NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau E
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October 28, 2016

Mr. Paul Lageraaen
Vice President
H2M architects + engineers
290 Broad Hollow Road
Suite 400E
Melville, New York 11747

RE: Approval RCRA Closure Work Plan
DFCI Solutions, Inc.
425 Union Boulevard, West Islip, New York
EPA ID # NYD002043701

Dear Mr. Lageraaen:

The New York State Department of Environmental Conservation (DEC) has reviewed the *RCRA Closure Plan for DFCI Solutions, Inc., 425 Union Boulevard, West Islip, New York, dated May 23, 2016, Rev1*, submitted on September 21, 2016 via email by H2M architects + engineers (the “May 23, 2016 Rev1 Closure Plan”) and along with the Proposed Revision to the May 23, 2016 Plan which was transmitted via email by H2M architects + engineers on October 13, 2016 (the “Proposed Revision”). The language of Proposed Revision which replaces Section 2.4.3 Soil Vapor of the May 23, 2016 Rev1 Closure Plan is contained in Attachment 1 to this letter (the “RCRA Closure Plan Amendment.”) The May 23, 2016, Rev1 together with the RCRA Closure Plan Amendment shall constitute the “RCRA Closure Plan.”

NYSDEC approves the RCRA Closure Plan with the following condition:

> No solvent based degreasers shall be used to clean or rinse the building interior.

Please submit a copy of the RCRA Closure Plan which incorporates the RCRA Closure Plan Amendment and the condition stated above into the body of the document. All copies of the RCRA Closure Plan released to any entity must incorporate this letter and Attachment 1.

Please submit an updated schedule of work to be completed under this Closure Work Plan. All tasks must be conducted in accordance with the final RCRA Closure Work Plan as amended by this approval letter.

Please contact me at (518) 402-9813 if you have any questions.

Sincerely,

Payson Long, P.E.
Project Manager
Remedial Section D, Remedial Bureau E
Division of Environmental Remediation

Attachment: Modified text of Section2.4.3

ec: Stephen Meshover, DFCI Solutions, Inc.
Olivia Marie, DFCI Solutions, Inc.
Michel Cruden, DER
Susan Edwards, DER
Walter Parish, DER, Region 1
Charlotte Bethoney/Scarlett McLaughlin, NYSDOH

ATTACHMENT 1
RCRA Closure Plan Amendment
DFCI Solutions, Inc.

The following language shall replace Section 2.4.3. of the RCRA Closure Plan dated May 2016, REv1.

2.4.3 Soil Vapor

Based on FPM's 2007 Subsurface Investigation Report, elevated levels of chlorinated volatile organic compounds (VOCs) (i.e., 1,1,1-trichloroethane, trichloroethene and tetrachloroethene) were detected in sub-slab soil vapor samples collected within the Product/Raw Stock Storage Area and Screw Machinery Fabrication Department in the Main Manufacturing Building, and within the Plastic Injection Forming Machinery Area in the Plastics Manufacturing Building. In 2015 during Impact's Phase II ESA investigation, soil borings were advanced at locations either within or in close proximity to the soil vapor areas of concern. The soil borings include SB-12, SB-28, SB-29 and SB-42, as shown in **Figure 5**. Soil samples from those locations were collected from depths just above the water table. No VOCs were identified in any of the soil samples at concentrations exceeding the NYSDEC Part 375 Unrestricted Use SCOs.

In June 2015, the concrete slabs in the vicinity of those sampling locations were removed to ventilate the soil vapors. Subsequent soil vapor sampling performed in August 2015 by H2M detected elevated levels of trichloroethene in the samples collected within the Main Manufacturing Building, but at significantly lower concentrations than previous sampling results. **Table 5** shows the sampling results for vapor samples collected in August 2015. The soil vapor areas of concern and sampling points from August 2015 are shown in **Figure 5**.

In order to address residual soil vapors, it is proposed that a temporary Soil Vapor Extraction (SVE) system be implemented on-site and operated while the field work component of the RCRA Closure is conducted. Two systems are proposed. One system would be located in each of the two soil vapor areas of concern within the Main Manufacturing Building, i.e., next to the former Product/Raw Stock Storage Area and next to the former Tumbling Department. Each system would be comprised of extraction wells, a moisture separator/demister, rotary regenerative blower (GeoTech 10hp, 380CFM, or equivalent), and a 55-gallon activated carbon drum. All extracted soil vapor contaminants would be captured in the carbon drum. Extraction wells are anticipated to be placed 20-feet on-center based on a preliminary evaluation of soil conditions. A total of six extraction wells are planned in the area next to the former Product/Raw Stock Storage Area and four extraction wells next to the former Tumbling Department. The extraction wells would be constructed from 20-slot perforated, Schedule 40 PVC piping advanced to a depth of 3-4 feet below the elevation of the floor slab. The currently exposed soil areas will be covered and secured with poly sheeting. Some wells may be located within the open floor area (through the poly sheeting) and some will be core drilled through the existing floor slab. The extraction wells will be interconnected with the blowers with aboveground piping running across the floor. The discharge from the systems (i.e., after the carbon drums) will be piped to an exterior door or window. The inlet and discharge from the 55-gal carbon drum will be periodically monitored each day with a portable photoionization detector (PID).

Following SVE operation for a period of 2-3 weeks, the system will be shut down. The soil vapor will be allowed to equilibrate for a period of 3-4 days after which confirmatory soil vapor samples will be collected in conformance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the

State of New York. Two (2) soil vapor samples will be collected from the poly-covered exposed soil area within the Product/Raw Stock Storage Area and one (1) soil vapor sample will be collected from the poly-covered exposed soil area within the Screw Machinery Fabrication Department. These vapor points will be manually installed to a depth of approximately 5 feet below grade surface utilizing the Hefty Soil Gas Probe System. A sampling implant connected to inert tubing (e.g., polyethylene tubing) will be placed at the sampling depth. The depth of 5 feet was chosen based on the depth of the foundation footings, and the depth to groundwater at the subject property, which is approximately 6 to 11 feet bgs. The exposed soil and the sampling probe location will remain sealed with the poly sheeting. The inert tubing penetration in the polyethylene sheeting will be sealed with tape. A helium tracer gas will be utilized as a QA/QC measure to verify the integrity of the surface seal. After installation of the probes and prior to sample collection, up to three volumes (volume of the sample probe and tubing) will be purged. In addition, one (1) sub-slab soil vapor sample shall be collected from just beneath the existing concrete slabs approximately 10 feet east of the open floor areas in the former Product/Raw Stock Storage Area and the former Tumbling Department. The sub-slab sampling methodology shall also conform with the NYSDOH soil Vapor Intrusion guidance and utilize a surface seal and helium tracer gas.

Concurrent with the sub-slab and soil vapor samples, two (2) indoor air and one (1) outdoor/ambient air samples will also be collected. The indoor air samples will be placed within the Main Manufacturing Building in proximity to the former Product/Raw Stock Storage Area and the former Tumbling Department. All vapor and air samples will be collected over a period of approximately two hours with a flow rate of <0.2 L/min utilizing Summa® vacuum canisters. All samples will be analyzed for VOCs via EPA Method TO-15. Sampling results will be evaluated utilizing the NYSDOH Soil Vapor Intrusion decision matrices.

Soil sampling within the soil vapor areas of concern were performed during previous environmental investigations. All floor slab concrete removed will be sampled and properly characterized for off-site disposal. After use, the 55-gallon carbon drums shall also be properly characterized for off-site disposal.

RCRA CLOSURE PLAN

DFCI SOLUTIONS, INC.
425 UNION BOULEVARD
WEST ISLIP, NEW YORK 11795

MAY 23, 2016, REV1

Prepared for:

DFCI Solutions, Inc.
425 Union Boulevard
West Islip, New York 11795

Prepared by:

H2M architects + engineers
290 Broad Hollow Road, Suite 400E
Melville, New York 11747

H2M Project No.: DFCI1501

H2M architects + engineers

DFCI SOLUTIONS, INC.
425 UNION BOULEVARD
WEST ISLIP, NEW YORK

RCRA CLOSURE PLAN

MAY 23, 2016, REV1

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DFCI SOLUTIONS, INC.
425 UNION BOULEVARD
WEST ISLIP, NEW YORK

RCRA CLOSURE PLAN

MAY 23, 2016, REV1

1.0 GENERAL INFORMATION

Facility Name:	DFCI Solutions, Inc.
Address:	425 Union Boulevard West Islip, New York 11795
Facility Contact:	Olivia Marie Vice President
Telephone No.:	(631) 669-0494, ext. 154
Owner / Operator:	DFCI Solutions, Inc. 425 Union Boulevard West Islip, New York 11795
RCRA Status:	Large Quantity Generator

1.1 Location and Facility Description

The DFCI Solutions, Inc. (DFCI) facility was formerly utilized for the manufacturing of cam fasteners and small springs. Operations included manufacturing processes such as machining, assembling and plastic injection molding, and parts finishing processes such as tumbling, electroplating and heat treating. Wastes historically generated from the operations included oils, solvents and heavy metals. At this time, all operations have ceased and all equipment has been removed. The property is currently planned for redevelopment. The RCRA Closure cleanup will allow for commercial use of the property.

The DFCI facility is situated on a triangular-shaped property, encompassing approximately 4 acres. The property is generally bordered to the north by the Long Island Rail Road; to the south and east by Union Boulevard; and to the west by Beach Street and Prospect Avenue. The site consists of a Main Manufacturing Building in the middle of the property; a Plastics Manufacturing Building, recharge basin and parking area in the western portion of the property; a Hazardous Waste Storage Building, Power Distribution Room, former Heat Treatment Process Building and former Kerosene Tank Containment Area to the north of the Main Manufacturing Building; and parking area in the eastern portion of the property.

The DFCI property is listed as a New York State Inactive Hazardous Waste Disposal Site (Site No. 1-52-033). Based on an Operable Unit 1 Record of Decision (OU1 ROD) dated March 1995, the New York State

Department of Environmental Conservation (NYSDEC) implemented a remedy on the eastern portion of the property. The remedy involved the in-situ stabilization/solidification of cadmium-contaminated soils, i.e., Treatment Cell Area. A June 2004 Declaration of Covenants and Restrictions requires maintenance of a topsoil/asphalt cap in this area and NYSDEC notification and approval should site work or redevelopment plan for a soil disturbance in the Treatment Cell Area.

The general vicinity primarily comprises commercial and residential properties. Depth to groundwater at the subject property is approximately 6 to 11 feet below grade surface (bgs). A site location map is provided as **Figure 1** and facility site plan is provided as **Figure 2**, **Figures 2A and 2B**. The Treatment Cell Area is shown on Figure 2B.

1.2 Scope

DFCI operated intermittently as a Large Quantity Generator (LQG) of hazardous waste, and as required by New York State Hazardous Waste regulations, is required to have a RCRA Closure Plan. This Closure Plan has been prepared to formally cease and document completion of regulated waste activities at the property. This Closure Plan also outlines remediation activities to address the findings of the following previous environmental investigations:

- Subsurface Investigation Report, dated November 8, 2007, prepared by FPM Group (FPM)
- Environmental Investigation, dated January 5, 2009, prepared by H2M
- Phase II Environmental Site Assessment (ESA), dated August 26, 2015, prepared by Impact Environmental Closures, Inc. (Impact)
- Soil vapor sampling conducted by H2M in August 2015
- Pre-Closure Limited Soil Investigation of the Hazardous Waste Storage Area (HWSA) and Pad-Mounted Electrical Transformer, performed by H2M in October 2015

Based on these reports and subsequent investigative activities, the primary contaminants of concern include:

- Cadmium exceedances in subsurface soils in eleven (11) soil boring locations throughout the property
- Metal exceedances in soils beneath a sump within the former Heat Treatment Process Building and in subsurface soils in the vicinity of the former Kerosene Tank Containment Area
- Trichloroethene in sub-slab soil vapor in the Product/Raw Stock Storage Area and Screw Machinery Fabrication Department of the Main Manufacturing Building
- Cadmium, copper and silver exceedances in sanitary leaching pool CP-1
- Chlorinated volatile organic compound exceedances in sanitary leaching pool CP-2

- Mercury, cadmium and copper exceedances in the former Plastics Manufacturing Building sanitary leaching pool

The purpose of completing the formal closure is to eliminate post-closure maintenance of hazardous waste generation sources and hazardous waste storage area(s) at the property and to minimize the potential for a post-closure or post-demolition release of hazardous waste to the environment.

This Work Plan has been prepared by H2M architects + engineers (H2M) in accordance with the requirements outlined in 6 NYCRR Part 373-3.7, Closure and Post-Closure and DER-10 / Technical Guidance for Site Investigation and Remediation.

2.0 CLOSURE ACTIVITIES

The general closure procedure for the DFCI facility will include the decontamination and washing of the building floors, excavation and removal of contaminated soils, remediation of residual soil vapor contamination, and remediation and closure of contaminated leaching pools.

2.1 General Closure Description

At this time, all facility operations have discontinued and all equipment has been removed. Upon shutting down the process operations, all inventories of hazardous wastes were also disposed of in accordance with all applicable federal, state and local regulations. Wastewaters that will be generated during cleaning procedures during closure will be collected, containerized, and disposed of in accordance with all applicable regulations. Excavated soils will be stockpiled, containerized and disposed of in accordance with all applicable regulations.

During all ground intrusive activities, a Community Air Monitoring Plan (CAMP) and odor monitoring will be implemented in conformance with the New York State Department of Health (NYSDOH) Generic CAMP, provided as **Appendix A**. The CAMP will include monitoring of volatile organic compounds (VOCs) and particulates. Two (2) monitoring stations will be set up along the perimeter of the work area, with one (1) placed at an upwind location and one (1) at a downwind location. The locations of the monitoring stations will be chosen based on wind direction. Both the upwind and downwind stations will comprise of a dust monitor (i.e., TSI DustTRAK or equivalent) that will continuously measure particulate (PM-10) concentrations. The downwind station will also include a photoionization detector (PID) that will continuously monitor VOCs. A portable PID will be utilized at the upwind location at the beginning of each workday to establish background conditions, and periodically thereafter as wind direction changes. The response levels and actions for particulate and VOC exceedances will be followed in accordance with the NYSDOH Generic CAMP.

Based on the minor exceedances of VOCs detected in the on-site soils during prior environmental investigations, odor monitoring will be based on olfactory screening. Should offensive odors be detected migrating from the work area, then work activities will be stopped and evaluated to determine the source of the odors. Corrective actions will then be taken to abate the emissions. Work activities can continue provided that odors are no longer detected.

2.2 Closure Performance Standard

With the exception of the documented Treatment Cell Area, this Closure Plan is designed to ensure that the DFCI facility will require no additional maintenance or controls following closure of the hazardous waste activities and removal of contaminated soils, and to permit the redevelopment of the property. The contents of the plan are structured to minimize threats to human health and the environment. Following remediation activities, confirmatory samples will be collected and analyzed to ensure that no significant concentrations (i.e., those exceeding the closure performance standards) of hazardous contaminants remain. If contamination exceeding performance standards is found to exist, appropriate remedial actions in accordance with NYSDEC and/or SCDHS requirements will be taken.

When available and applicable, federal, state, and/or local environmental quality standards are to be used to determine the adequacy of closure. Where formal standards do not exist, informal closure performance guidelines are to be used. The determination of the closure performance guidelines is typically made after an assessment of the following:

1. Review of available federal, state, and local guidelines and remedial action levels.
2. Review of similar projects and past New York State Department of Environmental Conservation (NYSDEC) and Suffolk County Department of Health Services (SCDHS) guidance.
3. The contaminated media (e.g., finished surfaces, media below grade, soils, etc.).
4. Migration potential of contaminants.
5. Toxicological data for contaminants (i.e., methods of exposure, NIOSH standards, etc.).
6. Anticipated future use of subject property.

The Closure Performance Standards for this RCRA Closure Work Plan include:

- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation
- NYSDEC 6 NYCRR Part 375 Commercial Use and Protection of Groundwater Soil Cleanup Objectives (SCOs)
- NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Class GA Ambient Water Quality Standards and Guidance Values

- NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006
- Suffolk County Department of Health Services (SCDHS) Article 12 SOP No. 9-95 Pumpout and Soil Cleanup Criteria

Confirmatory sampling will be conducted as part of the closure activities to document that no hazardous materials remain that can adversely impact public health or the environment, and will consist of surface rinsate sampling and endpoint soil sampling. During the excavation of soils and collection of endpoint samples, an X-Ray Fluorescence (XRF) Spectrometer and portable photoionization detector (PID) will be utilized to field screen the subsurface media for metals and potential volatile organic compounds (VOCs), respectively. The scope of sampling and closure performance cleanup guidelines are detailed in the project specific Quality Assurance Project Plan (QAPP), which is included as **Appendix B**.

2.3 Maximum Waste Inventory

During facility operations, all hazardous materials and/or wastes were stored in a Hazardous Waste Storage Building located along the north side of the property. After the facility ceased operations in 2015, all hazardous wastes were removed and properly disposed of at Veolia ES Technical Solutions in Flanders, New Jersey. The implementation of this RCRA Closure Plan may generate additional wastes requiring off-site disposal, such as decontamination rinse waters and metal-contaminated soils. These wastes will be containerized in 55-gallon drums and/or stockpiled on-site on polyethylene sheeting prior to being transported and disposed of off-site at a disposal facility. Waste characterization samples, discussed in Section 2.4, will be collected in accordance with the disposal facility protocols.

2.4 Closure Requirements

The activities to be performed as part of the RCRA Closure at the DFCI property are provided in the following sections:

2.4.1 Decontamination of Building Floors

The floors of the Main Manufacturing Building, raw material storage areas of the Plastics Manufacturing Building, Hazardous Waste Storage Building, and former Heat Treatment Process Building will be decontaminated utilizing a Hotsy Pressure Washer and degreasing agent. For the Main Manufacturing Building, the areas that will be pressure washed include the Product/Raw Stock Storage Area, Parts Assembly Area, Tumbling Department, Sand Blasting Department, Screw Machinery/Fabrication Department, Metal Stamping Department and Metal Forming Department.

Rinsate samples will be collected following decontamination. Approximately twelve (12) rinsate samples will be collected. The proposed sampling locations are shown in **Figure 3**. The rinsate samples will be analyzed for RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) via EPA Method 6010/7471. Sampling results will be compared with the NYSDEC TOGS 1.1.1 Class GA Ambient Water Quality Standards and Guidance Values, which are provided in **Table 6**. Should the sampling results exceed the Class GA standards, decontamination of the floors will be repeated until subsequent confirmatory rinsate samples meet the Class GA standards.

The decontamination rinse waters will be containerized into 55-gallon drums and properly disposed of at an off-site disposal facility. A composite sample of the decontamination wastewater will be collected and analyzed for the contaminants of concern (i.e., metals) for waste characterization.

2.4.2 Soil Excavation

The SCOs for metal contamination in soils shall be the lower of either the NYSDEC Part 375 Commercial Use Cleanup Guideline or the Part 375 Protection of Groundwater Cleanup Guideline. Based on Impact's 2015 Phase II ESA report, cadmium was identified at concentrations exceeding the NYSDEC Part 375 Protection of Groundwater SCO in eleven (11) soil borings performed throughout the property. The soil boring locations, shown in **Figure 4**, included SB-5, SB-7, SB-8, SB-18, SB-20, SB-22, SB-31, SB-36, SB-38, SB-46 and SB-47. Soil boring SB-20 also exhibited VOC (i.e., 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene) exceedances at the depth interval of 6 to 8 feet below grade surface (bgs). FPM's 2007 Subsurface Investigation Report and H2M's 2009 Environmental Investigation report identified metal exceedances in soil samples collected beneath a sump within the former Heat Treatment Process Building and within the vicinity of the former Kerosene Tank Containment Area.

