CORRECTIVE ACTION PLAN

MORAN CENTER AND WATERFRONT NORTH

475 Lake Street
Burlington, Vermont

SMS Sites #2005-3357 & #90-0540

Prepared for:

The City of Burlington
Community and Economic Development Office
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PROFESSIONAL ENGINEER'S REVIEW:

I have reviewed this ***Corrective Action Plan*** for the Moran Center and Waterfront North in Burlington, Vermont prepared by Waite Environmental Management, LLC for the City of Burlington, dated August 24, 2011.

August 25, 2011

Date

Dirk Grotenhuis, P.E.
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STATE OF VERMONT
DIRK GROTENHUIS
No. 018-0008943
CIVIL
9/25/11
LICENSED
PROFESSIONAL ENGINEER

CAP CHECKLIST

A document cover that includes the site name, location, and SMS site number as well as the responsible party's name, address, and phone number.	See Cover Page
An Executive Summary that includes a statement of the problem (why corrective action is needed), a review of the results of the investigation(s), a description of the chosen corrective action technology, a statement of site operations and monitoring activities, and an estimation of the duration of the cleanup.	See page vi
A one-page News Brief (under separate cover) that consists of the CAP Executive Summary.	With cover letter
A Table of Contents.	See page i
A copy of the Executive Summary from the Site Investigation.	See sections 3.4, 3.5, 3.7, 3.12, 3.13, 3.18, and 3.19 for executive summaries of different investigations.
Tabular, time series summaries of contaminant concentrations by media and water table elevations.	See Appendix B
Appropriately scaled maps including a detailed site plan, area plan (including sensitive receptors and neighboring properties), and a USGS 7.5 minute topographical map.	See Appendix A
At least two cross-sections of the contaminated zone (ideally, along the long axis and perpendicular to the contaminated zone) depicting well or boring depths, soil stratigraphy, recent soil contaminant concentrations, and recent water levels.	See Appendix A
A recent groundwater elevation contour map.	See Appendix A
A recent contaminant concentration map.	See Appendix A
A list of all sensitive receptors at risk of affected as well as all interested, threatened, or impacted third parties including contact names, locations and addresses, and phone numbers.	See Section 4.0
A discussion of the reasons for and goals of the corrective action.	See Section 1.0 & Section 4.1
A qualitative feasibility study of various corrective action alternatives (e.g. CAFI).	See Section 6.4

CAP CHECKLIST, CONT.

An in-depth, quantitative review of the recommended remedial alternative(s) chosen with a discussion of 'real world' limitations.	Not required for this project
A schedule for CAP implementation	See Section 8.0
An estimate of the contaminant mass of volume, expected removal rates, and the duration of cleanup.	See Section 6.0 – 8.0
Plans and specifications of the corrective action remedial design and related calculations.	See Appendix A
All CAFI data	Not required for this project
A list of all contractors and sub-contractors, including contact people, addresses and phone numbers.	See Section 4.1
A list of all permits required for the project, and the contacts necessary to obtain these permits.	See Section 6.1 & 7.1
A discussion of all hazardous and solid waste disposal issues.	See Section 4.0
A separate itemized cost estimate for CAP implementation and system operations and maintenance (O&M). This cost estimate should be broken down by task and by labor cost, sub-contractor costs, and equipment costs. The requirement for a cost estimate may be waived for sites using private funds.	See Section 9.0 for 2011 estimated costs
A schedule for evaluation of start-up of remedial system.	Not required for this project
A formal long-term monitoring and O&M plan for the corrective action.	See Section 6.4.18, 7.3 and 7.7
An updated Health & Safety Plan.	See Appendix D
A Professional Engineers signature of review.	See Page iv

Moran Center and Waterfront North, Burlington, Vermont
VT DEC Site #2005-3357, Closed Site #90-0540

EXECUTIVE SUMMARY/NEWS BRIEF

The following Corrective Action Plan (CAP) was prepared by Waite Environmental Management, LLC (WEM) for the City of Burlington, Community and Economic Development Office (CEDO) into guide the development of the Moran Center and associated Waterfront North Development. The Site is composed of Parcel A and Parcel B totaling 9.85 acres owned by the City of Burlington, and includes the building and grounds of the Former Moran Generating Plant, land occupied by the Burlington skate park, a portion of the Burlington Bike Path, portions of Lake Street and Penny Lane, parking and grounds of the Burlington Water Department and Burlington Department of Public Works (BDPW) water pumping facility, and grounds and electrical infrastructure of the Burlington Electric Department (BED) and Green Mountain Power (GMP). The Moran Plant area of concern site is on Parcel A and is identified by the Vermont Department of Environmental Conservation (VT DEC) as active site #2005-3357. The Penny Lane area of concern and Transformer Yard area of concern are also identified as site #2005-3357 and are both on Parcel A, but additional work is required to determine the full limits of these areas. The BDPW water pumping facility is on Parcel B and identified by the VT DEC as closed site #90-0540.

The CAP was prepared per requirement of the Vermont Department of Environmental Conservation (VT DEC). The VT DEC contact is Mr. Hugo Martínez Cazón, P.E. (address: 103 S. Main Street, Waterbury, VT 05671-0404; phone: (802) 241-3892; email: hugo.martinezcazon@state.vt.us). Electronic copies of this CAP can be requested from the VT DEC. A previously prepared CAP that guided previous phases of corrective action inside the Moran Plant in 2009 and 2010 is also available for review.

The objective of the corrective action is to ensure that residual contaminants at the Site do not pose an undue risk to construction workers during redevelopment activities or to future users of the property. More specifically, the corrective action will:

- Address known areas of environmental concern, identified by exceedences of EPA Regional Screening Levels (RSLs) for residential soil, site specific VT DEC guidance on Arsenic in soils, and by Vermont Groundwater Enforcement Standards, as well as other pertinent federal and state guidance. If yet unknown areas of environmental concern are identified during the redevelopment activities, they will be documented and addressed appropriately with approval of the VT DEC.
- Manage contaminated and uncontaminated soil using a classification and stockpiling system during construction that will allow for reuse of soil as fill material as appropriate. Soil that cannot be reused as fill will be managed in stockpiles or disposed of at an appropriate treatment facility.
- Provide a constructed and continuous barrier that will deter direct contact with potentially contaminated soil, and allow use of the Waterfront North/Moran Center area for recreational activity. This will be done using a combination of engineering and institutional controls that will suitably manage exposure risks to below EPA RSLs.
- Ensure that the proposed stormwater treatment systems will be constructed and operated in a manner that will avoid the infiltration of surface water into areas with known or potential soil contamination.
- Install vapor intrusion control measures that will be shown to impede migration into the Moran Center envelope of vapors from external soil contaminants and contaminants within and under the existing concrete foundation that is to be covered to manage exposure risks to below EPA RSLs.

The exterior contaminants of concern have been identified as arsenic in the shallow soil within the entire project area, polycyclic aromatic hydrocarbons (PAH) in the shallow soil within the entire project area, petroleum in soil and groundwater under Penny Lane and the BDPW parking lot, polychlorinated biphenyls (PCBs) in soil in a discrete zone in the former transformer yard, and chlorinated volatile organic compounds (VOCs) in groundwater in a small plume off the north side of the Moran Plant. The interior contaminants of concern inside the Moran Plant have been identified as PCBs in the concrete of the basement floor, residual contaminants in sediment in sub-basement channels, and a few remaining asbestos-containing materials (ACMs) in interior and exterior building components.

Additional assessment of two previously identified areas will be required as part of this CAP. An additional subsurface investigation for the Penny Lane area of concern is planned for summer of 2011 and will involve soil borings, soil testing and groundwater testing to further assess the source and full impacts of former petroleum release(s). An additional assessment and remediation of contaminated soil from former release(s) of PCBs-containing transformer oil is required for the Transformer Yard area of concern and will be completed prior to the start of construction in this area. Additional assessment will also be required if during the course of construction work newly identified areas of concern are identified.

Disturbance of an estimated 18,200 cubic yard (CY) of soil is anticipated during the 2011-2012 construction work. This CAP provides a Soil Management Plan that divides the project area into fourteen zones and establishes an offsite soil stockpiling area. The basic components of this plan are:

1. Soil excavated for grading and utility trenching will be temporarily stockpiled offsite and then the acceptable type and volume will be returned for onsite re-use as fill. All pre-existing surface and shallow (<2 ft deep) soils that are re-used onsite shall be covered by a continuous cap of filter fabric as a marker layer followed by either clean topsoil and cover material (grass, plantings, or mulched beds) or else hardscape/impervious surface to deter future contact with the soil. An O&M Plan will be developed to require annual inspections of the topsoil cap.
2. A combination of field screening with a PID and Ex Situ (once the soil has been excavated and stockpiled) analytical testing and will be required for classifying all soil to be stockpiled and potentially reused during the entire project.
3. Strict record keeping of soil types, stockpile volumes, and reuse volumes will be required.
4. Continuous observation of soil conditions will be required during excavation and trenching to flag any unanticipated contaminant conditions (buried objects, odors, staining, free product). If unanticipated conditions are encountered, then In Situ (from excavation zone prior to removal) analytical testing will be required for the contaminants of concern. This may require excavation activities in the area of concern to cease while the testing results are pending.

Groundwater will also be encountered during the 2011-2012 construction work. The need for special treatment of groundwater or dewatering of excavations is not anticipated to be required with the exception of a few identified areas, in which management of groundwater will be accomplished by analytical sampling, settling in frac tanks, appropriate treatment, followed by discharge to the City sanitary sewer system.

Redevelopment of the Moran Plant building in 2012 will involve raising the basement floor by seven feet with a layer of fill and new concrete slab. A sub-slab depressurization system will be installed to prevent potential indoor air quality impacts from external soil contaminants and contaminants within and under the existing concrete foundation. Performance testing of this system followed by pre-occupancy indoor air testing will be conducted, and an O&M Plan will be developed to specify future testing requirements.

The redevelopment efforts are being funded by a combination of City funds, third party governmental grants, and tax credit equity. Some of the environmental assessment costs to date have been funded by EPA Brownfields grant money, and some of the cleanup costs to date have been funded by VT DEC Brownfields grant money. EPA Brownfield grant money may cover some of the corrective action assessment tasks, including sampling, VT DEC reporting, and As-Built Report preparation.

1.0 INTRODUCTION

The following Corrective Action Plan (CAP) was prepared by Waite Environmental Management, LLC (WEM) for the City of Burlington, Community and Economic Development Office (CEDO) to guide the development of the Moran Center and associated Waterfront North Development. The Site (refer to Site Location Map in Appendix A) is composed of 9.85 acres shown as Parcel A and Parcel B on Figure 1, with a general address of 475 Lake Street. This Site includes the building and grounds of the Former Moran Generating Plant, land occupied by the Burlington skate park, a portion of the Burlington Bike Path, portions of Lake Street and Penny Lane, parking and grounds of the Burlington Water Department and Burlington Department of Public Works (BDPW) water pumping facility, and grounds and electrical infrastructure of the Burlington Electric Department (BED) and Green Mountain Power (GMP). The Moran Plant site is on Parcel A and identified by the Vermont Department of Environmental Conservation (VT DEC) as active site #2005-3357. The Penny Lane area of concern and Transformer Yard area of concern are also on Parcel A and contained within active site #2005-3357. The BDPW water pumping facility in on Parcel B and identified by the VT DEC as closed site #90-0540.

The objective of the corrective action is to ensure that residual contaminants that have been identified in the shallow soil and groundwater under portions of the Site as well underneath and inside the Moran Plan do not pose an undue risk to construction workers during redevelopment activities or to future users of the property. The cleanup goals to be used are the EPA Regional Screening Levels, the VT DEC site specific cleanup goals, and the Vermont Groundwater Enforcement Standards. These objectives and goals apply to work to be conducted during the Waterfront North development during 2011-2012 and during the renovation of the Moran Plant into the Moran Center during 2012. Previous phases of corrective action have been conducted inside the Moran Plant in 2009 and 2010, including removal of asbestos containing materials, pigeon guano, basement debris, contaminated sediment, and basement dewatering. The previous work was conducted in general accordance with WEM's *Corrective Action Plan For Building Cleanup* [1] which was approved by the VT DEC in April 2009.

The engineering and planning for the Moran Center and Waterfront North was done jointly by CEDO, Resource Systems Group (RSG), Engineering Ventures (EV), Freeman French Freeman (FFF), the SE Group, Stantec, and WEM. Other parties involved have been the Burlington Department of Public Works (BDPW), the Vermont Agency of Transportation (VTrans), and the Federal Highway Administration (FHWA). The oversight of the corrective action proposed in this document will be a joint effort between WEM, RSG, EV, Stantec, BDPW, VTrans, FHWA, and the contractor(s) chosen for the work.

2.0 SITE DESCRIPTION

The "Site" for the purposes of this CAP is composed of 9.85 acres in the City Of Burlington, shown as Parcel A and Parcel B in Figure 1 in Appendix A. The Site is further defined into sections described below; refer to Figures 2, 3, and 4 for identification of the areas.

- **Moran Center (Parcel A; VT DEC Site #2005-3357)**: This area includes the Moran Plant and the grounds immediately east, west, and north of the property. The Moran Plant is a 120 ft by 140 ft steel, brick and concrete structure on a mat concrete foundation. Currently the building is vacant. The area east of the Moran Plant is an asphalt covered area that is currently being used for boat storage by the Lake Champlain Community Sailing Center (LCCSC). The area north of the Moran Plant is grass and gravel covered area also used for boat storage by the LCCSC. The area west of the Moran Plant is gravel covered and leads to docks used by the LCCSC.
- **Waterfront North (Parcel A & B; VT DEC Site #2005-3357, closed Site #90-0540)**: This area includes the southern half of the Site currently occupied by the end of Lake Street and Penny Lane, the skate park, the former electrical transformer and switchyard areas, and parking lots currently used by the Burlington Water Department, the parking and equipment storage areas used by Burlington Electric Department, the parking area next to the BDPW Pumping Station building, and a public parking lot for the fishing pier. This area also includes an eastern portion of the Site that is occupied by the existing Burlington bike path and gravel road that leads to the Urban Reserve. Finally, a component of WFN is the area north and northeast of the Moran Plant that is currently a grassy yard and scrub vegetated area.
- **New Lake Champlain Community Sailing Center (Parcel A)**: This area is the northern acre of the Site that is currently a scrub vegetated area and Class III wetland with approximately 200 ft of Lake frontage.
- **Penny Lane Area (Parcel A; VT DEC Site #2005-3357)**. This general area encompasses approximately 250 ft of Penny Lane (informal name for the end of Lake Street) between the bike path and the Water Department building.
- **Transformer Yard (Parcel A; VT DEC Site #2005-3357)**: This 5,500 ft^2 fenced off area is located off the southwest corner of the Moran Plant. This property is owned by the City of Burlington but has been operated by Burlington Electric Department (BED) for many years, and more recently the use has been shared with Green Mountain Power (GMP). This area was actively used until 2009-2010 when most of the electrical infrastructure was removed.

Two auxiliary sites are also discussed in this CAP, described below and shown in Figure 20-21.

- **Former Astroline Property**: This property is located in the Urban Reserve north of the Site, further identified by the VT DEC as Site #94-1585. Currently, this property is vacant with no particular land use with the exception of a temporary dog park. A portion of this property is proposed to be used as a temporary inline/ice skating rink during construction work on the WFN and Moran Center projects, and as a temporary contractor staging area. This area is identified on Figure 20. Construction and staging activities here will be guided by the erosion prevention and sediment control plan developed by

EV. The staging area will be surrounded by a fence, and will be used for equipment storage, employee parking, and storage of non-erodible construction materials. Storage of any other materials must be approved by the City of Burlington and the VT DEC.

- **Flying A Site / Former Astroline East Property**: This property is located further north in the Urban Reserve, also associated with VT DEC Site #94-1585. Currently, this property is used by the BDPW for temporary soil stockpiling and snow storage. This area is proposed to be used as a soil stockpiling area during the construction work on the WFN and Moran Center projects. Additional description of the proposed use of this area are described in Section 6.4.14 and in Figure 21.

2.1 Topography and Drainage

Slopes across the Site are generally shallow, typically ranging from 1% - 2%. The existing topography contours are shown in Figure 5 in Appendix A. The ground surface elevation ranges between 101.0 and 106.0 ft above mean sea level (NAVD88 datum). The Lake level typically varies between 95.0-101.0 ft. Given the low relief, this Site is within the 100-year floodplain of Lake Champlain. Topographical relief to the east of the Site is much greater, where the ground surface rises steeply to the east.

At the north end of the Site lies a portion of a Class III wetland, which has been evaluated by VHB-Pioneer [2]. The wetland was created when water filled in the earthen berm and depression left behind when a bulk petroleum tank was removed in 1992. The delineation of the wetland is shown as a green dashed line in Figure 5. This wetland is subject to U.S. Army Corps of Engineers (USACOE) and VT DEC Water Quality Division permitting and mitigation process. The City is in the process of obtaining the permit, and will provide a copy of the permit to the VT DEC prior to the start of work. Wetland/buffer disturbance is not anticipated until the 2012 construction season.

2.2 Geology & Hydrogeology

This part of the Burlington waterfront was constructed through the placement of fill into areas adjacent to the lake; the fill boundary is roughly the line of the bike path, so most of the Site is located within this fill area. The thickness of fill ranges between 1 to 8 ft and is composed of a mix of sand and gravel with varying amount of silt. At some locations, the fill is mixed with asphalt, wood, brick and coal. The native soil below the fill is generally fine to medium sand. Refer to soil boring logs in Appendix C for additional details on the soil stratigraphy.

The soil east of the fill material is mapped as Adams-Windsor series, characterized as deep, loose, and excessively well-drained sandy loams. Bedrock under the site, which was not encountered during any drilling efforts, is mapped as Dunham Dolomite.

Overburden groundwater is relatively shallow under the Site, ranging in depth from 1-6 feet below grade. This translates to elevations between 96.5 to 101.5 ft. Groundwater elevations fluctuate seasonally, often by several feet. Refer to Table 2 and Graph 1 in Appendix B for historical groundwater elevation data from monitoring wells for the Moran Plant site.

Monitoring well locations are shown on Figure 5. It should be noted that top of the groundwater, or water table, is consistently above the Moran Plant basement floor elevation of 96.0 ft. During former operations of the Moran Plant a system of sumps and pumps were actively utilized to keep the basement space dry. The water inside the Plant intruded from both the Lake and from groundwater seepage. The Lake water intrusion has now been stemmed by the closure of the sluicegates (see Section 3.8), but it is evident that some level of groundwater seepage into the building envelope continues through cracks and utility conduits.

Groundwater flow under the Moran Plant is generally to the west/southwest with a lateral hydraulic gradient between 0.01 – 0.02 ft/ft. The flow direction and gradient in the northern portion of the Site is slightly different due to the presence of the wetland. A recent groundwater contour map is shown in Figure 7 in Appendix A.

2.3 Abutters

This Site is abutted to the north by the Urban Reserve and to the east by the Burlington bike path and railroad right-of-way. Directly to the south is the Burlington Water Department and U.S. Coast Guard. Lake Champlain abuts the property to the west.

2.4 Existing Building Description

The Moran Plant is the only building being renovated as part of this project. The building shared by the BDPW and Burlington Electric Department is not being modified and is not addressed in this CAP.

A cross-sectional view of the Moran Plant building is shown in Figure 22. A brief description of the components of the building are described below:

- **Sub-Basement**: The building is constructed on a mat foundation that extends to an elevation of 83.0 ft (20 ft below grade) at its deepest point under the building. The top of the mat is at 91.0 ft. Between the top of the mat and the basement floor is a water flume and a series of open cells. The water flume is connected to an inlet sluiceway and an outlet sluiceway and formerly provided a direct connection between the building and the Lake. The purpose of the flume was to provide Lake water for operation/cooling of the former steam boilers. The openings to the flume at the inlet and outlet were plugged in 2008-09. In 2010, we also discovered the presence of two sub-floor channels that run parallel to the northern and southern walls that are accessed from the basement via manholes. The trench and manhole locations are shown in Figure 17. The bottom elevation of the sub-floor channels is 91.5 ft.
- **Basement Level**. The basement level is located between 96.0 and 106.0 ft. A layout of the basement is also shown in Figure 17. The floor area at 96.0 ft is approximately 15,000 ft^2 and is penetrated by a series of steel and concrete columns that support the structure. Most of the floor is at an elevation of 96.0 ft, but there are former generator pits in the floor with a bottom elevation of 91.5 ft. There are also former ash conveyor trenches in the floor with a bottom elevation of 95.0 ft. The basement area, including the pits and ash trenches, was been cleaned of all hazardous material and debris in 2009-10.

The sub-floor channels also have a layer of sediment and this was not removed. Due to rainwater and groundwater infiltration, without active dewatering the basement typically has water above the floor between November and June of each year.

- **Mezzanine, Front Entry, Rear Access Level**: Between 106.0 and 116.0 ft is the front (west) entry space (formerly used by the LCCSC), a steel grate mezzanine system that provides access to the basement, and a rear (east) access/landing area. The front entry space is empty and free of physical or environmental constraints. The mezzanine and stairs are well rusted but are still functional. The rear access area is clean and has a functional large overhead door.
- **Operations Level**: The operations level ("main level") is located between 116.0 ft and 141.0 ft. The main floor used to house the boilers, which have since been removed. The concrete floor is primarily empty and was cleaned of all pigeon guano in 2009. Much of concrete surfaces are painted, as is most of the structural steel. The flaking paint is primarily on the steel surfaces. The western end of this level has office rooms, a bathroom/locker room, and a break room that were formerly used by the employees of the Moran Plant.
- **Deaerator Level**: The deaerator level is located between 141.0 and 176.0 ft. This level has large hoppers that were formerly used to deliver coal to the boilers. The floor is steel grating. The concrete walls and steel structure are unpainted.
- **Upper Platform/Catwalk**: This level is located between 176.0 and the roof at 184.0 ft. It consists of a grated steel catwalk and a large conveyor belt that delivered coal to the hoppers.

One other building and two auxiliary structures are present east of the Moran Plant: 1) a metal shed used by the LCCSC, 2) a concrete bunker that provides access to the coal tunnel that leads to a former hopper next to the railroad tracks, and 3) the base of a former coal elevator. The shed will be removed from its present location and may be reused by LCCSC at their new site. The coal tunnel bunker will be removed and a portion of the coal tunnel will be demolished. The coal tunnel, shown on Figure 5, is a concrete tunnel 95 ft long by 7 ft wide and 7 tall. In the western 50 ft, it slopes downward from an elevation of 105.0 ft to 89.0 ft; the eastern 45 ft have a bottom elevation of 89.0 ft, or approximately 15 ft below existing grade. As of the summer of 2010, the tunnel was completely filled with water. Based on the dimensions, there is approximately 35,000 gallons of water present. Refer to Section 6.6 for discussion of coal tunnel water quality and the dewatering plan.

2.5 Proposed Site and Buildings

2.5.1 Moran Center

The Moran Plant building will be refurbished into the Moran Center, which will have a family adventure center with ice and rock climbing facilities, a restaurant, café, observation deck and green roof. Full details of the architectural design or refurbishment process are not provided in this CAP. The only processes that are addressed in the CAP are the filling of the existing basement, the capping of soil around the perimeter of the building with either clean soil or hardscape, and the installation of a vapor control system under the new basement

floor. The entire basement will be filled with structural fill to bring the new basement floor from an existing elevation of 96.0 ft to a final elevation of 103.0 ft. Refer to Sections 7.2-7.3 for more detail on the filling and installation of a vapor control system.

Site work associated with the Moran Center will be trenching for utilities, re-grading, re-surfacing (pavers), skating rink/splash park construction, and landscaping.

2.5.2 Waterfront North

The Waterfront North development will modify the traffic flow along Lake Street and Penny Lane, extend Lake Street 1,000 ft to the north, re-orient the bike path, re-locate and improve the skate park, add 190 new parking spaces, and construct two gravel wetland stormwater treatment units. As part of the Waterfront North work, existing overhead electric lines will be removed and new underground utilities (water, sanitary sewer, storm sewer, gas, telecom, and electric) will be installed to accommodate the development of the Moran Center and the new the LCCSC. Refer to the Figures 3 and 4 for a proposed layout of the Waterfront North development.

Site work associated with the Waterfront North development will be road and parking lot construction, existing skate park removal and new skate park construction, new bike path construction, utility trenching, stormwater treatment system construction, re-grading, re-surfacing, and landscaping. Demolition of existing road and new road construction will involve disturbing/removal of the upper 2.0 ft of soil, and parking lot construction will involve disturbing/removal of the upper 1.0 ft of soil. Utility trenching is anticipated to disturb the upper 4.0 ft of soil. The construction of two gravel wetlands for the stormwater treatment will disturb the upper 8.0 ft of soil.

The stormwater will be treated via two gravel wetlands anticipated to remove up to 99% suspended sediment and 56% of phosphorous. Runoff from the northern portion of Lake Street, the skate park, pavement areas around the east half of the Moran Center, the roofs of the Moran Center (post green roof) will be directed into the northern gravel wetland. Stormwater will flow through a forebay for sediment removal and then laterally through 2 hydraulically distinct treatment cells. Discharge from the wetland will travel by pipe to the Lake. Stormwater runoff from the southern portion of Lake Street, the loop road, and parking areas east of the BED building will be directed to the southern gravel wetland. This wetland includes a forebay and 2 treatment cells, with discharge running by pipe to the Lake. Both wetlands will have 30-mil HDPE liners to prevent hydraulic connection with the groundwater below. There will be no infiltration through native soil, and no significant modification to the existing hydrogeology. The wetland treatment components have been designed to meet or exceed the requirements of the Vermont Stormwater Management Manual, and are therefore presumed to comply with Vermont's Anti-Degradation Policy. The design is based on gravel wetland treatment system that has been installed and tested at the University of New Hampshire. Once construction is complete, it will be checked by the Resident Engineer for general conformance with the approved design and a designer certification will be made.

Stormwater will also be managed by two swales in the northern portion of the project area. A lined swale will be constructed between the LCCSC boat yard and a retaining wall at the edge of the Class III wetland. An unlined swale will be constructed east and north of the proposed skatepark. The unlined swale, which is in an area outside the known area of VOC contamination, will continue to have clean fill and geotextile marker layer below.

2.5.3 Lake Champlain Community Sailing Center (LCCSC)

The LCCSC development will add a new 100 ft x 90 ft building for office and indoor boat storage, a new gravel boat storage yard, a new boat launch area with associated dock/pier, and a new stormwater treatment swale. A retaining wall is proposed north of the building. This development will disturb approximately 10,000 ft^2 of the Class III Wetland, so a permit is being obtained from the US Army Corps of Engineers (USACOE) and VT DEC Water Quality Division. Refer to the Figures 3 and 4 for a layout of the LCCSC development.

Site work associated with the LCCSC development proposed for 2012 will be re-grading, building construction, boat yard construction, retaining wall construction, stormwater swale construction, and landscaping. The building will be constructed on a concrete slab with frostwalls, anticipated to disturb 5 ft of soil. Please note that this CAP does not address any of the dredging and associated lake sediment testing that may be required for the boat launch/pier construction, as that item will be addressed by the LCCSC separately.

2.6 Site History

The Site has a long history of commercial and industrial use dating back to the 1860s [3]. Filling of the lands can be dated to 1860-1862 when the Vt. & Canada Railroad expanded. A lumber mill known as the Linsley Mill was constructed just north of the Site in 1865 and operated until it was destroyed by fire in the early 1900s. The Mill site was eventually converted into petroleum storage where Astroline constructed a bermed area with a large bulk tank in the 1960s that operated until the early 1990s. Between 1926 and 1938 the American Oil Company also built five petroleum aboveground tanks directly north of the Moran Plant in the area that is now occupied by the stone sculpture.

The southern portion of the Site (Parcel B in Figure 1) now occupied by BED and BDPW was first occupied by the Municipal Waterworks in 1867 where an intake pipe and large pump moved water to the reservoir on Main Street near UVM. Starting in 1904, Burlington's first municipal electric plant was constructed next to the Waterworks and operated until the 1950s when the J. Edward Moran Generating Plant was built just to the north. This coal fired plant was constructed in 1952-54 and operated using coal until 1977. Coal was brought in by rail, stored in a large pile north of the building, and conveyed using a tunnel and elevator system to large hoppers at the top of the building. The decision to convert the Plant to wood was made after it was cited for violations of EPA emissions limits in 1975; soot and fly ash that was emitted was reportedly problematic, particularly to residents of the Lakeview Terrace neighborhood on the bluff east of the Site where a large cloud of black smoke was reported to hang over the neighborhood.

This part of Burlington's waterfront had several fires around the turn of the 19th century. A lumber yard fire that started at the foot of Pearl Street in December 1894 quickly spread and burned 15 acres of lumber piles, buildings, and rail cars, although both the Linsley Mill and the Waterworks buildings were spared. Other fires occurred in 1895 and in 1906, the latter of which destroyed the Linsley Mill.

The Moran Plant was decommissioned in 1986, and since that time the building has generally remained vacant, with the exception of the LCCSC which until recently occupied a small area of the west end of the building. The grounds surrounding the building continue to be used by LCCSC for boat storage.

An archeological resource assessment of the Moran Plant was conducted in 2009 [3] and a Section 106 National Historic Preservation Act determination of "no historic properties affected" was made.

3.0 PREVIOUS WORK SUMMARY

A summary of the environmental work completed to date on the Moran Plant building is described below.

3.1 Moran Plant Decommissioning: 1987

During decommissioning of the Moran Plant in 1987, the vast majority of the asbestos containing materials (ACMs) were removed. Based on records provided to the State by the asbestos contractor, Eastern Refractories Company, Inc. [4], a total of 236 bags of ACMs were removed from the "condenser", and 128 bags of ACMs were removed from the "deaerator tank". Upon removal, the final air clearance results ranged between 0.0013 and 0.0036 fibers per cubic centimeter. During a survey conducted in March – April 1987 [5], dust samples collected throughout the building were determined positive for asbestos, indicating that there was a "definite asbestos hazard to personnel" working inside the Plant. It was recommended that asbestos danger signs be posted throughout the building.

3.2 BDPW UST Removal and Investigation: 1990-93 (closed VT DEC Site #90-0540)

Two petroleum USTs were present under the parking lot west of the BDPW Water Pumping building, as shown in the Figure 5. One 3,000-gallon gasoline UST was removed in June 1990. Petroleum contaminated soil was encountered with the maximum PID reading at 110 ppm, but all soil was backfilled into the tank grave. The VT DEC designated the site as #90-0540, and required the installation of two monitoring wells northwest of the UST zone. Two years later in January 1992, one 2,000-gallon diesel UST was removed, and again contaminated soil was encountered with maximum PID reading at 40 ppm, and again the soil was backfilled. Collection of groundwater from the two monitoring wells was conducted in July 1993, with total volatile hydrocarbons detected at 162 ppb but individual concentrations below the state standards at that time. The VT DEC predicted that the soil contamination would be reduced through natural biodegradation and did not believe the contamination was a threat to Lake Champlain, and they issued site closure in September 1993. Since that time, no further work has been conducted. The monitoring wells are no longer present. Further assessment of this area via a soil boring and soil sampling was conducted in 2009 (refer to Section 3.12).

3.3 Urban Reserve Phase I ESA: 1997

In 1997 Heindel and Noyes (H&N) conducted a Phase I ESA for CEDO on the Urban Reserve [6]. Most of the work focused on the petroleum storage areas to the north and are not pertinent to this Site. The only mention of the Moran Plant in the report was the observation that ground surface near the boundary with the Urban Reserve was littered with coal and lacked vegetation. The wetland was also mentioned in the report, and H&N postulated that the wetland plants and biota were likely breaking down any residual petroleum contamination in the soil and groundwater from the former storage activities.

3.4 Urban Reserve Phase II ESA: 1999

In 1999 Lamoureaux & Dickinson Consulting Engineers, Inc. (L&D) conducted a Phase II ESA for CEDO on the Urban Reserve [7]. Again, while most of the work focused on the petroleum storage areas in the Urban Reserve to the north, there was testing of soil, groundwater, and soil gas at several locations on the Site shown on the Site Plan-Sampling Locations in Appendix A. Testing was for the following contaminants of concern: volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals, and polychlorinated biphenyls (PCBs). Soil was tested via hand auger pits at eight locations shown on Figure 5 as HA-29 through HA-34. Two borings were installed by drill rig shown as BH-19 and BH-22. Four soil gas samples were collected at locations shown as SG-18, SG-19, SG-20, and SG-21. Groundwater was tested from three monitoring wells shown in Figure 5 as MW-10, MW-14, and MW-15 (only MW-14 is still present). In general, the findings of the Phase II ESA were that surficial soil contamination and groundwater quality were found to be at or near background over most of the Urban Reserve. The primary area identified as having significant levels of surficial soil contamination (petroleum, PAHs) was the Astroline parcel. Regarding the southern testing locations in the vicinity of the Moran Plant parcel, the findings were:

- The presence of the chlorinated VOCs in the groundwater immediately north of the Moran Plant at monitoring well MW-14. VOCs were not detected in well MW-10 or MW-15.
- Elevated lead and arsenic in the soil at the perimeter of the Moran Plant at HA-34 and HA-35.

3.5 Moran Phase II ESA: 2005

A Phase II ESA [8] and Additional Brownfield Investigation [9] were conducted on the area surrounding the building and on the grounds of the Moran Plant Site by WEM in 2005. This work included: 1) the installation of twelve soil borings by drill rig with ten of them installed as groundwater monitoring wells; 2) the hand installation of six shallow borings; 3) the sampling of shallow soil at sixteen locations for lab analysis of several contaminants; 4) the sampling of deep soil at ten locations for lab analysis of VOCs; 5) the collection of groundwater samples from eleven monitoring wells for lab analysis of several contaminants; 6) the sampling of 24 different asbestos containing materials (ACMs) for asbestos testing from inside the Moran Plant; 7) and the collection of eleven different paint samples for lead testing from inside the Moran Plant. This work excluded the Transformer Yard area of concern now aggregated as part of the Moran Plant (see Section 3.19). Sampling locations tested include the following, shown on Figure 5 in Appendix A: MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, SB-9, SB-10, MW-11, MW-12, SS-1, SS-2, SS-3, SS-4, SS-5, SS-6, and SS-7. Note that existing monitoring well MW-14 installed in 1999 (see Section 3.4) was also tested. Water and soil testing results are tabulated in Tables 3-8 in Appendix B. Soil boring logs are provided in Appendix C.

The findings of this work were:

- PAHs were detected in the soil at concentrations in excess of the EPA residential RSLs (refer to Section 4.1 for definition of guidance levels) in the shallow soil at most locations tested.
- The metal arsenic was detected at concentrations in excess of the EPA residential RSLs at all locations. Higher concentrations of arsenic are present in the footprint of the former coal pile.
- Some chlorinated VOCs were detected in soil north of the Moran Plant, with a zone of trichloroethene (TCE) and tetrachloroethene (PCE) contamination off the north wall at MW-3. The TCE concentration was below the EPA residential RSL.
- Chlorinated VOCs were detected in groundwater near the building, with a plume of groundwater contaminated by TCE and PCE above Vermont Groundwater Enforcement Standards (VGES) present off the north side of the building.
- 3 types of building material tested positive for asbestos: 1) exterior window caulk; 2) corrugated window panels; and 3) exterior roof flashing. In each case the asbestos was classified as chrysotile.
- Lead was found to be present in all of the painted surfaces tested. Lead concentrations ranged from 0.01% to 14.0%.
- Contamination by bird droppings was present on most of the main and upper levels of the Moran Plant. The bird droppings are commingled with dust that has accumulated over the years.

The findings ruled out contamination of soil by other metals, PCBs, cyanide, and petroleum VOCs, as any detected concentrations were below EPA residential RSLs. The findings also ruled out contamination of groundwater by metals, PAHs, PCBs, and petroleum VOCs.

3.6 Interim CAP Development

At the request of the VT DEC, WEM developed an interim Corrective Action Plan [10] to address the approximately 11,000 ft^2 zone of high arsenic concentrations in soil in the lawn north of the Moran Plant. The objective was to control short-term exposure to arsenic by public users of the property. As part of the CAP development process, the VT DEC agreed to a site-specific arsenic cleanup guideline of 35 mg/Kg. Elements of the CAP included:

- The emplacement of 6 inches (after compaction) of clean topsoil above the 16,000 ft^2 zone to cover the high arsenic zone and the area where coal is visible on the ground surface;
- Prior to emplacement of the topsoil, it would need to be tested for contaminants of concern (arsenic and PAHs) to ensure that it was indeed clean.
- The use of signage to inform the public of the presence of arsenic in the soil and warning against excavation of the soil.
- Educating users of the properties (LCCSC and University of Vermont sailing team) about the arsenic in the soil and health risks of arsenic.

The interim CAP was approved by the VT DEC, but the soil capping plan was not pursued by the City. Instead, this area was fenced off during the summer of 2009 to deter public exposure and signage was added.

3.7 Additional Phase II ESA Testing: 2006-2010

Additional monitoring of groundwater from the monitoring wells at the Moran Plant Site has been conducted by WEM to track the concentrations of VOCs. The sampling was conducted on a semi-annual basis in 2006-2008, and then on an annual basis in 2009-2010. All groundwater sampling results are shown in Table 3 in Appendix B.

On September 24, 2008 WEM oversaw the advancement of soil boring/monitoring well off the northwest corner Moran Plant building, shown on the Site Plan as MW-13 [11]. This well was installed at the request of the VT DEC to further evaluate the hot spot of TCE and PCE contamination. Subsequent testing results (see Table 3) indicate the presence of dissolved petroleum and chlorinated VOCs, but all at concentrations below VGES. The soil boring log is provided in Appendix C.

In August 2009, WEM conducted a subsurface investigation to assess soil conditions and quality east, north, and northeast of the Moran Plant in anticipation of Moran Center development [12]. This work was conducted with funding from the Chittenden County Regional Planning Commission under a QAPP approved by VT DEC and EPA. Eleven soil borings were installed at three locations on the Moran Plant site: 1) the footprint of the proposed transition skate park, 2) the footprint of the proposed ice skating rink, and 3) the footprint of the proposed north gravel wetland stormwater treatment area. The boring locations are shown as SB-15 through SB-25 on the Figure 5. The soil boring logs are provided in Appendix C. Soil testing was for VOCs, PAHs, and arsenic, with results tabulated in Tables 5-8. The findings of the investigation were:

- Soil stratigraphy encountered is typical of what had already been observed, with a thin veneer of loam/asphalt underlain by well graded fine-medium sand with fine gravel. Heterogeneous zones (fill, buried waste, etc.) were not encountered. Saturated conditions were observed between 4 – 5.5 ft below grade.
- VOCs were not detected in the saturated soil within proposed stormwater wetland area.
- PAHs were detected the shallow soil within the proposed transition skate park, ice skating rink, and stormwater wetland. PAH concentrations were above EPA residential RSLs.
- Arsenic was detected in the shallow soil within the proposed transition skate park, ice skating rink, and stormwater wetland. Arsenic concentrations were above EPA residential RSLs but below the site specific VT DEC cleanup level.

3.8 Sluiceway Closure: 2008-2009

Between December 23, 2008 and January 7, 2009 the inlet and outlet sluiceways on the west side of the Moran Plant were closed [13] in order to disconnect the Lake from the building. To achieve this, the connections between the inlet sluiceway and the two flumes that extend under the basement were plugged with subaqueous grout, accessed from inside the two screening

chambers. In a similar manner, the connections between the outlet sluiceway and the two flumes were also plugged with concrete, accessed from the exterior of the building. During this process, there was no pumping of water into the Lake. Water from one of the screening chambers was pumped into the basement, as was some sediment from the outlet sluiceway. Permits from the US Army Corps of Engineers (USACOE) and City of Burlington were obtained prior to the start of work.

3.9 Basement Water and Sediment Testing: 2008

In anticipation of dewatering the building, WEM undertook an initial characterization of the water and sediment quality in the basement of the Moran Plant in May 2008 [14]. During sampling activities on May 13, 2008 WEM measured 3.25 ft of water above the basement floor.

Water samples were collected from two locations inside the basement and one location outside the building in the sluiceway (control sample), shown as DBS-1, DBS-2, and DBS-3 in the Figure 17. WEM collected sediment samples from two locations on the basement floor, shown as SED-2 and SED-3 in Figure 17. The water samples were collected by diffusion bag samplers (VOCs) and with disposable bailers. The sediment samples were collected by grab sampling methods. Testing was for VOCs, PAHs, metals and PCBs.

Water and sediment quality results are tabulated in Table 9 and 10 in Appendix B. These results are summarized below:

- The Lake water sample had detectable levels of the metals barium, chromium and lead. This sample has no detectable VOCs, PAHs, or PCBs and a normal pH of 7.7.
- Interior water had one detectable VOCs, one PCBs compound, several of PAHs and several metals, including very high levels of arsenic and lead. The pH of the water was measured at 7.5.
- Sediment had detectable concentrations of the VOCs PCE, 1,1-DCA, 1,1,1-TCA, and 1,4-DCB. The source of these VOCs, which are also present in aqueous form in groundwater collected outside the building, is the former use of degreasers/cleaners on the power generation equipment.
- Sediment had detectable levels of several PAHs. These compounds, which are also present in shallow soil outside the building, are a residual by-product of the former coal burning process.
- Sediment had detectable levels of the two PCBs compounds Aroclor-1254 and Aroclor-1260. The highest concentration was for Aroclor-1254 in SED-3 (1.1 mg/Kg).
- Sediment had detectable levels of the metals arsenic, barium, cadmium, chromium, lead, mercury, and selenium. While the presence of these metals is not surprising given the former presence of coal and metallic objects/paint inside the building that have been degrading for years, the concentrations of lead at 10,300 - 11,900 mg/Kg were very high. In addition to lead, several other metals (arsenic, chromium, mercury) required that the sediment would need to be treated as a RCRA hazardous waste.

The results above were used to dictate the interior building cleanup work that followed in 2009 (see Section 3.10) and again in 2010 (see Section 3.15).

3.10 Interior Building Cleanup: 2009

Between June and September 2009, Lincoln Applied Geology, Inc. (LAG) coordinated and oversaw interior cleanup activities inside the Moran Plant for the VT DEC [15]. The work was completed in general accordance with VT DEC-approved Corrective Action Plan prepared by WEM [16]. This work was funded with a state Brownfield cleanup grant. Subcontractors involved included Alderson Environmental and ENPRO Services, Inc. The work included the following:

- Dewatering of 342,150 gallons of water from the basement (96.0 level) of the Moran Plant. The water was pumped to a 21,000 gallon frac tank where it settled, was filtered, and then pumped to the City sanitary sewer system via a manhole near the northeast corner of the Water Department building.
- 4 tons of bird guano (pigeon droppings) were removed from the building, most of it from the operations level. The guano was disposed of as municipal waste at the Moretown Landfill. Upon removal of the guano, the surfaces were washed with a bleach/water solution.
- 4.75 tons of loose debris and scrap metal was removed from the basement level. The scrap metal was taken to Burnet Scrap yard in Hinesburg, and the remaining was disposed as municipal waste at the Moretown Landfill.
- 8 cubic yards of lead paint waste was removed from painted metal beams inside the building as part of a stabilization effort. The lead paint was disposed as hazardous waste at a certified landfill.
- 800 ft^2 of asbestos containing window caulk and 600 ft^2 of asbestos hard board was removed from the building. The asbestos waste was disposed of at a certified landfill. The caulk removal entailed removing all of the windows and replacement with wire mesh to make the building bird-proof.

3.11 Additional Asbestos Testing: 2009

In September 2009, WEM coordinated testing of additional media and dust inside the Moran Plant for asbestos [17, 18] at the request of CEDO. The sampling was conducted by KD Associates. The objective of the work was to address concerns raised by Mr. Vernon Nelson of the Vermont Department of Health (VT DOH) that not all of the suspect asbestos containing materials had been sampled during the 2005 interior survey [8], especially in the basement space that was inaccessible at that time due to flooding.

Of twenty two (22) additional material samples collected, five (5) tested positive for asbestos: 1) black tar paper material inside the ceramic wall of the shower area of the main floor ("operations level" at 116.0 ft elevation), 2) mudded joint fitting surrounding piping in the ceiling of the shower area of the main floor, 3) gasket rope on the lower portion of the north side exterior structural steel, 4) gasket material in the lower portion of the north side exterior structural steel, and 5) caulking in the lower portion of the north side exterior structural steel. It was also noted that debris from broken transite panels had fallen into the basement floor.

Thirty (30) dust samples were horizontal surfaces inside the Moran Plant. Portions of the building sampled include: conveyor belt level, bottom of coal hoppers, main floor (operations level), entry level (grade level), and the former Sailing Center floor. Sampling locations were selected as most likely to contain dust or debris that may have been present during plant operations. Results indicated that no asbestos was present in the 30 dust samples collected.

3.12 Waterfront North Subsurface Investigation: 2009

As part of the Waterfront North project, Resource Systems Group, Inc. (RSG) contracted Geodesign to conduct geotechnical testing of the soil and WEM to conduct soil quality testing [19] in a study area composing the existing bike path and abutting gravel drive, the skate park, Penny Lane, the area around the BED and BDPW buildings and parking lots, and area east of the Moran Plant. The soil quality testing was a voluntary measure, and the work plan was not previously reviewed by the VT DEC. This work involved the installation of twenty four (24) soil borings on August 31 and September 1, 2009. The boring locations are shown as GD-2 through GD-25 on Figure 5. The depth of borings ranged from 6 ft to 12 ft. Soil boring logs are provided in Appendix C. The findings of the investigation were:

- The soil stratigraphy is composed of fill underlain by fine-medium sand with little/trace silt and gravel. Saturated conditions were observed between 4 and 6 ft below grade.
- Petroleum contamination was detected in two zones within the project area. One zone is defined around the former petroleum USTs on the west side of the BDPW pumping station building, and another, larger zone is defined under Penny Lane between the existing bike path and the Water Department building.
- PAHs were detected in the shallow soil in the project area, with concentrations in all but two of the borings in excess of EPA soil guidance levels. Highest levels were detected in the southern part of the study area near Penny Lane and the Water Department parking area.
- Arsenic was detected in shallow soil at all locations.
- PCBs were not detected in any soil sample.
- Lead was detected in shallow soil at all locations, but concentrations were all below EPA soil guidance levels.

3.13 Community Sailing Center Subsurface Investigation: 2010

At the request of CEDO, WEM conducted a subsurface investigation in the area north of the Moran Plant where the LCCSC intends to construct their new facility [20]. The work involved the installation of two deep borings through the footprint of the proposed new LCCSC building, and the hand-installation of four shallow borings on the grounds. Boring locations are shown as DB-101, DB-102, SB-103, SB-104, SB-105, and SB-106 on the Figure 5 in Appendix A. Soil boring logs are provided in Appendix C. Soil testing results are tabulated in Table 3-8. The findings are summarized below:

- Soil stratigraphy encountered was typical of what has been observed in the past, consisting of loam above fine-medium sand followed by coarse sand and fine gravel.

Based on blow counts, a very dense layer was encountered at 15.5 ft bg where the borings ended due to refusal. Saturated conditions were observed between 2-4 ft bg.

- Limited contamination by VOCs was detected at a shallow boring near the former bulk petroleum tank, but at concentrations were well below EPA soil guidance levels.
- PAHs were detected in shallow soil only, with concentrations below EPA residential RSLs at all locations except two borings (SB-104 and SB-106).
- Arsenic was detected in shallow soil at all locations.

3.14 Coal Tunnel Water Sampling: 2010

On August 4, 2010, WEM collected a sample of the static water inside the coal tunnel at the request of CEDO in anticipation of having to remove this water and the coal tunnel as part of the redevelopment. The location of the coal tunnel is shown on Figure 5. The tunnel was accessed via the concrete bunker on the west end; the access under the former hopper on the east end could not be located and is apparently buried. The tunnel was observed to be completely filled with water to roughly the grade of ground surface outside the bunker. The water present in assumed to be a combination of rainwater and groundwater that has seeped in. A small pile of raw coal was observed inside the bunker, but the presence of coal or other equipment (conveyor belt, etc.) inside the tunnel could not be evaluated due to the presence of the murky water.

The water was collected using a disposable bailer and submitted for laboratory analysis of VOC, PAHs, metals, and PCBs. In addition, the geochemistry of the water was field analyzed with a water quality meter for pH, specific conductance, turbidity, and dissolved oxygen.

Results, tabulated in Table 9, indicate that the water had no detectable VOCs, PAHs, or PCBs. The metals arsenic, barium, lead and mercury were detected, and while concentrations were below VGES, the arsenic concentration was above Vermont water quality standard for surface water. The pH was slightly more acidic (6.25) than previous readings of groundwater (average 7.2). The water also had a high turbidity (522 NTU). Based on these results, it has been established that the water should be pumped to the City sanitary sewer system rather than allowed to discharge to the ground surface or Lake.

3.15 Interior Building Cleanup: 2010

Between October and December 2010, a second phase of interior cleanup work was completed at the Moran Plant. This work was coordinated and overseen by The Johnson Company (JCO) for the VT DEC [21]. The work was completed in general accordance with VT DEC-approved Corrective Action Plan prepared by WEM [16]. This work was funded with a state Brownfield cleanup grant. Subcontractors involved included Alderson Environmental and ENPRO Services, Inc. The work included the following:

- The removal of asbestos containing loose transite panels from the basement floor by Alderson. A total of 54 bags, weighing between 20 and 30 lbs each, were removed for disposal at a certified facility. Many of the bags were intermixed transite and sediment from the floor. The work was conducted in accordance with an Alternative Practices

Work Plan and an asbestos permit issued by the VT DOH. The permit was closed after post-remediation inspection and post-clearance air testing by Clay Point Associates.

- The removal of loose debris from the basement, including wood, metal, metal tanks, metal pipes, plastic, and miscellaneous refuse by Alderson. This included three 20-ton rolloff dumpsters of C&D waste disposed of at Moretown Landfill, three 40-yard dumpsters of washed scrap metal disposed of at Burnett Scrap Metal Yard, and two 8-yard dump truck loads of washed aggregate debris (brick and concrete) recycled at All Seasons Excavating.
- The removal of sediment from the basement floor, the generator pits and ash trenches by ENPRO. A total of three 20-yard dumpsters of sediment were disposed of as RCRA hazardous waste at Stablex Canada in Blainville, Quebec.
- The cleaning of the basement floor using a combination of pressure washing and vacuuming by ENPRO.
- The pumping of approximately 30,000 gallons of water from the basement to a frac tank, followed by settling and filtering and then discharge to the City sanitary sewer system. The water pumped was a combination of washwater generated during the cleaning of all the debris that was removed as well as groundwater/rainwater that had infiltrated into the basement.

3.16 Sub-Basement Water and Sediment Testing: 2010

During the 2010 cleanup process described above, the presence of two sub-floor channels underneath the basement was discovered. The channels are present parallel to the northern and southern ends of the building (see Figure 17), with the southern channel accessed by three manholes and the northern channel accessed by eight manholes. Inspection of the channels during November 2010 revealed the presence of a layer of sediment at the bottom. Over the course of the work by ENPRO, it was also discovered that there were pipes connecting the southern channel to the generator pits. The dimensions, interconnectivity, and potential connectivity to the exterior have not yet been firmly established.

On December 3, 2010 WEM with assistance by JCO collected samples of the water inside and sediment at the bottom of the two channels [22]. Composite water samples were collected from under two manholes in the southern channel and under two manholes in the northern channel shown as CS-1 and CN-2 in the Figure 17. Composite sediment samples were collected from under from under two manholes in the southern channel and under two manholes in the northern channel shown as CS-Sed and CN-Sed. The water samples were collected with disposable bailers, and the sediment samples were collected by grab sampling methods. Testing was for VOCs, PAHs, metals and PCBs.

Water and sediment quality results are tabulated in Table 9 and 10 in Appendix B. These results are summarized below:

- Water in the channels was not contaminated by VOCs or PCBs. Only the southern channel had detectable concentrations of PAHs. The channel water had detectable concentrations of arsenic, barium, and lead. In addition, the southern channel water had

detectable concentrations of mercury and selenium. Based on the concentrations of arsenic and PAHs, the water is not acceptable for discharge to the Lake.

- With the exception of 1-1-DCA, the sediment in the channel is not contaminated by VOCs. The sediment from both channels is contaminated by PAHs and the metals arsenic, lead, and mercury. The PCB compound Aroclor-1254 is present in southern channel sediment, and Aroclor-1260 is present in the northern channel sediment. Based on the lead and arsenic concentrations, the sediment would be classified as hazardous. The PCB concentration in the southern channel (6.3 mg/Kg) is above the 1.0 mg/Kg threshold for high occupancy use specified by the TSCA.

3.17 Lake Water and Lake Sediment Testing: 2010

On December 3, 2010 WEM with assistance by JCO collected a sample of the Lake water and sediment for a control sample to the sediment and water testing described above [22]. The sampling location was next to the dock immediately west of the Moran Plant, shown as "Lake" and "Lake Sed" in Figure 5. Testing was for VOCs, PAHs, metals and PCBs. Water and sediment quality results are tabulated in Table 9 and 10 in Appendix B. These results are summarized below:

- Lake water had no detections for VOCs, PAHs, PCBs. Only the metals barium and lead were detected, both at concentrations below VT DOH drinking water standards.
- Lake sediment had no detectable VOCs, detections for all PAHs, detections for the PCBs Aroclor-1242 and Aroclor-1254, and detections for the metals arsenic, barium, chromium, and lead. The sediment results are indicative of anthropogenic contamination likely present in much of the waterfront near shore sediments from the many years of industrial activity. The presence of PAHs, arsenic, and PCBs at concentrations in excess of the EPA soil guidance level is not surprising given the former land uses here. The presence of the PCBs compound Aroclor-1242 in the Lake but not in the soil surrounding the Moran Plant or in any of the interior sediment samples collected from the basement of the Moran Plant, suggests some other source of this PCBs compound.

3.18 Concrete Floor Testing: 2010-2011

JCO collected bulk concrete samples for PCB testing from eight (8) suspect locations on the concrete basement floor of the Moran Plant on December 15, 2010, after completion of the basement cleaning activities [21]. On January 24, 2011 [23], WEM and JCO returned to the basement to collect and additional 24 samples for PCBs testing from the concrete floor (including one from inside the ash trench and a second from inside a generator pit), and a sample of suspect oil from a pipe leading from the transfer pump in the northwest corner room. These locations are shown as FL-1 through FL-32 on Figure 18 in Appendix A. The analytical results, provided in Table 11 in Appendix B, indicated the oil had no detectable PCBs, and that ten (10) concrete samples had total PCBs in excess of TSCA high occupancy threshold of 1 ppm but well below the TSCA 50 ppm threshold for PCB remediation waste. The most elevated total PCB detections (FL-16 @ 15 ppm and FL-17 @ 6.5 ppm) were identified in the southwest corner of the basement in a separate room (see Figure 17) where electrical panel(s) appeared to have been formerly mounted. WEM and JCO believe that the elevated PCB detection here can be attributed

to the former panels that may have contained PCBs. The specific former use of this room remain unknown, however if this room once contained a source of PCBs, that source has been removed.

The information obtained from the December 2010 and the January 2011 investigations performed on the concrete basement floor suggests that PCBs containing equipment were utilized inside the Moran Plant. Given that all data indicates total PCBs concentrations are less than 50 ppm and a source no longer exists, WEM and JCO concluded that the PCB-impacted concrete floor does not constitute PCBs remediation waste as defined by 40 CFR 761.3. As such, it is WEM's professional opinion that the redevelopment of the Moran Center is outside TSCA jurisdiction and will instead be subject to the VT DEC as the sole regulatory authority supervising future corrective action at the Site. The proposed redevelopment plan includes filling the entire basement area with 9 feet of structural fill and pouring a new concrete slab over the fill with an integrated sub-slab vapor barrier (refer to Section 7.2 and 7.3).

3.19 Transformer Yard Subsurface Investigation: 2011

Based on WEM's review of the history of transformer yard, transformers were formerly located on four separate concrete pads, shown as red-hatched areas on Figure 5. The large eastern pad had transformers owned by BED; this pad has spill containment via concrete knee walls and a drainage hole in the southwest corner. The north-central pad had a BED transformer but did not have spill containment. The south-central pad had a GMP transformer and also no spill containment. The western pad had BED transformers and no spill containment. WEM also learned from GMP that their transformer "weeped oil" from one side.

On January 19, 2011, WEM oversaw the installation of ten (10) shallow borings in the former transformer yard [24]. These borings are shown as MW-201, SB-202, SB-203, SB-204, SB-205, SB-206, SB-207, SB-208, SB-209, and SB-210 Figure 5. Borings extended to a depth of 6 ft. Upon completion of boring MW-201, it was fitted as a groundwater monitoring well. Soil samples and a groundwater sample were collected for the contaminants of concern (PCBs and TPH). Soil boring logs are provided in Appendix C. Laboratory results are provided in Tables 4, 5, and 7. The findings of the investigation are summarized below:

- PCBs were detected in upper interval soil in all borings except SB-202. The only PCBs compounds detected were Aroclor-1254 and Aroclor-1260. Total PCBs ranged from 0.05 to 0.82 mg/Kg. While these concentrations are well below the 50 mg/Kg limit which TSCA defines as PCBs Remediation Waste (40 CFR 761.3), the concentrations at SB-206S (0.82 mg/Kg) and SB-207 (0.27 mg/Kg) are above the EPA residential RSLs applied by the VT DEC for characterization of the area of concern.
- PCBs were not detected in groundwater above detection limits in well MW-201.
- TPH-DRO was detected at SB-205 and SB-206, but only the concentration at SB-206 (6,200 mg/Kg) on the west side of the former GMP transformer is indicative of a significant leak or spill of transformer oil. TPH-DRO was not detected in saturated soil at SB-201, suggesting that the oil has not migrated downgradient (west) of this area.
- The soil contamination (PCB and TPH) appears to be limited to a 200 ft^2 area within the transformer yard.

4.0 CONTAMINATION SUMMARY

The investigations described in Section 3.0 have identified several types of contaminants at the Site and inside the Moran Plant. These contaminants are summarized below. Contaminant data are all tabulated in Tables 3-11 in Appendix B. Contaminant distribution data are also shown in plan view and cross-section in Figures 7-18 in Appendix A. Guidance levels are defined below.

4.1 Guidance Levels

The proposed guidance levels for the contaminants of concern to be used for this project are as follows:

- **TCE, PCE, 1,1-DCA, and 1,1,1-TCA in Soil**: EPA Regional Screening Level (RSL) for residential soil (see Table 5)
- **Petroleum VOCs in Soil**: EPA Regional Screening Level (RSL) for residential soil (see Table 5)
- **PAHs in Soil**: EPA RSL for residential soil of 15 ug/Kg for B(a)P-TE (see Table 6).
- **PCBs in Soil and Sediment**: EPA RSL for residential soil of 0.22 mg/Kg for Aroclor-1254 and Aroclor-1260 (see Table 7).
- **Metals in Soil and Sediment (except arsenic)**: EPA RSLs for residential soil (see Table 8).
- **Arsenic in Soil**: VT DEC Site Specific Cleanup guideline of 35 mg/Kg (see Table 8). This guideline dictates only the limits of what is considered "contaminated soil" as it pertains to native onsite soils. For cover soil or topsoil that is brought onto the Site, the guideline shall the 10 mg/kg, which is between the median and average concentration detected at the Site and is a value commonly used by the VT DEC.
- **VOCs, PAH, PCBs, and metals in Groundwater:** Vermont Groundwater Enforcement Standards (VGES) (see Tables 3-4).
- **VOCs, PAH, PCBs, and metals in Lake Water:** EPA and VT DOH Drinking Water Standards (see Table 9).
- **PCBs in Concrete: TSCA (**40 CFR 761.3) threshold for high occupancy use of 1 mg/Kg, low occupancy use of 25 mg/Kg, and remediation waste of 50 mg/Kg.

