNECTION AREA WILL BE TEMPORARILY SEEDED AND HEAVILY MULCHED. POST CONSTRUCTION CONTRACTOR SHALL RE-GRADE ANY EROSION, REMOVE BUILD UP SEDIMENTS, PERMANENT SEED AND HEAVILY RE-MULCH.
2. TOPSOIL WILL BE WELL GRADED AND FREE OF WOODY DEBRIS, STICKS AND ROOTS.
3. CONTRACTOR WILL AT A DOUBLE SEEDING RATE AS NEEDED TO ENSURE ROBUST GROWTH.

IMPERVIOUS DISCONNECTION DETAIL (10' OR LESS IN WIDTH)

N.T.S.



REQUIRED SIMPLE DISCONNECTION LENGTHS

HSG OF SOIL IN DISCONNECTION AREA	DISCONNECTION AREA SLOPE	
	0% - 8%	8% - 15%
A/B OR INFILTRATION RATE >= 0.5 IN/HR	35'	50'
C/D OR INFILTRATION RATE <= 0.5 IN/HR	65'	85'

NOTES

1. DURING CONSTRUCTION DISCONNECTION AREA WILL BE TEMPORARILY SEEDED AND HEAVILY MULCHED. POST CONSTRUCTION CONTRACTOR SHALL RE-GRADE ANY EROSION, REMOVE BUILD UP SEDIMENTS, PERMANENT SEED AND HEAVILY RE-MULCH.
2. TOPSOIL WILL BE WELL GRADED AND FREE OF WOODY DEBRIS, STICKS AND ROOTS.
3. CONTRACTOR WILL AT A DOUBLE SEEDING RATE AS NEEDED TO ENSURE ROBUST GROWTH.

IMPERVIOUS DISCONNECTION DETAIL (GREATER THAN 10')

N.T.S.

WINTER EROSION CONTROL PROCEEDURES

(FOR ANY EARTH WORK PERFORMED BETWEEN OCTOBER 15TH AND APRIL 15TH)

WINTER EROSION CONTROL NARRATIVE:
OBJECTIVE - ANY SITE WORK PERFORMED LATER THAN OCTOBER 15TH WILL RESULT IN EXPOSED SOIL THROUGH THE WINTER. THIS PRESENTS A POTENTIAL FOR EROSION THROUGH THE WINTER. THE WINTER EROSION CONTROL MEASURES ARE INTENDED TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION ZONE DURING THAWS AND RAINSTORMS.

WINTER EROSION CONTROL SEQUENCE:
ON-SITE COORDINATOR - THE ON-SITE COORDINATOR SHALL BE SURE ALL EROSION CONTROL MEASURES REQUIRED FOR WINTER CONSTRUCTION ARE INSTALLED BY OCTOBER 15TH AND PRIOR TO GROUND FREEZING. IF A PERMITTED AREA CAN BE LEFT UNDISTURBED UNTIL THE SPRING THE CONTRACTOR SHALL MAKE EVERY EFFORT TO LIMIT THESE AREAS OF DISTURBANCE.

THE CONTRACTOR SHALL STABILIZE ANY PORTION OF THE SITE THAT IS BEING WORKED AND DISTURBED PRIOR TO BEGINNING CONSTRUCTION AT ANOTHER AREA OF THE SITE. AT NO TIME DURING WINTER CONSTRUCTION SHALL THERE BE MORE THAN 1 ACRE OF EXPOSED SOIL ON SITE.

ANTICIPATED WINTER CONSTRUCTION ACTIVITIES WILL INCLUDE ALL ASPECTS OF THE PROJECT PROPOSED DURING SUMMER CONSTRUCTION. THIS IS A CONTINUATION OF WORK WHICH WAS NOT COMPLETED DURING THE SUMMER. MAJOR GRADING IS EXPECTED TO BE COMPLETE BEFORE OCTOBER 15TH.

LIMITS OF DISTURBANCE - LOD WILL BE MOVED AND/OR REPLACED TO REFLECT THE BOUNDARY OF WINTER WORK. CONTRACTOR WILL MAINTAIN A MINIMUM 25' BUFFER FROM PERIMETER CONTROLS TO ALLOW FOR SNOW CLEARING AND MAINTENANCE.

SNOW STORAGE ON SITE - CONTRACTOR WILL CREATE A SNOW MANAGEMENT PLAN. PLAN WILL IDENTIFY LOCATIONS FOR ADEQUATE SNOW STORAGE AND CONTROL SNOW MELT. SNOW STORAGE WILL BE DOWN GRADIENT OF ALL DISTURBED AREAS AND WILL NOT PROHIBIT THE FUNCTION OF ALL PERMANENT STORMWATER TREATMENT STRUCTURES. CONTRACTOR SHALL KEEP ALL DRAINAGE STRUCTURES OPWN AND FREE OF SNOW AND ICE DAMS.

INSTALL SILT FENCE - SILT FENCE SHALL BE INSTALLED ON THE DOWNHILL SIDE OF THE WINTER CONSTRUCTION AREAS AND SOIL STOCKPILE AREAS, AS SHOWN ON THE PLAN, BY OCTOBER 15TH. IF THE GROUND IS UNFROZEN THE SILT FENCE SHALL BE DUG IN AS NORMAL. IF THE GROUND IS FROZEN CONTACT THE ENGINEER FOR ALTERNATE OPTIONS (STONE BERM, FILTREXX SILT SOXX, STRAW WATTLES, ETC.).

STABILIZED CONSTRUCTION ENTRANCE - THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL STABILIZED CONSTRUCTION ENTRANCES TO PREVENT SEDIMENT TRACKING OFF SITE. CONTRACTOR SHALL ENLARGE THE WIDTH OF ACCESS TO PROVIDE ADDITIONAL ROOM FOR SNOW STOCKPILING, IF NEEDED. ADDITIONAL STONE SHALL BE ADDED OR THE LENGTH SHALL BE INCREASED, IF ICE AND SNOW LIMITS CONSTRUCTION ENTRANCE'S ABILITY TO HOLD SEDIMENTS ON SITE.

WINTER STABILIZATION – ALL DISTURBED AREAS NOT INVOLVED IN WINTER CONSTRUCTION SHALL BE AT LEAST TEMPORARILY STABILIZED BY OCTOBER 15. AFTER OCTOBER 15TH, ALL AREAS DISTURBED DURING WINTER CONSTRUCTION SHALL BE STABILIZED DAILY TO PREVENT EXPOSURE FROM RAIN EVENTS AND ACCUMULATION OF SNOWFALL (SEE EXCEPTIONS BELOW). CONTRACTOR SHALL ADD ADDITIONAL STONE, AS NECESSARY, TO PROVIDE STABILIZATION THROUGH WINTER CONSTRUCTION ON ALL AREAS WHERE CONSTRUCTION TRAFFIC IS ANTICIPATED.

EXCEPTIONS:

- HYDROSEEDING AFTER OCTOBER 15TH AND BEFORE APRIL 15TH MUST BE STABILIZED WITH STRAW MULCH OR EROSION CONTROL MATTING.*
- SNOW AND/OR ICE MUST BE REMOVED TO, AT MOST, ONE INCH PRIOR TO APPLYING MULCH OR EROSION CONTROL STABILIZATION MATTING.
- IF NO PRECIPITATION, WITHIN 24 HOURS, IS FORECASTED AND WORK WILL RESUME IN THE SAME DISTURBED AREA WITHIN 24 HOURS, DAILY STABILIZATION IS NOT NECESSARY.
- DISTURBED AREAS THAT COLLECT AND RETAIN RUNOFF, SUCH AS OPEN UTILITY TRENCHES, REQUIRE STABILIZATION AT THE END OF EACH WORK WEEK.

MAINTENANCE - ALL DISTURBED AREAS SHALL BE MONITORED BY THE CONTRACTOR AND THE ON-SITE PLAN COORDINATOR IN ACCORDANCE WITH THE INSPECTION REQUIREMENT OUTLINED IN THE INDIVIDUAL CONSTRUCTION STORMWATER PERMIT. THE CONTRACTOR AND ON-SITE PLAN COORDINATOR SHALL EVALUATE THE SITE AFTER A THAW OR RAINSTORM. THE CONTRACTOR OR ON-SITE PLAN COORDINATOR SHALL NOTIFY THE ENGINEER IF ANY EROSION CONTROL MEASURES APPEAR TO BE INADEQUATE. THE CONTRACTOR OR ON-SITE PLAN COORDINATOR SHALL IMMEDIATELY (WITHIN THE SAME BUSINESS DAY) IMPLEMENT ANY FURTHER EROSION CONTROL MEASURES SPECIFIED BY THE ENGINEER. THE CONTRACTOR OR ON-SITE PLAN COORDINATOR SHALL ADD MULCH, AS NECESSARY, THROUGHOUT THE WINTER AFTER THAWS OR RAINSTORMS. THE MULCH DEPTH SHALL BE BROUGHT UP TO 2". THE MULCH AND SILT FENCE SHALL BE MAINTAINED UNTIL A PERMANENT GROUND COVER (70% STABILIZATION) IS ESTABLISHED IN THE SPRING. THE SITE SHALL BE REMULCHED AND RESEEDED, IN THE SPRING, AS REQUIRED TO ESTABLISH A VIGOROUS PERMANENT GROUND COVER.

INSPECTION - THE ON-SITE COORDINATOR SHALL BE RESPONSIBLE FOR, AT A MINIMUM, DAILY WRITTEN INSPECTIONS WHILE THE SITE IS DISTURBED OR WEEKLY IF EVERYTHING IS STABILIZED BUT CONSTRUCTION IS ON-GOING. IF, DURING WINTER CONSTRUCTION, EARTH DISTURBANCE ACTIVITIES TEMPORARILY CEASE AND THE SITE HAS BEEN FULLY STABILIZED, INSPECTION AND MONITORING REQUIREMENTS FOR THE ON-SITE COORDINATOR MAY BE REDUCED TO ONCE PER MONTH MINIMUM. ALL INSPECTION SHEETS SHALL BE KEPT ON SITE AND BE AVAILABLE UPON REQUEST.

10TH CAVALRY APARTMENTS

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APPLICANT:
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SPAN: 153-048-22335 (portion of)
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Front Yard Building Setback: 30'
Back Yard Building Setback: 30'
Side Yard Building Setback: 15'
Maximum Total Lot Coverage: 70%
Density: 10 Dwelling Unit per Acre

STAMP:

REV. NO.	REVISIONS/COMMENTS	DATE
1.	Revision for State SW Application	11/29/21

DRAWING TITLE:
DETAILS

DATE ISSUED: 10/28/21
DRAWN BY: GTD CHECKED BY: GTD
PROJECT NO.: 20328 SCALE: N/A
DRAWING NO.: C-2.04 REV. NO.: 1

DWG NAME: FFF_Fort-Ethan-Allen-Apartments_Base.dwg

APPENDIX H

COST ESTIMATES

Corrective Action Plan Implementation Cost Estimate
10th Cavalry Complex
Environmental Professional Costs
July 19, 2022