Impact's 2015 Phase II ESA report also identified acetone in soil borings SB-30 and SB-50 at concentrations of 59 µg/kg and 60 µg/kg, respectively, exceeding the Part 375 Protection of Groundwater SCO of 50 µg/kg. These soil borings were both located within the Main Manufacturing Building. However, Impact stated that these detections may be attributed to a laboratory artifact. Therefore, acetone is not considered to be a primary contaminant of concern for this site.

In October 2015, two soil borings were advanced by H2M within the Hazardous Waste Storage Building and four surface soil samples were collected around the perimeter of an electrical transformer in accordance with a Pre-Closure Limited Soil Investigation Work Plan. The soil borings were advanced to approximately 5 to 5.5 feet bgs utilizing a decontaminated hand auger. Three soil samples were collected from each boring at depth intervals of 0 to 2 feet, 2 to 4 feet and 4 to 5/5.5 feet bgs. The samples were analyzed for the Target Compound List (TCL) of VOCs and RCRA metals. The VOC samples were collected as discrete, non-homogenized samples from each depth interval utilizing dedicated Terra Core samplers. **Tables 1 to 3** show the soil sampling results. No metals were detected at concentrations exceeding the Part 375 Commercial Use or Protection of Groundwater SCOs. Only acetone was detected in the 0 to 2 feet samples of both soil borings at concentrations exceeding the Protection of Groundwater SCO, but below the Commercial Use SCO. No PCBs were detected in the surface soil samples around the electrical transformer above the Commercial Use or Protection of Groundwater SCOs. Based on these sampling results, no soil excavation is deemed warranted within the Hazardous Waste Storage Building or around the electrical transformer.

In order to address the metal exceedances, soils in the vicinity of the eleven soil boring locations, the sump within the former Heat Treatment Process Building and the former Kerosene Tank Containment Area will be excavated utilizing a backhoe and/or guzzler truck until clean soils are encountered. The determination of clean soils will be based on field screening results. An estimate of the remedial excavation areas and depths is provided in **Table 4**. During excavation, the soils will be field screened for cadmium, the primary contaminant of concern, utilizing an X-Ray Fluorescence (XRF) Spectrometer. The field screening results, which will be compared with the NYSDEC Part 375 Commercial Use and Protection of Groundwater SCOs provided in **Table 7**, will be utilized qualitatively to determine the extents of the excavations. Following excavation, confirmatory soil samples will be collected from the excavation bottom and sidewalls in accordance with DER-10 Technical Guidance for Site Investigation and Remediation. The frequency of confirmatory sampling will be as follows: For all excavations, one bottom sample will be collected for every 900 square feet of bottom area and one sample from each sidewall for every 30 linear feet of sidewall. All excavations are expected to be between 20 to 300 feet in perimeter. The soil samples will be analyzed for RCRA metals via EPA Method 6010/7471. Due to the VOC exceedances detected in SB-20 during Impact's 2015 investigation, soil samples collected from this excavation will also include analysis for 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene via EPA Method 8260. Sampling results will be compared with the NYSDEC Part 375 Commercial Use and Protection of Groundwater SCOs.

Excavated soils will be stockpiled on-site on polyethylene sheeting. The stockpiles will also be covered with polyethylene sheeting when not in active use. Select areas of excavated soils will be segregated based on cadmium concentrations detected above 20 mg/kg during prior due diligence sampling. Soils excavated from areas SB-5, SB-7, SB-22, SB-38, SB-46, SB-47 and the sump within the former Heat Treatment Process Building will be separately stockpiled. All stockpiles will be no taller than 8 feet. Waste characterization samples will be collected from the stockpiles for disposal purposes in accordance with the Clean Earth Carteret Sampling Protocol. One 5-point composite sample will be collected per 100 cubic yards (or 1 discrete grab sample per 20 cubic yards) of excavated soil and analyzed for Total Petroleum Hydrocarbons (TPH) via EPA Method 8015. In addition, one 8-point composite sample will be collected per 800 cubic yards (or 1 discrete grab sample per 100 cubic yards) of excavated soil and analyzed for total volatile organic compounds (VOCs) via EPA Method 8260, polycyclic aromatic hydrocarbons (PAHs) via EPA Method 8270, total RCRA metals via EPA Method 6010, TCLP RCRA metals via EPA Method 1311/6010, ignitability via EPA Method 1010, corrosivity via EPA Method 9040, reactivity – sulfide and cyanide via EPA Method SW846 Chapter 7.3, and polychlorinated biphenyls (PCBs) via EPA Method 8082.

Following soil removal and receipt of clean endpoint sampling results, the excavations will be backfilled to grade surface utilizing clean fill material. Clean fill material, as defined in NYSDEC 6 NYCRR Part 360, will consist of uncontaminated inert material (i.e., sand) imported from a virgin or recycled source obtained from a permitted facility. Prior to importing, non-virgin fill material will be sampled in conformance with Section 5.4(e)10 and Table 5.4(e)10 of DER-10. The sampling results will be compared with the Part 375 Commercial Use and Protection of Groundwater SCOs provided in **Table 7**.

2.4.3 Soil Vapor

Based on FPM's 2007 Subsurface Investigation Report, elevated levels of chlorinated volatile organic compounds (VOCs) (i.e., 1,1,1-trichloroethane, trichloroethene and tetrachloroethene) were detected in sub-slab soil vapor samples collected within the Product/Raw Stock Storage Area and Screw Machinery Fabrication Department in the Main Manufacturing Building, and within the Plastic Injection Forming Machinery Area in the Plastics Manufacturing Building. In 2015 during Impact's Phase II ESA investigation, soil borings were advanced at locations either within or in close proximity to the soil vapor areas of concern. The soil borings include SB-12, SB-28, SB-29 and SB-42, as shown in **Figure 5**. Soil samples from those locations were collected from depths just above the water table. No VOCs were identified in any of the soil samples at concentrations exceeding the NYSDEC Part 375 Unrestricted Use SCOs.

In June 2015, the concrete slabs in the vicinity of those sampling locations were removed to ventilate the soil vapors. Subsequent soil vapor sampling performed in August 2015 by H2M detected elevated levels of trichloroethene in the samples collected within the Main Manufacturing Building, but at significantly lower concentrations than previous sampling results. **Table 5** shows the sampling results for vapor samples collected in August 2015. The soil vapor areas of concern and sampling points from August 2015 are shown in **Figure 5**.

In order to address residual vapors, additional sections of the concrete slabs in the Main Manufacturing Building will be removed, as shown in **Figure 5**, and the soil will be disturbed utilizing a backhoe. Approximately one month following the aeration, soil vapor samples will be collected in conformance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Two (2) soil vapor samples will be collected within the Product/Raw Stock Storage Area and one (1) soil vapor sample will be collected within the Screw Machinery Fabrication Department. The vapor points will be manually installed to a depth of approximately 5 feet below grade surface utilizing the Hefty Soil Gas Probe System. A sampling implant connected to inert tubing (e.g., polyethylene tubing) will be placed at the sampling depth. The depth of 5 feet was chosen based on the depth of the foundation footings, and the depth to groundwater at the subject property, which is approximately 6 to 11 feet bgs. The areas of exposed soil will also be sealed at the earthen surface utilizing polyethylene sheeting. The inert tubing penetration in the polyethylene sheeting will be sealed with tape. A helium tracer gas will be utilized as a QA/QC measure to verify the integrity of the surface seal. After installation of the probes and prior to sample collection, up to three volumes (volume of the sample probe and tubing) will be purged.

Concurrent with the soil vapor samples, two (2) indoor air and one (1) outdoor/ambient air samples will also be collected. The indoor air samples will be placed within the Main Manufacturing Building at the Product/Raw Stock Storage Area and the Screw Machinery Fabrication Department. All vapor and air samples will be collected over a period of approximately two hours with a flow rate of <0.2 L/min utilizing Summa® vacuum canisters. All samples will be analyzed for VOCs via EPA Method TO-15. Sampling results will be evaluated utilizing the NYSDOH Soil Vapor Intrusion decision matrices.

Soil sampling within the soil vapor areas of concern were performed during previous environmental investigations.

All floor slab concrete removed will be sampled and properly characterized for off-site disposal.

2.4.4 Leaching Pool Remediation

Based on FPM's Subsurface Investigation Report and H2M's 2009 Environmental Investigation report, metal exceedances were detected in sanitary leaching pool CP-1, chlorinated VOC exceedances were detected in sanitary leaching pool CP-2, and metal exceedances were detected in the former Plastics Manufacturing Building sanitary leaching pool. The locations of the leaching pools are highlighted in **Figures 6A and 6B**. Remediation of the leaching pools will be performed in conformance with SCDHS Article 12 SOP No. 9-95 Pumpout and Soil Cleanup Criteria.

Leaching pools CP-1 and CP-2 were previously backfilled with clean fill material during abandonment in 1985. This fill material will be excavated and stockpiled for reuse (i.e., 0-7 feet). Contaminated soils within the leaching pools will be excavated utilizing a guzzler truck until clean soils are encountered. The determination of clean soils will be determined based on visual and olfactory field screening, as well as screening with the XRF Spectrometer. Following excavation, one endpoint soil sample from each leaching pool will be collected utilizing a decontaminated hand auger. The samples will be analyzed for the SCDHS lists of VOCs, SVOCs and metals. Field screening and sampling results will be compared with the SCDHS

Soil Cleanup Objectives and NYSDEC Part 375 Commercial Use and Protection of Groundwater SCOs. The most stringent cleanup objectives, provided in **Tables 8 to 10**, will be utilized for comparison. Following receipt of clean endpoint sampling results, the leaching pools will be backfilled and properly abandoned. Notification will be provided to SCDHS for oversight of remediation and proper closure of the leaching pools.

3.0 CLOSURE CERTIFICATION

Following completion of the closure activities identified herein and in accordance with 6 NYCRR 373-3.7(f)(1), within 60 days of completion of remediation and closure (including verification of clean closure) of the DFCI facility, DFCI will submit to NYSDEC by registered mail, a certification that the hazardous waste storage area was closed in accordance with the specifications of the approved RCRA Closure Plan. The owner/operator (i.e., DFCI) and an independent Professional Engineer registered in the State of New York will sign the certification. A Final Closure Report will be submitted along with the Closure Certification. The Closure Report will include the following: text describing remediation and closure activities, tables and figures summarizing the sampling and analytical data, photographs, laboratory analytical results including QA/QC documentation and electronic copy of the deliverables package in PDF format, and documentation of all stages of waste generation, handling and disposal.

4.0 CLOSURE SCHEDULE

Following RCRA Closure Plan and Quality Assurance Project Plan (QAPP) approval by the NYSDEC, closure of the DFCI facility is expected to require approximately nine weeks to complete. This includes two weeks for closure activity, three weeks for confirmatory sample analysis, two weeks for independent data validation, and two weeks for reporting. If the confirmatory sampling results indicate that additional closure activities are required (i.e., additional decontamination, remediation, etc.), the closure schedule will be updated at that time.

5.0 CLOSURE COST ESTIMATES

Following are the estimated costs associated with the closure activities:

1. Preparation of Closure Plan and QAPP	$6,500.00
2. Site Remediation	$200,000.00
3. Laboratory Analytical Reports	$15,000.00
4. Closure Certification Report	$6,500.00
5. 3rd Party Data Validation	$2,500.00
Estimated Total Costs	**$230,500.00**

FIGURES

SITE LOCATION MAP

SCALE: 1" = 3,000'

FIGURE 1

DFC11501

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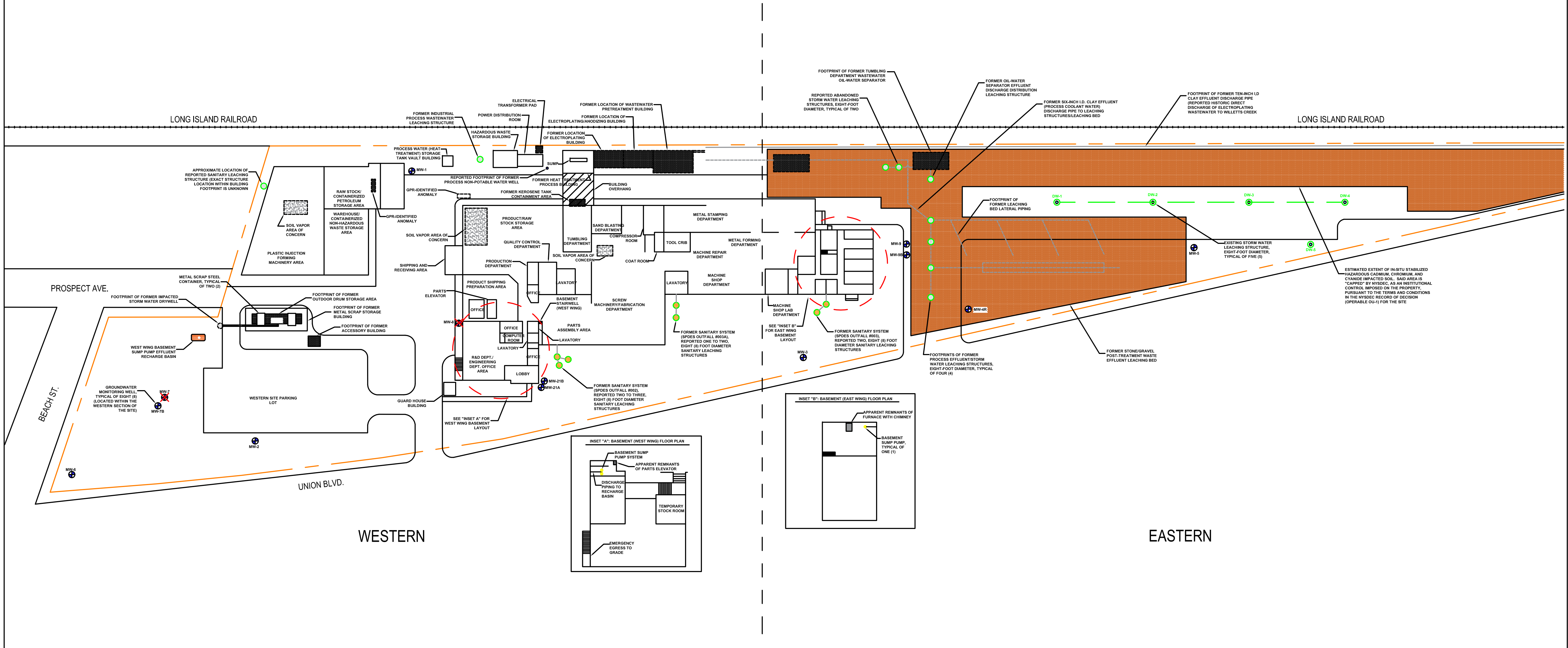

NOTE: SEE FIGURES 2A AND 2B, FACILITY SITE PLAN WESTERN AND FACILITY SITE PLAN EASTERN, FOR MORE ZOOMED IN/DETAILED VIEWS

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NOTES:

BASE MAP OBTAINED FROM FIGURE 1: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: WESTERN SITE AREA, DATED MARCH 14, 2015, AND FIGURE 2: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: EASTERN SITE AREA, DATED MARCH 14, 2015. FIGURES 1 AND 2 OBTAINED FROM PHASE II ENVIRONMENTAL SITE ASSESSMENT, PREPARED BY IMPACT ENVIRONMENTAL, DATED AUGUST 26, 2015.

LEGEND:

MW-1 ⊕	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ⊗	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
🟠	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

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RCRA CLOSURE PLAN

SHEET NO.

FIGURE 2

SHEET TITLE

FACILITY SITE PLAN OVERVIEW

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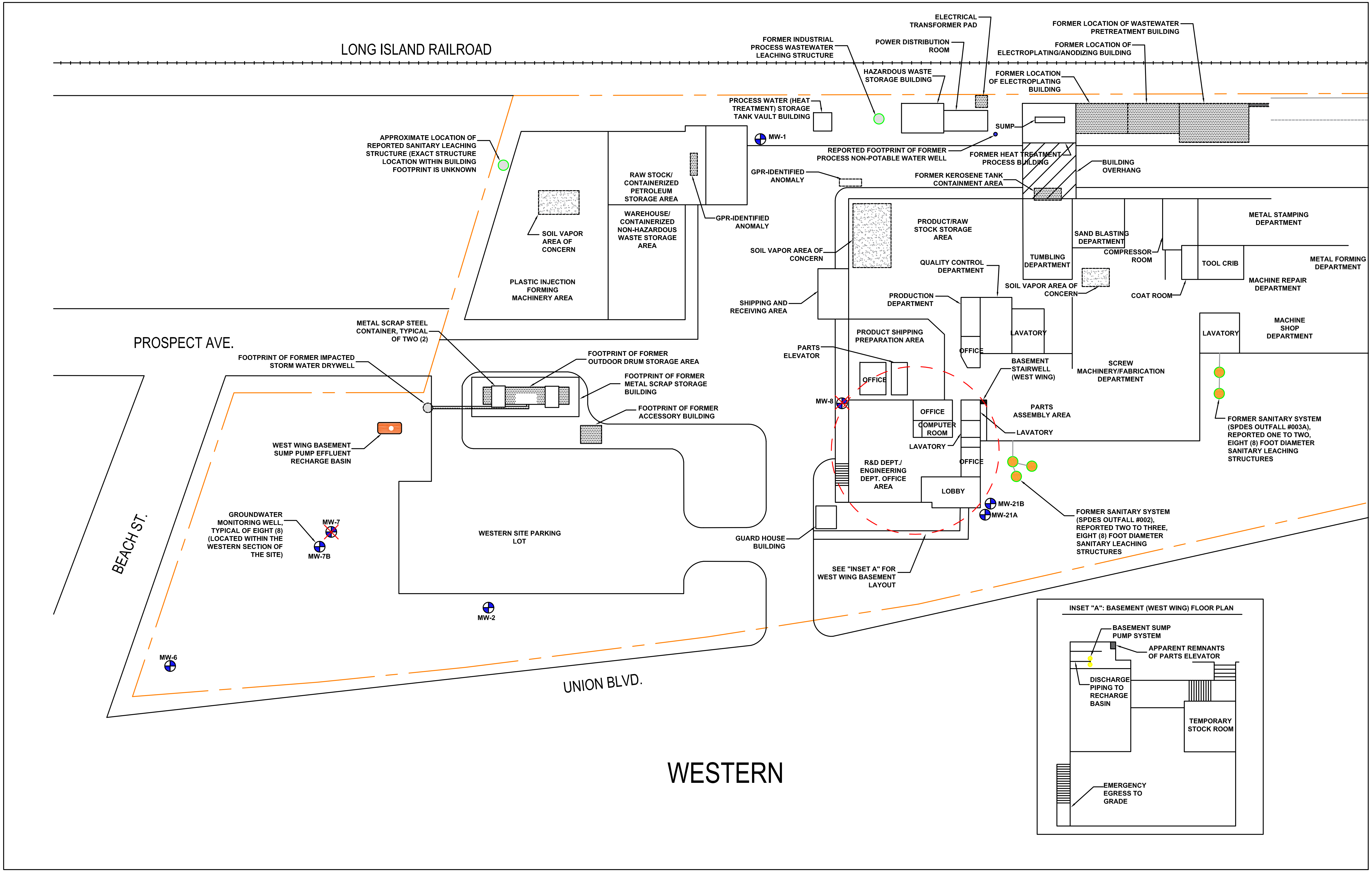

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●	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

