COST TO CURE REPORT
PARK LAND

GREENPOINT MONITOR MUSEUM
SOUTH SHORELINE OF BUSHWICK CREEK
1 FRANKLIN STREET AND 56 QUAY STREET
BLOCK 2590, LOT 25 & 100 (PARTIAL LOTS)
BROOKLYN, NEW YORK

DDC PROJECT NO. – BEGS2005027
CONTRACT REGISTRATION NO. 20040028082
TASK 3099

Prepared for:

NEW YORK CITY DEPARTMENT OF DESIGN + CONSTRUCTION

City of New York Department of Design and Construction
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AUGUST 2007

WOL NOS. 3099-M&E2R-3253, 3099-M&E2R-3515, 3099-M&E2R-3923

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1.0 INTRODUCTION

On behalf of the City of New York Department of Design & Construction ("DDC"), Metcalf & Eddy of New York, Inc. ("M&E") has prepared this Cost to Cure ("CTC") report for the property owned by Greenpoint Monitor Museum (Block 2510, Lots 25 and 100 - Partial Lots), also known as the Bushwick Creek Inlet ("the Site"), located along the northern shoreline of the Bushwick Creek and Quay Street in Greenpoint-Williamsburg section of the Borough of Brooklyn, New York (Figure 1). This property was donated to the Greenpoint Monitor Museum by Motiva Enterprises LLC for the future construction of a museum. For the purposes of this report, the Site will refer to the property owned by the Greenpoint Monitor Museum.

The purpose of this CTC report is to provide the DDC with an order-of-magnitude cost estimate for remediation of contaminated soil that may be encountered as part of the development of Park Land on the Site.

This CTC report is based on the findings of the Site Investigation ("SI") report prepared by M&E dated October 2006. The investigation conducted at the Site is representative of the type of environmental investigation that a purchaser would undertake prior to acquiring the property.

This report is divided into the following sections:

- Section 1 - Introduction
- Section 2 – Site Description
- Section 3 – Investigation Activities and Results
- Section 4 – Conceptual Site Development
- Section 5 – Conceptual Remedial Measures
- Section 6 – Remedial Cost Estimate

1.1 Background

Recognized environmental conditions ("RECs") related to historic fill have been identified by several previous investigations of the Site and the surrounding areas. M&E reviewed a Phase I Environmental Site Assessment ("ESA") report prepared by Fleming Lee Shue ("FLS") in 2003 for the Site and surrounding areas prior to conducting the SI. In addition, M&E reviewed an SI Report prepared by TRC dated November 2002 for the Bayside Fuel Oil Company ("BFOC") property located adjacent and south of the Site. M&E also conducted its own SI of the BFOC property on behalf of the DDC. The results of M&E's investigation are presented in a separate document dated October 2006.

A review of the Sanborn Fire Insurance Maps and aerial photographs dating back to 1916 indicate that the inlet of the Site was used for the loading and off-loading of petroleum products from the petroleum bulk storage facility. The BFOC property has been developed as a petroleum distillery / bulk oil storage terminal for at least 100 years. Further south of the Site, a former manufactured gas plant ("MGP") was owned and operated by the Brooklyn Union Gas Company. Based upon our review of Sanborn Fire Insurance Maps, the MGP facility appears to have ceased operations sometime during the 1920s or 1930s.

M&E conducted a SI of the property from February 21, 2006 to March 22, 2006. The purpose of the SI, as requested by the New York City Office of Environmental Coordination ("OEC") and DDC, was to evaluate the lateral and vertical extent of potential on-site contamination in the subsurface soils, as a result of historic and current on- and off-site operations for the potential redevelopment of the area.

2.0 SITE DESCRIPTION

2.1 General Physical Setting

The property owner is identified by the City of New York Department of Finance ("DOF") as the Greenpoint Monitor Museum ("Monitor") on Block 2590, Lots 25 and 100 (partial lots). This property is located south of Quay Street next to the property occupied by the New York City Transit Authority. For the purposes of this report, the property owned by the Greenpoint Monitor Museum is being evaluated for the development of Park Land on the Site.

The shoreline topography of the Site ranges from flat to a moderate slope towards the Bushwick Creek. According to the property survey conducted in early 2006 by the DDC, the elevation ranges from 0 to 7 feet above mean sea level ("msl") (see Figure 1). The shoreline of the Site is covered with material including riprap and overgrown vegetation. The Site is bounded by the Bushwick Inlet to the south, the East River to the west, the New York City Transit Authority to the east, and Quay Street to the north. A sewer easement is located along North 12th Street south of the Site that terminates at the East River. Property utilized by the New York City Transit Authority is located north of the inlet and properties located east of the inlet are generally utilized for light commercial operations.

2.2 Geology

Two major stratigraphic units were identified during the SI, in order of increasing depth, they are fill and native soil. Bedrock was not encountered during this investigation.

2.2.1 Fill Material

Based on the findings of the SI performed by M&E, the subsurface consists of a layer of fill material to depths of 11 to 19 feet below ground surface ("bgs"). Fill was encountered in each of the soil boring advanced during the SI. The fill generally consists of sand and silty sand with crushed stone, wood, concrete, ash, cinders, and brick. The thickness of the fill decreases from south to north at the Site.

2.2.2 Native Soils

Along the shoreline of the Site, the fill is underlain by black organic silt ranging in thickness from 4 to 15 feet. The silt has alternating strata of fine sandy silts and silty clays to depths of approximately 60 to 70 feet below grade, below which a gray to reddish brown stiff silty clay is present. Within the Site, the organic silt layer extends to a depth of 10 to 26 feet below the mud line which is located approximately 10 to 15 feet below the water line. A layer of sandy silts and silty clays is present under the organic silty layer to depths of 36 to 54 feet below the mud line, below which a reddish brown stiff silty clay is present.

2.3 Hydrogeology

The Site hydrogeology is discussed in terms of closest surface water body (East River) and the groundwater aquifers located beneath the Site. Based on information obtained from M&E's investigation conducted on the Site and the adjacent BFOC property, groundwater is present at depths ranging from 5 to 9 feet bgs and flows in a northern direction towards Bushwick Creek and a western direction towards the East River.

3.0 INVESTIGATION ACTIVITIES AND RESULTS

The purpose of the SI, as requested by the DDC, was for the initial evaluation of the lateral and vertical extent of contamination in subsurface soil that may exist from the historic and current on- and off-site operations, prior to the proposed redevelopment of the Site.

The investigation was performed in general accordance with New York State Department of Environmental Conservation ("NYSDEC") Draft DER-10 Technical Guidance for Site Investigation and Remediation dated December 2002. The investigation findings were evaluated based on the Technical and Administrative Guidance Memorandum ("TAGM") No. 4046 for Recommended Soil Cleanup Objectives ("RSCOs") and Soil Cleanup Objectives to Protect Groundwater Quality ("SCOPGQs"), and the Spill Technology and Remediation Services ("STARS") Memorandum No.1, Toxicity Characteristic Leachate Procedure ("TCLP") Alternative Guidance Values.

3.1 Summary of Site Investigation Activities

The SI field activities were conducted from February 21, 2006 to March 22, 2006 and consisted of the advancement of soil borings on the Site (Figure 2). Soil samples were collected from the borings and submitted for laboratory analysis to characterize soil conditions at the Site.