A secondary Vermont soil guideline for areas that have petroleum contamination stemming from underground storage tanks (USTs), known to be the BDPW area, is a field screening (PID) measurement of 10 ppm to define "contaminated soil" that shall not be used for backfill. If relict USTs are discovered during the redevelopment process, this screening guideline may be used as a secondary measure of petroleum contamination.

4.2 Shallow Soil (0-2 ft deep)

Chlorinated VOCs: The chlorinated VOC 1,1,1-TCA has been detected in shallow soil immediately north of the Moran Plant (SB-9 and MW-12), and TCE and PCE have been detected next to the former bulk petroleum tank at the northern boundary of the Site (SB-103). The source of these VOCs is the former use of degreasers/cleaners on the power generation and petroleum distribution equipment. All concentrations are below EPA residential RSLs, so will not require treatment or disposal but must be managed in accordance with the Soil Management Plan (see Section 6.4).

Petroleum VOCs: Petroleum VOCs, including BTEX, trimethylbenzene, and naphthalene, have been detected in the shallow soil by lab testing immediately north and off the northeast corner of the Moran Plant (SB-9 and MW-12), next to the former bulk petroleum tank at the northern boundary of the Site (SB-103), and next to the existing skate park (GD-16). These concentrations are below EPA residential RSLs, so will not require treatment or disposal but must be managed in accordance with the Soil Management Plan. Petroleum VOCs are also present in shallow soil under Penny Lane (borings GD-6, GD-10, and GD-12), and soil from this area may require treatment or disposal and must be managed in accordance with the Soil Management Plan. The distribution of petroleum VOCs is shown in plan view in Figures 10 and in cross-section in Figure 14.

PAHs: PAHs are present in all of the shallow soil in the study area with the exception of the northern portion of the Site where the LCCSC building is planned (MW-6 and DB-101) and some other small pockets (SB-25, MW-12). The distribution of PAHs is shown in Figures 11, 14, 15 and 16. The source of the PAHs is the fallout of polycyclic organic matter from the former burning of coal and wood, ashes from the major fires, and combustion of petroleum that has occurred over the past century in this portion of the Waterfront. With the possible exception of the Penny Lane area, the source of the PAHs does not appear to from petroleum leaks or spills. The concentrations of PAHs at the Site, expressed as Benzo(a)pyrene Toxicity Equivalence (B(a)P-TE), range from 7.0 – 8,245 ug/Kg. The average concentration is 1,008 ug/Kg and the median concentration is 141 ug/Kg. These concentrations compare to urban soil concentration within the City of Burlington from consultant surveys [25] ranging from 0.05 – 12,990 ug/Kg, average of 2,248 ug/kg, and median of 1,061 ug/Kg. All PAH contaminated soil (defined as B(a)P > 15 ug/Kg) must be managed in accordance with the Soil Management Plan.

Metals: The metals arsenic, chromium, copper, lead, nickel, selenium, thallium and zinc are present in the shallow soil on the Moran Plant Site. With the exception of arsenic and lead, the metals are below EPA Residential RSLs and indicative of background concentrations. Arsenic and lead have been detected over the entire Moran Center and WFN project area (Parcel A and B).

> **Lead:** Based on 18 samples from the Moran Center and WFN project area, the range in lead concentration is 9.2 – 184 mg/Kg. The average lead concentration is 61 mg/Kg, and the median lead concentration is 46 mg/Kg. None of these lead concentrations exceeds the EPA soil guidance level of 400 mg/Kg, so will not require special treatment.

Arsenic: Based on 45 samples from the Moran Center and WFN project area, the range in arsenic concentration is 0.8 – 88.5 mg/Kg. The average arsenic concentration is 14.6 mg/Kg, and the median arsenic concentration is 8.6 mg/Kg. The distribution of arsenic is shown in Figures 12, 14, 15 and 16. Arsenic exceeds the EPA residential RSL (0.39 mg/Kg) at all locations, but exceeds the site specific guidance (35 mg/Kg) only a 10,600 ft^2 zone north of the Moran Plant where the coal storage pile was formerly located. This area has been identified as the high arsenic zone, and is shown in Figure 12. The source of the elevated arsenic is anthracite coal. The high background presence of arsenic in Vermont soil merits use the use of 10 mg/Kg guidance level for defining Clean Topsoil. Because of the presence of arsenic, soil must be managed in accordance with the Soil Management Plan (see Section 6.4).

PCBs: Two PCBs compounds, Aroclor-1254 and Aroclor-1260 have been detected in shallow soil around the perimeter of the Moran Plant and within the former Transformer Yard. The distribution of PCBs is shown in Figures 13, 14, 15 and 16. With the exception of a 200 ft^2 area inside the Transformer Yard, all concentrations are below the EPA soil guidance levels and will not require special treatment or disposal. The soil in the Transformer Yard will require special treatment prior to construction activities (refer to Section 5.3).

4.3 Deep Soil (> 2 ft deep)

Chlorinated VOCs: Chlorinated VOCs, including TCE, PCE, cis-1,2- DCE, 1,1-DCA, and 1,1,1-TCA have been detected in the deeper soil immediately north and off the northeast corner of the Moran Plant (MW-2, MW-3, MW-11). All concentrations are below EPA Residential RSL, so will not require special treatment or disposal. Chlorinated VOCs have not been detected in soil at any other location.

Petroleum VOCs and TPH: Petroleum VOCs, including BTEX, trimethylbenzene, and naphthalene, have been detected in the deeper soil immediately north and off the northeast corner of the Moran Plant (SB-10 and MW-11). The concentrations in this area are below EPA Residential RSLs, so will not require special treatment or disposal. Petroleum VOCs and TPH have also been detected in the deeper soil under Penny Lane (GD-6, GD-10, and GD-12) (see Figure 10 & 14). and under the former USTs immediately west of the BDPW Pumping Station building (GD-3) (see Figure 10). Under Penny Lane, the concentration of 1,2,4-Trimethylbenzene is above the EPA residential RSL. While no excavation is planned for the area above the former BDPW USTs, excavation is planned under Penny Lane this area will require special treatment during construction activities in accordance with the Soil Management Plan (Section 6.4).

PAHs: PAHs are associated atmospheric fallout and urban fill and are limited to the soil above 2 ft depth. The deeper soil that is encountered during excavation activities does not require special treatment or disposal, but must be managed in accordance with the Soil Management Plan.

Metals: Metals are not a deep soil contaminant. The elevated level of arsenic is associated with the storage of coal are limited to the shallow soil. The presence of elevated arsenic can be correlated with the presence of coal clasts, dust and/or black discoloration of the soil. The deeper soil that is encountered during excavation activities does not require special treatment or disposal, but must be managed in accordance with the Soil Management Plan (section 6.4).

PCBs: PCBs are not a deep soil contaminant. With the exception of the Transformer Yard, the deeper soil that is encountered during excavation activities does not require special treatment for PCBs. While PCBs were not detected in the Transformer Yard at depth of 5 ft (SB-201D and SB-205D), they are likely present below 2 ft in the approximate 200 ft^2 zone identified near the western GMP transformer Pad (see Figure 13). The soil in the Transformer Yard will require special treatment prior to construction activities (refer to Section 5.3). Preliminary data indicate that PCB concentrations are below 50 ppm, and hence redevelopment of this area is outside TSCA jurisdiction and will instead be subject to the VT DEC as the sole regulatory authority .

4.4 Groundwater

Chlorinated VOCs: Chlorinated VOCs, including TCE, PCE, cis-1,2- DCE, 1,1-DCA, and 1,1,1-TCA have been detected in groundwater around the perimeter and immediately north of the Moran Plant. The only compounds reported in excess VGES are PCE and TCE in well MW-3 and TCE in well MW-14. The compounds PCE and TCE, and the degradation by-product cis-1,2-DCE, are confined to a small a "hot spot" in a 1,100 ft^2 area immediately north of the Moran Plant (see Figure 8). Low concentrations of these compounds are detected to the west (MW-8 and MW-13) and occasionally east (MW-11) of the hot spot. The compounds 1,1,1-TCA and/or 1,1-DCA are present in a 61,000 ft^2 area around the perimeter of the Moran Plant (see Figure 9), but are all at concentrations well below their respective VGES. Because deep (>2 ft) excavation is not planned for the 1,100 ft^2 hot spot, where depth to groundwater is generally between 4-5 ft, groundwater contaminated by PCE/TCE should not be encountered during redevelopment. The presence of these VOCs will require future groundwater monitoring (refer to Section 7.7) and will require the use of engineering controls to prevent the migration of VOCs into the new Moran Center building (refer to Section 7.3).

Petroleum VOCs: With the exception of estimated concentrations (below quantitation limits) of petroleum VOCs occasionally detected in groundwater northwest (MW-8) and north (MW-13, MW-14) of the Moran Plant, petroleum VOCs are not a groundwater contaminant near the Moran Plant. There are no recent groundwater quality data for the areas near the BDPW USTs or under Penny Lane, as groundwater sampling was not conducted as part of the Waterfront North Subsurface Investigation. Proposed groundwater assessment for petroleum contamination is described in Section 5.1. If groundwater is encountered during excavation in the Penny Lane area, it must be managed in accordance with Section 6.5.

PAHs: Groundwater is not contaminated by PAHs in the vicinity of the Moran Plant.

Metals: Groundwater is not contaminated by metals with the possible exception of arsenic. In one monitoring well located off the northwest corner of the Moran Plant (MW-2), the arsenic concentration was detected at 18 ug/L in 2005 which is above the VGES of 10 ug/L.

PCBs: Groundwater is not contaminated by PCBs in the vicinity of the Moran Plant including the one location tested inside the Transformer Yard.

4.5 Lake Water

Surface water testing has been conducted from the sluiceway west of the Moran Plant (DBS-1) and next to a dock west of the Moran Plant (Lake). Lake water had no detections for VOCs, PAHs, PCBs. Only the metals barium, chromium and lead were detected, all at concentrations below applicable water quality standards. The planned redevelopment activities will not disturb Lake Champlain surface water. Erosion control measures will be adhered to in accordance with the Erosion Prevention and Sediment Control (EPSC) plan prepared by EV.

4.6 Lake Sediment

Lake sediment testing has been conducted next to a dock west of the Moran Plant (Lake Sed). Lake sediment had no detectable VOCs, detections for all PAHs, detections for the PCBs Aroclor-1242 and Aroclor-1254, and detections for the metals arsenic, barium, chromium, and lead. The concentrations of PAHs, arsenic, and PCBs are in excess of the EPA RSLs for residential soil. As per the VT DEC Guidance *Recommended Guidelines for Evaluating Contaminant Concentrations in Freshwater Sediments and the Potential for Those Sediments to Adversely Affect Aquatic Biota*, additional sampling may be merited to determine the bioavailability of these contaminants, but this is not proposed as part of this CAP. The sediment results are indicative of anthropogenic contamination likely present in much of the waterfront near shore sediments from the many years of industrial activity. The presence of the PCBs compound Aroclor-1242 in the Lake but not in the soil surrounding the Moran Plant or in any of the sediment inside the Moran Plant, suggests some other source of this PCBs compound.

The planned redevelopment activities will not disturb Lake Champlain sediment. Erosion control measures will be adhered to in accordance with the EPSC plan prepared by EV.

4.7 Moran Interior

Asbestos: While all of the ACMs have been removed from the basement and from the window caulking, there remains five (5) additional materials inside the building that tested positive for asbestos: 1) black tar paper material inside the ceramic wall of the shower area of the main floor ("operations level" at 116.0 ft elevation), 2) mudded joint fitting surrounding piping in the ceiling of the shower area of the main floor, 3) gasket rope on the lower portion of the north side exterior structural steel, 4) gasket material in the lower portion of the north side exterior structural steel, and 5) caulking in the lower portion of the north side exterior structural steel. Demolition activities inside the building will need to address this asbestos (refer to Section 7.5).

PCBs in Concrete: PCBs are present in the concrete floor of the basement. Concentrations of total PCBs ranges from non-detect (< 0.02 ppm) to 15 ppm. Disturbance of the floor is not planned as part of the redevelopment activities, and the PCBs do no present a health risk to construction workers. The future filling of the basement will provide a protective cap over the contaminated concrete. Due to the presence of these PCBs, engineering controls will need to be installed during the filling in of the basement, pre-occupancy air testing for PCBs will need to be conducted, and an institutional control will be emplaced to deter future sub-floor disturbance (refer to Section 7.0). It is WEM's professional opinion that the redevelopment of the Moran Center is outside TSCA jurisdiction and will instead be subject to the VT DEC as the sole regulatory authority supervising the redevelopment of the building and Site.

Contaminated Sub-Channel Sediments: The sediment from the bottom of the two sub-floor channels is contaminated by PAHs, the PCBs Aroclor-1254 and Aroclor-1260, and the metals arsenic, lead, and mercury. The proposed redevelopment activities will not disturb this sediment, and the future filling of the basement of the Moran Plant will provided a protective cap over these sediments. Due to the presence of these contaminated sediments, further evaluation of the connectivity to outside groundwater and potentially the Lake will be required (refer to Section 5.4) and future groundwater monitoring will be required (refer to Section 7.7). It is the City's commitment to seal any detected areas that allow for hydraulic connectivity between the interior of the Moran Plant and the Lake.

5.0 PROPOSED ADDITIONAL ASSESSMENT

5.1 Penny Lane Subsurface Investigation

Petroleum contamination was identified in 2009 during soil boring work under approximately 240 linear ft of Penny Lane between the Water Department building and the bike path crossing (see Section 3.12). The VT DEC was provided the soil testing results, and the City and VT DEC have recently agreed that additional assessment is required. A first letter was recently issued by the VT DEC to the City of Burlington [26]. The City has agreed to undertake this work in conjunction with the WFN redevelopment. The source of petroleum contamination is likely the former bulk petroleum storage activities that occurred in this portion of the waterfront between the 1940s and 1980s.

The petroleum contamination of soil and groundwater will be further assessed in a Site Investigation to determine the full extent and magnitude of contamination any potential impacts to Lake Champlain. A work plan for the Site Investigation was submitted by Heindel and Noyes [27] and is currently in the review and revision process. The scope of work includes the installation of up to 17 soil borings; four (4) borings to be installed through Penny Lane, eight (8) borings to be installed the boat launch and parking area east of the Water Department building and Coast Guard building, and three (3) borings next to the bike path in Waterfront Park. Based on soil screening during installation, select borings will be installed as groundwater monitoring wells. Samples of soil and groundwater will be collected for analysis of VOCs by EPA Method 8260B and for total petroleum hydrocarbons (TPH) and fuel fingerprinting by EPA Method 8015. This work will be conducted prior to the utility and road work described in Section 6.0. Results will be provided to the VT DEC. Eligibility for reimbursement of this and future assessment/remediation costs by the Petroleum Cleanup Fund (PCF) will be considered upon review of the land use and site investigation data provided.

5.2 BDPW UST area

Petroleum contamination identified in 2009 during soil boring work under the parking lot on the west side of the BDPW Pumping Station building (see Section 3.12) <u>will not be disturbed during the future redevelopment</u>. This part of the asphalt parking lot will be milled and repaved without any invasive excavation. Because this site was formally closed by the VT DEC in 1993, it is WEM's opinion that additional assessment of this area is not merited. No additional borings or soil/groundwater testing is proposed as part of the corrective action work. Screening of soil will be conducted during nearby utility trenching in accordance with the Soil Management Plan (Section 6.4).

5.3 Transformer Yard Soil Assessment and Remediation

PCB contaminated soil was identified in January 2011 next to a former transformer pad inside the Transformer Yard, assumed to be from former release(s) of PCB-containing transformer oil during operation by Green Mountain Power and Burlington Electric Department. An approximate 200 ft^2 zone has PCB concentrations in excess of the EPA RSL. As required in the recently issued first letter from the VT DEC to the City of Burlington [28], the PCB

contamination will be further assessed to determine the full extent and magnitude of contamination. This will be followed by remediation if merited, to be pre-approved by the VT DEC in a CAP Addendum. A work plan for the assessment will be provided to the VT DEC for review and approval in coordination with the overall redevelopment schedule. The timeline for work plan development will not meet the VT DEC required timeline of July 6, 2011 as per the first letter [28]. In the interim, the approximately 200 ft^2 zone of PCB contaminated soil will be avoided by the proposed 2011 construction work.

5.4 Moran Plant Sub-Basement Channel Conduit Assessment

The sub-basement channels present under the basement of the Moran Plant were inspected from above from several manholes, and interconnectivity between the southern channel and the generator pits was established during the Fall of 2010. Further inspection of the channels is required to confirm that there is no connectivity to the groundwater or Lake water outside the building. This will be accomplished by inserting a remote camera into each channel for a visual survey, with focus on looking for conduits or penetrations through the concrete. This work will be pursued during the summer-fall of 2011 after the water level has receded to below 96.0 ft. All results will be provided to the VT DEC. If results indicate a direct hydraulic connection to the outside, then sediment removal or channel filling/sealing may be required, and will be addressed in a CAP Addendum.

Any dewatering of the Moran Plant basement required in 2011 or 2012 will be conducted in accordance with the previous protocol established in 2010, which is to pump water via sump pump and hose to the sanitary sewer pump station off the northeast corner of the Water Department Building. Discharge of basement water directly to the Lake is not suitable. The BDPW has approved raw water pumping to this station at a maximum flow rate of 50 gpm[1]. The discharge hose will extend on the ground surface through transformer yard to Penny Lane, and then go under Penny Lane in a pipe conduit that was installed in 2010 for this purpose. While the basement is clean and all water present is primarily from rainwater and Lake flooding, a grab sample of the basement water will be collected for analysis of VOCs, PCBs, PAHs, and metals prior to dewatering, with results provided to the VT DEC and BDPW.

[1] Based on flow testing of pump station in June 2011; correspondence from Steve Roy, BDPW.

6.0 PROPOSED CORRECTIVE ACTION – WATERFRONT NORTH

This component of the corrective action pertains to Waterfront North Development, and is proposed to start in fall 2011 and extend through 2012.

6.1 Project Management / Permits

WEM will continue to work for the City of Burlington on coordination and general oversight of activities that involve managing or sampling soil, groundwater and air quality. WEM may also provide staff as Environmental Project Manager and Site Safety Officer. Project Team members also to be involved are as follows:

- City of Burlington, CEDO: contacts Nick Warner and Kirsten Merriman Shapiro
- Department of Public Works: contacts Erin Demers and Carol Weston
- VT Agency of Transportation, Funding: contact Wayne Davis
- Federal Highway Administration, Funding: contact Chris Jolly
- Resource Systems Group (RSG), Prime Engineer: contacts David Saladino and Corey Mack
- Engineering Ventures (EV), Civil and Structural Engineers: contacts Paul Boisvert and Russ-Miller Johnson
- Freeman-French-Freeman, Architects: contact Alex Halpren
- SE Group, Landscape Architects: contact Mike Willard
- Vanasse Hangen Brustlin, Inc (VHB), Wetland Permitting: contact Brad Ketterling
- Stantec, Resident Engineer: contact Dan Gregoire

Subcontractors to be doing the earthwork, construction, demolition activities have not yet been chosen.

CEDO and the Project Team is in the process of obtaining all necessary permits for this project. Permits that have been obtained or will be obtained prior to implementation of CAP measures are:

- Section 106 National Historic Preservation Action determination of "No Historic Properties Affected" [3]
- City of Burlington Planning and Zoning: Permit 10-1005CA/MA
- City of Burlington Planning and Zoning Permit 11-0570CU/CA (soil stockpiling area)
- ANR Operational Stormwater Permit (individual): Permit #6589-INDS
- ANR Construction Stormwater Permit: will be applying coverage under general permit 3-9020
- ANR Wastewater and Potable Water Supply Permit: will be applying for permit for municipal wastewater and water connections for Moran Center
- U.S. Army Corps of Engineers (USACOE) Section 404 Individual Permit / Section 10 Permit: submitted permit on July 15 for wetland fill and stormwater outfall in existing Class III wetland and Lake Champlain.
- VTrans requirement: photo-documentation of the coal tunnel for historical assessment prior to demolition and filling.

Other than DIGSAFE, no other permits are anticipated to be obtained for the corrective action described in this document.

6.2 Monitoring Well Abandonment/Protection/Replacement

The current network of monitoring wells used for annual VOC sampling is shown on Figure 5 WEM proposes to modify this network as follows:

1. Wells MW-4, MW-5, MW-6, and MW-11, will be properly abandoned, as groundwater is consistently below detection limits for VOC contaminants. Well MW-7 will also be abandoned, as it is within the footprint of the new skating rink, and wells MW-14 and MW-B will be abandoned, as these wells are duplicative given their proximity to other wells. Well abandonment will be in accordance with state protocols, and will involve removing the well boxes/guards, removing the PVC well casings, and filling well bores with bentonite clay. Well abandonment will occur during the summer-fall of 2011.
2. The existing network of w ells around the perimeter of the Moran Plant, comprised of wells MW-1, MW-2, MW-3, MW-13, MW-8, MW-A, and MW-C, will be preserved and protected throughout the redevelopment process. These wells will be modified during the summer-fall of 2011 by cutting down the PVC well casings and covering with heavy duty steel collars so that they will be protected from heavy equipment during the construction activities. The well casings will be extended back to final grade and covered in watertight well boxes once the construction is complete. For wells that are unavoidably damaged during the construction, they will be replaced once the work is complete. A new survey will be conducted to establish final top-of-casing elevations if modification or replacement is necessary. Since all of these wells are outside the zone of the Waterfront North construction area, these wells should not be affected by the 2011 construction work.

6.3 Long Term Groundwater Monitoring

With the possible exception of future groundwater monitoring at the Penny Lane site, which may be implemented after completion of the Penny Lane site investigation, long term groundwater monitoring is not anticipated to be required for the WFN component of the project. Long term groundwater monitoring for VOCs will be required for the Moran Center component (refer to Section 7.7).

6.4 Soil Management Plan

The options for soil management at the Site are onsite management under a continuous permanent constructed cap and offsite management. The principal contaminants of concern are arsenic and PAHs, which are predominant across the Site. These contaminants tend to stay adsorbed to soil particles and do not dissolve and create groundwater contamination. The arsenic is not amenable to commonly used treatment methods and levels are not anticipated to change with time, while the PAH contamination may degrade slowly with time. The objective is to establish a continuous engineering control layer, via clean soil or hardscape surfaces, that will interrupt the possibility of direct contact with contaminated soils.

Secondary contaminants of concern are petroleum and PCBs which are limited to smaller areas. The petroleum contamination can be treated in-situ or ex-situ, and is anticipated to slowly degrade with time. Because petroleum-contaminated soils can potentially pose a source of migration and impact to groundwater and Lake Champlain, existing and newly encountered petroleum-contaminated areas will be laterally and vertically characterized. The petroleum contaminated soil above EPA Residential RSLs will be removed from the Site for offsite treatment or disposal. The PCBs are not amenable to commonly used treatment methods and levels are not anticipated to change with time, so PCB-contaminated soil above EPA Residential RSLs will be removed from the Site for offsite disposal.

The basic components of this Soil Management Plan are as follows:

1. All pre-existing surface and shallow (<2 ft deep) soils that are re-used onsite shall be covered by a continuous cap of filter fabric as a marker layer followed by either Clean Topsoil and cover material (grass, plantings, or mulched beds) or else hardscape/impervious surface to deter future contact with the soil. An O&M plan will be developed to require annual inspections of the cap.
2. A combination of field screening with a PID and Ex Situ (once the soil has been excavated and stockpiled) analytical testing and will be required for classifying all soil to be stockpiled and potentially reused during the entire project. Ex Situ soil sampling will occur on the at the rate of 1 sample/250 cubic yards of soil.
3. Strict record keeping of soil types, stockpile volumes, and reuse volumes will be required.
4. Continuous observation of soil conditions will be required during excavation and trenching to flag any unanticipated contaminant conditions (buried objects, drums, tanks, strong odors, free product). If unanticipated conditions are encountered, then In Situ (from excavation zone prior to removal) analytical testing will be required for the contaminants of concern. This may require excavation activities in the area of concern to cease while the testing results are pending.

6.4.1 Soil Classification and Sampling

To assist in soil management, the soil will be classified into the four categories below.

Class A	from any area except the Penny Lane or PCE/TCE area (Defined in Figure 19) Field Parameters depth of > 2 ft PID < 1ppm No obvious visual or olfactory evidence of contamination Ex Situ Analytical Parameters PAHs: Below EPA res RSLs Arsenic: Below 10 ppm VOCs: Below EPA res RSLs RCRA 8 metals (excluding Arsenic): Below EPA res RSLs PCBs: Below EPA res RSLs
Class B	from any area except the Penny Lane or PCE/TCE area (Defined in Figure 19) Field Parameters depth of < 2 ft PID < 1ppm No obvious visual or olfactory evidence of contamination Ex Situ Analytical Parameters PAHs: Above EPA res RSLs OR Arsenic: Above 10 ppm, Below 35 ppm VOCs: Below EPA res RSLs RCRA 8 metals (excluding Arsenic): Below EPA res RSLs PCBs: Below EPA res RSLs
Class C	from any area except the Penny Lane or PCE/TCE area (Defined in Figure 19) Field Parameters PID > 1ppm Obvious visual or olfactory evidence of contamination Ex Situ Analytical Parameters PAHs: Above EPA res RSLs OR Arsenic: Above 35 ppm OR VOCs: Above EPA res RSLs OR RCRA 8 metals (excluding Arsenic): Above EPA res RSLs OR PCBs: Above EPA res RSLs (below trigger for TSCA jurisdiction)
Class D	petroleum contaminated soil generated from the Penny Lane zone Field Parameters PID > 1ppm PID readings > 1 ppm but <10 ppm ("Class D1") or PID readings >10 ppm ("Class D10") Obvious visual or olfactory evidence of contamination Ex Situ Analytical Parameters VOCs: Above EPA res RSLs OR Other parameters dependent on proposed disposal method (e.g. toxicity characteristic leachate procedure (TCLP) for benzene, TCE, arsenic, or lead and/or testing for ignitability)
Clean Topsoil	Organic soil to be provided by contractor that meets engineering specifications (VTRANS item 755.02) Required Analytical Parameters PAHs: Below EPA res RSLs Arsenic: Below 10 ppm

Table 6-1 – Proposed Soil Classification System

Soil Screening

Soil screening will be conducted using a PID (10.6 eV lamp) throughout the excavation process. All PIDs used will be calibrated daily using an isobutylene standard according to manufacturer specifications. Appropriate entries in the instrument calibration log will be made after each calibration. PID readings will be recorded in field notes by the Environmental Project Manager during the duration of the project.

The standard procedure for PID screening of soils is summarized below:

1. Sampling personnel shall always use clean jars or new polyethylene sealable bags to perform the analysis. Sampling personnel will don new gloves when transferring soils to the headspace bag or jar. If using a jar, the jar is to be half filled with soil, the top quickly covered with a layer of aluminum foil and then the jar lid screwed on tight. When using a polyethylene bag, fill the bag half full of soil, and seal it completely. Soils collected from an excavation or soil pile should be collected from freshly exposed surfaces and from undisturbed areas whenever possible. Care should be taken to shield the soils from rain and wind during the soil collection process.
2. Sampling personnel will allow headspace development (let the container sit) for at least one minute, preferably longer. The jar or bag should be vigorously shaken for at least 10 seconds at both the beginning and the end of the development period. If a bag is being used, the sampler will manually break up the soil clumps within the bag during development. The headspace development must take place in an environment where the ambient temperature is 60 degrees Fahrenheit or greater. If the temperature is below 60 degrees, the sampler will perform the development within a heated area, after the soils have warmed to a temperature above 60 degrees F.
3. When the headspace development is complete, the sampler will remove the jar lid and expose the foil, or alternatively, slightly open the bag's seal. The sampler will then quickly puncture the foil with the instrument probe tip, or insert the probe tip into the bag, to obtain a reading. The highest instrument meter response will be recorded. The probe tip of the PID shall be held no closer than a one-inch distance from the soils, to insure that sediments and moisture are not forced into the probe.

Continuous observation and screening of soil will be required for excavation activities that involve excavation into/through previously undisturbed soil, including general grade reduction, road and parking lot construction, skate park construction, wetland treatment area construction, utility trenching, etc. Screening will not be required for excavation activities that involve moving or transferring previously excavated soil, re-grading of soil, backfilling of soil, compacting of soil, loading of soil, etc.

PID readings will be utilized to confirm safe working conditions, and to classify the soil as described in Table 6-1.

Soil Analytical Sampling

Ex Situ analytical sampling will be required at the Stockpile Area (see Section 6.4.1) at the rate of 1 sample/250 cubic yards of soil. The stockpiling should proceed in a manner that keeps track of soil volume as it is accumulating.

If unanticipated contaminant conditions (buried objects, drums, tanks, strong odors, free product) are observed during the excavation process, In Situ testing of the soil for PAHs, VOC, PCBs, and Metals will be required for assessment purposes after telephone consultation with the VT DEC. The recording of these suspect conditions in the Daily Work Sheets will alert the VT DEC to the possible need for assessment sampling. In cases where suspect contaminant conditions are observed, the excavation contractor shall be prepared to stop work in the area of concern until the initial assessment of soil quality is complete. If soil conditions merit concern for groundwater quality, additional analytical testing of groundwater may be required once the excavation activities are complete.

Analytical parameters to be tested and methods used are provided in the table below.

SOIL PARAMETER	ANALYTICAL METHOD	REQUIRED DETECTION LIMIT FOR SELECT COMPOUNDS
PAHs	EPA Method 8270D SIM for PAHs	10 ug/Kg for all PAH compounds
VOCs	EPA Method 8260B (methanol preservation)	50-100 ug/Kg for BTEX, naphthalene, TCE, PCE, 1,1,1-TCA, and 1,1-DCA
PCBs	EPA Method 8082 (soxhlet extraction)	20 ug/Kg for all Aroclors
Metals	EPA Method 6020A for RCRA 8 metals	500 ug/Kg for all metals

Table 6-2: Proposed analytical testing parameters, methods, and detection limits.

It should be noted that soils to be collected for VOC analysis may not come from the container used for PID screening. Rather, fresh undisturbed soil should be sampled using a polyethylene syringe or similar device and immediately placed in the vial with methanol preservation.

Quality Assurance/Quality Control (QA/QC) protocols shall be used for the analytical testing, including the collection of a field duplicate for analysis of each parameter analyzed when any more than three (3) samples are collected on a single day, and the use of a deionized water trip blank for analysis of VOCs whenever samples for VOCs analysis are shipped or transported to the lab. If EPA Brownfield Assessment funds are applied toward soil testing, then QA/QC procedures shall be documented in an approved Quality Assurance Project Plan (QAPP).

6.4.2 Soil Stockpiling and Reuse

Soil stockpiling will occur onsite in temporary piles within several excavation zones (see Figure 19 and EPSC) for short-term duration. For any soil that will be stockpiled for more than one working week, then it must be moved to the Flying A Site north of the project area. This area was part of the Astroline property (see Section 2.0) and has been used by the BDPW for soil stockpiling for the past decade. A zoning permit for this use of this area for the Moran Center/WFN project has been obtained from the City of Burlington. This area is shown in Figure 21 in Appendix A. The stockpiling area will have site access control via a gate that will be locked at the end of each day and caution signs to warn public not to enter the area. Erosion control measures will be utilized, discussed below.

The Flying A soil stockpiling are will contain five separate soil stockpiles. Soil will be managed here throughout the duration of the project. Analytical testing of the soil (see Table 6-2) will be utilized as part of the management process, with a frequency of sampling of 1 sample/250 cubic yards of accumulation. Each pile will be clearly marked so as to ensure that soil types will not be mixed. The five piles are described below.

- **Pile A**: This is for Class A soils as described above. Stockpiled Class A soil will not require polyencapsulation.
- **Pile B**: This is for Class B soils as described above. Stockpiled Class B soil should not require polyencapsulation.
- **Pile C**: This is for Class C soils as described above. Class C soil will require polyencapsulation at the discretion of the VT DEC Project Manager if it has obvious evidence of VOC contamination or lab testing indicates VOC or PCB contamination.
- **Pile D1 and Pile D10**: These are for Class D soils as described above. <u>All Class D soils will require polyencapsulation</u>.

Erosion control plans have been developed by Engineering Ventures (reference to Sheets C12.1, C12.2, C12.3, and C12.6) and have been approved by the City of Burlington and for use in the Construction Stormwater Permit 3-9020. The erosion control plans for the Flying A soil stockpiling area is shown in Figure 21. Erosion control measures to be used include stabilizing all soil piles with either poly or seed/mulch, using a stabilized construction entrance, marking limits of disturbance (estimated 1.96 acres), using a sediment trap at downgradient end of stockpiling area, and making contractor responsible for preventing soil tracking on road surfaces.

Reuse of shallow and deep soil in all areas is proposed to the maximum extent possible. The reuse scenarios are described below:

- Onsite or offsite reuse of all Class A Soils as common fill pending meeting the proposed classification shown in Table 6-1. Excess Class A Soils that cannot be stored onsite may be temporarily stockpiled in Pile A and then brought back onsite as necessary for filling and regrading or hauled off site by the excavation contractor. Analytical characterization of Class A soils will be required in accordance with Table 6-2 at a frequency of 1 sample/250 CY of accumulation.

- Onsite reuse only of all Class B Soils contingent on using a protective barrier pending meeting the proposed classification shown in Table 6-1. The protective barrier will consist of either impervious materials (asphalt, concrete, pavers, etc.) or a Clean Topsoil cap (see Section 6.4.3) to deter any future human contact with the soil. Excess Class B Soils that cannot be stored onsite will be temporarily stockpiled in Pile B and then brought back onsite as necessary for filling and regrading. Analytical characterization of Class B soils will be required in accordance with Table 6-2 at a frequency of 1 sample/250 CY of accumulation.
- Offsite disposal or treatment of Class C Soil. Analytical characterization of Class C soils will be required in accordance with Table 6-2 at a frequency of 1 sample/250 CY of accumulation. Additional analytical characterization may be required by the permitted disposal/treatment facility.
- Offsite disposal or treatment of Class D10 Soil. Class D1 soil that analytical testing indicates VOC concentrations below residential RSLs may be used onsite in Zone C1 only if reused strictly for backfilling of trenches and covered under asphalt if deemed acceptable by the by the VT DEC Project Manager, Environmental Project Manager the Resident Engineer. Offsite disposal or treatment of Class D soils may be a PCF-reimbursable expense pending the outcome of the Penny Lane Subsurface Investigation.

Based on a total soil cut of 18,200 CY, a total soil fill of 5,900 CY (anticipated Class B) under a protective barrier, and a volume of 4,200 CY (anticipated Class A) that may be acceptable for use as common fill for other City of Burlington projects, there could be as much as 8,100 CY of soil remaining in stockpiles at the conclusion of the construction project. The remaining 8,100 CY will be either Class B, C, or D pending laboratory testing and will be either disposed or treated offsite. Estimates of the cut and fill volumes from each Soil Management Zone are provided in Table 6-3.

6.4.3 Clean Topsoil Cap

All areas were Class B soil is reused on Site that is not covered by impervious surface will be capped with a minimum 6 inches of Clean Topsoil (not to be confused with Class A Soil; see Table 6-1). A geotextile fabric will be emplaced after compaction of the fill, followed by final grading with Clean Topsoil and revegetation. The purpose of the geotextile is to be a marker layer intended to warn users in the future that excavation below is not permitted. Per VTrans Standards, a “non-woven geotextile for underdrain trench lining” (VTRANS item 649.41) shall be used. Compost may be added to the topsoil without the need for testing.

Based on VTRANs protocols (Section 651, sub-section 651.06), only 2 inches of topsoil are required for turf establishment. We propose using 6 inches of topsoil as a conservative measure to ensure that a healthy vegetative layer will act as a barrier to contact with fill soils below.

The areas where the Clean Topsoil cap is to be emplaced are shown as the light green spaces on Figure 4, and include green belts between parking lots, areas around the two gravel wetlands, the area surrounding the ice rink/splash pad, and the area surrounding the skate park. The stormwater swale east and north of the skatepark will also have a geotextile marker and clean fill below the vegetated surface. The total area to have Clean Topsoil cap is estimated at 75,000 ft^2, which translates to 1,400 CY of topsoil.

The presence of the topsoil cap will be referenced in the notice to the land records (see Section 6.7). An O&M plan will be developed to that will require the topsoil cap have annual inspections by a consultant/engineer to confirm the adequacy of coverage. An inspection letter will be submitted to the VT DEC to document each annual inspection.

6.4.4 Top Soil Testing

New topsoil will be required to be used for capping of reused Class B soil. As per the previous section, at least 6 inches of Clean Topsoil with a geotextile fabric will be required. Prior to using new topsoil, it must be tested for PAHs by EPA Method 8270D and for arsenic by EPA Method 6020A to confirm that concentrations of PAHs and arsenic are below soil guidance levels. Specifically, for PAHs the concentration expressed as Benzo(a)Pyrene Toxicity Equivalence (B(a)P-TE) must be below the 15 ug/kg residential EPA RSL, and for arsenic the concentration must be below the reuse guideline of 10 mg/Kg. If a single source of topsoil is to be used, a minimum of three (3) samples shall be collected for testing (or one sample/500 CY). If different sources of topsoil are to be used, samples must be collected from each source in the same manner.

The topsoil testing can be done by an environmental contractor, but all testing results must be reviewed and approved by the Environmental Project Manager. The testing results will be provided to the VT DEC before the final grading process begins and in the As-Built Report.

The soil requiring management has been separated into Zones A-L described below. Refer to Figure 19 for the layout of the Zones. Anticipated volumes of soil to be managed from each zone are described in each section and summarized in the table below.

SOIL ZONE	AREA FT^2	GRADE CUT CY	GRADE FILL CY	TRENCH CUT CY	TRENCH FILL CY	REMEDIATION CUT CY
A	39,123	2,406	0	147	49	0
B	56,437	2,660	0	443	146	0
C	47,700	3,486	0	534	176	0
C1	18,720	0	0	52	17	?
D	16,800	500	0	23	8	0
E	16,890	1,182	0	577	190	0
E1	27,580	61	0	60	30	0
E2	4,100	287	0	76	25	37
F	43,041	1,200	0	129	43	0
G	34,607	48	2,173	65	21	0
H	11,660	0	0	76	25	0
J	16,468	2,098	0	59	19	0
K	16,591	710	488	133	44	0
L	43,113	1,198	2,413	0	0	0
	TOTALS	15,836	5,074	2,314	764	37

TOTAL CUT	18,200	TOTAL FILL FOR ONSITE REUSE (UNDER CONSTRUCTED CAP)	5,900
ANTICIPATED CLASS A	4,200	TOTAL FILL FOR OFFSITE REUSE, (PENDING TESTING)	4,200
ANTICIPATED CLASS B, C, D	14,000	TOTAL SOIL REMAINING FOR OFFSITE DISPOSAL OR TREATMENT (PENDING TESTING)	8,100

Table 6-3: Anticipated Soil Management / Cut & Fill Volumes.

6.4.5 Soil Management Zone A –Lake Street Extension South (Figure 19)

This 39,100 ft^2 Zone will have the new 50 ft wide paved Lake Street extension with two lanes and on-street parking separated by a concrete median with lights. This area also has the re-aligned 10 ft wide paved bike path. A grassy strip with planted trees will be between the bike path and street. New utilities for this Zone include a new primary underground electric line and underground telephone under the bike path, stormwater catch basins and lines that cross Lake Street at two locations, and a new natural gas main under the south bound Lake Street. Secondary underground electrical lines are present for the new light poles.

This Zone is anticipated to have a grade cut of 2,400 cubic yards (CY) to allow for adequate sub-base for the new road, path, and sidewalks. Since the grade cut will be less than 2 ft deep, most of this soil is anticipated to be Class B or Class C. An additional cut of 150 CY is anticipated for utility trenching and utility structures. Since the utility cut will be deeper than 2 ft deep, most of this soil is anticipated to be Class A.

A temporary soil stockpile is proposed for a portion of Zone A, as shown in Figure 19 and in Engineering Ventures Sheet C.12.2. This stockpiling area will be used for temporary storage of Class A or B soil (segregated into two piles) that may be reused within the adjacent soil management zones. All other soil generated from this area will be stored at the Flying A Site.

6.4.6 Soil Management Zone B –Lake Street Extension North (Figure 19)

This 56,400 ft^2 Zone will have a 50 ft wide paved road with two lanes and on-street parking. This area also has the re-aligned 10 ft wide paved bike path and a turn-around at the end of the Lake Street Extension. A grassy strip with planted trees will be between the bike path and road in the central and southern end of this Zone. New utilities for this Zone include a new primary underground electric line and underground telephone under the bike path, stormwater catch basins and lines that cross Lake Street at four locations, and a new natural gas main under the south bound Lake Street that crosses into the north bound Lake Street. Secondary underground electrical lines are present for the new light poles.

This Zone is anticipated to have a grade cut of 2,700 CY to allow for adequate sub-base for the new road, path, and sidewalks. Since the grade cut will be less than 2 ft deep, most of this soil is anticipated to be Class B or Class C. An additional cut of 440 CY is anticipated for utility trenching and utility structures. Since the utility cut will be deeper than 2 ft deep, most of this soil is anticipated to be Class A and can be used as common backfill.

This Zone also has the former hopper for the coal tunnel, which was filled in after decommissioning of the Moran Plant. Excavation in this area will be required to remove the concrete to allow new road base, and to facilitate in the filling of the coal tunnel (see Section 6.6).

6.4.7 Soil Management Zone C - South Gravel Wetland and Parking (Figure 19)

This 47,700 ft^2 Zone will have 70 parking spaces surrounding a gravel wetland for stormwater treatment, as well as the northern leg of the traffic circulator road. The gravel wetland consists of two tanks for sediment removal and then 2 treatment cells with a bottom elevation of 96.0 ft. The gravel wetland will have a liner and underdrain to prevent infiltration into the soil; treated stormwater will be discharged to the Lake. New utilities for this Zone will be the gravel wetland and associated settling structures and network of stormwater lines and catch basins, and a new primary underground electric line in the northern part of the Zone that extends from Lake Street to the BED building. Secondary underground electrical lines are present for the new light poles.

This Zone is anticipated to have a grade cut of 3,500 CY. The excavation for the parking lots and road will be less than 2 ft deep, so soil from this component is anticipated to be Class B or Class C. The approximate 700 CY from the deeper (between 2 ft and 8 ft) excavation from the gravel wetland is anticipated to be Class A soils. An additional cut of 530 CY is anticipated for utility trenching and utility structures. Since the utility cut will be deeper than 2 ft deep, most of this soil is anticipated to be Class A and can be used as common backfill.

This zone is anticipated to be outside the Penny Lane contaminated soil area. Any soil excavated from this area that has field evidence of petroleum contamination will be classified and stockpiled as Class D1 or D10 soils and tested analytically for waste characterization once the stockpile is complete.

6.4.8 Soil Management Zone C1 – Penny Lane Zone (Figure 19)

This 18,700 ft^2 Zone, established as the Penny Lane petroleum contamination zone, will have the southern leg of the traffic circulator road and utility lines underneath. The limits of this zone are based on the 2009 subsurface investigation; the limits may expand based on the results of the Site Investigation process described in Section 5.1. New utilities for this Zone will a primary underground electric line that crosses Penny lane and traverses the southern Site boundary, and secondary underground electric for some light poles.

This Zone is anticipated to have a no grade cut, as the new road will be constructed after milling the existing asphalt and applying a new layer of asphalt. Some existing stormwater catch basins near the Water Department building will be modified and continued to be used. A trench cut of approximately 50 CY is anticipated for underground primary/secondary electrical lines. Prior to trenching, the soil and groundwater will have been characterized via the subsurface investigation proposed for this area. Any soil excavated from the trenching that has field evidence of petroleum contamination will be classified and stockpiled as Class D1 or D10 soils and tested analytically for waste characterization once the stockpile is complete.

6.4.9 Soil Management Zone D – Lake Street/Penny Lane (Figure 19)

This 16,800 ft^2 Zone will have the eastern end of the Penny Lane (traffic circulator road), western Lake Street, southern Depot Street, the railroad crossing, and utility lines underneath. New utilities for this Zone will be a two new stormwater catch basins, primary underground electric line crossing, secondary underground electric for light poles, a new gas main crossing, and underground telephone crossing.

This area is anticipated to have grade cut of 500 CY for the new road. Soil from the road cut in this Zone is anticipated to be Class B and C soils. An additional cut of 25 CYs anticipated for utility trenching and utility structures, which is anticipated to be Class A soils. Any soil excavated from this area that has field evidence of petroleum contamination will be classified and stockpiled as Class D1 or D10 soils and tested analytically for waste characterization once the stockpile is complete.

6.4.10 Soil Management Zone E – West Circulator and Parking (Figure 19)

This 16,890 ft^2 Zone will have 10 parking spaces for the Water Department and BED facility, the western leg of the traffic circulator road, and a road extending westward to the parking lot for the BDPW pumping facility and the fishing pier. New utilities for this Zone include a new stormwater line and catch basins, a new stormwater line that extends westward from the south gravel wetland and discharges treated stormwater into the Lake, a new primary

underground electric line that connects the BED building, and a new sanitary sewer line that connects to Moran Center.

This Zone is anticipated to have grade cut of 1,200 CY for the new parking lot and circulator. The excavation for the parking lot and circulator will be less than 2 ft deep, so soil from this component is anticipated to be Class B and Class C. An additional cut of 520 CY is anticipated for utility trenching and structures. Since the utility cut will be deeper than 2 ft deep, most of this soil is anticipated to be Class A.

This area encompasses the Transformer Yard where a zone of PCBs contaminated soil has been identified, shown as **Zone E2**. This 4,100 ft^2 area may be disturbed for a new storm sewer line and a new primary underground electric line. Construction in this area, which is currently surrounded by a chain link fence, will not occur until the Transformer Yard area has been further characterized by analytical sampling and remediated as necessary (refer to Section 5.3). The chain link fence shall not be removed until this characterization/remediation is complete. PCBs soils will not be managed onsite as part of this corrective action. For the purpose of estimating soil excavation volumes, we have assumed the removal of PCBs-contaminated soil in a 200 ft zone to a depth of 5 ft, for a total of 37 CY. For utility trenching once the remediation is complete, an additional 60 CY of soil will be excavated. Since the utility cut will be deeper than 2 ft deep and will occur after the PCB testing and remediation is complete, most of this soil is anticipated to be Class A.

6.4.11 Soil Management Zone E1 – BDPW and Fishing Pier Parking (Figure 19)

This 27,600 ft^2 Zone will have 25 parking spaces for the BDPW pumping facility and public fishing pier with a re-worked green belt to allow for circulating traffic. This zone also includes the alley between the BDPW/BED building and the Water Department building, which will receive an asphalt overlay. New utilities for this Zone include a new stormwater line that extends westward from the south gravel wetland that discharges treated stormwater into the Lake, and a new water line that brings nonpotable Lake water into the Moran Center (for HVAC), street light conduit, and a new secondary underground electric line.

There is no significant grade cut for this area, as the new parking lot will be constructed on top of the existing lot after milling of existing asphalt. Only 60 CY of soil will need to be excavated for construction of the new green island, and 60 CY of soil will need to be excavated for utility trenching. The utility trenching will avoid the known area of petroleum contamination associated with VT DEC Site #90-0540. This soil is anticipated to be Class B and C. Any soil excavated from this area that has field evidence of petroleum contamination will be classified as Class D soils.

6.4.12 Soil Management Zone F – Moran Center Entrance and Yard (Figure 19)

This 43,000 ft^2 Zone will have the eastern entrance to the Moran Center which will be capped with landscaping pavers, and the northern side of the Moran Center which will be partially capped in pavers and partially capped with a layer of Clean Topsoil and grass, both of which will act as a protective barrier to contact with fill soils. New utilities in this area will be

underground water, gas, electric and telephone lines to the southeast corner of the Moran Center from Lake Street, underground water, gas, and chilled water lines extending from the northeast corner of Moran Center to the ice rink/splash pad, several new stormwater catch basins, a new stormwater line that extends westward from the north gravel wetland and discharges treated stormwater into the Lake, and a sanitary sewer line that extends north-south that services the LCCSC building. Groundwater is present in this zone between 2-4 ft below grade, some of the utility lines will be below water table.

This area is anticipated to have a grade cut of 1200 CY. Soil from this area is anticipated to be Class B and C soils. An additional cut of 130 CY is anticipated for utility trenching and structures. Since the utility cut will be deeper than 2 ft deep, most of this soil is anticipated to be Class A soil.

No deep (>2 ft) excavation is planned and will not be allowed within the plume of TCE/PCE contaminated groundwater, so there will be no contact with these contaminants of concern. A portion of this zone extends above the high arsenic soil zone, so the impervious cover afforded by the pavers will be a sufficient cap of any shallow soils that are not removed.

6.4.13 Soil Management Zone G –Skate Park (Figure 19)

This 34,600 ft^2 Zone will have the skate park. Most of this area will be covered with impervious surface (concrete). A Clean Topsoil and grass layer will surround the skate park. New utilities for this Zone include some stormwater drains within the skate park structures, and a portion of a new sanitary sewer line and structure for the LCCSC building.

This Zone is anticipated to have a net grade fill of 2,100 CY. While some excavation for the skate park foundation, underdrains, grade change and utility lines will be required, the excavated soil is anticipated to be Class B and C soil and will be reused here to the maximum extent possible. A temporary soil stockpile is proposed for a portion of Zone G, as shown in Figure 19 and in Engineering Ventures Sheet C.12.2. This stockpiling area will be used for temporary storage of Class A or B soil (segregated into two piles) that may be reused within this zone. The additional soil to be used as fill will be Class A and B soils generated from other areas of cut, and will be covered by a continuous layer of Clean Topsoil or concrete for the skate park.

If removed, the raw coal currently visible at the ground surface in this area will need to be classified as Class C. A portion of this Zone extends above the high arsenic soil zone, so the impervious cover afforded by the skate park will be a sufficient cap for any of the shallow soils that are not removed.

6.4.14 Soil Management Zone H – Moran Center Perimeter South and West (Figure 19)

This 11,660 ft^2 Zone encompasses the southern side of Moran which will have a 10 ft wide gravel strip, and the west side of Moran which will be a 40 ft wide area covered in textured concrete and wooden decking. New utilities for this area will be new stormwater line and

catch basins on the south side of Moran and new secondary underground electric on the west side of Moran. A new water service line to bring Lake water into a heat pump system for heating/cooling of the building is also proposed to connect to the south side of Moran.

This area is anticipated to have no significant grade cut, as it is being resurfaced only. A cut of 75 CY will be required for utility trenching. Soil from this area is anticipated to be Class B and C soils. The deeper soil excavated from the utility trenches is anticipated to be Class A soils.

6.4.15 Soil Management Zone J – North Gravel Wetland (Figure 19)

This 16,500 ft^2 Zone will be a gravel wetland that consists of a forebay with three tanks for sediment removal and then 2 treatment cells with a bottom elevation of 95.0 ft. New utilities for this Zone will be the gravel wetland and associated settling structures and network of stormwater lines and catch basins. The gravel wetland will have a liner and underdrain to prevent infiltration into the soil; treated stormwater will be discharged to the Lake.

This Zone is anticipated to have a grade cut of 2,100 CY. While the upper 600 CY is anticipated to be Class B and C soils, the approximate 1,500 CY from the deeper (between 2 ft and 8 ft) excavation from the gravel wetland is anticipated to be Class A soils. Testing of the saturated soil from a depth of 5-8 ft at seven (7) locations in 2009 did not reveal any detectable contamination by VOCs. An additional cut of 60 CY is anticipated for utility trenching and utility structures. Since the utility cut will be deeper than 2 ft deep, most of this soil is anticipated to be Class A.

This Zone also has the coal tunnel access bunker and the western half of the coal tunnel. Excavation in this Zone will be required to demolish the bunker and approximately 40 ft of the coal tunnel to facilitate the construction of the wetland and filling of the remaining coal tunnel (see Section 6.6).

6.4.16 Soil Management Zone K – Ice Rink/Earthen Mound (Figure 19)

This 16,600 ft^2 Zone will be the ice rink/splash pad abutted by an earthen mound and open lawn. New utilities in this area will be underground water, gas, and chilled water lines extending from the northeast corner of Moran Center to the ice rink/splash pad, and a sanitary sewer line that extends north-south that services the LCCSC building.

This Zone is anticipated to have a grade cut of 710 CY followed by a fill of 490 CY, for a net cut of 220 CY. Shallow soil that will be stripped for the skating rink is anticipated to be Class B and C soils. Class B soils will be returned here to construct the earthen mound and then capped with Clean Topsoil. An additional cut of 130 CY is anticipated for utility trenching. Since the utility cut will be deeper than 2 ft deep, most of this soil is anticipated to be Class A.

6.4.17 Soil Management Zone L – Community Sailing Center Site (Figure 19)

This 43,100 ft^2 Zone will be for the new LCCSC building and storage yard. The building will be a slab on grade. The boatyard will be gravel. Utilities will consist of sewer, water and gas to the southeast corner of the new building, and secondary underground electric from the building into the boat yard for lighting. Excavation for a retaining wall and swale on the northern edge of the property and a retaining wall at the edge of the Lake will be required, and will be in accordance with the USACOE permit to be obtained.

This Zone is anticipated to have a grade cut of 1,200 CY, followed by a grade fill of 2,400 CY, for a net fill of 1,200 CY. With the exception of a small zone in the southwest corner of the boat yard, all of the existing soil here is anticipated to be Class A. Raw coal soil with coal dust may be encountered under a portion of the building footprint, and this soil should be classified as Class B or C pending analytical testing. The additional soil to be used as fill will be Class A and B soils generated from other areas of cut, and will be covered by a continuous layer of clean fill or the new building footprint.

6.4.18 Soil Record Keeping and Daily Field Sheets

As part of the Soil Management Plan, strict record keeping of soil volumes will be required by the Contractor. A log book will be kept at the Flying A Site for use tallying volumes (i.e. truck loads) of each class of soil that is brought into the stockpiling site and which pile it was stored at. The logbook will be similarly used to tally the volume and class of soil that is removed from the Flying A site for reuse or disposal. A template for the Soil Stockpiling Inventory Log Sheet is included in Appendix D.

The Environmental Project Manager will be required to prepare Daily Inspection Reports during the corrective action process. The inspection reports are necessary to keep track of the different contractors and consultants that are onsite each day, the tasks completed each day, and problems or deviations that may be encountered during the process. If, during the course of grade excavation or utility trenching, unanticipated evidence of contamination (strong odors, greasy or oily texture, free-phase petroleum) or buried structures potentially associated with contamination (tanks, pipelines, drums) are encountered, observations will be recorded in the daily inspection reports. Inspection reports shall be provided to the VT DEC on a daily basis. A template for the Daily Inspection Report is provided in Appendix D.

Field observations will also be recorded in field notebooks on a daily basis. Observations and data to be recorded will include soil screening values, soil sampling times, groundwater sampling times, instrument calibration data, etc.

6.4.19 Site Access Management

During the earthwork process when soil is exposed/stockpiled onsite, strict control of access to the construction areas must be maintained. This shall be done using fencing and signage to deter the public from entering the construction site. At the entrance to the construction site, caution signs for the construction zone will be erected to deter public access. In addition,

caution signs reading "*Contaminated Soil, No Unauthorized Access*" will be erected. The safety officer for the construction contractor will be required to watch for unauthorized access, and all authorized non-construction workers will be required to sign the daily log and read the Site Safety Plan before entrance. The Flying A Site soil stockpiling area will have a gate to be locked at the end of every day. Caution signs reading "*Contaminated Soil, No Unauthorized Access*" will be placed at the gate and at several other locations in the area.

6.5 Groundwater Management

Groundwater may be encountered in deeper utility trenches over the course of excavation activities. Trenching will not be required on the north side of the Moran Plant above where the plume of PCE/TCE contaminated groundwater is located (see Section 4.3), so there will be no direct contact with this. The need for special treatment of groundwater or dewatering of excavations is not anticipated to be required with the exception of areas A-D described below. When groundwater sampling is required, parameters to be analyzed are shown below.

GROUNDWATER PARAMETER	ANALYTICAL METHOD	REQUIRED DETECTION LIMIT FOR SELECT COMPOUNDS
PAHs	EPA Method 8270D for PAHs	0.1 ug/L for all PAH compounds
VOCs	EPA Method 8260B	1.0 ug/L for BTEX, naphthalene, TCE, PCE, 1,1,1-TCA, and 1,1-DCA
PCBs	EPA Method 8082	0.3 ug/L for all Aroclors
Total Metals	EPA Method 6020A for RCRA 8 metals	1-10 ug/L for all metals

Table 6-4: Proposed groundwater analytical testing parameters, methods, and detection limits.

A. North Gravel Wetland (Soil Management Zone J): This gravel wetland will be excavated first. Excavation to a depth of 8 ft will be required for construction of the two treatment cells. Depth to groundwater here is approximately 3-4 ft below grade, so groundwater may accumulate in the excavation. Based on saturated soil and groundwater testing results, the groundwater here is not contaminated by VOCs (see Table 5, page 2, results for SB-19 through SB-25). Any dewatering that will be required for construction will be managed onsite using infiltration into a temporary sediment trap. The trap will be located in footprint of the northern treatment cell, shown as TST-2 in Figure 19, while the southern treatment cell is being constructed. In this manner, groundwater will be re-introduced in the vicinity of its point of origin, thereby not changing subsurface conditions. The trap will consist of an excavated pit with earthen berm and perforated standpipe that will be adjusted to maximize detention and infiltration of water. Once the southern treatment cell is constructed, dewatering required for the northern cell will discharge into the southern cell. Additional details of the sediment trap are provided in the EPSC plans developed by Engineering Ventures. Groundwater discharge by other manners (overland flow, Lake discharge, offsite) <u>shall not be permitted</u> without first analytically characterizing water for parameters in Table 6-4.

B. South Gravel Wetland (soil management Zone C): This gravel wetland will be excavated after the Northern one is constructed, and a temporary sediment trap is planned here (see TST-1 in Figure 19. Excavation to a depth of 8 ft will be required for construction of the treatment cell. Depth to groundwater here is approximately 4 ft below grade, so groundwater may accumulate in the excavation. Based on groundwater testing results in perimeter wells to the north (MW-4 and MW-10, see Table 3) and saturated soil sampling to the south (GD-24B; see Table 5), the groundwater here is not contaminated by VOCs above VGES. However, additional characterization of accumulated groundwater will be required for analysis of parameters shown in Table 6-4. If dewatering is required for treatment cell construction and water quality testing results show all concentrations are below VGES and approval is granted by the VT DEC, then groundwater can be discharged into the North Gravel Wetland. If VOCs are detected in the accumulated groundwater at levels above the VGES or if there is any visual/olfactory evidence of petroleum contamination, the groundwater will be treated in accordance with Section 6.5.1. If groundwater contamination is detected, the VT DEC will be immediately notified and additional subsurface investigation may be required to fully characterize the source and extent, but this can occur after wetland construction is complete.

