

*Environmental
Strategies
& Management*

**MASSACHUSETTS CONTINGENCY PLAN
PHASE II COMPREHENSIVE SITE ASSESSMENT
SCOPE OF WORK**

**FORMER LEWIS CHEMICAL PROPERTY
12-24 FAIRMOUNT COURT
HYDE PARK, MASSACHUSETTS**

DEP Site Number: 3-1616

May 16, 2005

Prepared for:

City of Boston Public Facilities Commission
Acting through its Department of Neighborhood Development
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1.0 INTRODUCTION

The City of Boston Public Facilities Commission, through its Department of Neighborhood Development (DND) retained Environmental Strategies & Management, Inc. (ES&M) to conduct a Phase II Comprehensive Site Assessment at the former Lewis Chemical Site, 12-24 Fairmont Court, Hyde Park, Massachusetts. This project is funded by a Brownfields grant through the United States Environmental Protection Agency (USEPA).

1.1 Background

The site has a history of industrial use, and is the former location of the Lewis Chemical Corporation (Lewis Chemical). The site consists of a vacant mill building situated on approximately 27,182 square feet of land surface on the banks of the Neponset River in Hyde Park, Massachusetts. The site also extends onto property located between the vacant mill building and the Neponset River, which is owned by the Massachusetts Department of Recreation and Conservation (DCR). Surrounding properties are mixed commercial and residential. Active railroad tracks used by Massachusetts Bay Transit Authority (MBTA) commuter rail and associated with the Penn Central Railroad right-of-way are located adjacent to the site towards the northeast. The Neponset River is located to the southeast. A Site Map depicting the subject site is included as Figure 1.

From 1940 until the early 1960s, a leather manufacturing company operated at the site. Lewis Chemical operated at the site from 1963 until 1983. Lewis Chemical was involved in the collection, transportation, storage, and processing of hazardous waste. Numerous violations of Federal, State, and local laws regarding the safe handling, transport, storage, and treatment of hazardous materials were documented, as well as complaints from local residents during its time of operation. Lewis Chemical was forced to terminate operations under a Court Order issued by DEP in 1983.

Several environmental investigations have been conducted at the site. Available reports include "Phase I Preliminary Assessment" completed in 1986 by Wehran Engineering; "Site Report Relative to Hazardous Materials" completed in 1988 by Environmental Impact Services, Inc. (EIS), and "Environmental Assessment" completed in 1991 by HTS Environmental Group. These investigations have identified impacts to soil, groundwater, and surface water at the site from historical uses. In addition, DEP conducted sediment and surface water screening in 1998 that also revealed impacts to surface water and sediment in the Neponset River.

The City of Boston foreclosed on the property on October 18, 2000, due to failure of payment of back taxes.

A Phase I Brownfields site assessment was conducted at the site¹ in 2002 by ES&M under the direction of the Massachusetts Department of Environmental Protection

¹ At the time of this investigation, the "0" Fairmont Court parcel was not in the control of DND, and was therefore not included in the investigation.

(DEP). The Phase I site assessment included:

- Background research to better understand the types of chemical involved, and how they were stored and processed;
- A detailed site inspection to identify sources of contamination and potential pathways into the environment;
- A geophysical survey to determine the presence of underground features such as tanks and drums;
- A field investigation program, including the installation of soil borings and monitoring wells, and the collection and analysis of soil, groundwater, surface water, and sediment samples to broadly evaluate current environmental conditions across the site; and
- The completion of an Imminent Hazard evaluation to determine if there is an immediate threat to human health or the environment, and if accelerated clean up efforts are warranted.

Summary of Site Assessment Results

- The background research identified the types of chemicals that were present during operation of the facility, and provided details of where chemical processing operations were conducted.
- The site inspection identified a series of floor drains in the basement of the building. These drains provided a pathway for spilled chemicals inside the building to enter the subsurface. The site inspection also identified areas of filling, including possible process waste and construction-related debris.
- The geophysical survey identified two underground storage tanks along with numerous other objects, some of which may be buried drums.
- The field investigation program identified impacted soil and groundwater at several locations at the site, particularly between the building and the Neponset River. The contaminants identified were consistent with the chemicals that Lewis Chemical stored and processed during their operation. The areas of highest impact coincided with the locations of the interior floor drains. The investigation also identified a limited number of locations with elevated concentrations of lead in surficial soil.
- The sediment and surface water sampling program in the Neponset River identified very low concentrations of contaminants along the shoreline adjacent to the Lewis Chemical building.