The SI field work included:

- Advancement of two (2) soil borings utilizing a track mounted hollow-stem auger drill rig (BC-7 and BC-8).
- Containment of drill cuttings and decontamination water in 55-gallon drums.
- Survey of all soil boring locations.

The following samples were collected from each of these investigation points.

- Four (4) soil samples were collected from two (2) boring locations advanced on the Site.

- One (1) composite soil sample and one (1) water sample was collected from the drill cuttings and decon water generated during the field sampling program for waste classification purposes.

3.2 Results of the Investigation Activities

3.2.1 Soil Borings

In order to evaluate the subsurface soil quality, laboratory analytical results were compared with NYSDEC regulatory standards identified in:

- TAGM No. 4046 RSCO, SCOPGQ; and Eastern U.S. Background Concentrations; and,
- STARS Memo No.1, TCLP Alternative Guidance Values.

The laboratory results are summarized in Tables 1 through 5 and on Figure 3. The analytical data revealed the following:

- No TCL Volatile Organic Compounds ("VOCs") were detected in the soil samples at concentrations above the NYSDEC TAGM criteria.
- TCL Semivolatile Organic Compounds ("SVOCs") consisting predominantly of polycyclic aromatic hydrocarbons ("PAHs") were detected in three (3) of the four (4) soil samples collected from the shoreline of the Site. These PAHs were encountered at depths ranging from 31 to 62 feet bgs. The concentrations of the SVOCs were below the TAGM RSCOs, TAGM SCOPGQs, and/or STARS TCLP Alternative Guidance Values. The concentrations of SVOCs are likely associated with contaminants in historic fill placed at the Site.
- No PCBs were detected in the soil samples at concentrations above the NYSDEC TAGM criteria.
- Target Analyte List ("TAL") Metals consisting of chromium, copper, nickel, selenium, and zinc were detected in all four (4) soil samples at concentrations above either NYSDEC RSCO or Eastern U.S. Background criteria in borings BC-7 and BC-8. The metals are likely attributed to contaminants from the historic fill placed at the Site.

- The detection of VOCs and SVOCs at concentrations below the NYSDEC TAGM and STARS TCLP Alternative Guidance Values indicate that the soil has been slightly impacted by placement of historic fill material at the Site. Thus, there is a minor potential exposure risk during construction activities, especially in the areas where elevated concentrations of SVOCs were detected.
- A limited exposure risk is also posed by metals such as chromium, copper, nickel, selenium, and zinc which were detected at concentrations above either the RSCO or Eastern U.S. Background criteria. The presence of these compounds, along with other metals detected at concentrations below NYSDEC criteria is consistent with historic fill placed at the Site.
- The Site is surrounded by a chain link fence on the northern and eastern sides, Bushwick Creek on the southern side, and the East River is present on the western side. Since access to the Site is restricted and no subsurface excavation activities are occurring, there are no direct pathways for contact with contaminants by local residents, pedestrians, or employees at adjacent sites. Therefore, the current condition of the Site does not appear to a pose a significant health risk for local residents, pedestrians, and the employees of neighboring commercial and industrial facilities.

3.3 Conclusions

3.3.1 Soils along the Bushwick Creek Shoreline

Based upon the contamination detected in soil borings installed along the southern portion of the Site and the Site's physical setting, two (2) receptors may be impacted as follows:

- surface waters of the Bushwick Creek and the East River, through surface runoff, dust, and groundwater flow; and,
- humans, through on-site, direct contact with soil, surface water runoff, and inhalation.

The Bushwick Creek and the East River may be impacted through several means of transport including surface water runoff from the Site, which could potentially carry contaminated

sediments; contaminated dust particles from historic fill carried by the wind; and contaminated groundwater flowing towards both water bodies.

Human receptors may be exposed to contaminants via dermal contact through swimming or wading in the Bushwick Creek and the East River or through contact with historic fill by digging or other invasive activities at the Site. Exposure by inhalation of dust blown from contaminated areas also provides an additional path to human receptors.

4.0 CONCEPTUAL SITE DEVELOPMENT

The DDC has requested that M&E prepare a conceptual site plan associated with the redevelopment of the Site as a Park Land, a use that is currently inconsistent with the M3-1 heavy manufacturing zone in which the Site is located. The development of a conceptual site plan will assist M&E in preparing an order-of-magnitude cost estimate for the remediation of contaminated soil that may be encountered should redevelopment of the Site occur.

In order to prepare the conceptual site plan, M&E used the following assumptions, which are based upon information provided by the DDC, OEC, and information collected during the field investigation:

- The area of the Site is approximately 35,000 square feet ("SF"), which consists of entirely of upland area (as reported by the City of New York Department of Citywide Administrative Services ["DCAS"]).
- The property is zoned M3-1 heavy manufacturing (per the New York City Department of City Planning ["DCP"]). The City restricts manufacturing operations that may have potentially noxious uses in the M3-1 Zone; however, this zoning designation will need to be changed to accommodate the proposed use of the Site as Park Land. This analysis assumes that the zoning change will be granted.
- The topographic map prepared for the Site indicates that the northern portion of the site is classified as an A5 Flood Zone. This means that the area will be inundated by 100 year flooding, for which no base flood elevations ("BFE") have been established. For the purposes of this report, we have assumed that flooding will not exceed 4 feet above msl.
- The historic fill remaining on-site will be environmentally suitable for construction purposes based upon the results of the soil samples collected from the Site.
- All utility service for the Site will be obtained from the underground utilities located along Kent Avenue, Franklin Street, and Quay Street.

Based upon these assumptions, M&E's conceptual site plan is as follows:

- The entire Site would be re-vegetated open space (park land), with rip-rap and/or a bulkhead placed along the shoreline of Bushwick Creek. For the purposes of the CTC report, this area would remain as vegetated park land (open space) and be capped with a minimum of 2 feet of certified clean fill.

Figure 4 provides a conceptual site plan for the Site. Please note that this is a simple conceptual design for the development of park land based upon the assumptions previously identified. This conceptual design was developed only as a means to evaluate the potential costs to manage contaminated soil at the Site should the property be developed. There are numerous other development plans that could be pursued on this Site. However, it is likely that any costs associated with managing contaminated soil at the Site would be similar to the costs associated with this conceptual plan.

5.0 CONCEPTUAL REMEDIAL MEASURES

The majority of the remedial activities would be associated with excavation and off-site disposal of contaminated historic fill. Based on the findings of the SI report, metal contaminated, non-hazardous soil is present on the Site. Depth to groundwater ranges from 5 to 9 ft bgs at the Site. Dewatering and utility installation is not anticipated at the Site for the conceptual development plan prepared by M&E.

For the purposes of this CTC Report, we have assumed that the entire Site will be capped with a minimum of 2 feet of clean fill or 1 foot of clean fill/1 foot of pavement to act as a barrier to reduce potential employee, pedestrians, and trespasser contact with contaminated historic fill detected in the soil. In order to maintain existing grades for drainage and access purposes, this would result in the excavation of historic fill across some portions of the Site to be redeveloped, and reuse of some of the cut material to bring low lying areas up to developed grade. This will reduce the costs for off-site disposal of the historic fill. Figure 5 provides a generalized site elevation illustrating the present topographic profile of the Site and a profile illustrating the conceptual design.