Task	Type	Units	Quantity	Rate	Mark Up	Item Total	Sub Totals	Task Total
1. Project Coordination, Meetings, HASP, Site Visit								
Atlas Labor	Principal	hrs	4	150	--	600		
and Expenses	PE	hrs	6	150	--	900		
	Sr. Project Manager	hrs	40	120	--	4,800		
	Staff Scientist	hrs	16	80	--	1,280		
	Field Truck	day	1	135	--	135		
		Task Total						**7,715**
2. Monitoring Well and Soil Vapor Point Decommissioning								
Atlas Labor	Sr. Project Manager	hrs	2	120	--	240		
and Expenses	Staff Scientist	hrs	10	80	--	800		
-assumes 1 day	Field Truck	day	1	135	--	135		
		Atlas Subtotal					1,175	
Drilling Subcontractor	Mob/Demob	ea	1	350	*1.15*	403		
	Well Abandonment - Labor	hrs	8	210	*1.15*	1,932		
	Well Abandonment - Material	ft	60	1.5	*1.15*	104		
	Surface Completion	ea	3	7	*1.15*	24		
		Drilling Subcontractor Subtotal					2,462	
		Task Total						**3,637**
3. Additional Contaminated Soil Delineation - PCBs and Lead								
Atlas Labor	Sr. Project Manager	hrs	4	120	--	480		
and Expenses	Staff Scientist	hrs	10	80	--	800		
	CAD	hrs	4	70	--	280		
	Administrative	hrs	2	65	--	130		
		Atlas Subtotal (Sampling Plan)					1,690	
-assumes 2 days/2 staff	Sr. Project Manager	hrs	4	120	--	480		
	Staff Scientist	hrs	20	80	--	1,600		
	Field Technician	hrs	20	65	--	1,300		
	Sampling Materials Fee	day	2	25	--	50		
	Field Truck	day	2	135	--	270		
		Atlas Subtotal (Drilling/Sampling)					3,700	
Drilling Subcontractor	Mob/Demob	LS	1	400	*1.15*	460		
	7822 Rig - 2 Man Crew (8 Hr Day)	day	2	2100	*1.15*	4,830		
	Project Management	day	2	90	*1.15*	207		
	Liners (DT35)	ea	50	8	*1.15*	460		
		Drilling Subcontractor Subtotal					5,957	
Lab Subcontractor	Soil Lead	sample	97	30	*1.15*	3,347		
	Soil PCBs w/soxhlet	sample	21	80	*1.15*	1,932		
	Full Waste Analyticals	sample	8	850	*1.15*	7,820		
		Laboratory Subcontractor Subtotal					13,099	
Atlas Labor	Sr. Project Manager	hrs	4	120	--	480		
and Expenses	Staff Scientist	hrs	10	80	--	800		
	CAD	hrs	4	70	--	280		
	Administrative	hrs	2	65	--	130		
		Atlas Subtotal (Summary Report)					1,690	
		Task Total						**26,136**

Corrective Action Plan Implementation Cost Estimate
10th Cavalry Complex
Environmental Professional Costs
July 19, 2022

Task	Type	Units	Quantity	Rate	Mark Up	Item Total	Sub Totals	Task Total
4. Contaminated Soils Management								
Atlas Labor	Sr. Project Manager	hrs	7	120	--	840		
and Expenses	Staff Scientist (daily reports)	hrs	14	80	--	1,120		
-assumes 7 days, including	Field Technician (field work)	hrs	70	65	--	4,550		
1 day prep, 5 days oversight,	Field Truck	day	7	135	--	945		
1 day final inspection								
		Task Total						**7,455**
5. CAP Completion Report/LUR								
Atlas Labor	Principal	hrs	2	150	--	300		
	PE	hrs	4	150	--	600		
	Sr. Project Manager	hrs	20	120	--	2,400		
	Staff Scientist	hrs	10	80	--	800		
	CADD	hrs	10	70	--	700		
	Administrative	hrs	4	65	--	260		
		Task Total						**5,060**
		Total Estimated EP Costs:						**50,003**

Corrective Action Plan Implementation Cost Estimate
10th Cavalry Complex
General Contractor Costs
July 19, 2022

Task	Type	Units	Quantity	Rate	Mark Up	Item Total	Sub Totals	Task Total
1. Contaminated Soil Management								
GC Costs	Soil Handling Costs	CY	651	50	--	32,550		
	Stockpile Costs	Cy	139	25	--	3,475		
	Geotextile Costs	SF	11079	0.1	--	1,108		
	T&D Costs	Ton	976.5	175	--	170,888		
	Delivered Backfill Costs	CY	651	25	--	16,275		
		Total Estimated GC Costs:						**224,295**

Building Material Remediation Implementation Cost Estimate
10th Cavalry Complex
Environmental Professional Costs
July 19, 2022

Task	Type	Units	Quantity	Rate	Mark Up	Item Total	Sub Totals	Task Total
1. Project Coordination, Meetings, HASP, Site Visit								
Atlas Labor	Principal	hrs	8	150	--	1,200		
	Sr. Project Manager	hrs	40	120	--	4,800		
	Staff Scientist	hrs	16	80	--	1,280		
		Task Total						**7,280**
2. Project Monitoring								
Atlas Labor	Sr. Project Manager	hrs	8	120	--	960		
and Expenses	Staff Scientist	hrs	48	80	--	3,840		
	mileage	each	120	0.625	--	75		
-assumes 2 days/building	travel	each	6	150	--	900		
		Task Total						**5,775**
3. Clearance Sampling								
Atlas Labor	Sr. Project Manager	hrs	6	120	--	720		
and Expenses	Staff Scientist	hrs	24	80	--	1,920		
-assumes 1 clr/building	CAD	hrs	4	70	--	280		
	PCM Samples	each	15	25	--	375		
	mileage	each	60	0.625	--	38		
	travel	each	3	150	--	450		
	Administrative	hrs	2	65	--	130		
		Atlas Subtotal (Sampling)					3,913	
Atlas Labor	Principal	hrs	1	150	--	150		
and Expenses	Sr. Project Manager	hrs	3	120	--	360		
-assumes 1 report/building	Staff Scientist	hrs	12	80	--	960		
	CAD	hrs	6	70	--	420		
	Administrative	hrs	2	65	--	130		
		Atlas Subtotal (Summary Reports)					2,020	
		Task Total						**5,933**
		Total Estimated EP Costs:						**18,988**

Corrective Action Plan Implementation Cost Estimate
10th Cavalry Complex
Building Material Remediation Contractor Costs
July 19, 2022

Task	Type	Units	Quantity	Rate	Mark Up	Item Total	Task Total
1. Asbestos and PCB Remediation Costs							
Remediation Contractor Costs	Dupont	Est. $	550000	1	--	$550,000	
	Purtill	Est. $	700000	1	--	$700,000	
	Hamell	Est. $	550000	1	--	$550,000	
	See attached proposal from AAC Contracting, Inc, for additional detail						
		Total Estimated GC Costs:					**$1,800,000**

AAC Contracting, LLC
175 Humboldt Street – Suite 200
Rochester, New York 14610
Tel: (585) 527-8000
www.aac-contracting.com

AAC Contracting, LLC
Environmental Remediation and Construction Services

July 19, 2022

Atlas
51 Knight Lane
Williston, Vermont 05495
Attn: Mr. Jessie Stratton

Re**: FORT ETHAN ALLEN – DUPONT, HAMEL & PURTEL HALLS**
ASBESTOS ABATEMENT PROPOSAL BUDGET NUMBER ONLY

Please find below confirmation of our proposals for all labor, material, equipment and supervision to complete the work described. All work will be performed in strict accordance with federal, state and local regulations and guidelines governing general construction and asbestos abatement.

HAZARDOUS MATERILAS ABATEMENT **$ 1,800,000.00**

Our prices are based on the following statements, conditions and qualifications:

- **SCOPE –** This budget number proposal includes the removal and disposal of asbestos, lead and PCB containing materials identified in Atlas Environmental hazardous materials surveys for Dupont, Hamel and Purtel Halls. This price is for budget purposes only. Pricing can change due to several price changes from venders and scope of work changes. A complete set of abatement drawings will be required for future pricing.

- **EMPLOYEE WAGE RATES -** Our prices are based on payment of our standard employee wage rates.

- **SCHEDULE –** We feel all work could be completed in accordance to milestone construction schedule. Our pricing is based on standard 40 hour work week, Monday through Friday. Additional night, weekend, holiday shifts or any variation of schedule may require additional compensation.

- **INTERIOR & STRUCTURAL DEMOLITION OR ABATEMENT** - Pricing is based on the information provided. A full survey of any materials anticipated to be removed or disturbed is required prior to start of work. Additionally, any areas of suspect structural integrity leading to, or within the scheduled work area will require a structural review by a licensed engineer prior to mobilization to the area in question. The cost of any surveys or reviews is NOT included in our pricing, unless specifically noted.

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175 Humboldt Street – Suite 200
Rochester, New York 14610
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AAC Contracting, LLC
Environmental Remediation and Construction Services

- **DAMAGE TO EXISTING FINISHES** – The abatement process often requires temporary isolation consisting of tape, staples, polyethylene sheeting, etc. that may result in removal of finishes and/or minor damages. Repairs of these damages is excluded from our proposal unless specifically stated otherwise.

- **UTILITIES & ACCESS –** Unless otherwise stated, all utility shutdowns (electric, telecommunications, data, fire alarm, HVAC, plumbing, etc.) required to perform our work shall be shut down and locked out, by others, prior to our mobilization. AAC will provide temporary GFI power panels and temporary lighting for our work, as necessary. Connection of power panels to owner power source to be by a licensed electrician at no cost to AAC. Unless otherwise stated, owner shall provide access to the work area, and adequate source of temporary power, water and sewer.

- **NOTIFICATIONS / VARIANCES –** Our price includes processing all required state and Federal 10 day notifications and variance applications, if applicable, pertaining to asbestos abatement and their associated fees.

    - Regardless of the presence of any hazardous or regulated materials, any complete structure demolition, or interior selective demolition involving structural supporting components, requires an EPA 10 day notification prior to start of work, and should be factored into any scheduling accordingly.

- **AIR / PROJECT MONITORING -** The cost for an independent testing lab to perform all required air/project monitoring is **NOT** included in our proposal. NYS asbestos regulations require this service be hired directly by the owner or their representative. The cost of OSHA required personnel air sampling is included in our pricing.

- **AIR / PROJECT MONITORING -** The cost for an independent testing lab to perform all required air/project monitoring is **NOT** included in our proposal. NYS asbestos regulations require this service be hired directly by the owner or their representative. The cost of OSHA required personnel air sampling is included in our pricing.

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- **SALVAGE RIGHTS –** Excluding hazardous, regulated and general waste, and unless specifically stated otherwise, AAC Contracting retains rights to all removed fixtures, furnishings, MEP systems, structural steel and related items.

- **WASTE DISPOSAL -** Transportation and disposal of all waste is included in our price, unless indicated otherwise.

- **PERFORMANCE / PAYMENT BOND -** Our pricing does **NOT** include the cost of providing a Performance/Payment Bond. If required, bonds will be provided for the additional cost of 2% of our quoted price.

- **TAXES -** Our price does **NOT** include NYS sales and use tax. Tax will be added to all invoices unless we are provided with a tax-exempt certificate, capital improvement certificate or direct pay permit.

Our prices are good for thirty days from the date of this letter. Our payment terms are net thirty days. Work may be scheduled upon receipt and/or execution of a binding contract or purchase order.

Should you have questions or require further information, please do not hesitate to contact me.

Sincerely,

Richard Fairbridge
Estimator/Project Manager

AMENDMENT 1

BUILDING MATERIALS ABATEMENT DESIGN

ASBESTOS Abatement & PCB Remediation Specification

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Remediation of potentially hazardous materials

B. Disposal of building materials containing potentially hazardous elements.

1.02 DESCRIPTION OF WORK

A. Examine all Sections of the Specifications for requirements which affect the work of this Section whether or not such work is specifically mentioned in this Section.

B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section.

C. The Contractor shall furnish all labor, materials, services, training, insurance, and equipment as needed to complete removal and disposal of Polychlorinated Biphenyl (PCB) Bulk Product Waste, PCB Remediation Waste, asbestos containing, trace (<1%) asbestos containing, and lead containing materials and debris as indicated herein. The Contractor shall follow all federal, state and local ordinances, regulations, and rules pertaining to removal, storage, transportation and disposal of PCBs, asbestos and lead.

D. All provisions of this Section relating to the health and safety of workers and the general public, as well as protection of the environment, are minimum standards. The General Contractor is responsible for determining whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices, and for implementing such measures if deemed necessary. Nothing in this Section shall be deemed to relieve the General Contractor from any liability with respect to any such legal requirements or requirement of prudent conservative practice.

E. The Consultant will render certain technical services during the Work. All services performed by such Consultant shall be considered advisory to, and for the sole and exclusive benefit of the Owner. The Contractor acknowledges that the Consultant is an independent contractor of the Owner and agrees that no act or omission by such Consultant, and no communication by said Consultant, shall be deemed in any manner to alter or modify the terms of this Contract, or to waive any provision hereof, or to bind Owner, unless specifically agreed upon by Owner in a written and signed document.

F. The Owner has retained Atlas Technical Consultants (Atlas) as the Consultant for Hazardous Material abatement activities. For the purpose of this Section, "*Consultant"* shall refer to Atlas, who will act as designated, authorized representative of the Owner for the purpose of inspecting, monitoring, and testing.

G. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section.

H. This Section establishes requirements for the removal, segregation, management, and disposal of Hazardous and other regulated wastes including Asbestos, trace (<1%) Asbestos, lead, and PCB Bulk Product Waste and PCB Remediation Waste in the form of building materials adjacent to PCB Bulk Product Waste.

I. Certain demolition debris with PCB concentrations greater than or equal to 50 ppm are regulated as PCB Bulk Product Waste pursuant to the Toxic Substances Control Act (TSCA) in 40 CFR 761.50(b)(4), or as PCB Remediation Waste as noted in 40 CFR 761.50(b)(3) if PCB concentrations are greater than or equal to 1 ppm and have been contaminated by nearby PCB Bulk Product Waste. The removal and disposal of these materials is regulated by 40 CFR 761.

1.03 RELATED REQUIREMENTS.

A. Available Project Information: Asbestos Containing Building Materials (ACBM), trace (<1%) ACBM, PCB Bulk Product Waste, and PCB Remediation Waste have been identified at the Site.

B. Materials to be managed in accordance with this Section may also contain lead paint. The requirements for managing these contaminants, as specified in other Technical Specifications, must be followed in addition to those presented here.

1. This specifically applies to health and safety, work zone containment, work zone posting and waste storage, shipping papers, transportation and disposal.

2. When there is a conflict, the most stringent requirements shall apply, except that when there is a conflict between the below-listed Sections and this Section regarding surface preparation (e.g. etching, drilling, cutting, sanding, washing or other activities that will generate dust or building debris) and waste management, the requirements of this Section shall prevail. This specifically pertains to any activity related to the demolition, cleaning, and/or disturbance of PCB Bulk Product Waste and PCB Remediation Waste.

C. Summary: ACM materials are present in each building. Bidders must refer to applicable summary reports and all sections of this specification for each building to determine type, extent, and location of ACM materials identified in each building. Building materials in the facilities have been identified as containing ≥50 ppm of PCBs and additional materials have been identified as containing ≥1 ppm of PCBs Some materials have lead content.

1.04 REFERENCE STANDARDS

A. The work of this Section shall be performed in accordance with applicable provisions of the Toxic Substances Control Act (TSCA), 40 CFR 761.61(a), and in accordance with applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and disposal of materials managed under this Section, including EPA requirements.

B. The work of this Section shall be performed in accordance with applicable provisions of the Vermont Regulations for Asbestos Control, V.S.A. Title 18, Chapter 26, and in accordance with applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and disposal of asbestos materials managed under this Section, including EPA requirements.

C. The work of this Section shall be performed in accordance with applicable provisions of the Vermont Regulations for Lead Control, V.S.A. Title 18, Chapter 38, and in accordance with applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and disposal of lead containing materials managed under this Section, including EPA requirements.

D. Contractor is solely responsible for obtaining all additional federal, state, and local permits or approvals which may be required to perform the work of this Section, including all costs, fees and taxes required or levied. Contractor shall adhere to all permit/approval requirements.

E. Contractor shall comply with all applicable federal, state, and local environmental, safety and health requirements regarding the demolition of structures or other Site features and recycling or disposal of demolition debris, as applicable.

F. The Contractor shall document that the disposal facility(ies) proposed have all certifications and permits as required by federal, state and local regulatory agencies to receive and dispose of the materials managed under this Section. Note that some materials to be managed contain asbestos and/or lead and/or PCBs.

G. The following regulations are cited for information and guidance. The list below is not all-inclusive. The Contractor shall be responsible for a thorough knowledge and full implementation of all requirements for removal, transportation, and disposal of the materials managed under this Section.

1. PCBs Manufacturing, Processing, Distribution in Commerce, And Use Prohibition, 40 CFR 761 ("TSCA").

2. Hazardous Waste Operations and Emergency Response, Federal Occupational Safety and Health Act (OSHA), 29 CFR 1910.120.

3. Safety and Health Regulations for Construction, OSHA 29 CFR Part 1926.

4. General Regulations for Hazardous Waste Management, EPA, 40 CFR 260.

5. Regulations for Identifying Hazardous Waste, Hazardous Waste Generators and Hazardous Waste Transporters, EPA, 40 CFR 261, 262 and 263.

6. Regulations for Owners and Operators of Permitted Hazardous Waste Facilities, EPA, 40 CFR 264.

7. Interim Status Standards for Owners and Operators of Permitted Hazardous Waste Facilities, EPA. 40 CFR 265.

8. Standards for Management of Specific Hazardous Wastes and Facilities, EPA, 40 CFR 266.

9. Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities, EPA, 40 CFR 267.

10. Hazardous Materials Regulations Relating to Transportation, 49 CFR 171-180 – U.S. Department of Transportation (U.S. DOT).

11. Regulations Relating to Transportation, 49 CFR Subtitle B Parts 100-185 – U.S. Department of Transportation (U.S. DOT).

12. Publications, Practices for Respiratory Protection, z88.2-1992 - American National Standards Institute (ANSI).

13. Vermont Hazardous Waste Management Regulations, 3 V.S.A. section 2853 (5) and 10 V.S.A. chapter 159, Vermont Department of Environmental Conservation.

H. The following guidance documents are cited for information and guidance. The list below is not all-inclusive. The Contractor shall be responsible for a thorough knowledge and full implementation of all requirements for removal, transportation, and disposal of the materials managed under this Section.

1. Contractors Handling PCBs in Caulk during Renovation; EPA, EPA-747-F-09-004.

2. Preventing Exposures to PCBs in Caulking Material; EPA, EPA-747-F-09-005 (September 2009).

1.05 SUBMITTALS

A. Prior to the start of work, prepare and submit the following items. Do not commence work activities until the submittals are approved.

B. Schedule: Provide a work schedule at least 15 business days prior to the start of work outlined in this Section.

C. Certification: Provide signed certification stating you have read and understand and will agree to and abide by conditions specified in 40 CFR 761.61(a) at least 15 business days prior to the start of work outlined in this Section.

D. Work Plan: Provide a detailed work plan illustrating proposed work practices for demolition, transportation and disposal of asbestos, PCB and lead containing materials at least 30 business days prior to the start of work outlined in this section.

E. Health and Safety Plan (HASP): Developed in accordance with Occupational Safety and Health Administration (OSHA) regulations and any other applicable federal, state, or local regulations at least 10 business days prior to the start of work outlined in this Section.

F. Certifications, Licenses and Permits: Certifications, licenses and permits required for complying with any applicable federal, state and local laws, codes, policies and regulations in connection with the work outlined in this Section at least 5 business days prior to the start of the work outlined in this Section.

G. Waste Profiles: All waste profiles, applications and questionnaires, prior to forwarding them to the party requiring these documents, at least 5 business days prior to the start of the work outlined in this Section.

H. Shipping Papers: Any manifests or other documents required to transport and dispose of the items identified in this Section at least 5 business days prior to shipment of waste materials. The Contractor shall not transport or dispose of any materials until authorized by the Owner. Completed copies of all manifests, Certificates of Disposal, other applicable documents, and certified scale weight receipts, as applicable, must be furnished to the Owner as attachments to all invoices.

I. Work Method Changes: Significant changes to the means and methods used to complete the work outlined in this Section at least 15 business days prior to making change, for the Owner review and approval. Note that significant changes will also require approval by EPA, which may take up to 30 days or more. Any additional costs incurred by Contractor as a result of delay due to EPA approval of changes shall be borne by Contractor.

J. Completion Report: Report that summarizes and documents the removal and disposal of all materials associated with activities outlined in this Section. The report shall be a prerequisite for payment. At a minimum the report shall include the name of the disposal facility(ies), a summary of materials disposed, and a copy of the manifest, PCB Waste Certificates of Disposal, and other applicable documentation.

1.06 EXISTING CONDITION

A. Previous reports & Hazardous material documentation assessments
   1. *Fort Ethan Allen Building Renovation Survey- Asbestos, PCB, and Radon Sampling – Final Report (May 2022), Dupont Hall – 123 Ethan Allen Ave, Colchester, Vermont* – dated May 4, 2022
   2. *Fort Ethan Allen Building Renovation Survey- Asbestos, PCB, and Radon Sampling – Final Report (May 2022), Hamel Hall – 33 Ethan Allen Ave, Colchester, Vermont* – dated May 4, 2022
   3. *Fort Ethan Allen Building Renovation Survey- Asbestos, PCB, and Radon Sampling – Final Report (May 2022), Purtill Hall – 81 Ethan Allen Ave, Colchester, Vermont* – dated May 4, 2022

PART 2 - GENERAL REQUIREMENTS

A. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section.

B. The Contractor shall furnish all labor, materials, services, training, insurance, and equipment as needed to complete removal and disposal of PCB containing, asbestos containing, and lead containing materials and debris as indicated herein. The Contractor shall follow all federal, state and local ordinances, regulations, and rules pertaining to removal, storage, transportation and disposal of Lead, PCB, and Asbestos containing materials.

C. All provisions of this Section relating to the health and safety of workers and the general public, as well as protection of the environment, are minimum standards. The General Contractor is responsible for determining whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices, and for implementing such measures if deemed necessary. Nothing in this Section shall be deemed to relieve the General Contractor from any liability with respect to any such legal requirements or requirement of prudent conservative practice.

D. The Consultant will render certain technical services during the Work. All services performed by such Consultant shall be considered advisory to, and for the sole and exclusive benefit of the Owner. The Contractor acknowledges that the Consultant is an independent contractor of the Owner and agrees that no act or omission by such Consultant, and no communication by said Consultant, shall be deemed in any manner to alter or modify the terms of this Contract, or to waive any provision hereof, or to bind Owner, unless specifically agreed upon by Owner in a written and signed document.

E. The Owner has retained ATC Group Services LLC dba Atlas Technical Consultant (Atlas) as the Consultant for Hazardous Material abatement activities. For the purpose of this Section, "*Consultant"* shall refer to Atlas, who will act as designated, authorized representative of the Owner for the purpose of inspecting, monitoring, and testing.

J. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section. Sampling has determined that PCBs and ACBM are present. **Samples collected have indicated PCB concentrations in excess of 50 ppm and asbestos concentrations greater than 1%.**

K. This Section establishes requirements for the removal, segregation, management, and disposal of Hazardous and other regulated wastes including Asbestos, Lead and PCB containing materials.

L. Certain demolition debris with PCB concentrations greater than or equal to 50 ppm are regulated as PCB Bulk Product Waste pursuant to the Toxic Substances Control Act (TSCA) in 40 CFR 761.50(b)(4), or as PCB Remediation Waste as noted in 40 CFR 761.50(b)(3) if PCB concentrations are greater than or equal to 1 ppm and have been contaminated by nearby PCB Bulk Product Waste. The removal and disposal of these materials is regulated by 40 CFR 761 and 29 CFR 1910.120.

M. The Consultant and Owner have the authority to stop the abatement and demolition work at any time the Consultant or Owner determines that conditions are not in accordance with the Specifications and applicable regulations. The stoppage of work shall continue until corrective steps have been taken to the satisfaction of the Consultant and Owner. Standby time required for resolving violations and Specification interpretations or contractual obligations shall be at the Contractor's expense.

N. Contractor onsite staff shall include a competent person as defined by 29 CFR 1926.32(f). This individual shall possess sufficient training and experience to identify and the authority to correct hazards related to this section.

PART 3 – EXECUTION

3.01 REMEDIATION

A. Known PCB Bulk product and associated remediation waste materials, ACBM, and trace (<1%) ACBM are to be removed prior to renovation. If previously unknown suspect ACBM is discovered during remediation activities, all work potentially disturbing the material(s) must cease until such time that the material can be assessed for asbestos content by the owner's representative.

B. Unless otherwise noted, all work practices shall be full procedures in accordance with the TSCA requirements utilizing trained HAZWOPER remediation contractors. Any alternative procedures shall be approved by the Consultant and the Owner and will be written and presented for. All applicable notifications, permits and fees will be the responsibility of the selected contractor.

C. Asbestos work areas will be subject to PCM air clearance sampling. PCB work areas may be subject to clearance testing via PCB air sampling, wipe sampling, and/or substrate sampling. Analysis associated with the first round of clearance samples in a work area will be performed by the Consultant at the owner's expense. Clearance sampling will be conducted in accordance with VRAC and TSCA requirements. Additional sampling rounds will be at the expense of the abatement contractor.