1.2 Purpose

The purpose of this Phase II Scope of Work is to outline the field investigation tasks that will be undertaken to investigate the extent of contamination at the disposal site. Specifically, the Phase II Comprehensive Site Assessment will:

1. Define the source, nature and extent of oil and/or hazardous material (OHM) impacts at the site;
2. Further evaluate potential migration and exposure pathways;
3. Evaluate the risk of harm posed by the site to human health, safety, public welfare, and the environment; and
4. Evaluate the need to conduct remedial actions at the site.

The project objectives outlined above may necessitate different data quality needs and objectives. Specifically, data quality needs to define the nature and extent of contamination may be less rigorous than data quality needs for the risk characterization. To that end, this Phase II work plan includes the use of field screening techniques (and laboratory data) to fulfill the project objectives of nature and extent. These data may or may not be of adequate quality to be utilized in the risk characterization. The data from this Phase II will be carefully evaluated to determine its suitability for these two objectives.

1.3 Regulatory Status

The site was first listed by the DEP in 1987, was issued Release Tracking Number (RTN) 3-1616, and was previously classified as default Tier I D. The site has recently been reclassified as a Tier IC site. The City of Boston foreclosed on the property on October 18, 2000 due to failure of payment of back taxes. In accordance with Massachusetts General Law Ch. 21E, Section 2 (as amended), the City of Boston is NOT deemed an "owner" or "operator" for the site, and is therefore entitled to certain liability protection under the Statute, as well as exemptions under the MCP. As required under the Statute, the City desires to divest itself of the property. Since further investigation of the site is clearly warranted in order to develop future re-use plans, the City has elected to voluntarily conduct further response actions under the MCP. Specifically, the City has acquired grant funds under the USEPA Brownfield program to complete a Phase II assessment, the details of which are outlined below.

2.0 SCOPE OF WORK

2.1 Disposal Site Name, Location, and Locus Map

A Site Map showing the present layout of the property is included as Figure 1. This map shows the 12-24 Fairmont Court parcel, existing and former buildings, and exploration points completed under the Phase I. This map will be updated as appropriate, and included in the Phase II report. The site map will also be expanded, or companion maps will be created, to show additional details as needed.

Several detailed site maps will also be developed as appropriate. These maps will:

- Depict soil, groundwater and surface water/sediment sample analytical results;
- Illustrate the orientation of the water table, and groundwater flow direction within shallow and deep portions of the aquifer; and

- Show details of test pits, sample locations and/or details of source materials.

2.2 Disposal Site History

The historic uses of the site were researched and reported during the Phase I investigation. This information provided valuable insight relative to chemical handling and processing procedures during the Lewis Chemical operation, which operation extensively involved chlorinated solvents. Given new information provided by a USGS report, ES&M will re-examine historical records to see if there is additional information relative to the origin of the PCBs. The Phase II field investigation program will investigate the site as a source of PCBs in the river.

2.3 Hydrogeological Characteristics and Nature/Extent of Contamination

The Phase II field investigation will include several key components to better characterize the hydrogeologic relationship between groundwater beneath the site and the Neponset River, and to define the nature and extent of impact to soil, groundwater, surface water and sediment. The previous investigation identified a number of source areas on the Lewis Chemical property, which will be further investigated. Additional soil and groundwater sampling will also be conducted to evaluate potential PCB source areas. The Phase II field investigation on the subject property will include the following components. Please refer to Figure 1 for proposed investigation locations:

Test Pits

Test pits will be excavated to obtain detailed information about the nature of three potential source areas: (1) fill area (southern corner of property); (2) UST area adjacent to northwest side of building; and (3) possible buried drum area northeast of building. The objective of the test pits is to determine the nature and identity of possible USTs, buried drums and other metal objects identified during the GPR survey, and the extent of fill/debris in the southern corner of the site. The test pits will be excavated with a backhoe and appropriately trained work crew, and supervised by ES&M field staff. This subtask includes contingencies for Level C personal protective equipment (such upgrade requirements to be specified in the Site Specific Health and Safety Plan) and overpacks to secure any drums that may be encountered². At each potential source area, a sufficient number of test pits will be excavated to define the vertical and horizontal extent of impact.