The conceptual remedial measures have been divided into two (2) construction categories:

- Park Land Area; and
- Paved Walkways.

5.1 Park Land Area

The park land area would act as a buffer between the Bushwick Creek, the East River, adjacent areas, and the developed areas of the Site. The elevation of this area is fairly flat (5 to 6 feet above msl), with the exception of a few feet from the edge of the Bushwick Creek that grades steeply to approximately 1 ft above msl. It is estimated that that 2,500 CY of historic contaminated fill would be removed from this area for disposal off-site or reuse elsewhere on-site. A 2 foot layer of clean fill would replace the historic fill in order to maintain the original grade of

the area. Subsequent to regarding, appropriate landscaping measures would be taken to stabilize the soil.

5.2 Paved Walkways

It is assumed that approximately five (5) percent of the upland area (1,750 SF) would be utilized for asphalt paved walkways, which would be constructed at the existing grade of the Site. A 2 foot layer of historic contaminated fill would be removed from these areas for off-site disposal or re-use elsewhere on-site (approximately 130 cubic yards). A 1 foot layer of clean fill would replace the historic fill, topped by a 6 inches of crushed stone and 6inches of asphalt.

5.3 Potential Remedial Concerns

Based upon our experience with similar sites in New York City, the NYSDEC typically will become involved with cases of significant contamination or if there are petroleum spill indicators at the Site. Though there is evidence of a historic petroleum discharge in the southeastern portion of the Site, the petroleum discharge appears to be associated with the adjacent property. Thus, the NYSDEC would be involved in future development of the Site. According to the latest New York City Zoning Map (February 13, 2007), the Site is "E" designated, which will require a City Environmental Quality Review ("CEQR") Declaration. In accordance with the CEQR process, the New York City Department of Environmental Protection ("NYCDEP") will be involved with construction/redevelopment activities at the Site. The NYSDEC MGP Unit may also be involved in the review of proposed remedial work plan or other remedial measures proposals for the Site.

Therefore, for costing purposes, the following additional tasks may be required for the Site.

5.3.1 Agency Interaction

There will be the need to interact with the NYSDEC and/or the NYCDEP for the proposed re-use of historic fill at the Site, or its off-site disposal. It is also anticipated that an application will be required for a Beneficial Use Determination ("BUDS") from NYSDEC to facilitate the on- or off-site re-use of excavated contaminated historic fill/soil. An allowance has been included in the cost estimate for coordinating construction activities with these agencies.

5.3.2 Additional Investigation

It is our opinion that the SI activities conducted by M&E at the Site, along with previous investigation activities by others fulfill the sampling requirements of the NYSDEC and the NYCDEP. However, once specific site plans have been developed for the Site, additional SI activities will likely be required by NYSDEC, NYCDEP, or the prospective site developer.

5.3.3 Use of Health and Safety Trained Construction Workers

It is likely that excavation and grading activities will require health and safety trained construction workers. Although it is not difficult to locate construction companies that employ such people, the additional cost for properly trained and equipped personnel may be up to 30% above a typical construction laborer.

5.3.4 Health and Safety – Dust Monitoring

Due to the presence of contaminated historic fill, there will likely be a need to monitor the amount of dust generated during construction activities at the Site. A Community Air-Monitoring Program ("CAMP") will need to be developed and implemented during construction activities. Personnel will need to operate and calibrate air monitoring equipment to assess levels of dust with respect to the requirements of the CAMP. For the purposes of this report, we have established an allowance for monitoring dust generated during construction activities.

6.0 REMEDIAL COST ESTIMATE

Based upon the conceptual site plan and remedial measures discussed in Sections 4 and 5, this section presents the order-of-magnitude remedial cost estimate for the development of the Site for Park Land use. Additionally, a request was made by the NYC Department of Parks and Recreation to prepare an alternate remedial cost estimate that would consider the re-use of the proposed excavated contaminated soil to level the existing grade of the Site, in lieu of off-site disposal of excavated contaminated soil.

Therefore, two (2) separate remedial cost estimates have been prepared for the Site with both estimates including a 2 ft. layer of clean fill placed above the existing ground surface. Cost Estimate A assumes the excavated contaminated soil (construction-related) would be transported for off-site disposal. Cost Estimate B assumes the excavated contaminated soil (construction-related) would be spread throughout the Site to level the existing grade. Under Cost Estimate B, the costs for the excavation of contaminated soils and re-grading are assumed to be related to typical site development activities (grading) with no additional environmental costs for this construction activity. The following tables summarize the order-of-magnitude environmental costs that could be encountered during redevelopment of the Site.

COST ESTIMATE A

PARK LAND AREA					
Environmental Task	**Quantity**	**Unit**	**Unit Cost ($)**	**Extended Cost ($)**	**Comments**
Excavation, and Loading of Historic Fill/ Non-Hazardous Contaminated Soil	3,750	Ton	$20	$75,000	This is for 2,500 cubic yards of historic contaminated fill that can't be reused at the site. It assumes 1.5 tons per cubic yard.
Transportation and Disposal of Historic Fill/Non-Hazardous Contaminated Soil	3,750	Ton	$50	$187,500	This is for 2,500 cubic yards of historic contaminated fill that can't be reused at the site. It assumes 1.5 tons per cubic yard.
Clean Fill – 2 foot cap	3,750	Ton	$30	$112,500	Clean fill to limit exposure to historic fill.
Landscaping – Hydroseeding	4,100	Square Yard	$0.50	$2,100	Hydroseeding for grass cover only.
SUBTOTAL ESTIMATE				**$378,000**	

PAVED WALKWAYS					
Environmental Task	**Quantity**	**Unit**	**Unit Cost ($)**	**Extended Cost ($)**	**Comments**
Excavation, Grading, and Loading of Historic Fill (non-hazardous)	200	Ton	$20	$4,000	This is for 130 cubic yards of historic fill that can't be reused at the site. It assumes 1.5 tons per cubic yard.
Transportation and Disposal of Historic Fill (non-hazardous)	200	Ton	$50	$10,000	This is for 130 cubic yards of historic fill that can't be reused elsewhere at the Site. It assumes 1.5 tons per cubic yard.
Clean Fill	200	Ton	$30	$6,000	This cost is only for the 2 foot cap that would act as a barrier to the historic fill. It is based upon 130 cubic yards at 1.5 tons per cubic yard.
SUBTOTAL ESTIMATE				**$20,000**	

POTENTIAL REMEDIAL CONCERNS					
Environmental Task	**Quantity**	**Unit**	**Unit Cost ($)**	**Extended Cost ($)**	**Comments**
Agency Interaction	1	Lump Sum	$20,000	$20,000	Estimated cost should involvement by the NYSDEC and/or NYCDEP be required.
Additional Investigation	1	Lump Sum	$30,000	$30,000	Estimated cost should apply if the NYSDEC, NYCDEP, or the developer requires further investigation based upon site design.
Use of Health & Safety Trained Construction Workers	1	Lump Sum	$83,000	$83,000	This cost is based upon 30% of the costs associated with the excavation and disposal of historic fill.
Health & Safety Dust Monitoring	1	Lump Sum	$30,000	$30,000	Cost estimated for budgeting purposes only.
SUBTOTAL ESTIMATE				**$163,000**	
TOTAL ESTIMATE				**$560,000**	
CONTINGENCY (25% OF TOTAL ESTIMATE)				**$140,000**	
TOTAL ESTIMATED COST TO CURE				**$700,000**	