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FIGURE 2A

SHEET TITLE

FACILITY SITE PLAN
WESTERN

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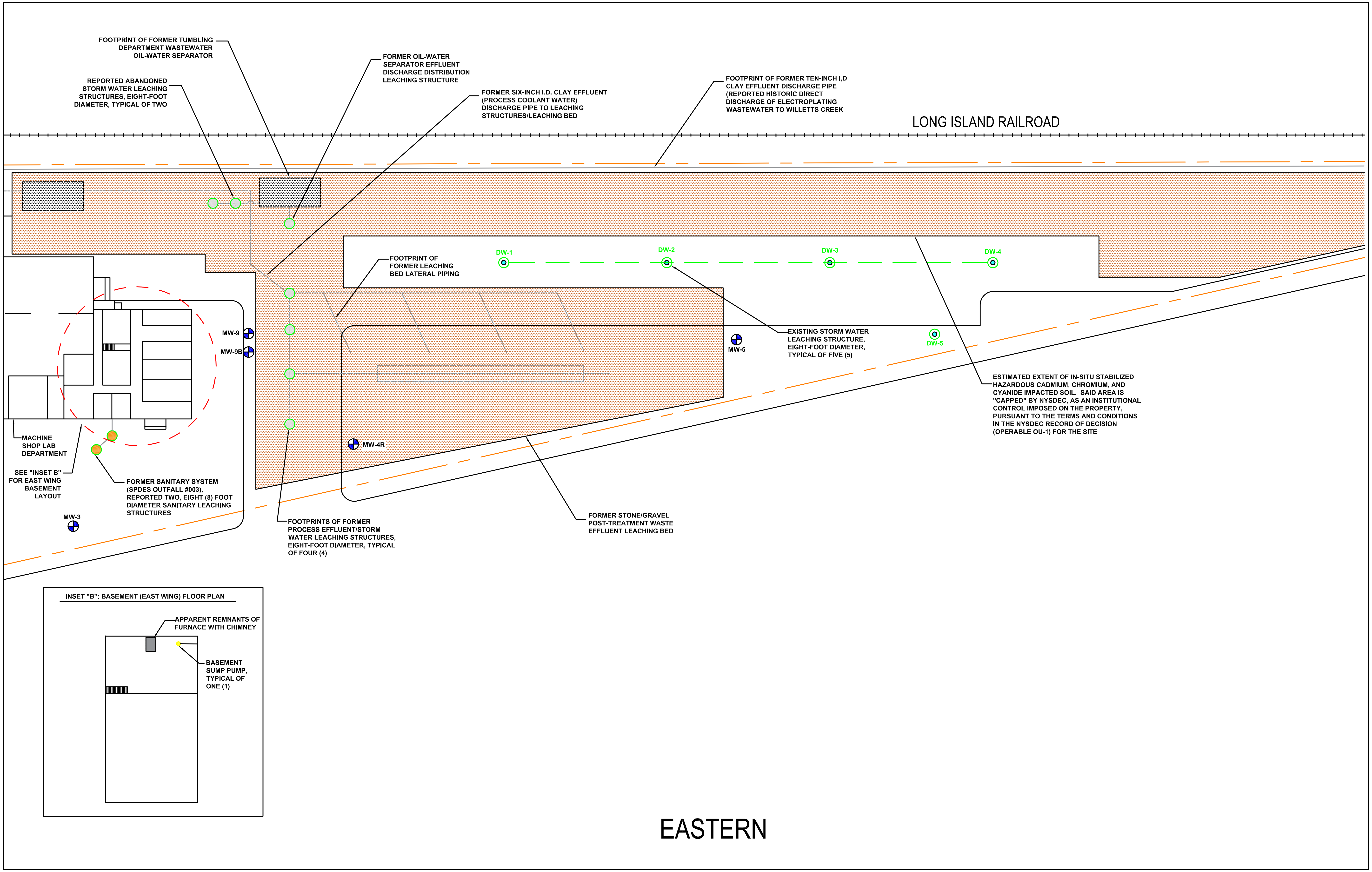

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LEGEND:

MW-1 ⊕	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ⊗	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
●	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

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RCRA CLOSURE PLAN

SHEET NO.

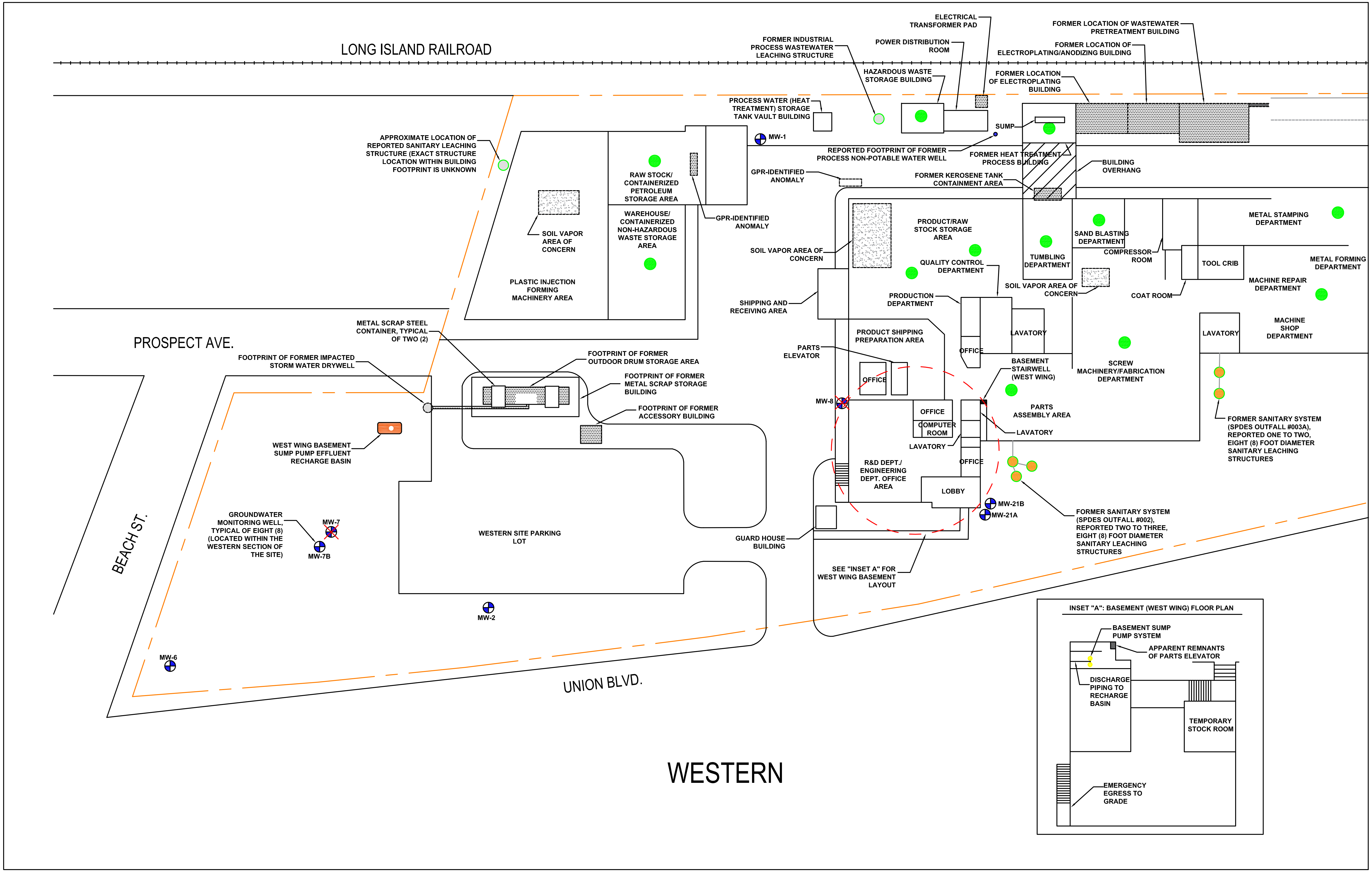
FIGURE 2B

SHEET TITLE

FACILITY SITE PLAN
EASTERN

H2M PROJECT NO.

DFCI 1501



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LEGEND:

- MW-1 — MONITORING WELL ID / MONITORING WELL LOCATION
- MW-8 ⊗ — MONITORING WELL ID / DESTROYED/MISSING MONITORING WELL LOCATION
- ● PROPOSED RINSATE SAMPLING LOCATION
- ● SPDES OUTFALL LOCATION
- ○ LEACHING STRUCTURE LOCATION

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RCRA CLOSURE PLAN

SHEET NO.

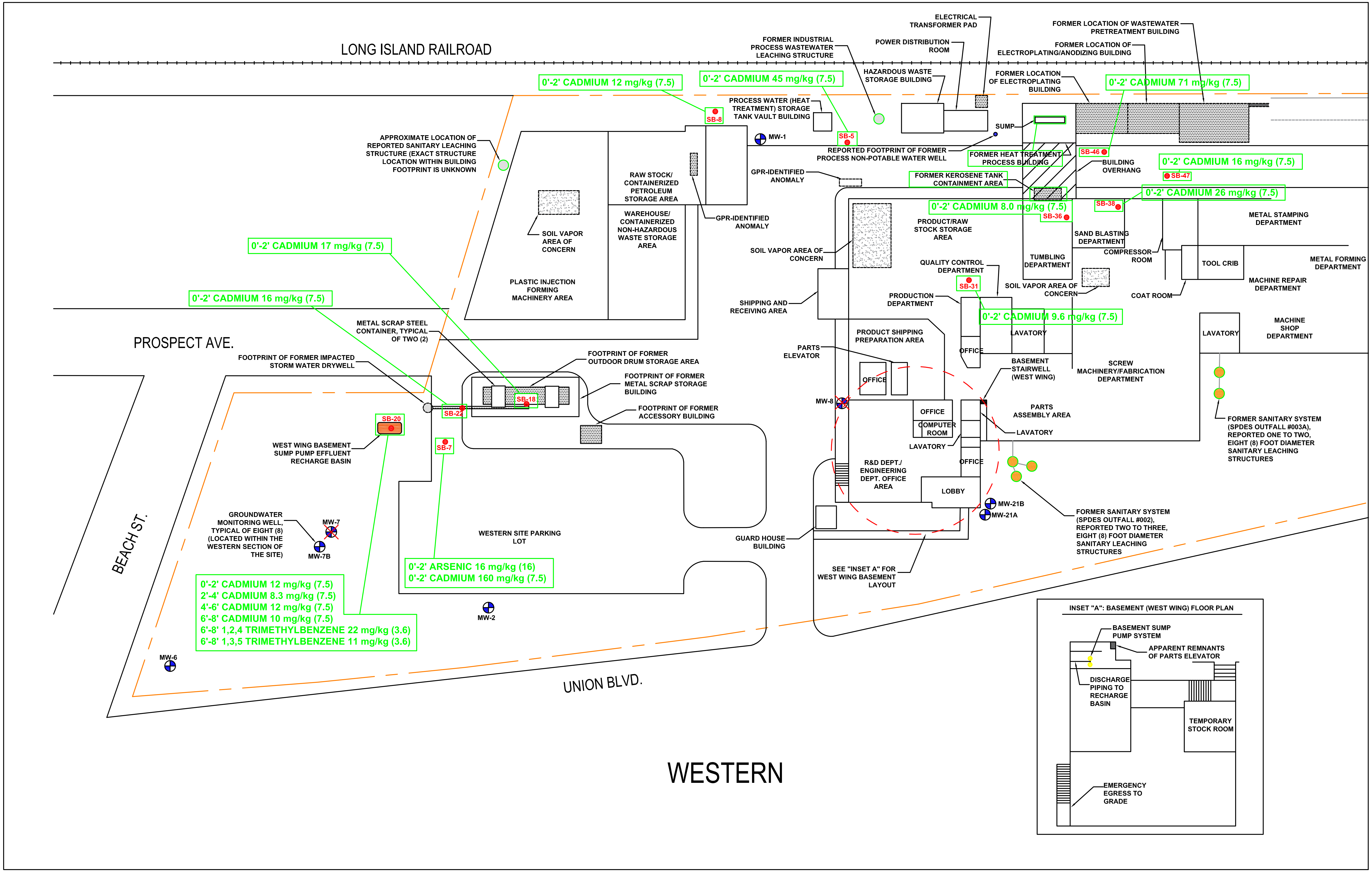
FIGURE 3

SHEET TITLE

PROPOSED RINSATE SAMPLING LOCATIONS

H2M PROJECT NO.

DFCI 1501



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SOIL BORING CONCENTRATIONS FROM A PHASE II ESA PERFORMED BY IMPACT ENVIRONMENTAL, REPORT DATED AUGUST 26, 2015.

LEGEND:

SB-4 ●	SOIL BORING ID SOIL BORING SAMPLING LOCATION
MW-1 ⊕	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ⊗	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
●	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

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RCRA CLOSURE PLAN

SHEET NO.

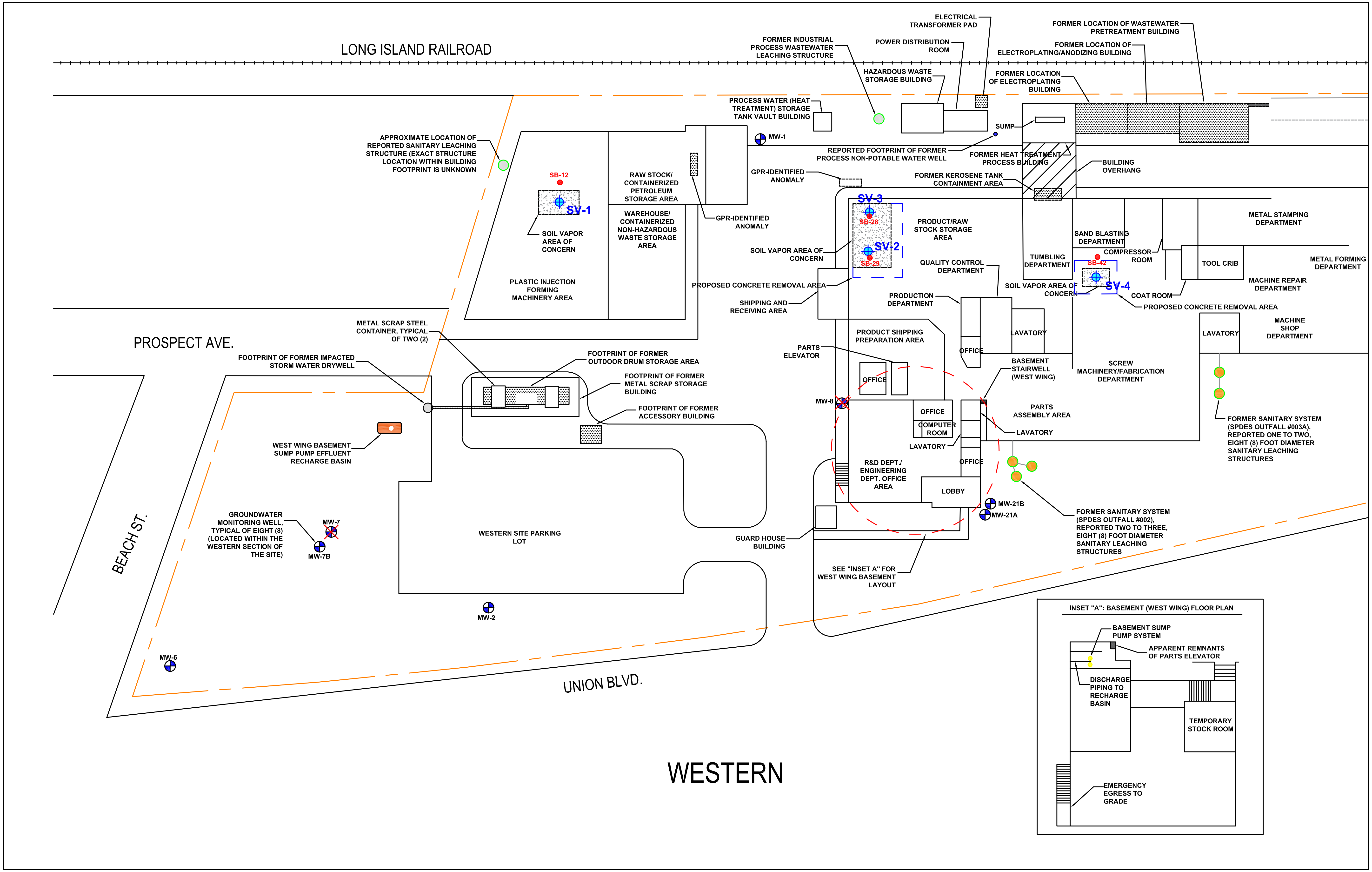
FIGURE 4

SHEET TITLE

SOIL EXCAVATION LOCATIONS

H2M PROJECT NO.

DFCI 1501



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SUB-SLAB VAPOR SAMPLES COLLECTED BY H2M IN AUGUST 2015.

LEGEND:

MW-1 ◍	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ⊗	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
SV-2 ⊕	SUB-SLAB VAPOR SAMPLE ID SUB-SLAB VAPOR SAMPLE LOCATION
●	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

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RCRA CLOSURE PLAN

SHEET NO.

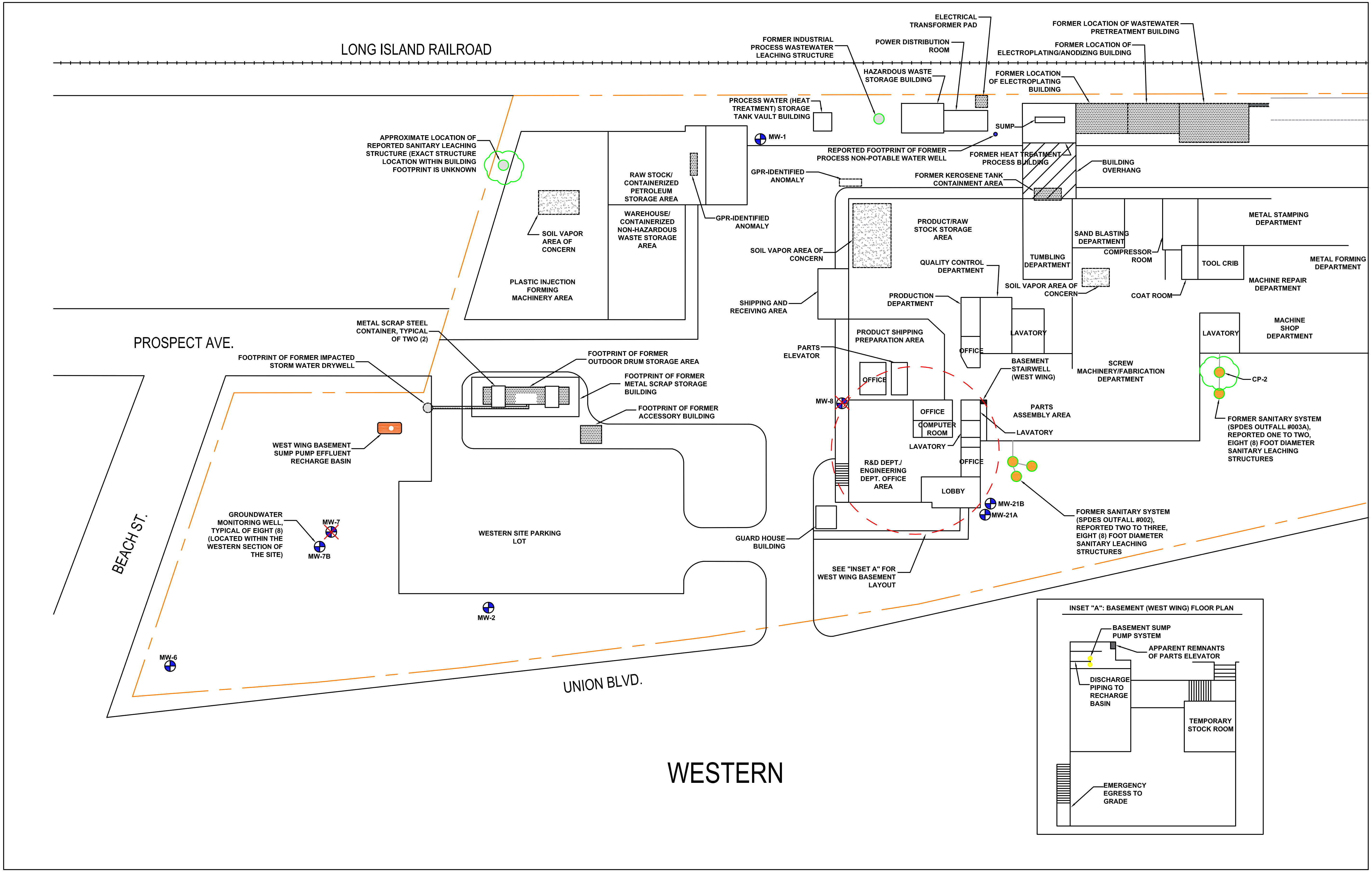
FIGURE 5

SHEET TITLE

SUB-SLAB VAPOR AREAS OF CONCERN AND SAMPLING POINTS

H2M PROJECT NO.