Soil samples will be collected during the excavation, at the direction of the supervising ES&M field staff. Samples will be visually classified and recorded on a Test Pit Log form. Soil samples will also be field screened for volatile organics with a photoionization detector equipped with an 11.7 eV lamp, using the DEP jar headspace method. At least two soil samples from each of the three source areas will be collected for laboratory analysis (one to characterize contaminant levels within the source area, and one at or near the boundary of the source area to define the extent of impact). These

² Any removal action relative to buried drums would need to be conducted as an Immediate Response Action (IRA) or Release Abatement Measure (RAM) under the MCP.

samples will likely be composite samples from the test pit side walls and bottom, however, additional samples may be collected to more accurately characterize the subsurface (example – if the side walls of the excavation do not appear to be impacted based on visual observations and/or PID screening results, but the bottom of the pit does appear impacted, then separate sidewall and bottom samples will be collected). All samples will be properly preserved, and submitted to a certified laboratory under Chain-of-Custody procedures for the following parameters:

- Volatile Organic Compounds (VOCs) by EPA Method 8260B;
- Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH) by the DEP Method;
- Lead by EPA 6010B, and;
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082.

If field screening and/or laboratory data indicate impact at or near the water table, additional groundwater monitoring wells will be installed as described below. The number and locations of wells in these source areas will depend on the locations of other, pre-existing wells in the vicinity.

Installation of Additional Water Table Wells

Additional shallow (overburden) monitoring wells will be installed to investigate soil and groundwater conditions on the adjacent parcel (“0” Fairmount Ave). Two wells will also be installed within the Lewis Chemical building, upgradient of the trench drains, to evaluate the source and to define the extent of solvents in groundwater at wells ESM-3, ESM-5 and ESM-6. Soil borings on the “0” Fairmount Court parcel will be completed with a hollow-stem auger rig, so that two-inch diameter PVC monitoring wells may be installed. Borings inside the building will likely be completed with a direct-push type rig due to overhead clearance issues, which will necessitate use of one-inch diameter well materials.

Soil samples will be collected continuously during drilling for visual observations and field screening with a PID and the jar headspace method. At least one sample from each boring (the sample with the highest PID reading, or the sample closest to the water table if no PID readings are noted) will be submitted for laboratory analysis of VOCs and PCBs. In addition, at least one sample from the trench drain area, and one sample from the “0” Fairmount Court area, will also be analyzed for RCRA 8 metals and VPH/EPH.

Following installation, all monitoring wells will be developed by purging a minimum of three to five times the equivalent volume of standing water in the well, or until the well is bailed dry, whichever comes first. The extracted groundwater will be monitored for temperature, pH, turbidity, dissolved oxygen, and conductivity during well development to ensure water quality stabilization has occurred. Development water will be containerized for characterization and off-site disposal.

Completion of Shallow Soil Borings

Shallow soil borings will be conducted with a direct-push rig between the building and the river, and in the vicinity of the Tank Farm, to collect soil samples for laboratory analysis of PCBs. One day of drilling is planned, and it is estimated that 12 borings will be completed. Since the most likely source of PCBs, if one exists, is from surface spills, the borings will extend to eight feet below grade (length of two four-foot core barrels). Soil samples will be collected from each core barrel for visual classification and field screening with a PID. At least one sample from each boring (the shallow sample, unless staining or visual observations dictate otherwise) will be submitted to a certified laboratory for PCB analysis by EPA Method 8082. If the field screening results indicate PID readings over 10 ppmv, those samples will also be submitted for VOC analysis by EPA Method 8260B. If a significant source of PCBs is found, additional soil borings and/or monitoring wells may be installed (during a second work mobilization) to better define the extent of PCBs and to define potential impact to groundwater and/or the river.