C. Coal Tunnel (Soil Management Zone J): Re-sampling and dewatering of the coal tunnel will be required, as described in Section 6.6.

D. Penny Lane Area Utility Trenching (Soil Management Zone C1). Petroleum contaminated groundwater may be encountered in the deeper utility trenches in this zone. All efforts should be made to avoid direct contact with this water and to avoid working in any trench that has pooling contaminated groundwater. If dewatering of trenches is required for laying pipe, then discharge will be to a sediment trap shown as TST-3 in Figure 19 to allow infiltration back into the contaminated zone. This activity must be overseen by the Environmental Project Manager. <u>No contaminated water shall be discharged to the ground surface, and discharge to storm sewers is not permitted</u>. If the volume of water requiring dewatering is more that can be infiltrated or at the discretion of the Environmental Project Manager, then treatment of the groundwater in accordance with Section 6.5.1 will be required.

Quality Assurance/Quality Control (QA/QC) protocols shall be used for the analytical testing, including the collection of a field duplicate for analysis of each parameter analyzed when any more than three (3) samples are collected on a single day, and the use of a deionized water trip blank for analysis of VOCs whenever samples for VOCs analysis are shipped or transported to the lab. If EPA Brownfield Assessment funds are applied toward groundwater testing, then QA/QC procedures shall be documented in an approved Quality Assurance Project Plan (QAPP).

6.5.1 Groundwater Treatment Contingency

If groundwater encountered during the excavation of the South Gravel Wetland has any contaminants at concentrations above VGES based on testing for VOCs, PAHs, PCBs and metals, then discharge for dewatering shall not be to the North Gravel Wetland. Instead, groundwater will need to be temporarily pumped into a frac tank (typical 21,000 gallon) where it will be allowed to settle. If during the course of trenching in Zone C1 petroleum contaminated groundwater cannot be managed through infiltration, then it must also be pumped into a frac tank. Once the dewatering efforts are complete and the water has settled, a sample of the water will be collected for analysis of VOCs by EPA Method 8260B and for PAHs, PCB, or metals if any of these compounds were detected in the accumulated water. If results indicate levels of contamination in excess of the VGES, then the water will required VT DEC approved treatment prior to discharge. A work plan for the proposed treatment method shall be submitted for VT DEC approval. Possible treatment methods are filtration of solids via a 25-micron bag filter and/or removal of contaminants using activated carbon. Discharge of treated water shall be to the City sanitary sewer system. The Environmental Project Manager will document all groundwater treatment activities. Groundwater treatment costs associated with Penny Lane contamination may be eligible for PCF reimbursement; this will be determined by the VT DEC upon completion of the Penny Lane Subsurface Investigation (see Section 5.1).

6.6 Coal Tunnel Dewatering, Inspection, and Filling

The coal tunnel, shown on Figure 5, is a concrete tunnel 95 ft long by 7 ft wide and 7 tall. The west side of the tunnel ends at a concrete bunker, and the east side ends at the former coal hopper that was under a rail spur and allowed train cars filled with coal to bottom dump the coal. A conveyor system was then used to move the coal through the tunnel to another elevator that was located next to the Moran Plant. Based on original 1953 blueprints, the tunnel floor at the bunker is at 105.0 ft, where the tunnel slopes downward over 50 linear ft to an elevation of 90.0 ft. The tunnel then extends eastward another 45 ft to the hopper. The top of the concrete tunnel under the existing road/bike path is at 99.0 ft, which translates to approximately 7.0 below ground surface, and means that the existing City of Burlington water lines that are present under the road/bike path go above the tunnel. There are no records of how the tunnel was demised when the Moran Plant was decommissioned in the late 1980s, so it is possible that the conveyor system was left behind

As of the summer of 2010, the tunnel was completely filled with water, assumed from both rainwater collection and groundwater infiltration. Based on the tunnel dimensions, there are approximately 35,000 gallons of water present. The water sample collected in 2010 for analysis of VOCs, PAHs, PCBs and metals indicated no concentration above the VGES (see Table 9), but the pH is slightly more acidic than groundwater and has a high turbidity.

Because of the overlying water lines and the extensive earth disturbance that would be required to remove the tunnel, the plan is to: 1) demolish the bunker and western 40 ft of the tunnel that extends into the footprint of the proposed north gravel wetland, 2) build a retaining wall/dam to seal the eastern half of the tunnel, and 3) fill the eastern half of the tunnel by pumping in

controlled low strength material (CLSM, or "flowable fill"). Because the tunnel has historic significance, VTrans has required that an inspection of the coal tunnel to photo-document it be conducted prior to partial demolition and filling. Since the tunnel is a confined space with unknown breathing conditions, the inspection will be made while the tunnel is still filled with water using a remote camera. The camera will be inserted from the bunker and extend into the tunnel to document the condition, features, and presence of any abandoned equipment (conveyor belt, conveyor motor, residual coal). The results of the inspection will be provided to the VT DEC. If the inspection reveals any objects inside the tunnel that may have environmental significance, then removal of this material may be required and will be addressed in a CAP Addendum.

Prior to partial demolition and filling the tunnel will be dewatered by the excavation contractor with oversight by the Environmental Project Manager. Water shall be pumped from the tunnel into two (2) 21,000 gallon frac tanks to be located in the fenced yard east of the Moran Plant. The water will be allowed to settle in the tanks for at least 24 hours, and then sampled again for VOCs, PAHs, PCB, and metals in accordance with Section 6.5. If concentrations are below the VGES, then one tank at a time will be discharged to the City sanitary sewer system similar to the 2009-2010 basement dewatering events. Prior to discharge, the water will then pass through a 2-inch duplex bag filter system with a 25 micron filter. From the filter housing, the discharge hoses will extend southward across the ground to the pump station next to the water treatment building. The maximum flow rate will be 50 gpm. The Environmental Project Manager will document all discharge activities and discharge volume. If results indicate levels of contamination in excess of the VGES, then the water will required VT DEC approved treatment prior to discharge. A work plan for the proposed treatment method shall be submitted for VT DEC approval. Possible treatment methods are filtration of solids via a 25-micron bag filter and/or removal of contaminants using activated carbon.

6.7 Proposed Institutional Control

A Notice to The Land Record (NTLR) will be recorded with the City Of Burlington. This document provides information to the public on the onsite contamination that will remain once the corrective action is complete, and requires timely consultation with the VT DEC prior to conducting any subsurface work, excavation, groundwater extraction, or coring/demolition through the new concrete floor of the Moran Center. A draft of the NTLR is provided in Appendix E. The NTLR will be finalized after the work is complete and document any new areas of identified contamination.

6.8 Reporting

An As-Built Report will be prepared at the conclusion of the Waterfront North project. The report will provide documentation of all the corrective actions proposed in this CAP, including monitoring records, soil testing results, water testing results (if required), dewatering volumes, soil volumes, topsoil cover zones, etc. A plan showing the different areas of the soil cap will be prepared for both the As-Built Report and the final NTLR

7.0 PROPOSED CORRECTIVE ACTION – MORAN CENTER

This component of the corrective action pertains to the redevelopment of the Moran Plant into the new Moran Center, and is proposed for 2012-2013, after the Waterfront North work is complete. If over the course of the next year the Moran Center redevelopment plans are modified, then a CAP Addendum will be prepared to describe those changes for approval by the VT DEC.

7.1 Permits / Project Management

WEM will continue to work for the City of Burlington on coordination and general oversight of activities that involve managing or sampling soil, groundwater and air quality. WEM may also provide staff as Environmental Project Manager and Site Safety Officer. Project Team members also to be involved are as follows:

- City of Burlington, CEDO: contacts Nick Warner and Kirsten Merriman Shapiro
- Department of Public Works: contact Erin Demers and Carol Weston
- Engineering Ventures (EV), Civil and Structural Engineers: contacts Paul Boisvert and Russ-Miller Johnson
- Freeman-French-Freeman, Architects: contact Alex Halpren

The permits required for this component of the project are same as described in Section 6.1, with the exception of a VT DOH permit that will be required for the removal of remaining asbestos containing materials from the Moran Plant building. Lead paint management during construction will not require a permit, but must be conducted in accordance with VT DOH protocols.

7.2 Interior Building Filling

Currently the building redevelopment plan involves filling the basement from the existing floor elevation of 96.0 to a final elevation of 103.0 ft. With basement cleaning activities already complete and all direct contact and breathing hazards removed, this work will not require special working conditions. The plan is to cover the existing generator pits and ash trenches (see Figure 17) with structural slabs, followed by filling from 96.0 ft to 101.5 ft with structural fill, defined by EV as "Clean[2] soil material, free of organic and other unsuitable matter, with less than 10% of the soil material smaller than a number 200 sieve (by dry weight)." Between 101.5 and 102.5 ft will be a layer of crushed gravel fill, also specified by EV. A 15-mil Stego® Wrap vapor barrier will be installed on top of the fill that will inhibit the vertical migration of moisture and potential contaminant vapor. The barrier will be laid out in sheets with 6 in overlap and taped seams. The barrier will be attached to the sidewalls using a termination bar and concrete nails. Once the barrier is installed and inspected, then the final 6.0 in concrete slab will be poured between 102.5 and 103.0 ft to create a new ground floor. A cross-section of the proposed filling is shown in the detail of Figure 23. A cross-section of the building showing the new floor elevation is shown in Figure 22.

[2]Does not refer to "Clean" as described by Table 6-1.

A mechanical trench and two new elevator shafts will be present in the new ground floor, as shown in Figure 23. The bottoms of these areas will still be above the 96.0 ft existing floor elevation. Construction of the elevator shaft shall not disturb the existing concrete floor. Due to PCBs contamination in the existing concrete basement floor, there shall be absolutely no disturbance (coring, grinding, etc.) of the existing basement floor.

Dependent on results of sub-slab channel assessment to be conducted during the summer-fall of 2011 (refer to Section 5.4) and review by the VT DEC, the contaminated sediment that is currently in the sub-floor trenches at 91.5 ft may be left in place. If over the course of the assessment it is decided that the remediation of the sediment is necessary prior to basement filling, this will be addressed via a CAP Addendum.

The basement filling work should be optimally be scheduled between July and September 2012, when the basement is typically dry. If basement filling needs to occur before this time, then dewatering of the basement will be required. With advance notice, this can be accomplished by the City of Burlington by pumping (sump pump) water to the City sanitary sewer system. Without advance notice, a more aggressive pumping scheme may be required using a frac tank with slow discharge to the sanitary sewer system. Water discharge to the Lake or ground surface will not be allowed.

7.3 Sub-Slab Vapor Control System

A sub-slab depressurization (SSD) system will be installed within the crushed gravel fill layer during the filling process. This system will provide engineering control to prevent the potential intrusion of vapor into the building from VOC contaminated groundwater than may be under or around the perimeter of the building and from PCBs-contaminated concrete that is in the existing basement floor. It is WEM's professional opinion that the capping of the existing floor is outside TSCA jurisdiction and will instead be subject to the VT DEC as the sole regulatory authority of the supervision and review of this activity.

Based on EPA guidance [29, 30] for sub-slab depressurization of a 100,000 ft^2 slab, 950 linear ft of 2-inch diameter perforated pipe with approximately 35% perforated volume would be required for an effective SSD system. Since the Moran slab is only 15% of this area, technically a linear length of 142.5 ft would be required. Based on VT DEC protocols, the system must be able to maintain a minimum 2 Pascal (0.008 inches of water) pressure differential to effectively impede vapor migration from below the slab into the building, and must avoid short-circuiting.

As a conservative measure, a much longer system is proposed, as shown in Figure 23 in Appendix A. Two loops, shown as Loop 1 and Loop 2, are proposed. Loop 1 will have 330 linear ft of 2-in diameter 20 slot (0.02 in slot) SCH 40 PVC connected together by a combination of threaded end fittings and slip couplings. Loop 2 will have 440 linear ft of 2-in diameter 20 slot (0.02 in slot) SCH 40 PVC. The 770 linear ft of piping translates to 16.94 ft^3 of pipe void space and 5.08 ft^3 of slot space. Each loop will have vertical risers to extend through the basement floor at the eastern and western ends of the pipe loop; the risers at the eastern end are proposed for future extension upwards to the roof or out the side of the building if necessary.

Pipe boots will be used on all vertical risers and the concrete will be carefully poured around the risers to provide an airtight seal to prevent short-circuiting of air. Details of the proposed system are also provided in Figure 23.

The slotted PVC pipe will be laid down horizontally by the construction contractor on top of 6 inches of crushed gravel fill after emplacement and compaction. The elevation of the bottom of the PVC pipe will be approximately 101.5 ft, which is above the normal seasonal high water table elevation below the building; given that the pipes are continuously slotted and will fully drain water, the system will not be damaged by unanticipated flood conditions. Once the pipe is connected and inspected, it will be covered by another 6 inches of crushed gravel fill and final compacted. A 15-mil Stego® Wrap vapor barrier will be installed on top of the fill. The barrier will be laid out in sheets with 6 in. overlap and taped seams. The barrier will be attached to the sidewalls using a termination bar and concrete nails. Once the barrier is installed and inspected, then the final concrete slab will be poured to create the new ground floor. The vertical risers can be capped above the new basement floor until the construction process nears completion, at which point they will be extended to their final discharge locations.

This system can be used both passively and actively. Passive use allows for atmospheric pressure outside and positive HVAC-driven pressure inside to flush vapor contaminants (if present) from the sub-slab into the vent piping and then through the vertical risers into the atmosphere. Active use means that an in-line fan is placed on risers to constantly flush out the vapor contaminants. To test performance of the active system after the system is constructed and new concrete floor is poured, a temporary blower will be used to extract air from each loop via the eastern risers. The extraction rate (in cfm) will be modified using fresh air bleed to achieve a test vacuum level of 0.1 in water (~25 Pascal). While under vacuum, measurements of vacuum from the western risers will be made using a manometer to ensure that an equivalent vacuum is present under the entire slab. While under vacuum, a smoke source will be used next to all of the risers to confirm that there is no air movement through the seals.

Once the performance testing is complete, pre-occupancy indoor air testing will be conducted (See Section 7.4). The results of the air testing will be provided to the VT DEC and will be used to determine whether the system should be used actively or passively. Regardless of the type of use, a formal operation and management plan (O&M) plan will be prepared to provide use instructions, fan specs (if required), and air sampling schedule (if required). The O&M plan will be an appendix to the As-Built Plan to be submitted at the conclusion of the corrective action work.

7.4 Pre-Occupancy Indoor Air Testing

After the SSD system is complete and the SSD riser pipes have been completed to their final discharge locations and preferable at least one (1) month after indoor construction is complete, the Environmental Project Manager will undertake indoor air testing on the ground floor of the new Moran Center. Samples will be collected from four (4) locations, one from each quadrant of the building. The sampling will be undertaken while the SSD system is operating passively, the HVAC system is operating, and all doors and windows are closed. Due to VOCs in the

groundwater outside the building and the presence of PCBs in the concrete floor, the air samples will be analyzed for VOCs and PCBs. The air quality guidance levels to be used are the EPA residential RSLs for indoor air, with reference to the VT DOH indoor air survey data from 1992. The air quality parameters, analytical methods, and required detection limits are shown on the Table 7-1 below.

AIR QUALITY PARAMETER	ANALYTICAL METHOD	REQUIRED DETECTION LIMIT FOR SELECT COMPOUNDS
VOCs	EPA Method TO-15 Low Level for VOCs	0.04 - 0.08 ppbv BTEX, naphthalene, TCE, PCE, 1,1,1-TCA, and 1,1-DCA
PCBs	PUF sorbent cartridge, EPA Method 8082 compounds	0.0002 ppbv for Aroclor-1254 and Aroclor-1260

Table 7-1: Proposed air quality analytical testing parameters, methods, and detection limits.

For VOCs, samples will be collected over an 8-hour period in 6-liter stainless steel Silco air canisters. The canisters and flow controllers will be procured by the Environmental Project Manager from TestAmerica Laboratory (TA) of South Burlington, Vermont prior to sampling. The flow controllers will be calibrated by TA to provide a flow rate that allowed a final canister pressure between -7.0 and -2.0 inches of Mercury (in Hg) below ambient pressure after a run time of approximately 8 hours. Collection times, initial and final canister vacuum, initial and final ambient temperature, and initial and final ambient pressure readings will be recorded on a Canister Samples Chain of Custody Record & Field Test Data Sheet. The canisters will then be transported back to TA for analysis of VOCs by Method TO-15 low level (LL).

For PCBs samples will be collected according to EPA protocols [31] over an 8-hour period using a high volume (~ 8 cfm) sampler to draw air through a sorbent cartridge filled with polyurethane foam (PUF). The cartridges will be procured from TA, and the sampling pumps will be procured from a Pine Environmental. The cartridges will be transported back to TA for extraction by EPA Method TO-4A, and then analysis for PCBs by EPA Method 8082.

In addition to the four indoor locations, samples will be collected in a similar manner to that described above from one (1) ambient location outside the building. The proposed outdoor location will be determined at the time of sampling; it will be chosen as to avoid areas where active construction equipment, vehicles, or other potentially VOC-creating activities are being conducted. If necessary, the sampling will be conducted on a weekend when there is no construction activity.

All sample results will be compared to appropriate VT DOH & EPA guidelines. If any contaminants are present in the air at concentrations in excess of these guidelines, then re-sampling shall be conducted. If the second round of sampling continues to show that contaminants are present in the air at concentrations in excess of these guidelines, then active operation of the SSD system will start with a confirmatory round of air sampling to be conducted with the system in operation. Results and recommendations will be provided by the

Environmental Project Manager to the VT DEC in a formal report. If required by the VT DEC, a regular indoor air sampling program will be developed to monitor air quality while the new facility is in operation. Additional air sampling will also be conducted if flood conditions ever inundate the piping. If EPA Brownfield Assessment money is used toward air sampling, QA/QC procedures shall be documented in an approved QAPP.

7.5 Remaining Interior and Exterior Building Hazards

Based on a September 2009 additional asbestos survey (refer to Section 3.11), asbestos is present in five (5) materials that remain present inside and outside the Moran Plant: 1) black tar paper material inside the ceramic wall of the shower area of the main floor ("operations level" at 116.0 ft elevation), 2) mudded joint fitting surrounding piping in the ceiling of the shower area of the main floor, 3) gasket rope on the lower portion of the north side exterior structural steel, 4) gasket material in the lower portion of the north side exterior structural steel, and 5) caulking in the lower portion of the north side exterior structural steel. Based on these results, all mudded joint fittings found during demolition should be considered positive for asbestos and managed accordingly. The gasket and caulk materials, estimated at 10 ft^2, and the black paper material, assumed to be limited to inside the ceramic walls, also needs to be managed accordingly. Any mudded joint fittings, paper, gasket, and caulk materials that are now visible should be removed prior to demolition. All removal/abatement techniques shall be in accordance with VT DOH protocols and conducted by a certified asbestos contractor. The VT DOH contact is Vernon Nelson. All documentation of asbestos abatement shall be provided to the Environmental Project Manager for inclusion in the As-Built Report.

Lead is also present on painted block walls and painted steel structure inside the Moran Plant. All demolition of painted concrete and welding of painted steel must be in accordance with the Vermont Occupational Safety and Health Administration (VOSHA) guidelines, as specified in the "Lead in Construction" standard (OSHA 3142, 1993). All documentation of lead abatement shall be provided to the Environmental Project Manager for inclusion in the As-Built Report.

7.6 Soil Management

The soil management protocols described in Section 6.4 will be followed for all soil disturbance required for the Moran Center Redevelopment. Work will be conducted in Soil management zones H and F (see Figure 19) during construction of the skating rink/splash pad and associated utilities, re-grading, trenching for utility lines into the new Moran Center, and installation of concrete pavers around the perimeter of the Moran Center.

7.7 Long Term Groundwater Monitoring

During construction, the existing network of monitoring wells around the perimeter of the Moran Center will be protected in an attempt to avoid damage from heavy equipment (refer to Section 6.2). Groundwater monitoring from the seven wells to be preserved (wells MW-1, MW-2, MW-3, MW-13, MW-8, MW-A, and MW-C) at the Moran Center site will continue on an annual basis in December of each year. In accordance with current protocols, the sampling will be conducted by slow-purge methods to remove three well volumes and be analyzed for VOCs by

EPA Method 8260B. Starting in December 2011, four wells downgradient of the Moran Plant (MW-A, MW-C, and MW-8, and MW-13) will also be sampled for PCBs by EPA Method 8082 to confirm that that the interior PCB-contaminated sediment and concrete that is left in place is not communicating with the exterior groundwater. Annual reports will be prepared to include tabulated groundwater quality data, groundwater elevation contour maps, contaminant summary maps, and conclusions and recommendations.

7.8 Proposed Institutional Control

A Notice to The Land Record (NTLR) will be recorded with the City Of Burlington. This document provides information to the public on the onsite contamination that will remain once the corrective action is complete, and requires that the VT DEC prior to conducting any subsurface work, excavation, groundwater extraction, or coring/demolition through the new concrete floor of the Moran Center. A draft of the NTLR is provided in Appendix D.

7.9 Reporting

An As-Built Report will be prepared at the conclusion of the Moran Center project. The report will provide documentation of all the corrective actions proposed in this CAP, including monitoring records, air testing results, asbestos abatement documentation, basement filling documentation, soil volumes, etc. The As-Built Report will have the O&M Plan for the SSD system.

8.0 IMPLEMENATION SCHEDULE

The implementation schedule for the Waterfront North and Moran Center developments has not yet been firmly established. There are some specific phasing requirements, including that the work will not start before the 2011 Burlington Marathon, that the existing skate park remain open until the new skate park is completed, and maintaining full access to the bike path during construction. The tentative phasing timeline is shown on the following page.

WATERFRONT NORTH		MORAN CENTER	
ACTIVITY	TIMELINE	ACTIVITY	TIMELINE
Penny Lane Subsurface Investigation	August 2011	Sub-Basement Channel Assessment	Fall 2011
Transformer Yard Remediation (GMP)	Fall 2011	Final Architectural Design	2011
Electrical Infrastructure Removal (GMP)	Summer 2011	Contractor Bidding/Selection	2012
Contractor Bids	September 1, 2011	Building Renovation	2012- 2013
Contractor Selection	October 1, 2011	Basement Filling	2012
Flying A Site Preparation	October-November 2011	SSD System Construction	2012
Contractor Staging Area Prep	October-November 2011	Ice Rink/Splash Pad Construction	2012-2013
New Bike Path Construction (north)	October-November 2011	New Surfacing	2012-2013
New Skate Park Construction	2012	New LCCSC Building Construction	2012? 2013?
North Gravel Wetland Construction	2012		
Coal Tunnel Dewatering/Filling	2012		
Stormwater line trenching (north)	2012		
BED Electrical Trenching (south)	2012		
Road/Parking Lot Improvements	Fall 2011 - 2012		
Utility Work	Fall 2011 - 2012		
Soil Stockpiling	Fall 2011 - 2012		
South Gravel Wetland	2012		
Final Grading	2012		
Final Paving	2012		

9.0 COST ESTIMATE

Funding for this project moving forward will be from a combination of municipal sources, private sources, federal (Federal Highway) and state (VTRANs) transportation sources, and other governmental/grant sources. EPA Brownfield Assessment grant money through the Chittenden County Regional Planning (CCRPC) may go toward some of the required assessment, monitoring, and reporting tasks described in this CAP. The estimated 2011-12 costs that may be covered by EPA funds are bulleted below:

- QAPP Development $ 2,160
- Screening/Sampling, Segregation of Soil $57,640
- Supervision and Sampling During Coal Tunnel Dewatering $ 6,875
- Moran Interior Follow Up Monitoring $ 7,650
- Monitoring Well Abandonment $ 960
- Fall 2011 Groundwater Monitoring $ 3,860
- VT DEC Reporting, CAP Addendum $ 5,400

$ 84,545

10.0 HEALTH AND SAFETY PLAN

WEM's Health & Safety Plan (HASP) is provided in Appendix D. The purpose of this plan is to protect WEM personnel only. This HASP covers sediment sampling and dewatering work as well as other anticipated task outside the building. Because WEM will not be providing labor involving for lead paint work, asbestos work, or work requiring Level C protection (sediment removal and guano removal), these tasks are not addressed in WEM's HASP.

However, WEM will require that all subcontractors have their own HASPs which must be submitted to WEM for review and approval prior to the start of work.

11.0 REFERENCES

1. Waite Environmental Management, LLC, *Corrective Action for Building Cleanup, Moran Plant, 475 Lake Street,* March 11, 2009, revised March 17, 2009.

2. VHB-Pioneer, Memorandum to Moran Plant Project File re: Moran Plant Wetland Functions and Values Documentation, June 22, 2010.

3. University of Vermont Consulting Archeology Program, *Archeological Resources Assessment, Moran Center at Waterfront Park, City of Burlington,*, August 2009.

4. Letter from Eastern Refractories Company, Inc. to the State of Vermont, Department of Health, re: Burlington Electric Moran Station Asbestos Removal Work, May 25, 1987.

5. Letter from Shelburne Laboratories, Inc. to Burlington Electric Department, re: Moran Generating Plant, April 6, 1987.

6. Heindel and Noyes, *Phase I Environmental Site Assessment, Urban Reserve, Burlington, Vermont*, November 12, 1997.

7. Lamoureux & Dickinson Consulting Engineers, Inc., *Phase II Environmental Site Assessment, North 40 – Urban Reserve, Burlington, Vermont*, May 2000.

8. Waite Environmental Management, LLC, *Phase II Environmental Site Assessment Report, Moran Generating Plant*, May 18, 2005, revised June 24, 2005.

9. Waite Environmental Management, LLC, *Additional Brownfield Site Investigation Report, Moran Generating Plant*, February 27, 2006.

10. Waite Environmental Management, LLC, *Groundwater Monitoring Report & Interim Corrective Action Plan, Moran Generating Plant,* March 13, 2007, revised May 7, 2007.

11. Letter from Waite Environmental Management, LLC to CEDO, re: Additional Monitoring Well Installation, November 7, 2008.

12. Waite Environmental Management, LLC, *August 2009 Subsurface Investigation Report, Moran Generating Plant*, October 2, 2009, revised December 29, 2009.

13. KAS, Inc., "Record Drawings – Moran Plant Sluiceway Permanent Closure", letter from Erick Sandblom to Julie Potter, February 10, 2009.

14. Waite Environmental Management, LLC, *Report: Semi-Annual Groundwater Monitoring and Pre-Dewatering Characterization*, July 21, 2008.

15. Lincoln Applied Geology, Inc., *Moran Plant Rehabilitation*, October 22, 2009.

16. Waite Environmental Management, LLC, *Corrective Action Plan for Building Cleanup, Moran Plant*, March 11, 2009, revised March 17, 2009.

17. Letter from Waite Environmental Management, LLC to CEDO, re: Asbestos in Dust Samples, October 2, 2009.

18. Letter from Waite Environmental Management, LLC to CEDO, re: Additional Asbestos Sampling, October 9, 2009.

19. Letter from Waite Environmental Management, LLC to Resource Systems Group, re: Subsurface Investigation Report, December 7, 2009.

20. Waite Environmental Management, LLC, *Community Sailing Center Subsurface Investigation Report*, November 15, 2010.

21. The Johnson Company, *Remediation Report, Moran Plant Project,* January 10, 2011.

22. Letter from Waite Environmental Management, LLC to VT DEC, re: Sediment and Water Sampling Results, December 22, 2010.

23. Waite Environmental Management, LLC and The Johnson Company, *Report on Supplemental PCB Sampling of Basement Concrete Floor, Moran Generating Plant*, February 16, 2011; revised March 16, 2011.

24. Waite Environmental Management, LLC, *Transformer Yard Subsurface Investigation Report*, *Moran Generating Plant*, February 17, 2011; revised March 17, 2011.

25. Wagner, Heindel & Noyes, Burlington Background PAH Study, prepared for the City of Burlington, October 1992.

26. Letter from Hugo Martinez Cazon (VT DEC) to Nick Warner (City of Burlington) re: Penny Lane (Waterfront North), June 3, 2011.

27. Heindel & Noyes, Penny Lane, Burlington – Site Investigation Work Plan REVISED, submitted to VT DEC July 11, 2011.

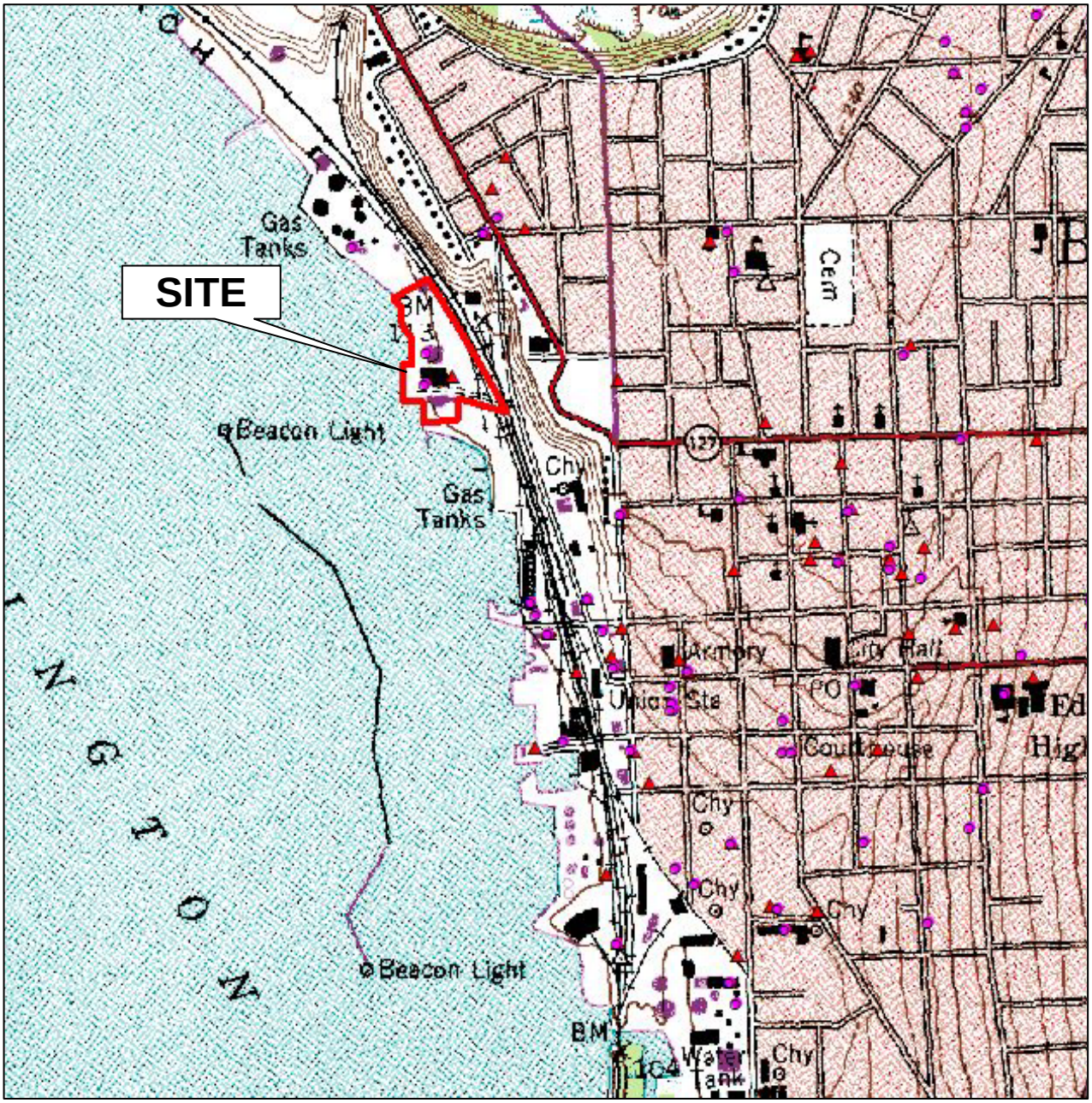
28. Letter from Hugo Martinez Cazon (VT DEC) to Nick Warner (City of Burlington) re: Former Transformer Pad, Moran Plant, June 6, 2011.

29. EPA, Radon Prevention in the Design and Construction of Schools and Other Large Buildings, EPA/625/R-92/016, 1994.

30. EPA, Radon Reduction Techniques for Existing Detached Houses, Technical Guidance for Active Soil Depressurization Systems, EPA/625/R-93/011, 1993.

31. EPA, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition, EPA/625/R-96/010b, 1999.

APPENDIX A
FIGURES



LEGEND

- State-Listed Hazardous Waste Site (2009)
- State-Registered UST (2006)

N

WEM Job Number:	*02052-28*
Map Source:	*USGS Mapping 7.5 Minute Burlington, Vermont Quadrangle (1987)*
Data Source	*ANR databases, updated October 2009*

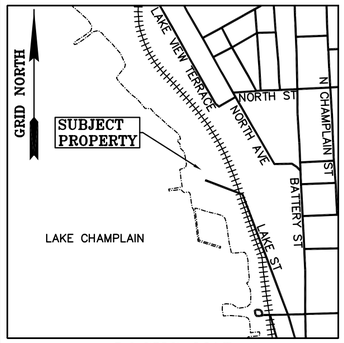
Waite Environmental Management, LLC

SITE LOCATION MAP

Moran Center and Waterfront North

Burlington, VT

Date: 04/02/11	Drawing No. 1	Scale: 1" = 1,200	By: MEW



LOCUS MAP

REFERENCES:

R1 – A plat entitled "A PORTION OF THE CENTRAL VERMONT RAILWAY, INC. LANDS BURLINGTON, VERMONT PROPERTY PLAT" prepared by Donald L. Hamlin Consulting Engineers, Inc. Essex Junction, VT, dated 10/1/91, drawing 3A, filed in Slide 241C of the City of Burlington Land Records.

R2 – A plat entitled "A PORTION OF THE CENTRAL VERMONT RAILWAY, INC. LANDS BURLINGTON, VERMONT PROPERTY PLAT" prepared by Donald L. Hamlin Consulting Engineers, Inc. Essex Junction, VT, dated 10/1/91, drawing 1B, filed in Slide 241B of the City of Burlington Land Records.

R3 – A plat entitled "A PORTION OF THE CENTRAL VERMONT RAILWAY, INC. LANDS BURLINGTON, VERMONT PLAN NOTES" prepared by Donald L. Hamlin Consulting Engineers, Inc. Essex Junction, VT, dated 10/1/91, drawing 3F, filed in Slide 242B of the City of Burlington Land Records.

R4 – A plat entitled "A PORTION OF THE CENTRAL VERMONT RAILWAY, INC. LANDS BURLINGTON, VERMONT PROPERTY PLAT" prepared by Donald L. Hamlin Consulting Engineers, Inc. Essex Junction, VT, dated 10/1/91, drawing 3E, filed in Slide 242A of the City of Burlington Land Records.

R5 – A plat entitled "A PORTION OF THE CENTRAL VERMONT RAILWAY, INC. LANDS BURLINGTON, VERMONT PROPERTY PLAT" prepared by Donald L. Hamlin Consulting Engineers, Inc. Essex Junction, VT, dated 10/1/91, drawing 1A, filed in Slide 241A of the City of Burlington Land Records.

R6 – A plat entitled "LANDS OF THE CITY OF BURLINGTON LAKE STREET, BURLINGTON, VERMONT PROPERTY PLAT THE MORAN PLANT" prepared by Lamoureux & Dickinson Consulting Engineers, Inc., Essex Junction, VT, dated 3/2/09, project number 09001, provided by the Resource Systems Group, Inc. White River Junction, Vermont.

R7 – A plat entitled "CITY OF BURLINGTON COMMUNITY DEVELOPMENT DEPARTMENT BURLINGTON, VERMONT SUBDIVISION PLAN OF A PORTION OF THE WATERFRONT PROPERTY" prepared by Donald L. Hamlin Consulting Engineers, Inc., Essex Junction, VT, last revised 9/14/93, drawing P-2, filed in Slide 273A of the City of Burlington Land Records.

NOTES:

N1 – This survey was performed using an electronic total station to traverse between control points established using dual frequency GPS receivers, resulting in a closure with a relative precision that exceeds 1:10000.

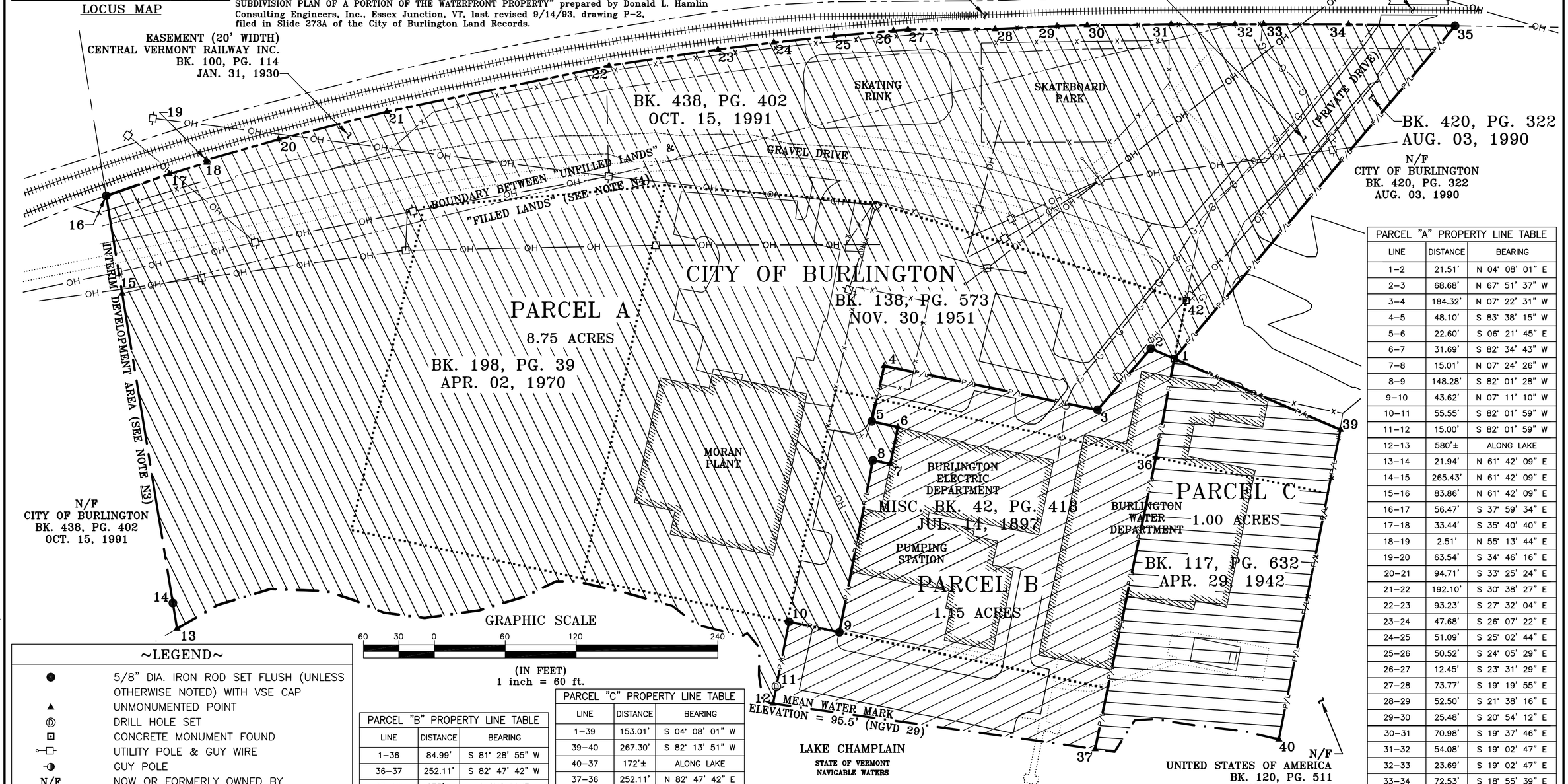
N2 – An average orthometric height of 103 feet was used for grid distance computations. A combined factor of 1.000005076 was used. All bearings, distances and coordinates are shown as Vermont Grid, NAD 83 in U.S. Survey Feet.

N3 – Interim Development Area limit based on an extension of the southerly boundary of 9 Lakeview Terrace in substitution of the "Conservation Map" that has not yet been documented.

N4 – Filled lands are impressed with the public trust doctrine pursuant to the lawsuit of State of Vermont and City of Burlington v. Central Vermont Railway, Inc. Supreme Court Docket No. 87-607.

N5 – Underground utilities located by others.

N6 – No easements was found for utilities shown hereon.



PARCEL "A" PROPERTY LINE TABLE		
LINE	DISTANCE	BEARING
1–2	21.51'	N 04° 08' 01" E
2–3	68.68'	N 67° 51' 37" W
3–4	184.32'	N 07° 22' 31" W
4–5	48.10'	S 83° 38' 15" W
5–6	22.60'	S 06° 21' 45" E
6–7	31.69'	S 82° 34' 43" W
7–8	15.01'	N 07° 24' 26" W
8–9	148.28'	S 82° 01' 28" W
9–10	43.62'	N 07° 11' 10" W
10–11	55.55'	S 82° 01' 59" W
11–12	15.00'	S 82° 01' 59" W
12–13	580'±	ALONG LAKE
13–14	21.94'	N 61° 42' 09" E
14–15	265.43'	N 61° 42' 09" E
15–16	83.86'	N 61° 42' 09" E
16–17	56.47'	S 37° 59' 34" E
17–18	33.44'	S 35° 40' 40" E
18–19	2.51'	N 55° 13' 44" E
19–20	63.54'	S 34° 46' 16" E
20–21	94.71'	S 33° 25' 24" E
21–22	192.10'	S 30° 38' 27" E
22–23	93.23'	S 27° 32' 04" E
23–24	47.68'	S 26° 07' 22" E
24–25	51.09'	S 25° 02' 44" E
25–26	50.52'	S 24° 05' 29" E
26–27	12.45'	S 23° 31' 29" E
27–28	73.77'	S 19° 19' 55" E
28–29	52.50'	S 21° 38' 16" E
29–30	25.48'	S 20° 54' 12" E
30–31	70.98'	S 19° 37' 46" E
31–32	54.08'	S 19° 02' 47" E
32–33	23.69'	S 19° 02' 47" E
33–34	72.53'	S 18° 55' 39" E
34–35	90.27'	N 68° 49' 03" W
35–1	368.62'	N 68° 49' 03" W

~LEGEND~

- ● 5/8" DIA. IRON ROD SET FLUSH (UNLESS OTHERWISE NOTED) WITH VSE CAP
- ▲ UNMONUMENTED POINT
- Ⓓ DRILL HOLE SET
- ⊡ CONCRETE MONUMENT FOUND
- UTILITY POLE & GUY WIRE
- GUY POLE
- N/F NOW OR FORMERLY OWNED BY
- —OH— OVERHEAD UTILITY
- EDGE OF PAVEMENT
- —x— FENCE
- INTERIOR LOT LINE
- MEAN WATER MARK
- EASEMENT LIMIT
- RAILROAD EASEMENT LIMIT
- EDGE OF CONCRETE
- —G— UNDERGROUND GAS LINE
- —P/L— PROPERTY LINE
- RAILROAD TRACKS
- BUILDING

PARCEL "B" PROPERTY LINE TABLE		
LINE	DISTANCE	BEARING
1–36	84.99'	S 81° 28' 55" W
36–37	252.11'	S 82° 47' 42" W
37–12	275'±	ALONG LAKE
12–11	15.00'	N 82° 01' 59" E
11–10	55.55'	N 82° 01' 59" E
10–9	43.62'	S 07° 11' 10" E
9–8	148.28'	N 82° 01' 28" E
8–7	15.01'	S 07° 24' 26" E
7–6	31.69'	N 82° 34' 43" E
6–5	22.60'	N 06° 21' 45" W
5–4	48.10'	N 83° 38' 15" E
4–3	184.32'	S 07° 22' 31" E
3–2	68.68'	S 67° 51' 37" E
2–1	21.51'	S 04° 08' 01" W

PARCEL "C" PROPERTY LINE TABLE		
LINE	DISTANCE	BEARING
1–39	153.01'	S 04° 08' 01" W
39–40	267.30'	S 82° 13' 51" W
40–37	172'±	ALONG LAKE
37–36	252.11'	N 82° 47' 42" E
36–1	84.99'	N 81° 28' 55" E

COORDINATE TABLE		
MON. NO.	DESCRIPTION	COORDINATE
1	4"X4" CONCRETE MONUMENT FOUND 0.1' ABOVE GROUND STABLE	N 722977.0 E 1451637.3
14	5/8" DIA. IRON ROD SET 0.5' ABOVE GROUND WITH CAP MARKED "VSE LS 527"	N 723711.23 E 1451165.70
16	5/8" DIA. IRON ROD SET FLUSH WITH CAP MARKED "VSE LS 527"	N 723876.81 E 1451473.25
42	4"X4" CONCRETE MONUMENT FOUND 0.2' ABOVE GROUND STABLE	N 722983.2 E 1451687.0

Approval of this lot line adjustment plat does not constitute the creation of a separate parcel or lot. It adjusts the physical location of the common boundary of the adjoining parcels or lots. This lot line adjustment has been approved by:

City of Burlington Administrative Officer/ Assistant Administrative Officer

Date: _____Zoning Permit #_____

I certify that this plat, is based on information abstracted from documents, parol evidence, and physical evidence. The survey work identified hereon is consistent with this information.

I certify that this plat meets the requirements of 27 VSA Section 1403 and complies with Vermont Board of Land Surveyors Rules, Part 5.4 and 5.5, adopted under 26 VSA Section 2544(a).

Signed: Stephen C. Fraser Date: 11/30/10

Stephen C. Fraser, L.S. #527

FIGURE 1

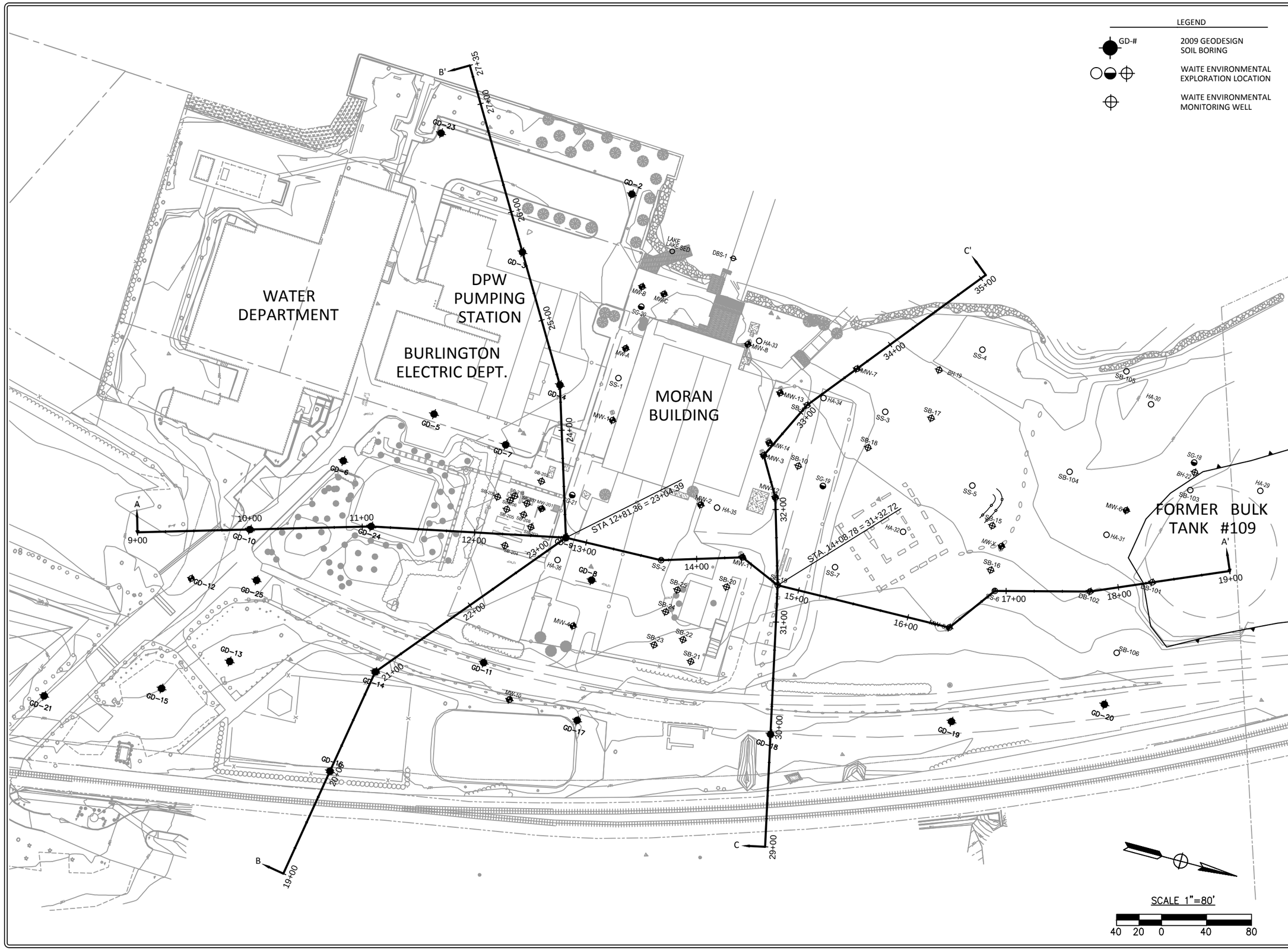
STATE OF VERMONT
STEPHEN C. FRASER
No. 527
REGISTERED LAND SURVEYOR

BOUNDARY SURVEY
LANDS OF
CITY OF BURLINGTON
off LAKE STREET
BURLINGTON, VERMONT

SCALE: 1"= 60'	SURVEY DATE: MAY 2010	PLAT DATE: 11–30–10
VSE PROJECT #: 10019	DRAWN BY: JMR	SHEET 1 OF 1

Vermont Survey and Engineering, Inc.
79 River Street, Montpelier, Vermont
(802) 229-9138 ~ info@vermontsurvey.com

ORIGINAL DRAWING–INK ON POLYESTER FILM MEETING THE REQUIREMENTS OF 27 VSA 1403



Waterfront

WATERFRONT NORTH AND MORAN CENTER CORRECTIVE ACTION PLAN

CITY OF BURLINGTON
Community & Economic Development Office
Burlington City Hall
149 Church Street
Burlington, VT 05401
Ph: (802) 865-7144

Department of Public Works
PO Box 649
Burlington, VT 05402
Ph: (802) 863-9094

VT AGENCY OF TRANSPORTATION
Local Transportation Facilities
National Life Building, Drawer 33
Montpelier, VT 05633

FEDERAL HIGHWAY ADMINISTRATION
P. O. Box 568
Montpelier, VT 05601-0568

PREPARATION TEAM

WEM Waite Environmental Management, LLC

WAITE ENVIRONMENTAL MANAGEMENT
11 Kilburn Street, Suite 212
Burlington, VT 05401
Ph: (802) 860-9400

RSG INC. RESOURCE SYSTEMS GROUP, INC.

RESOURCE SYSTEMS GROUP
55 Railroad Row
White River Junction, VT 05001
Ph: (802) 295-4999

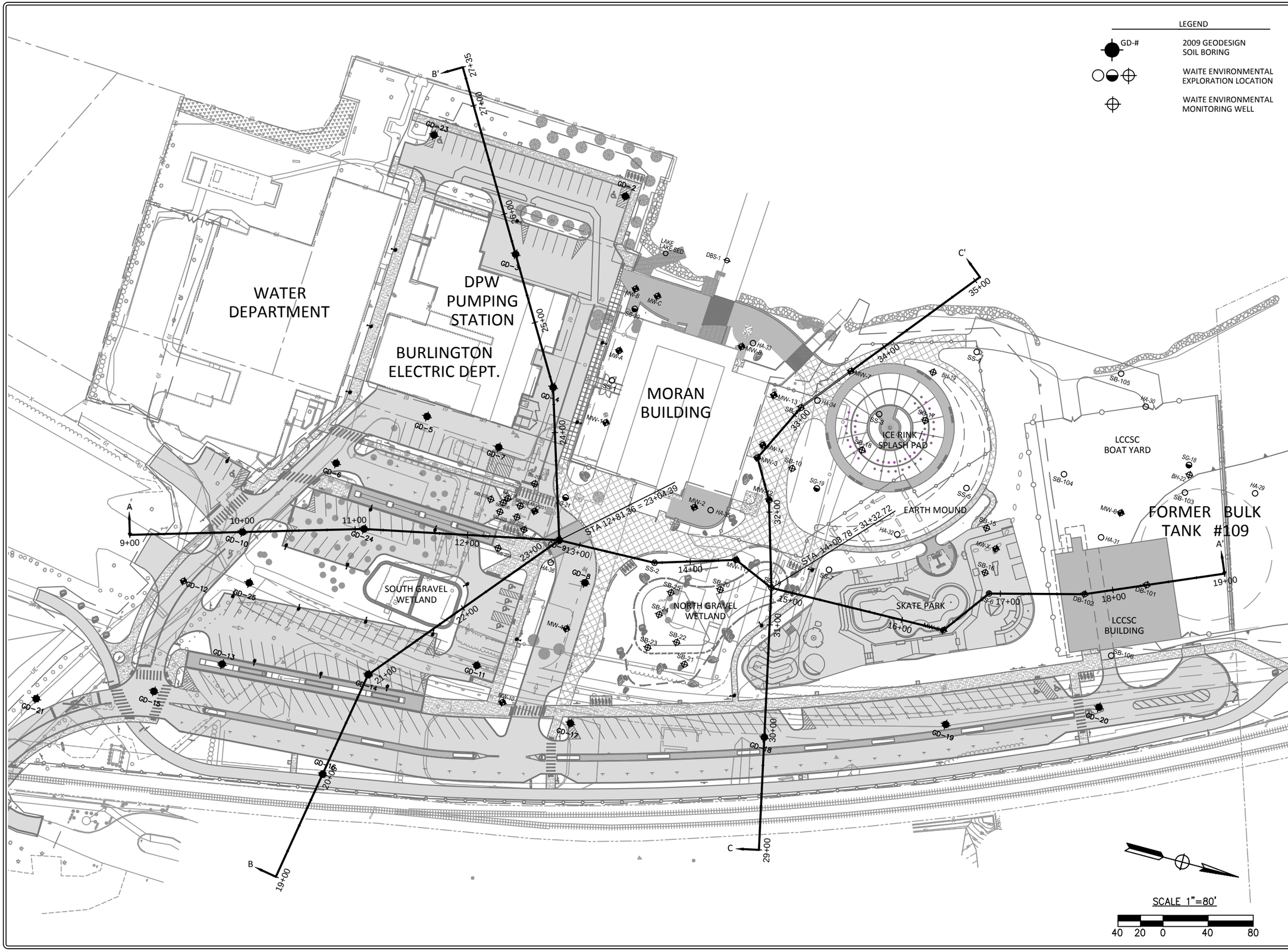
REVISIONS

DATE	DESCRIPTION	BY

SITE PLAN EXISTING

SCALE:	1"=80'
DESIGNED BY:	CDM
DRAWN BY:	CDM
CHECKED BY:	MEW
DATE:	04/15/2011
PROJ. NO.:	11024

SHEET 2



Waterfront

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RESOURCE SYSTEMS GROUP
55 Railroad Row
White River Junction, VT 05001
Ph: (802) 295-4999

REVISIONS

DATE	DESCRIPTION	BY

SITE PLAN PROPOSED

SCALE:	1"=80'	SHEET
DESIGNED BY:	CDM	3
DRAWN BY:	CDM	
CHECKED BY:	MEW	
DATE:	04/15/2011	
PROJ. NO.:	11024	

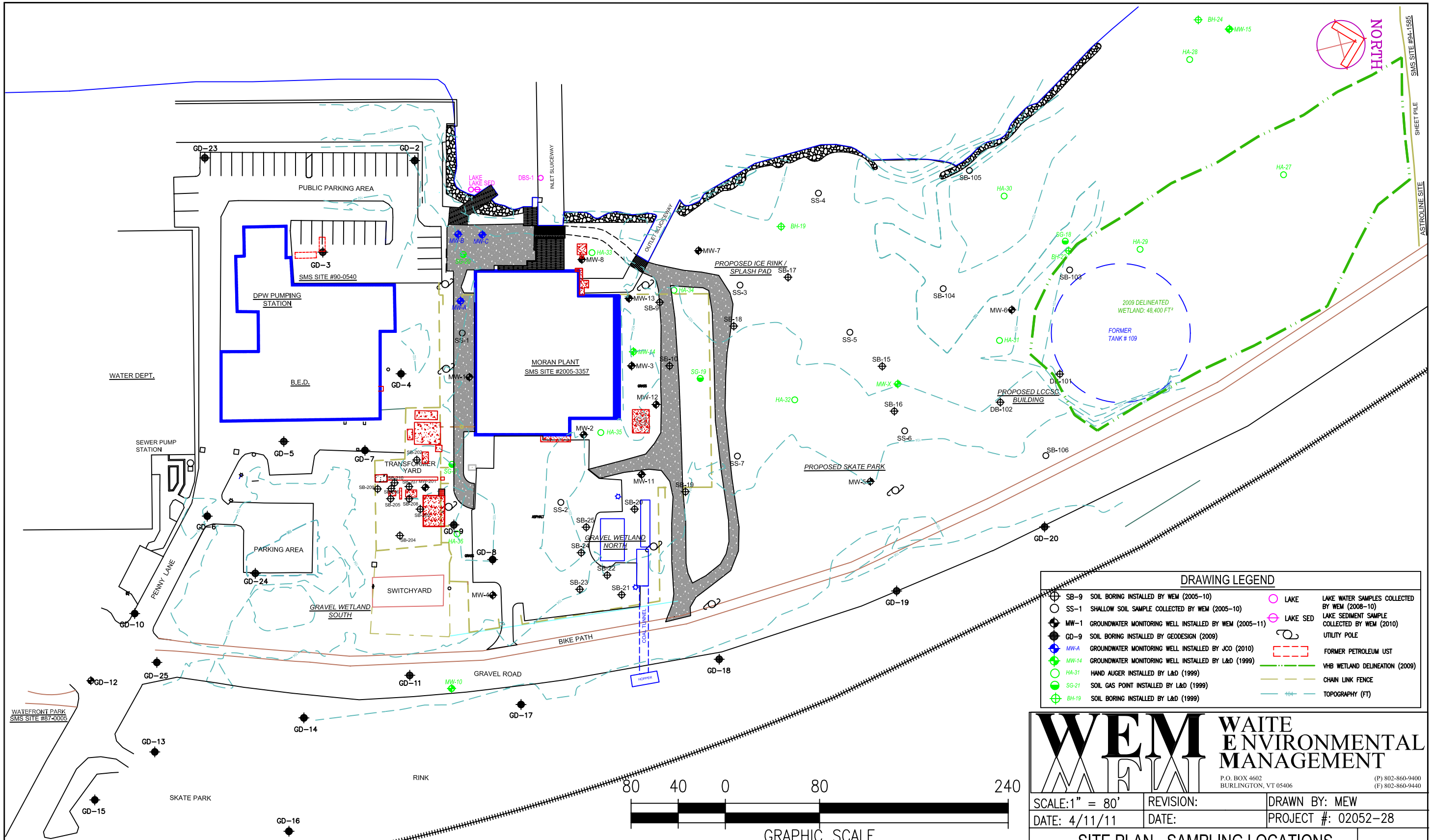
FIGURE 4

Waterfront CEDO

MORAN CENTER
CONCEPT SITE PLAN
DECEMBER 13, 2010

SE GROUP

fff freeman | french | freeman



DRAWING LEGEND

SB-9	SOIL BORING INSTALLED BY WEM (2005-10)	LAKE	LAKE WATER SAMPLES COLLECTED BY WEM (2008-10)
SS-1	SHALLOW SOIL SAMPLE COLLECTED BY WEM (2005-10)	LAKE SED	LAKE SEDIMENT SAMPLE COLLECTED BY WEM (2010)
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2005-11)		UTILITY POLE
GD-9	SOIL BORING INSTALLED BY GEODESIGN (2009)		FORMER PETROLEUM UST
MW-A	GROUNDWATER MONITORING WELL INSTALLED BY JCO (2010)		VHB WETLAND DELINEATION (2009)
MW-14	GROUNDWATER MONITORING WELL INSTALLED BY L&D (1999)		CHAIN LINK FENCE
HA-31	HAND AUGER INSTALLED BY L&D (1999)	404	TOPOGRAPHY (FT)
SG-21	SOIL GAS POINT INSTALLED BY L&D (1999)		
BH-19	SOIL BORING INSTALLED BY L&D (1999)		

NOTES:
Base Map Source: Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E". Map modified by WEM based on surveys conducted in March 2005, November 2005, February 2007, and September 2008 and a survey conducted by Lamoureux & Dickinson Consulting Engineers (L&D) in 2009.