DFCI 1501



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CONTAMINATED LEACHING POOLS DETERMINED FROM H2M'S ENVIRONMENTAL INVESTIGATION, REPORT DATED JANUARY 5, 2009.

LEGEND:

MW-1 ⊕	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ⊗	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
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PROJECT

RCRA CLOSURE PLAN

SHEET NO.

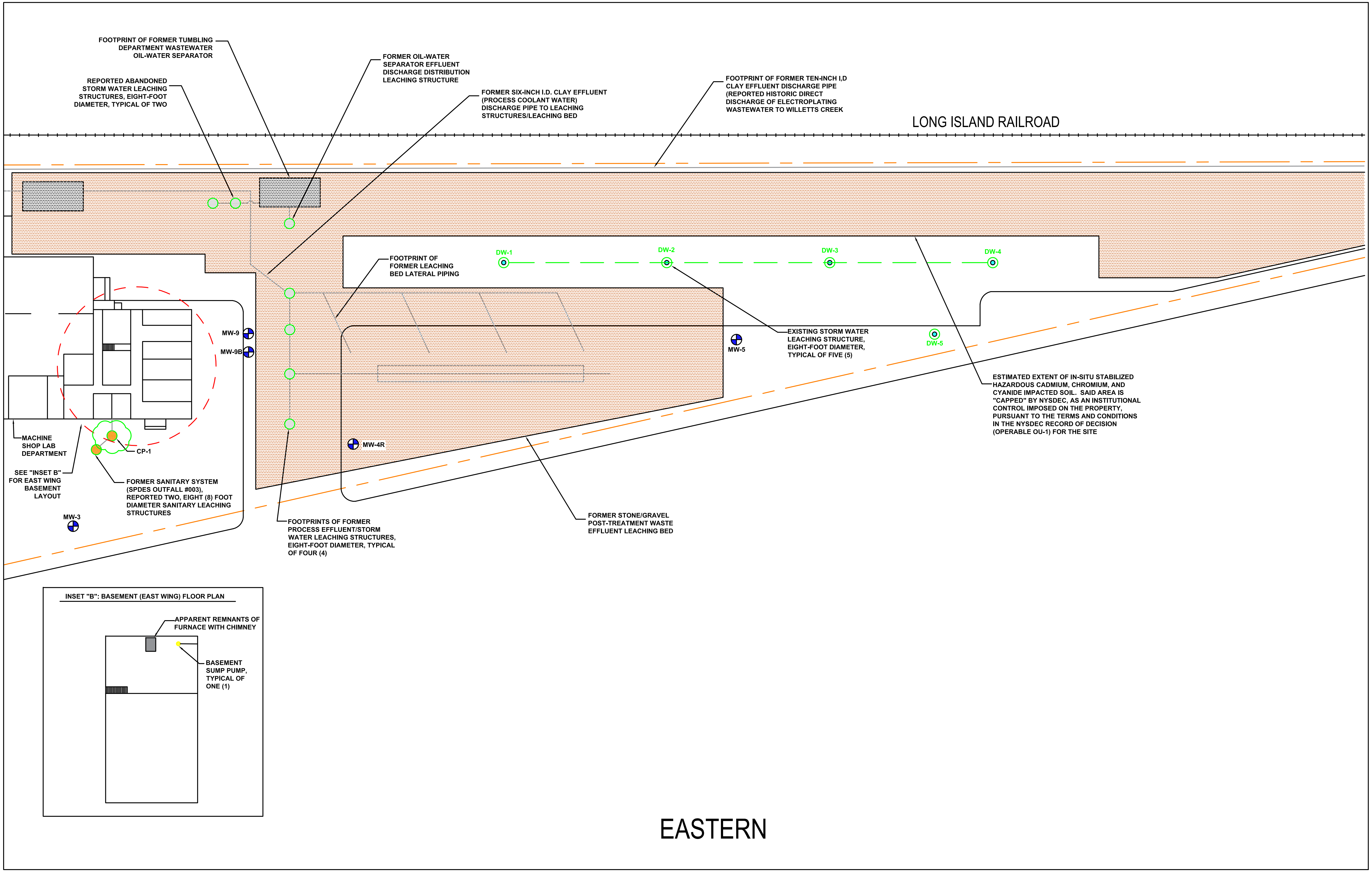
FIGURE 6A

SHEET TITLE

LEACHING POOL LOCATIONS
WESTERN

H2M PROJECT NO.

DFCI 1501



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RCRA CLOSURE PLAN

SHEET NO.

FIGURE 6B

SHEET TITLE

LEACHING POOL LOCATIONS
EASTERN

H2M PROJECT NO.

DFCI 1501

TABLES

Table 1. Hazardous Waste Storage Area Soil Boring Sampling Results for VOCs

Sample ID:	**6 NYCRR Part 375 Protection of Groundwater Soil Cleanup Objectives(1)**	**6 NYCRR Part 375 Commercial Use Soil Cleanup Objectives(1)**	**Haz Area B-1 0'-2'**	**Haz Area B-1 2'-4'**	**Haz Area B-1 4'-5.5'**	**Haz Area B-2 0'-2'**	**Haz Area B-2 2'-4'**	**Haz Area B-2 4'-5'**
Sample Date:			10/5/2015	10/5/2015	10/5/2015	10/5/2015	10/5/2015	10/5/2015
Lab Sample ID:			15J0119-05	15J0119-06	15J0119-07	15J0119-08	15J0119-09	15J0119-10
Units:	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
Volatile Organic Compounds (VOCs)								
1,1,1-Trichloroethane	680	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,1,2,2-Tetrachloroethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,1,2-Trichloroethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,1-Dichloroethane	270	240,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,1-Dichloroethylene	330	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,2,3-Trichlorobenzene	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,2,4-Trichlorobenzene	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,2-Dibromo-3-chloropropane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,2-Dibromoethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,2-Dichlorobenzene	1,100	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,2-Dichloroethane	20	30,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,2-Dichloropropane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,3-Dichlorobenzene	2,400	280,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,4-Dichlorobenzene	1,800	130,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
1,4-Dioxane	100	130,000	<48	<46	<49	<51	<49	<49
2-Butanone	120	500,000	16	3.9	<2.4	31	<2.4	<2.5
2-Hexanone	---	---	<2.4	<2.3	<2.4	2.8	<2.4	<2.5
4-Methyl-2-pentanone	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Acetone	50	500,000	**52**	17	11	**110**	9.2	8.3
Benzene	60	44,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Bromochloromethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Bromodichloromethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Bromoform	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Bromomethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Carbon disulfide	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Carbon tetrachloride	760	22,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Chlorobenzene	1,100	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Chloroethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Chloroform	370	350,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Chloromethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
cis-1,2-Dichloroethylene	250	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
cis-1,3-Dichloropropylene	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Cyclohexane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Dibromochloromethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Dichlorodifluoromethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Ethyl Benzene	1,000	390,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Isopropylbenzene	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Methyl acetate	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Methyl tert-butyl ether (MTBE)	930	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Methylcyclohexane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Methylene chloride	50	500,000	<4.8	<4.6	<4.9	<5.1	<4.9	<4.9
o-Xylene	1,600	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
p- & m- Xylenes	1,600	500,000	<4.8	<4.6	<4.9	<5.1	<4.9	<4.9
Styrene	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Tetrachloroethylene	1,300	150,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Toluene	700	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
trans-1,2-Dichloroethylene	190	500,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
trans-1,3-Dichloropropylene	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Trichloroethylene	470	200,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Trichlorofluoromethane	---	---	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Vinyl Chloride	20	13,000	<2.4	<2.3	<2.4	<2.6	<2.4	<2.5
Xylenes, Total	1,600	500,000	<7.2	<6.9	<7.3	<7.7	<7.3	<7.4

(1) New York State Department of Environmental Conservation (NYSDEC) Part 375 Unrestricted Use and Commercial Use Soil Cleanup Objectives (SCOs).

Shaded values indicate concentrations exceeding the Part 375 Unrestricted Use SCOs, but below the Commercial Use SCOs.

Table 2. Hazardous Waste Storage Area Soil Boring Sampling Results for Metals

Sample ID:	6 NYCRR Part 375 Protection of Groundwater Soil Cleanup Objectives[1]	6 NYCRR Part 375 Commercial Use Soil Cleanup Objectives[1]	Haz Area B-1 0'-2'	Haz Area B-1 2'-4'	Haz Area B-1 4'-5.5'	Haz Area B-2 0'-2'	Haz Area B-2 2'-4'	Haz Area B-2 4'-5'
Sample Date:			10/5/2015	10/5/2015	10/5/2015	10/5/2015	10/5/2015	10/5/2015
Lab Sample ID:			15J0119-05	15J0119-06	15J0119-07	15J0119-08	15J0119-09	15J0119-10
Units:	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Metals								
Arsenic	16	16	1.52	1.32	1.34	2.45	<1.02	<1.02
Barium	820	400	18.4	16.9	6.32	21.4	10.6	4.80
Cadmium	7.5	9.3	6.04	6.03	0.931	1.28	1.05	<0.307
Chromium	NS	1,500	8.02	7.79	2.50	9.87	7.19	10.6
Lead	450	1,000	7.84	7.99	2.19	6.24	2.98	1.19
Selenium	4	1,500	<1.02	<1.02	<1.03	<1.04	<1.02	<1.02
Silver	8.3	1,500	<0.509	<0.512	<0.514	<0.521	<0.512	<0.512
Mercury	0.73	2.8	<0.0305	<0.0307	<0.0309	<0.0312	<0.0307	<0.0307

(1) New York State Department of Environmental Conservation (NYSDEC) Part 375 Unrestricted Use and Commercial Use Soil Cleanup Objectives (SCOs).

NS = No Standard

Table 3. Transformer Surface Soil Sampling Results for PCBs

Sample ID:	**6 NYCRR Part 375 Protection of Groundwater Soil Cleanup Objectives$^{(1)}$**	**6 NYCRR Part 375 Commercial Use Soil Cleanup Objectives$^{(1)}$**	**Xformer-N**	**Xformer-E**	**Xformer-S**	**Xformer-W**
Sample Date:			10/5/2015	10/5/2015	10/5/2015	10/5/2015
Lab Sample ID:			15J0119-02	15J0119-01	15J0119-04	15J0119-03
Units:	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	3.2	1	<0.0185	<0.0186	<0.0186	<0.0184
Aroclor 1221	3.2	1	<0.0185	<0.0186	<0.0186	<0.0184
Aroclor 1232	3.2	1	<0.0185	<0.0186	<0.0186	<0.0184
Aroclor 1242	3.2	1	<0.0185	<0.0186	<0.0186	<0.0184
Aroclor 1248	3.2	1	<0.0185	<0.0186	<0.0186	<0.0184
Aroclor 1254	3.2	1	<0.0185	<0.0186	<0.0186	<0.0184
Aroclor 1260	3.2	1	<0.0185	<0.0186	0.0947	0.0691
Total PCBs	3.2	1	0.0700	0.242	0.0947	0.0691

(1) New York State Department of Environmental Conservation (NYSDEC) Part 375 Protection of Groundwater and Commercial Use Soil Cleanup Objectives (SCOs).

DFCI Solutions, Inc. - 425 Union Boulevard, West Islip, NY
RCRA Closure Plan

Table 4. Estimate of Remedial Soil Excavation

Location	Extent of Excavation	Volume	
	Length x Width x Depth (feet)	ft^3	yd^3
SB-5	10 x 20 x 4	800	30
SB-7 / SB-22	30 x 5 x 4	600	22
SB-8	10 x 10 x 4	400	15
SB-18	20 x 5 x 4	400	15
SB-20 (Recharge Basin)	20 x 40 x 10	8,000	296
SB-31	10 x 20 x 4	800	30
SB-36	10 x 10 x 4	400	15
SB-38	10 x 10 x 4	400	15
SB-46 / SB-47	10 x 40 x 4	1,600	59
Heat Treatment Building Sump	5 x 30 x 12	1,800	67
Kerosene Tank Area	5 x 10 x 2	100	4
CP-1	10 x 10 x 5	500	18.5
CP-2	10 x 10 x 5	500	18.5
Plastics Mfg Leaching Pool	10 x 10 x 5	500	18.5
	Total	16,800	623.5

Table 5. Summary of Soil Vapor Sampling Results with Recommended NYSDOH Guidance Actions

Location:	SV-1			SV-2			SV-3			SV-4			Ambient
Sample Type:	**Indoor Air**	**Sub-Slab**	**NYSDOH Guidance Action(1)**	**Indoor Air**	**Sub-Slab**	**NYSDOH Guidance Action(1)**	**Indoor Air**	**Sub-Slab**	**NYSDOH Guidance Action(1)**	**Indoor Air**	**Sub-Slab**	**NYSDOH Guidance Action(1)**	
Sample Date:	8/20/2015	8/20/2015		8/20/2015	8/20/2015		8/20/2015	8/20/2015		8/20/2015	8/20/2015		8/20/2015
Units:	(μg/m^3)	(μg/m^3)		(μg/m^3)	(μg/m^3)		(μg/m^3)	(μg/m^3)		(μg/m^3)	(μg/m^3)		(μg/m^3)
1,1,1-Trichloroethane	<0.82	0.87	NFA	<0.82	4.5	NFA	<0.82	7.3	NFA	<0.82	37	NFA	<0.82
Carbon tetrachloride	0.75	0.63	IDENTIFY	0.75	0.75	IDENTIFY	0.75	0.75	IDENTIFY	0.75	<0.25	IDENTIFY	0.75
Tetrachloroethene	<1.0	0.81	NFA	<1.0	1.4	NFA	<1.0	1.6	NFA	<1.0	1.2	NFA	<1.0
Trichloroethene	1.9	0.86	IDENTIFY	1.9	93	MITIGATE	1.9	140	MITIGATE	1.9	110	MITIGATE	1.9

(1) New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006.

Table 6. NYSDEC TOGS 1.1.1 Class GA Ambient Water Quality Standards and Guidance Values

	NYSDEC TOGS 1.1.1 Class GA Standards(1)
RCRA Metals	(µg/l)
Arsenic	25
Barium	1,000
Cadmium	5
Chromium	50
Lead	25
Mercury	0.7
Selenium	10
Silver	50

(1) NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (Class GA), June 1998.

Table 7. NYSDEC Part 375 Commercial Use and Protection of Groundwater SCOs

	NYSDEC Part 375 Commercial Use Soil Cleanup Objectives[1] (mg/kg)	NYSDEC Part 375 Protection of Groundwater Soil Cleanup Objectives[1] (mg/kg)
RCRA Metals		
Arsenic	16	16
Barium	400	820
Cadmium	9.3	7.5
Chromium, hexavalent	400	19
Chromium, trivalent	1,500	NS
Lead	1,000	450
Mercury	2.8	0.73
Selenium	1,500	4
Silver	1,500	8.3
VOCs		
1,2,4-Trimethylbenzene	190	3.6
1,3,5-Trimethylbenzene	190	8.4

(1) New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375 Commercial Use and Protection of Groundwater Soil Cleanup Objectives (SCOs).

Table 8. SCDHS Article 12 and NYSDEC Part 375 SCOs for VOCs

	SCDHS Article 12 SCOs[1]	NYSDEC Part 375 Commercial Use SCOs[2]	NYSDEC Part 375[2] / CP-51[3] Protection of Groundwater SCOs
	(µg/kg)	(µg/kg)	(µg/kg)
Volatile Organic Compounds (VOCs) - SCDHS Article 12 List			
Acetone	--	500,000	50
Acrolein	50	--	--
Acrylonitrile	50	--	--
Allyl Chloride	200	--	--
t-Amyl Methyl Ether	2,000	--	--
Benzene	60	44,000	60
Bromobenzene	1,400	--	--
Bromochloromethane	200	--	--
Bromodichloromethane	2,300	--	--
Bromoform	6,300	--	--
n-Butyl Acetate	10,000	--	--
n-Butylbenzene	5,900	500,000	12,000
sec-Butylbenzene	5,900	500,000	11,000
tert-Butylbenzene	5,900	500,000	5,900
t-Butyl Ethyl Ether	2,000	--	--
Carbon Disulfide	2,800	--	2,700
Carbon tetrachloride	800	22,000	760
Chlorobenzene	1,100	500,000	1,100
Chlorodifluoromethane	50	--	--
Chloroethane	200	--	--
2-Chloroethyl Vinyl Ether	500	--	--
Chloroform	400	350,000	370
Chloromethane	50	--	--
Chlorotoluene(s)	2,600	--	--
cis-Decahydronaphthalene	100,000	--	--
trans-Decahydronaphthalene	100,000	--	--
Decane	100,000	--	--
Dibromochloromethane	3,100	--	--
1,2-Dibromo-3-chloropropane	50	--	--
1,2-Dibromoethane	300	--	--
Dibromomethane	200	--	--
o-(1,2)-Dichlorobenzene	1,100	500,000	1,100
m-(1,3)-Dichlorobenzene	2,400	280,000	2,400
p-(1,4)-Dichlorobenzene	1,800	130,000	1,800
Dichlorodifluoromethane	300	--	--
1,1-Dichloroethane	300	240,000	270
1,2-Dichloroethane	50	30,000	20
1,1-Dichloroethene	300	500,000	330
cis-1,2-Dichloroethene	250	500,000	250
trans-1,2-Dichloroethene	200	500,000	190
1,2-Dichloropropane	50	--	--
1,3-Dichloropropane	300	--	300
2,2-Dichloropropane	300	--	--
1,1-Dichloropropene	100	--	--
cis-1,3-Dichloropropene	50	--	--
trans-1,3-Dichloropropene	50	--	--
p-Diethylbenzene	26,000	--	--
Diethyl Ether	300	--	--
Ethylbenzene	1,000	390,000	1,000
Ethyl Methacrylate	2,100	--	--
p-Ethyltoluene	4,500	--	--
Freon 113	6,000	--	6,000
Hexachlorobutadiene	27,000	--	--
Hexachloroethane	11,000	--	--
Hexane	73,000	--	--
2-Hexanone	6,700	--	--
Isopropylbenzene	4,700	--	2,300
p-Isopropyltoluene	11,000	--	10,000
Limonene	100,000	--	--
Methylene Chloride	50	500,000	50
Methyl tert-butyl ether (MTBE)	100	500,000	930
Methyl Ethyl Ketone (2-Butanone)	200	500,000	120
Methyl Iodide	100	--	--
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	700	--	1,000
Methyl Isothiocyanate	300	--	--
Methyl Methacrylate	700	--	--
Naphthalene	12,000	--	--
Nitrobenzene	50	--	--
2-Nitropropane	300	--	--
Nonane	100,000	--	--
Octane	100,000	--	--
n-Propylbenzene	4,000	500,000	3,900
Styrene	4,600	--	--
1,1,1,2-Tetrachloroethane	300	--	--
1,1,2,2-Tetrachloroethane	400	--	600
Tetrachloroethene	1,300	150,000	1,300
Tetrahydrofuran	1,100	--	--
1,2,4,5-Tetramethylbenzene	8,800	--	--
Toluene	1,500	500,000	700
1,2,3-Trichlorobenzene	8,300	--	--
1,2,4-Trichlorobenzene	8,300	--	3,400
1,1,1-Trichloroethane	700	500,000	680
1,1,2-Trichloroethane	100	--	--
Trichloroethene	500	200,000	470
Trichlorofluoromethane	800	--	--
1,2,3-Trichloropropane	50	--	340
1,2,4-Trimethylbenzene	3,600	190,000	3,600
1,3,5-Trimethylbenzene	8,400	190,000	8,400
Undecane	100,000	--	--
Vinyl Acetate	300	--	--
Vinyl Chloride	50	13,000	20
Xylene(s)	1,600	500,000	1,600

(1) Suffolk County Department of Health Services (SCDHS) Article 12 SOP No. 9-95 Soil Cleanup Objectives (SCOs).
(2) New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375 Commercial Use and Protection of Groundwater SCOs.
(3) NYSDEC CP-51 / Soil Cleanup Guidance Table 1 Supplemental SCOs.
Shaded values indicate most stringent cleanup objectives.