D. Disturbance of materials containing identifiable concentrations of PCBs, Lead, and Asbestos must be conducted in accordance with all applicable OSHA and EPA regulations.

3.02 DISPOSAL

A. All costs associated with the proper disposal of PCB, Lead, and Asbestos containing materials shall be borne by the Contractor. All materials shall be disposed of in accordance with all applicable federal, state, county or local laws and guidelines, and the provisions of this Section.

3.03 DOCUMENTATION & CLOSE OUT

A. The Contractor shall not transport or dispose of any materials until authorized by the Owner. Completed copies of all manifests, Certificates of Disposal, other applicable documents, and certified scale weight receipts, as applicable, must be furnished to the Owner as attachments to all invoices.

B. Completion Report that summarizes and documents the removal and disposal of all materials associated with activities outlined in this Section. The report shall be a prerequisite for payment. At a minimum the report shall include the name of the disposal facility(ies), a summary of materials disposed, and a copy of the manifest, and other applicable documentation.

END OF SECTION

BID FORM

PROJECT IDENTIFICATION:

10th Cavalry Project
Dupont, Purtill and Hamell Buildings
Colchester, Vermont

THIS BID IS SUBMITTED TO:

Ms.Sandra Silla
Evernorth
100 Bank Street, Suite 400
Burlington, VT 05401

The undersigned BIDDER proposes and agrees, if the Bid is accepted, to enter into an agreement with OWNER to perform and furnish all Work as specified or indicated in the Work Plan for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. BIDDER accepts all of the terms and conditions of the Invitation to Bid and Work Plan. BIDDER promises and agrees that this Bid will remain subject to acceptance for thirty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the documents required by the Bidding Requirements within ten days after the date of OWNER's Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

(a) BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date Revised:	Addenda Number:
_____	_____
_____	_____

(b) BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or furnishing of the work.

(c) BIDDER has studied carefully all reports and drawings of physical conditions included with this Work Plan, and accepts that all measurements and technical data included herein is INDUSTRIAL HYGENIST'S estimates and BIDDER has made such investigations of his own as necessary and has based his bid on those investigations.

(d) BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or which pertain to the physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work) as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by BIDDER for such purposes.

(e) BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

(f) BIDDER has given INDUSTRIAL HYGENIST written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by INDUSTRIAL HYGENIST is acceptable to BIDDER.

(g) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham bid;

BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other bidder or over OWNER.

4. BIDDER agrees to complete the work described in the Work Plan for the following price:

Fill in Lump Sum Bid Amount in Tables below.

Dupont Building
33 Ethan Allen Drive
Colchester, Vermont

Location	**Description**	**Approximate Quantity** (To be filled in by Contractor)	**Lump Sum Bid Amount**
Base Bid			
Entire Building- (ACM) >1% Asbestos content	Mudded Joint Packings		
	9x9 Floor tile- Dark Beige with Black and White Streaks		
	Transite Panels		
	Insulation Paper Dark Gray behind metal sheeting		
	Cementitious Patching		
	9x9 Floor tile- Brown with Red and White Streaks		
	9x9 Floor tile- Light Grey with Black and White Streaks		
	Glue Dabs		
	Roofing Tar- Black		
	Roofing Flashing Cement- Grey		
	Fire Door Insulation		
	Window Caulk- Wood to Stone basement		
Entire Building- (Trace) <1% via 400 Point Count	Plaster Base Coat- Walls and Ceiling		
	Joint Compound		
	Window Glazing- White on 2 pane windows		
	Window and Door Caulk White – casing to brick		
	Grey Paint- on concrete porch floor		
PCB Containing Material >50 ppm and associated remediation waste	Grey and Blue Floor Paint- Basement		
	Concrete to a depth of 5.5”		

The Abatement Contractor is responsible for verifying all quantities of materials, there will be no change orders issued for additional quantities.

Hamell Building
81 Ethan Allen Drive
Colchester, Vermont

Location	Description	Approximate Quantity (To be filled in by Contractor)	Lump Sum Bid Amount
Base Bid			
Entire Building- (ACM) >1% Asbestos content	GWB adhesive to plaster		
	Mudded Joint Packings		
	Fire Door Insulation		
	Mirror Adhesive		
	Sink Undercoat- Pink Basement		
	9x9 Floor Tile- Grey with Black and White Streaks		
	Window Glaze- White with 3 pane windows basement		
	Window Caulk- white with 3 pane windows basement		
	Roofing Tar- Black		
	Roofing Cement- Black and Grey		
	Window Glaze- Windows in attic (wrap and store – no disposal)		
Entire Building- (Trace) <1% via 400 Point Count	Plaster Base Coat		
	Joint Compound		
PCB Containing Material >50 ppm and associated remediation waste	Mastic With 9x9 Floor Tile		
	Concrete under mastic to a depth of 0.5”		
	Grey Floor Paint		
	Concrete below grey floor paint to a depth of 1.0”		
	Exterior Door Caulk- off white brick to steel frame		
	Brick around door caulking to a distance of 0.5”		

The Abatement Contractor is responsible for verifying all quantities of materials, there will be no change orders issued for additional quantities.

Purtill Building
123 Ethan Allen Drive
Colchester, Vermont

Location	**Description**	**Approximate Quantity** (To be filled in by Contractor)	**Lump Sum Bid Amount**
Base Bid			
Entire Building- (ACM) >1% Asbestos content	Mudded Joint Packings		
	Fire Door Insulation		
	Mirror Adhesive		
	9x9 Floor Tile- Grey with Black and White Streaks		
	9x9 Floor Tile- Tan beneath underlayment		
	9x9 Floor Tile- Red beneath underlayment		
	Window Glazing- with 3 pane windows wood to stone- white basement		
	Roofing Tar- Black		
	Window Caulking- with 3 pane windows - white		
	Roof Flashing Cement- Black to Grey		
	Window Glaze- Windows in attic (wrap and store – no disposal)		
	Roofing tar paper		
Entire Building- (Trace) <1% via 400 Point Count	Joint Compound		
	Ceramic Wall Tile Adhesive		
	Ceiling Paint- with tin ceilings- tan		
PCB Containing Material >50 ppm and associated remediation waste	Adhesive Stair Tread- Brown		
	Wood Stair Tread- with adhesive to a depth of 0.5”		
	Paint on Metal Support Columns- Basement Level (TSCA waste) ****		
	Paint on Metal Support Columns- Upper Levels (non-TSCA waste)****		

****= Assumed Lead Based Paint- additional requirements apply for removal

The Abatement Contractor is responsible for verifying all quantities of materials, there will be no change orders issued for additional quantities.

The contractor shall provide, on an additional sheet all labor rates (including off-shift, overtime and holiday rates), material and disposal costs for additional work which may be awarded during this contract period. All labor and material rates must be included. The owner will not accept charges for items not included in this submittal.

5. BIDDER agrees that the work shall be completed in the specified number of working days from the date of the Notice to Proceed, and Bidder accepts the provisions of this agreement as to liquidated damages in the event of failure to complete the Work on time. The Contractor shall pay the owner **$**_____ for each day that expires after the time specified in this work plan for the completion of the project. The contractor shall also be responsible for the payment of all Industrial Hygienist and air monitoring costs, which occur after the project completion date.

6. The following documents are attached to and made a condition of the Bid:

   Bidder qualifications and other requirements (including proof of bonding) as presented in the Work Plan.

7. Communications regarding this bid shall be addressed to the address of the bidder indicated below:

   Name _____
   Address _____
   Phone # _____

8. The Client reserves the right to reject any and all bids, to accept the bid that, in the opinion of the Board, serves the best interest of the client, and to waive any informality in the bidding.

9. The terms used in this Bid which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

SUBMITTED ON_____20___.

A Corporation

By_____

(Corporation Name)

_____

(State of Incorporation)

By_____

(Authorized Signature)

_____

(Title)

(Corporate Seal)

Attest

(Secretary)

Business Address:

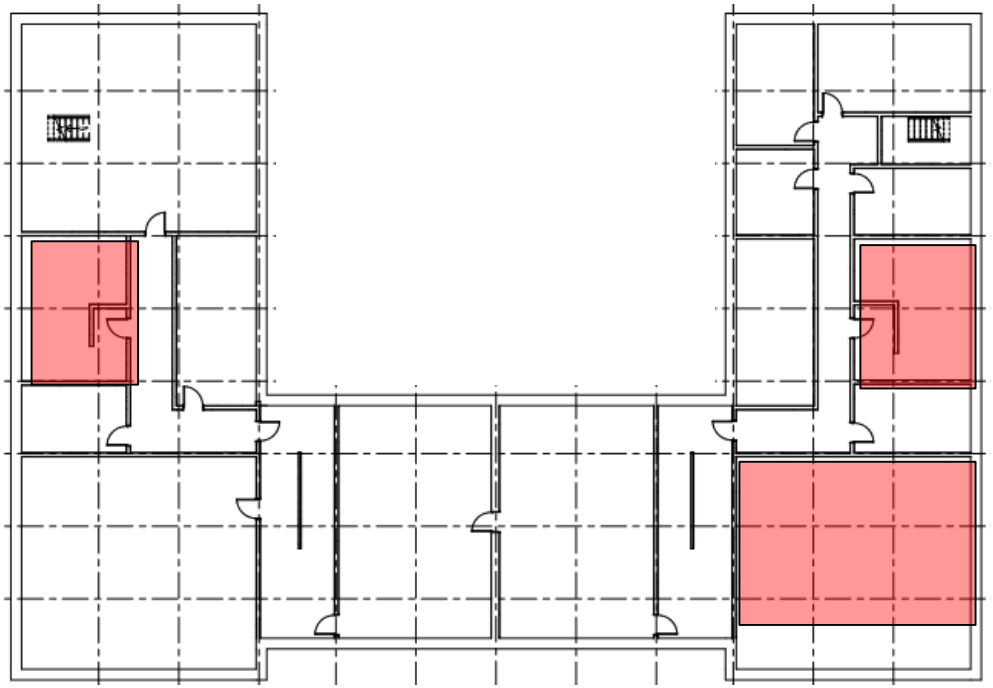
_____

Phone Number:_____

END OF BID FORM

Basement Floor

N



= Paint, Grey – Concrete Floors Basement, 440ppm – 3200ppm

PCB CONTAINING MATERIAL LOCATION DIAGRAM

Address: Dupont Hall
123 Ethan Allen Ave.
Colchester, Vermont

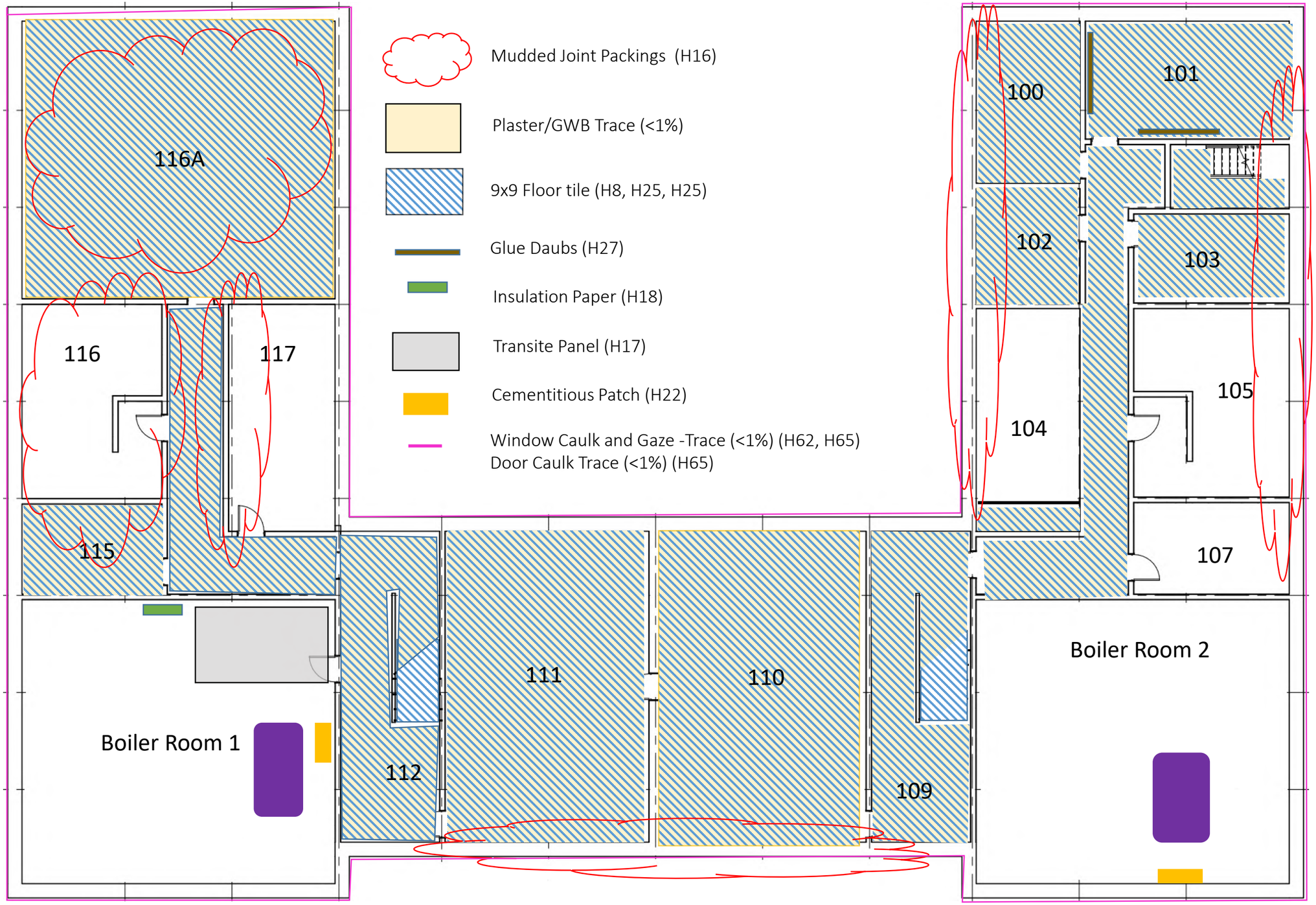
Project Number: 280BS02225

ATLAS

51 Knight Lane, Williston, Vermont 05495
Phone:(802) 862-1980 Fax: (737) 207-8272

SCALE: Not to scale

N



Mudded Joint Packings (H16)

Plaster/GWB Trace (<1%)

9x9 Floor tile (H8, H25, H25)

Glue Daubs (H27)

Insulation Paper (H18)

Transite Panel (H17)

Cementitious Patch (H22)

Window Caulk and Gaze -Trace (<1%) (H62, H65)
Door Caulk Trace (<1%) (H65)

Asbestos Location Diagram – Diagram I - Basement
Address: **Dupont Hall**
123 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None

N

Mudded Joint Packings (H16)

Plaster (H2)/GWB (H4/H5) Trace (<1%)

Window Caulk and Gaze -Trace (<1%) (H62, H65)
Door Caulk Trace (<1%) (H65)
and Caulk on exterior stone(H71)

Paint – Trace <1% (H70)

Tar (H73) and Flashing Cement (H74)

9x9 Floor tile (H8, H25, H25)

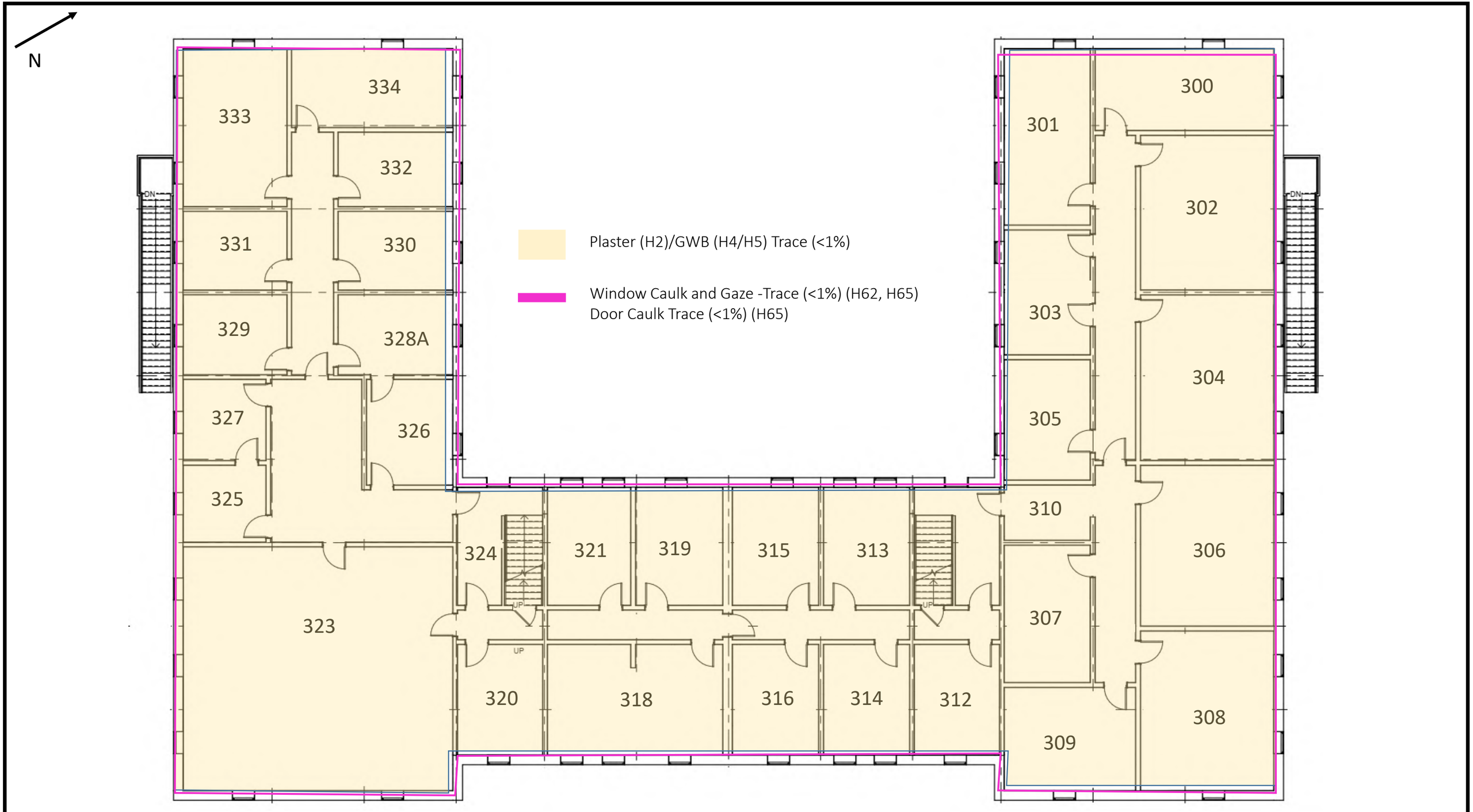
227
228B
228B
225
226
223
224
221
222
220
217
216
212
211
214
213
200
Library
office
201
202
207
203
204
206
205
UP
DN

Asbestos Location Diagram – Diagram II – First Floor
Address: **Dupont Hall**
123 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None



Asbestos Location Diagram – Diagram III – Second Floor
Address: **Dupont Hall**
123 Ethan Allen Ave
Colchester, Vermont

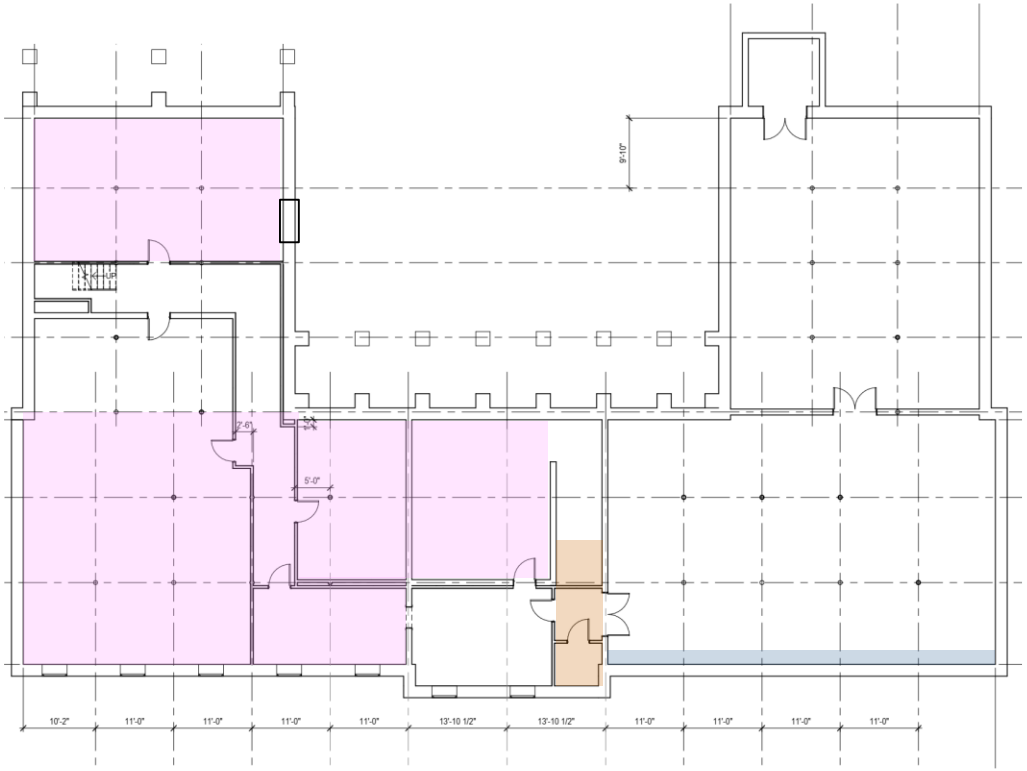
SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None