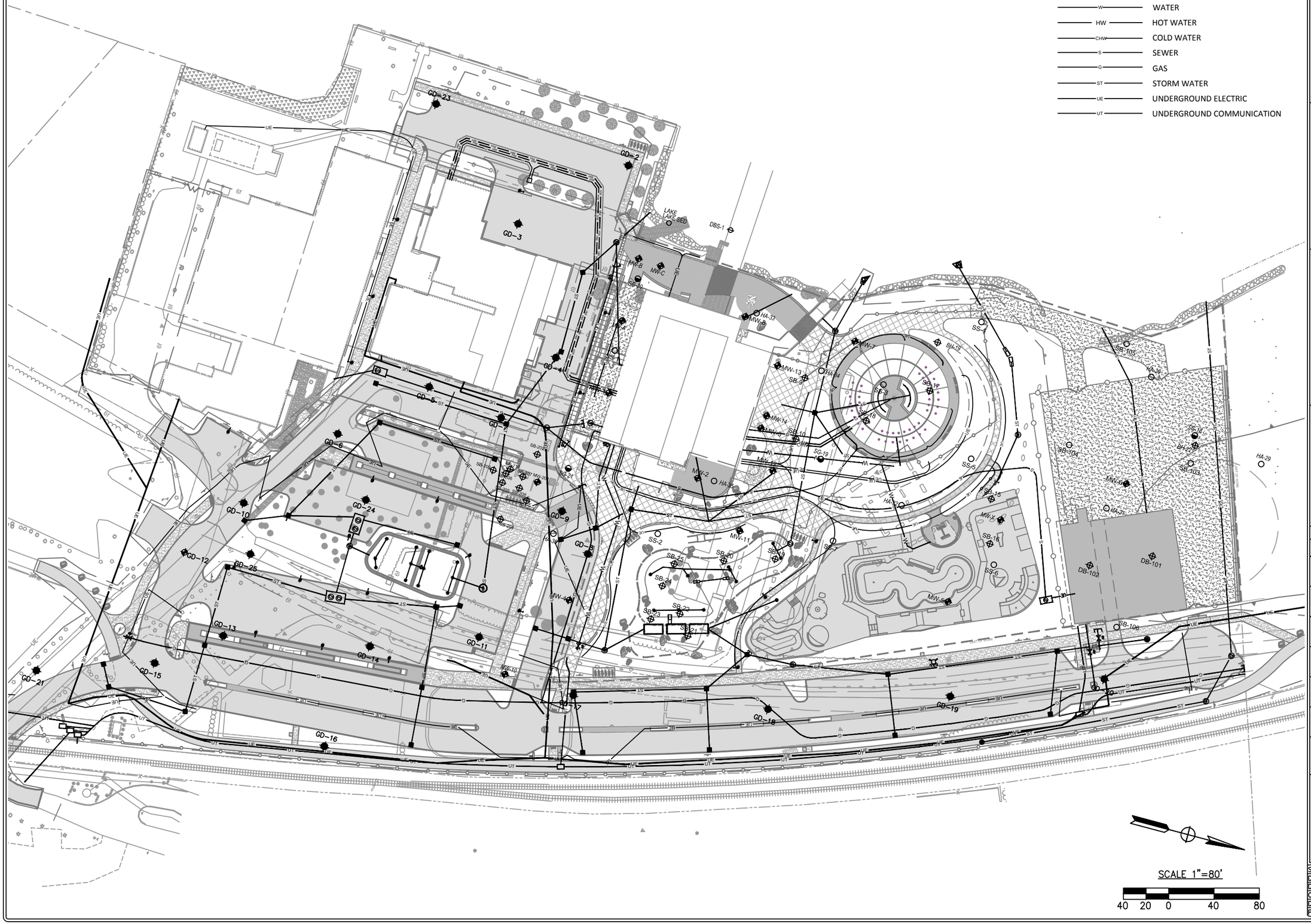
WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 80'	REVISION:	DRAWN BY: MEW
DATE: 4/11/11	DATE:	PROJECT #: 02052-28

SITE PLAN - SAMPLING LOCATIONS

MORAN CENTER & WATEFRONT NORTH
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

5



Waterfront

WATERFRONT NORTH AND MORAN CENTER CORRECTIVE ACTION PLAN

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PREPARATION TEAM

WEM Waite Environmental Management, LLC

WAITE ENVIRONMENTAL MANAGEMENT
11 Kilburn Street, Suite 212
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Ph: (802) 860-9400

RSG INC. RESOURCE SYSTEMS GROUP, INC.

RESOURCE SYSTEMS GROUP
55 Railroad Row
White River Junction, VT 05001
Ph: (802) 295-4999

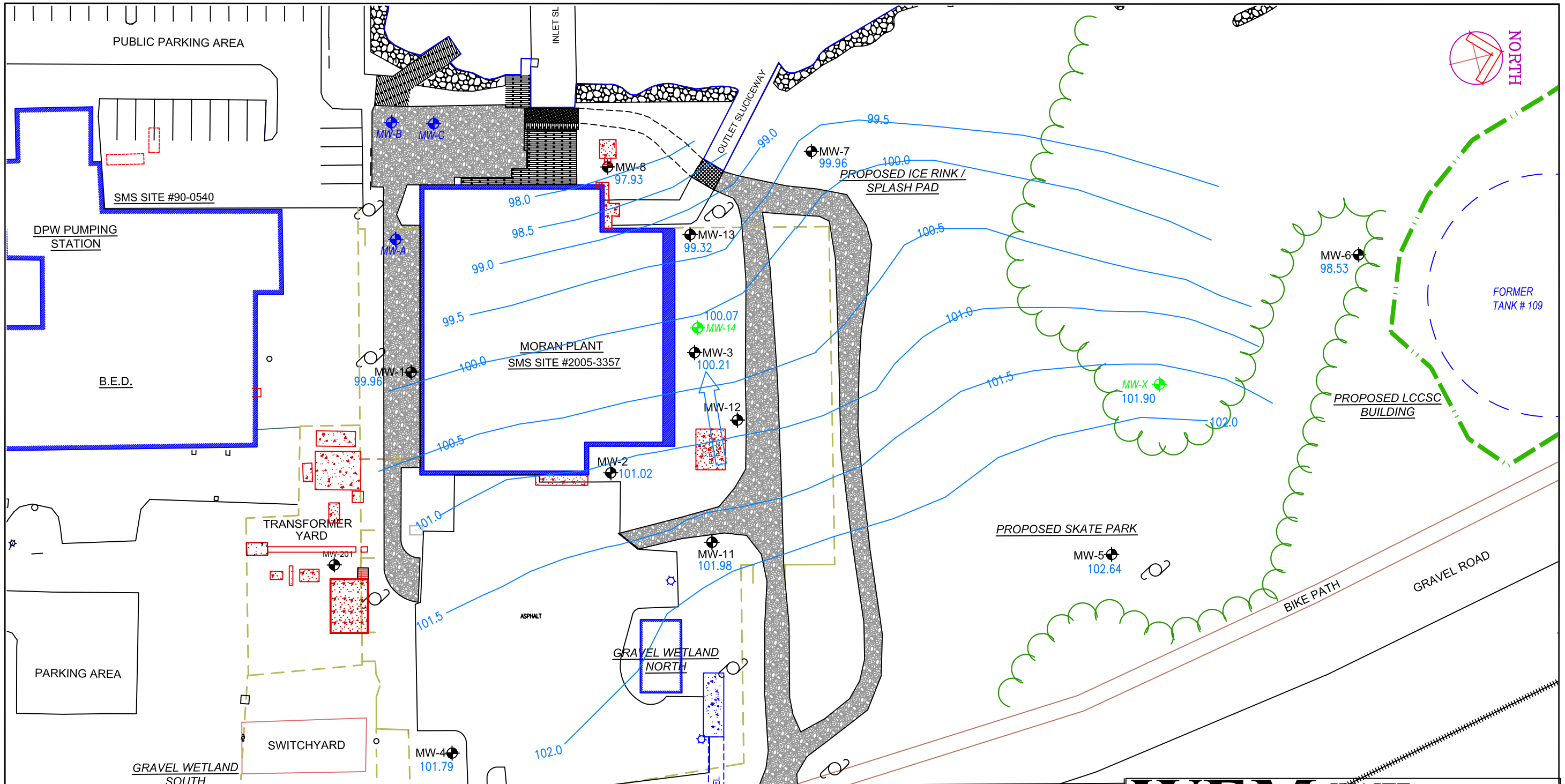
REVISIONS

DATE	DESCRIPTION	BY

DRAFT UTILITY PLAN PROPOSED

SCALE:	1"=80'
DESIGNED BY:	CDM
DRAWN BY:	CDM
CHECKED BY:	MEW
DATE:	04/15/2011
PROJ. NO.:	11024

SHEET 6



50 25 0 50 150

GRAPHIC SCALE

DRAWING LEGEND

MW–1 98.70	MONITORING WELL WITH GROUNDWATER ELEVATION (FT)
100.0	GROUNDWATER ELEVATION CONTOUR (FT)
	GROUNDWATER FLOW DIRECTION

Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureax & Dickinson, "Moran Plant Topographic Site Plan", January 2009.

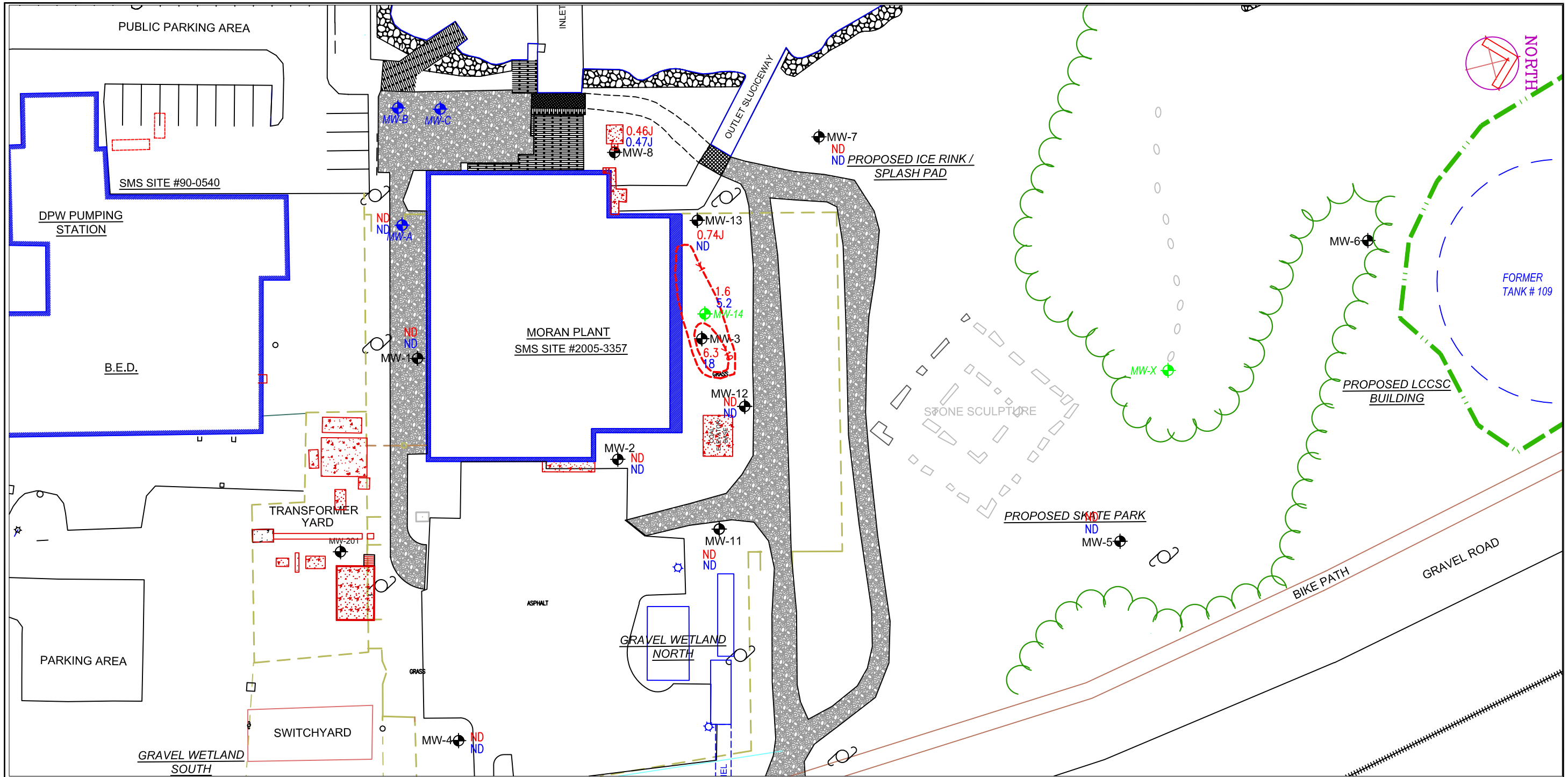
All elevations are in units of ft above mean sea level (based on NAVD88 Benchmark utilized by Lamoureux & Dickinson survey in January 2009). Groundwater elevations measured by WEM on December 2-3, 2010.

WEM
WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE:1" = 50'	REVISION:	DRAWN BY: MEW
DATE: 2/11/11	DATE:	PROJECT #: 02052–28

GROUNDWATER ELEVATION CONTOUR MAP
DECEMBER 2010
MORAN GENERATING PLANT
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

7



50 25 0 50 150

GRAPHIC SCALE

DRAWING LEGEND

MW–1 GROUNDWATER MONITORING WELL

5.6 RED = REPORTED CONCENTRATION OF PCE (PPB)

12 BLUE = REPORTED CONCENTRATION OF TCE (PPB)

INFERRED LIMITS OF REPORTED CONTAMINANTS IN GROUNDWATER (>1 PPB)

Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureax & Dickinson, "Moran Plant Topographic Site Plan", January 2009.

VOC concentrations are from EPA Method 8260B from samples collected by WEM on December 2-3, 2010.

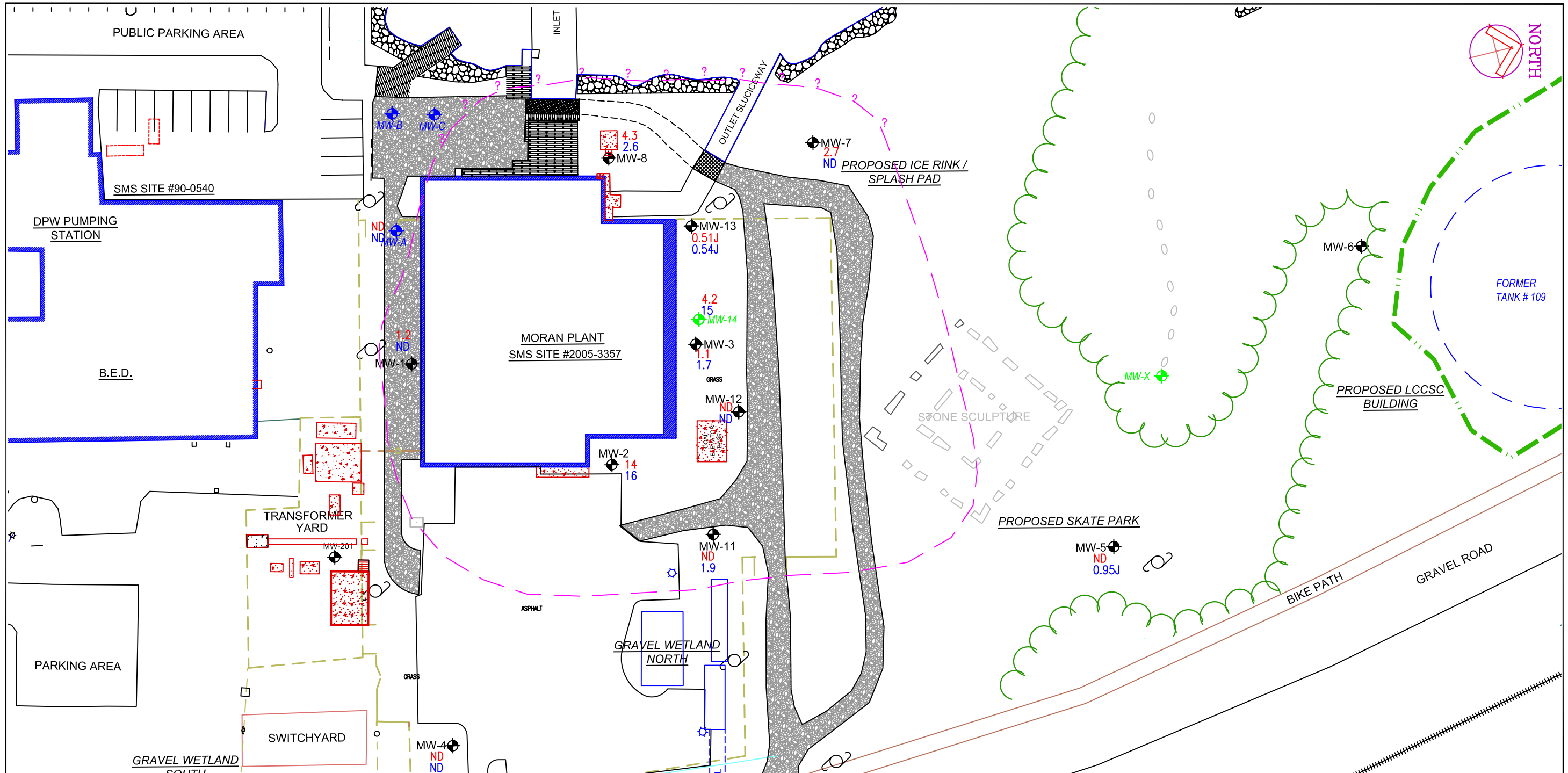
ND = Not Detected above reporting limit (1 ppb)
PCE = Tetrachloroethene
TCE = Trichloroethene
J = estimated concentration

WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 50'	REVISION:	DRAWN BY: MEW
DATE: 2/11/11	DATE:	PROJECT #: 02052-28

GROUNDWATER CONTAMINATION MAP: PCE AND TCE
DECEMBER 2010
MORAN GENERATING PLANT
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

8



50 25 0 50 150

GRAPHIC SCALE

DRAWING LEGEND

MW–1 GROUNDWATER MONITORING WELL
17 RED = CONCENTRATION OF 1,1–DCA (PPB)
2.1 BLUE = CONCENTRATION OF 1,1,1–TCA (PPB)

INFERRED LIMITS OF REPORTED CONTAMINANTS IN GROUNDWATER (>1 PPB)

Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureax & Dickinson, "Moran Plant Topographic Site Plan", January 2009.

VOC concentrations are from EPA Method 8260B from samples collected by WEM on December 2-3, 2010.

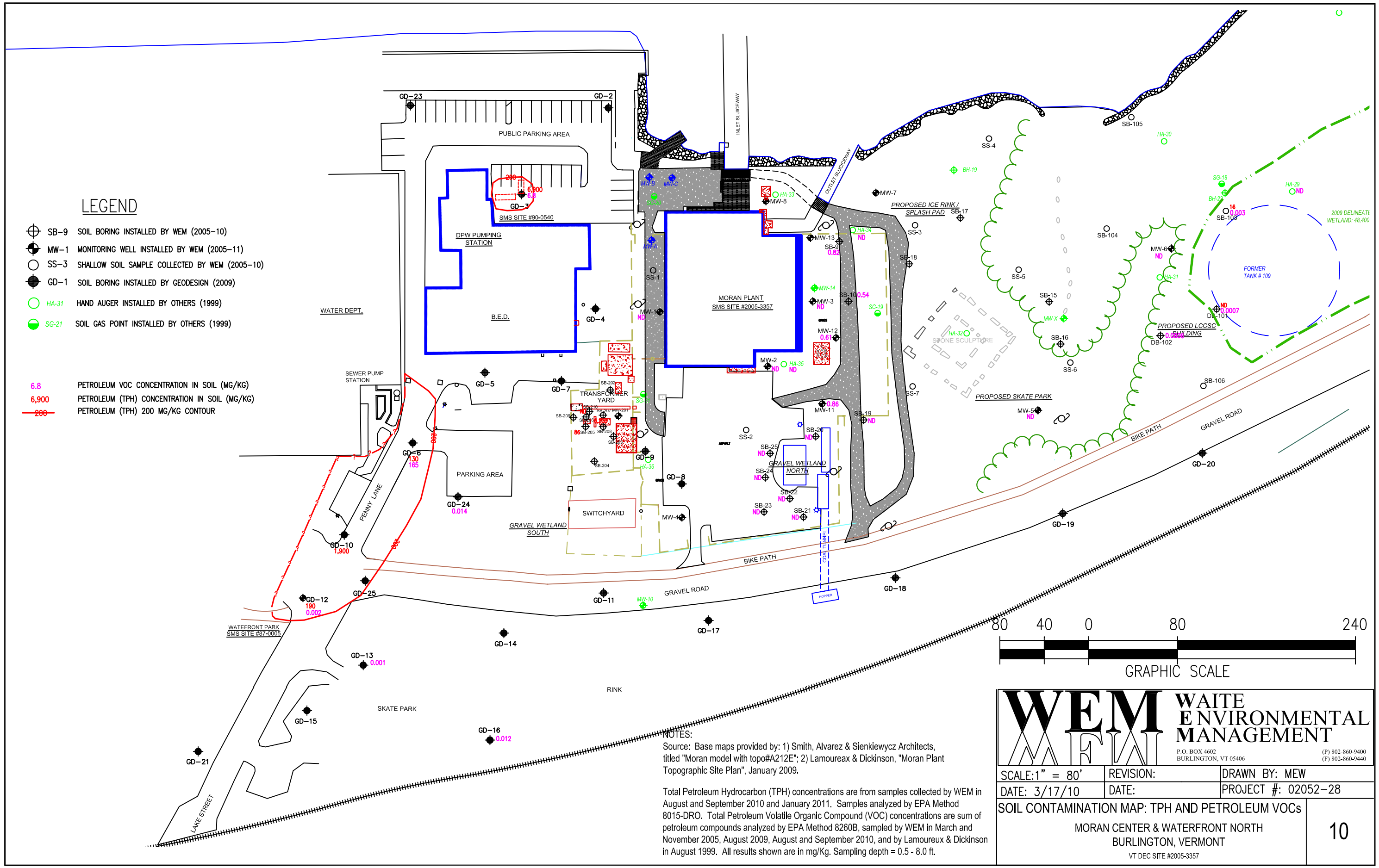
ND = Not Detected above reporting limit (1 ppb)
DCA = Dichloroethane
TCA = Trichloroethane
J = estimated concentration

WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 50'	REVISION:	DRAWN BY: MEW
DATE: 2/11/11	DATE:	PROJECT #: 02052–28

GROUNDWATER CONTAMINATION MAP: 1,1-DCA & 1,1,1-TCA
DECEMBER 2010
MORAN GENERATING PLANT
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

9



NOTES:

Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureax & Dickinson, "Moran Plant Topographic Site Plan", January 2009.

Total Petroleum Hydrocarbon (TPH) concentrations are from samples collected by WEM in August and September 2010 and January 2011. Samples analyzed by EPA Method 8015-DRO. Total Petroleum Volatile Organic Compound (VOC) concentrations are sum of petroleum compounds analyzed by EPA Method 8260B, sampled by WEM in March and November 2005, August 2009, August and September 2010, and by Lamoureux & Dickinson in August 1999. All results shown are in mg/Kg. Sampling depth = 0.5 - 8.0 ft.

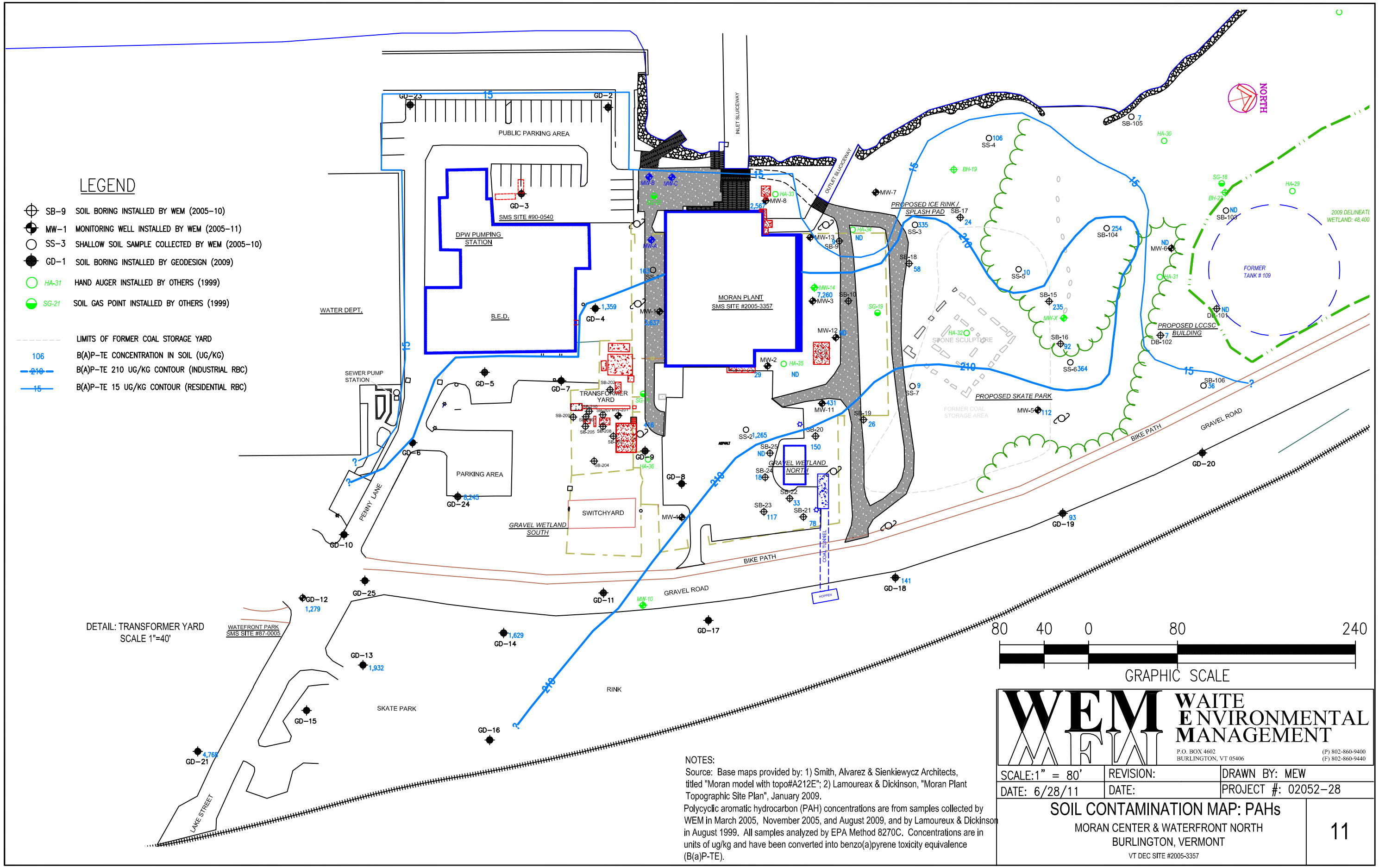
WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 80'	REVISION:	DRAWN BY: MEW
DATE: 3/17/10	DATE:	PROJECT #: 02052-28

SOIL CONTAMINATION MAP: TPH AND PETROLEUM VOCs

MORAN CENTER & WATERFRONT NORTH
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

10



NOTES:
Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureax & Dickinson, "Moran Plant Topographic Site Plan", January 2009.
Polycyclic aromatic hydrocarbon (PAH) concentrations are from samples collected by WEM in March 2005, November 2005, and August 2009, and by Lamoureux & Dickinson in August 1999. All samples analyzed by EPA Method 8270C. Concentrations are in units of ug/kg and have been converted into benzo(a)pyrene toxicity equivalence (B(a)P-TE).

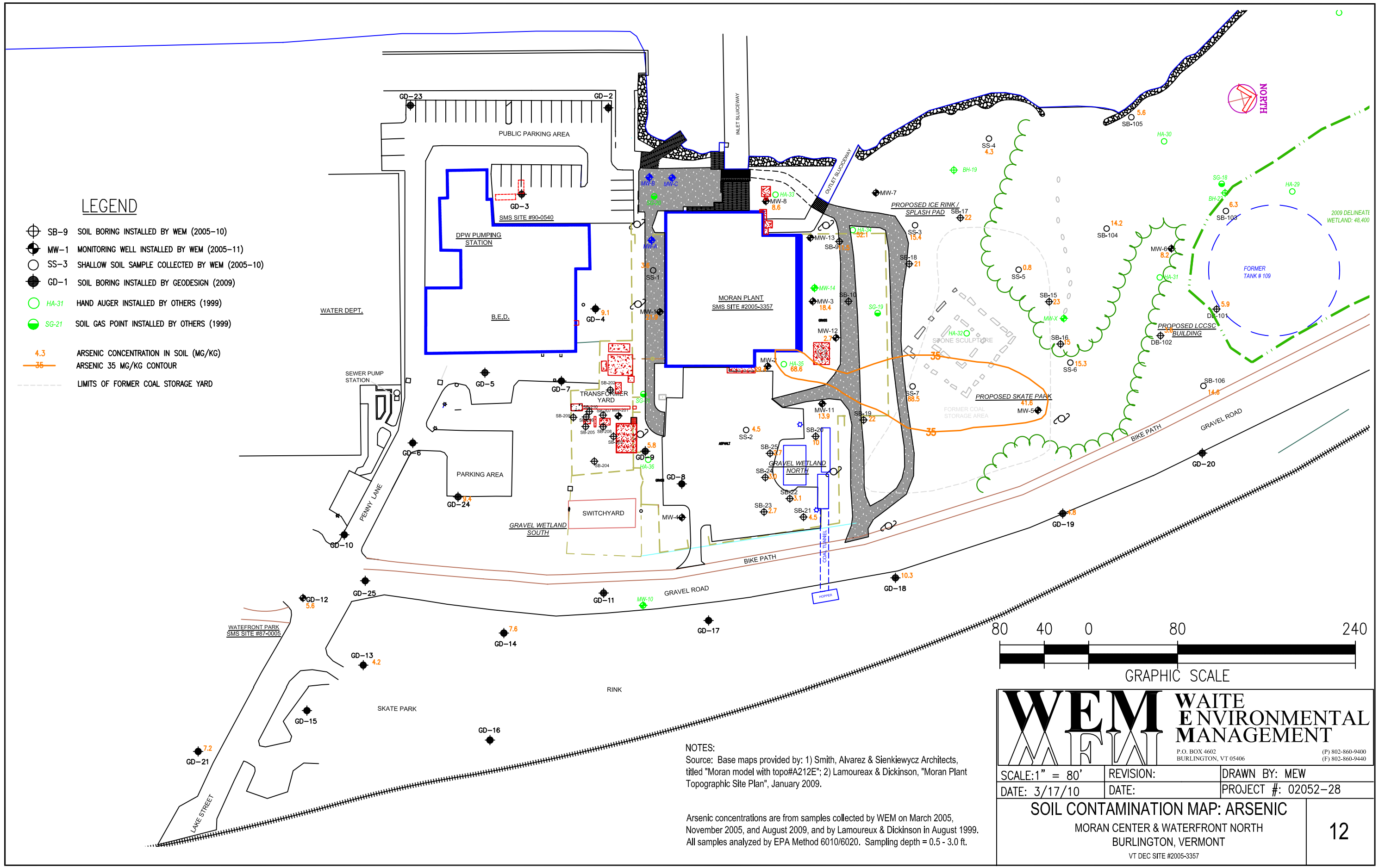
WEM
WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 80'	REVISION:	DRAWN BY: MEW
DATE: 6/28/11	DATE:	PROJECT #: 02052-28

SOIL CONTAMINATION MAP: PAHs

MORAN CENTER & WATERFRONT NORTH
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

11



NOTES:
Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureax & Dickinson, "Moran Plant Topographic Site Plan", January 2009.

Arsenic concentrations are from samples collected by WEM on March 2005, November 2005, and August 2009, and by Lamoureux & Dickinson in August 1999. All samples analyzed by EPA Method 6010/6020. Sampling depth = 0.5 - 3.0 ft.

WAITE ENVIRONMENTAL MANAGEMENT
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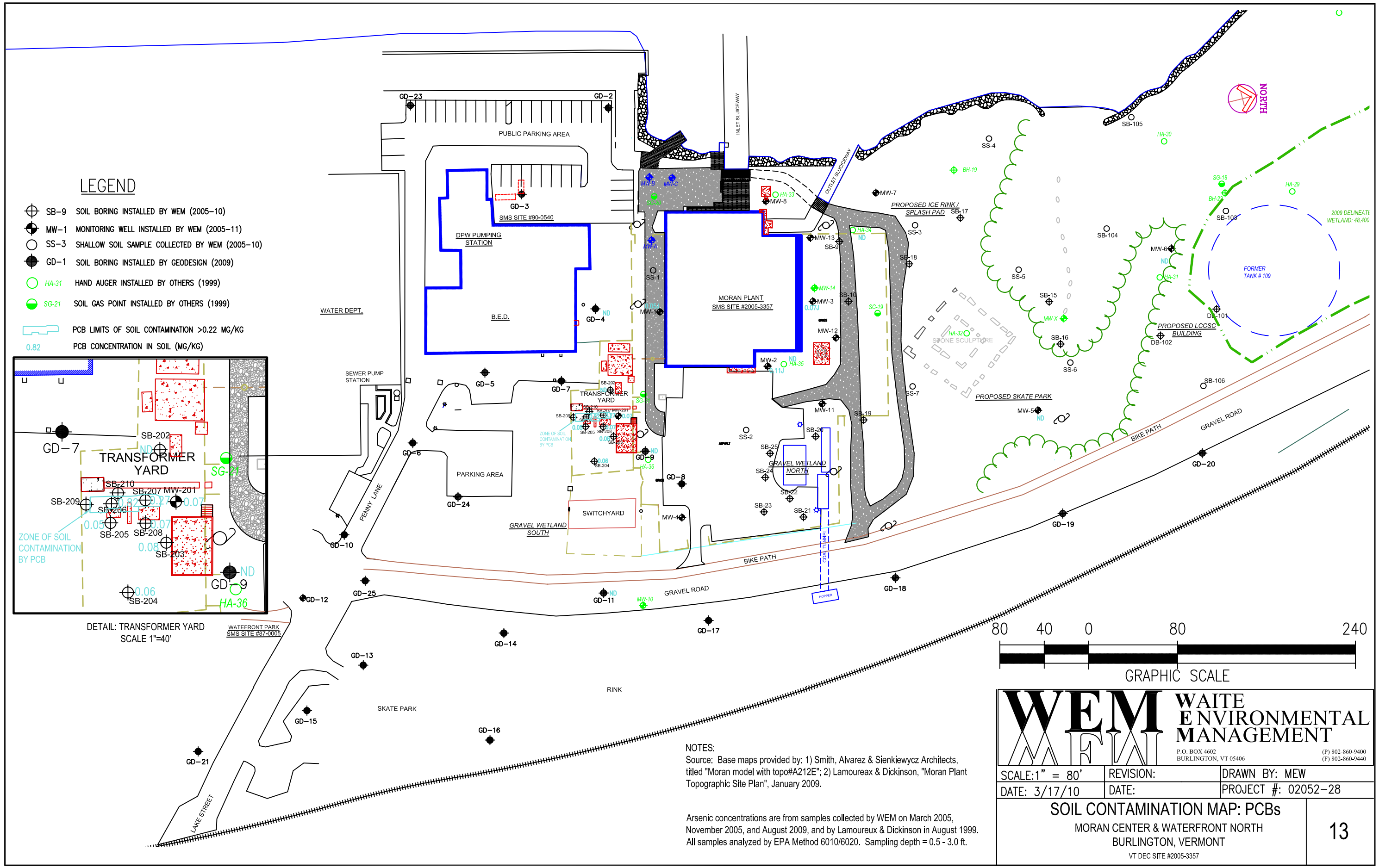
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 80'	REVISION:	DRAWN BY: MEW
DATE: 3/17/10	DATE:	PROJECT #: 02052-28

SOIL CONTAMINATION MAP: ARSENIC

MORAN CENTER & WATERFRONT NORTH
BURLINGTON, VERMONT
VT DEC SITE #2005-3357



NOTES:
Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureux & Dickinson, "Moran Plant Topographic Site Plan", January 2009.

Arsenic concentrations are from samples collected by WEM on March 2005, November 2005, and August 2009, and by Lamoureux & Dickinson in August 1999. All samples analyzed by EPA Method 6010/6020. Sampling depth = 0.5 - 3.0 ft.

WAITE ENVIRONMENTAL MANAGEMENT
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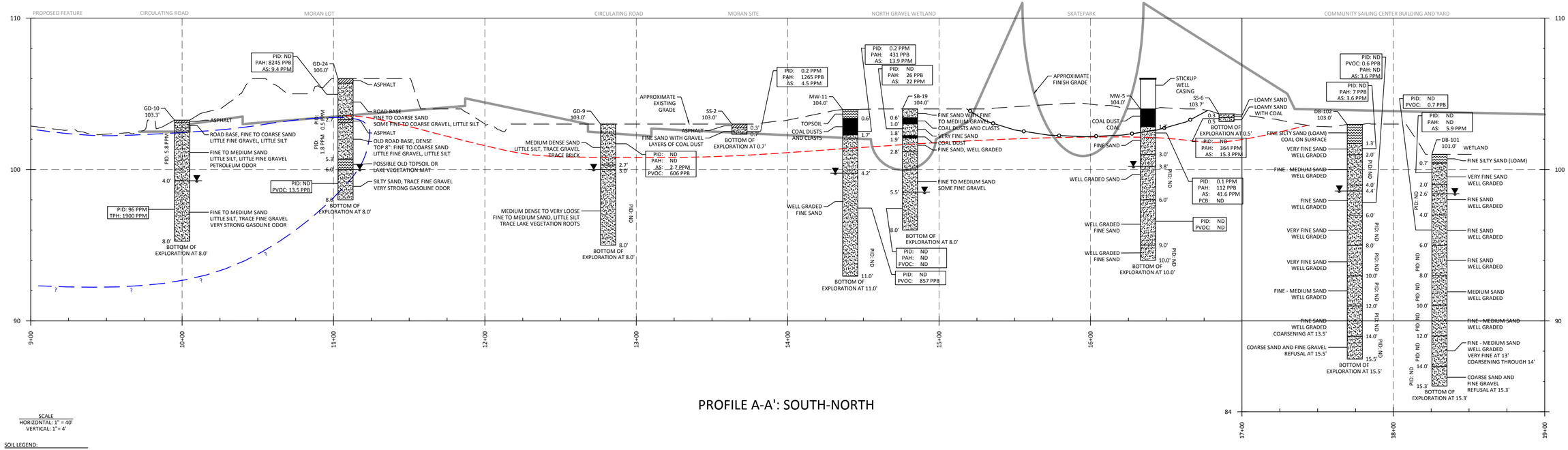
(F) 802-860-9440

SCALE: 1" = 80'	REVISION:	DRAWN BY: MEW
DATE: 3/17/10	DATE:	PROJECT #: 02052-28

SOIL CONTAMINATION MAP: PCBs

MORAN CENTER & WATERFRONT NORTH
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

13



PROFILE A-A': SOUTH-NORTH

SCALE
HORIZONTAL: 1" = 40'
VERTICAL: 1" = 4'

SOIL LEGEND:

- ASPHALT
- COAL DEBRIS
- SAND
- SILT
- GRAVEL
- SAND / GRAVEL
- SAND / SILT
- TOPSOIL / LOAM
- WATER LEVEL

- LIMITS OF PETROLEUM CONTAMINATION
- LIMITS OF PAH CONTAMINATION
- LIMITS OF ARSENIC CONTAMINATION

PID: READING OF VOLATILE ORGANIC COMPOUNDS WITH A PHOTO-IONIZATION DETECTOR (10.6 eV) IN PPM
TPH: TOTAL PETROLEUM HYDROCARBONS BY EPA METHO 8015B IN PPM
PVOC: TOTAL PETROLEUM VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 8608 IN PPB
PAH: POLYCYCLIC AROMATIC HYDROCARBONS AS BENZO(A)PYRENE TOXICITY EQUIVALENCE BY EPA METHOD 8270C IN PPB
AS: ARSENIC CONCENTRATION BY EPA METHOD 6010 IN PPM
PCB: TOTAL POLYCHLORINATED BIPHENYL CONCENTRATION BY EPA METHOD 8082 IN PPM
TCE: TRICHLOROETHYLENE BY EPA METHOD 8260B IN PPB

NOTES:
1. SOIL DATA BASED ON DECEMBER 2009 GEOTECHNICAL REPORT PREPARED BY GEODESIGN, INCORPORATED AND VARIOUS DATA RECEIVED FROM WAITE ENVIRONMENTAL MANAGEMENT.
2. ALL PROPOSED FEATURES SHOWN FOR REFERENCE AND ARE APPROXIMATE.
3. WATER LEVELS SHOWN ARE AS REPORTED DURING DRILLING.

Waterfront

WATERFRONT NORTH
AND MORAN CENTER
CORRECTIVE ACTION PLAN

CITY OF BURLINGTON
Community & Economic Development Office
Burlington City Hall
149 Church Street
Burlington, VT 05401
Phn (802) 865-7144

Department of Public Works
PO Box 649
Burlington, VT 05402
Phn (802) 863-9094

VT AGENCY OF TRANSPORTATION
Local Transportation Facilities
National Life Building, Drawer 33
Montpelier, VT 05633

FEDERAL HIGHWAY ADMINISTRATION
P. O. Box 568
Montpelier, VT 05601-0568

PREPARATION TEAM

WEM Waite Environmental Management, Inc.

WAITE ENVIRONMENTAL MANAGEMENT
11 Kilburn Street, Suite 212
Burlington, VT 05401
Phn (802) 860-9400

RSG INC. RESOURCE SYSTEMS GROUP, INC.

RESOURCE SYSTEMS GROUP
55 Railroad Row
White River Junction, VT 05001
Phn (802) 295-4999

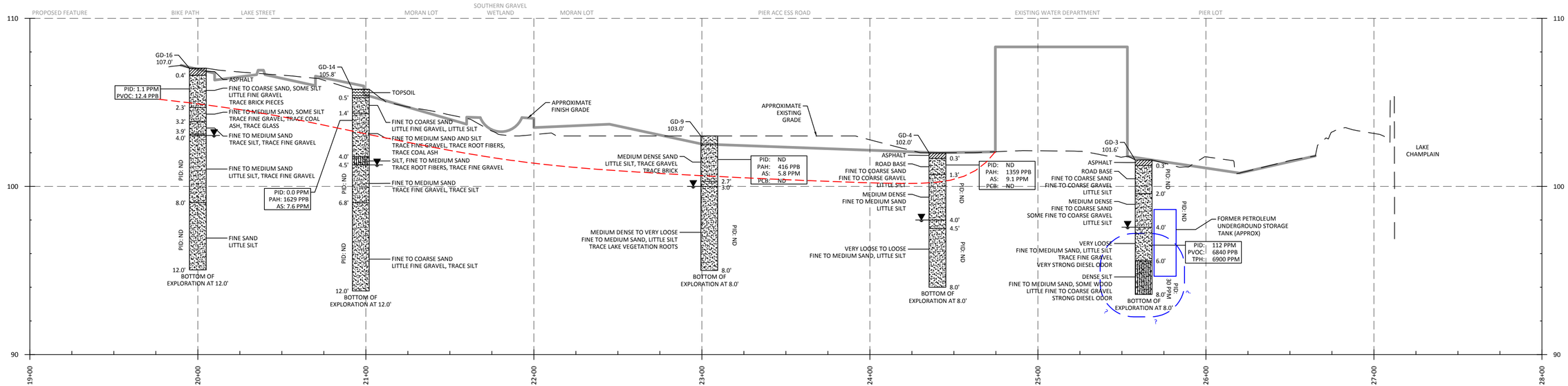
REVISIONS

DATE	DESCRIPTION	BY

SOIL PROFILE A-A'
SOUTH - NORTH

SCALE:	AS SHOWN
DESIGNED BY:	CDM
DRAWN BY:	CDM
CHECKED BY:	MEW
DATE:	04/15/2011
PROJ. NO.:	11024

SHEET 14



SCALE
HORIZONTAL: 1" = 40'
VERTICAL: 1" = 4'

PROFILE B-B': EAST-WEST

SOIL LEGEND:

- ASPHALT
- COAL DEBRIS
- SAND
- SILT
- GRAVEL
- SAND / GRAVEL
- SAND / SILT
- TOPSOIL / LOAM
- WATER LEVEL

- LIMITS OF PETROLEUM CONTAMINATION
- LIMITS OF PAH CONTAMINATION
- LIMITS OF ARSENIC CONTAMINATION

PID: READING OF VOLATILE ORGANIC COMPOUNDS WITH A PHOTO-IONIZATION DETECTOR (10.6 eV) IN PPM
TPH: TOTAL PETROLEUM HYDROCARBONS BY EPA METHO 8015B IN PPM
PVOC: TOTAL PETROLEUM VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 860B IN PPB
PAH: POLYCYCLIC AROMATIC HYDROCARBONS AS BENZO(A)PYRENE TOXICITY EQUIVALENCE BY EPA METHOD 8270C IN PPB
AS: ARSENIC CONCENTRATION BY EPA METHOD 6010 IN PPM
PCB: TOTAL POLYCHLORINATED BIPHENYL CONCENTRATION BY EPA METHOD 8082 IN PPM
TCE: TRICHLOROETHYLENE BY EPA METHOD 8260B IN PPB

NOTES:
1. SOIL DATA BASED ON DECEMBER 2009 GEOTECHNICAL REPORT PREPARED BY GEODESIGN, INCORPORATED AND VARIOUS DATA RECEIVED FROM WAITE ENVIRONMENTAL MANAGEMENT.
2. ALL PROPOSED FEATURES SHOWN FOR REFERENCE AND ARE APPROXIMATE.
3. WATER LEVELS SHOWN ARE AS REPORTED DURING DRILLING.

Waterfront

WATERFRONT NORTH
AND MORAN CENTER
CORRECTIVE ACTION PLAN

CITY OF BURLINGTON
Community & Economic Development Office
Burlington City Hall
149 Church Street
Burlington, VT 05401
Ph: (802) 865-7144

Department of Public Works
PO Box 849
Burlington, VT 05402
Ph: (802) 863-9094

VT AGENCY OF TRANSPORTATION
Local Transportation Facilities
National Life Building, Drawer 33
Montpelier, VT 05633

FEDERAL HIGHWAY ADMINISTRATION
P. O. Box 568
Montpelier, VT 05601-0568

PREPARATION TEAM

WAITE ENVIRONMENTAL MANAGEMENT
11 Kilburn Street, Suite 212
Burlington, VT 05401
Ph: (802) 860-9400

RESOURCE SYSTEMS GROUP
55 Railroad Row
White River Junction, VT 05001
Ph: (802) 295-4999

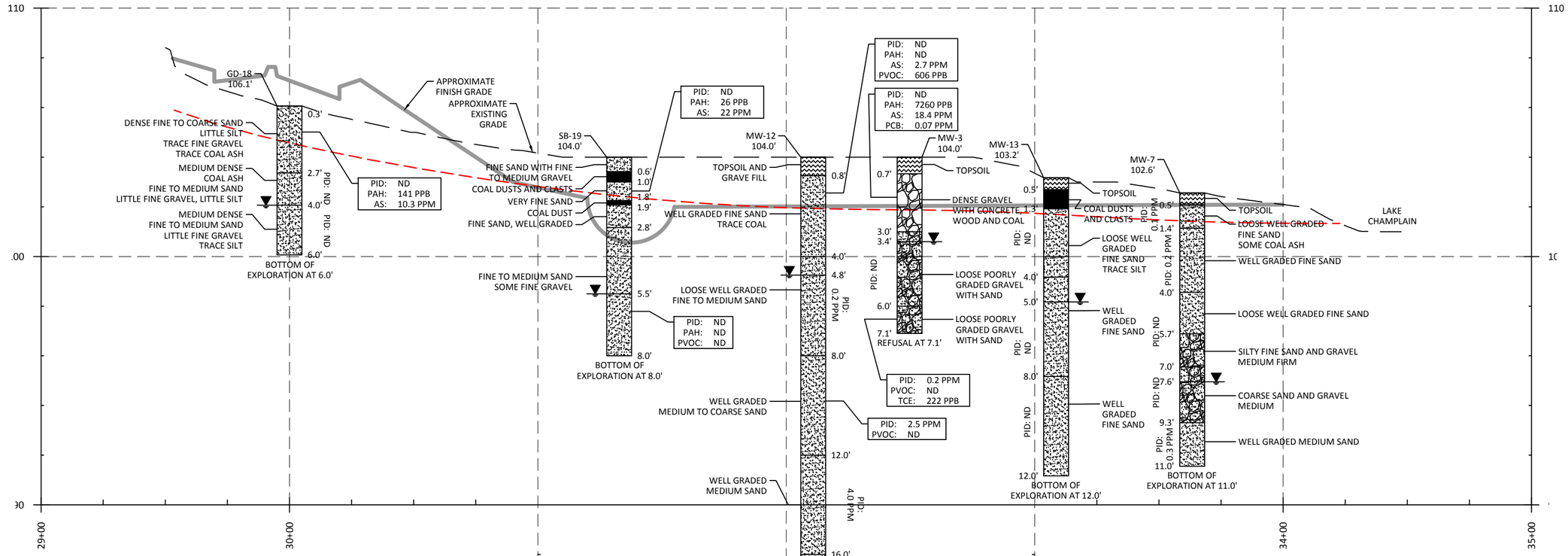
REVISIONS

DATE	DESCRIPTION	BY

SOIL PROFILE B-B'
EAST - WEST

SCALE:	AS SHOWN
DESIGNED BY:	CDM
DRAWN BY:	CDM
CHECKED BY:	MEW
DATE:	04/15/2011
PROJ. NO.:	11024

SHEET 15



PROFILE C-C': EAST-WEST

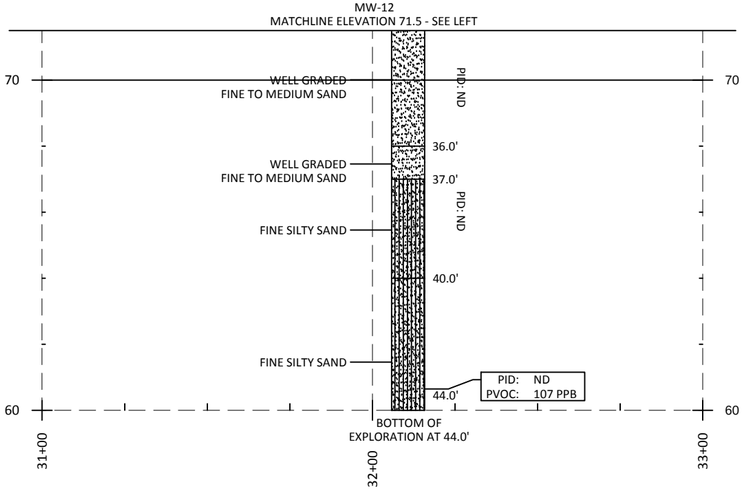
SCALE
HORIZONTAL: 1" = 40'
VERTICAL: 1"= 4'

SOIL LEGEND:

- ASPHALT
- COAL DEBRIS
- SAND
- SILT
- GRAVEL
- SAND / GRAVEL
- SAND / SILT
- TOPSOIL / LOAM
- WATER LEVEL

LIMITS OF PETROLEUM CONTAMINATION
LIMITS OF PAH CONTAMINATION
LIMITS OF ARSENIC CONTAMINATION

PID: READING OF VOLATILE ORGANIC COMPOUNDS WITH A PHOTO-IONIZATION DETECTOR (10.6 eV) IN PPM
TPH: TOTAL PETROLEUM HYDROCARBONS BY EPA METHO 8015B IN PPM
PVOC: TOTAL PETROLEUM VOLATILE ORGANIC COMPOUNDS BY EPA METHOD 860B IN PPB
PAH: POLYCYCLIC AROMATIC HYDROCARBONS AS BENZO(A)PYRENE TOXICITY EQUIVALENCE BY EPA METHOD 8270C IN PPB
AS: ARSENIC CONCENTRATION BY EPA METHOD 6010 IN PPM
PCB: TOTAL POLYCHLORINATED BIPHENYL CONCENTRATION BY EPA METHOD 8082 IN PPM
TCE: TRICHLOROETHYLENE BY EPA METHOD 8260B IN PPB



NOTES:
1. SOIL DATA BASED ON DECEMBER 2009 GEOTECHNICAL REPORT PREPARED BY GEODESIGN, INCORPORATED AND VARIOUS DATA RECEIVED FROM WAITE ENVIRONMENTAL MANAGEMENT.
2. ALL PROPOSED FEATURES SHOWN FOR REFERENCE AND ARE APPROXIMATE.
3. WATER LEVELS SHOWN ARE AS REPORTED DURING DRILLING.

WATERFRONT NORTH AND MORAN CENTER CORRECTIVE ACTION PLAN

CITY OF BURLINGTON
Community & Economic Development Office
Burlington City Hall
149 Church Street
Burlington, VT 05401
Ph: (802) 865-7144

Department of Public Works
PO Box 649
Burlington, VT 05402
Ph: (802) 863-9094

VT AGENCY OF TRANSPORTATION
Local Transportation Facilities
National Life Building, Drawer 33
Montpelier, VT 05633

FEDERAL HIGHWAY ADMINISTRATION
P. O. Box 568
Montpelier, VT 05601-0568

PREPARATION TEAM

WAITE ENVIRONMENTAL MANAGEMENT
11 Kilburn Street, Suite 212
Burlington, VT 05401
Ph: (802) 860-9400

RESOURCE SYSTEMS GROUP
55 Railroad Row
White River Junction, VT 05001
Ph: (802) 295-4999

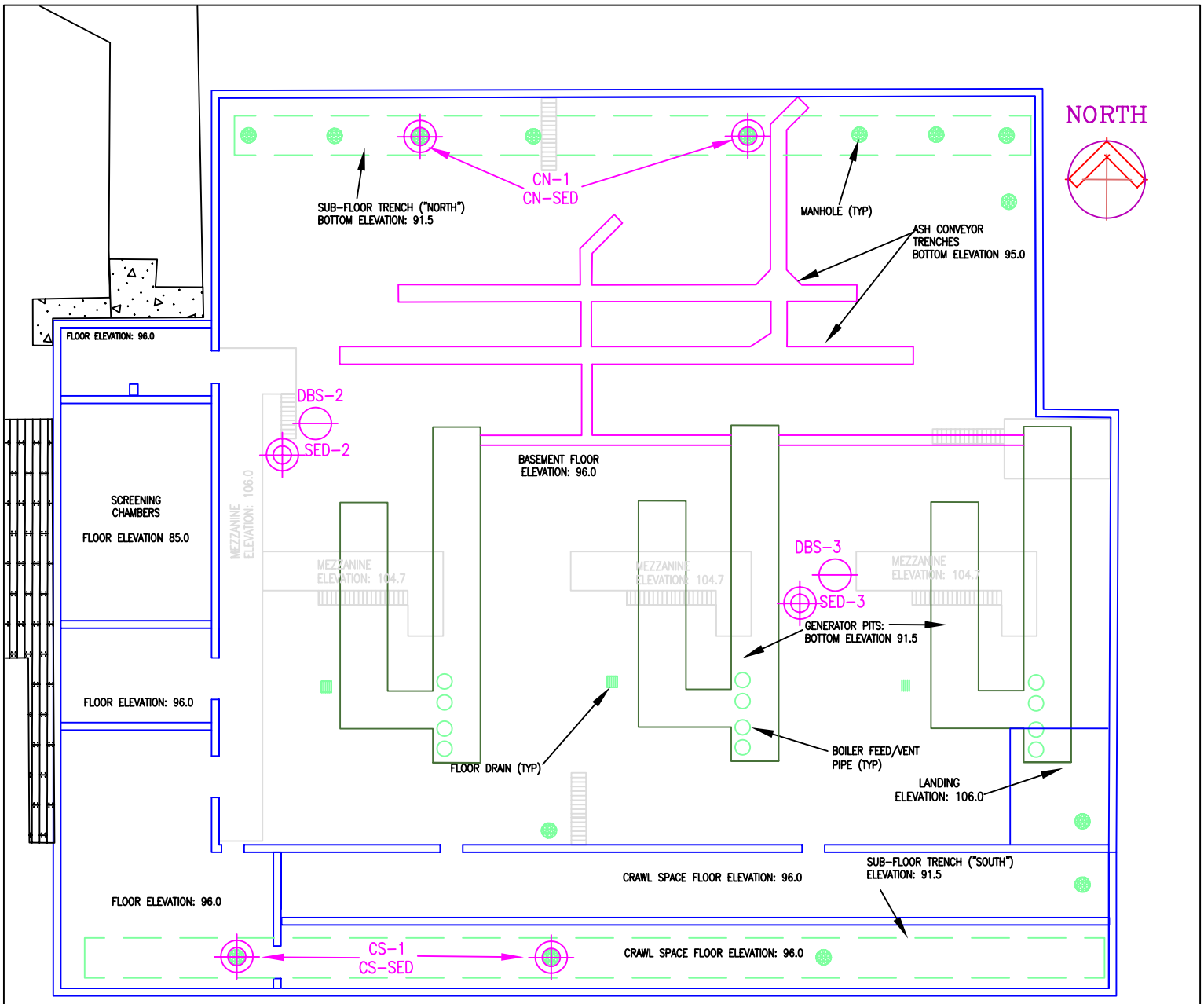
REVISIONS

DATE	DESCRIPTION	BY

SOIL PROFILE C-C'
EAST - WEST

SCALE:	AS SHOWN
DESIGNED BY:	CDM
DRAWN BY:	CDM
CHECKED BY:	MEW
DATE:	04/15/2011
PROJ. NO.:	11024

SHEET 16



LEGEND

DBS-3 — INTERIOR WATER SAMPLE

SED-2 — INTERIOR SEDIMENT SAMPLE

MANHOLE

NOTE: SAMPLES "DBS-" AND "SED-" COLLECTED WHILE BASEMENT WAS FLOODED AND BEFORE BASEMENT FLOOR WAS CLEANED OF SEDIMENT. SAMPLES "CN-" AND "CS-" WERE COLLECTED FROM THE SUB-FLOOR TRENCHES AFTER THE FLOOR HAD BEEN CLEANED AND DEWATERED.