Additional shallow soil borings will also be completed where elevated concentrations of lead were detected during the Phase I investigation (See Table 7 and Figure 4, Phase I report). Borings will be completed to four feet (one core barrel) within the grids that were established for the Phase I (Grids A, C and F). One half day of drilling is planned, and it is estimated that six borings will be completed. One soil sample will be collected from each boring location, and submitted to a fixed laboratory for lead analysis by EPA Method 6010B. This sampling scheme will be implemented to estimate the horizontal and vertical extent of lead in soil.

Installation of Piezometers

Two piezometer pairs will be installed down the embankment and along the Neponset River to investigate the hydrogeologic relationship between groundwater and the river. The piezometers will be constructed with 5/8" diameter steel well materials, which will include a one-foot section of screen at the bottom. The piezometers will be driven into the ground with vibratory equipment. The target screen intervals will be as follows:

Bank/Shore Area

- Install shallow point to a depth of three to five feet below grade so that the screen intercepts the water table
- Install deep point ten feet below the shallow point, if possible, or to refusal

Following installation, the depth to water and saturated thickness of water in the piezometers will be measured. If a sufficient volume of water is present and if after purging a sufficient flow of water is available so that water is relatively free of suspended solids, water samples will be collected for laboratory analysis. In this case, samples will be analyzed at a fixed laboratory for VOCs by EPA Method 8260B, and PCBs by EPA Method 8082. If insufficient water is available, then the depth of the piezometers will be extended, or they will be used solely for hydrogeologic evaluation purposes.

Installation of Bedrock Monitoring Wells

Three bedrock monitoring wells will be installed in the vicinity of wells ESM-3, ESM-5, and ESM-8 to define the vertical extent of impacted groundwater. A hollow stem auger or air rotary drill rig will complete a boring to competent bedrock, and will install steel casing grouted in place to seal the upper aquifer. At two of the three locations (ESM-3, and ESM-5) the drilling rig will core up to 50 feet into competent bedrock to obtain groundwater samples from discrete fracture zones. Groundwater samples will be obtained for VOC analysis via the inflatable packer method for either expedited laboratory turn around or on-site analysis with a portable gas chromatogram. These data will be used to delineate the vertical extent of impacted groundwater, and to identify water bearing fractures that may be a migration pathway.

A two-inch diameter bedrock monitoring well will be installed in each open hole, with the screened interval determined based on the packer testing results. A sufficient length of casing will be used to reach the surface, and grout slurry will be used to seal the bedrock zone from the upper unconsolidated (cased) zone. At the three locations adjacent to the river, well materials other than PVC will be used given the high concentrations of solvents detected during the Phase I. Such well materials may include fiberglass or stainless steel.

Aquifer Testing

Hydrogeological testing (slug tests) will be completed during one day of testing in up to three shallow well and one bedrock well couplets to obtain permeability and hydraulic conductivity information and to better understand the groundwater/surface water relationship. Slug tests will use an appropriately sized slug bar to perform rising head tests. Water level data will be measured with a submersible pressure transducer and recorded with an In-Situ MiniTroll Datalogger® at predetermined time intervals. Water level data stored in the data logger will be downloaded to a personal computer for analysis to estimate hydraulic conductivity of the aquifer.

Site Monitoring Tasks

The Phase II monitoring program will include the following tasks:

- The well casings of the new monitoring wells and the top of the piezometers will be surveyed relative to the existing site datum. If possible, the site datum will be referenced to National Geodetic Vertical Datum (NGVD).
- The depth to water in all wells and piezometers will be gauged on one occasion. All wells/piezometers will be evaluated for the presence of light and dense non-aqueous phase liquids.
- Groundwater samples will be collected from all wells on one occasion. Groundwater samples will be collected in accordance with ES&M Standard Operation Procedures, and as outlined in the Quality Assurance Project Plan, which was developed concurrently with this Phase II Scope of Work. Samples will be analyzed for the following:

- VOCs by EPA Method 8260B – all samples.
- VPH and EPH by the DEP Method – all samples collected in the vicinity of the UST area, and from any well were elevated concentrations of VPH/EPH were detected in soil samples.
- Lead by EPA 6010B – Wells ESM-5, ESM-5D (new bedrock well next to ESM-5) and ESM-3; and from any well were elevated concentrations of metals were detected in soil samples.
- PCBs by EPA Method 8082 – all samples from overburden monitoring wells. If PCBs are detected in shallow groundwater, samples from the bedrock wells will also be analyzed for PCBs.