Table 9. SCDHS Article 12 and NYSDEC Part 375 SCOs for SVOCs

	SCDHS Article 12 SCOs(1)	NYSDEC Part 375 Commercial Use SCOs(2)	NYSDEC Part 375 Protection of Groundwater SCOs(2)
	(µg/kg)	(µg/kg)	(µg/kg)
Semi-Volatile Organic Compounds (SVOCs) - SCDHS Article 12 List			
Acenaphthene	98,000	500,000	98,000
Anthracene	100,000	500,000	1,000,000
Benzo(a)anthracene	1,000	5,600	1,000
Benzo(b)fluoranthene	1,700	5,600	1,700
Benzo(k)fluoranthene	1,700	56,000	1,700
Benzo(g,h,i)perylene	100,000	500,000	1,000,000
Benzo(a)pyrene	22,000	1,000	22,000
Chrysene	1,000	56,000	1,000
Dibenzo(a,h)anthracene	100,000	560	1,000,000
Fluoranthene	100,000	500,000	1,000,000
Fluorene	100,000	500,000	386,000
Indeno(1,2,3-cd)pyrene	8,000	5,600	8,200
Phenanthrene	100,000	500,000	1,000,000
Pyrene	100,000	500,000	1,000,000

(1) Suffolk County Department of Health Services (SCDHS) Article 12 SOP No. 9-95 Soil Cleanup Objectives (SCOs).

(2) New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375 Commercial Use and Protection of Groundwater SCOs.

Shaded values indicate most stringent cleanup objectives.

Table 10. SCDHS Article 12 and NYSDEC Part 375 SCOs for Metals

	SCDHS Article 12 SCOs(1)	NYSDEC Part 375 Commercial Use SCOs(2)	NYSDEC Part 375 Protection of Groundwater SCOs(2)
	(mg/kg)	(mg/kg)	(mg/kg)
Metals - SCDHS Article 12 List			
Arsenic	**6**	16	16
Barium	820	**400**	820
Beryllium	**47**	590	47
Cadmium	**7.5**	9.3	7.5
Chromium	20	400	**19**
Copper	1,700	**270**	1,720
Lead	**450**	1,000	450
Mercury	**0.7**	2.8	0.73
Nickel	**130**	310	130
Silver	10	1,500	**8.3**

(1) Suffolk County Department of Health Services (SCDHS) Article 12 SOP No. 9-95 Soil Cleanup Objectives (SCOs).

(2) New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 375 Commercial Use and Protection of Groundwater SCOs.

Shaded values indicate most stringent cleanup objectives.

APPENDIX A

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN (CAMP)

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

> **Continuous monitoring** will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.
>
> **Periodic monitoring** for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN (QAPP)

DFCI SOLUTIONS, INC.
425 UNION BOULEVARD
WEST ISLIP, NEW YORK 11795

MAY 23, 2016, REV1

Prepared for:

DFCI Solutions, Inc.
425 Union Boulevard
West Islip, New York 11795

Prepared by:

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H2M Project No.: DFCI1501

H2M architects + engineers

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DFCI SOLUTIONS, INC.
425 UNION BOULEVARD
WEST ISLIP, NEW YORK

QUALITY ASSURANCE PROJECT PLAN

MAY 23, 2016, REV1

1.0 PROJECT DESCRIPTION

H2M architects + engineers (H2M) has prepared this Quality Assurance Project Plan (QAPP) to address sampling activities to be performed as part of a RCRA Closure at the DFCI Solutions, Inc. (DFCI) facility located at 425 Union Boulevard in West Islip, New York.

This QAPP presents procedures to be followed during the sampling and analysis program as well as project organization and personnel responsibilities necessary to carry out these practices. Quality Assurance / Quality Control (QA/QC) and data validation requirements are also summarized in this plan. The closure of the DFCI facility will be performed in accordance with a New York State Department of Environmental Conservation (NYSDEC)-approved RCRA Closure Plan.

The DFCI Solutions, Inc. (DFCI) facility was formerly utilized for the manufacturing of cam fasteners and small springs. The facility is situated on a triangular-shaped property, encompassing approximately 4 acres. The property is generally bordered to the north by the Long Island Rail Road; to the south and east by Union Boulevard; and to the west by Beach Street and Prospect Avenue. The site consists of a Main Manufacturing Building in the middle of the property; a Plastics Manufacturing Building, recharge basin and parking area in the western portion of the property; a Hazardous Waste Storage Building, Power Distribution Room, former Heat Treatment Process Building and former Kerosene Tank Containment Area to the north of the Main Manufacturing Building; and parking area in the eastern portion of the property. The general vicinity primarily comprises commercial and residential properties. Depth to groundwater at the subject property is approximately 7 to 11 feet below grade surface (bgs). A site location map is provided as **Figure 1** and facility site plan is provided as **Figure 2**, **Figures 2A and 2B**.

Regulated wastes were historically generated as a result of routine facility operations and equipment maintenance activities. Wastes that were historically generated at the DFCI facility included oils, solvents and heavy metals. Current hazardous wastes at the site are limited to wastes generated as part of facility closure and remediation activities including metal-contaminated soils and decontamination rinse waters. The final process related wastes were removed from the site in June 2015.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

H2M, a professional engineering corporation, has been retained by DFCI for the oversight of the RCRA Closure of the DFCI facility including providing for all sampling services. An organization chart for the closure activities and field investigation program is provided as **Figure 3**.

For projects involving a field investigation program, a project team is assembled with each team member responsible for specific elements of the work. To ensure that every project is completed with the highest degree of quality, each member of the project team must be aware of the quality assurance objectives for his/her specific element of the work.

As indicated in **Figure 3**, the Principal-in-Charge is the direct contact between H2M and the client. The Principal-in-Charge is responsible for overall project technical direction and quality assurance, including:

- Defining project objectives;
- Allocation of resources;
- Establishing chains of command; and
- Periodic evaluation of the project.

H2M's Project Manager is responsible for directing and overseeing all technical and administrative elements of the project. This includes:

- Day to day direction, communication and coordination with the project team;
- Review of all project documents;
- Monitoring overall work progress, schedules, project costs; and
- Day to day direction of QA/QC activities.

Reporting directly to the Project Manager is the Field Team Supervisor, who is responsible for directing all field investigation activities. Depending upon the specific project requirements, the field investigation/sampling work is carried out by staff engineers, geologists, hydrogeologists, wetlands specialists, wildlife specialists and/or field technicians.

The Field Team Supervisor is responsible for ensuring that the work performed by the field investigation staff is carried out in a manner consistent with the project QA requirements. Project QA requirements are specified by the NYSDEC and/or the approved closure plan. The Field Team Supervisor is also responsible for the direction and coordination of subcontractors, which may be utilized for surveying, geophysical investigations, drilling and excavations, and acts as an intermediary between the field staff and the analytical laboratory.

The Quality Assurance Officer (QAO) operates independently of the Project Manager, reporting directly to the Principal-in-Charge. The primary responsibilities of the QAO are as follows:

- Assist in the development of the work plan and evaluate its effectiveness;
- Monitor work to ensure conformance with the requirements of the work plan;
- Evaluate the need for and, if necessary, conduct field and laboratory QA audits; and
- Supervise data validation and review all report deliverables.

3.0 QA OBJECTIVES FOR DATA MEASUREMENT

The primary aim of this plan is to establish the procedures to be followed by project personnel when conducting field sampling and analysis. Quality assurance requires careful planning, organization and the dedication of every member of the firm to the concepts of QA/QC. This must be accompanied by the understanding and coordination of the roles of all personnel involved in a particular project, if this quality objective is to be met. The overall QA objective for the closure sampling and analysis associated with the DFCI facility is to produce data at the highest level to provide direct support for determining the environmental quality of the areas in question.

4.0 FIELD SAMPLING

Based on communications with the NYSDEC, the field sampling plan associated with the Closure of the DFCI facility is anticipated to include the collection and analysis of surface rinsate samples, confirmatory soil samples, and soil vapor and indoor air samples. Rinsate samples are to ensure the proper decontamination of the building floors. Endpoint soil samples will be collected to document that contaminated soils have been properly removed. The soil vapor samples are to confirm the proper ventilation of subsurface vapors.

4.1 Sampling Methodology

4.1.1 Rinsate Sampling

Following decontamination of the building floors, rinsate samples will be collected. Rinsate sampling will be performed in accordance with the rinsate sample collection protocol provided in **Appendix A**. A temporary containment area will be created on the surface at the designated sampling area using an inert, pre-cleaned sampling container. Deionized water will then be poured into this temporary collection area. The volume of deionized water will be sufficient to collect all samples, including QA/QC samples. The minimum quantity is typically 1 to 1.5 gallons. If the designated sampling area is sloped, the deionized water will be poured starting at the highest elevation. Following a contact time of 10 minutes, the samples will be collected from the temporary collection area using sterile sampling pipettes, a peristaltic pump with dedicated sample tubing, or by an equivalent method. Field personnel will transfer the samples directly into dedicated containers provided by the analytical laboratory.

4.1.2 Soil Excavation – Confirmatory Soil Sampling

During soil excavation, the soils will be field screened for cadmium, the primary contaminant of concern, utilizing an X-Ray Fluorescence (XRF) Spectrometer. The field screening results, which will be compared with the NYSDEC Part 375 Commercial Use and Protection of Groundwater SCOs, will be utilized to qualitatively determine the extents of the excavations. Following excavation, confirmatory soil samples will be collected from the excavation bottom and sidewalls in accordance with DER-10 Technical Guidance for Site Investigation and Remediation. For shallow excavations of 3 feet or less, soil samples will be collected using disposable sampling scoops or a decontaminated shovel. For deeper excavations of greater than 3 feet, soil samples will be collected utilizing a decontaminated hand auger.

4.1.3 Soil Vapor Sampling

Approximately one month following the aeration of the building sub-slab soils, soil vapor samples will be collected in conformance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. The vapor points will be manually installed to a depth of approximately 5 feet below grade surface (bgs) utilizing the Hefty Soil Gas Probe System. A sampling implant connected to inert tubing (e.g., polyethylene tubing) will be inserted to the sampling depth. Due to the removal of the concrete slabs, the areas of exposed soil will also be sealed at the earthen surface utilizing polyethylene sheeting. The inert tubing penetration in the polyethylene sheeting will be sealed with tape. A helium tracer gas will be utilized as a QA/QC measure to verify the integrity of the surface seal. After installation of the probes and prior to sample collection, up to three volumes (volume of the sample probe and tubing) will be purged. Concurrent with the soil vapor samples, two (2) indoor air and one (1) outdoor/ambient air samples will also be collected at breathing height. The samples will be collected over a period of approximately two hours at a flow rate of <0.2 L/min utilizing Summa® vacuum canisters.

4.1.4 Leaching Pool Sampling

Following leaching pool excavation, endpoint soil samples will be collected from the bottom of the leaching pools in accordance with the Suffolk County Department of Health Services (SCDHS) Article 12 SOP No. 9-95 Pumpout and Soil Cleanup Criteria. One endpoint soil sample will be collected from each leaching pool utilizing a decontaminated hand auger.

4.1.4 Sampling Equipment Decontamination and Waste Characterization

All non-dedicated sampling equipment that requires re-use will be cleaned and decontaminated using the following procedure:

1) Detergent wash (e.g., Alconox®) and potable tap water rinse,
2) Double rinse with distilled deionized water.

All contaminated disposable field sampling equipment, decontamination fluids and rinse water will be collected and characterized for proper disposal. The wastewater generated from the rinse and cleaning operations will be collected into a 55-gallon drum(s). The wastewater will be analyzed for the contaminants of concern (i.e., metals) for waste characterization prior to proper disposal.

All floor slab concrete removed will be sampled and properly characterized for off-site disposal.

Excavated soils will be stockpiled onsite on polyethylene sheeting. The stockpiles will also be covered with polyethylene sheeting when not in active use. Select areas of excavated soils will be segregated based on cadmium concentrations detected above 20 mg/kg during prior due diligence sampling. Waste characterization samples will be collected from the stockpiles for disposal purposes in accordance with the Clean Earth Carteret Sampling Protocol. One 5-point composite sample will be collected per 100 cubic yards (or 1 discrete grab sample per 20 cubic yards) of excavated soil and analyzed for Total Petroleum Hydrocarbons (TPH) via EPA Method 8015. In addition, one 8-point composite sample will be collected per 800 cubic yards (or 1 discrete grab sample per 100 cubic yards) of excavated soil and analyzed for total volatile organic compounds (VOCs) via EPA Method 8260, polycyclic aromatic hydrocarbons (PAHs) via EPA Method 8270, total RCRA metals via EPA Method 6010, TCLP RCRA metals via EPA Method 1311/6010, ignitability via EPA Method 1010, corrosivity via EPA Method 9040, reactivity – sulfide and cyanide via EPA Method SW846 Chapter 7.3, and polychlorinated biphenyls (PCBs) via EPA Method 8082.

4.2 Sampling Plan

All samples will be submitted to the analytical laboratory for analysis in accordance with NYSDEC ASP Category B protocols.

4.2.1 Rinsate Sampling

A total of twelve (12) rinsate samples will be collected throughout the building floors in accordance with the procedures described in Section 4.1.3. The final sampling locations will be determined in the field in coordination with the NYSDEC. Additional QA/QC samples, i.e., blank, duplicate and spike samples, will also be collected to satisfy the NYSDEC Category B standards for Data Quality Assessments. The rinsate samples will be analyzed for RCRA metals via EPA Method 6010/7471. Sampling results will be compared with the NYSDEC TOGS 1.1.1 Class GA Ambient Water Quality Standards and Guidance Values. Should the sampling results exceed the Class GA standards, decontamination of the floors will be repeated until subsequent confirmatory rinsate samples meet the Class GA standards.

4.2.2 Soil Excavation – Confirmatory Soil Sampling

The frequency of confirmatory soil sampling will be as follows: For all excavations, one bottom sample will be collected for every 900 square feet of bottom area and one sample from each sidewall for every 30 linear feet of sidewall. All excavations are expected to be between 20 to 300 feet in perimeter. Additional QA/QC samples, i.e., blank, duplicate and spike samples, will be collected to satisfy the NYSDEC Category B standards for Data Quality Assessments. The soil samples will be analyzed for RCRA metals via EPA Method 6010/7471. Due to the VOC exceedances detected in SB-20 during a Phase II ESA investigation performed by Impact Environmental Closures, Inc., soil samples collected from this excavation will also include analysis for 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene via EPA Method 8260. Sampling results will be compared with the NYSDEC Part 375 Commercial Use and Protection of Groundwater SCOs.

4.2.3 Soil Vapor Sampling

A total of three (3) soil vapor samples will be collected from the soil vapor areas of concern in the Product/Raw Stock Storage Area and Screw Machinery Fabrication Department within the Main Manufacturing Building. As discussed previously in Section 4.1.1, the soil vapor samples will be collected from a depth of approximately 5 feet bgs. Concurrent with the soil vapor samples, two (2) indoor air and one (1) outdoor/ambient air samples will also be collected. All vapor and air samples will be analyzed for volatile organic compounds (VOCs) via EPA Method TO-15. Sampling results will be evaluated utilizing the NYSDOH Soil Vapor Intrusion decision matrices.

4.2.4 Leaching Pool Sampling

A total of three (3) endpoint soil samples, one from each leaching pool, will be collected utilizing a decontaminated hand auger. The samples will be analyzed for the SCDHS lists of VOCs via EPA Method 8260, SVOCs via EPA Method 8270 and metals via EPA Method 6010/7471. Samples collected from the leaching pools will be analyzed under a separate chain-of-custody for report only deliverables and will not be included in the Category B Analytical Data Package. Sampling results will be compared with both the SCDHS Soil Cleanup Objectives and the NYSDEC Part 375 Commercial Use and Protection of Groundwater SCOs.

5.0 DOCUMENTATION AND CUSTODY

Sample preparation, documentation and custody are important elements of any QA/QC program. Without proper sample preparation and accurate documentation and tracking of sample custody, even well planned and properly implemented field sampling programs can generate data open to interpretation. For the purposes of this QA Plan, sample preparation and custody include containerization, preservation, container transfer to field personnel, field handling and sample custody, sample transfer to the laboratory, and internal laboratory custody during sample analysis.

Sample custody is initiated at the designated laboratory where appropriate sample containers and preservatives, if required, are compiled for use by field personnel.

5.1 Sample Containers

Sample containers are provided by the designated laboratory. The wide scopes of analyses performed during field and sampling investigations necessitate the use of several different types of sample containers. Container materials are selected so that there will be no interference with the analysis to be performed on the given sample. Each sample container will have a label that contains the information necessary to identify the sample. Care must be taken to ensure that the sample locations identified on the Sample Request Form precisely match those on the container and the Chain of Custody. The information to be provided on the container label will include the following, at a minimum:

- A unique laboratory identification number,
- Sample identification,
- Sample location (and depth, if appropriate),
- Sampler’s name,
- Date and time of collection, and
- Identification of any preservatives, if applicable.

CLP bottles, as used during this closure sampling effort, are prepared using only CLP approved cleaning techniques with quality control certified by the vendor. The bottles used will be verified as non-contaminated by filling representative bottles with distilled water and analyzing the bottles for the parameters that would be analyzed using the specific bottle type. If any analytes are detected, the entire affected lot will be discarded and not used until the source of contamination is identified and remedied. Verification data is maintained on file at the laboratory.

5.2 Sample Preservation

Sample preservation is dependent upon the specific type or suite of analyses to be performed. A summary of sample container types and preservation methods is presented in Tables 7.21 and 7.2.2. If necessary, sample preservatives will be added in the laboratory prior to shipment and identified on the sample bottle labels. Field personnel are responsible for verifying the addition of preservatives by visually examining the sample bottles, sample bottle labels, and the chain of custody. Any discrepancies will be reported immediately to the laboratory and field personnel will not use the bottles in question.

After samples are collected and transferred into their respective sample bottles by field personnel, the samples are packed on ice, maintained at 4°C, and delivered to the laboratory within twenty-four hours of collection. Samples will be maintained in a refrigerator (4°C) in the laboratory prior to analysis.

5.3 Preparation of Sample Bottles and Coolers

Coolers used for sample transport will be scrubbed clean prior to use with a non-contaminating detergent followed by a thorough rinse with organic-free distilled water. Coolers will then be dried before packing and use. All sample bottles are purchased new and specially cleaned and certified by the vendor. As per CLP requirements, the sample bottles for this sampling program will be used once for the specific job intended. Non-CLP projects permit the sample bottles to be re-used after thorough cleaning and verification of non-contamination as discussed earlier. All glass containers to be used will be individually packaged in “bubble-wrap” to prevent breakage during transport.