0 10 20 40

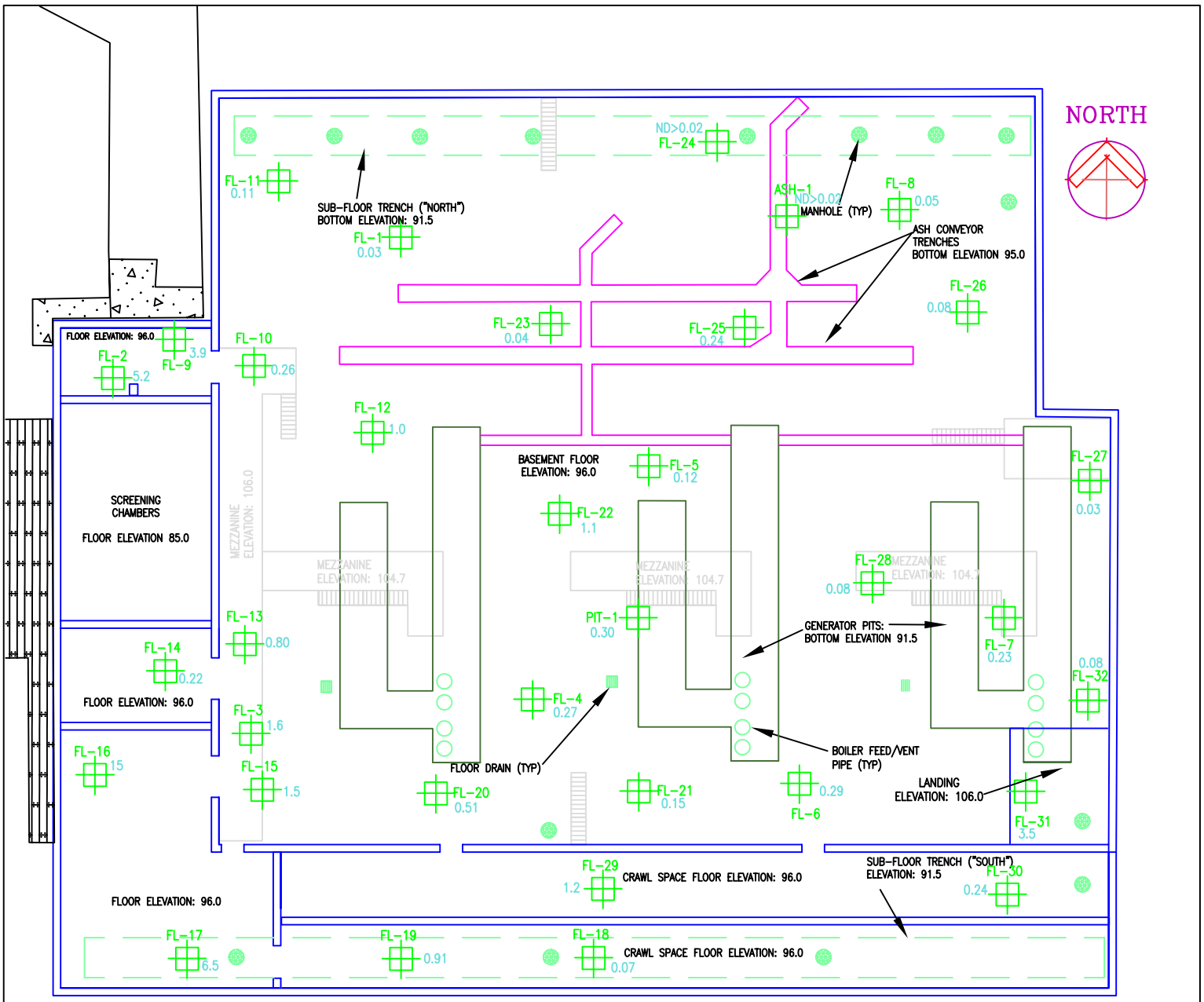
GRAPHIC SCALE: 1" = 20'

ALL ELEVATIONS ARE IN FT ABOVE MEAN SEA LEVEL.
PLAN DEVELOPED BY WEM FROM REVIEW OF ORIGINAL BLUEPRINTS: ALL LOCATIONS APPROXIMATE

WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 20'	REVISION:	DRAWN BY: MEW
DATE: 2/7/11	DATE:	PROJECT #: 02052-28

MORAN BASEMENT: INTERIOR SEDIMENT AND WATER SAMPLE LOCATIONS
MORAN GENERATING PLANT
BURLINGTON, VERMONT
VT DEC SITE #2005-3357



LEGEND

BULK CONCRETE SAMPLE LOCATION

5.2 TOTAL PCB CONCENTRATION, SUM OF 7 AROCLORS (mg/kg)

MANHOLE

NOTE: ANALYTICAL RESULTS SHOWN ARE SUM OF SEVEN PCB ARCLORS; ANALYSIS BY EPA METHOD 8082 USING SOXHLET EXTRACTION METHOD.

0 10 20 40

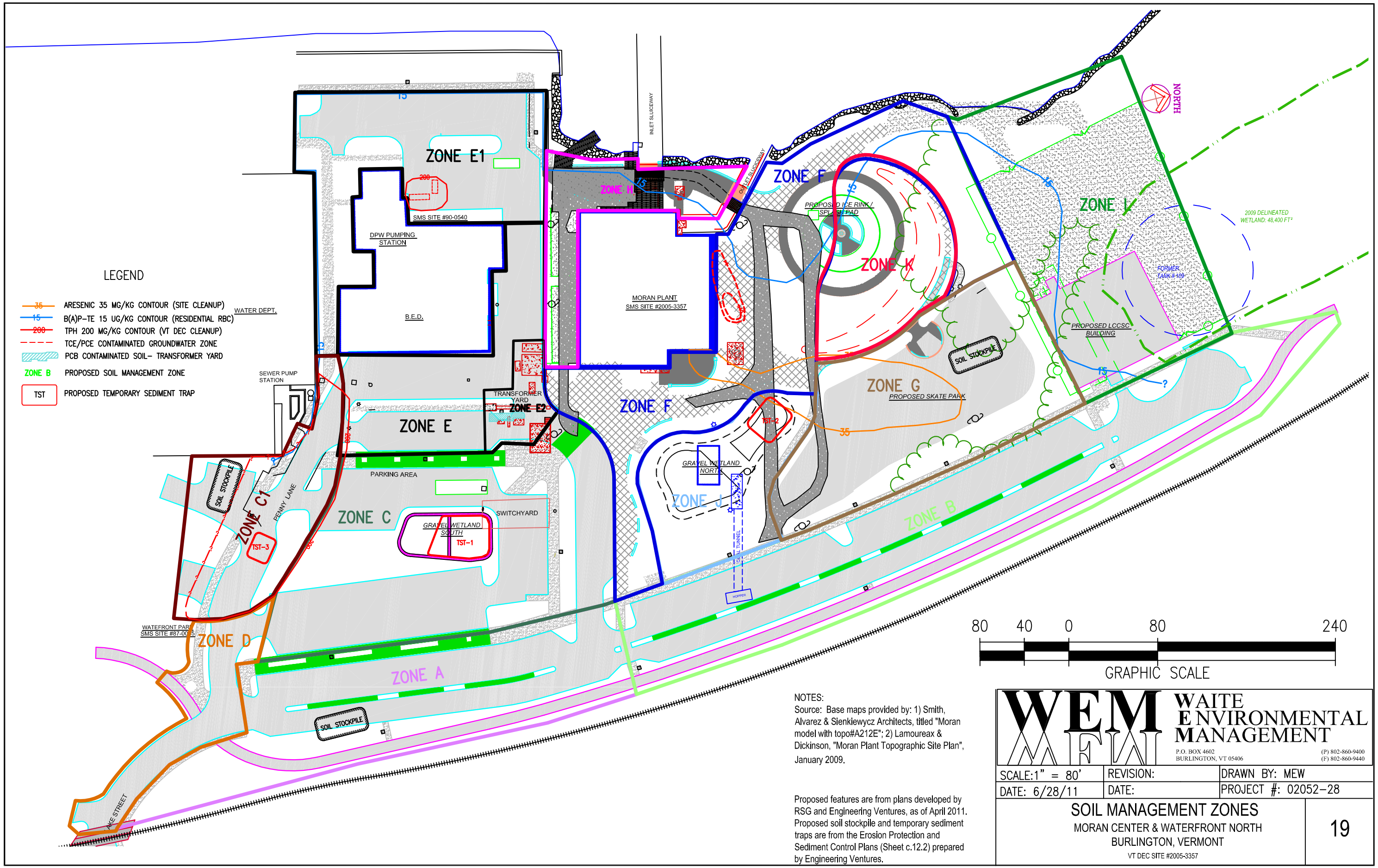
GRAPHIC SCALE: 1" = 20'

ALL ELEVATIONS ARE IN FT ABOVE MEAN SEA LEVEL.
PLAN DEVELOPED BY WEM FROM REVIEW OF ORIGINAL BLUEPRINTS: ALL LOCATIONS APPROXIMATE

WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 20'	REVISION:	DRAWN BY: MEW
DATE: 2/7/11	DATE:	PROJECT #: 02052-28

MORAN BASEMENT: CONCRETE FLOOR SAMPLE LOCATIONS AND RESULTS
MORAN GENERATING PLANT
BURLINGTON, VERMONT
VT DEC SITE #2005-3357



NOTES:
Source: Base maps provided by: 1) Smith, Alvarez & Sienkiewycz Architects, titled "Moran model with topo#A212E"; 2) Lamoureax & Dickinson, "Moran Plant Topographic Site Plan", January 2009.

Proposed features are from plans developed by RSG and Engineering Ventures, as of April 2011. Proposed soil stockpile and temporary sediment traps are from the Erosion Protection and Sediment Control Plans (Sheet c.12.2) prepared by Engineering Ventures.

WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
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(F) 802-860-9440

SCALE:1" = 80'	REVISION:	DRAWN BY: MEW
DATE: 6/28/11	DATE:	PROJECT #: 02052-28

SOIL MANAGEMENT ZONES

MORAN CENTER & WATERFRONT NORTH
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

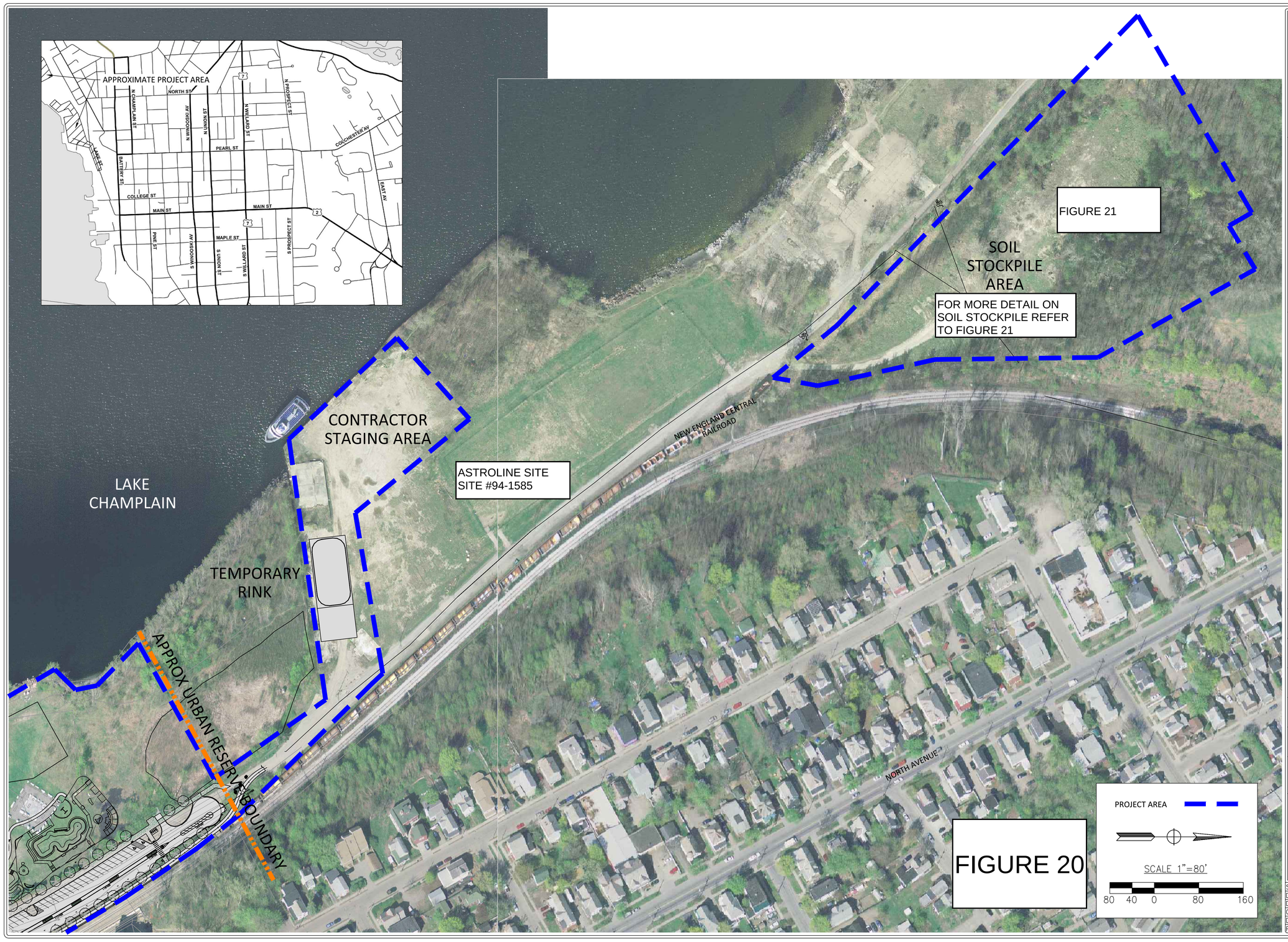


FIGURE 20

Waterfront

WATERFRONT ACCESS / LAKE STREET EXTENSION
STP5000 (17) C-5
BURLINGTON, VERMONT

CITY OF BURLINGTON
Community & Economic Development Office
Burlington City Hall
149 Church Street
Burlington, VT 05401
Ph: (802) 865-7144

Department of Public Works
PO Box 649
Burlington, VT 05402
Ph: (802) 863-9094

VT AGENCY OF TRANSPORTATION
Local Transportation Facilities
National Life Building, Drawer 33
Montpelier, VT 05633

FEDERAL HIGHWAY ADMINISTRATION
P. O. Box 568
Montpelier, VT 05601-0568

DESIGN TEAM

RESOURCE SYSTEMS GROUP - PRIME
55 Railroad Row
White River Junction, VT 05001
Ph: (802) 295-4999

ENGINEERING VENTURES - SITE/CIVIL
208 Flynn Avenue, Suite 2A
Burlington, VT 05401
Ph: (802) 863-6225

SE GROUP - LANDSCAPE ARCHITECT
131 Church Street
Burlington, VT 05401
Ph: (802) 862-0098

REVISIONS

DATE	DESCRIPTION	BY

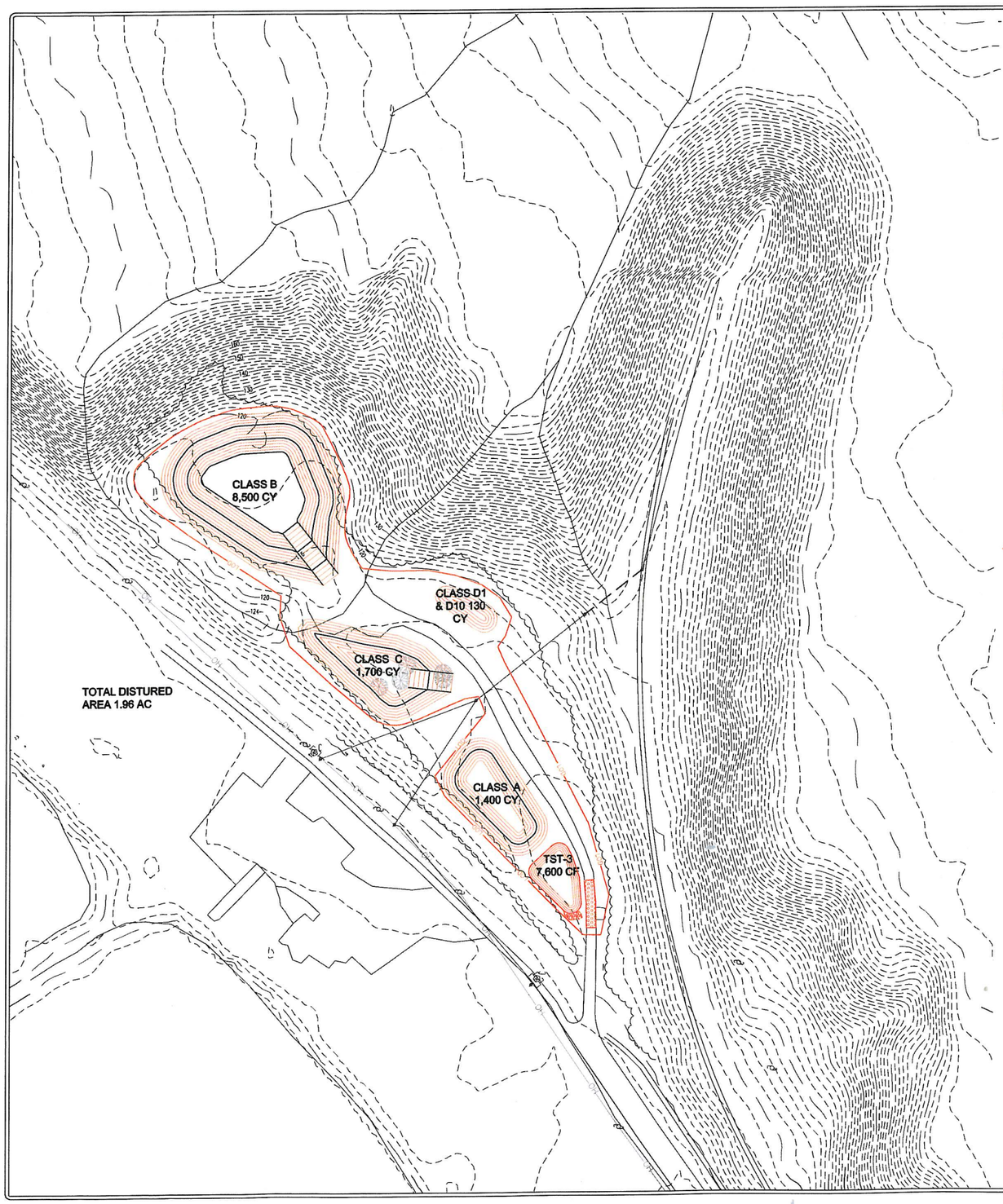
WATERFRONT NORTH
MORAN CENTER
URBAN RESERVE
ACTIVITIES

SCALE:	1"=80'
DESIGNED BY:	CDM
DRAWN BY:	CDM
CHECKED BY:	JDS
DATE:	1/28/11
PROJ. NO.:	STP5000 (17) C5

SHEET 1

v:_shared projects\burlington - wfn phase 1 final design-09126\cad\working pdfs\ce boundary.dwg

\\Ev-vtbu\server\PROJECTS\0-2008\08316 Burlington Waterfront North\dwg\08316 C12.X EPSC All Phases.dwg, 5/24/2011 11:36:24 AM, 1:2.18559



N

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

NOTE:
ALL SOIL DISTURBANCE MUST BE IN ACCORDANCE WITH THE CORRECTIVE ACTION PLAN (CAP) REQUIREMENTS

EROSION PREVENTION AND SEDIMENT CONTROL STRUCTURE LEGEND

EROSION PREVENTION AND SEDIMENT CONTROL STRATEGY
THE FOLLOWING TECHNIQUES WILL BE UTILIZED AS PART OF A SEDIMENT AND EROSION CONTROL PROGRAM, WHICH WILL BE COMPLETED IN PHASES.

APPROXIMATE WORK AREA LIMITS (NOT MARKED IN FIELD)

LOD

LIMIT OF DISTURBANCE (ITEM 653.55)
DISTURBANCE LIMITS TO BE MARKED IN THE FIELD WITH ORANGE RIBBON, CONSTRUCTION FENCE, OR CHAIN LINK FENCE IN EACH WORK AREA, PRIOR TO EARTH DISTURBANCE IN THAT AREA.

STABILIZED CONSTRUCTION ENTRANCE (ITEM 653.35)
THIS STRUCTURAL MEASURE IS A STABILIZED PAD OF AGGREGATE UNDERLAIN WITH FILTER FABRIC LOCATED AT ANY POINT WHERE TRAFFIC WILL BE ENTERING OR LEAVING A CONSTRUCTION SITE TO OR FROM A PUBLIC RIGHT-OF-WAY, STREET, ALLEY, SIDEWALK, OR PARKING AREA. THE PURPOSE OF A STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY OR STREETS. THIS WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. ONCE REMOVED, THE IMPACTED AREA SHALL BE STABILIZED WITH PAVEMENT, MULCH OR VEGETATION(AS INDICATED). SEE DETAIL 3/C-30.6.

STONE CHECK DAMS. (ITEM 653.25)
INSTALL IN AREA OF CONCENTRATED FLOW TO SLOW VELOCITY AND REDUCE EROSION POTENTIAL. SEE DTL 2/C-30.6.

DIVERSION SWALE/BERM (ITEM 653.21)
THIS STRUCTURAL MEASURE IS USED TO DIVERT SURFACE RUNOFF AWAY FROM PROBLEM AREAS. AND IN THIS CASE DIVERT THIS RUNOFF TO AND FROM A TEMPORARY SEDIMENT TRAP.

SILT FENCING. (ITEM 653.50)
THIS STRUCTURAL MEASURE IS A TEMPORARY BARRIER OF GEOTEXTILE FABRIC USED TO INTERCEPT SEDIMENT LADEN RUNOFF FROM SMALL DRAINAGE AREAS OF DISTURBED SOIL. IT IS INSTALLED ALONG THE PERIMETER OF IMPACTED AREAS AND ALONG THE BASE OF THE FILL SLOPES. SILT FENCE IS TO BE INSTALLED PARALLEL TO SITE CONTOURS. ADDITIONALLY, WHEN DESIGNATED ALONG THE LIMITS OF DISTURBANCE, INSTALL CONSTRUCTION FENCE BEHIND THE SILT FENCE. SILT FENCE IS EFFECTIVE IN REDUCING STORMWATER RUNOFF VELOCITIES, ASSISTING IN THE DEPOSITION OF TRANSPORTED SEDIMENT LOAD AND PREVENTING THE MIGRATION OF ERODED SOIL PARTICLES ONTO ADJACENT AREAS. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. SEE DETAIL 1/C-30.6.

TEMPORARY INLET PROTECTION. (ITEM 653.40)
INSTALL AS INDICATED ON PLANS. STONE TO BE REMOVED AND REPLACED WITH CLEAN STONE WHEN SEDIMENT REACHES ≤ 1/2 DEPTH OF STONE. REMOVE ALL SEDIMENT IF COLLECTED IN STRUCTURE AS SOON AS POSSIBLE. FIBER ROLLS MAY BE USED AS AN ALTERNATIVE TO CRUSHED STONE. SEE DTL 8/C-30.6.

TST-1

TEMPORARY SEDIMENT TRAP (S.P. ITEM 900.653)
A TEMPORARY BASIN EXCAVATED TO INTERCEPT RUNOFF AND ALLOW SEDIMENT TO SETTLE PRIOR TO DISCHARGE FROM THE SITE. SEE DTL 7/C-30.6.

GENERAL EROSION CONTROL NOTES
1. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL THROUGHOUT THE DURATION OF THE PROJECT, UNTIL ALL DISTURBED SURFACES HAVE BEEN PERMANENTLY STABILIZED. WATER APPLICATION FOR CONTROL OF DUST IS TO BE COMPLETED AT THE DISCRETION OF THE RESIDENT PROJECT ENGINEER, AND PAID UNDER ITEM 609.10.
2. NOTICE OF AUTHORIZATION UNDER GENERAL PERMIT 3-9020, AS PROVIDED BY THE VERMONT ANR, SHALL REMAIN POSTED IN A PUBLICLY VISIBLE LOCATION THROUGHOUT CONSTRUCTION.
3. A COPY OF THE EPSCP PLAN, WITH ALL AMENDMENTS AND ASSOCIATED REPORTS, , SHALL BE KEPT ON SITE DURING CONSTRUCTION, AND SHALL BE MADE AVAILABLE TO REPRESENTATIVES OF THE STATE OF VERMONT AND THE CITY OF BURLINGTON UPON REQUEST.
4. DISTURBANCE LIMITS ARE TO REMAIN MARKED THROUGHOUT CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRS.
5. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE "VERMONT HANDBOOK FOR SOIL EROSION AND SEDIMENT CONTROL ON CONSTRUCTION SITES," AND THE VERMONT GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES.
6. THE PERIOD BETWEEN OCTOBER 15TH AND APRIL 15TH IS CONSIDERED THE "WINTER CONSTRUCTION PERIOD". A PLAN FOR WINTER CONSTRUCTION MUST BE DEVELOPED BY THE CONTRACTOR, AND SUBMITTED TO THE ENGINEER AND VERMONT AGENCY OF NATURAL RESOURCES (ANR) AT LEAST 30 DAYS IN ADVANCE OF PROPOSED EARTH DISTURBANCE DURING THIS PERIOD. NO SUCH DISTURBANCE IS TO OCCUR PRIOR TO APPROVAL BY ANR.
7. ALL DISTURBED AREAS ARE TO BE STABILIZED (TEMPORARY OR FINAL) WITHIN 7 DAYS OF INITIAL DISTURBANCE. AFTER THIS TIME, ANY DISTURBANCE WITHIN THIS WORK AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY, WITH THE FOLLOWING EXCEPTIONS:
   a. STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN 24 HOURS AND NO PRECIPITATION IS FORECAST DURING THAT PERIOD.
   b. WORK IS OCCURRING WITHIN A SELF-CONTAINED EXCAVATION, 2 FEET OR MORE IN DEPTH.

DAILY STABILIZATION MAY BE REQUIRED DURING THE WINTER PERIOD.
8. ALL STABILIZATION INVOLVING SEEDING IS TO BE COMPLETED BY SEPTEMBER 15TH.
9. PARKING ON CITY-OWNED GREENBELTS IS PROHIBITED UNLESS APPROVED IN ADVANCE BY THE DEPARTMENT OF PUBLIC WORKS.
10. IN ADDITION TO THE REQUIREMENTS NOTED ABOVE, THE CONTRACTOR MUST COMPLY WITH THE CITY OF BURLINGTON WASTEWATER, STORMWATER, AND POLLUTION CONTROL ORDINANCE.

"FLYING A" AREA NOTES

GENERAL PHASING NOTES
1. INSTALL STABILIZED CONSTRUCTION ENTRANCE AND MARK LIMITS OF DISTURBANCE PRIOR TO HAULING SOIL TO THIS AREA.
2. VEHICLE AND PEDESTRIAN TRAFFIC ACCESS MUST BE MAINTAINED AT ALL TIMES ON THE BIKE PATH.
3. HAULING OPERATIONS MUST NOT INHIBIT USE OF THE TEMPORARY SKATE AREA OR DOG PARK.
4. THE CONTRACTOR IS RESPONSIBLE FOR PREVENTING SOIL TRACKING ONTO ROAD SURFACES ADJACENT TO THE WORK AREA. ALL SOIL TRACKED ONTO ROAD SURFACES MUST BE SWEPT OFF AT THE END OF EACH WORK DAY, OR MORE FREQUENTLY.
5. SOIL STOCKPILES THAT ARE NOT COVERED (PER CORRECTIVE ACTION PLAN) MUST BE STABILIZED IN ACCORDANCE WITH NOTE 6 OF THE GENERAL EROSION CONTROL NOTES ABOVE.

SOILS NOTES

NO TEST BORINGS HAVE BEEN CONDUCTED WITHIN THE ATROLINE EAST SITE.
1. USGS SOIL MAPPING INDICATES ADAMS AND WINDSOR LOAMY SANDS UNDERLYING THE EASTERN HALF OF THE ASTROLINE EAST AREA AND FILL SOILS UNDERLYING THE WESTERN PORTION. THESE FILL SOILS ALSO APPEAR TO BE SANDY.
2. ADAMS AND WINDSOR LOAMY SANDS HAVE BEEN ASSIGNED AN ERODIBILITY COEFFICIENT OF 0.17 BY NRCS, AND ARE THEREFORE CONSIDERED LOW RISK FOR EROSION.

FIGURE 21

Waterfront

WATERFRONT ACCESS / LAKE STREET EXTENSION
STP5000 (17) C-5
BURLINGTON, VERMONT

CITY OF BURLINGTON
Community & Economic Development Office
Burlington City Hall
149 Church Street
Burlington, VT 05401
Ph: (802) 865-7144

Department of Public Works
PO Box 649
Burlington, VT 05402
Ph: (802) 863-9094

VT AGENCY OF TRANSPORTATION
Local Transportation Facilities
National Life Building, Drawer 33
Montpelier, VT 05633

FEDERAL HIGHWAY ADMINISTRATION
P. O. Box 568
Montpelier, VT 05601-0568

DESIGN TEAM

RESOURCE SYSTEMS GROUP - PRIME
55 Railroad Row
White River Junction, VT 05001
Ph: (802) 295-4999

ENGINEERING VENTURES - SITE/CIVIL
208 Flynn Avenue, Suite 2A
Burlington, VT 05401
Ph: (802) 863-6225

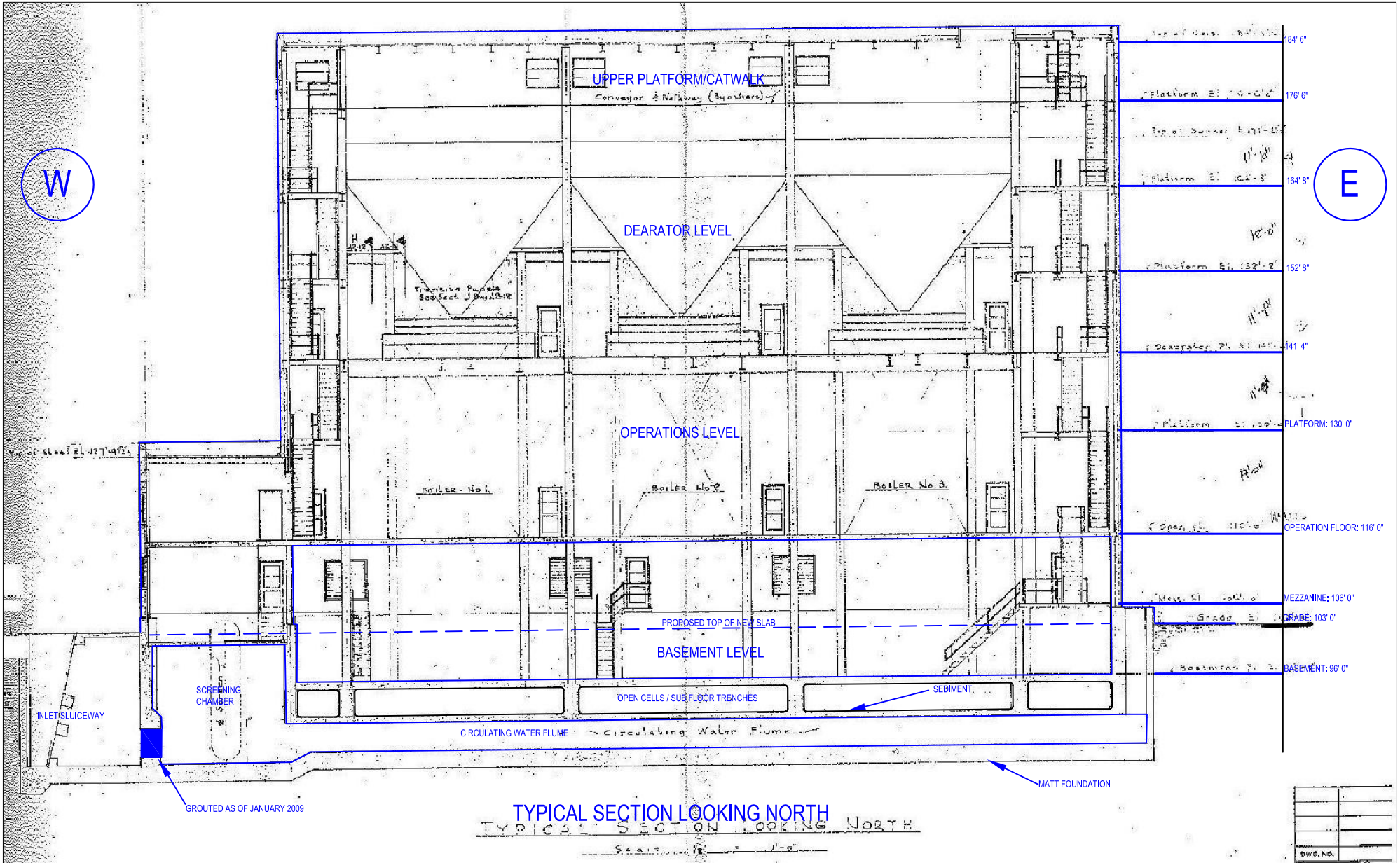
SE GROUP - LANDSCAPE ARCHITECT
131 Church Street
Burlington, VT 05401
Ph: (802) 862-0098

REVISIONS

DATE	DESCRIPTION	BY
2/14/11	REVISED TST AREA	PMB

CONSTRUCTION PHASE
FLYING A SITE
EROSION PREVENTION
& SEDIMENT CONTROL
PLAN
85% SUBMITTAL - NOT FOR CONST.

SCALE:	AS NOTED	SHEET
DESIGNED BY:	PB/ST	C12.6
DRAWN BY:	WC	
CHECKED BY:	KW	
DATE:	01/31/11	
PROJ. NO.:	STP5000(17)C5	



TYPICAL SECTION LOOKING NORTH

TYPICAL SECTION LOOKING NORTH

Scale: 1/8" = 1'-0"

WAITE ENVIRONMENTAL MANAGEMENT

P.O. BOX 4602
BURLINGTON, VT 05406

(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" ~ 18.5'	REVISION:	DRAWN BY: MEW
DATE: 2/18/09	DATE:	PROJECT #: 02052-28

BUILDING CROSS-SECTION

MORAN GENERATING PLANT
BURLINGTON, VERMONT
VT DEC SITE #2005-3357

22

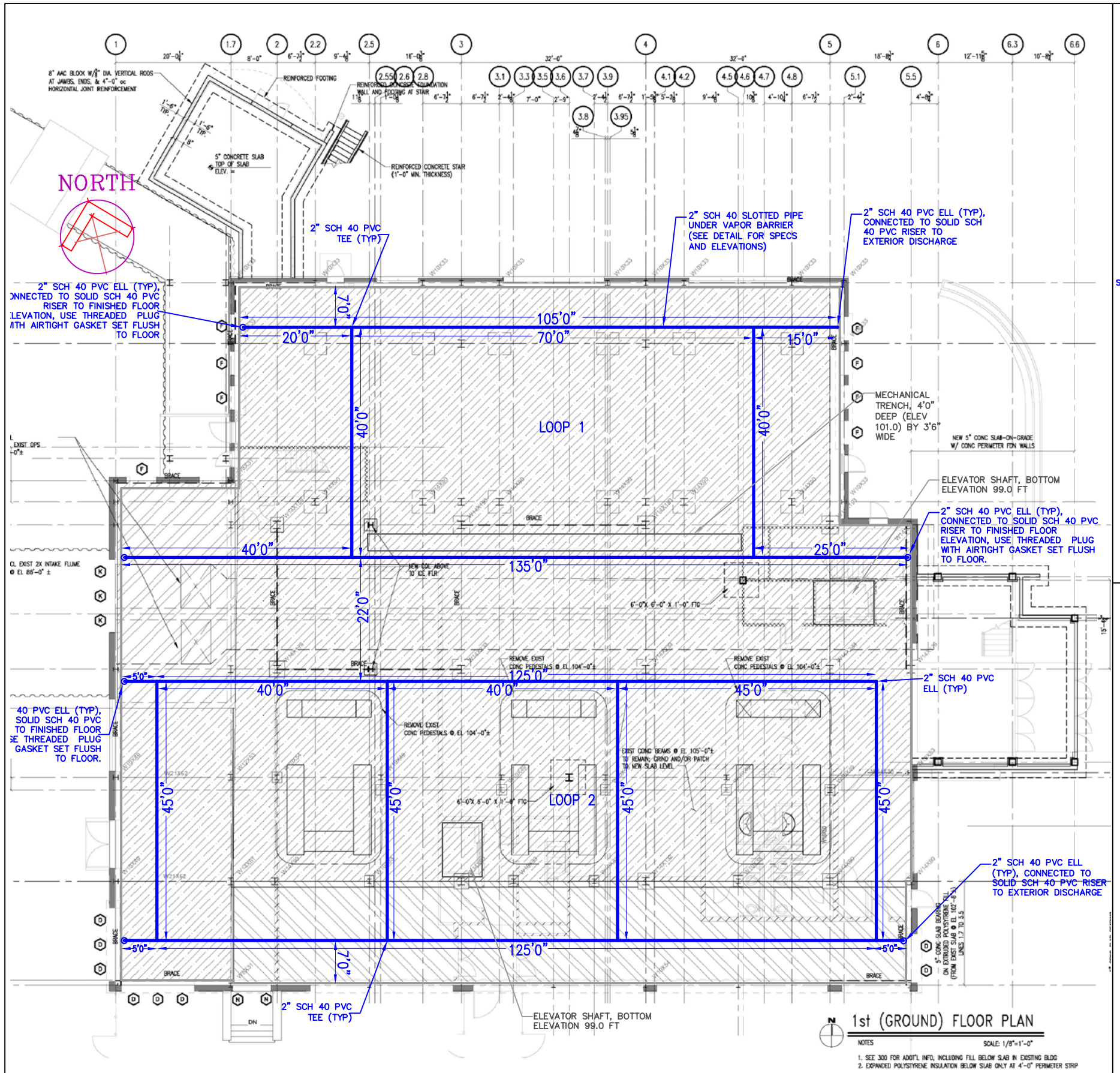
ORIGINAL PLAN:
J.F. PRITCHARD & CO., "CITY OF BURLINGTON, VERMONT, STEAM ELECTRICAL POWER PLANT, TYPICAL SECTION LOOKING NORTH", DRAWING A2-11, APRIL 1953

APR 9 1953

DWG. NO.

CITY OF B
STEAM
TYPICAL

J. F.
ENGI



1st (GROUND) FLOOR PLAN

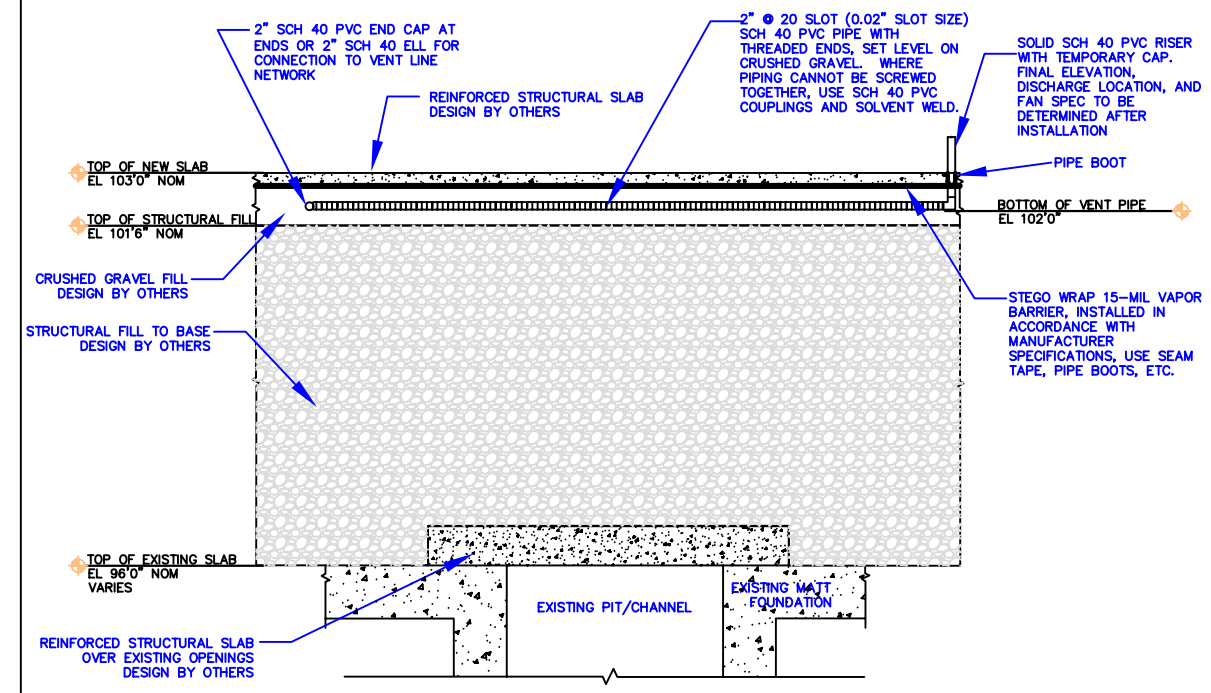
NOTES SCALE: 1/8"=1'-0"

1. SEE 300 FOR ADOT'L INFO, INCLUDING FILL BELOW SLAB IN EXISTING BLDG
2. EXPANDED POLYSTYRENE INSULATION BELOW SLAB ONLY AT 4'-0" PERIMETER STRIP

20 10 0 20

DEPRESSURIZATION SYSTEM PLAN

1" = 20'



DETAIL - TYPICAL SECTION

NTS

GENERAL NOTES:

1) THIS PLAN IS INTENDED FOR USE IN CONJUCTION WITH PLANS PROVIDED BY ENGINEERING VENTURES AND/OR FREEMAN-FRENCH-FREEMAN FOR THE CONSTRUCTION OF THE MORAN CENTER AT WATERFRONT PARK. ALL ELEVATIONS REFERENCED ON THIS PLAN ARE DIRECTLY REFERENCED FROM THOSE PLANS (NAVD88 DATUM).

2) ALL STEGO WRAP VAPOR BARRIER COMPONENTS SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS, INCLUDING TAPED SEAMS AND MECHANICAL CONNECTIONS TO SIDEWALLS.

3) IF ALTERNATIVE VAPOR BARRIER TO STEGO WRAP BY STEGO INDUSTRIES, LLC IS USED, IT MUST BE EVALUATED BY WAITE ENVIRONMENTAL MANAGEMENT TO ENSURE IT MEETS REQUIREMENTS FOR PERMEANCE, TENSILE STRENGTH, AND CHEMICAL RESISTANCE.

4) ALL PVC PIPE JOINTS SHALL BE SOLVENT WELDED.

5) DEVIATION FROM THESE PLANS MUST BE APPROVED BY WAITE ENVIRONMENTAL MANAGEMENT PRIOR TO CONSTRUCTION.

WAITE ENVIRONMENTAL MANAGEMENT
11 KILBURN STREET, SUITE 212
BURLINGTON, VT 05401
(P) 802-860-9400
(F) 802-860-9440

SCALE: AS NOTED	REVISION: 1	DRAWN BY: MEW
DATE: 4/12/11	DATE: 6/23/11	PROJECT #: 02052-28

SUB-SLAB DEPRESSURIZATION SYSTEM DESIGN

MORAN CENTER
475 LAKE STREET
BURLINGTON, VERMONT

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APPENDIX B
TABLES & GRAPHS

TABLE 1
Monitoring Well Construction Details
Moran Center
Burlington, Vermont

Well I.D.	Installed By	Well Diameter (in)	Total Depth (ft bgs)	Total Depth (ft btoc)	Screened Interval (ft bgs)	TOC Elevation (ft AMSL)	Well Bottom Elevation (ft AMSL)	Notes
MW-1	WEM - KENNEDY DRILLING	1.0	9.0	8.4	2' - 9'	102.99	94.6	flush mounted well box
MW-2	WEM - KENNEDY DRILLING	1.0	9.0	8.2	2' - 9'	103.02	94.8	flush mounted well box
MW-3	WEM - KENNEDY DRILLING	1.0	7.0	6.3	2' - 7'	104.50	98.2	flush mounted well box
MW-4	WEM - KENNEDY DRILLING	1.0	9.0	8.2	2' - 9'	102.85	94.7	flush mounted well box
MW-5	WEM - KENNEDY DRILLING	1.0	9.0	10.5	2 - 9'	106.33	95.8	stickup above grade
MW-6	WEM - KENNEDY DRILLING	1.0	6.0	7.7	1' - 6'	102.20	94.5	stickup above grade
MW-7	WEM - SDI	1.0	10.0	9.5	3' - 10'	102.23	92.7	flush mounted well box
MW-8	WEM - SDI	1.0	10.0	8.7	3' - 10'	102.36	93.7	flush mounted well box
MW-11	WEM - SDI	1.0	10.0	9.4	3' - 10'	103.56	94.2	flush mounted well box
MW-12	WEM - SDI	1.0	40.0	39.2	35' - 40'	103.21	64.0	flush mounted well box
MW-13	WEM - SDI	1.0	12.0	11.6	2' - 12'	102.94	91.3	flush mounted well box
MW-201	WEM - SDI	1.0	6.5	8.1	1.5'-6.5'			stickup above grade
MW-10	LAMEROUX & DICKINSON	2.0	10.0		3' - 10'			well not located by WEM
MW-14	LAMEROUX & DICKINSON	2.0	10.0	9.5	3' - 10'	103.94	94.4	flush mounted well box
MW-X	GRIFFIN INTL'	2.0	9.5			104.94		stickup above grade
GD-12	GEODESIGN	1.0	8.4		3.4' - 8.4'			flush mounted well box
MW-A	JCO - PLATFORM DRILLING	1.0	13.0		4' -13'			flush mounted well box
MW-B	JCO - PLATFORM DRILLING	1.0	13.0		4' -13'			flush mounted well box
MW-C	JCO - PLATFORM DRILLING	1.0	13.0		4' -13'			flush mounted well box

Notes:

bgs = below ground surface; btoc = below top of casing; AMSL = above mean sea level

TOC elevations surveyed by Lamoureux & Dickinson, August 2008; relative to NAGD88

Blank spaces indicate that information is unavailable.

SDI - Specialty Drilling & Investigation; JCO = The Johnson Company

TABLE 2
Groundwater Elevation Data
Moran Center
Burlington, Vermont

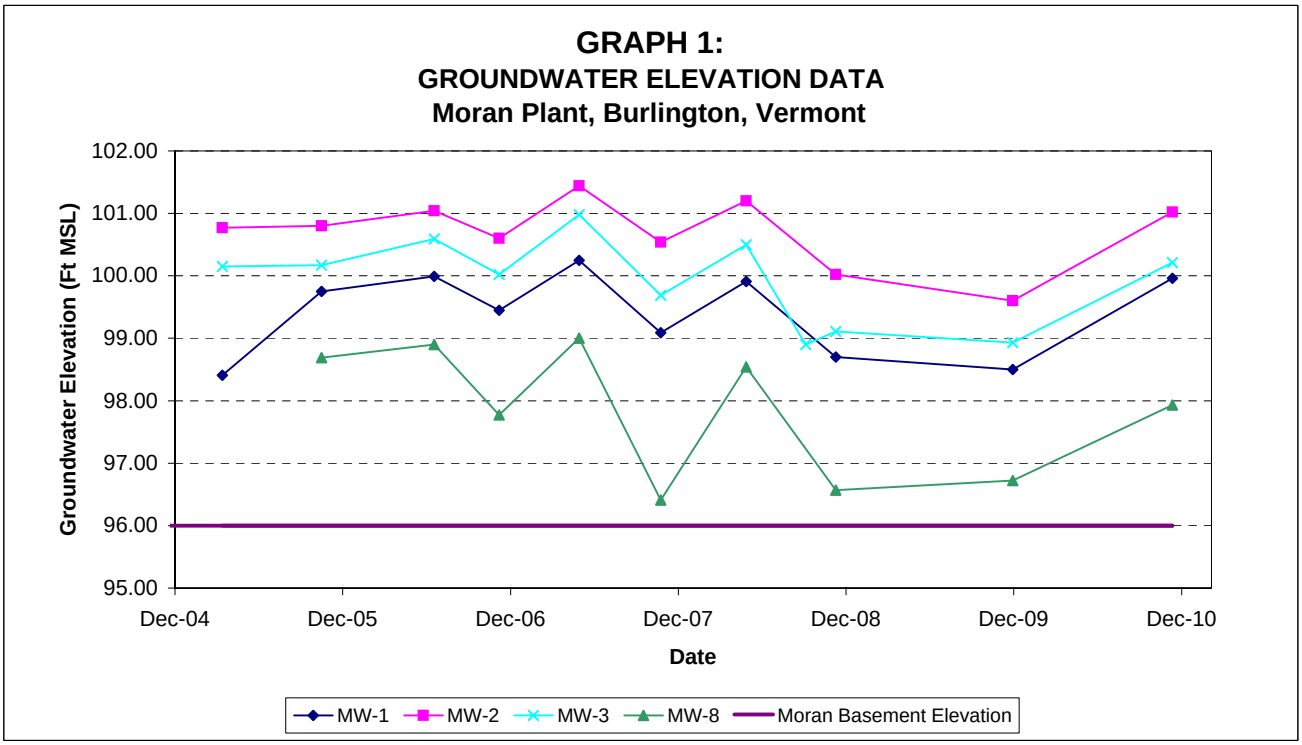
Measurement Date: 12/21/2009

Well I.D.	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	102.99	n/a	4.49					98.50
MW-2	103.02	n/a	3.42					99.60
MW-3	104.50	n/a	5.57					98.93
MW-4	102.85	n/a	2.47					100.38
MW-5	106.33	n/a	5.44					100.89
MW-6	102.20	n/a	5.04					97.16
MW-7	102.23	n/a	4.17					98.06
MW-8	102.36	n/a	5.64					96.72
MW-11	103.56	n/a	3.39					100.17
MW-12	103.21	n/a	3.85					99.36
MW-13	102.94	n/a	4.55					98.39
MW-14	103.94	n/a	5.18					98.76
MW-X	104.94	n/a	4.84					100.10

Measurement Date: 12/2-3/2010

Well I.D.	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	102.99	n/a	3.03					99.96
MW-2	103.02	n/a	2.00					101.02
MW-3	104.50	n/a	4.29					100.21
MW-4	102.85	n/a	1.06					101.79
MW-5	106.33	n/a	3.69					102.64
MW-6	102.20	n/a	3.67					98.53
MW-7	102.23	n/a	2.57					99.66
MW-8	102.36	n/a	4.43					97.93
MW-11	103.56	n/a	1.58					101.98
MW-12	103.21	n/a	2.46					100.75
MW-13	102.94	n/a	3.62					99.32
MW-14	103.94	n/a	3.87					100.07
MW-X	104.94	n/a	3.04					101.90
MW-A		n/a	4.28					
MW-B		n/a	4.76					
MW-C		n/a	4.74					

All data in feet.
Elevations are in ft above MSL, referenced from a survey conducted by Lamoureaux & Dickinson, January 2009.
n/a signifies that free product (LNAPL) was not detected.


GRAPH 1:
GROUNDWATER ELEVATION DATA
Moran Plant, Burlington, Vermont
Groundwater Elevation (Ft MSL)
102.00
101.00
100.00
99.00
98.00
97.00
96.00
95.00
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Date
MW-1
MW-2
MW-3
MW-8
Moran Basement Elevation

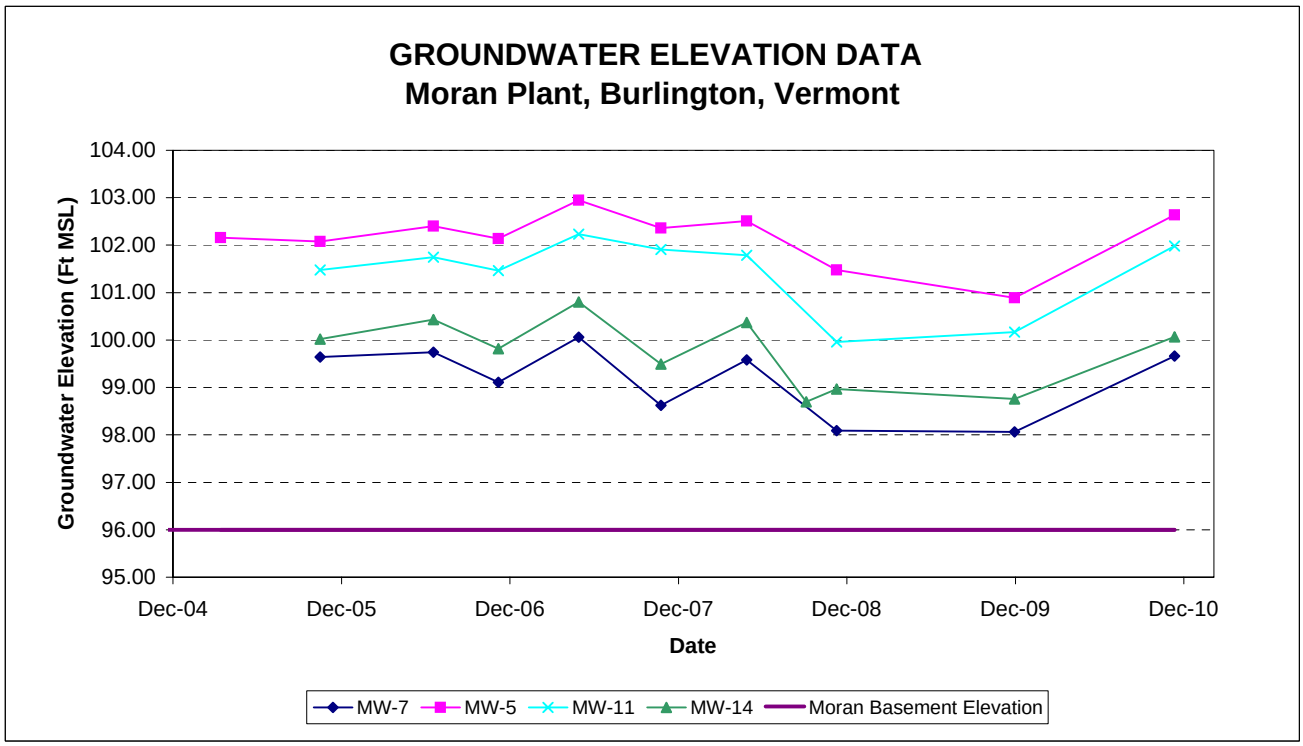

GROUNDWATER ELEVATION DATA
Moran Plant, Burlington, Vermont
Groundwater Elevation (Ft MSL)
104.00
103.00
102.00
101.00
100.00
99.00
98.00
97.00
96.00
95.00
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Dec-09
Dec-10
Date
MW-7
MW-5
MW-11
MW-14
Moran Basement Elevation

TABLE 3
Groundwater Quality Summary: VOCs
Moran Center
Burlington, Vermont

MW-1												
Sample Date		VGES	11/8/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	**0.22 J**	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	**4.7**	**1.9**	**2.5**	**1.3**	**3.3**	**1.1**		**4**	**2.7**	**1.2**
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	**0.26 J**	1.0 U	**0.29 J**	1.0 U	**0.29 J**		1 U	**0.20 J**	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		***4.7***	***2.4***	***2.5***	***1.6***	***3.3***	***1.4***		***4***	***2.7***	***1.2***
UNIDENTIFIED PEAKS	#	--	0									

MW-2												
Sample Date		VGES	11/8/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	1.0 U	**0.33 J**	1.0 U	**0.38** J	1.0 U		2 U	**0.42 J**	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	**0.26 J**	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	**39.9**	**28**	**36**	**18**	**37**	**11**		**29**	**17**	**14**
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	**20.4**	**24**	**12**	**21**	**11**	**20**		**9**	**2.1**	**16**
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		***60.3***	***52.0***	***48.3***	***39.0***	***48.4***	***31.0***		***38***	***19.8***	***30***
UNIDENTIFIED PEAKS	#	--	0									

MW-3												
Sample Date		VGES	11/9/2005	7/11/2006	11/29/2006*	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	**7.0**	**5.3**	**5.6**	**2.8**	**6.5**	**2.7**	**4.2**	**6**	**5.6**	**6.3**
Trichloroethene (TCE)	ug/L (ppb)	5.0	**28.0**	**32**	**26**	**15**	**13**	**15**	**19**	**11**	**12**	**18**
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	**4.4**	**3.0**	**3.9**	**3.1**	**4.8**	**3.1**	**8.5**	**4**	**2.8**	**2.7**
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	**0.24 J**	**0.21 J**	1.0 U	2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	**2.2**	**1.7**	**1.4**	**2.7**	**2.0**	**2.1**	**1.9**	2 U	**0.83** J	**1.1**
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	**2.7**	**2.0**	**2.1**	**0.87 J**	**2.5**	**0.71 J**	**2.6**	**2**	**2.3**	**1.7**
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		***44.3***	***44.0***	***39.0***	***24.5***	***28.8***	***23.6***	***36.2***	***23***	***23.5***	***29.8***
UNIDENTIFIED PEAKS	#	--	0									

TABLE 3
Groundwater Quality Summary: VOCs
Moran Center
Burlington, Vermont

MW-4												
Sample Date		VGES		7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
Toluene	ug/L (ppb)	1000		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0		1.0 U	**0.23 J**	**0.44 J**	1.0 U	**0.32** J			1.0 U	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*			*ND*	***0.2***	***0.4***	*ND*	***0.3***			*ND*	*ND*
UNIDENTIFIED PEAKS	#	--										

MW-5												
Sample Date		VGES	11/8/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	**0.34 J**	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	1.0 U	1.0 U	**0.21 J**	1.0 U	**0.48 J**	1.0 U		2 U	1.0 U	**0.95** J
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		*ND*	*ND*	***0.2***	*ND*	***0.5***	*ND*		*ND*	***0.3***	***0.95***
UNIDENTIFIED PEAKS	#	--	0									

MW-6												
Sample Date		VGES	11/18/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U						
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U						
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U						
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U						
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U						
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U						
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U						
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U						
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U						
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U						
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U						
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U						
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U						
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U						
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U						
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	1.0 U	1.0 U	1.0 U	1.0 U						
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U						
TOTAL REPORTED VOCS	*ug/L (ppb)*		*ND*	*ND*	*ND*	*ND*						
UNIDENTIFIED PEAKS	#	--	0									

TABLE 3
Groundwater Quality Summary: VOCs
Moran Center
Burlington, Vermont

MW-7												
Sample Date		VGES	11/8/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	**8.5**	**8.1**	**7.0**	**6.1**	**4.0**	**5.6**		**5**	**4.4**	**2.7**
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	1.0 U	**0.77 J**	1.0 U	**0.41 J**	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		***8.5***	***8.9***	***7.0***	***7.5***	***4.0***	***5.6***		***5***	***4.4***	***2.7***
UNIDENTIFIED PEAKS	#	--	0									

MW-8												
Sample Date		VGES	11/8/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	**0.45 J**	**0.49 J**	1.0 U	**0.53 J**	1.0 U		1 U	**0.43 J**	**0.23 J**
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	**0.33 J**	**0.28 J**	**0.32 J**	**0.25 J**	**0.33 J**		2 U	**0.52 J**	**0.46 J**
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	**0.74 J**	**0.63 J**	**0.33 J**	**0.71 J**	**0.35 J**		2 U	**0.52 J**	**0.47 J**
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	**0.48 J**	**0.46 J**	1.0 U	**0.46 J**	1.0 U		2 U	**0.30 J**	**0.20 J**
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	**6.2**	**5.5**	**6.4**	**1.7**	**4.7**	**4.2**		**5**	**4.3**	**4.3**
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	**1.8**	**2.4**	**1.8**	**3.5**	**0.58 J**	**4.9**		2 U	**1.5**	**2.6**
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		***8.0***	***9.9***	***10.1***	***5.9***	***7.2***	***9.8***		***5***	***7.6***	***8.3***
UNIDENTIFIED PEAKS	#	--	**>10**									

MW-11												
Sample Date		VGES	11/8/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	**0.50 J**	**0.28 J**	**0.44 J**	**0.24 J**	**0.59 J**		2 U	1.0 U	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	1.0 U	1.0 U	**0.41 J**	**0.26 J**	**1.7**	1.0 U		2 U	1.0 U	**1.9**
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		*ND*	***0.5***	***0.7***	***0.7***	***1.9***	***0.6***		*ND*	*ND*	***1.9***
UNIDENTIFIED PEAKS	#	--	0									

TABLE 3
Groundwater Quality Summary: VOCs
Moran Center
Burlington, Vermont

MW-12												
Sample Date		VGES	11/8/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		2 U	1.0 U	1.0 U
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		*ND*	*ND*	*ND*	*ND*	*ND*	*ND*		*ND*	*ND*	*ND*
UNIDENTIFIED PEAKS	#	--	0									

MW-13												
Sample Date		VGES							9/26/2008	12/3/2010	12/3/2010	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0							1.0 U	1 U	1.0 U	1.0 U
Toluene	ug/L (ppb)	1000							1.0 U	1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700							1.0 U	1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000							1.0 U	2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350							1.0 U	1 U	1.0 U	**0.29** J
1,2,4-Trimethylbenzene	ug/L (ppb)								**0.65 J**	1 U	1.0 U	**0.22** J
Naphthalene	ug/L (ppb)	20.0							**0.98 J**	5 U	**0.56 J**	1.1 U
MTBE	ug/L (ppb)	40.0							1.0 U	5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0							**0.60 J**	2 U	**0.30 J**	**0.74 J**
Trichloroethene (TCE)	ug/L (ppb)	5.0							1.0 U	2 U	**0.77 J**	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0							1.0 U	2 U	1.0 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0							1.0 U	2 U	1.0 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0							1.0 U	2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0							**0.50 J**	**6**	**4.4**	**0.51** J
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0							1.0 U	2 U	**0.24** J	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0							**0.97 J**	2 U	**1.1**	**0.54** J
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0							1.0 U	1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*								***3.7***	***6***	***7.4***	***2.3***
UNIDENTIFIED PEAKS	#	--										

MW-14												
Sample Date		VGES	11/9/2005	7/11/2006	11/29/2006	5/22/2007	11/16/2007	5/20/2008	9/26/2008	12/1/2008	12/21/2009	12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0	1.0 U	**0.24 J**	1.0 U	**0.22 J**	**0.28 J**	1.0 U	1.0 U	1 U	**0.23 J**	1.0 U
Toluene	ug/L (ppb)	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
Ethylbenzene	ug/L (ppb)	700	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
Xylenes	ug/L (ppb)	10000	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	ug/L (ppb)		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
Naphthalene	ug/L (ppb)	20.0	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5 U	1.0 U	1.0 U
MTBE	ug/L (ppb)	40.0	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	**1.1**	**1.1**	**1.5**	**0.72 J**	**1.4**	**1.0**	**2.5**	**2**	**1.5**	**1.6**
Trichloroethene (TCE)	ug/L (ppb)	5.0	**6.7**	**6.3**	**6.0**	**3.1**	**6.3**	**4.6**	**8.7**	**7**	**7.1**	**5.2**
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	**2.2**	**1.8**	**4.1**	**0.74 J**	**4.2**	**2.3**	**8.8**	**8**	**7.0**	**3.2**
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	**0.22 J**	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	1.0 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	**9.6**	**6.6**	**5.2**	**2.1**	**5.5**	**3.8**	**4.9**	**5**	**2.7**	**4.2**
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	1.0 U	1.0 U	1.0 U	1.0 U	**0.48** J	1.0 U	1.0 U	2 U	1.0 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	**3.4**	**18**	**16**	**6.5**	**2.5**	**5.8**	**7.0**	**7**	**7.5**	**15**
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U
TOTAL REPORTED VOCS	*ug/L (ppb)*		***17.3***	***34.0***	***33.8***	***13.4***	***20.7***	***17.5***	***31.9***	***29***	***26.3***	***29.2***
UNIDENTIFIED PEAKS	#	--	**>10**									

TABLE 3
Groundwater Quality Summary: VOCs
Moran Center
Burlington, Vermont

MW-A												
Sample Date		VGES										12/3/2010
VOCs (EPA Method 8260B)												
Benzene	ug/L (ppb)	5.0										1 U
Toluene	ug/L (ppb)	1000										1 U
Ethylbenzene	ug/L (ppb)	700										1 U
Xylenes	ug/L (ppb)	10000										1 U
1,3,5-Trimethylbenzene	ug/L (ppb)	350										1 U
1,2,4-Trimethylbenzene	ug/L (ppb)											1 U
Naphthalene	ug/L (ppb)	20.0										5 U
MTBE	ug/L (ppb)	40.0										5 U
Tetrachloroethene (PCE)	ug/L (ppb)	5.0										2 U
Trichloroethene (TCE)	ug/L (ppb)	5.0										2 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0										2 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0										2 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0										2 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0										1 U
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0										2 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0										2 U
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0										1 U
TOTAL REPORTED VOCS	*ug/L (ppb)*											*ND*
UNIDENTIFIED PEAKS	#	--										

NOTES:
"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value;
VGES = Vermont Groundwater Enforcement Standard (Table 1 of the Groundwater Protection Rule and Strategy 1/00)
Blank spaces indicate data not collected
EPA Method 8260B compounds not shown indicate that they were not detected above respective quantitation limits.
Results reported above quantitation limits are indicated in bold; values in excess of the VGES are shaded.
1999 results from MW-14 were obtained from the report: "Phase II ESA, North 40 - Urban Reserve" prepared by Lamoureux & Dickenson, May 2000, and these data have not been formally validated.