This analyte list may be reduced based on a review of soil analytical data, or increased if new information becomes available to suggest the presence of additional analytes.

The data from the Phase II field program for the Lewis Chemical property will be evaluated to confirm that the project objectives of nature and extent are satisfied, particularly with respect to chlorinated solvents and possible source areas for PCBs. After this information is evaluated, a Phase II Scope of Work Addendum may be necessary to outline additional Phase II sampling activities.

2.4 Environmental Fate and Transport of Oil and/or Hazardous Material

Laboratory analytical data will be reviewed to determine the types and distribution of OHM across the site. Standard literary references will be consulted to document the mobility, volatility, persistence, and bioaccumulative potential of each identified OHM type (or individual compounds). A summary of these results will be presented in the Phase II report.

The potential for migration of OHM from the site into the Neponset River will be further evaluated based on updated and revised hydrogeological information. Phase II hydrogeologic information is intended to investigate in detail vertical groundwater flow direction and gradient, the presence of water bearing fractures in bedrock, and the evaluation of groundwater flow data from piezometers adjacent to the river.

2.5 Exposure Assessment/Risk Characterization

An exposure assessment will be performed to identify human and environmental receptors that could be impacted by OHM at or migrating from the site. Exposure quantification and risk characterization will be performed in accordance with the MCP (310 CMR 40.0900). At this time, it is expected that a Method 3 risk characterization will be necessary for the upland portion of the site, given the extensive OHM list, and given that the future reuse options for the site may consider a wide variety of potential reuses.

In addition, the potential risk to environmental receptors will need to be evaluated through a Stage I environmental screening. If required, the scope of work for a Stage II ecological risk characterization will be defined in a Phase II Scope of Work Addendum.

2.6 Phase II Report and Statement of Conclusions

A Phase II report that describes the methods and results of the historical research, field investigation program and risk assessment will be prepared to meet the MCP requirements of 310 CMR 40.0835. This report will also include a Phase II Completion Statement and LSP opinion as to the completeness of the Phase II assessment. Specifically, the report will include:

- an updated Site Map to accurately show all pertinent site features and assessment sampling locations;
- a Vicinity Map showing portions of the Neponset River, as appropriate;
- a description of geologic and hydrogeologic characteristics of the overburden and bedrock aquifers, including copies of boring and well logs and cross-sections;
- determination of horizontal and vertical groundwater flow direction and gradient;
- a water table elevation contour map showing the horizontal direction of groundwater flow and the slope of the water table surface;
- an evaluation of migration pathways and sensitive receptors, with emphasis on potential pathways to the Neponset River;
- laboratory analytical and field monitoring data documenting the extent of OHM in the study area;
- a characterization of risk that OHM compounds detected during the investigation pose to identified receptors; and
- conclusions and opinions as to the completeness of the Phase II, and regarding the need for accelerated and/or comprehensive remedial actions.

If a Phase II addendum is necessary, the findings gathered from that work would be included in the Phase II Report and Statement of Conclusions.

3.0 LICENSED SITE PROFESSIONAL

The Licensed Site Professional who will oversee the Phase II assessment is Mr. Douglas A. Heely, PG, LSP of Environmental Strategies & Management, Inc. Mr. Heely's license number is No. 9632. ES&M will be contracted to perform the Phase II assessment by The City of Boston/Department of Neighborhood Development.

4.0 SCHEDULE

The Phase II assessment described in this Scope of Work will require approximately eight months to complete. A Project Schedule showing the sequence and duration of significant tasks is included as Figure 2.