COST ESTIMATE B

PARK LAND AREA					
Environmental Task	**Quantity**	**Unit**	**Unit Cost ($)**	**Extended Cost ($)**	**Comments**
Excavation, and Loading of Historic Fill/ Non-Hazardous Contaminated Soil	3,750	Ton	No Cost	No Cost	This is for 2,500 cubic yards of historic contaminated fill that can be reused at the site. It assumes 1.5 tons per cubic yard.
Transportation and Disposal of Historic Fill/Non-Hazardous Contaminated Soil	3,750	Ton	No Cost	No Cost	This is for 2,500 cubic yards of historic contaminated fill that can be reused at the site. It assumes 1.5 tons per cubic yard.
Clean Fill – 2 foot cap	3,750	Ton	$30	$112,500	Clean fill to limit exposure to historic fill.
Landscaping – Hydroseeding	4,100	Square Yard	$0.50	$2,050	Hydroseeding for grass cover only.
SUBTOTAL ESTIMATE				**$115,000**	

PAVED WALKWAYS					
Environmental Task	**Quantity**	**Unit**	**Unit Cost ($)**	**Extended Cost ($)**	**Comments**
Excavation, Grading, and Loading of Historic Fill (non-hazardous)	200	Ton	No Cost	No Cost	This is for 130 cubic yards of historic fill that can be reused at the site. It assumes 1.5 tons per cubic yard.
Transportation and Disposal of Historic Fill (non-hazardous)	200	Ton	No Cost	No Cost	This is for 130 cubic yards of historic fill that can be reused elsewhere at the Site. It assumes 1.5 tons per cubic yard.
Clean Fill	200	Ton	$30	$6,000	This cost is only for the 2 foot cap that would act as a barrier to the historic fill. It is based upon 130 cubic yards at 1.5 tons per cubic yard.
SUBTOTAL ESTIMATE					**$6,000**

POTENTIAL REMEDIAL CONCERNS					
Environmental Task	**Quantity**	**Unit**	**Unit Cost ($)**	**Extended Cost ($)**	**Comments**
Agency Interaction	1	Lump Sum	$20,000	$20,000	Estimated cost should involvement by the NYSDEC and/or NYCDEP be required.
Additional Investigation	1	Lump Sum	$30,000	$30,000	Estimated cost should apply if the NYSDEC, NYCDEP, or the developer requires further investigation based upon site design.
Use of Health & Safety Trained Construction Workers	1	Lump Sum	$36,000	$36,000	This cost is related to handling and re-use of historic fill. For budgetary purposes, we have assumed that the cost for re-use is the same as the cost of clean fill placement. Workers health and safety training related costs are estimated at 30% of the clean fill costs.
Health & Safety Dust Monitoring	1	Lump Sum	$30,000	$30,000	Cost estimated for budgeting purposes only.
SUBTOTAL ESTIMATE				**$116,000**	
TOTAL ESTIMATE				**$237,000**	
CONTINGENCY (25% OF TOTAL ESTIMATE)				**$60,000**	
TOTAL ESTIMATED COST TO CURE				**$297,000**	

These conceptual cost to cure estimates are based upon only those activities that would be outside typical construction/redevelopment activities as a result of contaminated historic fill at the Site. They provide an order-of-magnitude cost assessment and should only to be used for budgeting purposes, as discussed with the DDC. Significant differences may arise between the conceptual and actual costs of managing the historic fill depending upon the actual redevelopment scenario. This conceptual cost to cure estimate also assumes the NYSDEC and/or NYCDEP would allow placement of fill within the flood zone as the case of the CitiStorage site.