TABLE 4
Groundwater Quality Data: PAH, PCBs, Metals
Moran Center
Burlington, Vermont

MW-2					
Sample Date		VGES	10/1/1999	4/6/2005	1/19/2011
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)					
Acenapthene	ug/L (ppb)	--		0.2 U	
Acenapthylene	ug/L (ppb)	--		0.2 U	
Anthracene	ug/L (ppb)	2,100.0		0.2 U	
Benzo(a)anthracene	ug/L (ppb)	--		0.2 U	
Benzo(b&k)fluoranthene	ug/L (ppb)	--		0.2 U	
Benzo(a)pyrene	ug/L (ppb)	0.2		0.2 U	
Benzo(g,h,i)perylene	ug/L (ppb)	--		0.2 U	
Chrysene	ug/L (ppb)	--		0.2 U	
Dibenzo(a,h)anthracene	ug/L (ppb)	--		0.2 U	
Fluoranthene	ug/L (ppb)	280		0.2 U	
Fluorene	ug/L (ppb)	280		0.2 U	
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	--		0.2 U	
1-Methylnaphthalene	ug/L (ppb)	--		0.2 U	
2-Methylnaphthalene	ug/L (ppb)			0.2 U	
Naphthalene	ug/L (ppb)	20		0.2 U	
Phenanthrene	ug/L (ppb)	--		0.2 U	
Pyrene	ug/L (ppb)	--		0.2 U	
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)					
Aroclor-1016	ug/L (ppb)	0.5		0.5 U	
Aroclor-1221	ug/L (ppb)	0.5		0.5 U	
Aroclor-1232	ug/L (ppb)	0.5		0.5 U	
Aroclor-1242	ug/L (ppb)	0.5		0.5 U	
Aroclor-1248	ug/L (ppb)	0.5		0.5 U	
Aroclor-1254	ug/L (ppb)	0.5		0.5 U	
Aroclor-1260	ug/L (ppb)	0.5		0.5 U	
Aroclor-1268	ug/L (ppb)	0.5		0.5 U	
PRIORITY POLLUTANT METALS (EPA Methods 245.1/6010/SM3113B)					
Total Antimony	ug/L (ppb)	6.0		2.0 U	
Total Arsenic	ug/L (ppb)	10.0		**18**	
Total Beryllium	ug/L (ppb)	4.0		2.0 U	
Total Cadmium	ug/L (ppb)	5.0		3.0 U	
Total Chromium	ug/L (ppb)	100.0		10.0 U	
Total Copper	ug/L (ppb)	1,300		10.0 U	
Total Lead	ug/L (ppb)	15.0		2.0 U	
Total Mercury	ug/L (ppb)	2.0		1.0 U	
Total Nickel	ug/L (ppb)	100.0		20.0 U	
Total Selenium	ug/L (ppb)	50.0		5.0 U	
Total Silver	ug/L (ppb)			10.0 U	
Total Thallium	ug/L (ppb)	2.0		1.0 U	
Total Zinc	ug/L (ppb)	5,000		**22**	

TABLE 4
Groundwater Quality Data: PAH, PCBs, Metals
Moran Center
Burlington, Vermont

MW-5					
Sample Date		VGES	10/1/1999	4/6/2005	1/19/2011
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)					
Acenapthene	ug/L (ppb)	--		0.2 U	
Acenapthylene	ug/L (ppb)	--		0.2 U	
Anthracene	ug/L (ppb)	2,100.0		0.2 U	
Benzo(a)anthracene	ug/L (ppb)	--		0.2 U	
Benzo(b&k)fluoranthene	ug/L (ppb)	--		0.2 U	
Benzo(a)pyrene	ug/L (ppb)	0.2		0.2 U	
Benzo(g,h,i)perylene	ug/L (ppb)	--		0.2 U	
Chrysene	ug/L (ppb)	--		0.2 U	
Dibenzo(a,h)anthracene	ug/L (ppb)	--		0.2 U	
Fluoranthene	ug/L (ppb)	280		0.2 U	
Fluorene	ug/L (ppb)	280		0.2 U	
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	--		0.2 U	
1-Methylnaphthalene	ug/L (ppb)	--		0.2 U	
2-Methylnaphthalene	ug/L (ppb)			0.2 U	
Naphthalene	ug/L (ppb)	20		0.2 U	
Phenanthrene	ug/L (ppb)	--		0.2 U	
Pyrene	ug/L (ppb)	--		0.2 U	
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)					
Aroclor-1016	ug/L (ppb)	0.5		0.5 U	
Aroclor-1221	ug/L (ppb)	0.5		0.5 U	
Aroclor-1232	ug/L (ppb)	0.5		0.5 U	
Aroclor-1242	ug/L (ppb)	0.5		0.5 U	
Aroclor-1248	ug/L (ppb)	0.5		0.5 U	
Aroclor-1254	ug/L (ppb)	0.5		0.5 U	
Aroclor-1260	ug/L (ppb)	0.5		0.5 U	
Aroclor-1268	ug/L (ppb)	0.5		0.5 U	
PRIORITY POLLUTANT METALS (EPA Methods 245.1/6010/SM3113B)					
Total Antimony	ug/L (ppb)	6.0		2 U	
Total Arsenic	ug/L (ppb)	10.0		**2**	
Total Beryllium	ug/L (ppb)	4.0		2 U	
Total Cadmium	ug/L (ppb)	5.0		3 U	
Total Chromium	ug/L (ppb)	100.0		10 U	
Total Copper	ug/L (ppb)	1,300		10 U	
Total Lead	ug/L (ppb)	15.0		2 U	
Total Mercury	ug/L (ppb)	2.0		1 U	
Total Nickel	ug/L (ppb)	100.0		20 U	
Total Selenium	ug/L (ppb)	50.0		**11**	
Total Silver	ug/L (ppb)			10 U	
Total Thallium	ug/L (ppb)	2.0		1 U	
Total Zinc	ug/L (ppb)	5,000		20 U	

TABLE 4
Groundwater Quality Data: PAH, PCBs, Metals
Moran Center
Burlington, Vermont

MW-14					
Sample Date		VGES	10/1/1999	4/6/2005	1/19/2011
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)					
Acenapthene	ug/L (ppb)	--	10 U		
Acenapthylene	ug/L (ppb)	--	10 U		
Anthracene	ug/L (ppb)	2,100.0	10 U		
Benzo(a)anthracene	ug/L (ppb)	--	10 U		
Benzo(b&k)fluoranthene	ug/L (ppb)	--	10 U		
Benzo(a)pyrene	ug/L (ppb)	0.2	10 U		
Benzo(g,h,i)perylene	ug/L (ppb)	--	10 U		
Chrysene	ug/L (ppb)	--	10 U		
Dibenzo(a,h)anthracene	ug/L (ppb)	--	10 U		
Fluoranthene	ug/L (ppb)	280	10 U		
Fluorene	ug/L (ppb)	280	10 U		
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	--	10 U		
1-Methylnaphthalene	ug/L (ppb)	--	10 U		
2-Methylnaphthalene	ug/L (ppb)		10 U		
Naphthalene	ug/L (ppb)	20	10 U		
Phenanthrene	ug/L (ppb)	--	10 U		
Pyrene	ug/L (ppb)	--	10 U		
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)					
Arochlor-1016	ug/L (ppb)	0.5			
Arochlor-1221	ug/L (ppb)	0.5			
Arochlor-1232	ug/L (ppb)	0.5			
Arochlor-1242	ug/L (ppb)	0.5			
Arochlor-1248	ug/L (ppb)	0.5			
Arochlor-1254	ug/L (ppb)	0.5			
Arochlor-1260	ug/L (ppb)	0.5			
Arochlor-1268	ug/L (ppb)	0.5			
PRIORITY POLLUTANT METALS (EPA Methods 245.1/6010/SM3113B)					
Total Antimony	ug/L (ppb)	6.0	**6**		
Total Arsenic	ug/L (ppb)	10.0	**6**		
Total Beryllium	ug/L (ppb)	4.0	1 U		
Total Cadmium	ug/L (ppb)	5.0	**4.6**		
Total Chromium	ug/L (ppb)	100.0	2 U		
Total Copper	ug/L (ppb)	1,300	50 U		
Total Lead	ug/L (ppb)	15.0	1 U		
Total Mercury	ug/L (ppb)	2.0	1 U		
Total Nickel	ug/L (ppb)	100.0	50 U		
Total Selenium	ug/L (ppb)	50.0	5 U		
Total Silver	ug/L (ppb)		50 U		
Total Thallium	ug/L (ppb)	2.0	5 U		
Total Zinc	ug/L (ppb)	5,000	**90**		

TABLE 4
Groundwater Quality Data: PAH, PCBs, Metals
Moran Center
Burlington, Vermont

MW-10					
Sample Date		VGES	10/1/1999	4/6/2005	1/19/2011
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)					
Acenapthene	ug/L (ppb)	--	10 U		
Acenapthylene	ug/L (ppb)	--	10 U		
Anthracene	ug/L (ppb)	2,100.0	10 U		
Benzo(a)anthracene	ug/L (ppb)	--	10 U		
Benzo(b&k)fluoranthene	ug/L (ppb)	--	10 U		
Benzo(a)pyrene	ug/L (ppb)	0.2	10 U		
Benzo(g,h,i)perylene	ug/L (ppb)	--	10 U		
Chrysene	ug/L (ppb)	--	10 U		
Dibenzo(a,h)anthracene	ug/L (ppb)	--	10 U		
Fluoranthene	ug/L (ppb)	280	10 U		
Fluorene	ug/L (ppb)	280	10 U		
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	--	10 U		
1-Methylnaphthalene	ug/L (ppb)	--	10 U		
2-Methylnaphthalene	ug/L (ppb)		10 U		
Naphthalene	ug/L (ppb)	20	10 U		
Phenanthrene	ug/L (ppb)	--	10 U		
Pyrene	ug/L (ppb)	--	10 U		
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)					
Arochlor-1016	ug/L (ppb)	0.5			
Arochlor-1221	ug/L (ppb)	0.5			
Arochlor-1232	ug/L (ppb)	0.5			
Arochlor-1242	ug/L (ppb)	0.5			
Arochlor-1248	ug/L (ppb)	0.5			
Arochlor-1254	ug/L (ppb)	0.5			
Arochlor-1260	ug/L (ppb)	0.5			
Arochlor-1268	ug/L (ppb)	0.5			
PRIORITY POLLUTANT METALS (EPA Methods 245.1/6010/SM3113B)					
Total Antimony	ug/L (ppb)	6.0	5 U		
Total Arsenic	ug/L (ppb)	10.0	**6**		
Total Beryllium	ug/L (ppb)	4.0	1 U		
Total Cadmium	ug/L (ppb)	5.0	0.5 U		
Total Chromium	ug/L (ppb)	100.0	2 U		
Total Copper	ug/L (ppb)	1,300	50 U		
Total Lead	ug/L (ppb)	15.0	**2**		
Total Mercury	ug/L (ppb)	2.0	1 U		
Total Nickel	ug/L (ppb)	100.0	50 U		
Total Selenium	ug/L (ppb)	50.0	5 U		
Total Silver	ug/L (ppb)		50 U		
Total Thallium	ug/L (ppb)	2.0	**6**		
Total Zinc	ug/L (ppb)	5,000	50 U		

TABLE 4
Groundwater Quality Data: PAH, PCBs, Metals
Moran Center
Burlington, Vermont

MW-A					
Sample Date		VGES	10/1/1999	4/6/2005	12/3/2010
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)					
Acenapthene	ug/L (ppb)	--			0.1 U
Acenapthylene	ug/L (ppb)	--			0.1 U
Anthracene	ug/L (ppb)	2,100.0			0.1 U
Benzo(a)anthracene	ug/L (ppb)	--			0.1 U
Benzo(b&k)fluoranthene	ug/L (ppb)	--			0.1 U
Benzo(a)pyrene	ug/L (ppb)	0.2			0.1 U
Benzo(g,h,i)perylene	ug/L (ppb)	--			0.1 U
Chrysene	ug/L (ppb)	--			0.1 U
Dibenzo(a,h)anthracene	ug/L (ppb)	--			0.1 U
Fluoranthene	ug/L (ppb)	280			0.1 U
Fluorene	ug/L (ppb)	280			0.1 U
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	--			0.1 U
1-Methylnaphthalene	ug/L (ppb)	--			0.1 U
2-Methylnaphthalene	ug/L (ppb)				0.1 U
Naphthalene	ug/L (ppb)	20			0.1 U
Phenanthrene	ug/L (ppb)	--			0.1 U
Pyrene	ug/L (ppb)	--			0.1 U
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)					
Aroclor-1016	ug/L (ppb)	0.5			0.3 U
Aroclor-1221	ug/L (ppb)	0.5			0.3 U
Aroclor-1232	ug/L (ppb)	0.5			0.3 U
Aroclor-1242	ug/L (ppb)	0.5			0.3 U
Aroclor-1248	ug/L (ppb)	0.5			0.3 U
Aroclor-1254	ug/L (ppb)	0.5			0.3 U
Aroclor-1260	ug/L (ppb)	0.5			0.3 U
Aroclor-1268	ug/L (ppb)	0.5			
PRIORITY POLLUTANT METALS (EPA Methods 245.1/6010/SM3113B)					
Total Antimony	ug/L (ppb)	6.0			
Total Arsenic	ug/L (ppb)	10.0			**3**
Total Beryllium	ug/L (ppb)	4.0			
Total Cadmium	ug/L (ppb)	5.0			1 U
Total Chromium	ug/L (ppb)	100.0			**2**
Total Copper	ug/L (ppb)	1,300			
Total Lead	ug/L (ppb)	15.0			**3**
Total Mercury	ug/L (ppb)	2.0			0.1 U
Total Nickel	ug/L (ppb)	100.0			
Total Selenium	ug/L (ppb)	50.0			**6**
Total Silver	ug/L (ppb)				1 U
Total Thallium	ug/L (ppb)	2.0			
Total Zinc	ug/L (ppb)	5,000			

TABLE 4
Groundwater Quality Data: PAH, PCBs, Metals
Moran Center
Burlington, Vermont

MW-201					
Sample Date		VGES	10/1/1999	4/6/2005	1/19/2011
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)					
Aroclor-1016	ug/L (ppb)	0.5			0.3 U
Aroclor-1221	ug/L (ppb)	0.5			0.3 U
Aroclor-1232	ug/L (ppb)	0.5			0.3 U
Aroclor-1242	ug/L (ppb)	0.5			0.3 U
Aroclor-1248	ug/L (ppb)	0.5			0.3 U
Aroclor-1254	ug/L (ppb)	0.5			0.3 U
Aroclor-1260	ug/L (ppb)	0.5			0.3 U
Aroclor-1268	ug/L (ppb)	0.5			

NOTES:
"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value;
VGES = Vermont Groundwater Enforcement Standard (Table 1 of the Groundwater Protection Rule and Strategy 12/05)
Blank spaces indicate data not collected
Results reported above quantitation limits are indicated in bold; values in excess of the VGES are shaded.
2005-2011 samples by WEM; 2005 results have been formally validated.
1999 results from MW-14 and MW-10 were obtained from the report: "Phase II ESA, North 40 - Urban Reserve" prepared b
& Dickenson, May 2000, and these data have not been formally validated.

TABLE 5
Soil Quality Data: VOCs and TPH
Moran Center / Waterfront North
Burlington, Vermont

					Moran Plant									
Sample Location		EPA	EPA	VT DEC	HA-34	HA-35	MW-1	MW-2	MW-3	MW-5	MW-6	SB-9	SB-10	MW-11
Sample Depth Interval (ft)		RSL	RSL	Cleanup Level	0 - 2'	0 - 2'	9-10	9-10	6.5-7.0	7.5-8.5	5.5-6.0	0.8 - 1.3'	5.0 - 5.7'	5.0 - 5.3
Sample Date		Resdential	Industrial	Residential	8/12/99	8/12/99	3/29/05	3/29/05	3/29/05	3/29/05	3/29/05	11/1/05	11/1/05	11/1/05
PETROLEUM VOCs (EPA Method 8260B)														
Benzene	ug/Kg (ppb)	1,100	5,400		10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**27.4**	**93.0**	**75.7**
Toluene	ug/Kg (ppb)	5,000,000	45,000,000		10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**169**	**86.0**	**213**
Ethylbenzene	ug/Kg (ppb)	5,400	27,000		10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**51.7**	**35.2**	**58.2**
Xylenes	ug/Kg (ppb)	630,000	2,700,000		20 U	16 U	20.0 U	18.0 U	34.0 U	22.0 U	26.0 U	**290**	**160**	**269**
1,3,5-Trimethylbenzene	ug/Kg (ppb)	780,000	10,000,000		10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**21.7**	16.0 U	16.0 U
1,2,4-Trimethylbenzene	ug/Kg (ppb)	62,000	260,000		10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**83.9**	**46.9**	**67.6**
Naphthalene	ug/Kg (ppb)	3,600	180,000		10 U	8 U	20.0 U	18.0 U	34.0 U	22.0 U	26.0 U	**105**	**57.1**	**105**
MTBE	ug/Kg (ppb)	43,000	220,000		25 U	20 U	20.0 U	18.0 U	34.0 U	22.0 U	26.0 U	26.0 U	32.0 U	32.0 U
n-Butylbenzene	ug/Kg (ppb)				10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**15.5**	16.0 U	16.0 U
Isopropylbenzene (Cumene)	ug/Kg (ppb)	2,100,000	11,000,000		10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**25.2**	**27.0**	**28.0**
n-Propylbenzene	ug/Kg (ppb)				10 U	8 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	**34.7**	**37.4**	**40.1**
TOTAL REPORTED PETROLEUM VOCS	ug/Kg (ppb)				*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	***824***	***543***	***857***
NON-PETROLEUM VOCs (EPA Method 8260B)														
Tetrachloroethane (PCE)	ug/Kg (ppb)	550	2,600		10 U	8 U	10.0 U	9.0 U	**222.**	11.0 U	13.0 U	13.0 U	16.0 U	13.0 U
Trichloroethane (TCE)	ug/Kg (ppb)	2,800	14,000		10 U	8 U	10.0 U	9.0 U	**253.**	11.0 U	13.0 U	13.0 U	16.0 U	13.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	160,000	2,000,000		25 U	20 U	10.0 U	9.0 U	**36.4**	11.0 U	13.0 U	13.0 U	16.0 U	13.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	150,000	690,000		25 U	20 U	10.0 U	9.0 U	17.0 U	11.0 U	13.0 U	13.0 U	16.0 U	13.0 U
Vinyl Chloride (VC)	ug/Kg (ppb)	60	1,700		25 U	20 U	20.0 U	18.0 U	34.0 U	22.0 U	26.0 U	26.0 U	32.0 U	26.0 U
1,1-Dichloroethane (1,1-DCA)	ug/Kg (ppb)	3,300	17,000		25 U	20 U	10.0 U	**33.8**	17.0 U	11.0 U	13.0 U	13.0 U	16.0 U	13.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/Kg (ppb)	8,700,000	38,000,000		25 U	20 U	10.0 U	**14.5**	**32.4**	11.0 U	13.0 U	**30.8**	16.0 U	**309**
1,4-Dichlorobenzene (1,4-DCB)	ug/Kg (ppb)	2,400	120,000				**12.9**	9.0 U	17.0 U	11.0 U	13.0 U	13.0 U	16.0 U	13.0 U
Acetone	ug/Kg (ppb)	61,000,000	630,000,000				10.0 U	90.0 U	170 U	110 U	130 U	130 U	160 U	160 U
2-Butanone	ug/Kg (ppb)	28,000,000	200,000,000				100 U	90.0 U	170 U	110 U	130 U	130 U	160 U	160 U
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE (TPH-DRO)														
TPH-DRO	mg/Kg (ppm)	--	--	200										

NOTES:
1. "U" = not detected above listed reporting limit; "J" = reported concentration is estimated value below reporting limit; "JB" = reported concentration is estimated value due to detection of compound in method blank.
2. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 2010).
3. Vermont Department of Health (VT DOH) Risk Based-Residential Screening Levels (RB-RSC) are from VT DOH memorandum to the VT DEC, May 22, 2006.
4. VT DEC Cleanup Level for TPH from Memo fronm Richard Spiese, December 30, 1992.
5. EPA Method 8260B compounds not shown were not detected.
6. Results reported above the method detection lmit are indicated in bold.
7. Shaded results are above guideline.

TABLE 5
Soil Quality Data: VOCs and TPH
Moran Center / Waterfront North
Burlington, Vermont

					Moran Plant										
Sample Location		EPA	EPA	VT DEC	MW-12	MW-12	MW-12	MW-12	SB-19B	SB-20B	SB-21B	SB-22B	SB-23B	SB-24B	SB-25B
Sample Depth Interval (ft)		RSL	RSL	Cleanup Level	1.0 - 1.6'	10'	20'	44'	5-8'	5-8'	5-8'	5-8'	5-8'	5-8'	5-8'
Sample Date		Resdential	Industrial	Residential	11/1/05	11/1/05	11/1/05	11/1/05	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09
PETROLEUM VOCs (EPA Method 8260B)															
Benzene	ug/Kg (ppb)	1,100	5,400		19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Toluene	ug/Kg (ppb)	5,000,000	45,000,000		**60.6**	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Ethylbenzene	ug/Kg (ppb)	5,400	27,000		**30.9**	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Xylenes	ug/Kg (ppb)	630,000	2,700,000		**195**	40.0 U	40.0 U	38.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,3,5-Trimethylbenzene	ug/Kg (ppb)	780,000	10,000,000		**25.7**	20.0 U	20.0 U	**44.6**	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,2,4-Trimethylbenzene	ug/Kg (ppb)	62,000	260,000		**90.7**	20.0 U	20.0 U	**62.0**	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Naphthalene	ug/Kg (ppb)	3,600	180,000		**153**	40.0 U	40.0 U	38.0 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
MTBE	ug/Kg (ppb)	43,000	220,000		38.0 U	40.0 U	40.0 U	38.0 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
n-Butylbenzene	ug/Kg (ppb)				19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Isopropylbenzene (Cumene)	ug/Kg (ppb)	2,100,000	11,000,000		**25.0**	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
n-Propylbenzene	ug/Kg (ppb)				**24.8**	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
TOTAL REPORTED PETROLEUM VOCS	ug/Kg (ppb)				***606***	*ND*	*ND*	***107***	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
NON-PETROLEUM VOCs (EPA Method 8260B)															
Tetrachloroethane (PCE)	ug/Kg (ppb)	550	2,600		19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Trichloroethane (TCE)	ug/Kg (ppb)	2,800	14,000		19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	160,000	2,000,000		19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	150,000	690,000		19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Vinyl Chloride (VC)	ug/Kg (ppb)	60	1,700		38.0 U	40.0 U	40.0 U	26.0 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,1-Dichloroethane (1,1-DCA)	ug/Kg (ppb)	3,300	17,000		19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/Kg (ppb)	8,700,000	38,000,000		**26.3**	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,4-Dichlorobenzene (1,4-DCB)	ug/Kg (ppb)	2,400	120,000		19.0 U	20.0 U	20.0 U	19.0 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acetone	ug/Kg (ppb)	61,000,000	630,000,000		190 U	200 U	200 U	190 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
2-Butanone	ug/Kg (ppb)	28,000,000	200,000,000		190 U	200 U	200 U	190 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE (TPH-DRO)															
TPH-DRO	mg/Kg (ppm)	--	--	200											

NOTES:
1. "U" = not detected above listed reporting limit; "J" = reported concentration is estimated value below reporting limit; "JB" = reported concentration is estimated value due to detection of compound in method blank.
2. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 2010).
3. Vermont Department of Health (VT DOH) Risk Based-Residential Screening Levels (RB-RSC) are from VT DOH memorandum to the VT DEC, May 22, 2006.
4. VT DEC Cleanup Level for TPH from Memo fronm Richard Spiese, December 30, 1992.
5. EPA Method 8260B compounds not shown were not detected.
6. Results reported above the method detection lmit are indicated in bold.
7. Shaded results are above guideline.

WEM

TABLE 5
Soil Quality Data: VOCs and TPH
Moran Center / Waterfront North
Burlington, Vermont

					Transformer Yard			*Sailing Center*			*Waterfront North*						
Sample Location		EPA	EPA	VT DEC	SB-205S	SB-206D	SB-210D	DB-101D	DB-102D	SB-103*	GD-3B	GD-6B	GD-10B	GD-12B	GD-13B	GD-16A	GD-24B
Sample Depth Interval (ft)		RSL	RSL	Cleanup Level	1.0'	5.0'	5.0'	4-6'	4-6'	0-1'	4-6'	6-8'	6-8'	4-6'	6-8'	0.5-1.0'	6-8'
Sample Date		Resdential	Industrial	Residential	1/19/2011	1/19/2011	1/19/2011	8/12/10	8/12/10	8/12/10	9/1/2009	8/31/2009	8/31/2009	9/1/2009	8/31/2009	8/31/2009	9/1/2009
PETROLEUM VOCs (EPA Method 8260B)																	
Benzene	ug/Kg (ppb)	1,100	5,400					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
Toluene	ug/Kg (ppb)	5,000,000	45,000,000					5.0 U	5.4 U	**0.80** J	390 U	850 U		5.0 U	4.7 U	6.1 J	5.2 U
Ethylbenzene	ug/Kg (ppb)	5,400	27,000					5.0 U	5.4 U	**0.09** J	390 U	**1,200**		5.0 U	4.7 U	**1.4** J	**1.4** J
Xylenes	ug/Kg (ppb)	630,000	2,700,000					5.0 U	5.4 U	5.4 U	**120** J	**7,600**		**1.8** J	**1.1** J	**6.6**	**6.7**
1,3,5-Trimethylbenzene	ug/Kg (ppb)	780,000	10,000,000					5.0 U	5.4 U	5.4 U	390 U	**42,000**		5.0 U	4.7 U	6.1 U	**0.99** J
1,2,4-Trimethylbenzene	ug/Kg (ppb)	62,000	260,000					5.0 U	5.4 U	**0.44** J	**5,200**	**84,000**		5.0 U	4.7 U	**1.4** J	**2.2** J
Naphthalene	ug/Kg (ppb)	3,600	180,000					**0.71** JB	**0.55** JB	**1.1** JB	390 U	**490** JB		5.0 U	4.7 U	**3.0** JB	**2.2** JB
MTBE	ug/Kg (ppb)	43,000	220,000					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
n-Butylbenzene	ug/Kg (ppb)							5.0 U	5.4 U	**0.30** J	**1,100**	**1,100**		5.0 U	4.7 U	6.1 U	5.2 U
Isopropylbenzene (Cumene)	ug/Kg (ppb)	2,100,000	11,000,000					5.0 U	5.4 U	5.4 U	**120** J	**3,400**		5.0 U	4.7 U	6.1 U	5.2 U
n-Propylbenzene	ug/Kg (ppb)							5.0 U	5.4 U	5.4 U	**300** J	**25,000**		5.0 U	4.7 U	6.1 U	5.2 U
TOTAL REPORTED PETROLEUM VOCS	ug/Kg (ppb)							***0.7*** *J*	***0.6*** *J*	***2.7*** *J*	***6,840***	***164,790***		***1.8*** *J*	***1.1*** *J*	***12.4*** *J*	***13.5*** *J*
NON-PETROLEUM VOCs (EPA Method 8260B)																	
Tetrachloroethane (PCE)	ug/Kg (ppb)	550	2,600					5.0 U	5.4 U	**1.6** J	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
Trichloroethane (TCE)	ug/Kg (ppb)	2,800	14,000					5.0 U	5.4 U	**0.90** J	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	160,000	2,000,000					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	150,000	690,000					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
Vinyl Chloride (VC)	ug/Kg (ppb)	60	1,700					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
1,1-Dichloroethane (1,1-DCA)	ug/Kg (ppb)	3,300	17,000					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/Kg (ppb)	8,700,000	38,000,000					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
1,4-Dichlorobenzene (1,4-DCB)	ug/Kg (ppb)	2,400	120,000					5.0 U	5.4 U	5.4 U	390 U	850 U		5.0 U	4.7 U	6.1 U	5.2 U
Acetone	ug/Kg (ppb)	61,000,000	630,000,000					**15**	**12**	**58**	390 U	850 U		**30**	**17**	**18**	**6.9**
2-Butanone	ug/Kg (ppb)	28,000,000	200,000,000					5.0 U	5.4 U	**6.1**	390 U	850 U		**4.1** J	4.7 U	6.1 U	5.2 U
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE (TPH-DRO)																	
TPH-DRO	mg/Kg (ppm)	--	--	200	**86**	**6,200**	8 U	8.3 U		**16**	**6,900**	**130**	**1,900**	**190**			

NOTES:
1. "U" = not detected above listed reporting limit; "J" = reported concentration is estimated value below reporting limit; "JB" = reported concentration is estimated value due to detection of compound in method blank.
2. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 2010).
3. Vermont Department of Health (VT DOH) Risk Based-Residential Screening Levels (RB-RSC) are from VT DOH memorandum to the VT DEC, May 22, 2006.
4. VT DEC Cleanup Level for TPH from Memo fronm Richard Spiese, December 30, 1992.
5. EPA Method 8260B compounds not shown were not detected.
6. Results reported above the method detection lmit are indicated in bold.
7. Shaded results are above guideline.

TABLE 6
Soil Quality Data: PAHs
Moran Center Waterfront North
Burlington, Vermont

RAW DATA

				Moran Plant											
Sample Location	Units	EPA	EPA	HA-34	HA-35	MW-1	MW-2	MW-3	MW-5	MW-6	MW-8	SB-9	MW-11	MW-12	SS-1
Sample Depth Interval (ft)		RSL	RSL	0 - 2'	0 - 2'	0.5	0.5	0.67	0.5	0.5	0.63'	0.58'	0.63'	0.54'	0.5'
Sample Date		Resdential	Industrial	8/12/99	8/12/99	3/29/05	3/29/05	3/29/05	3/29/05	3/29/05	11/1/05	11/1/05	11/1/05	11/1/05	11/3/05
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)															
Acenaphthene	ug/Kg (ppb)	3,400,000	33,000,000	350 U	350 U	**609.**	153. U	**1,480.**	76.0 U	84.0 U	**125.**	72.0 U	76.0 U	69.0 U	71.0 UJ
Anthracene	ug/Kg (ppb)	17,000,000	170,000,000	350 U	350 U	**1,170.**	153. U	**2,910.**	76.0 U	84.0 U	**456.**	72.0 U	**89.6**	69.0 U	71.0 UJ
Benzo(a)anthracene	ug/Kg (ppb)	150	2,100	350 U	350 U	**2,810.**	153. U	**5,850.**	**147.**	84.0 U	**1,630.**	72.0 U	**309.**	69.0 U	**102.** J
Benzo(b&k)fluoranthene	ug/Kg (ppb)	150	2,100	350 U	350 U	**4,110.**	**288.**	**9,250.**	**189.**	84.0 U	**2,860.**	**89.5**	**562.**	69.0 U	**217.** J
Benzo(a)pyrene	ug/Kg (ppb)	15	210	350 U	350 U	**2,380.**	153. U	**4,350.**	**77.9**	84.0 U	**1,590.**	72.0 U	**250.**	69.0 U	**123.** J
Benzo(g,h,i)perylene	ug/Kg (ppb)	--	--	350 U	350 U	**1,490.**	153. U	**3,570.**	**80.1**	84.0 U	**844.**	72.0 U	**180.**	69.0 U	**90.0** J
Chrysene	ug/Kg (ppb)	15,000	210,000	350 U	350 U	**2,330.**	**275.**	**6,490.**	**229.**	84.0 U	**1,500.**	72.0 U	**286.**	69.0 U	**118.** J
Dibenzo(a,h)anthracene	ug/Kg (ppb)	15	210	350 U	350 U	**422.**	153. U	**1,030.**	76.0 U	84.0 U	**443.**	72.0 U	**78.3**	69.0 U	71.0 UJ
Fluoranthene	ug/Kg (ppb)	2,300,000	22,000,000	350 U	350 U	**5,150.**	153. U	**11,000.**	**175.**	84.0 U	**3,840.**	**79.3**	**623.**	69.0 U	**214.** J
Fluorene	ug/Kg (ppb)	2,300,000	22,000,000	350 U	350 U	**502.**	153. U	**1,280.**	**76.7**	84.0 U	**145.**	72.0 U	76.0 U	69.0 U	71.0 UJ
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	150	2,100	350 U	350 U	**1,410.**	153. U	**3,640.**	76.0 U	84.0 U	**839.**	72.0 U	**152.**	69.0 U	**74.9** J
1-Methylnaphthalene	ug/Kg (ppb)	22,000	99,000	350 U	350 U	**121.**	**1,510.**	**274.**	**2,010.**	84.0 U	77. U	**75.3**	**257.**	69.0 U	71.0 UJ
2-Methylnaphthalene	ug/Kg (ppb)	310,000	4,100,000	350 U	350 U	**129.**	**2,370.**	**295.**	**2,450.**	84.0 U	77. U	**82.6**	**253.**	69.0 U	71.0 UJ
Naphthalene	ug/Kg (ppb)	3,600	180,000	350 U	350 U	**204.**	**1,070.**	**539.**	**1,670.**	84.0 U	77. U	72.0 U	**94.9**	69.0 U	71.0 UJ
Phenanthrene	ug/Kg (ppb)	--	--	350 U	350 U	**3,810.**	**1,050.**	**9,960.**	**1,030.**	84.0 U	**1,990.**	**74.6**	**538.**	69.0 U	**103.** J
Pyrene	ug/Kg (ppb)	1,700,000	17,000,000	350 U	350 U	**4,610.**	**208.**	**9,600.**	**186.**	84.0 U	**3,310.**	**80.8**	**558.**	69.0 U	**180.** J
TOTAL REPORTED PAHS	*ug/Kg (ppb)*			ND	ND	**31,257.**	**6,771.**	**71,518.**	**8,321.**	ND	**19,572.**	**482.**	**4,231.**	ND	**1,222.** J

BENZO(A)PYRENE TOXICITY EQUIVALENCE

				Moran Plant											
Sample Location	Units	TEF	EPA	HA-34	HA-35	MW-1	MW-2	MW-3	MW-5	MW-6	MW-8	SB-9	MW-11	MW-12	SS-1
Sample Depth Interval (ft)			RSL	0 - 2'	0 - 2'	0.5	0.5	0.67	0.5	0.5	0.63'	0.58'	0.63'	0.54'	0.5'
Sample Date			Residential	8/12/99	8/12/99	3/29/05	3/29/05	3/29/05	3/29/05	3/29/05	11/1/05	11/1/05	11/1/05	11/1/05	11/3/05
Benzo(a)anthracene	ug/Kg (ppb)	0.1		ND	ND	**281.**	ND	**585.**	**15.**	ND	**163.**	ND	**31.**	ND	**10.**
Benzo(b&k) fluoranthene	ug/Kg (ppb)	0.1		ND	ND	**411.**	**29.**	**925.**	**19.**	ND	**286.**	**9.**	**56.**	ND	**22.**
Benzo(a)pyrene	ug/Kg (ppb)	1.0		ND	ND	**2,380.**	ND	**4,350.**	**78.**	ND	**1,590.**	ND	**250.**	ND	**123.**
Chrysene	ug/Kg (ppb)	0.001		ND	ND	**2.3**	**0.3**	**6.5**	**0.2**	ND	**1.5**	ND	**0.3**	ND	**0.1**
Dibenzo(a,h)anthracene	ug/Kg (ppb)	1.0		ND	ND	**422.**	ND	**1,030.**	ND	ND	**443.**	ND	**78.**	ND	ND
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	0.1		ND	ND	**141.**	ND	**364.**	ND	ND	**84.**	ND	**15.**	ND	**7.**
B(a)P-TE	ug/Kg (ppb)		15	ND	ND	**3,637.**	**29.**	**7,260.**	**112.**	ND	**2,567.**	**9.**	**431.**	ND	**163.** J

NOTES:
1. "U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported detection limit is estimated; "NT" = compound not tested.
2. TEF = Toxicity Equivalence Factor
3. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 2010)
4. Vermont Department of Health (VT DOH) Risk Based-Residential Screening Levels (RB-RSC) are from VT DOH memorandum to the VT DEC, May 22, 2006.
5. Results reported above method detection limits are indicated in bold.
6. Values greater than the EPA Residential RSL are shaded.

TABLE 6
Soil Quality Data: PAHs
Moran Center Waterfront North
Burlington, Vermont

RAW DATA

				Moran Plant											
Sample Location	Units	EPA	EPA	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SB-15	SB-16	SB-17	SB-18	SB-19A	SB-20A
Sample Depth Interval (ft)		RSL	RSL	0.67'	0.5'	0.42	0.5'	0.5'	0.5'	0-3'	0-3'	0-3'	0-3'	0-3'	0-3'
Sample Date		Resdential	Industrial	11/3/05	11/3/05	11/3/05	11/3/05	11/3/05	11/3/05	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)															
Acenaphthene	ug/Kg (ppb)	3,400,000	33,000,000	**181.**	75.0 UJ	72.0 UJ	75.0 UJ	80.0 UJ	73.0 UJ	**52**	**10**	7 U	**8**	8 U	**9**
Anthracene	ug/Kg (ppb)	17,000,000	170,000,000	**398.**	75.0 UJ	72.0 UJ	75.0 UJ	80.0 UJ	73.0 UJ	**45**	**33**	**9**	**11**	8 U	**21**
Benzo(a)anthracene	ug/Kg (ppb)	150	2,100	**774.**	**138.** J	72.0 UJ	75.0 UJ	**100.** J	73.0 UJ	**190**	**76**	**22**	**44**	**22**	**140**
Benzo(b&k)fluoranthene	ug/Kg (ppb)	150	2,100	**1,440.**	**343.** J	**124.** J	**99.6** J	**282.** J	**93.5** J	**295**	**124**	**36**	**95**	**43**	**253**
Benzo(a)pyrene	ug/Kg (ppb)	15	210	**763.**	**186.** J	**86.2** J	75.0 UJ	**150.** J	73.0 UJ	**150**	**60**	**17**	**42**	**18**	**84**
Benzo(g,h,i)perylene	ug/Kg (ppb)	--	--	**546.**	**184.** J	**149.** J	**103.** J	**213.** J	73.0 UJ	**100**	**24**	7 U	**15**	**19**	**86**
Chrysene	ug/Kg (ppb)	15,000	210,000	**743.**	**160.** J	72.0 UJ	75.0 UJ	**135.** J	73.0 UJ	**230**	**90**	**26**	**54**	**36**	**150**
Dibenzo(a,h)anthracene	ug/Kg (ppb)	15	210	**234.**	**86.6** J	72.0 UJ	75.0 J	**158.** J	73.0 UJ	**25**	**9**	7 U	8 U	8 U	**19**
Fluoranthene	ug/Kg (ppb)	2,300,000	22,000,000	**1,580.**	**210.** J	**82.9** J	75.0 J	**127.** J	**83.7** J	**270**	**140**	**32**	8 U	**37**	**170**
Fluorene	ug/Kg (ppb)	2,300,000	22,000,000	**170.**	75.0 UJ	72.0 UJ	75.0 J	80.0 UJ	73.0 UJ	**62**	**13**	7 U	**25**	8 U	**24**
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	150	2,100	**462.**	**140.** J	**75.4** J	75.0 J	**176.** J	73.0 UJ	**110**	**31**	**8**	**20**	**18**	**79**
1-Methylnaphthalene	ug/Kg (ppb)	22,000	99,000	**124.**	**109.** J	72.0 UJ	**101.** UJ	**323.** J	73.0 UJ	NT	NT	NT	NT	NT	NT
2-Methylnaphthalene	ug/Kg (ppb)	310,000	4,100,000	**93.5**	**76.9** J	72.0 UJ	**90.7** UJ	**285.** J	73.0 UJ	**1,400**	**200**	**64**	**78**	**140**	**600**
Naphthalene	ug/Kg (ppb)	3,600	180,000	**77.3**	75.0 UJ	72.0 UJ	75.0 UJ	**115.** J	73.0 UJ	**1,100**	**140**	**43**	**52**	**57**	**380**
Phenanthrene	ug/Kg (ppb)	--	--	**1,330.**	**116.** J	72.0 UJ	**90.0** UJ	**300.** J	**73.9** J	**730**	**200**	**59**	**120**	**98**	**450**
Pyrene	ug/Kg (ppb)	1,700,000	17,000,000	**1,270.**	**202.** J	**96.5** J	75.0 UJ	**130.** J	73.0 UJ	**280**	**100**	**26**	**68**	**36**	**170**
TOTAL REPORTED PAHS	*ug/Kg (ppb)*			**10,186.**	**1,952.** J	**614.** J	**484.** J	**2,494.** J	**251.** J	**5,039**	**1,250**	**342**	**632**	**524**	**2,635**

BENZO(A)PYRENE TOXICITY EQUIVALENCE

				Moran Plant											
Sample Location	Units		EPA	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SB-15	SB-16	SB-17	SB-18	SB-19A	SB-20A
Sample Depth Interval (ft)		TEF	RSL	0.67'	0.5'	0.42	0.5'	0.5'	0.5'	0-3'	0-3'	0-3'	0-3'	0-3'	0-3'
Sample Date			Residential	11/3/05	11/3/05	11/3/05	11/3/05	11/3/05	11/3/05	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09
Benzo(a)anthracene	ug/Kg (ppb)	0.1		**77.**	**14.**	ND	ND	**10.**	ND	**19**	**8**	**2**	**4**	**2**	**14**
Benzo(b&k) fluoranthene	ug/Kg (ppb)	0.1		**144.**	**34.**	**12.**	**10.**	**28.**	**9.**	**30**	**12**	**4**	**10**	**4**	**25**
Benzo(a)pyrene	ug/Kg (ppb)	1.0		**763.**	**186.**	**86.**	ND	**150.**	ND	**150**	**60**	**17**	**42**	**18**	**84**
Chrysene	ug/Kg (ppb)	0.001		**0.7**	**0.2**	ND	ND	**0.1**	ND	**0.2**	**0.1**	**0.03**	**0.1**	**0.04**	**0.2**
Dibenzo(a,h)anthracene	ug/Kg (ppb)	1.0		**234.**	**87.**	ND	ND	**158.**	ND	**25**	**9**	ND	ND	ND	**19**
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	0.1		**46.**	**14.**	**8.**	ND	**18.**	ND	**11**	**3**	**1**	**2**	**2**	**8**
B(a)P-TE	ug/Kg (ppb)		15	**1,265.**	**335.**	**106.** J	**10.** J	**364.** J	**9.** J	**235**	**92**	**24**	**58**	**26**	**150**

NOTES:
1. "U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported detection limit is estimated; "NT" = compound not tested.
2. TEF = Toxicity Equivalence Factor
3. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 20
4. Vermont Department of Health (VT DOH) Risk Based-Residential Screening Levels (RB-RSC) are from VT DOH memorandum to the VT DEC, May 22, 2006.
5. Results reported above method detection limits are indicated in bold.
6. Values greater than the EPA Residential RSL are shaded.

TABLE 6
Soil Quality Data: PAHs
Moran Center Waterfront North
Burlington, Vermont

RAW DATA

				Moran Plant					*Sailing Center*						
Sample Location	Units	EPA	EPA	SB-21A	SB-22A	SB-23A	SB-24A	SB-25A	DB-101S	DB-102S	DB-102D	SB-103	SB-104	SB-105	SB-106
Sample Depth Interval (ft)		RSL	RSL	0-3'	0-3'	0-3'	0-3'	0-3'	0-1'	0-1'	4-6'	0-1'	0-1'	0-1'	0-1'
Sample Date		Resdential	Industrial	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)															
Acenaphthene	ug/Kg (ppb)	3,400,000	33,000,000	**11**	8 U	7 U	8 U	8 U	470 U	470 U	340 U	430 U	**25** J	410 U	440 U
Anthracene	ug/Kg (ppb)	17,000,000	170,000,000	**14**	8 U	**19**	8 U	8 U	470 U	470 U	340 U	430 U	**61** J	410 U	**20** J
Benzo(a)anthracene	ug/Kg (ppb)	150	2,100	**72**	**34**	**69**	**12**	8 U	470 U	**35** J	340 U	430 U	**200** J	**29** J	**79** J
Benzo(b&k)fluoranthene	ug/Kg (ppb)	150	2,100	**90**	**42**	**156**	**34**	8 U	470 U	**34** J	340 U	430 U	**440** J	**44** J	**280** J
Benzo(a)pyrene	ug/Kg (ppb)	15	210	**43**	**23**	**70**	**12**	8 U	470 U	470 U	340 U	430 U	**190** J	410 U	440 U
Benzo(g,h,i)perylene	ug/Kg (ppb)	--	--	**52**	**20**	**57**	8 U	8 U	470 U	**19** J	340 U	430 U	**73** J	410 U	**37** J
Chrysene	ug/Kg (ppb)	15,000	210,000	**100**	**50**	**100**	**19**	8 U	470 U	**62** J	340 U	430 U	**230** J	**35** J	**200** J
Dibenzo(a,h)anthracene	ug/Kg (ppb)	15	210	**15**	8 U	**17**	8 U	8 U	470 U	470 U	340 U	430 U	400 U	410 U	440 U
Fluoranthene	ug/Kg (ppb)	2,300,000	22,000,000	**73**	**42**	**130**	**25**	8 U	470 U	**59** J	340 U	**17** J	**380** J	**27** J	**340** J
Fluorene	ug/Kg (ppb)	2,300,000	22,000,000	**33**	8 U	7 U	8 U	8 U	470 U	470 U	340 U	430 U	**24** J	410 U	440 U
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	150	2,100	**41**	**20**	**78**	**9**	8 U	470 U	470 U	340 U	430 U	400 U	410 U	440 U
1-Methylnaphthalene	ug/Kg (ppb)	22,000	99,000	NT	NT	NT	NT	NT	470 U	**150** J	340 U	430 U	**73** J	410 U	**150** J
2-Methylnaphthalene	ug/Kg (ppb)	310,000	4,100,000	**540**	**61**	**41**	8 U	8 U	470 U	**150** J	340 U	430 U	**76** J	410 U	**130** J
Naphthalene	ug/Kg (ppb)	3,600	180,000	**330**	**36**	**31**	8 U	8 U	470 U	**56** J	340 U	430 U	**34** J	410 U	**57** J
Phenanthrene	ug/Kg (ppb)	--	--	**340**	**79**	**94**	**17**	8 U	470 U	**140** J	340 U	430 U	**280** J	**16** J	**340** J
Pyrene	ug/Kg (ppb)	1,700,000	17,000,000	**84**	**38**	**100**	**18**	8 U	470 U	**48** J	340 U	**19** J	**330** J	**29** J	**210** J
TOTAL REPORTED PAHS	*ug/Kg (ppb)*			**1,838**	**445**	**962**	**146**	*ND*	*ND*	**753** J	*ND*	**36** J	**2,416** J	**180** J	**1,843**

BENZO(A)PYRENE TOXICITY EQUIVALENCE

				Moran Plant					*Sailing Center*						
Sample Location	Units		EPA	SB-21A	SB-22A	SB-23A	SB-24A	SB-25A	DB-101S	DB-102S	DB-102D	SB-103	SB-104	SB-105	SB-106
Sample Depth Interval (ft)		TEF	RSL	0-3'	0-3'	0-3'	0-3'	0-3'	0-1'	0-1'	4-6'	0-1'	0-1'	0-1'	0-1'
Sample Date			Residential	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10
Benzo(a)anthracene	ug/Kg (ppb)	0.1		**7**	**3**	**7**	**1**	ND	ND	**4** J	ND	ND	**20** J	**3** J	**8** J
Benzo(b&k) fluoranthene	ug/Kg (ppb)	0.1		**9**	**4**	**16**	**3**	ND	ND	**3** J	ND	ND	**44** J	**4** J	**28** J
Benzo(a)pyrene	ug/Kg (ppb)	1.0		**43**	**23**	**70**	**12**	ND	ND	ND	ND	ND	**190** J	ND	ND
Chrysene	ug/Kg (ppb)	0.001		**0.1**	**0.1**	**0.1**	**0.02**	ND	ND	**0.1** J	ND	ND	**0.23** J	**0.04** J	**0.2** J
Dibenzo(a,h)anthracene	ug/Kg (ppb)	1.0		**15**	ND	**17**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	0.1		**4**	**2**	**8**	**1**	ND	ND	ND	ND	ND	ND	ND	ND
B(a)P-TE	ug/Kg (ppb)		15	**78**	**33**	**117**	**18**	*ND*	*ND*	**7** J	*ND*	*ND*	**254** J	**7** J	**36** J

NOTES:
1. "U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported detection limit is estimated; "NT" = compound not tested.
2. TEF = Toxicity Equivalence Factor
3. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 20
4. Vermont Department of Health (VT DOH) Risk Based-Residential Screening Levels (RB-RSC) are from VT DOH memorandum to the VT DEC, May 22, 2006.
5. Results reported above method detection limits are indicated in bold.
6. Values greater than the EPA Residential RSL are shaded.

TABLE 6
Soil Quality Data: PAHs
Moran Center Waterfront North
Burlington, Vermont

RAW DATA

				Waterfront North								
Sample Location	Units	EPA	EPA	GD-4A	GD-9A	GD-12A	GD-13A	GD-14A	GD-18A	GD-19A	GD-21A	GD-24A
Sample Depth Interval (ft)		RSL	RSL	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'
Sample Date		Resdential	Industrial	9/1/09	9/1/09	9/1/09	8/31/09	8/31/09	9/1/09	8/31/09	9/1/09	9/1/09
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)												
Acenaphthene	ug/Kg (ppb)	3,400,000	33,000,000	**19** J	390 U	**88** J	**200** J	**82** J	**360** J	350 U	**56** J	**120** J
Anthracene	ug/Kg (ppb)	17,000,000	170,000,000	**150** J	**63** J	**200** J	**260**	**220** J	**18** J	350 U	**340** J	**1,800**
Benzo(a)anthracene	ug/Kg (ppb)	150	2,100	**630**	**220** J	**680**	**990**	**810**	**86** J	**52** J	**2,300**	**4,900**
Benzo(b&k)fluoranthene	ug/Kg (ppb)	150	2,100	**2,030**	**1,020** J	**2,500**	**3,800**	**3,400**	**320** J	**178** J	**10,000**	**14,100**
Benzo(a)pyrene	ug/Kg (ppb)	15	210	**880**	**260** J	**840**	**1,300**	**1,100**	**97** J	**67** J	**3,100**	**5,300**
Benzo(g,h,i)perylene	ug/Kg (ppb)	--	--	**510**	**75**	**360**	**380**	**250** J	**39** J	**30** J	**1,100**	**2,300**
Chrysene	ug/Kg (ppb)	15,000	210,000	**810**	**370** J	**880**	**1,200**	**1,100**	**140** J	**81** J	**3,300**	**5,400**
Dibenzo(a,h)anthracene	ug/Kg (ppb)	15	210	**170** J	**25** J	**92** J	**120** J	**84** J	360 U	350 U	**340** J	**830**
Fluoranthene	ug/Kg (ppb)	2,300,000	22,000,000	**1,300**	**440**	**1,800**	**1,900**	**1,800**	**160** J	**89** J	**4,900**	**12,000**
Fluorene	ug/Kg (ppb)	2,300,000	22,000,000	**61** J	**18** J	**120** J	**160** J	**120** J	360 U	350 U	**61** J	**710**
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	150	2,100	**420**	**69** J	**280** J	**320** J	**230** J	**36** J	**28** J	**950**	**2,100**
1-Methylnaphthalene	ug/Kg (ppb)	22,000	99,000	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Methylnaphthalene	ug/Kg (ppb)	310,000	4,100,000	**55** J	**69** J	**300** J	**80** J	**89** J	**250** J	**41** J	**280** J	**61** J
Naphthalene	ug/Kg (ppb)	3,600	180,000	**17** J	**40** J	**150** J	**120** J	**88** J	**170** J	**21** J	**270** J	**61** J
Phenanthrene	ug/Kg (ppb)	--	--	**620**	**180** J	**850**	**1,300**	**1,200**	**170** J	**55** J	**1,500**	**5,900**
Pyrene	ug/Kg (ppb)	1,700,000	17,000,000	**2,600**	**480**	**1,700**	**1,600**	**1,400**	**160** J	**77** J	**3,800**	**8,800**
TOTAL REPORTED PAHS	*ug/Kg (ppb)*			**10,272** J	**3,329** J	**10,840** J	**13,730** J	**11,973** J	**2,006** J	**719** J	**32,297** J	**64,382** J

BENZO(A)PYRENE TOXICITY EQUIVALENCE

				Waterfront North								
Sample Location	Units	TEF	EPA	GD-4A	GD-9A	GD-12A	GD-13A	GD-14A	GD-18A	GD-19A	GD-21A	GD-24A
Sample Depth Interval (ft)			RSL	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'
Sample Date			Residential	9/1/09	9/1/09	9/1/09	8/31/09	8/31/09	9/1/09	8/31/09	9/1/09	9/1/09
Benzo(a)anthracene	ug/Kg (ppb)	0.1		**63**	**22** J	**68**	**99**	**81**	**9** J	**5** J	**230**	**490**
Benzo(b&k) fluoranthene	ug/Kg (ppb)	0.1		**203**	**102** J	**250**	**380**	**340**	**32** J	**18** J	**1,000**	**1,410**
Benzo(a)pyrene	ug/Kg (ppb)	1.0		**880**	**260** J	**840**	**1,300**	**1,100**	**97** J	**67** J	**3,100**	**5,300**
Chrysene	ug/Kg (ppb)	0.001		**0.8**	**0.4** J	**0.9**	**1.2**	**1.1**	**0.1** J	**0.1** J	**3.3**	**5.4**
Dibenzo(a,h)anthracene	ug/Kg (ppb)	1.0		**170** J	**25** J	**92** J	**120** J	**84** J	ND	ND	**340** J	**830**
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	0.1		**42**	**7** J	**28**	**32** J	**23** J	**4** J	**3** J	**95**	**210**
B(a)P-TE	ug/Kg (ppb)		15	**1,359** J	**416** J	**1,279** J	**1,932** J	**1,629** J	**141** J	**93** J	**4,768** J	**8,245** J

NOTES:
1. "U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported detection limit is estimated; "NT" = compound not tested.
2. TEF = Toxicity Equivalence Factor
3. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 20
4. Vermont Department of Health (VT DOH) Risk Based-Residential Screening Levels (RB-RSC) are from VT DOH memorandum to the VT DEC, May 22, 2006.
5. Results reported above method detection limits are indicated in bold.
6. Values greater than the EPA Residential RSL are shaded.