Basement Floor

N



= Mastic with 9x9 Floor Tile, 32.5ppm-76ppm

= Concrete Paint, Grey, 1.1ppm-160ppm

PCB CONTAINING MATERIAL LOCATION DIAGRAM

Address: Hamel Hall
33 Ethan Allen Ave
Colchester, Vermont

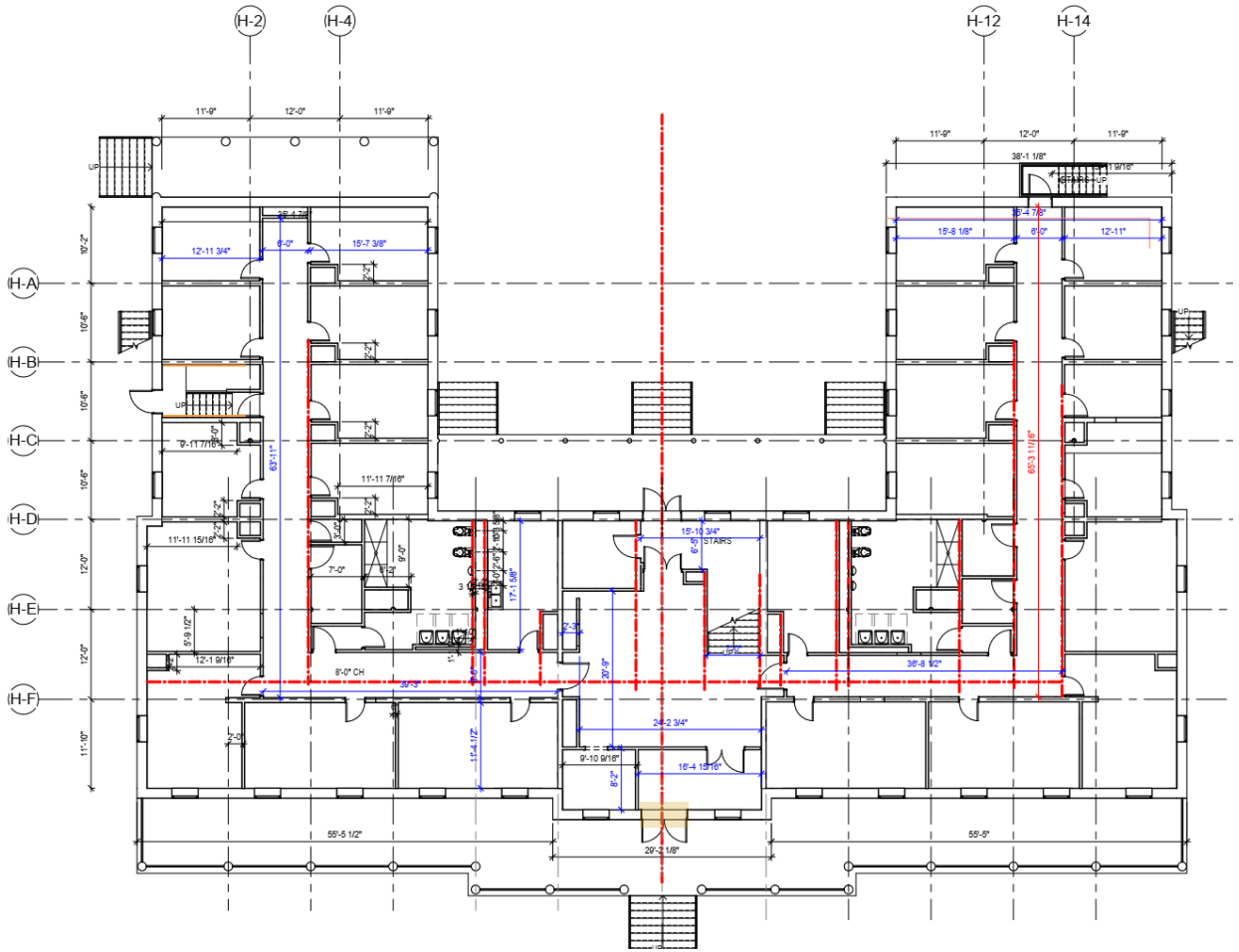
ATLAS

51 Knight Lane, Williston, Vermont 05495
Phone:(802) 862-1980 Fax: (737) 207-8272

SCALE: Not to scale

1st Floor

N



= Caulk associated with Exterior Doors, Off-White Brick to Steel Frame, Front Door, ND-162.07ppm

PCB CONTAINING MATERIAL LOCATION DIAGRAM

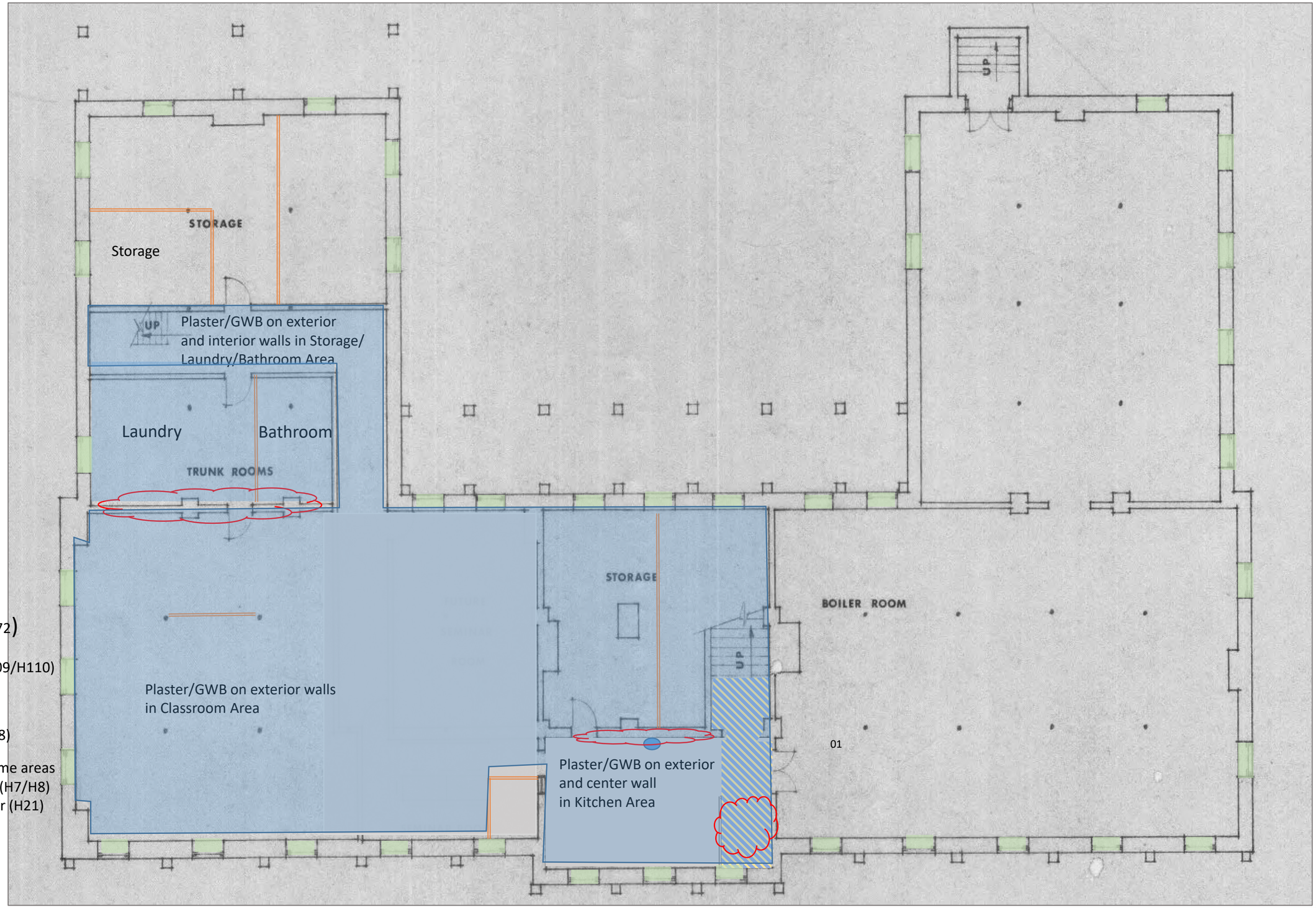
Address: Hamel Hall
33 Ethan Allen Ave
Colchester, Vermont

ATLAS

51 Knight Lane, Williston, Vermont 05495
Phone:(802) 862-1980 Fax: (737) 207-8272

SCALE: Not to scale

N



= 9x9 Floor tile (H65)

= Mudded Joint Packings (H24/H72)

= Window caulk and Glazing (H109/H110)

= Sink undercoating (H63)

= Trace <1% GWB Systems (H7/H8)

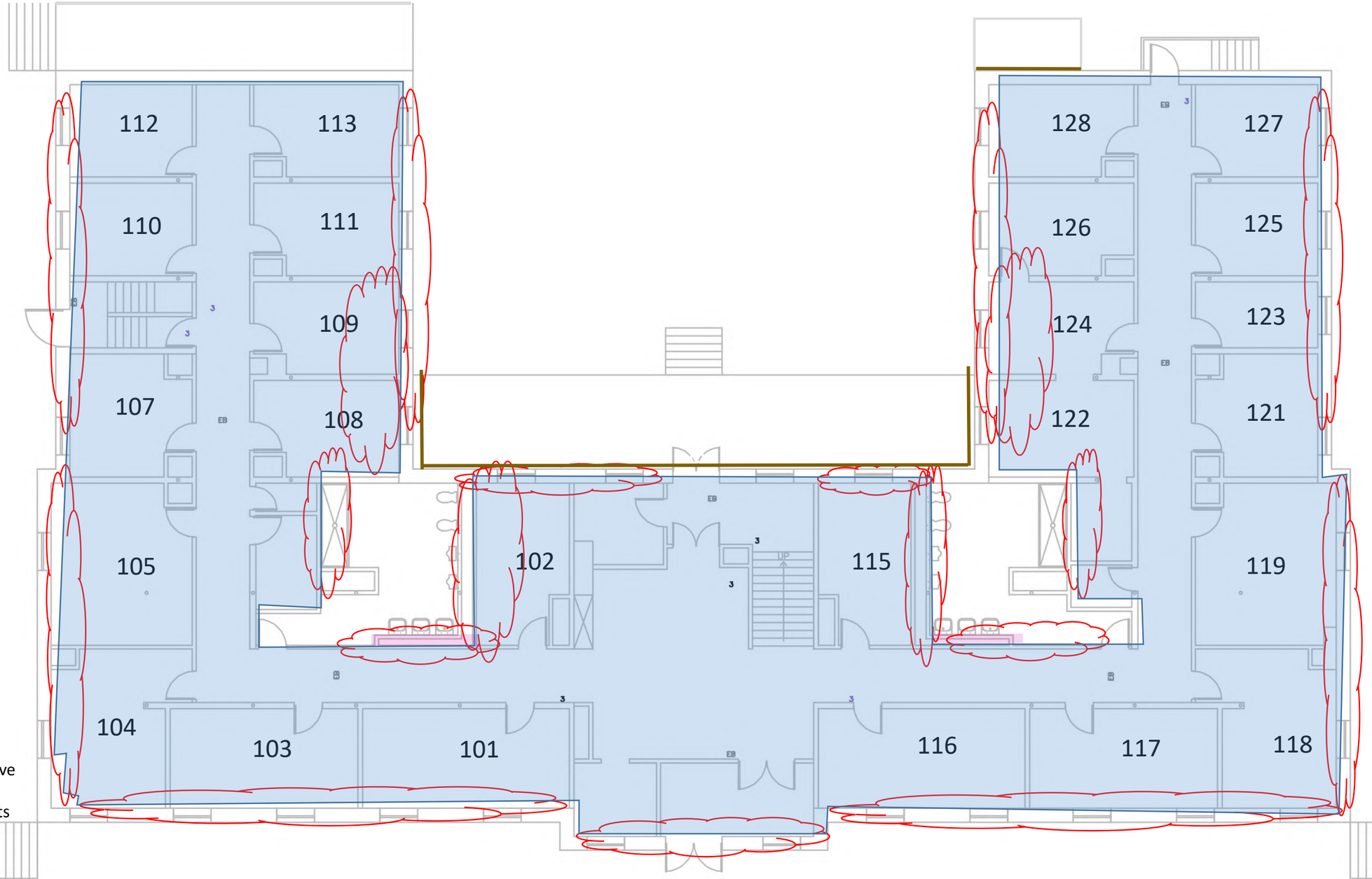
= Plaster Base Layer (H2) and (some areas may be covered with Trace GWB (H7/H8) and adhesive with GWB to plaster (H21)

ACBM Location Diagram – Diagram I - Basement
Address: **Hamell Hall**
123 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None



Roof Flashing Cement (H114)

Mirror adhesive (H31)

Mudded Joint Packings located above ceilings and within water closets and walls feeding up to heating units on second floor (H24/H72)

Plaster Base Layer (H2) and (some areas may be covered with Trace GWB (H7/H8) and adhesive with GWB to plaster (H21) All areas may contain 9x9 Floor Tile (H65) underneath flooring

HAMEL FIRST FLOOR

ACBM Location Diagram – Diagram II – First Floor
Address: **Hamell Hall**
123 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None

Mudded Joint Packings located within water closets and walls feeding up to heating units on second floor **(H24/H72)**

Mirror adhesive (H31)

Plaster Base Layer (H2) and (some areas may be covered with Trace GWB (H7/H8) and adhesive with GWB to plaster (H21) All areas may contain 9x9 Floor Tile (H65) underneath flooring