FIGURES

TABLES

TABLE 1

SOIL ANALYTICAL RESULTS

VOLATILE ORGANIC COMPOUNDS

TABLE 2

SOIL ANALYTICAL RESULTS

SEMI-VOLATILE ORGANIC COMPOUNDS

TABLE 3

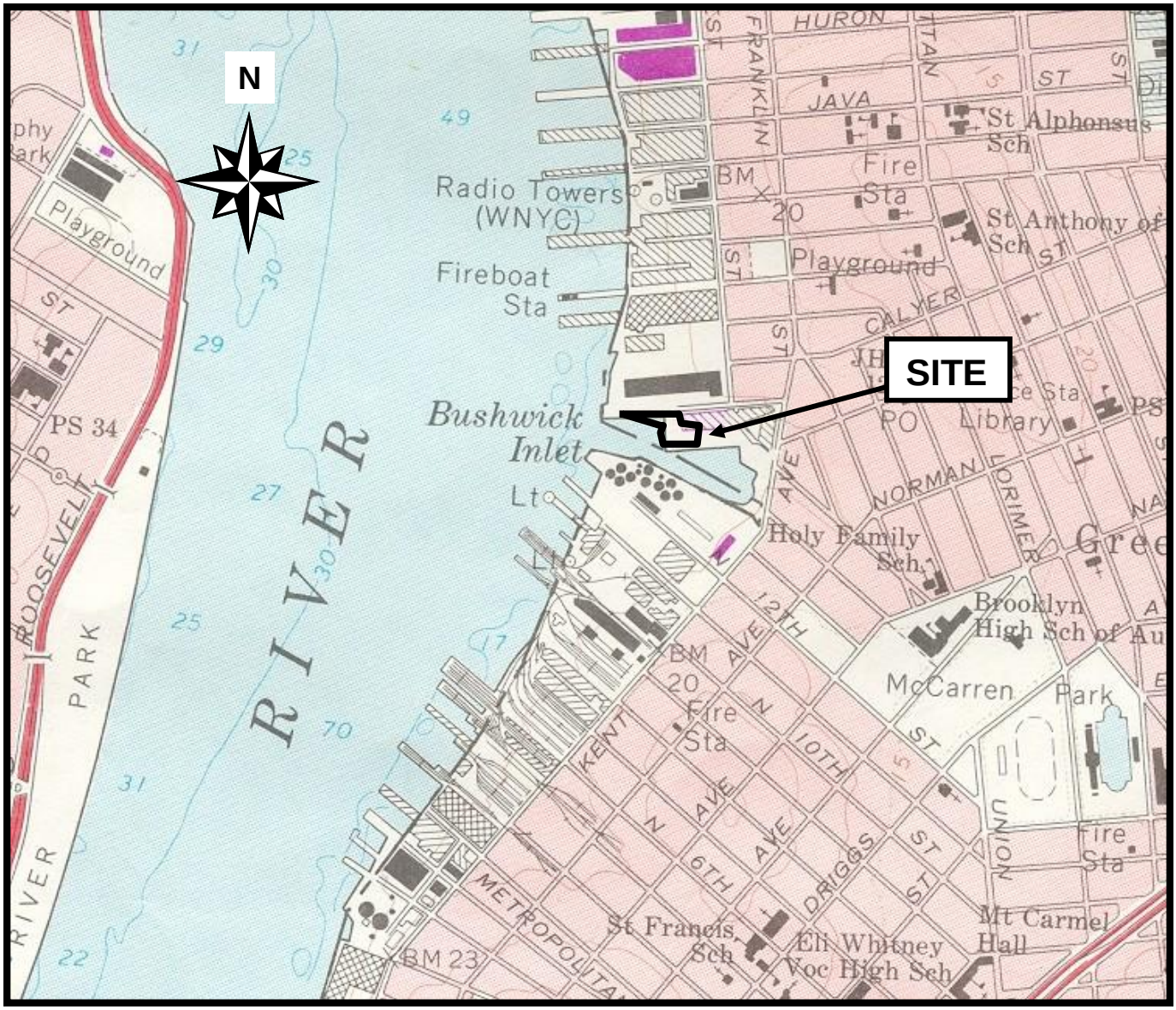
SOIL ANALYTICAL RESULTS

POLYCHLORINATED BIPHENYLS

TABLE 4

SOIL ANALYTICAL RESULTS

TARGET ANALYTE LIST METALS



Brooklyn, NY
7.5 Minute U.S.G.S. Quadrangle – 1967, photorevised 1979

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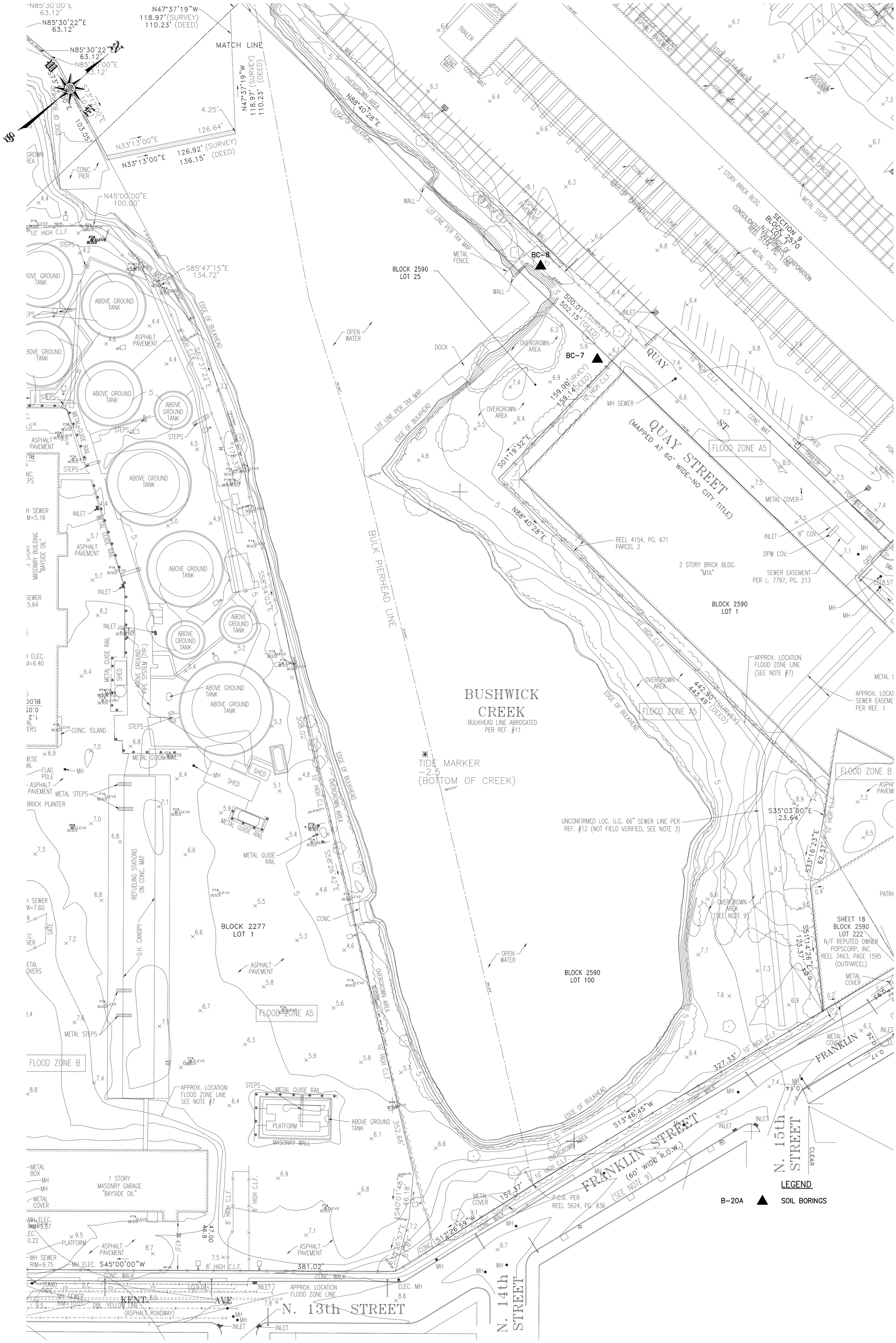
Figure 1
Site Location Map
Greenpoint Monitor Museum/Bushwick Creek Inlet
Kent Avenue between South Shoreline of Bushwick Creek and Quay Street
Brooklyn, New York



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DESIGNED BY:	E. ACS
DRAWN BY:	B.PAPA
DEPT. CHECK:	S.MUSTHYALA
PROJ. CHECK:	N. ABRAMS

SCALE:

0 40 80 120

SCALE IN FEET

SCALE:1"=40'-0"

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION

COST TO CURE REPORT-PARK LAND USE

MOTIVA ENTERPRISES LLC/BUSHWICK CREEK INLET, BROOKLYN, N.Y.

SOIL BORING LOCATIONS

WOL NOS. 3099-M&E2R-3253
3099-M&E2R-3515
3099-M&E2R-3923

CIVIL

AUGUST 2007

JOB 60004495

FILE NO.

CAD FILE CZBCCTC2

SHEET FIG.2

Boring Number	BC-8		NYSDEC	NYSDEC	NYSDEC	STARS TCLP
Sample ID	BC-8 31-33	BC-8 41-43	Recommended	Soil Cleanup	Eastern USA	Alternative
Sample Date	3/18/2006	3/18/2006	Soil Cleanup	Objectives to	Background	Guidance
Lab Identification Number	60300149	60300149	Objective	Protect GW	Criteria	Value
TAL Metals (mg/Kg)						
Chromium	8.76	**28.1**	10	-	1.5 - 40	-
Nickel	12.0	**21.7**	13	-	0.5 - 25	-
Zinc	**24.5**	**61.6**	20	-	9 - 50	-

Boring Number	BC-7		NYSDEC	NYSDEC	NYSDEC	STARS TCLP
Sample ID	BC-7 13-15	BC-7 60-62	Recommended	Soil Cleanup	Eastern USA	Alternative
Sample Date	3/16/2006	3/17/2006	Soil Cleanup	Objectives to	Background	Guidance
Lab Identification Number	60300130	60300149	Objective	Protect GW	Criteria	Value
TAL Metals (mg/Kg)						
Chromium	**25.6**	**31.3**	10	-	1.5 - 40	-
Nickel	**22.5**	**27.7**	13	-	0.5 - 25	-
Selenium	**2.62**	**2.31**	2	-	0.1 - 3.9	-
Zinc	**60.0**	**71.8**	20	-	9 - 50	-

NOTES FOR SUMMARY TABLES:

1. BOLD–INDICATES VALUES THAT EXCEEDED THE NYSDEC RECOMMENDED SOIL CLEANUP CRITERIA/NYSDEC EASTERN BACKGROUND CRITERIA.
2. ITALICS–INDICATES VALUES THAT EXCEEDED THE NYSDEC SOIL CLEANUP OBJECTIVES TO PROTECT GROUNDWATER.
3. SHADED–INDICATES VALUES THAT EXCEEDED THE STARS TCLP ALTERNATIVE GUIDANCE VALUES.
4. ND–NOT DETECTED.
5. J– INDICATES AN ESTIMATED VALUE.
6. B–ANALYTE WAS DETECTED IN THE ASSOCIATED METHOD BLANK.
7. M2–THE MS AND/OR MSD WERE BELOW THE ACCEPTANCE LIMITS DUE TO SAMPLE MATRIX INTERFERENCE.
8. MHA–DUE TO HIGH LEVELS OF ANALYTE IN THE SAMPLE, THE MS/MSD CALCULATION DOES NOT PROVIDE USEFUL SPIKE RECOVERY INFORMATION.