WEM

TABLE 7
Soil Quality Data: PCBs
Moran Center / Waterfront North
Burlington, Vermont

				Moran Plant						
Sample Location		EPA Regional	EPA Regional	HA-34	HA-35	MW-1	MW-2	MW-3	MW-5	MW-6
Sample Depth Interval (ft)		Screening Level (RSL)	Screening Level (RSL)	0 - 2'	0 - 2'	0.5'	0.5'	0.67'	0.5'	0.5'
Sample Date		Residential	Industrial	8/12/1999	8/12/1999	3/29/2005	3/29/2005	3/29/2005	3/29/2005	3/29/2005
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)										
Aroclor-1016	mg/Kg (ppm)	3.9	21.0	0.018 U	0.018 U	0.025 U	0.033 U	0.032 U	0.056 U	0.032 U
Aroclor-1221	mg/Kg (ppm)	0.14	0.54	0.018 U	0.018 U	0.025 U	0.033 U	0.032 U	0.056 U	0.032 U
Aroclor-1232	mg/Kg (ppm)	0.14	0.54	0.018 U	0.018 U	0.025 U	0.033 U	0.032 U	0.056 U	0.032 U
Aroclor-1242	mg/Kg (ppm)	0.22	0.74	0.018 U	0.018 U	0.025 U	0.033 U	0.032 U	0.056 U	0.032 U
Aroclor-1248	mg/Kg (ppm)	0.22	0.74	0.018 U	0.018 U	0.025 U	0.033 U	0.032 U	0.056 U	0.032 U
Aroclor-1254	mg/Kg (ppm)	0.22	0.74	0.018 U	0.018 U	**0.023 J**	**0.040 J**	**0.042 J**	0.056 U	0.032 U
Aroclor-1260	mg/Kg (ppm)	0.22	0.74	0.018 U	0.018 U	**0.030 J**	**0.066 J**	**0.024 J**	0.056 U	0.032 U
TOTAL PCBs	mg/Kg (ppm)			*ND*	*ND*	***0.053 J***	***0.106 J***	***0.065 J***	*ND*	*ND*

				B.E.D. / G.M.P. Transformer Yard						
Sample Location		EPA Regional	EPA Regional	SB-201S	SB-201D	SB-202	SB-203	SB-204	SB-205S	SB-205D
Sample Depth Interval (ft)		Screening Level (RSL)	Screening Level (RSL)	1.0'	5.0'	1.0'	1.0'	1.0'	1.0'	5.0'
Sample Date		Residential	Industrial	1/19/2011	1/19/2011	1/19/2011	1/19/2011	1/19/2011	1/19/2011	1/19/2011
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)										
Aroclor-1016	mg/Kg (ppm)	3.9	21.0	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor-1221	mg/Kg (ppm)	0.14	0.54	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor-1232	mg/Kg (ppm)	0.14	0.54	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor-1242	mg/Kg (ppm)	0.22	0.74	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor-1248	mg/Kg (ppm)	0.22	0.74	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Aroclor-1254	mg/Kg (ppm)	0.22	0.74	0.02 U	0.02 U	0.02 U	**0.08**	0.02 U	0.02 U	0.02 U
Aroclor-1260	mg/Kg (ppm)	0.22	0.74	**0.07**	0.02 U	0.02 U	0.02 U	**0.06**	**0.05**	0.02 U
TOTAL PCBs	mg/Kg (ppm)			***0.07***	*ND*	*ND*	***0.08***	***0.06***	***0.05***	*ND*

				B.E.D. / G.M.P. Transformer Yard			*Waterfront North*			
Sample Location		EPA Regional	EPA Regional	SB-206S*	SB-207	SB-208	GD-4A	GD-9A	GD-11A	
Sample Depth Interval (ft)		Screening Level (RSL)	Screening Level (RSL)	1.0'	1.0'	1.0'	0-2'	0-2'	0-2'	
Sample Date		Residential	Industrial	1/19/2011	1/19/2011	1/19/2011	9/1/2009	9/1/2009	8/31/2009	
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)										
Aroclor-1016	mg/Kg (ppm)	3.9	21.0	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	
Aroclor-1221	mg/Kg (ppm)	0.14	0.54	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	
Aroclor-1232	mg/Kg (ppm)	0.14	0.54	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	
Aroclor-1242	mg/Kg (ppm)	0.22	0.74	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	
Aroclor-1248	mg/Kg (ppm)	0.22	0.74	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	
Aroclor-1254	mg/Kg (ppm)	0.22	0.74	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	
Aroclor-1260	mg/Kg (ppm)	0.22	0.74	**0.82**	**0.27**	**0.07**	0.02	0.02 U	0.02 U	
TOTAL PCBs	mg/Kg (ppm)			***0.82***	***0.27***	***0.07***	*ND*	*ND*	*ND*	

NOTES:
1."U" = not detected above listed quantitation limit; "J" = concentration is estimated; blank spaces = no data available; "ND" = not detected
2. EPA Regional Screening Levels (RSLs) are from RSL Master Table (November 2010).
3. Data from 2005 - 2011 collected by WEM; data from 1999 collelcted by Lamoureaux & Dickinson
4. Results reported above the method detection lmit are indicated in bold.
5. Shaded results are in excess of EPA standard.

TABLE 8
Soil Quality Data: Select Metals
Moran Center Waterfront North
Burlington, Vermont

				Moran Plant												
Sample Location		EPA Regional	Site Target	HA-34	HA-35	MW-1	MW-2	MW-3	MW-5	MW-6	MW-8	SB-9	MW-11	MW-12	SS-1	SS-2
Sample Depth Interval (ft)		RSL	Cleanup Level	0 - 2'	0 - 2'	0.5	0.5	0.67	0.5	0.5	0.63'	0.58'	0.63'	0.54'	0.5'	0.67'
Sample Date		Resdential		8/12/1999	8/12/1999	3/29/2005	3/29/2005	3/29/2005	3/29/2005	3/29/2005	11/1/05	11/1/05	11/1/05	11/1/05	11/3/05	11/3/05
Total Antimony	mg/Kg (ppm)	31		0.386 U	0.352 U	0.715 U	**1.05**	0.777 U	0.713 U	0.750 U						
Total Arsenic	mg/Kg (ppm)	0.39	35	**52.1**	**68.6**	**21.9**	**29.4**	**18.4**	**41.6**	**8.15**	**8.63**	**11.5**	**13.9**	**2.70**	**3.57**	**4.46**
Total Beryllium	mg/Kg (ppm)	150		**2.31**	**0.70**	1.43 U	1.36 U	1.49 U	1.33 U	1.25 U						
Total Cadmium	mg/Kg (ppm)	37		**1.74**	**2.81**	1.00 U	0.953 U	**1.11**	0.931 U	0.875 U						
Total Chromium	mg/Kg (ppm)	210		**23.3**	**21.4**	**19.1**	**5.23**	**30.7**	**3.46**	**9.18**						
Total Copper	mg/Kg (ppm)	3,100		**53**	**51**	**16.9**	**5.42**	**37.8**	**1.36**	**8.43**						
Total Lead	mg/Kg (ppm)	400		**113**	**87**	**63.0**	**59.0**	**40.9**	**34.2**	**56.9**						
Total Mercury	mg/Kg (ppm)	23		0.571 U	0.527 U	0.330 U	**0.530**	0.342 U	0.473 U	0.259 U						
Total Nickel	mg/Kg (ppm)	1,600		**18**	**19**	**15.7**	**3.57**	**37.7**	**3.54**	**16.4**						
Total Selenium	mg/Kg (ppm)	390		0.771 U	0.352 U	**6.69**	**6.73**	**4.10**	**3.58**	1.50 U						
Total Silver	mg/Kg (ppm)	390		3.9 U	**5.6**	1.43 U	1.36 U	1.49 U	1.33 U	1.25 U						
Total Thallium	mg/Kg (ppm)	5.1		**1.00**	**0.563**	**0.600**	**0.840**	**0.670**	**1.30**	0.300 U						
Total Zinc	mg/Kg (ppm)	23,000		**29**	**140**	**47.6**	**10.2**	**131**	**8.91**	**29.8**						

				Moran Plant												
Sample Location		EPA Regional	Site Target	SS-3	SS-4	SS-5	SS-6	SS-7	SB-15	SB-16	SB-17	SB-18	SB-19A	SB-20A	SB-21A	SB-22A
Sample Depth Interval (ft)		RSL	Cleanup Level	0.5'	0.42'	0.5'	0.5'	0.5'	0-3'	0-3'	0-3'	0-3'	0-3'	0-3'	0-3'	0-3'
Sample Date		Resdential		11/3/05	11/3/05	11/3/05	11/3/05	11/3/05	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09	8/27/09
Total Antimony	mg/Kg (ppm)	31														
Total Arsenic	mg/Kg (ppm)	0.39	35	**15.4**	**4.3**	**0.79**	**15.3**	**88.5**	**23**	**15**	**22**	**21**	**22**	**10**	**4.5**	**2.7**
Total Beryllium	mg/Kg (ppm)	150														
Total Cadmium	mg/Kg (ppm)	37														
Total Chromium	mg/Kg (ppm)	210														
Total Copper	mg/Kg (ppm)	3,100														
Total Lead	mg/Kg (ppm)	400														
Total Mercury	mg/Kg (ppm)	23														
Total Nickel	mg/Kg (ppm)	1,600														
Total Selenium	mg/Kg (ppm)	390														
Total Silver	mg/Kg (ppm)	390														
Total Thallium	mg/Kg (ppm)	5.1														
Total Zinc	mg/Kg (ppm)	23,000														

NOTES:
1. Analysis is by EPA Method EPA 6010B or 6020B
2. "U" = not detected above listed quantitation limit; "NS" = not sampled for this compound.
3. EPA Regional Screening Levels (RSLs) are from RSL Master Table (April 2009).
4. Target Cleanup Guideline is per agreement with the VT DEC.

TABLE 8
Soil Quality Data: Select Metals
Moran Center Waterfront North
Burlington, Vermont

				Moran Plant			*Sailing Center*							*Watefront North*		
Sample Location		EPA Regional	Site Target	SB-23A	SB-24A	SB-25A	DB-101S	DB-102S	DB-102D	SB-103	SB-104	SB-105	SB-106	GD-4A	GD-9A	GD-12A
Sample Depth Interval (ft)		RSL	Cleanup Level	0-3'	0-3'	0-3'	0-1'	0-1'	4-6'	0-1'	0-1'	0-1'	0-1'	0-2'	0-2'	0-2'
Sample Date		Resdential		8/27/09	8/27/09	8/27/09	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10	8/12/10	9/1/09	9/1/09	9/1/09
Total Antimony	mg/Kg (ppm)	31														
Total Arsenic	mg/Kg (ppm)	0.39	35	**3.1**	**3.0**	**2.7**	**5.9**	**3.6**	**4.7**	**6.3**	**14.2**	**5.6**	**14.6**	**9.1**	**5.8**	**5.6**
Total Beryllium	mg/Kg (ppm)	150														
Total Cadmium	mg/Kg (ppm)	37														
Total Chromium	mg/Kg (ppm)	210														
Total Copper	mg/Kg (ppm)	3,100														
Total Lead	mg/Kg (ppm)	400					**9.2**			**17.1**				**34.4**	**26.3**	**114**
Total Mercury	mg/Kg (ppm)	23														
Total Nickel	mg/Kg (ppm)	1,600														
Total Selenium	mg/Kg (ppm)	390														
Total Silver	mg/Kg (ppm)	390														
Total Thallium	mg/Kg (ppm)	5.1														
Total Zinc	mg/Kg (ppm)	23,000														

				Waterfront North					
Sample Location		EPA Regional	Site Target	GD-13A	GD-14A	GD-18A	GD-19A	GD-21A	GD-24A
Sample Depth Interval (ft)		RSL	Cleanup Level	0-2'	0-2'	0-2'	0-2'	0-2'	0-2'
Sample Date		Resdential		8/31/09	8/31/09	9/1/09	8/31/09	9/1/09	9/1/09
Total Antimony	mg/Kg (ppm)	31							
Total Arsenic	mg/Kg (ppm)	0.39	35	**4.2**	**7.6**	**10.3**	**4.8**	**7.2**	**9.4**
Total Beryllium	mg/Kg (ppm)	150							
Total Cadmium	mg/Kg (ppm)	37							
Total Chromium	mg/Kg (ppm)	210							
Total Copper	mg/Kg (ppm)	3,100							
Total Lead	mg/Kg (ppm)	400		**44.9**	**138**	**47.2**	**17.4**	**184**	**15.9**
Total Mercury	mg/Kg (ppm)	23							
Total Nickel	mg/Kg (ppm)	1,600							
Total Selenium	mg/Kg (ppm)	390							
Total Silver	mg/Kg (ppm)	390							
Total Thallium	mg/Kg (ppm)	5.1							
Total Zinc	mg/Kg (ppm)	23,000							

NOTES:
1. Analysis is by EPA Method EPA 6010B or 6020B
2. "U" = not detected above listed quantitation limit; "NS" = not sampled for this compound.
3. EPA Regional Screening Levels (RSLs) are from RSL Master Table (April 2009).
4. Target Cleanup Guideline is per agreement with the VT DEC.

TABLE 9
INTERIOR WATER QUALITY
Moran Center
Burlington, Vermont

				BASEMENT LEVEL WATER (REMOVED)		SUB-FLOOR CHANNEL WATER (STILL PRESENT)		LAKE WATER		DEWATERING WATER (REMOVED)	COAL TUNNEL WATER (STILL PRESENT)
				DBS-2	**DBS-3**	**CS-1**	**CN-1**	**DBS-1** (LAKE WATER)	**Lake Water**	**Frac Tank**	**Coal Tunnel**
Sample Date		VGES	VHA/MCL	5/20/2008	5/20/2008	12/3/2010	12/3/2010	5/20/2008	12/3/2010	12/3/2010	8/4/2010
VOCs (EPA Method 8260B)											
Tetrachloroethene (PCE)	ug/L (ppb)	5.0	5.0	1.0 U	1.0 U	2 U	2 U	1.0 U	2 U	2 U	1.0 U
Trichloroethene (TCE)	ug/L (ppb)	5.0	5.0	1.0 U	1.0 U	2 U	2 U	1.0 U	2 U	2 U	1.0 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/L (ppb)	70.0	70.0	1.0 U	1.0 U	2 U	2 U	1.0 U	2 U	2 U	1.0 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/L (ppb)	100.0	100.0	1.0 U	1.0 U	2 U	2 U	1.0 U	2 U	2 U	1.0 U
Vinyl Chloride (VC)	ug/L (ppb)	2.0	2.0	1.0 U	1.0 U	2 U	2 U	1.0 U	2 U	2 U	1.0 U
1,1-Dichloroethane (1,1-DCA)	ug/L (ppb)	70.0	70.0	1.0 U	1.0 U	**2**	2 U	1.0 U	2 U	2 U	1.0 U
1,2-Dichloroethane (1,2-DCA)	ug/L (ppb)	5.0	5.0	1.0 U	1.0 U	2 U	2 U	1.0 U	2 U	2 U	1.0 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L (ppb)	200.0	--	1.0 U	**0.27** J	2 U	2 U	1.0 U	2 U	2 U	1.0 U
1,4-Dichlorobenzene (1,4-DCB)	ug/L (ppb)	75.0	75.0	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1 U	1.0 U
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)											
Acenapthene	ug/L (ppb)	--	--	**2.6** J	9.4 U	**0.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Acenapthylene	ug/L (ppb)	--	--	9.4 U	9.4 U	0.1 U	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Anthracene	ug/L (ppb)	2,100	--	**7.8** J	9.4 U	**0.5**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Benzo(a)anthracene	ug/L (ppb)	--	--	**16**	9.4 U	**1.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Benzo(b)fluoranthene	ug/L (ppb)	--	--	**13**	9.4 U	**1.6**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Benzo(k)fluoranthene	ug/L (ppb)	--	--	**15**	9.4 U	**0.6**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Benzo(a)pyrene	ug/L (ppb)	0.2	--	**14**	9.4 U	**1.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Benzo(g,h,i)perylene	ug/L (ppb)	--	--	**4.0** J	9.4 U	**0.9**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Chrysene	ug/L (ppb)	--	--	**19**	9.4 U	**1.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Dibenzo(a,h)anthracene	ug/L (ppb)	--	--	**1.2** J	9.4 U	**0.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Fluoranthene	ug/L (ppb)	280	--	**41**	9.4 U	**2.7**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Fluorene	ug/L (ppb)	280	--	**2.7** J	9.4 U	**0.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	--	--	**4.1** J	9.4 U	**1.0**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
2-Methylnaphthalene	ug/L (ppb)		--	**1.1** J	9.4 U	**0.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Naphthalene	ug/L (ppb)	20	--	**1.1** J	9.4 U	**0.2**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Phenanthrene	ug/L (ppb)	--	--	**31**	9.4 U	**1.9**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
Pyrene	ug/L (ppb)	--	--	**33**	9.4 U	**2.1**	0.1 U	9.4 U	0.1 U	0.1 U	10 U
POLYCHLORINATED BIPHENYLS (PCBs) (EPA Method 8082)											
Aroclor-1016	ug/L (ppb)	0.5	0.5	0.53 U	0.47 U	0.3 U	0.3 U	0.47 U	0.3 U	0.3 U	0.51 U
Aroclor-1221	ug/L (ppb)	0.5	0.5	0.53 U	0.47 U	0.3 U	0.3 U	0.47 U	0.3 U	0.3 U	0.51 U
Aroclor-1232	ug/L (ppb)	0.5	0.5	0.53 U	0.47 U	0.3 U	0.3 U	0.47 U	0.3 U	0.3 U	0.51 U
Aroclor-1242	ug/L (ppb)	0.5	0.5	0.53 U	0.47 U	0.3 U	0.3 U	0.47 U	0.3 U	0.3 U	0.51 U
Aroclor-1248	ug/L (ppb)	0.5	0.5	0.53 U	0.47 U	0.3 U	0.3 U	0.47 U	0.3 U	0.3 U	0.51 U
Aroclor-1254	ug/L (ppb)	0.5	0.5	**0.54**	0.47 U	0.3 U	0.3 U	0.47 U	0.3 U	0.3 U	0.51 U
Aroclor-1260	ug/L (ppb)	0.5	0.5	0.53 U	0.47 U	0.3 U	0.3 U	0.47 U	0.3 U	0.3 U	0.51 U
RCRA METALS											
Total Arsenic	ug/L (ppb)	10.0	10.0	**77.0**	**9.9** J	**3**	**1**	1.1 U	1 U	**2**	**8.1** J
Total Barium	ug/L (ppb)	2000.0	2000.0	**146** J	**32.9** J	**23**	**5**	**9.7** J	**8**	**58**	**242**
Total Cadmium	ug/L (ppb)	5.0	5.0	**10.2**	**1.6** J	1 U	1 U	0.14 U	1 U	**3**	5.0 U
Total Chromium	ug/L (ppb)	100.0	100.0	**23.4**	**2.4** J	**1**	1 U	**0.55** J	1 U	1 U	10.0 U
Total Lead	ug/L (ppb)	15.0	15.0	**3,480**	**760**	**8**	**10**	**3.7** J	**14**	**17**	**4.1** J
Total Mercury	ug/L (ppb)	2.0	2.0	**8.0** J	**0.60** J	**0.1**	0.1 U	0.10 UJ	0.1 U	0.1 U	**0.063**
Total Selenium	ug/L (ppb)	50.0	50.0	**4.3** J	**2.6** J	**3**	1.0 U	1.9 U	1 U	**2**	35.0 U
Total Silver	ug/L (ppb)	--	--	0.37 U	0.37 U	1.0 U	1.0 U	0.37 U	1 U	1 U	10.0 U

NOTES
ug/Kg = migcrogram per kilogram; mg/Kg = milligrams per kilogram; ppb = parts per billion; ppm = parts per million.
"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value.
VGES = Vermont Groundwater Enforcement Standard (Table 1 of the Groundwater Protection Rule and Strategy 1/00)
VHA/MCL = Vermont Health Advisory / Maximum Contaminant Level, VT DOH Drinking Water Guidance, December 2002.
VOC samples DBS-1, DBS-2, and DBS-3 were collected via passive diffusion bag samplers that were sumberged in the water at each location for 1 week prior to sampling. All other VOC samples were collected by grab sampling methods.
EPA Method 8260B compounds not shown indicate that they were not detected above respective quantitation limits.
Results reported above quantitation limits are indicated in bold.

TABLE 10
INTERIOR SEDIMENT QUALITY DATA
Moran Center
Burlington, Vermont

				BASEMENT LEVEL SEDIMENT (REMOVED)		SUB-FLOOR CHANNEL SEDIMENT (STILL PRESENT)		LAKE SEDIMENT (STILL PRESENT)
Sample Date	Units	EPA Regional Screening Level (RSL) Residential	EPA Regional Screening Level (RSL) Industrial	**SED-2** 5/20/2008	**SED-3** 5/20/2008	**CS-Sed** 12/3/2010	**CN-Sed** 12/3/2010	**Lake Sed** 12/3/2010
VOLATILE ORGANIC COMPOUNDS (EPA Method 8260)								
Tetrachloroethane (PCE)	ug/Kg (ppb)	550	2,600	**2.6** J	8.5 U	50 U	90 U	50 U
Trichloroethane (TCE)	ug/Kg (ppb)	2,800	14,000	8.6 U	8.5 U	50 U	90 U	50 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	160,000	2,000,000	8.6 U	8.5 U	50 U	90 U	50 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	150,000	690,000	8.6 U	8.5 U	50 U	90 U	50 U
Vinyl Chloride (VC)	ug/Kg (ppb)	60	1,700	8.6 U	8.5 U	100 U	200 U	100 U
1,1-Dichloroethane (1,1-DCA)	ug/Kg (ppb)	3,300	170,000	**5.3** J	**2.5** J	**60**	**140**	50 U
1,2-Dichloroethane (1,2-DCA)	ug/Kg (ppb)	430	2,200	8.6 U	8.5 U	50 U	90 U	50 U
1,1,1-Trichloroethane (1,1,1-TCA)	ug/Kg (ppb)	8,700,000	38,000,000	**7.5** J	**4.6** J	50 U	90 U	50 U
1,4-Dichlorobenzene (1,4-DCB)	ug/Kg (ppb)	2,400	120,000	**4.7** JB	**3.0** JB	50 U	90 U	50 U
2-Butanone (Methly Ethyl Ketone)	ug/Kg (ppb)	28,000,000	200,000,000	**75**	**18**	500 U	900 U	500 U
Acetone	ug/Kg (ppb)	61,000,000	630,000,000	**560** J	**160** B	200 U	300 U	200 U
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) (EPA Method 8270)								
Acenapthene	ug/Kg (ppb)	3,400,000	33,000,000	**1,300** J	**45,000**	**11,000**	**3,200**	**1,100**
Acenapthylene	ug/Kg (ppb)	--	--	**190** J	10,000 U	**300**	**120**	**450**
Anthracene	ug/Kg (ppb)	17,000,000	170,000,000	**3,200**	**110,000**	**16,000**	**6,800**	**3,000**
Benzo(a)anthracene	ug/Kg (ppb)	150	2,100	**6,700**	**140,000**	**31,000**	**13,000**	**4,400**
Benzo(b)fluoranthene	ug/Kg (ppb)	150	2,100	**7,100**	**83,000** J	**34,000**	**13,000**	**4,200**
Benzo(k)fluoranthene	ug/Kg (ppb)	1,500	210,000	**5,900**	**100,000**	**9,500**	**3,700**	**1,500**
Benzo(a)pyrene	ug/Kg (ppb)	15	210	**5,700**	**97,000**	**27,000**	**10,000**	**3,800**
Benzo(g,h,i)perylene	ug/Kg (ppb)	--	--	**890** J	**23,000**	**23,000**	**9,200**	**2,700**
Chrysene	ug/Kg (ppb)	15,000	210,000	**7,600**	**130,000**	**28,000**	**11,000**	**4,100**
Dibenzo(a,h)anthracene	ug/Kg (ppb)	15	210	**310** J	**12,000**	**6,300**	**2,700**	**750**
Fluoranthene	ug/Kg (ppb)	2,300,000	22,000,000	**22,000**	**380,000**	**59,000**	**22,000**	**9,100**
Fluorene	ug/Kg (ppb)	2,300,000	22,000,000	**1,100** J	**48,000**	**9,700**	**3,000**	**1,600**
Indeno(1,2,3-cd)pyrene	ug/Kg (ppb)	150	2,100	**1,000** J	**30,000**	**26,000**	**11,000**	**3,200**
2-Methylnaphthalene	ug/Kg (ppb)	310,000	4,100,000	**860** J	**9,400** J	**2,500**	**970**	**370**
Naphthalene	ug/Kg (ppb)	3,600	180,000	**700** J	**16,000**	**6,200**	**1,600**	**470**
Phenanthrene	ug/Kg (ppb)	--	--	**13,000**	**410,000**	**52,000**	**19,000**	**9,300**
Pyrene	ug/Kg (ppb)	1,700,000	17,000,000	**11,000**	**310,000**	**47,000**	**18,000**	**7,600**
PCBs (EPA METHOD 8082)								
Aroclor-1016	mg/Kg (ppm)	3.9	21.0	0.12 U	0.16 U	0.04 U	0.05 U	0.02 U
Aroclor-1221	mg/Kg (ppm)	0.14	0.54	0.12 U	0.16 U	0.04 U	0.05 U	0.02 U
Aroclor-1232	mg/Kg (ppm)	0.14	0.54	0.12 U	0.16 U	0.04 U	0.05 U	0.02 U
Aroclor-1242	mg/Kg (ppm)	0.22	0.74	0.12 U	0.16 U	0.04 U	0.05 U	**2.4**
Aroclor-1248	mg/Kg (ppm)	0.22	0.74	0.12 U	0.16 U	0.04 U	0.05 U	0.02 U
Aroclor-1254	mg/Kg (ppm)	0.22	0.74	**0.58**	**1.1**	**6.3**	0.05 U	**0.90**
Aroclor-1260	mg/Kg (ppm)	0.22	0.74	**0.36**	**0.52**	0.04 U	**0.67**	0.02 U
RCRA METALS								
Total Arsenic	mg/Kg (ppm)	0.39	1.6	**136**	**155**	**38**	**170**	**15**
Total Barium	mg/Kg (ppm)	15,000	190,000	**230**	**252**	**510**	**310**	**79**
Total Cadmium	mg/Kg (ppm)	70	800	**9.4**	**8.9**	**16**	**7.6**	0.5 U
Total Chromium	mg/Kg (ppm)	210	450	**89**	**105**	**160**	**49**	**13**
Total Lead	mg/Kg (ppm)	400	800	**11,900**	**10,300**	**1,800**	**680**	**32**
Total Mercury	mg/Kg (ppm)	5.6	340	**21.4** J	**10.0** J	**58**	**31**	0.1 U
Total Selenium	mg/Kg (ppm)	390	5,100	**8.9**	**8.6**	0.5 U	**5.5**	0.5 U
Total Silver	mg/Kg (ppm)	390	5,100	0.067 U	0.083 U	**13**	**0.6**	0.5 U

NOTES

ug/Kg = migcrogram per kilogram; mg/Kg = milligrams per kilogram; ppb = parts per billion; ppm = parts per million.

"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value;

"B" = compound detected in laboratory blank

EPA Regional Screening Levels are from November 2010.

Results reported above quantitation limits are indicated in bold.

Table 11

Bulk Concrete Analytical Results: PCBs
Moran Plant, Burlington, Vermont

	Sample ID:	FL-1	FL-1-DUP		FL-2	FL-3	FL-4	FL-5	FL-6	FL-7	FL-8		FL-9	FL-DUP 2		FL-10	FL-11
	Sample Date:	12/15/10	12/15/10		12/15/10	12/15/10	12/15/10	12/15/10	12/15/10	12/15/10	12/15/10		1/24/11	(FL-9)		1/24/11	1/24/11
Analyte	Units			*RPD*										1/24/11	*RPD*		
Aroclor 1016	mg/kg	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	--	< 0.02	< 0.02
Aroclor 1221	mg/kg	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	--	< 0.02	< 0.02
Aroclor 1232	mg/kg	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	--	< 0.02	< 0.02
Aroclor 1242	mg/kg	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	--	< 0.02	< 0.02
Aroclor 1248	mg/kg	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		< 0.02	< 0.02	--	< 0.02	< 0.02
Aroclor 1254	mg/kg	**0.03**	**0.03**	*0.00%*	**5.2**	**1.6**	**0.2**	**0.08**	**0.14**	**0.12**	**0.03**		**3.6**	**3.9**	*8.00%*	**0.2**	**0.08**
Aroclor 1260	mg/kg	< 0.02	< 0.02	--	< 0.02	< 0.02	**0.07**	**0.04**	**0.15**	**0.11**	**0.02**		< 0.02	< 0.02	--	**0.06**	**0.03**
Total PCBs	***mg/kg***	***0.03***	***0.03***		***5.2***	***1.6***	***0.27***	***0.12***	***0.29***	***0.23***	***0.05***		***3.6***	***3.9***		***0.26***	***0.11***

Notes:
Analysis by EPA Method 8082 with Soxhlet Extraction
Total PCBs Calculated assuming zero for non-detects
RPD - Relative Percent Difference
RPD not calculated where one or both of the results are non-detect
Shaded - Indicates a laboratory reported total PCB concentration greater than 1 ppm

Table 11

Bulk Concrete Analytical Results: PCBs

Moran Plant, Burlington, Vermont

	Sample ID:	FL-12	FL-13	FL-14	FL-15	FL-16	FL-17	FL-18	FL-19	FL-20	FL-21	FL-22	Pit 1	FL-23	FL-24
	Sample Date:	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11
Analyte	Units														
Aroclor 1016	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Aroclor 1221	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Aroclor 1232	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Aroclor 1242	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Aroclor 1248	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Aroclor 1254	mg/kg	**1.0**	**0.59**	**0.16**	**1.1**	**15**	**6.5**	**0.04**	**0.7**	**0.33**	< 0.02	**1.1**	**0.23**	**0.04**	< 0.02
Aroclor 1260	mg/kg	< 0.02	**0.21**	**0.06**	**0.42**	< 0.02	< 0.02	**0.03**	**0.21**	**0.18**	0.15	< 0.02	**0.07**	< 0.02	< 0.02
Total PCBs	***mg/kg***	***1.0***	***0.80***	***0.22***	***1.5***	***15***	***6.5***	***0.07***	***0.91***	***0.51***	***0.15***	***1.1***	***0.30***	***0.04***	*ND*

Notes:

Analysis by EPA Method 8082 with Soxhlet Extraction

Total PCBs Calculated assuming zero for non-detects

RPD - Relative Percent Difference

RPD not calculated where one or both of the results are non-detect

Shaded - Indicates a laboratory reported total PCB concentration greater than 1 ppm

Table 11

Bulk Concrete Analytical Results: PCBs
Moran Plant, Burlington, Vermont

	Sample ID:	Ash 1	FL-25	FL-26	FL-27	FL-DUP 3		FL-28	FL-29	FL-30	FL-31	FL-32	Pipe Oil
	Sample Date:	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11		1/24/11	1/24/11	1/24/11	1/24/11	1/24/11	1/24/11
Analyte	Units						*RPD*						
Aroclor 1016	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 1
Aroclor 1221	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 1
Aroclor 1232	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 1
Aroclor 1242	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 1
Aroclor 1248	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 1
Aroclor 1254	mg/kg	< 0.02	**0.14**	**0.04**	**0.03**	**0.03**	*0.00%*	**0.08**	**0.57**	< 0.02	**3.5**	< 0.02	< 1
Aroclor 1260	mg/kg	< 0.02	**0.1**	**0.04**	< 0.02	< 0.02	--	< 0.02	**0.63**	**0.24**	< 0.02	**0.08**	< 1
Total PCBs	***mg/kg***	*ND*	***0.24***	***0.08***	***0.03***	***0.03***		***0.08***	***1.2***	***0.24***	***3.5***	***0.08***	*ND*

Notes:
Analysis by EPA Method 8082 with Soxhlet Extraction
Total PCBs Calculated assuming zero for non-detects
RPD - Relative Percent Difference
RPD not calculated where one or both of the results are non-detect
Shaded - Indicates a laboratory reported total PCB concentration greater than 1 ppm

APPENDIX C
SOIL BORING LOGS

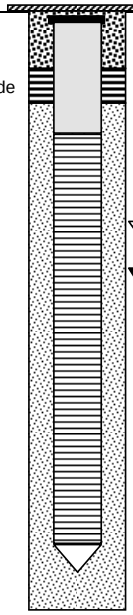
SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-1

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site #
Drilled by : Kennedy Drilling, LLC
Logged by: Miles Waite

Date Installed: 3/29/2005
Drilling Method: Geoprobe; 2" direct push probe
Sampling Method: Geoprobe: 2" x 36" clear soil liners
Development Method: Peristaltic Pump

Grade = 0



Pen/Rec(') BlowCounts	Interval (') PID (ppm)	Soil Characteristics	Letter Symbol
3.0' / 2.5' na	0 - 3.0' 0.1 ppm	0-6": **Gravel Fill**, dry, no odor 6-30": Well Graded Fine**Sand**, grey-brown, damp, dark staining at 6", no odor [collected soil sample MW-1 (6") for analysis of PAHs, PCBs and PP Metals]	GP SW
3.0' / 1.8' na	3.0' - 6.0' 0.1 ppm	Well Graded Fine-Medium**Sand**, grey-brown, wet @46", no odor	SW
3.0' / 3.0' na	6.0' - 9.0' 0.0 ppm	Well Graded Fine-Medium**Sand**, grey-brown, black staining below 85"	SW
1.0' / 1.0'	9.0' - 10.0' 0.0 ppm	As above [collected soil sample MW-1 (9-10') for analysis of VOCs]	SW
		End of Boring @ 10.0' Set well @ 9.0'	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level, below top of casing

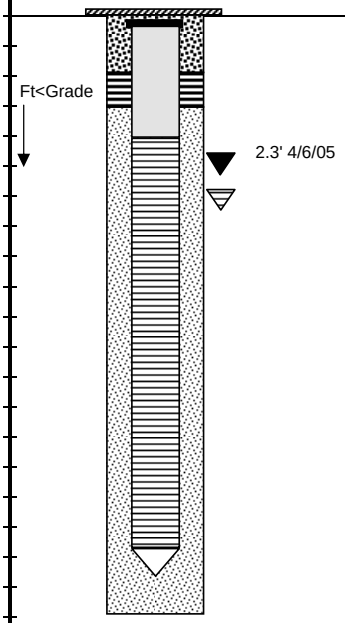
SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-2

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site #
Drilled by : Kennedy Drilling, LLC
Logged by: Miles Waite

Date Installed: 3/29/2005
Drilling Method: Geoprobe; 2" direct push probe
Sampling Method: Geoprobe: 2" x 36" clear soil liners
Development Method: Peristaltic Pump

Grade = 0



Pen/Rec(') / BlowCounts	Interval (') / PID (ppm)	Soil Characteristics	Letter Symbol
3.0' / 2.7' na	0 - 3.0' 0.0 ppm	0-23": **Silty Gravel with Coal Dust**, dry, no odor [collected soil sample MW-2 (6") for analysis of PAHs, PCBs and PP Metals]	**GP**
	0.0 ppm	23-36": Well Graded Fine **Sand**, grey/brown, black streaks, damp.	**GP** **SW**
3.0' / 3.0' na	3.0' - 6.0' 0.0 ppm	Well Graded Fine **Sand**, grey, wet, predominant black staining at 56", no odor	**SW**
3.0' / 3.0' na	6.0' - 9.0' 0.0 ppm	Well Graded Fine **Sand**, 10% fines, medium dense, black staining throughout.	**SW**
1.0' / 1.0'	9.0' - 10.0' 0.0 ppm	As above [collected soil sample MW-2 (9-10') for analysis of VOCs]	**SW**
		End of Boring @ 10.0' Set well @ 9.0'	

Graphic

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level, below top of casing

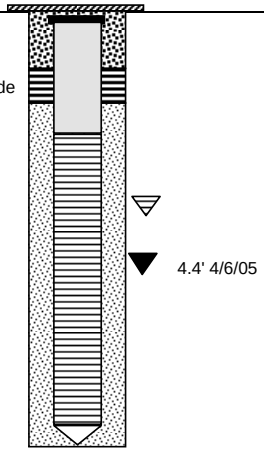
SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-3

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site #
Drilled by : Kennedy Drilling, LLC
Logged by: Miles Waite

Date Installed: 3/29/2005
Drilling Method: Geoprobe; 2" direct push probe
Sampling Method: Geoprobe: 2" x 36" clear soil liners
Development Method: Peristaltic Pump

Grade = 0



Pen/Rec(') / BlowCounts	Interval (') / PID (ppm)	Soil Characteristics	Letter Symbol
3.0' / 3.0' na	0 - 3.0' 0.0 ppm	0-8": **Top Soil** 8-36": **Gravel** Fill with concrete (15-18"), wood, and coal, dense, dry. [collected soil sample MW-3 (8") for analysis of PAHs, PCBs and PP Metals]	**GP**
3.0' / 0.7' na	3.0' - 6.0' 0.0 ppm	Poorly Graded **Gravel with Sand**, brown, some blank staining and mottling, loose, wet	**GP**
3.0' / 0.5' na	6.0' - 7.1' 0.2 ppm	Poorly Graded **Gravel with Sand**, red-brown, loose [collected soil sample MW-5 (6.5-7.0') for analysis of VOCs]	**GP**
		Refusal @ 7.1' Set well @ 7.0'	

Legend

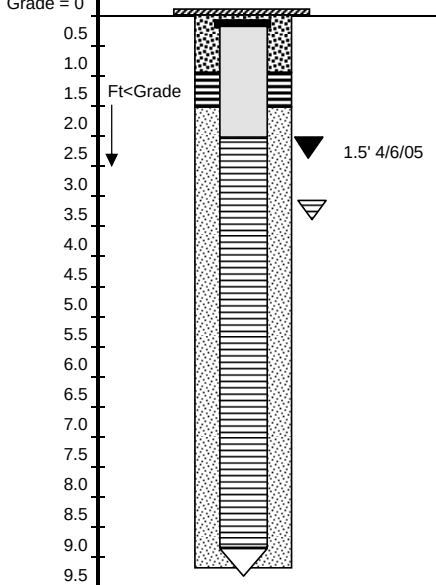
- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level, below top of casing

SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-4

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	3/29/2005
VT DEC Site #		Drilling Method:	Geoprobe; 2" direct push probe
Drilled by :	Kennedy Drilling, LLC	Sampling Method:	Geoprobe: 2" x 36" clear soil liners
Logged by:	Miles Waite	Development Method:	Peristaltic Pump

Well Construction



Pen/Rec(') BlowCounts	Interval (') PID (ppm)	Soil Characteristics	Letter Symbol
3.0' / 3.0' na	0 - 3.0' 0.0 ppm	0-14": **Top Soil** 14-36": Well Graded Fine-Medium**Sand**, grey, damp, no odor	**SW**
3.0' / 3.0' na	3.0' - 6.0' 0.0 ppm	Well Graded Fine-Medium**Sand**, grey, wet, no odor	**SW**
3.0' / 3.0' na	6.0' - 9.0' 0.0 ppm	As above	**SW**
		End of Boring @ 9.0' Set well @ 9.0'	

Graphic

Legend

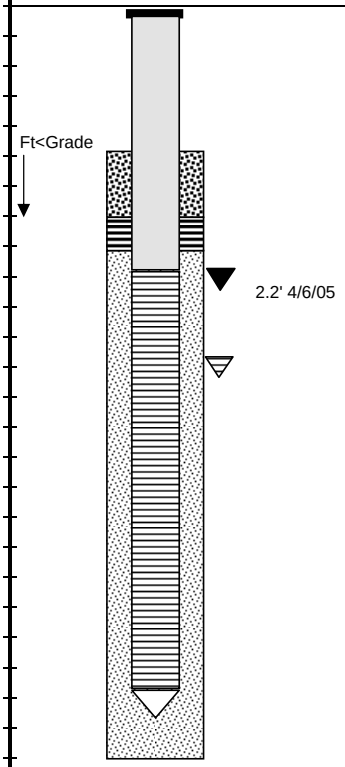
- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level, below top of casing

SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-5

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site #
Drilled by : Kennedy Drilling, LLC
Logged by: Miles Waite

Date Installed: 3/29/2005
Drilling Method: Geoprobe; 2" direct push probe
Sampling Method: Geoprobe: 2" x 36" clear soil liners
Development Method: Peristaltic Pump



Pen/Rec(') BlowCounts	Interval (') PID (ppm)	Soil Characteristics	Letter Symbol	Graphic
		Stickup Well Casing with Well Guard		
3.0' / 3.0' na	0 - 3.0' 0.1 ppm	0-14": **Coal Dust** and Coal above **Black Fine Sand,** no odor, dry [collected soil sample MW-5 (6") for analysis of PAHs, PCBs and PP Metals]	**SW**	
3.0' / 3.0' na	3.0' - 6.0' 0.0 ppm	Well Graded **Sand**, tan, wet, loose, some grey staining at 70", no odor	**SW**	
3.0' / 3.0' na	6.0' - 9.0' 0.0 ppm	Well Graded Fine **Sand**, tan, wet, loose 92-108": Well Graded Fine **Sand**, denser, less saturated [collected soil sample MW-5 (7.8-8.5') for analysis of VOCs]	**SW**	
1.0' / 1.0'	9.0' - 10.0' 0.0 ppm	As above	**SW**	
		End of Boring @ 10.0' Set well @ 9.0'		

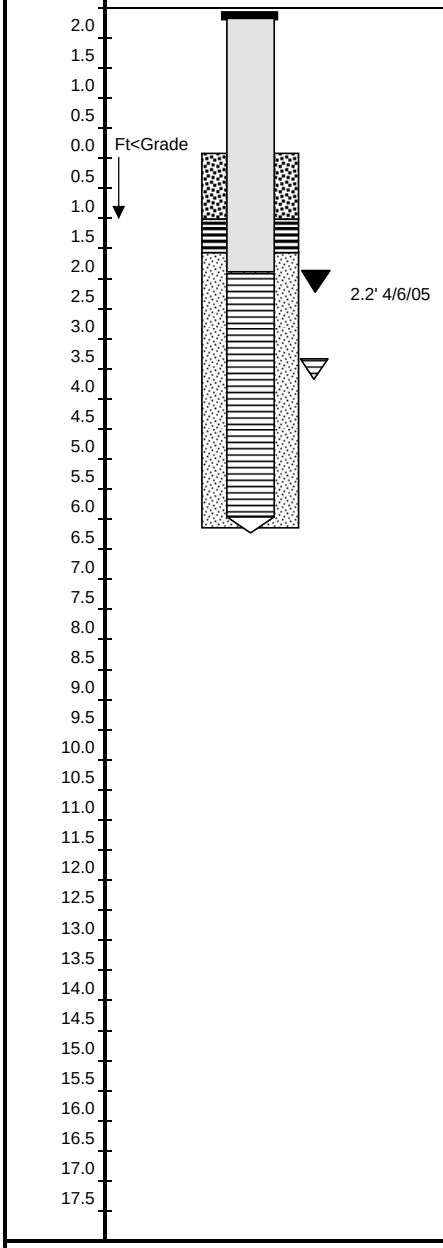
Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level, below top of casing

SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-6

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	3/29/2005
VT DEC Site #		Drilling Method:	Hand Auger
Drilled by :	Kennedy Drilling, LLC	Sampling Method:	Hand Auger
Logged by:	Miles Waite	Development Method:	Peristaltic Pump



Pen/Rec(') BlowCounts	Interval (') PID (ppm)	Soil Characteristics	Letter Symbol	Graphic
		Stickup Well Casing with Well Guard		
	0 - 0.5'	0-6": **Top Soil**		
	0.0 ppm	6-36": **Silty Sand**, 10% fines, grey, mottled, damp, no odor [collected soil sample MW-6 (6") for analysis of PAHs, PCBs and PP Metals]	**SM**	
	0.0 ppm	36-54": **Silty Sand**, fine, wet, no odor	**SM**	
	0.0 ppm	54-72": **Silty Sand**, fine, hole collapsing [collected soil sample MW-6 (5.5-6.0') for analysis of VOCs]	**SM**	
		End of Boring @ 6.0' Set well @ 6.0'		

Legend

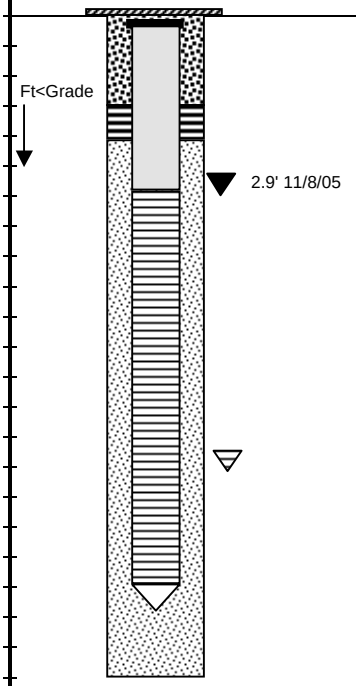
- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.010"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level, below top of casing

SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-7

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	11/1/2005
VT DEC Site #	2005-3357	Drilling Method:	Direct Push; 2" / 3" probe
Drilled by :	SDI, Inc.	Sampling Method:	Direct Push: 2" x 48" clear soil liners
Logged by:	Miles Waite	Development Method:	Peristaltic Pump

Grade = 0



Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 3.8' na	0 - 4.0'		0-6": **Top Soil**	
		0.1	6-17": Well Graded Fine **Sand**, black, some coal ash, loose	**SW**
		0.2	17-48": Well Graded Fine **Sand**, olive, dry	
3.0' / 2.2' na	4.0 - 7.0	0.0	48-68": Well Graded Fine **Sand**, olive, dry, loose	**SW**
			68-84": Silty Fine **Sand and Gravel**, 10% fines, olive, medium firm, damp	**SM**
4.0' / 3.1' na	7.0 - 11.0	0.0	84-111": Medium - Coarse **Sand and Gravel**, gray-black, wet	**SM**
		0.3	111-132": Well Graded Medium **Sand**, red-brown, red mottling, wet	**SW**
			End of Boring @ 11.0' Set well @ 10.0'	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

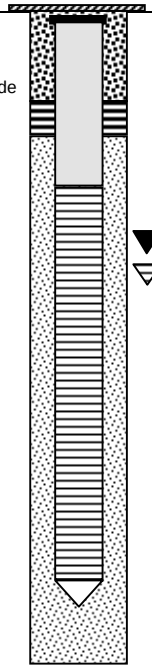
SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-8

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 11/1/2005
Drilling Method: Direct Push; 2" probe operated by jack hammer
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method: Peristaltic Pump

Grade = 0



Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 1.95' na	0 - 4.0'	0.0	0-6": **Top Soil** Well Graded Fine-Medium**Sand**, gray at top, brown below, some brick clasts, trace coal, loose Collected sample*SB-8 (6-9")* @ 08:57	**SW**
4.0' / 1.9' na	4.0 - 8.0	0.0	Medium - Coarse**Sand and Gravel**, brown, wet	**SW**
4.0' / 1.5' na	8.0 - 11.0	0.0	Well Graded Fine - Medium**Sand**, olive brown, wet	**SW**
			End of Boring @ 11.0' Set well @ 10.0'	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-9

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 11/1/2005
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method: Peristaltic Pump

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 3.0' na	0 - 4.0'	0.0	0-3": **Top Soil** Well Graded Fine-Medium**Sand**, few pebbles, gray at top, black below 9", trace coal, loose Collected sample*SB-9 (4-10")* @ 10:10 Collected duplicate sample*SB-X* @ 10:10 Collected sample*SB-9 (10-16")* @ 10:12	**SW**
3.0' / 3.1' na	4.0 - 7.0	0.0	Well Graded Fine-Medium**Sand**, gray with zones of black, med. firm, wet	**SW**
3.0' / 2.3' na	7.0 - 10.0	0.0	Well Graded Fine**Sand**, 10% silt, gray-brown, firm, wet	**SW**
			End of Boring @ 10.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-10

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 11/1/2005
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method: Peristaltic Pump

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 3.0' na	0 - 4.0'	0.0	0-8": **Top Soil with Gravel Fill** Well Graded Fine **Sand**, gray with black zones, trace coal, loose, dry	**SW**
3.0' / 3.2' na	4.0 - 7.0	0.3	Well Graded Fine **Sand**, trace gravel, gray-brown with zones of black, med. firm, wet @ 65" Collected sample *SB-10 (60-68")* @ 10:30	**SW**
3.0' / 2.3' na	7.0 - 10.0	0.2	Well Graded Fine **Sand**, trace gravel, gray-brown, med. firm, iron staining, wet	**SW**
			End of Boring @ 10.0' No Well	

Graphic

Legend

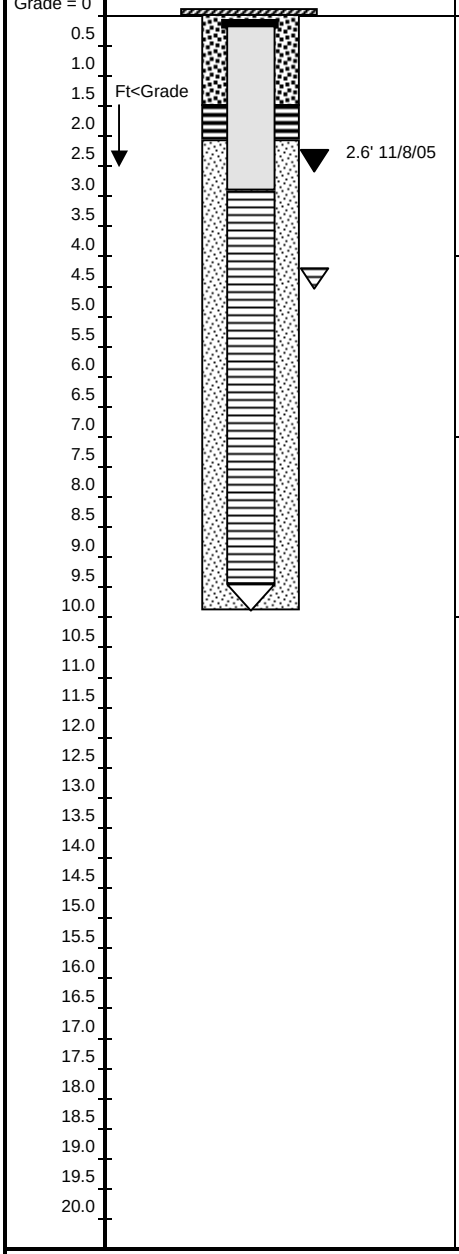
- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-11

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	11/1/2005
VT DEC Site #	2005-3357	Drilling Method:	Direct Push; 2" / 3" probe
Drilled by :	SDI, Inc.	Sampling Method:	Direct Push: 2" x 48" clear soil liners
Logged by:	Miles Waite	Development Method:	Peristaltic Pump

Well Construction



Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 2.7' na	0 - 4.0'	 0.0 0.0	0-7": **Top Soil** 7-20": **Coal** dust and clasts Well Graded Fine **Sand**, trace silt, gray-black until 40" brown below, loose, some iron staining, moist Collected sample *SB-11 (6-9")* @ 10:45	**SW**
3.0' / 3.9' na	4.0 - 7.0	0.0	Well Graded Fine **Sand**, light brown, wet below 50" Collected sample *SB-11 (60-63")* @ 10:55	**SW**
3.0' / 1.75' na	7.0 - 10.0	0.0	Well Graded Fine **Sand**, light brown, wet	**SW**
			End of Boring @ 11.0' Set well @ 10.0'	

Graphic

Legend

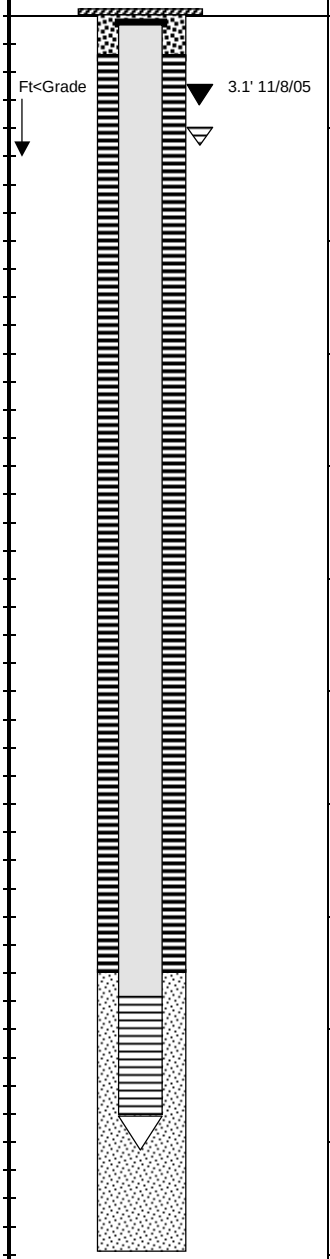
- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-12

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	11/1/2005
VT DEC Site #	2005-3357	Drilling Method:	Direct Push; 2" / 3" probe
Drilled by :	SDI, Inc.	Sampling Method:	Direct Push: 2" x 48" clear soil liners
Logged by:	Miles Waite	Development Method:	Peristaltic Pump

Well Construction



Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 1.0'	0 - 4.0'		Top Soil and Gravel Fill	
na		0.0	Well Graded Fine **Sand**, trace coal, gray	SW
			Collected sample *SB-12 (4-9")* @ 12:10	
			Collected sample *SB-12 (12-19")* @ 12:15	
4.0' / 3.7'	4.0 - 8.0'	0.2	Well Graded Fine - Medium **Sand**, black at top, tan below, loose,	SW
na			wet at 50"	
3.0' / 2.5'	8.0 - 12.0	2.5	Well Graded Medium - Coarse **Sand**, red-brown, med. firm, wet	SW
na				
			Collected sample *SB-12 (10')* @ 12:30	
4.0' / 2.5'	12.0 - 16.0'	4.0	Well Graded Medium **Sand**, gray-brown, med. firm, wet	SW
na				
4.0' / 0.8'	16.0 - 20.0'	0.6	Well Graded Medium **Sand**, gray-brown, med. firm, wet	SW
na				
4.0' / 2.8'	20.0 - 24.0'	0.2	Well Graded Medium **Sand**, gray-brown, med. firm, wet	SW
na				
			Collected sample *SB-12 (20')* @ 13:00	
4.0' / 3.3'	24.0 - 28.0'	0.2	288-310": Very Fine **Sand** with some silt, gray, dense	SW
na			310-322": Well Graded Medium **Sand**, red-brown, loose	
			322-336": Very Fine **Sand** with some silt, red-brown, dense	
4.0' / 3.6'	28.0 - 32.0'	0.0	336-342": Very Fine **Sand** with some silt, grey-brown	SW
na			342-384": Well Graded Medium **Sand**, red-brown	
4.0' / 2.9'	32.0 - 36.0'	0.0	Well Graded Fine - Medium **Sand**, orange-brown	SW
na				
4.0' / 3.5'	36.0 - 40.0'	0.0	432-444": Well Graded Fine - Medium **Sand**, orange-brown	SW
na			444-480": Fine **Silty Sand**, 30% fines, gray, dense	SM
4.0' / 3.6'	40.0 - 44.0'	0.0	Fine **Silty Sand**, 30% fines, gray-green, dense	SM
na				
			Collected sample *SB-12 (44')* @ 14:40	
			End of Boring @ 44.0'	
			Set well @ 40.0'	

Graphic

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

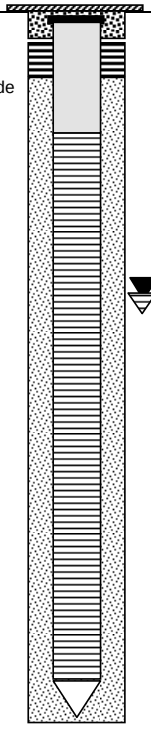
SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-13

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 9/24/2008
Drilling Method: Direct Push; 2" / 3" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method: Peristaltic Pump

Grade = 0



Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 1.7' na	0 - 4.0'	0.0 0.0	0-5": **Top Soil** 5-15": **Coal** dust and clasts Well Graded Fine **Sand**, trace silt, reddish-brown, loose, some iron staining, dry	**SW**
4.0' / 2.9' na	4.0 - 8.0	0.0	Well Graded Fine **Sand**, gray brown, wet below 60"	**SW**
4.0' / 2.9' na	8.0 - 12.0	0.0	Well Graded Fine **Sand**, light brown, wet	**SW**
			End of Boring Set well @ 12.0'	

Graphic

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-15

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	8/27/2009
VT DEC Site #	2005-3357	Drilling Method:	Direct Push; 2" probe
Drilled by :	SDI, Inc.	Sampling Method:	Direct Push: 2" x 48" clear soil liners
Logged by:	Miles Waite	Development Method:	

NO WELL INSTALLED

Grade = 0

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol	Graphic
3.0' / 1.8' na	0 - 3.0'	0.0	0-4": Loam with fine gravel, light brown, loose, dry 4-19": Coal Dust and Clasts, black, loose 19-21": Fine Sand, gray-black, well graded, firm, dry ***Collected sample SB-15 from 0-3' interval @ 08:30***	SW	
			End of Boring @ 3.0' No Well		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-16

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	8/27/2009
VT DEC Site #	2005-3357	Drilling Method:	Direct Push; 2" probe
Drilled by :	SDI, Inc.	Sampling Method:	Direct Push: 2" x 48" clear soil liners
Logged by:	Miles Waite	Development Method:	

NO WELL INSTALLED

Grade = 0

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
3.0' / 2.2' na	0 - 3.0'	0.0	0-7": Loam with fine sand and gravel, light brown, loose, dry 7-14": Fine Sand with Coal Dust and Clasts, gray-black, well graded, loose, dry 14-26": Fine Sand, tan, well graded, friable, moist ***Collected sample SB-16 from 0-3' interval @ 08:50***	**SW**
			End of Boring @ 3.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-17