HAMEL SECOND FLOOR

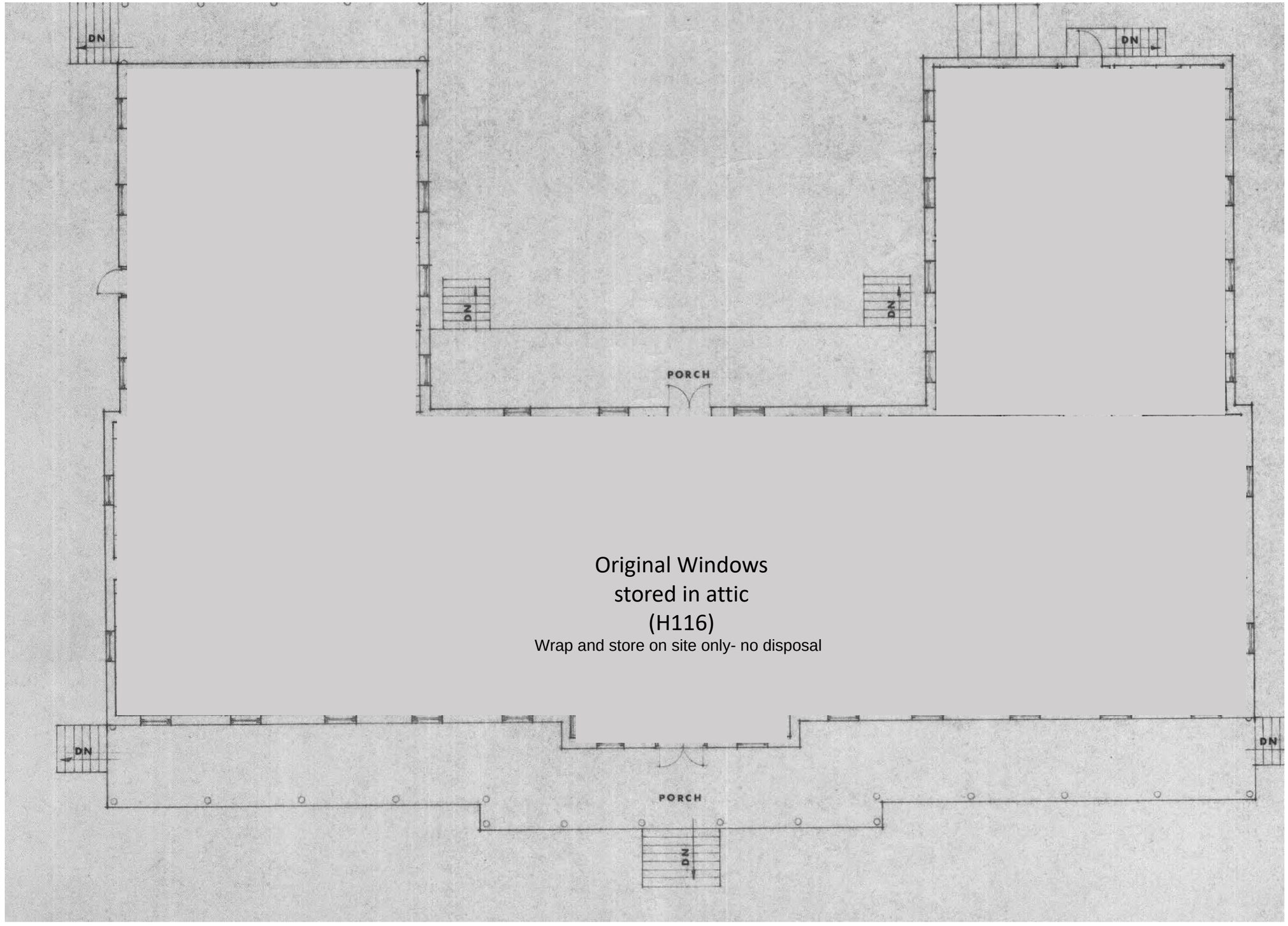
ACBM Location Diagram – Diagram III – Second Floor
Address: **Hamell Hall**
123 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None

N



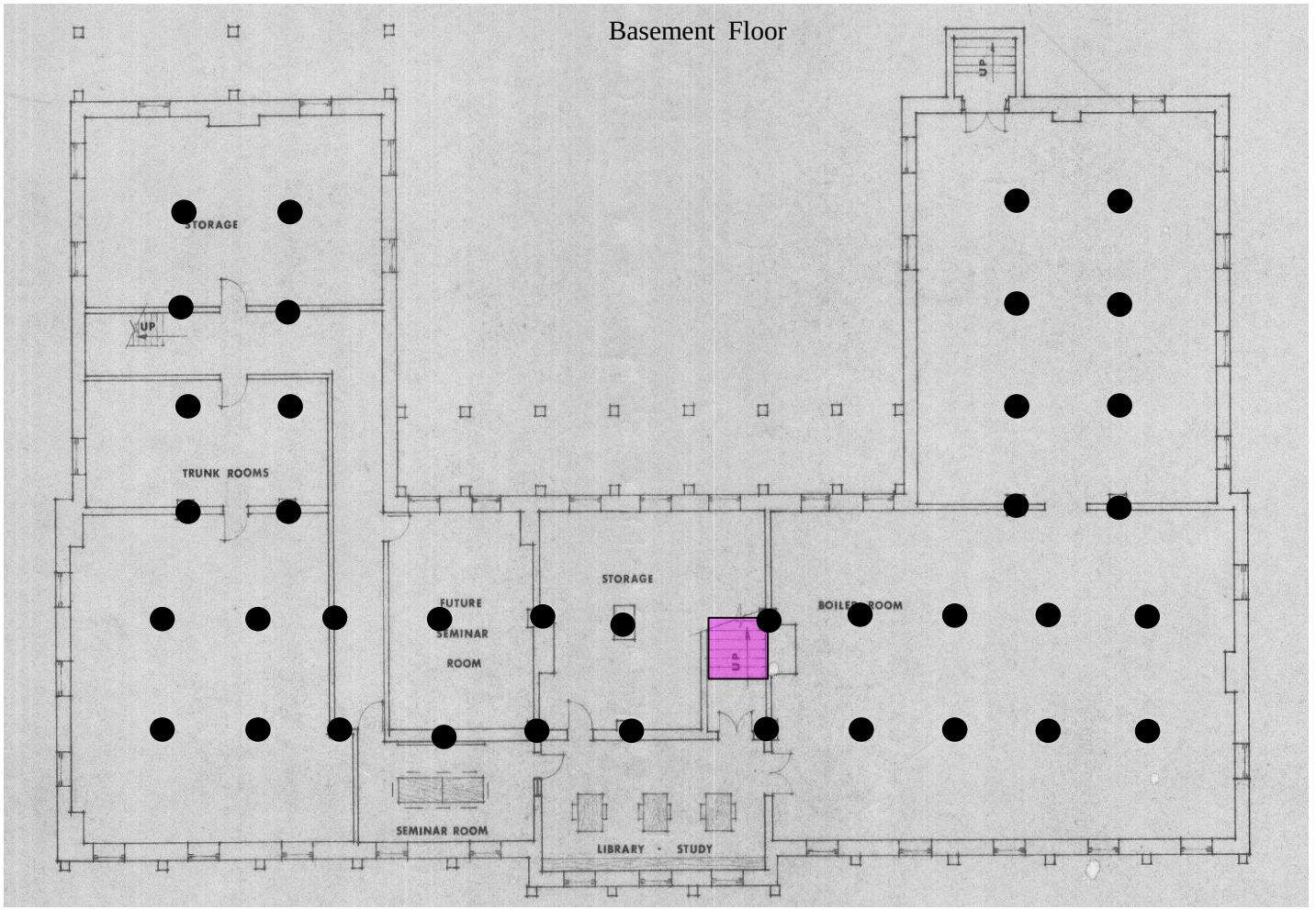
Original Windows
stored in attic
(H116)
Wrap and store on site only- no disposal

ACBM Location Diagram – Diagram IV – Attic
Address: **Hamell Hall**
123 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None



= Adhesive with Stair Tread, Brown Residual, 3.74ppm – 343ppm

= Paint on Metal Columns - Green, 4.2ppm – 190ppm.

PCB CONTAINING MATERIAL LOCATION DIAGRAM

Address: Purtil Hall
81 Ethan Allen Ave.
Colchester, Vermont

ATLAS
51 Knight Lane, Williston, Vermont 05495
Phone:(802) 862-1980 Fax: (737) 207-8272

SCALE: Not to scale

1st Floor

N

= **Adhesive with Stair Tread, Brown Residual, 3.74ppm – 343ppm**

= **Exposed Metal Support Columns to** be stripped (non TSCA, LBP coatings)

PCB CONTAINING MATERIAL LOCATION DIAGRAM

Address: **Purtil Hall**
81 Ethan Allen Ave.
Colchester, Vermont

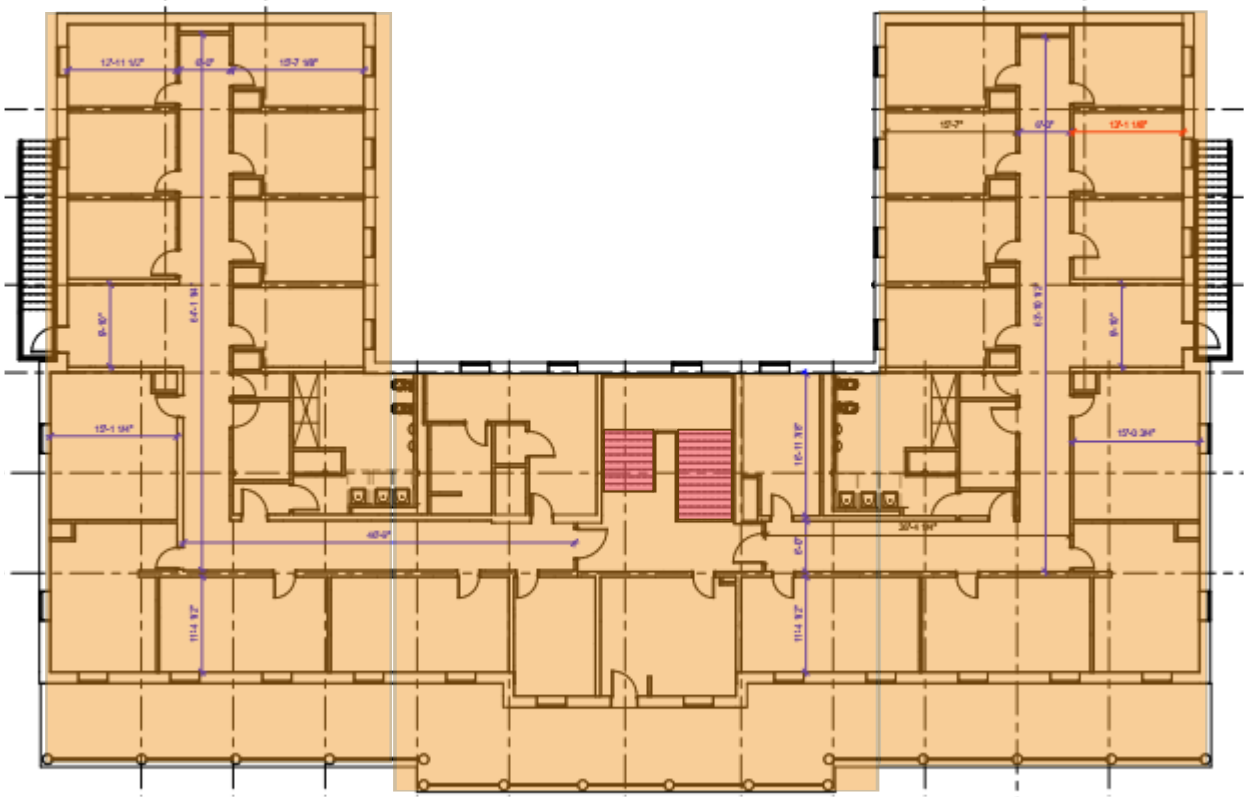
ATLAS

51 Knight Lane, Williston, Vermont 05495
Phone:(802) 862-1980 Fax: (737) 207-8272

SCALE: Not to scale

2nd Floor

N



= Exposed Metal Support Columns to be stripped (non-TSCA, LBP coatings)