5.4 Custody Transfer to Field Personnel

A standard chain of custody form is utilized for documenting the receipt, tracking and compilation of sample data. The chain of custody (COC) procedure begins with the preparation of the sample bottles. After the sample bottles have been prepared, the cooler to be used will be sealed with custody tape and an external chain of custody form prepared. At a minimum, the following information will be included on the COC at the time of shipment to field personnel:

- Container types including preservatives, if required;
- Number of containers required at each sample location for each analysis, including matrix spike/matrix spike duplicates (MS/MSD), trip blanks and field blanks;
- Any distinctive sample identification requirements;
- Sample custodian's signature with a date and time of relinquishment;
- Receiver's signature with a date and time of receipt.

Sample coolers will be picked up by field personnel at the laboratory. At this point, field personnel are in custody of the sample bottles.

5.5 Custody Transfer to Laboratory

Upon completion of field sampling, field personnel pack sample bottles, including any blank or duplicate samples, and seal the cooler with custody tape. Any breakage of bottles must be noted on the comment section of the COC. If lab prepared glassware is not to be submitted back to the laboratory for analysis, the line designating the unused sample bottles must be crossed-out with a single line through the entry, and the correction initialed by the person in custody of the samples. All corrections to the COC must be made with a single line through the incorrect entry and must be accompanied by the initials of the person in custody of the samples.

Field personnel must verify that the identification labels on the sample bottles and the COC are identical, and that all sample bottles are accounted. Any discrepancies must be resolved before relinquishing custody of the samples. Once the field personnel are satisfied that the samples are ready for submittal to the lab, the cooler will be returned to the laboratory.

Upon receipt of the sample cooler at the laboratory, the sample custodian examines the exterior of the cooler to ensure that sample integrity has not been impacted. Once the laboratory is satisfied that the sample integrity has not been compromised, a lab sample custodian signs and dates the COC to acknowledge receipt of the samples. The field personnel, when hand delivering samples, shall also sign and date the COC acknowledging that they have transferred custody of the samples to the laboratory.

6.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES

There are generally three types of QA/QC samples collected during field sampling programs: blank samples, duplicate samples, and spiked samples. Each of these types of samples serves a specific purpose. Blank samples provide a measure of contamination that may have been introduced into a sample set in either of two ways:

- in the field while the samples were being collected or transported, or
- in the laboratory during sample preparation or analysis.

Duplicate samples provide a quantitative measurement of the reproducibility of sample results and as such, provide a mechanism for measuring the accuracy of sample collection and laboratory analysis procedures. Spiked samples can be used in several ways; the most common of which are the determination of parameter recoveries and reproducibility of results. Parameter recoveries are important in discussing data usability and the possible use of pseudo-correction factors for site sample results.

6.1 Blanks

There are five basic types of blank samples: trip blanks, field blanks, equipment blanks, laboratory calibration blanks, and laboratory reagent (or method) blanks. Only trip blanks and equipment blanks are utilized by field sampling personnel.

Trip blanks are used to indicate potential contamination due to migration of volatile organic compounds (VOCs) from the air on the site or in the sample shipping containers into the sample. A trip blank consists of laboratory distilled and deionized water in a 40 ml glass vial sealed with a Teflon septum. The blank accompanies the empty sample bottles to the field as well as the samples returning to the laboratory for analysis.

Equipment blanks are used to determine if certain field sampling or cleaning procedures (e.g., decontamination of field equipment) result in cross-contamination of site samples. Like the trip blank, the equipment blank is a sample of distilled and deionized water taken to the field with empty sample bottles and analyzed with the site samples. However, unlike the trip blank, the equipment blank sample is prepared in the field. The equipment blank will be poured through or over the sampling equipment after the equipment has been decontaminated. The equipment blank is collected after cleaning the equipment and before next use. The equipment blank will be containerized and labeled in the same manner as other site samples. One (1) equipment blank per 20 field samples will be collected for each matrix type and submitted to the laboratory for the same analysis parameters as the field samples.

6.2 Duplicate Samples

Duplicate samples are used to assess the accuracy and repeatability of field procedures and laboratory analytical procedures. Duplicate site samples are generally collected so that the laboratory is “blind” to the source of the duplicate. Duplicate samples should be collected by sampling the given matrix in accordance with the procedures established for the project, except that approximately double the quantity of sample should be collected. Since sample recoveries are often a limiting factor as to which samples can be collected as duplicates, initial planning is important to ensure that sufficient sample volume is available for an accurate duplicate.

After collection of the sample, the sample will be divided evenly so that each 'half' sample is representative of the whole (i.e., the two samples should be as close to identical as possible). Each sample will then be labeled. The first sample will be labeled with the actual sample location and description. The second sample will be labeled with a fictitious sample identifier known only to the sampler and those responsible for data interpretation. The laboratory should not be informed of the presence of a duplicate sample. Both samples will then be submitted in an identical manner and documented on the COC. Analysis should include all parameters required for the original site sample. One (1) duplicate sample per 20 field samples will be collected over the course of the field sampling program.

6.3 Matrix Spiked Samples

Spiked samples are utilized to potentially improve combined sampling and analytical accuracy. The two spiked samples are identified as matrix spike and matrix spike duplicate (MS/MSD). For matrix spiked samples, a selected field sample is collected in triplicate following the same procedure as used for duplicate samples, discussed in Section 6.2. In the laboratory, two of the field samples are spiked with a known concentration of a contaminant of interest. The recovery of the spiked compound is determined after laboratory analysis. The recovery serves as an indicator of the efficiency of the laboratory analysis, and more importantly from the standpoint of the field sampling personnel; the percent recovery can be used as a pseudo-correction factor for other sample results. Sample recoveries outside of a pre-determined control limit can also be used by the personnel responsible for data interpretation to assess the usability of site data. One (1) set of MS/MSD samples will be collected per 20 field samples as part of the field sampling program.

A summary of spiking compounds, method, low and high QC limits for spike recovery and relative percent difference values (RPD) for all matrices are included in **Appendix B**. Tables listing surrogate compounds, method, and acceptability QC limits for all samples matrices are also included.

7.0 ANALYTICAL PROCEDURES AND LABORATORY TESTING

7.1 Analytical Laboratory

Environmental samples will be analyzed by Hampton-Clarke, Inc., a New York State ELAP-approved laboratory.

7.2 Sample Analysis

All environmental samples will be analyzed by Hampton-Clarke, Inc. and will include a NYSDEC ASP Category B data package that documents the quality of the analytical work. A summary of the desired parameters, methods of analyses, required sample container, preservative and maximum holding time is shown in **Table 7.2.1** for water matrices and **Table 7.2.2** for soil and solid matrices. The sample containers required for VOC analyses will be filled so that there is no headspace in the sample container. Water sample containers for VOCs will be sealed with Teflon lined septum caps. An Analytical Methods/Quality

Assurance summary including information pertaining to all environmental, performance evaluation and quality control samples is provided in **Table 7.2.3**.

8.0 CALIBRATION PROCEDURES

8.1 Calibration Practices

Instruments and equipment to be used in the analytical laboratory are controlled by a formal calibration program. The program verifies that equipment is of the proper type, range, accuracy and precision to provide data compatible with the desired requirements. All instruments and equipment that measure a quantity with performance expected at a stated level are subject to calibration. Calibration may be performed by lab personnel using reference standards or externally by calibration agencies or equipment manufacturers.

Implementation of the laboratory calibration program is the responsibility of the Laboratory Manager and Analysts. The Laboratory QA Manager shall review the implementation of the program.

There are two types of calibration pertinent to the laboratory procedures to be utilized during the analysis of samples from the DFCI facility. These are operational and periodic.

1.) Operational calibration which is routinely performed as part of the instrument usage, such as the development of a standard curve for use with an Atomic Absorption (AA) Spectrophotometer or Inductively Coupled Plasma (ICP) Spectrophotometer. Operation calibration is generally performed for instrument systems.

2.) Periodic calibration is performed at prescribed intervals for equipment such as balances and controlled ovens. In general, equipment that can be calibrated periodically is considered a distinct single purpose unit and is relatively stable in performance.

Whenever possible recognized procedures, such as those published by ASTM, USEPA, or the equipment manufacturers shall be utilized.

8.2 Calibration Frequency

Instruments and equipment shall be calibrated at prescribed intervals and/or as part of the operational use of the equipment. Frequency shall be based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended use, effect of error upon the measurement process, and prior experience.

8.3 Calibration Reference Standards

Two (2) types of reference standards are used by Hampton-Clarke, Inc. for calibration. These are physical and chemical.

1.) Physical Standards, such as weights for calibrating balances and certified thermometers for calibrating working thermometers and ovens, are generally used for periodic calibration.

2.) Chemical Standards are primarily used for operational calibration.

Whenever possible, physical and chemical reference standards shall have known relationships to nationally recognized standards (e.g., National Bureau of Standards) or accepted values of natural physical constants. If national standards do not exist, the basis for the reference standard shall be documented.

8.4 Calibration Failure

Equipment that fails calibration or becomes inoperable during use shall be removed from service and segregated to prevent inadvertent use, or shall be tagged to indicate it is out of calibration. Such equipment shall be repaired and satisfactorily recalibrated before reuse.

8.5 Calibration Records

Records shall be prepared and maintained for each piece of equipment subject to calibration. Records demonstrating accuracy of reference standards shall also be maintained.

For instruments and equipment that are calibrated on an operational basis, calibration generally consists of determining instrumental response against compounds of known composition and concentration or the preparation of a standard response curve of the same compound at different concentrations. Records of these calibrations can be maintained in several ways:

1.) The calibration data can be kept with analytical sample data.

2.) A logbook can be prepared for each instrument that contains all calibration data.

Method 1 provides response factor information, etc., directly with the analytical data so that the data can be readily processed and verified. Also, the raw data package is completed as a unit.

Method 2 provides an on-going record of calibration undertaken for a specific instrument. However, to process and verify the analytical data, the log must be used in conjunction with the raw data.

For operational calibration of instrumentation used for this project, calibration data will be included with the raw analytical data and maintained in project files.

9.0 DATA REDUCTION, VALIDATION AND REPORTING

9.1 Data Reduction

Laboratory data reduction and analysis for organic analyses involves relating a "peak area" to the mass of a constituent. This is accomplished by digital computers. The computer hardware and software is designed to allow the analyst to create libraries or files of calibration standards, and then compare raw sample data against these libraries to produce a report that contains the identification and qualification of constituents present in the sample. The analysts manually check the computer-reduced data.

Inorganic analyses are performed with instruments of varying electronic sophistication, but in all instances, data reduction and analysis involves essentially the generation of a standard calibration curve, and then comparing the instrument readout against the calibration curve to obtain a "Quantity" of constituent. The concentration is then manually calculated. The calculated results are manually entered into the computer system.

9.2 Data Validation

Data validation is a process in which field and analytical data quality is assessed relative to the data quality objectives. The validation process examines the acceptability or validity of data, and assesses data usability. Although data validation usually refers to analytical laboratory data, the same review process is applied to all field-generated data.

In order to ensure that data collected in the field is consistent and accurate, standard reporting forms are utilized. These forms are then checked by the Field Team Supervisor to confirm that the information is complete and that any calculations are correct. A minimum of 20% of the field data reports is checked in this manner. If, during the initial review process, errors are identified, the remaining 80% of the data set are reviewed. Items to be checked by the reviewer will be dependent on the type of data being reported, but in general include the following:

- Proper sampling methods and equipment were employed;
- Proper sample preservation methods were followed;
- Chain of custody information is complete;
- Proper QA/QC samples were utilized;
- Equipment decontamination procedures were followed; and
- Instruments were properly calibrated.

The final analytical laboratory category B data package generated as part of the closure activities at the DFCI facility will be evaluated for data validation by a third party. For this project, outside validation services will be provided by Data Validation Services. A copy of the resume for Ms. Judy Harry of Data Validation Services is provided as **Appendix C**.

9.3 Data Reporting

The following are applicable to data presentation:

1.) The final presentation shall be checked in accordance with data verification requirements and approved by the Laboratory QA Manager.

2.) Data presentation will include:

    a) Sample identification number used by Hampton-Clarke, Inc. and/or the sample identification provided to the laboratory (if different).

    b) Chemical parameters analyzed reported values, and units of measurements.

    c) Detection limit of the analytical procedure, if the reported value is less than the detection limit.

    d) Data for a chemical parameter are reported with consistent significant figures for all samples.

    e) Results of QA/QC sample analysis, if appropriate.

    f) Footnotes referenced to specific data, if required to explain reported values.

The format for reporting will follow the NYSDEC ASP Category B data package. All data will be made available in EQuIS Electronic Data Deliverable (EDD) Format.

QAPP FIGURES

SITE LOCATION MAP

SCALE: 1" = 3,000'

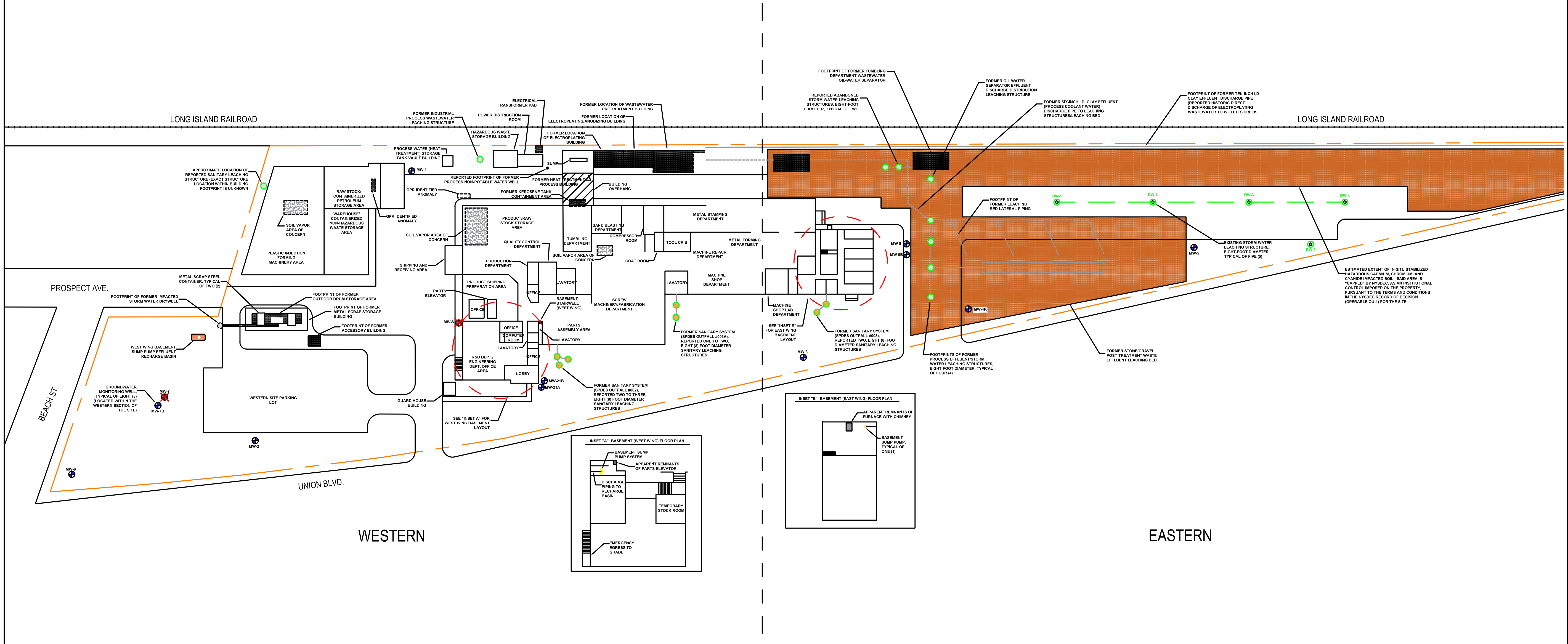
FIGURE 1

DFC11501

H2M

architects + engineers

Melville, NY
Parsippany, NJ



NOTE: SEE FIGURES 2A AND 2B, FACILITY SITE PLAN WESTERN AND FACILITY SITE PLAN EASTERN, FOR MORE ZOOMED IN/DETAILED VIEWS

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New City, NY 10956
Parsippany, NJ 07054
Howell, NJ 07731

NOTES:
BASE MAP OBTAINED FROM FIGURE 1: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: WESTERN SITE AREA, DATED MARCH 14, 2015, AND FIGURE 2: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: EASTERN SITE AREA, DATED MARCH 14, 2015. FIGURES 1 AND 2 OBTAINED FROM PHASE II ENVIRONMENTAL SITE ASSESSMENT, PREPARED BY IMPACT ENVIRONMENTAL, DATED AUGUST 26, 2015.

LEGEND:

MW-1 ⊕	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ☒	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
●	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

CLIENT

DFCI SOLUTIONS, INC.

425 UNION BOULEVARD
WEST ISLIP, NY 11795

PROJECT

RCRA CLOSURE PLAN

SHEET NO.

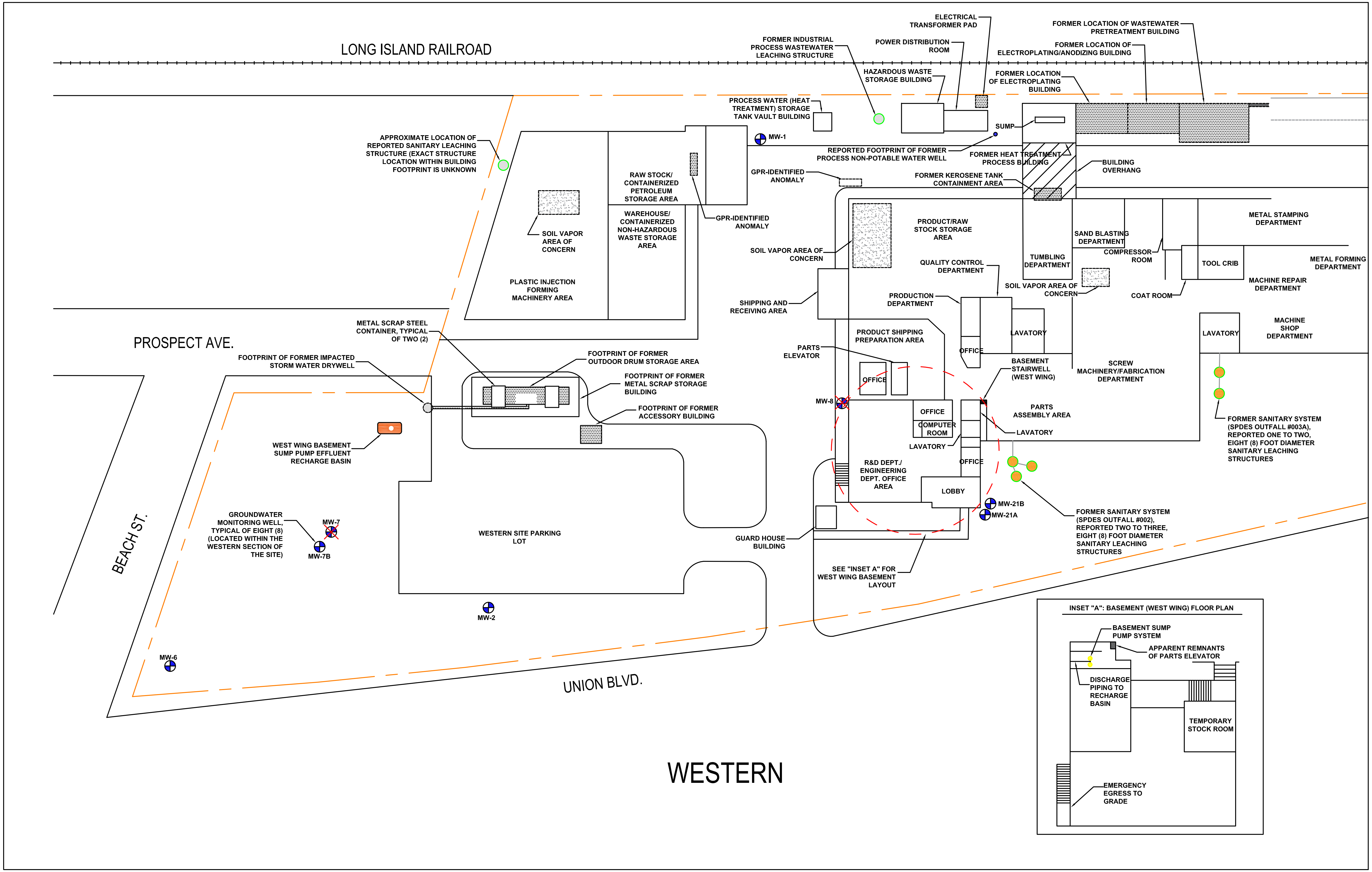
FIGURE 2

SHEET TITLE

FACILITY SITE PLAN OVERVIEW

H2M PROJECT NO.