METCALF & EDDY | AECOM

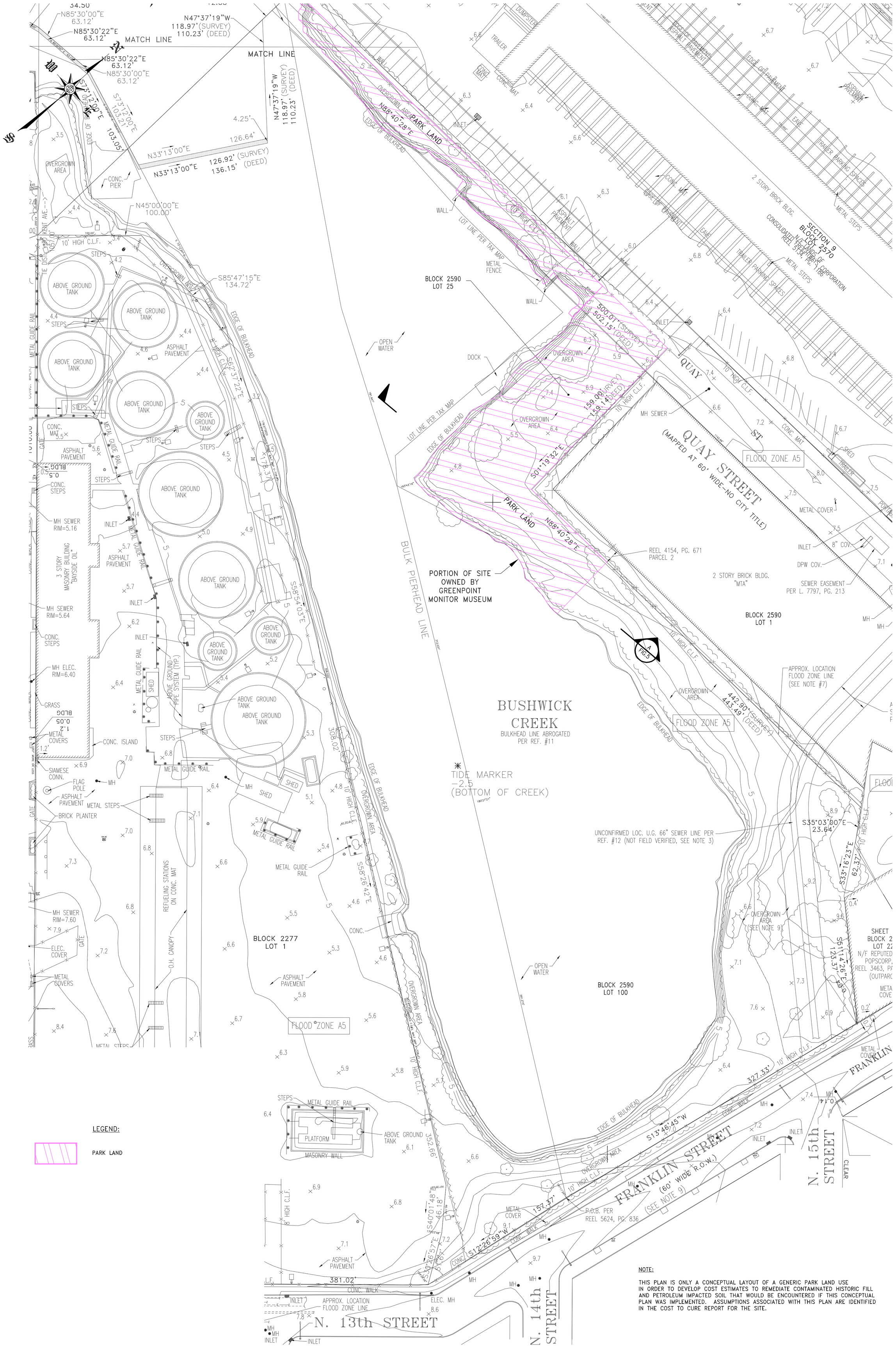
DESIGNED BY: E. ACS
DRAWN BY: B.PAPA
DEPT. CHECK: S.MUSTHYALA
PROJ. CHECK: N. ABRAMS

SCALE:
0 40 80 120
SCALE IN FEET
SCALE:1"=40'-0"

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION
COST TO CURE REPORT–PARK LAND USE
MOTIVA ENTERPRISES LLC/BUSHWICK CREEK INLET, BROOKLYN, N.Y.
SITE MAP WITH SOIL SAMPLE RESULTS
WOL NOS. 3099–M&E2R–3253
3099–M&E2R–3515
3099–M&E2R–3923
CIVIL
AUGUST 2007

JOB 60004495
FILE NO.
CAD FILE CZBCCTC3
SHEET FIG.3



NOTE:

THIS PLAN IS ONLY A CONCEPTUAL LAYOUT OF A GENERIC PARK LAND USE IN ORDER TO DEVELOP COST ESTIMATES TO REMEDIATE CONTAMINATED HISTORIC FILL AND PETROLEUM IMPACTED SOIL THAT WOULD BE ENCOUNTERED IF THIS CONCEPTUAL PLAN WAS IMPLEMENTED. ASSUMPTIONS ASSOCIATED WITH THIS PLAN ARE IDENTIFIED IN THE COST TO CURE REPORT FOR THE SITE.

METCALF & EDDY | AECOM

DESIGNED BY:	E. ACS
DRAWN BY:	B.PAPA
DEPT. CHECK:	S.MUSTHYALA
PROJ. CHECK:	N. ABRAMS

SCALE:

0 40 80 120

SCALE IN FEET

SCALE:1"=40'-0"

NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION

COST TO CURE REPORT–PARK LAND USE

MOTIVA ENTERPRISES LLC/BUSHWICK CREEK INLET, BROOKLYN, N.Y.