LEGEND

- PROPOSED PHASE II FIELD WORK
- PROPOSED SHALLOW MONITORING WELL
- PROPOSED BEDROCK MONITORING WELL
- PROPOSED TEST PIT AREAS

PHASE I FIELD WORK
(COMPLETED JUNE 2002)

- MONITORING WELL (APPROXIMATELY LOCATED)
- DESTROYED MONITORING WELL
- TRENCH DRAIN SAMPLE LOCATIONS
- SURFACE WATER SAMPLE LOCATIONS
- SEDIMENT SAMPLE LOCATIONS
- PROPERTY BOUNDARY (APPROXIMATE)
- FENCE (APPROXIMATELY LOCATED)
- RAILROAD TRACKS
- SURVEY BENCHMARK (PK NAIL IN ASPHALT ABOVE SEWER)

BASE MAP SOURCES: 1] "PLAN OF LAND IN BOSTON, JOSEPH F. PAGE, SURVEYOR, OCTOBER 1974";
2] FIGURE 2, "SITE SKETCH, LEWIS CHEMICAL CORP".
3] CITY OF BOSTON ASSESSORS MAP



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GAUGING DATE:	DRAWING DATE:	ACAD FILE:
N/A	04/29/05	DND-LEWIS/1

SITE MAP

CLIENT:	BOSTON DEPARTMENT OF NEIGHBORHOOD DEVELOPMENT	PM:	DH
LOCATION:	"0" AND 12-24 FAIRMOUNT COURT HYDE PARK BOSTON, MA	LSP:	DH
RTN:	DWG: AF PROJECT NO.: 2004-301	FIGURE:	1