DFCI 1501



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NOTES:
BASE MAP OBTAINED FROM FIGURE 1: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: WESTERN SITE AREA, DATED MARCH 14, 2015, AND FIGURE 2: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: EASTERN SITE AREA, DATED MARCH 14, 2015. FIGURES 1 AND 2 OBTAINED FROM PHASE II ENVIRONMENTAL SITE ASSESSMENT, PREPARED BY IMPACT ENVIRONMENTAL, DATED AUGUST 26, 2015.

LEGEND:

MW-1 ⊕	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ⊗	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
●	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

CLIENT
DFCI SOLUTIONS, INC.

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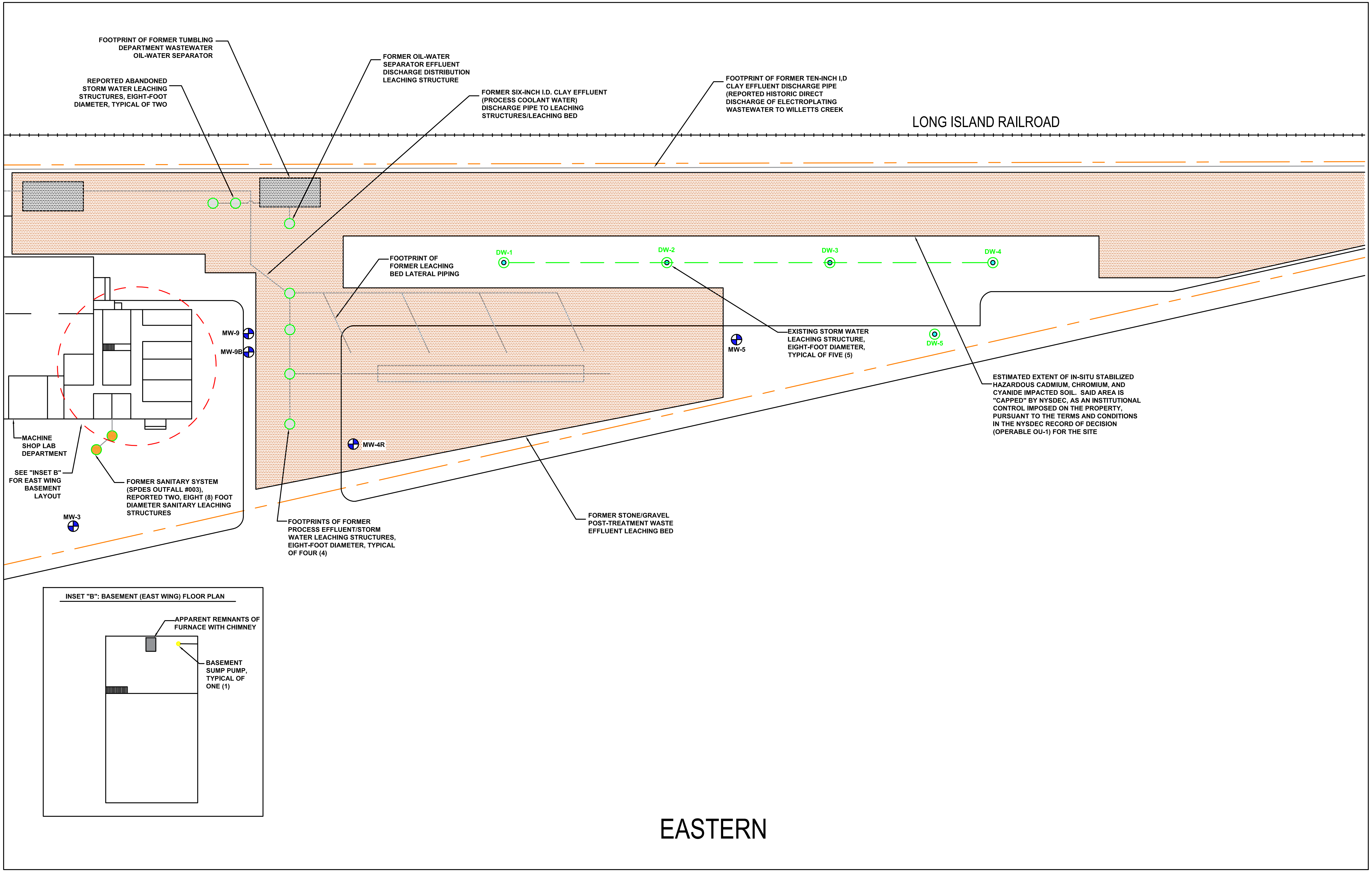
WEST ISLIP, NY 11795

PROJECT
RCRA CLOSURE PLAN

SHEET NO.
FIGURE 2A

SHEET TITLE
FACILITY SITE PLAN
WESTERN

H2M PROJECT NO.
DFCI 1501



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NOTES:

BASE MAP OBTAINED FROM FIGURE 1: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: WESTERN SITE AREA, DATED MARCH 14, 2015, AND FIGURE 2: SOIL, SEDIMENT AND GROUNDWATER SAMPLING LOCATIONS: EASTERN SITE AREA, DATED MARCH 14, 2015. FIGURES 1 AND 2 OBTAINED FROM PHASE II ENVIRONMENTAL SITE ASSESSMENT, PREPARED BY IMPACT ENVIRONMENTAL, DATED AUGUST 26, 2015.

LEGEND:

MW-1 ⊕	MONITORING WELL ID MONITORING WELL LOCATION
MW-8 ⊗	MONITORING WELL ID DESTROYED/MISSING MONITORING WELL LOCATION
●	SPDES OUTFALL LOCATION
○	LEACHING STRUCTURE LOCATION

CLIENT

DFCI SOLUTIONS, INC.

425 UNION BOULEVARD
WEST ISLIP, NY 11795

PROJECT

RCRA CLOSURE PLAN

SHEET NO.

FIGURE 2B

SHEET TITLE

FACILITY SITE PLAN
EASTERN

H2M PROJECT NO.

DFCI 1501

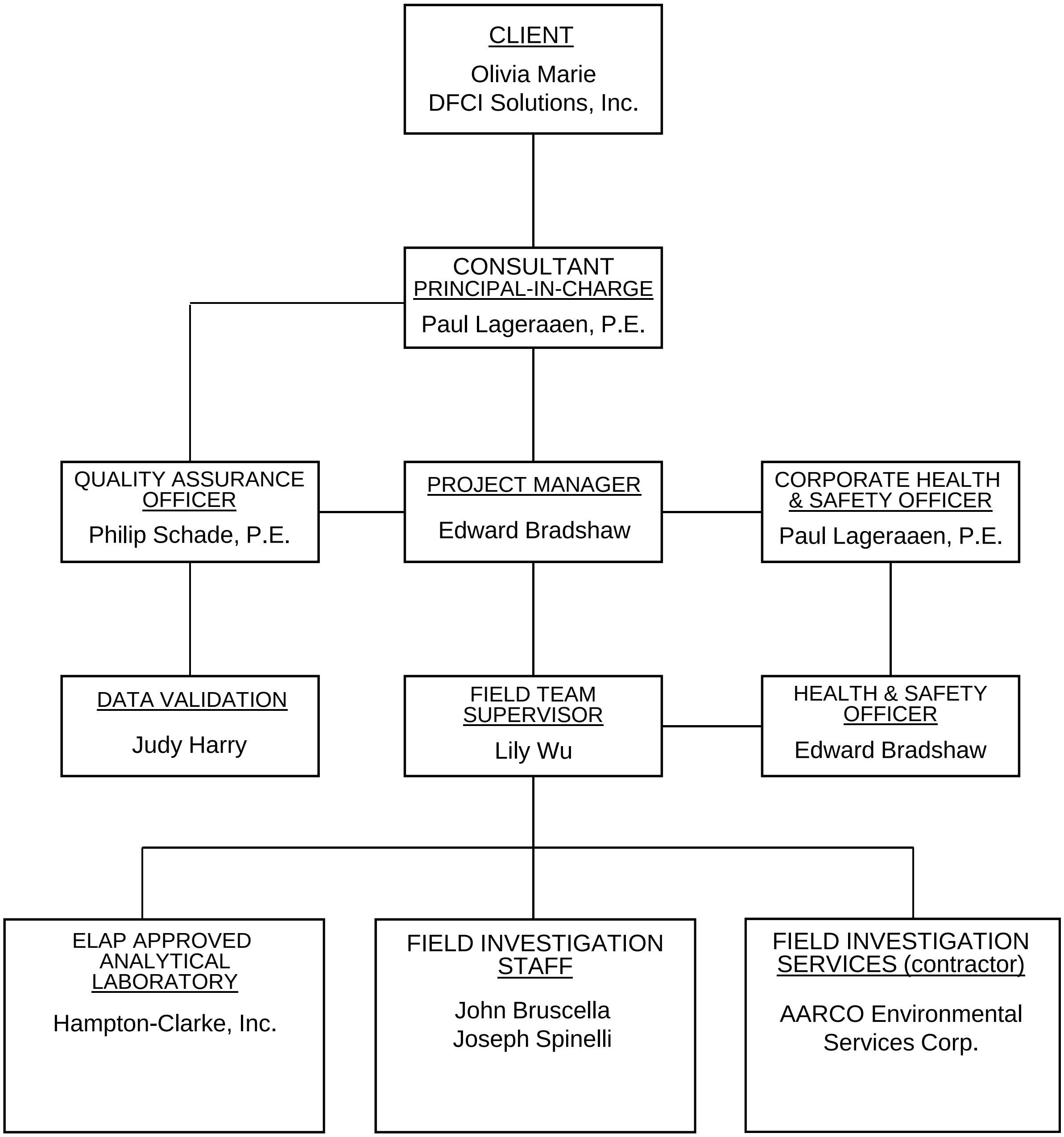

Figure 3. Organization Chart for Field Sampling and Analysis Program

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Melville, NY 11747

QAPP TABLES

Table 7.2.1. Water Matrix Analysis Requirements and Methods

Parameter	Method	Container	Preservative	Max. Holding Time*
VOCs	ASP 2005 8260C	40 ml vial	Cool, 4°C; HCl to pH<2	5 days unpreserved; 12 days preserved.
SVOCs	ASP 2005 8270D	1 L glass	Cool, 4°C; Store in dark	Extraction within 5 days. Analysis within 40 days of extraction.
Metals	ASP 2005 6010C / 7471B	500 ml plastic	Cool, 4°C; HNO_3 to pH<2	6 months / 28 days.
PCBs	ASP 2005 8082A	1 L glass	Cool, 4°C; Store in dark	Extraction within 5 days. Analysis within 40 days of extraction.

*All holding times from verified time of sample receipt (VTSR) as per NYSDEC ASP Category B.

Table 7.2.2. Soil and Solid Matrix Analysis Requirements and Methods

Parameter	Method	Container	Preservative	Max. Holding Time*
VOCs	ASP 2005 8260C / 5035	5 g EnCores / 40 ml vials	Cool, 4°C	5 days unpreserved; 12 days preserved.
SVOCs	ASP 2005 8270D	8 oz jar	Cool, 4°C	Extraction within 5 days. Analysis within 40 days of extraction.
Metals	ASP 2005 6010C / 7471B	8 oz jar	Cool, 4°C	6months / 28 days.
PCBs	ASP 2005 8082A	8 oz jar	Cool, 4°C	Extraction within 5 days. Analysis within 40 days of extraction.

* All holding times from VTSR as per NYSDEC ASP Category B.

Table 7.2.3. Analytical Methods/Quality Assurance Summary

Sampling Location	Matrix	No. of Samples	Analysis	Methods
1. Closure Sampling				
a. Soil Excavations	Soil	59	Metals	6010/7471
b. Rinsate Sampling	Liquid	13	Metals	6010/7471
c. Sub-Slab Soil Vapor	Air	5	VOCs	TO-15
d. Leaching Pools [3]	Soil	3	VOCs	8260
			SVOCs	8270
			Metals	6010/7471
2. QA/QC Sampling				
a. Trip Blank	Liquid	1 [1]	VOCs	8260
b1. Equipment Blank - Soil	Liquid	3 [2]	Metals	6010/7471
b2. Equipment Blank - Liquid	Liquid	1 [2]	Metals	6010/7471
c. Duplicate	Soil	3	Metals	6010/7471
	Liquid	1	Metals	6010/7471
d. MS/MSD	Soil	3	Metals	6010/7471
	Liquid	1	Metals	6010/7471

[1] One trip blank per day.

[2] Minimum of one set of QA samples per sample delivery group (SDG), i.e., 1 per 20.

[3] Leaching pool samples to be submitted under a separate chain-of-custody (COC) for report only deliverables and will not be included in the Category B Analytical Data Package. No associated QA/QC samples will be collected for the leaching pool samples.

QAPP APPENDIX A

RINSATE SAMPLE COLLECTION PROTOCOL

Attachment A

Rinsate Sample Collection Protocol

This procedure is intended to be used to collect samples for analysis of concrete floors, secondary containment areas and sumps, including surfaces that have been coated, to establish whether or not there is any contamination on the concrete surfaces. This procedure is to be performed after the surfaces have been cleaned and decontaminated pursuant to the approved closure plan. This procedure may also be suitable for use on other surfaces on a case-by-case basis.

1. Mark areas to be sampled on a facility floor plan for the area(s) to be closed. Sketches should include locations of building columns, walls, fixed equipment, and the rinsate sampling locations themselves to accurately locate the rinsate sampling points within the buildings.

2. Assemble and clean all equipment necessary for sample collection. Equipment needs to be cleaned, if not already pre-cleaned by the laboratory.

3. Create a temporary containment area on the floor using an inert, pre-cleaned, flexible boom.

4. Label the sample containers with a unique sample code, information on the site, sample location and date/time sample was collected. Affix appropriate labels for test parameters on the sample containers. Put on a new pair of disposable nitrile gloves.

5. At each sampling location, slowly pour the minimum quantity of de-ionized water (start with one gallon for metals analysis, much less for only volatiles) needed to collect all sample parameters, including QC samples, onto the concrete area. If the individual area is sloped, start pouring at the highest elevation. The de-ionized water may be provided by the analytical laboratory, purchased, or generated on-site.

6. Allow de-ionized water to collect and remain in the sample location for 10 minutes.

7. Collect the number of samples as specified in the closure plan along with appropriate QA/QC samples. Samples may be collected using dedicated, sterile glass pipettes provided by the laboratory, or any other suitable device approved in the closure plan. The pipettes are used to transfer the sample fluids into the appropriate laboratory supplied containers. Volatile sample containers shall be filled first to minimize loss of volatiles.

8. Samples must not be composited.

9. Cap the sample container and place sample containers in a cooler with ice to maintain a temperature of 4 °C.

10. Remove and discard the gloves. Place all disposable gloves into a plastic bag designated

for proper disposal.

11. Fill out sampling details in field log book. Photographs of the sample locations, wetted areas, equipment, and actual sampling events may be taken by the facility or Department staff and a list of the photographs shall be recorded in the field book.

12. Fill out the chain-of-custody and any other sample forms. Prepare the samples for storage and shipping in the cooler with ice to maintain a temperature of 4 ± 2°C. Ship overnight to the laboratory for analysis.

13. Follow the chain-of custody procedures as detailed in the Quality Assurance Project Plan.

QAPP APPENDIX B

QC LIMITS FOR SPIKING AND SURROGATE COMPOUNDS

Volatile Organic Compounds (VOCs), Method 8260B - Soil (ug/kg)

Lab Fortified Blank (LFB)		**QC Limits (%R)**	
Analyte	**Spike Concentration**	**Low**	**High**
1,1,1-Trichloroethane	50	78	127
1,1,2,2-Tetrachloroethane	50	72	152
1,1,2-Trichloroethane	50	80	139
1,1-Dichloroethane	50	67	141
1,1-Dichloroethene	50	65	142
1,2-Dichloroethane	50	65	147
1,2-Dichloroethene (total)	100	57	150
1,2-Dichloropropane	50	81	132
2-Butanone	50	30	226
2-Hexanone	50	59	163
4-Methyl-2-pentanone	50	64	170
Acetone	50	50	187
Benzene	50	71	142
Bromodichloromethane	50	78	137
Bromoform	50	81	142
Bromomethane	50	58	144
Carbon disulfide	50	52	143
Carbon tetrachloride	50	70	136
Chlorobenzene	50	85	128
Chloroethane	50	33	153
Chloroform	50	68	140
Chloromethane	50	33	149
cis-1,3-Dichloropropene	50	78	131
Dibromochloromethane	50	82	136
Ethylbenzene	50	80	129
Methylene chloride	50	46	157
Styrene	50	85	126
Tetrachloroethene	50	67	144
Toluene	50	83	129
trans-1,3-Dichloropropene	50	59	147
Trichloroethene	50	72	145
Vinyl chloride	50	20	164
Xylene (total)	150	79	133

VOCs, Method 8260B - Soil (ug/kg) (continued)

MS/MSD		**QC Limits (%R)**		**RPD**
Analyte	**Spike Concentration**	**Low**	**High**	
1,1-Dichloroethene	50	59	172	22
Benzene	50	66	142	21
Chlorobenzene	50	60	133	21
Toluene	50	59	139	21
Trichloroethene	50	62	137	24

Surrogates		**QC Limits (%R)**	
Analyte	**Spike Concentration**	**Low**	**High**
1,2-Dichloroethane-d4	50	70	121
4-Bromofluorobenzene	50	59	113
Toluene-d8	50	84	138

Volatile Organic Compounds (VOCs), Method 8260B - Water (ug/l)

Lab Fortified Blank (LFB)		QC Limits (%R)	
Analyte	**Spike Concentration**	**Low**	**High**
1,1,1-Trichloroethane	50	66	126
1,1,2,2-Tetrachloroethane	50	77	120
1,1,2-Trichloroethane	50	82	116
1,1-Dichloroethane	50	77	114
1,1-Dichloroethene	50	67	120
1,2-Dichloroethane	50	76	120
1,2-Dichloroethene (total)	100	78	128
1,2-Dichloropropane	50	81	115
2-Butanone	50	74	121
2-Hexanone	50	76	119
4-Methyl-2-pentanone	50	79	121
Acetone	50	71	125
Benzene	50	77	116
Bromodichloromethane	50	78	118
Bromoform	50	75	121
Bromomethane	50	50	136
Carbon disulfide	50	61	126
Carbon tetrachloride	50	64	126
Chlorobenzene	50	72	124
Chloroethane	50	71	116
Chloroform	50	75	119
Chloromethane	50	70	114
cis-1,3-Dichloropropene	50	79	116
Dibromochloromethane	50	75	125
Ethylbenzene	50	68	128
Methylene chloride	50	80	112
Styrene	50	72	124
Tetrachloroethene	50	59	133
Toluene	50	70	125
trans-1,3-Dichloropropene	50	77	120
Trichloroethene	50	72	121
Vinyl chloride	50	66	117
Xylene (total)	150	78	133