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
3.0' / 2.2' na	0 - 3.0'	0.0	0-9": Loam with fine gravel, light brown, loose, dry 9-11": Coal Dust, black 11-14": Fine Sand, tan, well graded, loose, dry 14-15": Coal Dust, black 15-26": Fine Sand, tan, well graded, friable, moist, few faint mottles ***Collected sample SB-17 from 0-3' interval @ 09:15***	**SW**
			End of Boring @ 3.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-18

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol	Graphic
3.0' / 2.3' na	0 - 3.0'	0.5	0-6": Loam with fine gravel, light brown, loose, dry 6-15": Fine Sand mixed with coal dust, gray-black, loose, dry 15-19": Coal Dust and Clasts, black 19-23": Medium Sand, gray-black, friable, moist 23-28": Very Fine Sand, gray-black, friable, moist ***Collected sample SB-18 from 0-3' interval @ 09:25***	**SW**	
			End of Boring @ 3.0' No Well		

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-19

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 2.8' na	0 - 4.0'	0.0	0-5": Fine Sand with Fine-Medium Gravel, tan, loose, dry 5-12": Coal Dust and Clasts, black 12-21": Very Fine Sand, yellow-brown, well graded, friable, dry 21-23": Coal Dust, black 23-34": Fine Sand, yellow-brown, well graded, friable, dry ***Collected sample SB-19A from 0-3' interval @ 09:45***	SW SW
4.0' / 2.3' na	4.0 - 8.0'	0.0	Fine-Medium Sand with Fine Gravel, tan, well graded, friable, saturated below 5.5' ***Collected sample SB-19B from 5-8' interval @ 09:55***	SW
			End of Boring @ 8.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-20

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 3.0' na	0 - 4.0'	0.6	0-2": Loam, black 2-8": Coal Dust and Clasts, black 8-16": Fine-Medium Sand with Coal Dust, gray-black, friable, dry 16-36": Fine-Medium Sand, tan, well graded, friable, damp at bottom ***Collected sample SB-20A from 0-3' interval @ 10:05***	SW
4.0' / 2.3' na	4.0 - 8.0'	0.0	Fine-Medium Sand with Fine Gravel, yellow-brown, turning redder with depth, medium firm, saturated below 4.3' ***Collected sample SB-20B from 5-8' interval @ 010:10*** ***Collected duplicate SB-XB from 5-8' interval @ 010:15***	SW
			End of Boring @ 8.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-21

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 1.6' na	0 - 4.0'	0.0	0-4": Loam, gray-brown 4-10": Fine Sand with Coal Dust, gray-brown, friable dry 10-19": Fine - Medium Gravel, gray brown, layer of asphalt clasts, dry, no odor ***Collected sample SB-21A from 0-3' interval @ 10:20***	**SW**
4.0' / 2.1' na	4.0 - 8.0'	0.0	Fine-Medium Sand with Fine Gravel, gray-brown, trace coal clasts, saturated below 4.8' ***Collected sample SB-21B from 5-8' interval @ 10:30***	**SW**
			End of Boring @ 8.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-22

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 1.8' na	0 - 4.0'	0.0	0-2": Loam and Duff (pine), brown 2-9": Gravel and Asphalt, black 9-22": Fine - Medium Sand with trace Gravel, gray-brown, dry, no odor ***Collected sample SB-22A from 0-3' interval @ 10:35***	**SW**
4.0' / 2.9' na	4.0 - 8.0'	0.0	Fine-Medium Sand with trace Fine Gravel, gray-brown, medium firm, saturated ***Collected sample SB-22B from 5-8' interval @ 10:45***	**SW**
			End of Boring @ 8.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-23

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 2.2' na	0 - 4.0'	0.0	0-5": Asphalt 5-11": Fine-Medium Gravel, tan, dry 11-13": Coal Dust, black 11-26": Fine-Medium Sand, gray-brown, friable, moist at bottom ***Collected sample SB-23A from 0-3' interval @ 10:50*** ***Collected duplicate SB-XA from 0-3' interval @ 10:55***	GW SW
4.0' / 2.6' na	4.0 - 8.0'	0.0	48-63": Fine-Medium Sand with trace Gravel, gray-brown, friable, saturated Fine-Medium Sand, no Gravel, tan, saturated ***Collected sample SB-23B from 5-8' interval @ 11:00***	SW
			End of Boring @ 8.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-24

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 2.0' na	0 - 4.0'	0.0	0-4": Asphalt 4-24": Fine-Medium Sand, gray-brown, well graded, interbedded layer of Very Fine Sand 19-21", dry, no odor, moist at bottom ***Collected sample SB-24A from 0-3' interval @ 11:05***	**SW**
4.0' / 4.0' na	4.0 - 8.0'	0.0	Fine-Medium Sand with trace Gravel, gray-brown, friable, saturated ***Collected sample SB-24B from 5-8' interval @ 11:15***	**SW**
			End of Boring @ 8.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
SB-25

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/27/2009
Drilling Method: Direct Push; 2" probe
Sampling Method: Direct Push: 2" x 48" clear soil liners
Development Method:

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
4.0' / 2.0' na	0 - 4.0'	0.0	0-4": Asphalt 4-24": Fine-Medium Sand, gray-brown, well graded, dry, no odor, moist at bottom ***Collected sample SB-25A from 0-3' interval @ 11:20***	**SW**
4.0' / 3.8' na	4.0 - 8.0'	0.0	Fine-Medium Sand with trace Gravel, gray-brown, friable, saturated ***Collected sample SB-25B from 5-8' interval @ 11:25***	**SW**
			End of Boring @ 8.0' No Well	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
DB-101

Site Name: **Moran Plant North / Wetland**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/12/2010
Drilling Method: Wash/Spin and Drive Casing
Sampling Method: Spilt Spoon, 140 lb. hammer, 30" drop
Development Method: na

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
2.0' / 1.0' 2,5,7,8	0 - 2.0'	0.0	0-7": Fine Silty Sand (Loam), brown 7-24": Fine Sand, olive gray, well graded, loose, no odor, no evidence of coal ***Collected DB-101S from 0-1' interval @ 08:45***	SW
2.0' / 1.5' 6,19,17,17	2.0 - 4.0'	0.0	Fine Sand, olive gray, red oxidation mottles at 24", wet below, turning grayer, thin silt layer at 46"	SW
2.0' / 1.7' 39,18,19,18	4.0 - 6.0'	0.0	Fine Sand, gray, well graded, wet, no odor ***Collected DB-101D from 4-6' interval @ 09:55***	SW
2.0' / 2.0' 11,10,9,10	6.0 - 8.0'	0.0	Fine Sand, gray, well graded, wet, no odor	SW
2.0' / 1.2' 9,5,6,6	8.0 - 10.0'	0.0	Medium Sand, olive brown, well graded, wet, no odor	SW
2.0' / 0.9' 8,5,4,2	10.0 - 12.0	0.0	Fine-Medium Sand, brown, well graded, wet, no odor	SW
2.0' / 1.8' 16,12,18,24	12.0 - 14.0	0.0	Fine-Medium Sand, brown, well graded, wet, nor odor, Very Fine Sand layer at 13', coarsening from 13-14'	SW
2.0' / 1.8' 29,50,50 for 3"	14.0 - 15.3	0.0	Coarse Sand and Fine Gravel, brown, dense Refusal at 15.3'	SW/ GW
			End of Boring @ 15.3' Backfilled with Cuttings	

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
DB-102

Site Name: **Moran Plant North / Wetland**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : SDI, Inc.
Logged by: Miles Waite

Date Installed: 8/12/2010
Drilling Method: Wash/Spin and Drive Casing
Sampling Method: Spilt Spoon, 140 lb. hammer, 30" drop
Development Method: na

Grade = 0

NO WELL INSTALLED

Ft<Grade

Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol
2.0' / 1.3' 2,2,10,30	0 - 2.0'	0.0	0-15": Fine Silty Sand (Loam), dark brown, coal on surface 15-24": Very Fine Sand, gray, well graded, loose ***Collected DB-102S from 0-1' interval @ 11:10***	SW
2.0' / 1.2' 30,17,18,26	2.0 - 4.0'	0.0	Fine-Medium Sand, gray, well graded, fining with depth, few coal clasts and black coal dust at 3.5'	SW
2.0' / 1.1' 15,15,13,11	4.0 - 6.0'	0.0	Fine Sand, gray-brown, well graded, wet, no odor ***Collected DB-102D from 4-6' interval @ 12:10***	SW
2.0' / 1.8' 3,4,3,6	6.0 - 8.0'	0.0	Fine Sand, brown, well graded, wet, no odor	SW
2.0' / 1.0' 6,4,6,8	8.0 - 10.0'	0.0	Fine Sand, brown, well graded, wet, no odor	SW
2.0' / 1.2' 4,6,7,7	10.0 - 12.0	0.0	Fine-Medium Sand, reddish brown, well graded, wet, grading to Fine Silty Sand at 12'	SW
2.0' / 1.3' 13,13,21,27	12.0 - 14.0	0.0	Fine Sand, gray-brown, well graded, wet, no odor, coarsening to medium sand at 13.5'	SW
1.5' / 1.2' 35,38,50 for 5"	14.0 - 15.5	0.0	Coarse Sand and Fine Gravel, brown, dense Refusal at 15.5'	SW/ GW
			End of Boring @ 15.5' Backfilled with Cuttings	

Legend

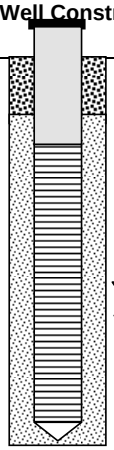
- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Approximate Water Level During Drilling, below grade

SOIL BORING LOG
WELL CONSTRUCTION RECORD
MW-201

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : Chris Aldrich, SDI
Logged by: Miles Waite

Date Installed: 1/19/2011
Drilling Method: jack hammer and hand auger
Sampling Method: grab sampling
Development Method: Peristaltic Pump



Grade = 0	Well Construction	Pen/Rec(') BlowCounts	Interval (ft)	PID (ppm)	Soil Characteristics	Letter Symbol	Graphic
	1.6' stickup						
0.5			0-15"		crushed stone		
1.0			15"		filter fabric		
1.5			15-21"	0.0	Well Graded Fine Sand, brown, loose	SW	
2.0					***Collected SS-201S from 15" @ 0930***		
2.5			24"	0.0	Well Graded Medium Sand, tan, firm, dry		
3.0							
3.5			36"	0.0	Well Graded Medium Sand, tan, firm, dry		
4.0							
4.5			48"	0.0	Well Graded Medium Sand, tan, firm, wet below	SW	
5.0							
5.5			66"	0.0	Well Graded Medium Sand, tan, firm, wet		
6.0			78"	0.0	Well Graded Medium Sand, tan, firm, wet		
6.5					***Collected SS-201D from 78" @ 0955***		
7.0					End of Boring		
7.5					Set well @ 6.5'		
8.0							
8.5							
9.0							
9.5							
10.0							
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							
14.0							
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							
19.0							
19.5							
20.0							

Legend

- Road Box with Bolt Down Cover, Set in Cement.
- Existing Surface.
- Bentonite Seal Placed in Annulus.
- Grade #1 Silica Sand Pack Placed in Annulus.
- Drill Cuttings Placed in Annulus.
- Locking Plug.
- 1" ID, Schedule 40 PVC Riser.
- 1" ID, Schedule 40 PVC, 0.020"-Slotted Well Screen
- Plug Point
- Approximate Water Level During Drilling, below grade
- Static Water Level During Sampling

SOIL BORING LOGS
HAND BORINGS

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : Miles Waite
Logged by: Miles Waite

Date Installed: 11/3/2005
Drilling Method: hand auger
Sampling Method: stainless steel spoon
Development Method: na

Boring	Depth	PID	Description
SS-1	0-6"	0.0	fine sand with angular pebbles (fill), brown
			Collected SS-1 from 6" interval @ 1420 (PAH, As, Cn)
SS-2	0-3"		aspahlt
	3-8"	0.2	fine sand with gravel, dark brown with layers of black coal dust
			Collected SS-2 from 8" interval @ 1430 (PAH, As, Cn)
SS-3	0-4"		loamy sand, roots, light brown
	4-6"	0.2	loamy sand, dark brown, coal clast
			Collected SS-3 from 6" interval @ 1445 (PAH, As)
SS-4	0-3"		loamy sand, roots, light brown
	3-6"	0.0	loamy sand, dark brown, several coal clasts
			Collected SS-4 from 6" interval @ 1500 (PAH, As)
SS-5	0-3"		loamy sand with gravel, roots, light brown
	3-6"	0.0	loamy sand with coal, black
			Collected SS-5 from 6" interval @ 1515 (PAH, As)
SS-6	0-3"		loamy sand, roots, light brown
	3-6"	0.0	loamy sand with coal, black
			Collected SS-6 from 6" interval @ 1525 (PAH, As)
SS-7	0-2.5"		loamy sand, roots, light brown
	2.5-6"	0.0	loamy sand with coal dust, black
			Collected SS-7 from 6" interval @ 1535 (PAH, As)

WEM Project # 02052-28
VT DEC Site # 2005-3357
Drilled by : Miles Waite
Logged by: Miles Waite

Date Installed: 8/12/2010
Drilling Method: hand auger
Sampling Method: stainless steel spoon
Development Method: na

Boring	Depth	PID	Description
SB-103	0-2"		organic matter, dead vegetation, dark brown
	2-12"	0.0	silty fine sand with gravel, reddish-brown, saturated below 3"
			Collected SB-103 from 0-1' interval @ 1345
			Collected duplicate SB-X from 0-1' interval (VOC analysis only)
SB-104	0-2"		loam with roots and vegetation, brown
	2-10"	0.0	silty fine sand with trace clasts of coal to 10"
	10-12"		silty fine sand with gravel, reddish-brown, no coal
			Collected SB-104 from 0-1' interval @ 1430
SB-105	0-12"	0.0	silty fine sand with gravel, brown, no coal
			Collected SB-105 from 0-1' interval @ 1440
SB-106	0-12"	0.0	silty fine sand with gravel, very dark brown, trace clasts of coal to 12"
			Collected SB-106 from 0-1' interval @ 1450

SOIL BORING LOGS
HAND BORINGS

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

WEM Project #	02052-28	Date Installed:	1/19/2011
VT DEC Site #	2005-3357	Drilling Method:	jack hammer and hand auger
Drilled by :	Chris Aldrich, SDI	Sampling Method:	grab sampling
Logged by:	Miles Waite	Development Method:	na

Boring	Depth	PID	Description
SB-202	0-24"	0.0	medium sand and gravel, frost, light brown, loose, no odor
			Collected SB-202 from 12" @ 1015 (PCB)
	24-39"	0.0	medium well graded sand with coal dust and coal clasts, black, underlain by black loamy layer with gray mottling
	39-48"	0.0	medium well graded sand, tan, firm, no odor, wet at 48"
	48-60"	0.0	medium well graded sand, tan, firm, no odor, wet
SB-203	0-2"		crushed stone above filter fabric
	0-22"	0.0	medium well graded sand with gravel, loose, refusal at chuck of concrete
			Collected SB-203 from 12" @ 1035 (PCB)
SB-204	0-2"	0.0	crushed stone, frost
	2-12"	0.0	medium well graded sand with gravel, loose, few roots
			Collected SB-204 from 12" @ 1050 (PCB)
	12-24"	0.0	medium well graded sand, tan, firm, no odor, wet below 24"
	48"	0.0	medium well graded sand, tan, firm, no odor, wet
	60"	0.0	medium well graded sand, tan, firm, no odor, wet
SB-205	0-12"	0.0	loam above fine-medium well graded sand, light brown, loose, few roots
			Collected SB-205S from 12" @ 1100 (PCB & TPH)
	12-24"	0.0	medium well graded sand, tan, firm, no odor, dry
	48"	0.0	medium well graded sand, tan, firm, no odor, wet below 42"
	60"	0.0	medium well graded sand, tan, firm, no odor, wet
			Collected SB-205D from 60" @ 1110 (PCB)
SB-206	0-12"	0.0	fine-medium well graded sand, light brown, loose
			Collected SB-206S from 12" @ 1120 (PCB)
	12-24"	0.0	medium well graded sand, tan, firm, no odor, dry
	24-35"	0.0	medium well graded sand, tan, firm, no odor, dry
	35"	1.4	medium well graded sand, color change to gray, petroleum odor, dry
	43"		medium well graded sand, gray, petroleum odor, wet
	60"	2.9	medium well graded sand, gray and black zones, obvious petroleum odor, sheen on soil, wet
			Collected SB-206D from 60" @ 1130 (TPH)
SB-207	0-12"	0.0	fine-medium well graded sand, light brown, loose, frost to 2"
			Collected SB-207 from 12" @ 1145 (PCB)
	12-24"	0.0	medium well graded sand, tan, firm, no odor, dry
	24-52"	0.0	medium well graded sand, tan, firm, no odor, wet below 46"
SB-208	0-12"	0.0	fine-medium well graded sand, light brown, loose, frost to 2"
			Collected SB-208 from 12" @ 1200 (PCB)
	12-24"	0.0	medium well graded sand, tan, firm, no odor, dry
	24-60"	0.0	medium well graded sand, tan, firm, no odor, wet below 46"
SB-209	0-18"	0.0	fine-medium well graded sand, light brown, loose, frost to 2"
	18-24"	0.1	medium well graded sand, tan, firm, light petroleum odor, no color change
	36"	0.0	medium well graded sand, tan, firm, no odor
	48"	0.0	medium well graded sand, tan, firm, no odor, wet
	60"	0.0	medium well graded sand, tan, firm, no odor, wet

SOIL BORING LOGS
HAND BORINGS

Site Name: **Moran Plant**
Lake Street, Burlington, Vermont

SB-210	0-12"	0.0	fine-medium well graded sand, light brown, loose, frost to 2"
	12-24"	0.0	medium well graded sand, tan, firm, some fill (brick clast)
	36"	0.0	medium well graded sand, tan, firm, no odor
	48"	0.0	medium well graded sand, tan, firm, no odor, wet
	60"	0.0	medium well graded sand, tan, firm, no odor, wet
			Collected SB-210D from 60" @ 1330 (TPH)

SOIL BORING LOG

Lamoureux & Dickinson, Inc.	Project #: 98152	Boring/Well Number: **BH-19**
Project: CEDO Urban Reserve	Location: Burlington, Vt.	Driller: Green Mountain Boring, Inc.
Ground Elevation (ft MSL):	Drilling Method & Equipment: 4" ID HSA, Acker AB2	

Date: 7-26-99	Logger: S. O'Brien	Drawn: SPO	Checked: JHF

Sample Parameters				Standard Penetration Test Results (6"-6"-6"-6") (N)	Soil Description
Sample Number	Interval (feet)	Recovery (inches)	PID Conc. (ppm)		Soil Name, USCS Group, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy
BH19-1	0-2	16	0	5,4,4,4 (8)	Moderate yellowish brown (10YR 5/4), fine SAND , loose, dry
BH19-2	2-4	16	0	6,4,4,5 (9)	Black (N1), very fine SAND, loose, dry-moist (like "coal dust")
BH19-3	4-6	19	0	8,4,2,1 (3)	same
BH19-4	6-8	18	0	4,2,2,1 (3)	same but wet
BH19-5	8-10	6	0	100/6"	Olive gray, mottled with orange, SAND, very dense, saturated
					Note: boring terminated at 10 feet bgs.
					Q:\1998\98152\LogBH-19.wpd

SOIL BORING LOG

Lamoureux & Dickinson, Inc.	Project #: 98152	Boring/Well Number: **BH-20/MW-10**
Project: CEDO Urban Reserve	Location: Burlington, Vt.	Driller: Green Mountain Boring, Inc.
Ground Elevation (ft MSL):	Drilling Method & Equipment: 4" ID HSA, Acker AB2	

Date: 7-26-99/7-30-99	Logger: S. O'Brien	Drawn: SPO	Checked: JHF

Sample Parameters				Standard Penetration Test Results (6"-6"-6"-6") (N)	Soil Description
Sample Number	Interval (feet)	Recovery	PID Conc. (ppm)		Soil Name, USCS Group, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy
BH20-1	0-2	12	0	6,7,7,8 (15)	gravel park lot over: Black (N1), sandy GRAVEL, medium dense, moist (FILL)
BH20-2	2-4	16	0	8,7,8,9 (17)	Olive gray (5Y 3/2), medium SAND, medium dense, moist
BH20-3	4-6	20	0	5,7,9,10 (19)	Moderate yellowish brown (10YR 5/4), fine-medium SAND with coarse sand lenses, wet
BH20-4	6-8	20	0	8,5,2,3 (5)	Moderate yellowish brown (10YR 5/4), coarse SAND, loose, saturated
					Note: boring terminated at 8feet bgs. Hole redrilled nearby to 10 feet bgs for completion of Monitoring Well MW-10
					MW-10: 2" SCH 40 PVC well, 0.01" slot screen **screen depth: 3-10' bgs** **sand pack: 2-10' bgs** **bentonite seal: 1-2' bgs** **grout to ground surface**
					Q:\1998\98152\LogBH-20MW-10.wpd

SOIL BORING LOG

Lamoureux & Dickinson, Inc.	Project #: 98152	Boring/Well Number: **BH-21/MW-13**
Project: CEDO Urban Reserve	Location: Burlington, Vt.	Driller: Green Mountain Boring, Inc.
Ground Elevation (ft MSL):	Drilling Method & Equipment: 4" ID HSA, Acker AB2	
Date: 7-26-99/7-30-99	Logger: S. O'Brien	Drawn: SPO / Checked: JHF

Sample Parameters				Standard Penetration Test Results (6"-6"-6"-6") (N)	Soil Description
Sample Number	Interval (feet)	Recovery	PID Conc. (ppm)		Soil Name, USCS Group, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy
BH21-1	0-2	12	0	8,10,10,10 (20)	Moderate yellowish brown (10YR 5/4), fine SAND, medium dense, moist
BH21-2	2-4	16	0	11,11,11,10 (21)	same
BH21-3	4-6	16	0	4,5,7,7 (14)	same but dry-moist
BH21-4	6-8	18	0	9,10,10,9 (18)	same but moist-wet
BH21-5	8-10	16	0	5,6,9,8 (17)	same but wet-saturated
					Note: boring terminated at 10 feet bgs. Hole redrilled nearby to 15 feet bgs for completion of Monitoring Well MW-13
					MW-13: 2" SCH 40 PVC well, 0.01" slot screen **screen depth: 5-15' bgs** **sand pack: 3-15' bgs** **bentonite seal: 1-3' bgs** **grout to ground surface**
					Q:\1998\98152\LogBH-21MW-13.wpd

SOIL BORING LOG

Lamoureux & Dickinson, Inc.	Project #: 98152	Boring/Well Number: **BH-22**
Project: CEDO Urban Reserve	Location: Burlington, Vt.	Driller: Green Mountain Boring, Inc.
Ground Elevation (ft MSL):	Drilling Method & Equipment: 4" ID HSA, Acker AB2	

Date: 7-26-99	Logger: S. O'Brien	Drawn: SPO	Checked: JHF

Sample Parameters				Standard Penetration Test Results (6"-6"-6"-6") (N)	Soil Description
Sample Number	Interval (feet)	Recovery (inches)	PID Conc. (ppm)		Soil Name, USCS Group, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy
BH22-1	0-2	11	0	25,15,9,11 (20)	Moderate yellowish brown (10YR 5/4), fine-medium SAND , medium dense, dry (6") over: coarse sand, moist (5")
BH22-2	2-4	8	0	20,13,10,15 (25)	Moderate yellowish brown(10YR 5/4), coarse SAND with silt, medium dense, wet-saturated
BH22-3	4-6	6	0	13,12,10,12 (22)	same, but saturated
					Note: boring terminated at 10 feet bgs.
					Q:\1998\98152\LogBH-22.wpd

SOIL BORING LOG

Lamoureux & Dickinson, Inc.	Project #: 98152	Boring/Well Number: **MW-14**
Project: CEDO Urban Reserve	Location: Burlington, Vt.	Driller: Green Mountain Boring, Inc.
Ground Elevation (ft MSL):	Drilling Method & Equipment: 4" ID HSA, Acker AB2	
Date: 8/3/99	Logger: S. O'Brien	Drawn: SPO	Checked: JHF

Sample Parameters				Standard Penetration Test Results (6"-6"-6"-6") (N)	Soil Description
Sample Number	Interval (feet)	Recovery	PID Conc. (ppm)		Soil Name, USCS Group, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy
					MW-14 was drilled just to the north of the Moran Plant; a boring log was not completed at this location
					MW-14: 2" SCH 40 PVC well, 0.01" slot screen **screen depth: 3-10' bgs** **sand pack: 2-10' bgs** **bentonite seal: 1-2' bgs** **grout to ground surface**
					Q:\1998\98152\LogMW-14.wpd

FIGURE 1
WELL NO. MW-A
Moran

Date Drilled: 11/23/2010
Logged by: MJJ

Source: Stone field notes, 2010
Date/initials: 12/30/2010 jab

STONE ENVIRONMENTAL INC

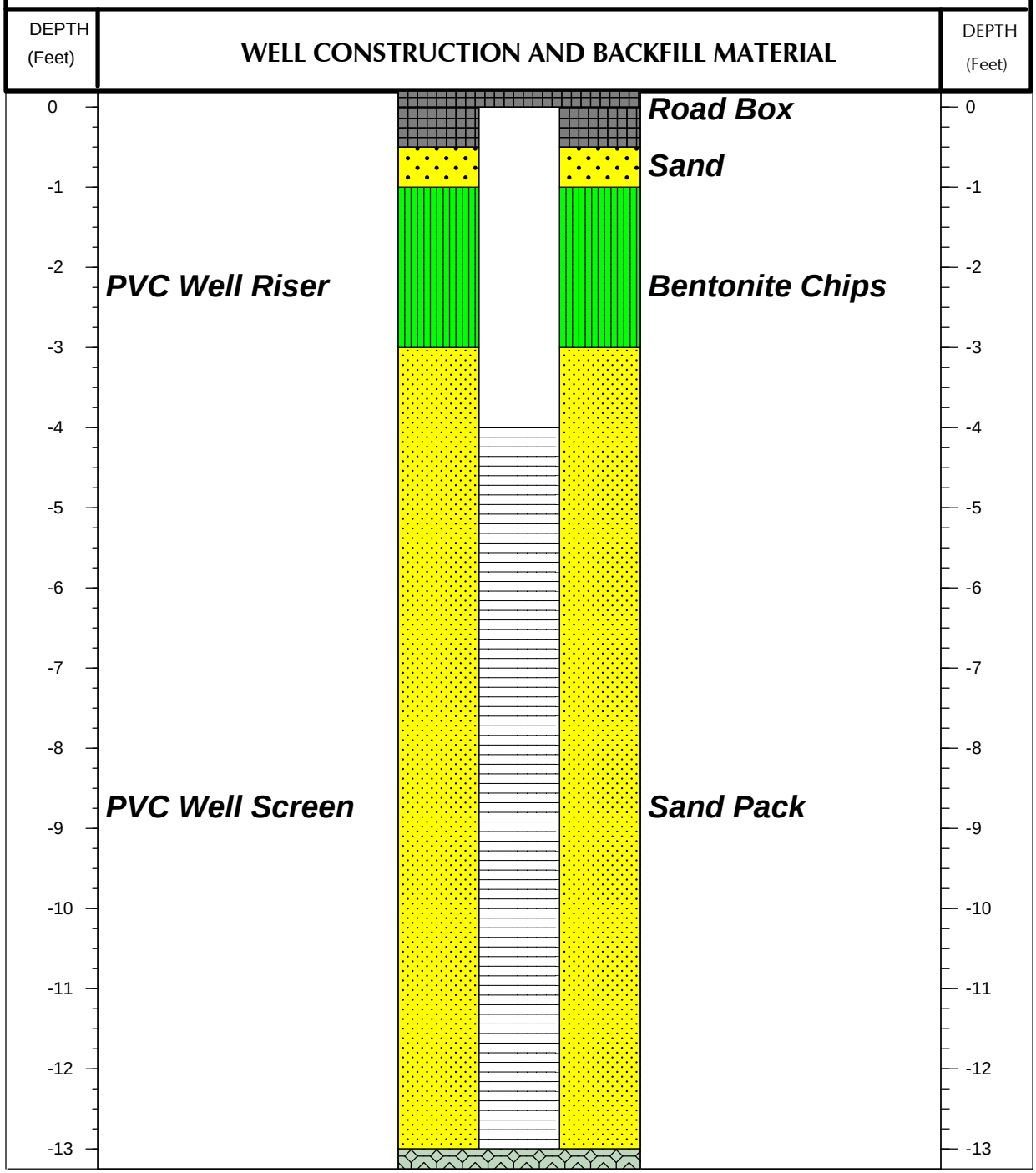


FIGURE 2
WELL NO. MW-B
Moran

Date Drilled: 11/23/2010
Logged by: MJJ

Source: Stone field notes, 2010
Date/initials: 12/30/2010 jab

STONE ENVIRONMENTAL INC

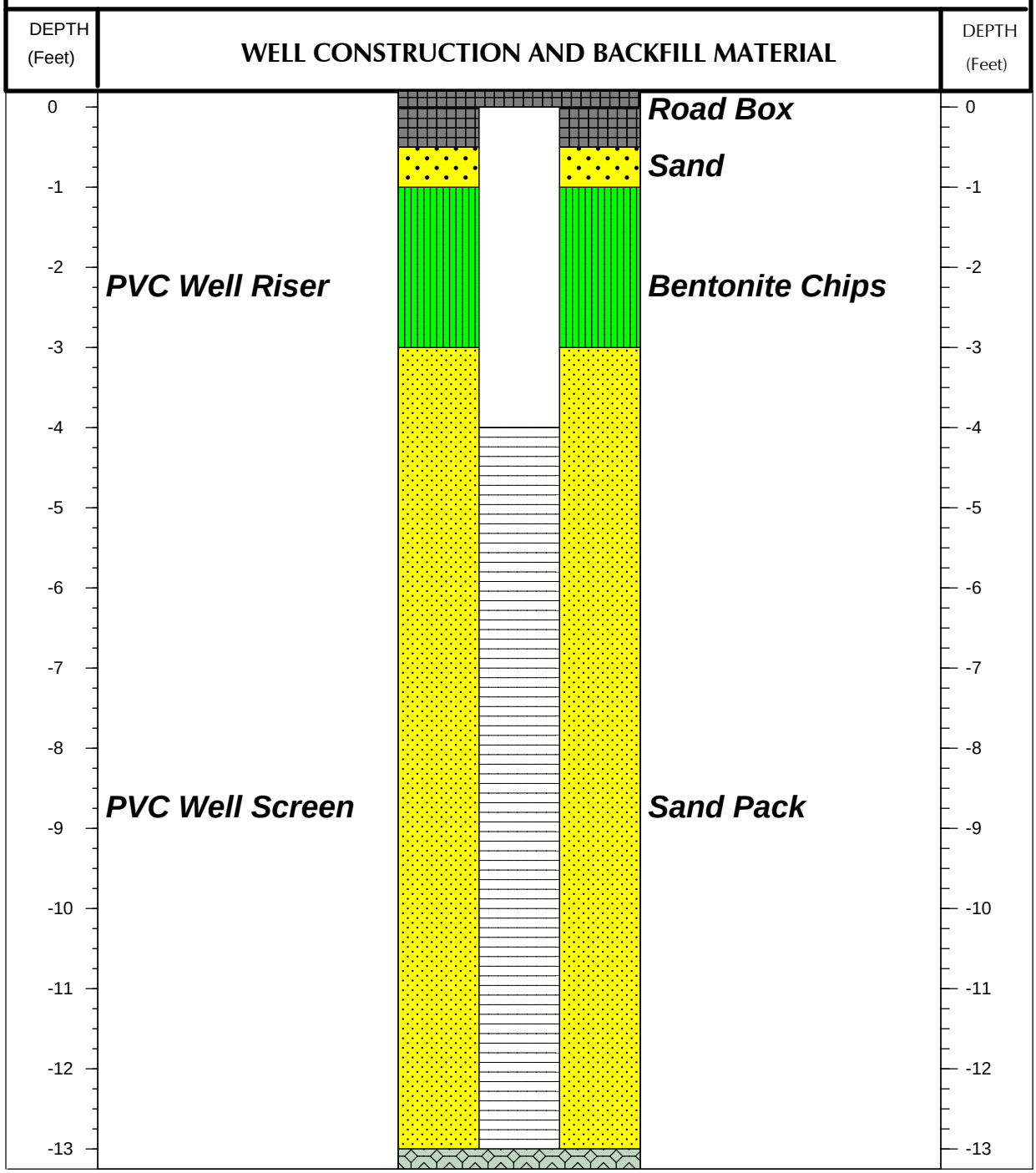
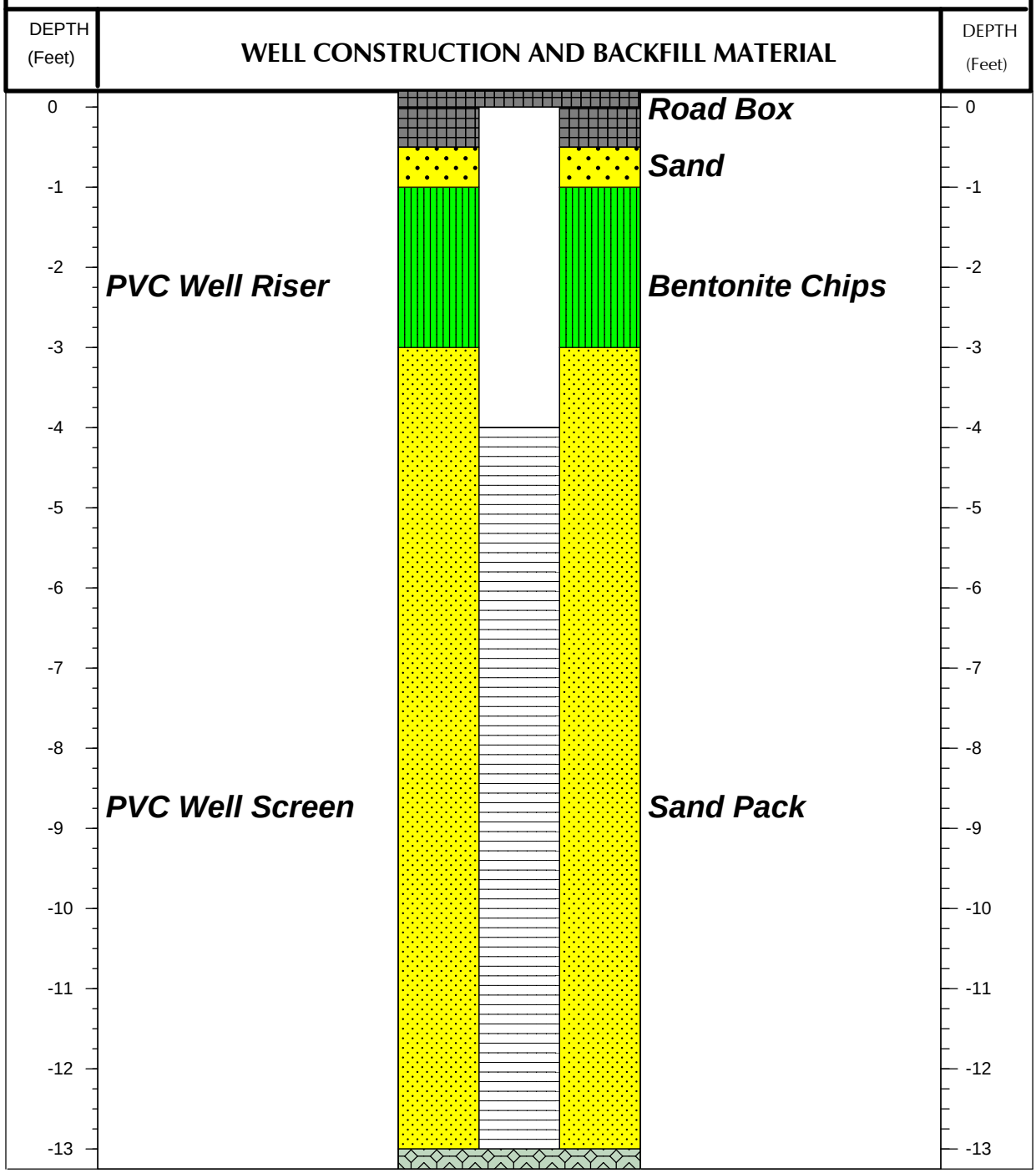


FIGURE 2
WELL NO. MW-C
Moran

Date Drilled: 11/23/2010
Logged by: MJJ

Source: Stone field notes, 2010
Date/initials: 12/30/2010 jab

STONE ENVIRONMENTAL INC



APPENDIX D
HEALTH & SAFETY PLAN

HEALTH AND SAFETY PLAN
for
ENVIRONMENTAL MONITORING AND CORRECTIVE ACTION MEASURES
at the
MORAN CENTER & WATERFRONT NORTH
475 LAKE STREET
BURLINGTON, VERMONT

August 2011

Prepared for:
City of Burlington
Community and Economic Development Office
City Hall, Room 32
149 Church Street
Burlington, Vermont 05401

Prepared by:

Waite Environmental Management, LLC.

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HEALTH & SAFETY PLAN REVIEW
SIGNATURE PAGE

INSTRUCTIONS: Field personnel of Waite Environmental Management, LLC (WEM) are required to receive a copy of the Health and Safety Plan (HASP), and to read, understand, and agree to the provisions of this plan. The Project Manager (PM) is responsible for distributing the HASP to personnel as they are assigned to the project. Personnel are required to sign this form indicating receipt of the HASP.

SITE NAME: Moran Center & Waterfront North
475 Lake Street, Burlington, Vermont

PROJECT MANAGER: _____
Miles E. Waite, PhD

I have received a copy, read, understood, and agree to comply with the provisions of the above referenced HASP for work activities on this project.

PRINTED NAME	SIGNATURE	DATE

HEALTH AND SAFETY PLAN

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared by Waite Environmental Management, LLC (WEM) to provide maximum protection to workers without significantly compromising the progress of the project. The Plan is only of value if read, understood, and adhered to by all affected personnel.

By signing this document, the reader acknowledges that all pages of the text are present, have been read, understood, and will be adhered to during operations at the former Moran Generating Plant ("Site") in Burlington, Vermont. WEM assumes that the reader will also adhere to all OSHA General Industry Standards.

This Plan governs the operations of WEM field personnel. It does not extend to any contractors working under the supervision of WEM. It is assumed that all contractors have their own health and safety plan and that they are fully and completely OSHA certified for the position they are working in. WEM offers a copy of our Plan so that contractors can have the general knowledge of the conditions on the Site as understood by WEM. Any questions about this Plan should be addressed to Miles E. Waite, the Project Manager.

This document provides a general Heath and Safety Plan for responding to hazardous material releases. This Plan is not all-inclusive and should be only used as a guide, not a standard.[1]

2.0 GENERAL SITE INFORMATION

The "Site" is composed 9.85 acres owned by the City of Burlington, and includes the building and grounds of the Former Moran Generating Plant, land occupied by the Burlington skate park, a portion of the Burlington Bike Path, portions of Lake Street and Penny Lane, parking and grounds of the Burlington Water Department and Burlington Department of Public Works (BDPW) water pumping facility, and grounds and electrical infrastructure of the Burlington Electric Department (BED) and Green Mountain Power (GMP). This Site is abutted to the north by the Urban Reserve and to the east by the Burlington bike path and railroad right-of-way. Directly to the south is the Burlington Water Department and U.S. Coast Guard. Lake Champlain abuts the property to the west.

The exterior contaminants of concern have been identified as arsenic in the shallow soil within the entire project area, polycyclic aromatic hydrocarbons (PAH) in the shallow soil within the entire project area, petroleum in soil and groundwater under Penny Lane and the BDPW parking lot, polychlorinated biphenyls (PCBs) in soil in a discrete zone in the former transformer yard,

[1] Plan patterned after document developed by the U.S. Coast Guard.

and chlorinated volatile organic compounds (VOCs) in groundwater in a small plume off the north side of the Moran Plant. The interior contaminants of concern inside the Moran Plant have been identified as PCBs in the concrete of the basement floor, residual contaminants in sediment in sub-basement channels, and a few remaining asbestos-containing materials (ACMs) in interior and exterior building components.

Redevelopment of the Site is anticipated to disturb an estimated 18,200 cubic yard (CY) of soil during the 2011-2012 construction work. Groundwater will also be encountered during the 2011-2012 construction work. The need for special treatment of groundwater or dewatering of excavations is not anticipated to be required with the exception of a few identified areas, in which management of groundwater will be accomplished by analytical sampling, settling in frac tanks, appropriate treatment, followed by discharge to the City sanitary sewer system. Redevelopment of the Moran Plant building in 2012 will involve raising the basement floor by seven feet with a layer of fill and new concrete slab. A sub-slab depressurization system will be installed to prevent potential indoor air quality impacts from external soil contaminants and contaminants within and under the existing concrete foundation.

3.0 PURPOSE

The purpose of this HASP is to provide standards for worker safety and protection during field activities conducted on during construction activities and on a routine basis in the future. The plan outlines standards and mandatory procedures relative to physical and chemical hazards encountered at sites, communication, training, worker health monitoring, decontamination procedures and levels of personal protection.

This plan is applicable to all personnel working at sites where mandatory worker health and safety training is required by State of Federal agencies. It is intended for use at sites where information regarding potential site hazards is available in the form of background research, pervious sampling results, etc.

Activities to which this plan is applicable include the following:

- Purging and sampling groundwater monitoring wells
- Modification and closure of monitoring wells
- Screening and sampling of soil
- Oversight of excavation and trenching of soil
- Soil borings, monitoring well installation
- Surveying
- Interior building sampling and dewatering
- Oversight/inspections of interior construction work

This plan does <u>not</u> cover procedures for entry into trenches, excavations, or confined spaces, cleanup or handling of lead paint, guano, or asbestos containing materials.

4.0 ONSITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated job functions. (Note: one person may carry out more than one job function.)

Project Manager/Safety Officer:	Miles Waite, WEM
Field Hydrogeologist	Miles Waite, WEM
Field Technician	subcontracted personnel
Client Contact	Nick Warner, CEDO

During all construction, monitoring and remediation activities an exclusion zone will be established in which all personnel arriving and departing the Site will log in and out with the Project Manager/Safety Officer. All activities onsite must be cleared through the Project Manager/Safety Officer.

5.0 ONSITE CONTROL

WEM has been designated to coordinate access control and security at the Site during site work. The groundwater sampling area is generally delineated by the fence that surrounds the building. The soil capping/excavation areas are in the grassy area north of the building and the fenced area immediately surrounding the building. The interior work area includes all five levels of the building. No unauthorized personnel will be allowed inside the building or fenced area, and all entry inside the building must be with the Safety Officer present. Where necessary, work area boundaries shall be identified by flagging/caution tape supported by steel rods, wooden stakes, or other suitable barriers.

Absolutely no smoking shall be permitted within 50 feet of the work area.

No confined space entry will be permitted without authorization of the WEM Site Inspector. Confined space entry shall be conducted only by those with OSHA confined space training, and shall be supervised/monitored by the buddy system.

Only OSHA-certified hazardous operations personnel should be permitted to physically handle or sample hazardous or contaminated materials.

Pursuant to 29 CFR 1910-120 (the OSHA standard for hazardous waste operations), an uncontrolled release site should be properly marked to delineate the following site safety zones:

The **Exclusion Zone** is defined as the immediate vicinity surrounding an area where a release has occurred or contaminated materials have been encountered.

The **Contaminant Reduction Zone** is defined as the area designated by the Safety Officer for the decontamination of tools and personal protective equipment (PPE), and is located between the Exclusion Zone and the Support Zone.

The **Support Zone** is defined as those portions of the Site where no personnel or equipment having contact with hazardous materials may enter without decontamination procedures. This will be the primarily assembly point in the event of an emergency. Alternate assembly areas may be chosen at the discretion of the Safety Officer.

6.0 SITE HAZARD EVALUATION SUMMARY

Physical Hazards at the Site

1. **Exterior Terrain**: No specific terrain hazards are known at the time of this plan.

2. **Traffic**: Traffic hazards may an issue during construction work, particularly during the utility work and road construction along Penny Lane and the bike path. Traffic control personnel will be required during all road construction work.

3. **Moran Plant (Interior and Exterior)**: Falling hazards are present due to gaps in the steel mezzanine that access the stairs to the basement level and the grated steel upper platforms. Water hazards are present in the basement level which is flooded for much of the year, compounded by the freezing of the ice during winter months. The presence of the ice means that trips/slips/falls and hypothermia are additional hazards.

4. **Confined Spaces**: Confined spaces are present at the Site, including the coal tunnel, coal elevator shaft, sub-basement channels inside the Moran Plant, and frac tanks. Entry into confined spaces shall be by properly trained personnel only. Entry into trenches deeper than 5 ft will require following all OSHA guidelines for trench protection.

3. **Equipment**: Heavy machinery (excavators, loaders, trucks, etc.) will be present during the excavation processes. Pumps will be used for dewatering (coal tunnel, basement, excavation). Also, equipment used during the sampling events may include water level probes, groundwater pumps, water quality meters, and portable generators. Personnel should follow the manufacturer's equipment operation instructions and take required safety precautions.

Chemical Hazards at the Site

1. **Materials Used/Stored at Site**: coal, electrical generating equipment, PCBs, petroleum.

2. **Chemicals Detected in Soil/Groundwater**: Chlorinated volatile organic compounds (tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, 1,1-dichloroethane, and 1,1,1-trichlorethane) have been detected in the groundwater on the north side of the Plant. The source of these chlorinated VOCs is not well established, but is assumed to be from the solvents used to clean the former electrical generating equipment. Petroleum VOCs have been detected in soil and groundwater under Penny Lane. The shallow soil contains residual semi-volatile organic compounds, specifically benzo(a)pyrene, a by-product of

the former coal burning operation. The shallow soil also contains the metal arsenic, also a by-product of the storage of coal at the Site.

3. **Chemical Hazards in Moran Plant (Interior and Exterior)**: There are several building hazards. Five (5) materials in/on building that tested positive for asbestos that have yet been mitigated are: 1) black tar paper material inside the ceramic wall of the shower area of the main floor ("operations level" at 116.0 ft elevation), 2) mudded joint fitting surrounding piping in the ceiling of the shower area of the main floor, 3) gasket rope on the lower portion of the north side exterior structural steel, 4) gasket material in the lower portion of the north side exterior structural steel, and 5) caulking in the lower portion of the north side exterior structural steel. Flaking lead paint is present on much of the painted steel framework on the main level. Polychlorinated biphenyls (PCBs) are present in the concrete in the basement floor .

Action levels for the listed compounds are summarized below (action levels apply to measured concentrations in worker breathing space and not measurements collected from soil screening).

Contaminant Action Levels

Chemical Name	IDLH (ppm)	PEL TWA (ppm)	Odor Threshold (ppm)	Upgrade to Level C (ppm)	Cease Works and Evacuate (ppm)
Tetrachloroethene	150	100	1.0-4.7	PID readings of 25	PID Readings of 50
Trichloroethene	1,000	100	28		
Cis-1,2-Dichlorethene	1,000	200	400-1400		
1,1-Dichlorethane	3,000	100	120		
1,1,1-Trichlorethane	700	350	>120		
Benzene	500	1 (PEL)	1.5	ND	ND
Toluene	500	50	2.9	ND	ND
Ethylbenzene	800	100	2.3	ND	ND
PCBs	NA	NA	NA	ND	ND
Benzo(a)pyrene	NA	NA	NA	ND	ND
Arsenic	NA	NA	NA	ND	ND
Lead	NA	NA	NA	ND	ND
Asbestos	NA	NA	NA	ND	ND

Notes:
PPM = parts per million
IDLH = Immediately Dangerous to Life or Health
PEL = OSHA Permissible Exposure Limit
TWA = Time weighted average (8-hour average)
NA = data not available
PID = photo-ionization detector
ND = Not detectable with a PID

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Based on evaluation of the potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

Location	Job Function	Level of Protection
Exterior	Soil sampling, groundwater sampling, dewatering	Level D
Interior	Air testing, SSD construction and monitoring, dewatering	Level D
Interior	removal of ACMs, lead paint (by subcontractors, not WEM)	Level C

Specific protective equipment of each level of protection is as follows:

Level A:	Fully-encapsulating suit SCBA Disposable coveralls	Level C:	Rain Suit Full-face or half-mask canister respirator Gloves (latex or nitrile) Over-boots
Level B:	Splash gear SCBA	Level D:	Hard hat Work boots (steel toed) Gloves (latex or nitrile) Eye protection

For tasks that require Level C Protection, respirators shall have combined organic vapor & P100 HEPA particulate filters.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFTEY OFFICER.

8.0 COMMUNICATION PROCEDURES

Three (3) horn blasts is the emergency signal to indicate that all personnel should leave the exclusion zone.

The following standard hand signals will be used:

SIGNAL	MEANING
Hand gripping throat	Out of air, can't breathe
Grip partner's wrist or Both hands around waist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	OK, I am alright, I understand
Thumbs down	No, negative

9.0 DECONTAMINATION PROCEDURES

Decontamination procedures will be required for all personnel receiving direct exposure to contaminated materials.

Decontamination will consist of removing all outer protective clothing and cleaning all non-disposable equipment with a soapy solution, followed by clean water rinse.

10.0 EMERGENCY CONTACTS

		PHONE #
Fire Department:	Burlington Fire Department	911
Police Department:	Burlington Police Dept	911
	State Police (Williston)	(802) 878-7111

Hospital: Fletcher Allen Hospital (802) 847-0000
Directions from site: Take Lake Street back to Battery Street. Take a left onto Battery to the top of the hill, and then turn right onto Pearl Street. Follow Pearl Street to the top of the hill past University and turn right into hospital entrance.

Other Applicable Emergency Contacts:

City of Burlington	(802) 865-7144
Burlington DPW	(802) 863-9094

Information for Emergency Personnel:
Address of site: 475 Lake Street; nearest cross road: Depot Street

11.0 EMERGENCY PROCEDURES

The following standard emergency procedures shall be used by onsite personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible of the appropriate procedures are followed. These procedures may be modified depending on the type of emergency.

Personal injury in the Exclusion Zone:

Upon notification of any injury in the Exclusion Zone, the designated emergency signal of three (3) horn blasts shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to remove the injured person. The rescue personnel and injured person should attempt to decontaminate to the extent possible prior to movement into the Support Zone. The onsite EMT shall initiate the appropriate first aid, and contact should be made for an ambulance with the designated medical facility (if

required). No persons shall re-enter the Exclusion Zone until the cause of injury or symptoms is determined.

Personal injury in Support Zone:

Upon notification of an injury in the Support Zone, the Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the onsite EMT initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency signal of three horn blasts shall be sounded and all site personnel shall move into the Decontamination Zone for further instructions. Onsite activities will stop until the added risk is removed or minimized.

Fire/Explosion:

Upon notification of a fire or explosion onsite, the designated emergency signal of three horn blasts shall be sounded and all onsite personnel shall assemble in the Decontamination Zone. The fire department shall be alerted and all personnel moved a safe distance from the involved area. Small fires will be fought with hand-held extinguishers.

PPE Failure

If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure

If any other equipment onsite fails to operate properly, the Site Inspector and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations onsite. If the failure affects the safety of personnel, than all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

In situations when an onsite emergency results in the evacuation of the Exclusion Zone, personnel shall not re-enter until:

(1) The conditions resulting in the emergency have been corrected.
(2) The hazards of been reassessed.
(3) The HASP has been reviewed.
(4) Site personnel have been briefed on any changes in the HASP.

12.0 PLAN LIMITATIONS

This health and safety plan governs the operations of WEM staff/employees[2]. It does not extend to any contractors or subcontractors working under the supervision of WEM. WEM assumes that all contractors have their own heath and safety plan and that they are fully and completely OSHA certified for the position that they are working in. WEM offers a copy of this Plan to that the contractors can have a general knowledge of the conditions of the Site as known to WEM, and how these conditions guide personnel site operations.

[2] At the time of the creation of this HASP, there are no employees of WEM. Miles Waite of WEM will initially be the only worker to be covered under this plan.

EMERGENCY PHONE NUMBERS

VERMONT POISON CENTER.....1-800-658-3456

HOSTPIAL.....(802) 847-0000

FIRE.....911

POLICE.....911

AMBULANCE.....911

U.S. COAST GUARD, BOSTON.....(617) 565-9000

VT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPILL REPONSE.....(802) 241-3888
SITES MANAGMENT.....(802) 241-3888

WAITE ENVIRONMENTAL MANAGEMENT.....(802) 860-9400

KAS, INC…….....(802) 383-0486

BURLINGTON CEDO…….....(802) 865-7144

BURLINGTON DPW.....…….(802) 863-9094

DIGSAFE ID# .....

Moran Center / Waterfront North
DAILY INSPECTION REPORT

Date:		**Day:**	**Prepared By:**
Location:	475 Lake Street, Burlington	**Weather:**	
Job Activity:	Corrective Action Work, Moran Center / Waterfront North Project, Burlington, VT VTDEC Project ID 2005-3357,		
Contract:		**Snow / Rain Fall (overnight):**	

STAKEHOLDERS	**REPRESENTATIVE'S NAME(title, hours onsite)**
Oversight	
Oversight	
Contractor	
Contractor	
Subcontractor	
Subcontractor	
Subcontractor	

Description of Corrective Action Activities:

TASK	***DETAILS (Personnel and Equipment Used)***

Problems/ Deviations /Unexpected Contaminant Conditions :

Health & Safety	

Moran Center / Waterfront North
Flying A Site
SOIL STOCKPILING INVENTORY LOG SHEET

DATE:	LOAD #:	BROUGHT IN OR BROUGHT OUT?	SOIL CLASS (A, B, C, D1, D10)	SOIL PILE (A, B, C, D1 OR D10)	FINAL DESTINATION

APPENDIX E
DRAFT NOTICE TO LAND RECORDS

Notice to the City of Burlington Land Records

This is to serve notice to the City of Burlington, Vermont, that at the City of Burlington property generally identified as 475 Lake Street has contaminants in soil and groundwater in the subsurface and contaminants inside the Moran Plant building from the historic industrial uses of the property and surrounding area. This property is described as City of Burlington "Parcel A" in the *Boundary Survey Lands of City of Burlington off Lake Street, Burlington, Vermont* prepared by Vermont Survey and Engineering, Inc. dated November 30, 2010, and recorded in Bk.___ Pg.____. The property is further described in deeds recorded in Bk. 198, Pg. 39, Bk. 138, Pg. 573, and Bk. 438, Pg. 402 in the City of Burlington records. The property is described by the Vermont Department of Environmental Conservation, Waste Management Division records as the "Moran Plant Property", Sites Management Section (SMS) Site # 2005-3357. A portion of the property is also identified as "Burlington Water Department" Site, SMS Site #90-0540.

Contamination of soil by polycyclic aromatic hydrocarbons (PAHs) has resulted from the former combustion of coal and wood by the former Moran Generating Station during the period 1953-1986, as well as from general lumber and railroad industrial activities and two lumber yard fires that occurred during the late 1800s to mid 1900s. The PAHs are present in the shallow soil in the range of 7.0-8,245 ug/Kg expressed as Benzo(a)pyrene Toxicity Equivalence. The PAHs are limited in depth to the upper 2.0 feet, but are present in most soil on the property with the exception of the northern portion. PAHs are not present in groundwater. As part of the 2011 redevelopment effort, the PAH contaminated soils have been covered by either impervious surface of a 6-inch layer of clean fill so are not exposed at the ground surface.

Contamination of soil by arsenic has resulted from the former use and storage of coal by the former Moran Generating Station during the period 1953-1986. Arsenic is present in the shallow soil in the range of 2.7-88.5 mg/Kg. The arsenic is naturally occurring in all soil on the property, but is present as a contaminant in a 10,600 ft^2 area under the lawn north of the Former Moran Generating Station where the former coal was stored in a large pile. Arsenic is also present in groundwater near the Former Moran Station in the range of 3-18 ug/L. As part of the 2011 redevelopment effort, the arsenic contaminated soils have been covered by either impervious surface of a 6-inch layer of clean fill so are not exposed at the ground surface.

Contamination of soil and groundwater by tetrachloroethene (PCE) and trichloroethene (TCE) has resulted from the former use of degreasing solvents by the former Moran Generating Station during the period 1953-1986. PCE and TCE are present in soil at a depth of 6.5-7.0 ft at concentrations of 222 and 235 ug/Kg, respectively. PCE and TCE are present in groundwater at maximum concentrations of 7.0 and 28.0 ug/L, respectively. The PCE and TCE are present in a 1,100 ft^2 area off the north end of the Former Moran Generating Station. As part of the 2011 redevelopment effort, the PCE/TCE contaminated zone has been covered by impervious surface so is not exposed at the ground surface.

DRAFT

Contamination of concrete by polychlorinated biphenyls (PCB) has resulted from the former use of PCB-containing electrical equipment in the basement of the Former Moran Generating Station during the period 1953-1986. PCBs are present in the concrete floor with an elevation of 96.0 ft over most of the 15,200 ft^2 basement the range of 0.04-15 mg/Kg. As part of the 2012 redevelopment effort, the PCB contaminated concrete has been left in place covered by a new 8.0 ft layer of fill that contains vapor control piping and a vapor barrier and a new 1.0 ft thick concrete slab foundation.

Contamination of sediment by PAHs, PCBs, arsenic, lead and mercury has resulted from the accumulation of particulate contaminants from the building in trenches underneath the basement floor due to years of regular flooding of the basement. The sediment is present in a thin layer in two (2) 100 ft x 4 ft x4 ft trenches with a bottom elevation of 91.5 ft that are present under the northern and southern ends of the Moran Plant basement. PAHs are present in the range of 16.8-43.4 mg/Kg, PCBs are present in the range of 0.7-6.3 mg/Kg, arsenic is present in the range of 38-170 mg/Kg, lead is present in the range of 680-1,800 mg/Kg, and mercury is present in the range of 34-58 mg/Kg. As part of the 2012 redevelopment effort, the contaminated sediment has been left in place in the water-filled trenches and covered by a new 8.0 ft layer of fill that contains vapor control piping and a vapor barrier and a new 1.0 ft thick concrete slab foundation.

Details regarding this property and the contaminants are outlined in the *Corrective Action Plan, Moran Center and Waterfront North*, prepared by Waite Environmental Management, LLC, dated August 24, 2011. All proposed redevelopment activities that encounter the existing contamination will be conducted in accordance with the CAP. Copies of this CAP are in the site file and are available for review at the Vermont Department of Environmental Conservation, Waste Management Division offices in Waterbury, Vermont.

Prior to conducting any subsurface work, excavation, groundwater extraction, or coring/demolition through the new concrete floor in the vicinity of the above described contamination on the property, the Agency of Natural Resources (ANR), Department of Environmental Conservation (DEC), Waste Management Division (WMD), must be notified. The status of this site may only be updated or altered by the Vermont ANR/DEC/WMD. For further information contact:

Vermont Agency of Natural Resources
Department of Environmental Conservation
Waste Management Division
103 South Main Street 1 West Building
Waterbury, VT 05671 -0404
Tel: (802) 241 -3888

Dated this ____day of _____. _____

City of Burlington

DRAFT