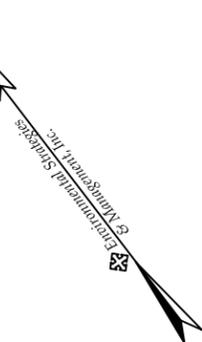
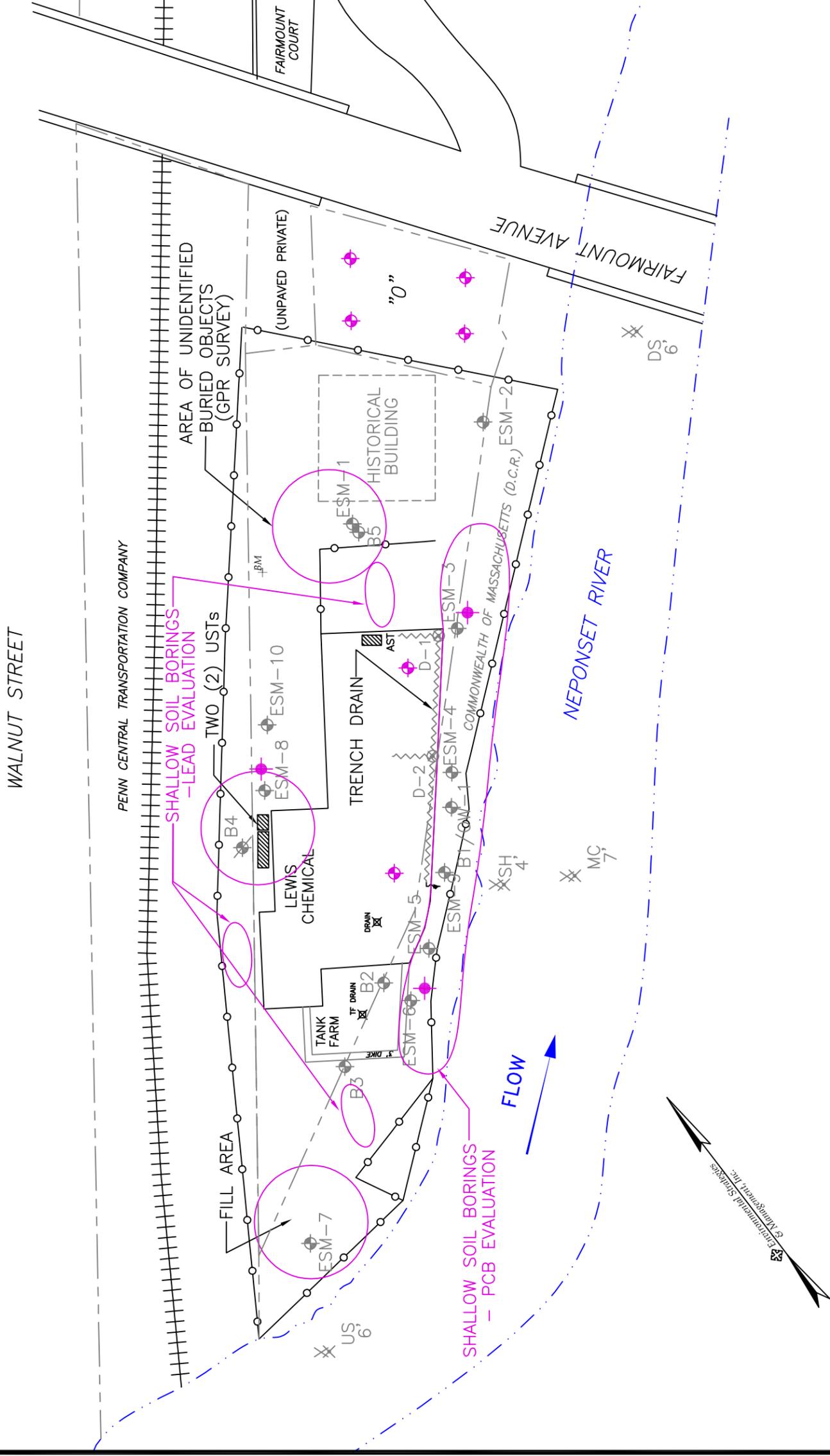
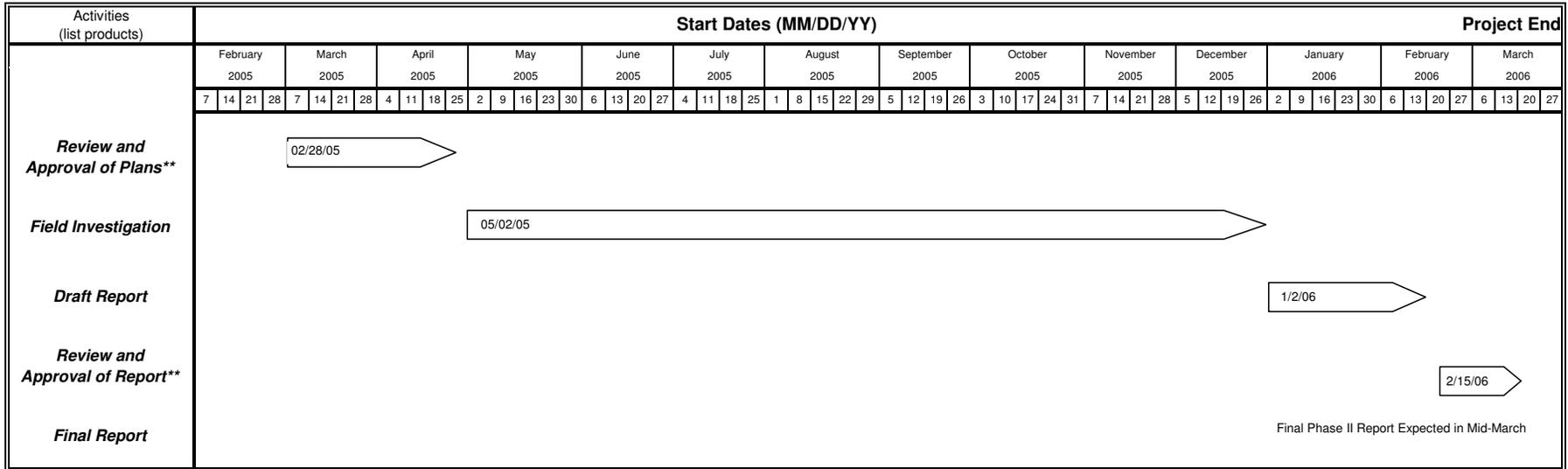


Figure 2 - Project Timeline
City of Boston/DND
Phase II Site Assessment - Lewis Chemical



* Schedule is dependent on approval of plans, access, and weather. Start dates for each task are shown.
 ** Approval by DEP and/or EPA. Also includes PIP comment periods