VOCs, Method 8260B - Water (ug/l) (continued)

MS/MSD		**QC Limits (%R)**		**RPD**
Analyte	**Spike Concentration**	**Low**	**High**	
1,1-Dichloroethene	50	61	145	14
Benzene	50	76	127	11
Chlorobenzene	50	75	130	13
Toluene	50	76	125	13
Trichloroethene	50	71	120	14

Surrogates		**QC Limits (%R)**	
Analyte	**Spike Concentration**	**Low**	**High**
1,2-Dichloroethane-d4	50	76	114
4-Bromofluorobenzene	50	86	115
Toluene-d8	50	88	110

Semi-Volatile Organic Compounds (SVOCs), Method 8270D - Soil (ug/kg)

Lab Fortified Blank (LFB)		**QC Limits**	
Analyte	**Spike Concentration**	**Low**	**High**
1,2,4-Trichlorobenzene	1667	35	110
1,2-Dichlorobenzene	1667	36	107
1,3-Dichlorobenzene	1667	34	104
1,4-Dichlorobenzene	1667	35	108
2,2´-oxybis(1-Chloropropane)	1667	33	116
2,4,5-Trichlorophenol	1667	45	111
2,4,6-Trichlorophenol	1667	45	110
2,4-Dichlorophenol	1667	41	117
2,4-Dimethylphenol	1667	24	96
2,4-Dinitrophenol	1667	10	80
2,4-Dinitrotoluene	1667	49	112
2,6-Dinitrotoluene	1667	50	109
2-Chloronaphthalene	1667	35	107
2-Chlorophenol	1667	36	109
2-methylnaphthalene	1667	31	135
2-Methylphenol	1667	36	104
2-Nitroaniline	1667	42	118
2-Nitrophenol	1667	36	117
3,3’-Dichlorobenzidine	1667	41	116
3-Nitroaniline	1667	40	95
4,6-Dinitro-2-methylphenol	1667	16	104
4-Bromophenyl-phenylether	1667	50	116
4-Chloro-3-methylphenol	1667	45	118
4-Chloraniline	1667	29	88
4-Chlorophenyl-phenylether	1667	48	111
4-Methylphenol	1667	26	119
4-Nitroaniline	1667	46	110
4-Nitrophenol	1667	26	118
Acenaphthene	1667	45	109
Acenaphthylene	1667	43	107
Anthracene	1667	50	117
Benzo(a) anthracene	1667	52	116
Benzo(a) pyrene	1667	56	119

Benzo(b)fluranthene	1667	45	122
Benzo (g,h,i) perylene	1667	30	107
Benzo (k) fluoranthene	1667	54	124
bis(2-Chloroethoxy)methane	1667	29	112
bis(2-Chloroethyl)ether	1667	32	116
Bis(2-ethylhexyl)phthalate	1667	60	127
Butylbenzylphthlate	1667	54	130
Carbazole	1667	51	114
Chrysene	1667	48	121
Di-n-butylphthalate	1667	53	124
Di-n-octyl phthalate	1667	46	141
Dibenzo(a,h) anthracene	1667	52	109
Dibenzofuran	1667	48	112
Diethylphthlate	1667	51	114
Dimethylphthlate	1667	49	112
Fluoranthene	1667	45	126
Fluorene	1667	47	108
Hexachlorobenzene	1667	51	110
Hexachlorobutadiene	1667	36	118
Hexachlorocyclopentadiene	1667	10	97
Hexachloroethane	1667	34	105
Indeno (1,2,3-cd) pyrene	1667	50	108
Isophorone	1667	14	129
N-Nitroso-di-n-propylamine	1667	33	109
N-Nitrosodiphenylamine	1667	39	90
Naphthalene	1667	18	142
Nitrobenzene	1667	36	119
Pentachlorophenol	1667	22	115
Phenanthrene	1667	47	124
Phenol	1667	38	104
Pyrene	1667	49	132

SVOCs, Method 8270D - Soil (ug/kg) (continued)

MS/MSD		QC Limits (%R)		RPD
Analyte	**Spike Concentration**	**Low**	**High**	
1,2,4-Trichlorobenzene	1667	38	107	23
1,4-Dichlorobenzene	1667	28	104	27
2,4-Dinitrotoluene	1667	28	116	47
2-Chlorophenol	2500	25	102	50
4-Chloro-3-methylphenol	2500	26	103	33
4-Nitrophenol	2500	11	114	50
Acenaphthene	1667	31	137	19
N-Nitroso-di-n-propylamine	1667	41	126	38
Pentachlorophenol	2500	17	109	47
Phenol	2500	26	90	35
Pyrene	1667	35	142	36

Surrogates		QC Limits (%R)	
Analyte	**Spike Concentration**	**Low**	**High**
1,2-Dichlorobenzene-d4	1667	20	130
2,4,6-Tribromophenol	2500	19	122
2-Chlorophenol-d4	2500	20	130
2-Fluorobiphenyl	1667	30	115
2-Fluorophenol	2500	25	121
4-Terphenyl-d14	1667	18	137
Nitrobenzene-d5	1667	23	120
Phenol-d5	2500	24	113

Semi-Volatile Organic Compounds (SVOCs), Method 8270D- Water (ug/l)

Lab Fortified Blank (LFB)		QC Limits	
Analyte	**Spike Concentration**	**Low**	**High**
1,2,4-Trichlorobenzene	50	29	129
1,2-Dichlorobenzene	50	28	116
1,3-Dichlorobenzene	50	18	122
1,4-Dichlorobenzene	50	25	123
2,2´-oxybis(1-Chloropropane)	50	44	100
2,4,5-Trichlorophenol	50	55	125
2,4,6-Trichlorophenol	50	55	114
2,4-Dichlorophenol	50	44	127
2,4-Dimethylphenol	50	39	135
2,4-Dinitrophenol	50	11	101
2,4-Dinitrotoluene	50	55	122
2,6-Dinitrotoluene	50	56	121
2-Chloronaphthalene	50	41	122
2-Chlorophenol	50	43	106
2-methylnaphthalene	50	31	123
2-Methylphenol	50	41	131
2-Nitroaniline	50	48	124
2-Nitrophenol	50	41	128
3,3’-Dichlorobenzidine	50	20	132
3-Nitroaniline	50	46	112
4,6-Dinitro-2-methylphenol	50	28	150
4-Bromophenyl-phenylether	50	53	121
4-Chloro-3-methylphenol	50	48	124
4-Chloraniline	50	25	133
4-Chlorophenyl-phenylether	50	53	116
4-Methylphenol	50	41	101
4-Nitroaniline	50	51	113
4-Nitrophenol	50	22	156
Acenaphthene	50	50	116
Acenaphthylene	50	50	109
Anthracene	50	54	117
Benzo(a) anthracene	50	31	128
Benzo(a) pyrene	50	30	146

Benzo(b)fluranthene	50	43	147
Benzo (g,h,i) perylene	50	25	153
Benzo (k) fluoranthene	50	28	148
bis(2-Chloroethoxy)methane	50	47	102
bis(2-Chloroethyl)ether	50	39	111
Bis(2-ethylhexyl)phthalate	50	37	138
Butylbenzylphthlate	50	38	135
Carbazole	50	49	116
Chrysene	50	42	140
Di-n-butylphthalate	50	50	128
Di-n-octyl phthalate	50	32	148
Dibenzo(a,h) anthracene	50	22	147
Dibenzofuran	50	53	117
Diethylphthlate	50	54	124
Dimethylphthlate	50	53	121
Fluoranthene	50	50	123
Fluorene	50	51	118
Hexachlorobenzene	50	52	128
Hexachlorobutadiene	50	18	90
Hexachlorocyclopentadiene	50	13	119
Hexachloroethane	50	41	119
Indeno (1,2,3-cd) pyrene	50	26	156
Isophorone	50	46	118
N-Nitroso-di-n-propylamine	50	40	124
N-Nitrosodiphenylamine	50	41	95
Naphthalene	50	37	107
Nitrobenzene	50	41	122
Pentachlorophenol	50	12	124
Phenanthrene	50	52	126
Phenol	50	40	100
Pyrene	50	41	137

SVOCs, Method 8270D- Water (ug/l) (continued)

MS/MSD		**QC Limits (%R)**		**RPD**
Analyte	**Spike Concentration**	**Low**	**High**	
1,2,4-Trichlorobenzene	50	39	98	28
1,4-Dichlorobenzene	50	27	123	40
2,4-Dinitrotoluene	50	24	96	38
2-Chlorophenol	75	12	110	42
4-Chloro-3-methylphenol	75	23	97	42
4-Nitrophenol	75	10	80	50
Acenaphthene	50	46	118	31
N-Nitroso-di-n-propylamine	50	41	116	38
Pentachlorophenol	75	9	103	50
Phenol	75	12	110	42
Pyrene	50	26	127	31

Surrogates		**QC Limits (%R)**	
Analyte	**Spike Concentration**	**Low**	**High**
1,2-Dichlorobenzene-d4	50	16	110
2,4,6-Tribromophenol	75	10	123
2-Chlorophenol-d4	75	33	110
2-Fluorobiphenyl	50	43	116
2-Fluorophenol	75	21	110
4-Terphenyl-d14	50	33	141
Nitrobenzene-d5	50	35	114
Phenol-d5	75	10	110

Metals, Method 6010/7471 - Soil (mg/kg)

LCS		QC Limits	
Analyte	**Spike Concentration**	**Low**	**High**
Aluminum	8400	47.0	152.4
Antimony	93.3	6.4	199.4
Arsenic	94.5	82.3	117.5
Barium	167	83.8	115.6
Beryllium	57.6	83.0	117
Cadmium	60.5	83.1	116.9
Calcium	6140	83.2	117
Chromium	70.4	81.8	118.1
Cobalt	102	83.2	116.7
Copper	79.6	83.2	116.1
Iron	12500	50.6	149.6
Lead	98.1	82.2	117.6
Magnesium	2580	76.0	123.6
Manganese	283	82.3	117.3
Mercury	3.73	71.6	128.1
Nickel	57.6	82.8	117.1
Potassium	2490	69.9	129.7
Selenium	86.4	80.1	120.4
Silver	34.4	66.3	134
Sodium	215	67.0	133
Thallium	120	78.2	120.8
Vanadium	57	73.5	126.3
Zinc	140	82.1	117.9

Metals, Method 6010/7471 - Soil (mg/kg) (continued)

Matrix Spike (MS)		**QC Limits (%R)**	
Analyte	**Spike Concentration**	**Low**	**High**
Antimony	50	75	125
Arsenic	4	75	125
Barium	200	75	125
Beryllium	5	75	125
Cadmium	5	75	125
Chromium	20	75	125
Cobalt	50	75	125
Copper	25	75	125
Lead	2	75	125
Manganese	50	75	125
Mercury	0.166	75	125
Nickel	50	75	125
Selenium	1	75	125
Silver	5	75	125
Thallium	5	75	125
Vanadium	50	75	125
Zinc	50	75	125

Sample Duplicate – 20% RPD

Metals, Method 6010/7471 - Water (mg/l)

LCS		**QC Limits**	
Analyte	**Spike Concentration**	**Low**	**High**
Aluminum	50	80	120
Antimony	1000	80	120
Arsenic	500	80	120
Barium	2.5	80	120
Beryllium	2500	80	120
Cadmium	2500	80	120
Calcium	50	80	120
Chromium	2.5	80	120
Cobalt	2.5	80	120
Copper	2.5	80	120
Iron	50	80	120
Lead	500	80	120
Magnesium	50	80	120
Manganese	2.5	80	120
Nickel	2.5	80	120
Potassium	80	80	120
Selenium	500	80	120
Silver	1	80	120
Sodium	80	80	120
Thallium	500	80	120
Vanadium	2.5	80	120
Zinc	2.5	80	120

Metals, Method 6010/7470 - Water (mg/l) (continued)

Matrix Spike (MS)		QC Limits (%R)	
Analyte	**Spike Concentration**	**Low**	**High**
Aluminum	2	75	125
Antimony	500	75	125
Arsenic	40	75	125
Barium	2	75	125
Beryllium	50	75	125
Cadmium	50	75	125
Chromium	0.2	75	125
Cobalt	0.5	75	125
Copper	0.25	75	125
Iron	1	75	125
Lead	20	75	125
Manganese	0.5	75	125
Mercury	0.001	75	125
Nickel	0.5	75	125
Selenium	10	75	125
Silver	0.05	75	125
Thallium	50	75	125
Vanadium	0.5	75	125
Zinc	0.5	75	125

Sample Duplicate – 20% RPD

PCBs, Method 8082 - Soil (mg/kg)

Lab Fortified Blank (LFB)		QC Limits	
Analyte	**Spike Concentration**	**Low**	**High**
Aroclor 1016	167	50	136
Aroclor 1221	167	50	136
Aroclor 1232	167	50	136
Aroclor 1242	167	50	136
Aroclor 1248	167	50	136
Aroclor 1254	167	50	136
Aroclor 1260	167	45	154

PCBs, Method 8082 - Water (ug/l)

Lab Fortified Blank (LFB)		QC Limits	
Analyte	**Spike Concentration**	**Low**	**High**
Aroclor 1016	5	42	134
Aroclor 1221	5	42	134
Aroclor 1232	5	42	134
Aroclor 1242	5	42	134
Aroclor 1248	5	42	134
Aroclor 1254	5	42	134
Aroclor 1260	5	34	146

QAPP APPENDIX C

RESUME FOR DATA VALIDATION SERVICES (OUTSIDE DATA VALIDATOR)

JUDY V. HARRY

P. O. Box 208
120 Cobble Creek Rd.
North Creek, NY 12853

Occupation:	Data Validator/Environmental Technical Consultant
Years Experience:	39
Education:	B.S., Chemistry, Magna cum laude, 1976, Phi Beta Kappa
Certifications:	New York State Woman-Owned Business Enterprise (WBE)

Relevant Work History:

Data Validation Services: September 1989 - present

Sole proprietor of Data Validation Services, a woman owned small business, CCR registered, certified by ORCA, providing consultation/validation services to regulatory and commercial clients.

These services include the review of analytical laboratory data for compliance with respect to specific protocols, accuracy and defensibility of data, verification of reported values, and evaluation of quality parameters for analytical usability of results. Approved by USEPA, NYSDEC, NJDEP, and NYCDEP as a data validator for projects, including USEPA Superfund, Brownfield, and lead sites, and those contracted through the NYSDEC Division of Hazardous Waste Remediation, Division of Solid Waste, and Division of Water Quality.

Performed validation for compliance with laboratory analytical protocols including USEPA OLM, USEPA OLC, USEPA ILM, USEPA DFLM, USEPA SOW3/90, USEPA SOW 7/87 CLP, USEPA SOW 2/88 CLP, USEPA SW846, RCRA, AFCEE, NYS 6 NYCRR Part 360, 40 CFR, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, including TO-15, 1989/1991/1995/2000/2005 NYSDEC ASPs, and 1987 NYSDEC CLP.

Performed validation according to the USEPA National and Regional SOPs and Functional Guidelines, AFCEE requirements, NYSDEC Validation Scope of Work, and NJDEP Division of Hazardous Site Mitigation/Publicly Funded Site Remediation SOPs.

Performed validation for USEPA Superfund Sites including Salem Acres, York Oil, Port Washington L-4 Landfill, Bridgeport Rental and Oil Services, MMR/ OTIS AFB, LCP, and Peter Cooper site; and for USEPA lead sites including SJ&J Piconne, Maska, Bowe System, Jones Sanitation, and Syossett Landfill, involving CLP, RAS, and SAS protocols.

Contracted for NYSDEC Superfund Standby Contracts with LMS Engineers, CDM, Malcolm-Pirnie, Ecology & Environment, HDR, Shaw Environmental, and EC Jordan, involving samples collected at NYS Superfund Sites and analyzed under the NYSDEC ASP.

Performed validation services for NYSDEC Phase II remedial investigations, RI/FS projects, Brownfield sites, and PRP over-site projects for hazardous waste sites.

Performed validation services for clients conducting RI/FS activities involving samples of many matrices, including waste, air, sludges, leachates, solids/sediments, aqueous, and biota.

Clients have included AECOM, ARCADIS, Barton & Loguidice, Benchmark Engineering, Bergmann Associates, Blasland, Bouck & Lee, Brown and Caldwell, CDM Smith, CB&I Shaw Environmental, C&S Consulting Engineers, Chazen Companies, Clough Harbour & Associates, Columbia Analytical Services, C.T. Male, Dames & Moore, Day Engineering, EA Engineering, EcolSciences, Ecology & Environment, Ecosystems, EC Jordan, Environmental Chemical Corporation, EHRT, ENSR Consulting, ELM, ERM-Northeast, Fagan Engineers, Fanning Phillips & Molnar, FluorDaniel GTI, Frontier, Foster Wheeler Environmental Corp, Frontier Technical, Galson Consultants, GE&R, Geomatrix Consultants, GZA Environmental, Handex of N, H2M Group, HDR, HRP, IT Corp, Jacques Whitford, JTM Associates, Labella Associates, Langan Engineers, Leader Environmental, Lockwood, Kessler & Bartlett, LMS Engineers, Malcolm-Pirnie, Metcalf & Eddy, NWEC&C, O'Brien & Gere Engineers, Pace, Parsons Engineering-Science, Plumley Engineering, Prescott Environmental, P. W. Grosser, Rizzo Associates, Roux Associates, Sear Brown Group, SECOR, Shaw Environmental, Stantec, ThermoRemediation Inc., TRC Environmental, Turnkey Environmental Restoration, TVGA Engineering, URS Consultants, Wehran Emcon, Weston, YEC, and private firms.

Provided consultation services to laboratories regarding analytical procedures and protocol interpretation, and to law firms for litigation support.

Provided services to firms involving audits of environmental analytical laboratories to determine analytical capability, particularly for compliance with NYSDEC ASP and AFCEE requirements.

Guest speaker on a panel discussing Data Review/Compliance and Usability, for an analysis workshop for the New York Association of Approved Environmental Laboratories, 1993.

Adirondack Environmental Services: June 1987 - August 1989

Senior mass spectroscopist for AES. Responsible for GC/MS analyses of environmental samples by USEPA and NYSDEC protocols, development of the GC/MS laboratory, initiating the instrumental and computer operations from the point of installation, and for implementing the procedures and methodologies for Contract Laboratory Protocol.

CompuChem Laboratories: May 1982 - January 1987

Managed a GC/MS production laboratory; developed, implemented, and supervised QA/QC criteria at three different levels of review; and was responsible for the development and production of the analysis of environmental and clinical samples. Directed a staff of 23 technical and clerical personnel, and managed the extraction and GC/MS labs and data review operations.

Research Triangle Institute: December 1979 - May 1982

Worked as an analytical research chemist responsible for development of analytical methods for the EPA Federal Register at RTI. This involved analysis of biological and environmental samples for priority pollutants, primarily relating to wastewaters and to human sampling studies. Method development included modification and interfacing of the initially developed Tekmar volatile purge apparatus to GC/MS, development and refinement of methods for entrapment and concentration of the air medium for subsequent volatile analysis, and the analysis and resolution/ identification of individual PCB congeners within Aroclor mixtures by capillary column and mass spectra.

Guardsman Chemical Company: February 1977 - November 1979

Performed all quality control functions for the manufacturing plant. Performed research and development on coatings and dyes.

Almay Cosmetics: May 1976 - December 1976

Product evaluation chemist. Responsible for analytical QC of manufactured products.

Publication

Pellizzzari, E.D., Moseley, M.A., Cooper, S.D., Harry, J.V., Demian, B., & Mullin, M. D. (1985). Recent Advances in the Analysis of Polychlorinated Biphenyls in Environmental and Biological Media. *Journal of Chromatography,* 334(3) 277-314.