CONCEPTUAL SITE PLAN

WOL NOS. 3099–M&E2R–3253
3099–M&E2R–3515
3099–M&E2R–3923

CIVIL

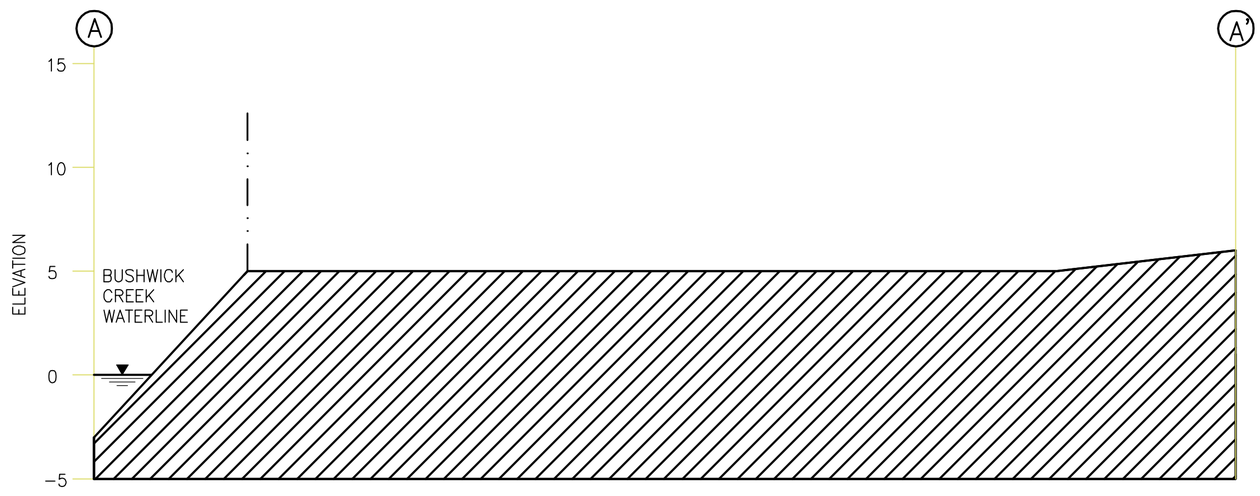
AUGUST 2007

JOB 60004495

FILE NO.

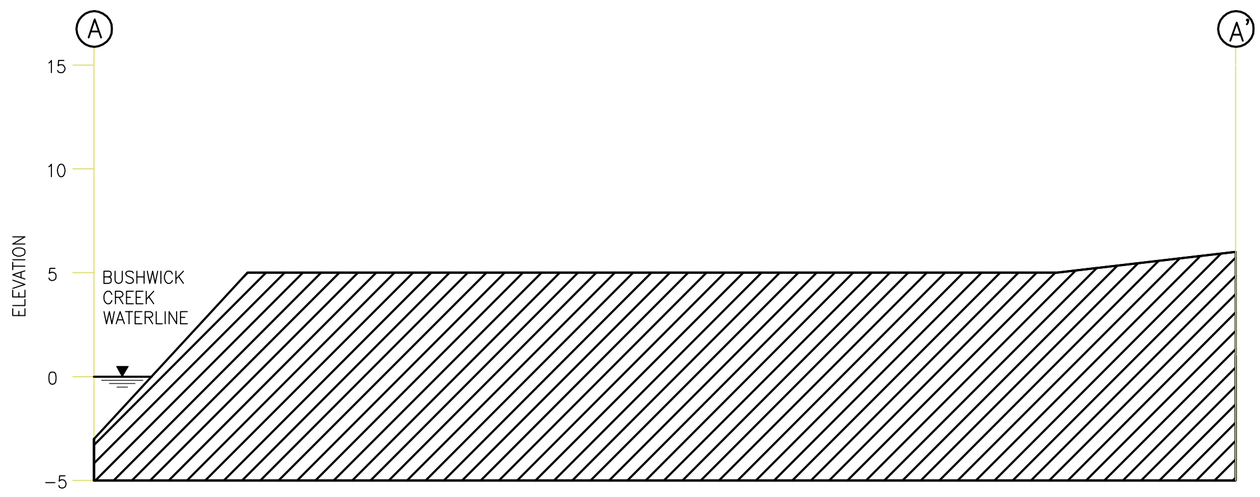
CAD FILE CZBCCTC4

SHEET FIG.4



CONCEPTUAL SITE PROFILE
CROSS SECTION A–A'

HORIZONTAL 1"=40'
VERTICAL 1"=5'



PRESENT TOPOGRAPHIC PROFILE
CROSS SECTION A–A'

HORIZONTAL 1"=40'
VERTICAL 1"=5'

METCALF & EDDY | AECOM

DESIGNED BY: S. MUSTHYALA
DRAWN BY: B. PAPA
DEPT. CHECK: S. MUSTHYALA
PROJ. CHECK: N. ABRAMS

SCALE: AS NOTED

NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION
COST TO CURE REPORT–PARK LAND USE
MOTIVA ENTERPRISES LLC/BUSHWICK CREEK INLET, BROOKLYN, N.Y.
GENERALIZED SITE ELEVATIONS
WOL NOS. 3099–M&E2R–3253
3099–M&E2R–3515
3099–M&E2R–3923
CIVIL AUGUST 2007

JOB 60004495
FILE NO.
CAD FILE CZBCCTC5
SHEET FIG. 5

Table 1
Summary of Analytical Results - Soil
Volatile Organic Compounds (VOCs)
Greenpoint Monitor Museum/Bushwick Creek Inlet Site Investigation

Boring Number Sample ID Sample Date Lab Identification Number	BC-7 BC-7 13-15 3/16/2006 60300130	BC-7 BC-7 60-62 3/17/2006 60300149	BC-8 BC-8 31-33 3/18/2006 60300149	BC-8 BC-8 41-43 3/18/2006 60300149	NYSDEC Recommended Soil Cleanup Objective	NYSDEC Soil Cleanup Objectives to Protect GW	STARS TCLP Alternative Guidance Value
Volatile Organic Compounds (ug/Kg)							
Acetone	ND	ND	ND	ND	200	110	NS
Carbon Disulfide	ND	ND	ND	ND	2700	2700	NS
Toluene	ND	ND	ND	ND	1500	1500	100
2-Hexanone	ND	ND	ND	ND	10000	10000	NS
Ethylbenzene	ND	ND	ND	ND	5500	5500	100
M & P Xylene	ND	5 J	4 J	ND	1200	1200	100
O-Xylene	ND	ND	ND	ND	1200	1200	100
Styrene	ND	ND	ND	ND	10000	10000	NS
Isopropylbenzene	ND	ND	ND	ND	2300	2300	100
n-Propylbenzene	ND	ND	ND	ND	3700	3700	100
1,3,5-Trimethylbenzene	ND	ND	ND	ND	3300	3300	100
tert-Butylbenzene	ND	ND	ND	ND	10000	11000	100
1,2,4-Trimethylbenzene	ND	ND	ND	ND	10000	13000	100
sec-Butylbenzene	ND	ND	ND	ND	10000	11000	100
4-Isopropyltoluene	ND	ND	ND	ND	10000	10000	NS
n-Butylbenzene	ND	ND	ND	ND	10000	12000	100
Naphthalene	ND	ND	ND	ND	13000	13000	200

Notes:
(1) Bold - Indicates value that exceeded the NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives.
(2) Italic - Indicates value that exceeded the NYSDEC TAGM 4046 Soil Cleanup Objectives to Protect Groundwater.
(3) Shaded - Indicates value that exceeded the STARS TCLP Alternative Guidance Value.
(4) ND - Non-detected above laboratory method detection limit.
(5) NS - No Standard.
(6) B - Indicates the analyte was found in the blank.
(7) J - Indicates an estimated value.