= Adhesive with Stair Tread, Brown Residual, 3.74ppm – 343ppm

PCB CONTAINING MATERIAL LOCATION DIAGRAM

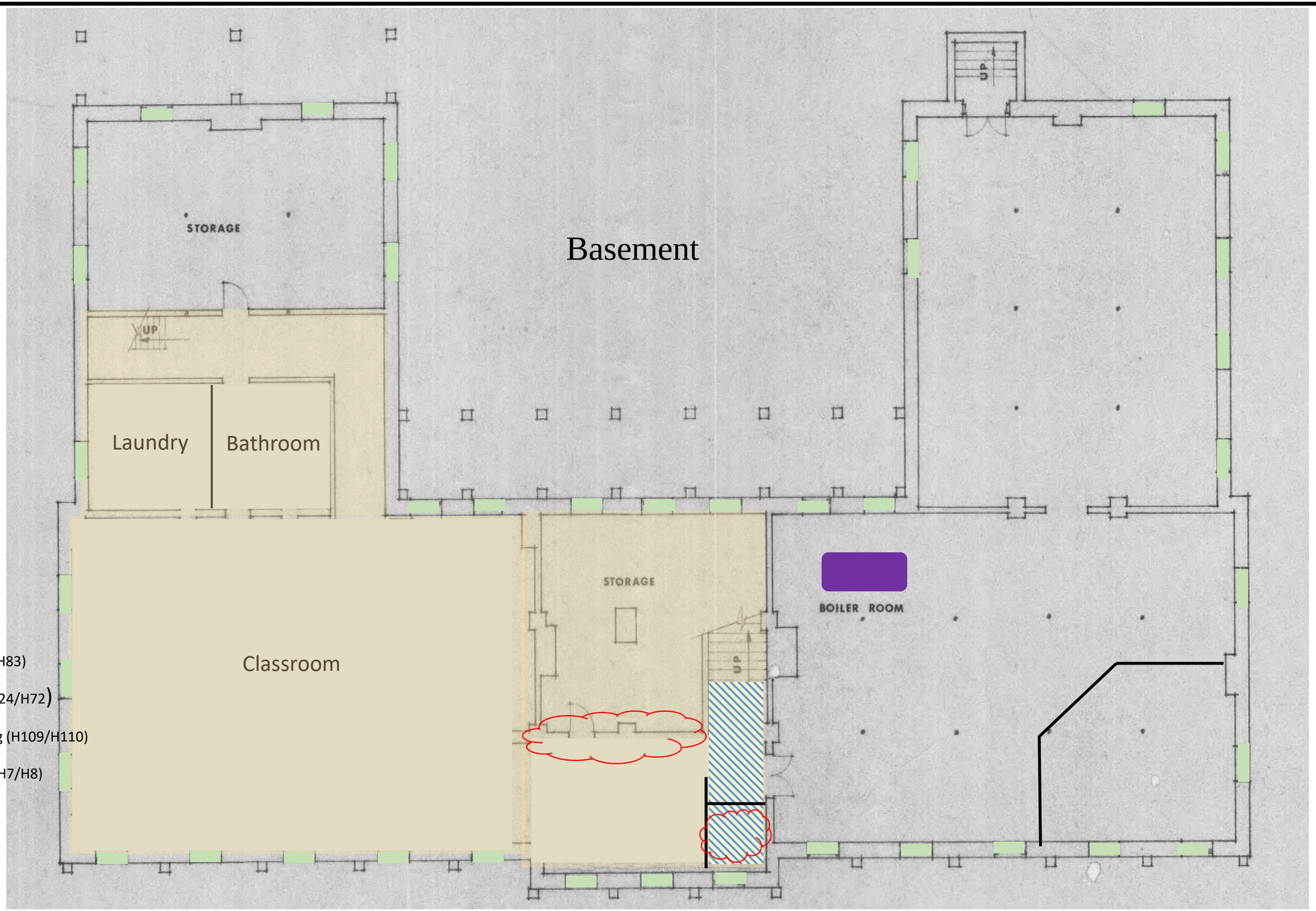
Address: Purtil Hall
81 Ethan Allen Ave.
Colchester, Vermont

ATLAS

51 Knight Lane, Williston, Vermont 05495
Phone:(802) 862-1980 Fax: (737) 207-8272

SCALE: Not to scale

N



= 9x9 Floor tile (H65, H82, H83)

= Mudded Joint Packings (H24/H72)

= Window caulk and Glazing (H109/H110)

= Trace <1% GWB Systems (H7/H8)

ACBM Location – Diagram I - Basement
Address: **Purtill Hall**
33 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None

N

Flashing Cement (H114)

Roofing Tar (H113)

Joint Compound/GWB (H7/H8) and 9x9 Floor tile (H65, H82, H83) under the underlayment

Mirror adhesive (H31)

Mudded Joint Packings as well located above ceilings and within water closets and walls feeding up to heating units on second floor (H24/H72)

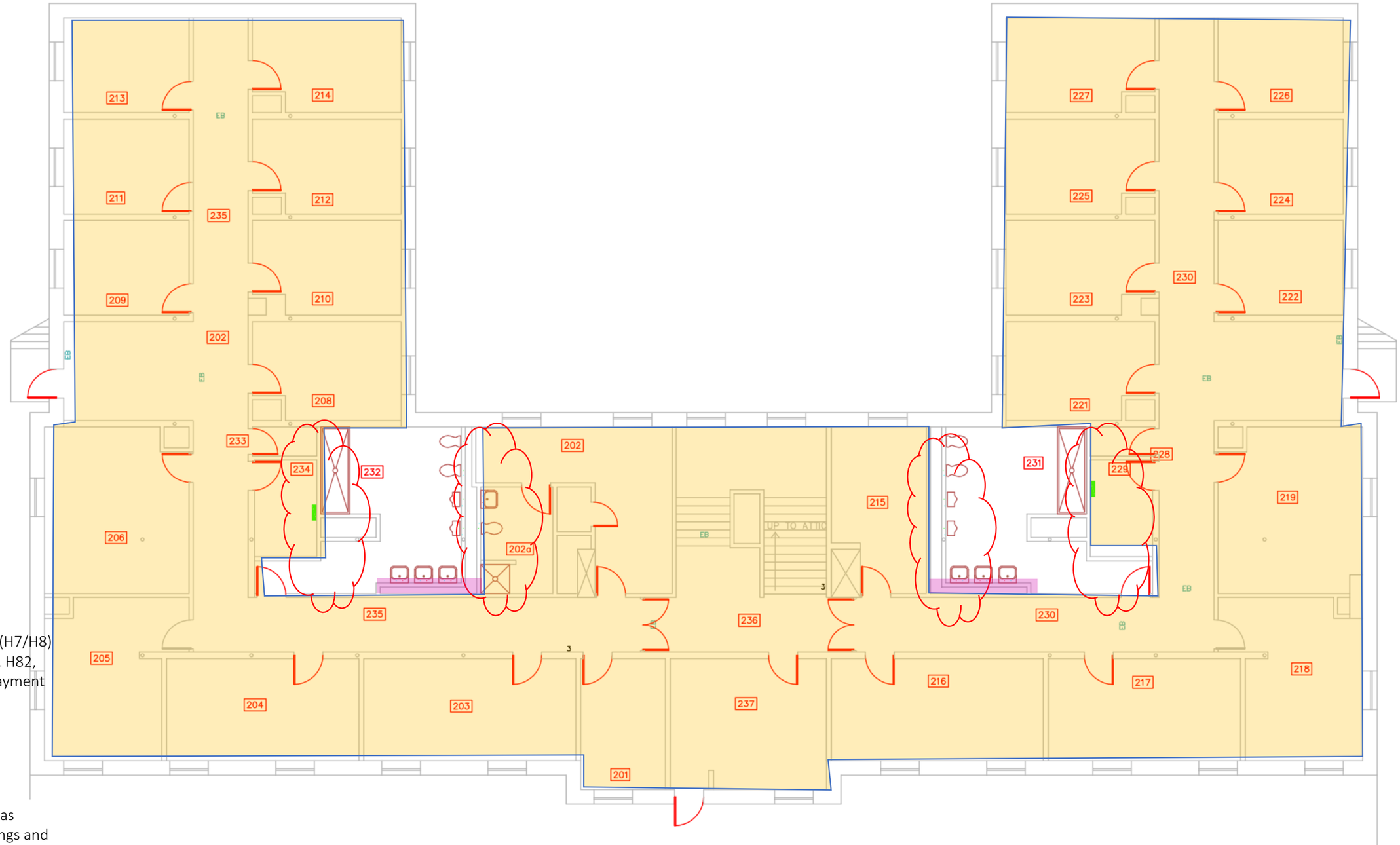
ACBM Location – Diagram II – First Floor
Address: Purtill Hall
81 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None

N



Joint Compound/GWB (H7/H8) and 9x9 Floor tile (H65, H82, H83) under the underlayment

Mirror adhesive (H31)

Mudded Joint Packings as well located above ceilings and within water closets and walls feeding up to heating units on second floor (H24/H72)

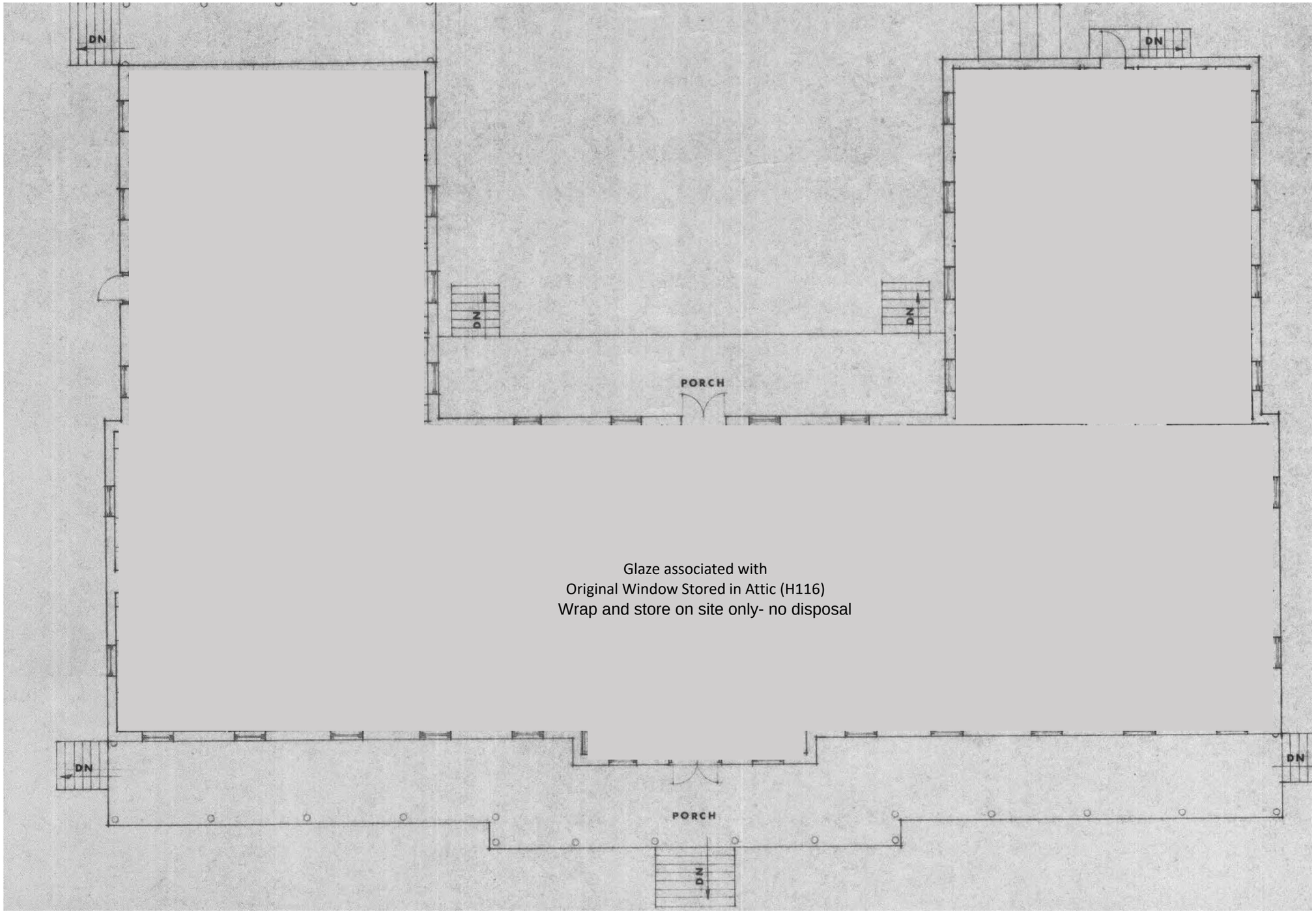
ACBM Location – Diagram III – Second Floor
Address: Purtill Hall
81 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None

N



Glaze associated with
Original Window Stored in Attic (H116)
Wrap and store on site only- no disposal

Asbestos Location – Diagram IV – Attic
Address: **Purtill Hall**
81 Ethan Allen Ave
Colchester, Vermont

SOURCE : Client

ATLAS
51 Knight Ln. Williston, Vermont 05477
Phone:(802) 862-1980 Fax: (737) 207- 8272

SCALE: None