Table 2
Summary of Analytical Results - Soil
Semi-volatile Organic Compounds (SVOCs)
Greenpoint Monitor Museum/Bushwick Creek Inlet Site Investigation

Boring Number Sample ID Sample Date Lab Identification Number	BC-7 BC-7 13-15 3/16/2006 60300130	BC-7 BC-7 60-62 3/17/2006 60300149	BC-8 BC-8 31-33 3/18/2006 60300149	BC-8 BC-8 41-43 3/18/2006 60300149	NYSDEC Recommended Soil Cleanup Objective	NYSDEC Soil Cleanup Objectives to Protect GW	STARS TCLP Alternative Guidance Value
Semivolatile Organic Compounds (ug/Kg)							
2,4-Dimethylphenol	ND	ND	ND	ND	50000	50000	NS
Naphthalene	ND	ND	ND	ND	13000	13000	200
2-Methyl Naphthalene	ND	ND	ND	ND	36400	36400	NS
Acenaphthylene	ND	ND	ND	ND	50000	103000	NS
Acenapthene	ND	ND	ND	ND	50000	92000	400
Dibenzofuran	ND	ND	ND	ND	6200	6200	NS
Fluorene	ND	ND	ND	ND	50000	365000	1000
Phenanthrene	ND	ND	ND	ND	50000	218000	1000
Anthracene	ND	ND	ND	ND	50000	700000	1000
Carbazole	ND	ND	ND	ND	50000	50000	NS
Fluoranthene	ND	ND	ND	ND	50000	1900000	1000
Pyrene	ND	ND	ND	ND	50000	665000	1000
Benzo(a)anthracene	ND	ND	ND	ND	224	2800	0.04
Chrysene	ND	ND	ND	ND	400	400	0.04
bis(2-Ethylhexyl)phthalate	ND	1100	1800	700	50000	435000	NS
Indeno (1,2,3-cd)Pyrene	ND	ND	ND	ND	3200	3200	0.04
Benzo(b)fluoranthene	ND	ND	ND	ND	220	1100	0.04
Benzo(k)fluoranthene	ND	ND	ND	ND	220	1100	0.04
Benzo(a)pyrene	ND	ND	ND	ND	61	11000	0.04
Dibenzo(a,h)Anthracene	ND	ND	ND	ND	14	165000000	1000
Benzo (g,h,i) perylene	ND	ND	ND	ND	50000	8000000	0.04

Notes:
(1) Bold - Indicates value that exceeded the NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives.
(2) Italic - Indicates value that exceeded the NYSDEC TAGM 4046 Soil Cleanup Objectives to Protect Groundwater.
(3) Shaded - Indicates value that exceeded the STARS TCLP Alternative Guidance Value.
(4) ND - Non-detected above laboratory method detection limit.
(5) NS - No Standard.
(6) B - Indicates the analyte was found in the blank.
(7) J - Indicates an estimated value.

Table 3
Summary of Analytical Results - Soil
Polychlorinated Biphenyls (PCBs)
Greenpoint Monitor Museum/Bushwick Creek Inlet Site Investigation

Boring Number Sample ID Sample Date Lab Identification Number	BC-7 BC-7 13-15 3/16/2006 60300130	BC-7 BC-7 60-62 3/17/2006 60300149	BC-8 BC-8 31-33 3/18/2006 60300149	BC-8 BC-8 41-43 3/18/2006 60300149	NYSDEC Recommended Soil Cleanup Objectives	NYSDEC Soil Cleanup Objectives to Protect GW	STARS TCLP Alternative Guidance Value
Polychlorinated Biphenyls (PCBs) (ug/Kg)							
PCB-1260	ND	ND	ND	ND	10000	10000	NS

Notes:
(1) Bold - Indicates value that exceeded the NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives.
(2) Italic - Indicates value that exceeded the NYSDEC TAGM 4046 Soil Cleanup Objectives to Protect Groundwater.
(3) Shaded - Indicates value that exceeded the STARS TCLP Alternative Guidance Value.
(4) ND - Non-detected above laboratory method detection limit.
(5) NS - No Standard.
(6) B - Indicates the analyte was found in the blank.
(7) J - Indicates an estimated value.

Table 4
Summary of Analytical Results - Soil
Target Analyte List Metals
Greenpoint Monitor Museum/Bushwick Creek Inlet Site Investigation

Boring Number	BC-7		BC-7		BC-8		BC-8		NYSDEC	NYSDEC
Sample ID	BC-7 13-15		BC-7 60-62		BC-8 31-33		BC-8 41-43		Recommended	Eastern USA
Sample Date	3/16/2006		3/17/2006		3/18/2006		3/18/2006		Soil Cleanup	Background
Lab Identification Number	60300130		60300149		60300149		60300149		Objective	Criteria
TAL Metals (mg/Kg)										
Aluminum	13300		15000		3240		17100	MHA	NS	33000
Arsenic	6.91		2.48		ND		ND		7.5	3 - 12
Barium	32.1		66.2		14.1		176		NS	15 - 600
Beryllium	0.668		0.843		ND		0.591		1.6	0 - 1.75
Cadmium	ND		ND		ND		ND		1	0.1 - 1
Chromium	**25.6**		**31.3**		8.76		**28.1**		10	1.5 - 40
Calcium	2310		2260		2330		17400	M2	NS	130 - 35000
Iron	23900	B1	29400	B1	7870	B1	26300	B1 MHA	NS	2000 - 550000
Cobalt	8.90		14.3		ND		10.6		NS	2.5 - 60
Copper	12.7		**27.1**		7.22		**26.3**	M1	25	1 - 50
Lead	12.2		14.5		3.82		7.93		500	500
Magnesium	*6270*		4760		2710		*8560*		NS	100 - 5000
Manganese	409		504		132		509	MHA	NS	50 - 50000
Mercury	ND		ND		ND		ND		0.1	0.001 - 0.2
Nickel	**22.5**		***27.7***		12.0		**21.7**		13	0.5 - 25
Vanadium	29.9		39.3		9.77		37.8		NS	1 - 300
Selenium	**2.62**		**2.31**		ND		ND		2	0.1 - 3.9
Potassium	3140		2650		633		4770		NS	8500 - 43000
Silver	ND		ND		ND		ND		NS	NS
Sodium	1420		417		303		853		NS	6000 - 8000
Thallium	ND		ND		ND		6.75		NS	NS
Zinc	***60.0***		***71.8***		**24.5**		***61.6***		20	9 - 50
Total Cyanide	ND		ND		ND		ND		NS	NS

Notes:
(1) Bold - Indicates value that exceeded the NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives.
(2) Italic - Indicates value that exceeded the NYSDEC TAGM 4046 Eastern USA Background Criteria.
(3) ND - Non-detected above laboratory method detection limit.
(4) NS - No Standard.
(5) B1 - Analyte was detected in the associated method blank. Analyte concentration in the sample is greater than 10x the concentration found in the method blank.
(6) M2 - The MS and/or MSD were below the acceptance limits due to sample matrix interference.
(7) MHA - Due to high levels of analyte in the sample, the MS/MSD calculation does not provide useful spike recovery information.