

**February 7, 2011**

**FINAL ENGINEERING REPORT  
EMBAYMENT AREA  
OPERABLE UNIT 3 (OU-3)**

**1 Nassau Place  
(Former Nassau Metals Corporation Facility)  
Staten Island, New York  
Site Number V-00159-2**

*Prepared for*

**NASSAU METALS CORPORATION  
600 Mountain Avenue  
New Providence, New Jersey 07974-2008**

**Remedial Engineering, P.C.**  
*Environmental Engineers*

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*and ROUX ASSOCIATES, INC.*

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## CERTIFICATION

I, Noelle M. Clarke, am currently a registered professional engineer licensed by the State of New York, I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Design was implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Design.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Design and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in for the remedy.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and/or any operation and maintenance requirements applicable to the Site are contained in an environmental easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a Site Management Plan has been submitted for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by Department.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Noelle M. Clarke, of Remedial Engineering, P.C., am certifying as Owner's Designated Site Representative for the site.

072491  
NYS Professional Engineer #

02/07/2011  
Date



Note: include PE stamp

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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## LIST OF ACRONYMS

Acronym	Definition
BMP	Best Management Practice
CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
CCP	Construction Contingency Plan
CQAP	Construction Quality Assurance Plan
CQCP	Construction Quality Control Plan
DGA	Dense Graded Aggregate
DOW	Division of Water
EC	Engineering Control
ERH	Effective Range-High
ERL	Effective Range-Low
FER	Final Engineering Report
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
IC	Institutional Control
LKB	Lockwood, Kessler & Bartlet
NMFS	National Marine Fisheries Services
NYCDEP	New York City Department of Environmental Protection
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OM&M	Operation, Maintenance and Monitoring
OU	Operable Unit

## LIST OF ACRONYMS

Acronym	Definition
PCB	Polychlorinated Biphenyl
RA	Remedial Action
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RSCO	Recommended Soil Cleanup Objective
RRAPDR	Revised Remedial Alternatives and Preliminary Design Report
SMP	Site Management Plan
SPDES	State Pollution Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
TAGM	Technical Administrative Guidance Memorandum
TCP	Traffic Control Plan
TOGS	Technical Operational Guidance Series
TSDF	Treatment, Storage and Disposal Facility
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound
WWHP	Work and Waste Handling Plan

## **1.0 INTRODUCTION**

On behalf of the Nassau Metals Corporation (“Nassau Metals”), Remedial Engineering, P.C (“Remedial Engineering”) has prepared this Final Engineering Report (“FER”) to describe the remedial activities performed at the Nassau Metals-owned portion of Site No. V-00159-2 located west of Arthur Kill Road, which is designated as Operable Unit 3 (“OU-3”) as shown on Figures 1 and 2. Remedial Engineering is a New York State professional service corporation organized primarily for the purpose of providing engineering services for clients of Roux Associates, Inc. (“Roux Associates”). The Site No. V-00159-2 is defined in the Voluntary Cleanup Agreement (“VCA”) between the New York State Department of Environmental Conservation (“NYSDEC”) and Nassau Metals (W2-0801-01-04 dated January 4, 2002 and amended April 16, 2010) as the property formerly owned, in its entirety, by Nassau Metals that will be referred to, herein, as the “VCA Property”. Under this agreement, Nassau Metals entered into New York State’s Voluntary Cleanup Program (“VCP”) to address the environmental conditions at the VCA Property. For the purposes of summarizing remediation activities at the VCA Property, now owned by multiple entities, Nassau Metals has subdivided the former facility into the following operable units, which are depicted on Figure 2:

- OU-1: the Nassau Metals-owned portion of the VCA Property located east of Arthur Kill Road;
- OU-2: the Best Equities LLC-owned portion of the VCA Property located east of Arthur Kill Road; and
- OU-3: the Nassau Metals-owned portion of the VCA Property located west of Arthur Kill Road.

Separate FERs and Site Management Plans (“SMPs”) will be issued for each operable unit. OU-3 is the subject of this FER and will be referred to, herein, as “the Site.”

Remedial activities for OU-3 were performed from September 2, 2008 to May 6, 2009 in accordance with the applicable portions of the NYSDEC-approved Specifications, Project Plans and Contract Documents (“Final Design Documents”) dated February 14, 2006, with exceptions noted herein. The Final Design Documents, which were prepared for Nassau Metals by Remedial Engineering, are considered a part of the VCA as an addendum to the Remedial Action Work Plan (“RAWP”) for the VCA Property. The RAWP is presented as Exhibit “B” of the



January 3, 2002 VCA and consists of the February 28, 2001 VCP Revised Remedial Alternatives and Preliminary Design Report (“RRAPDR”) and five addenda. The addenda include two separate comment letters presented by the NYSDEC, the New York State Department of Health (“NYSDOH”), and the New York City Department of Environmental Protection (“NYCDEP”), Nassau Metals’ response to those comments, and a revised project schedule.

In addition, a set of “for construction” contract documents dated May 17, 2006 was issued to the bidders for the remedial construction. In addition, four addenda to the May 17, 2006 contract documents were issued to the bidders during the bid phase (Addendum No. 1 dated June 5, 2006; Addendum No. 2 dated June 20, 2006; Addendum No. 3 dated June 23, 2006 and Addendum No. 4 dated June 30, 2006). These documents did not change the essential elements of the remedy. They were issued to finalize contractual elements missing from the February 14, 2006 set; provide additional language regarding the dredge window imposed on work in Mill Creek and the embayment areas; and provide minor design modifications based on value engineering conducted during the bid phase and questions from the bidders. This FER summarizes the work performed in accordance with the Final Design Documents and any subsequent approved modifications.

This report is divided into the following five sections:

- Section 1.0: provides an introduction;
- Section 2.0: provides background information for the VCA Property and the Site;
- Section 3.0: presents the remedial goals and a summary of the Final Design remedy that are applicable to OU-3;
- Section 4.0: provides a summary of the remedial action performed for OU-3; and
- Section 5.0: provides a summary of the NYSDEC-approved deviations from the Final Design.

Supporting tables, figures and appendices are included at the end of this report. All appendices have been included electronically on a DVD that is located in a sleeve on the inside back cover of this report. In addition, a hard copy of Appendix G (As-Built Drawings) has also been provided.

## **2.0 VCA PROPERTY AND SITE BACKGROUND**

This section provides a description of the location and history of the VCA Property, where applicable, and the Site, geologic conditions and nature and extent of contamination.

### **2.1 VCA Property and Site Description**

The VCA Property is located in the Staten Island County of Richmond, New York. The VCA Property is immediately bordered on the north by Richmond Valley Road and on the south by the Staten Island Rapid Transit railroad tracks. The developed portions of the VCA Property are bordered on the east by Page Avenue and on the west by Arthur Kill Road (portion of OU-1). The undeveloped portions of the VCA Property extend approximately 500 feet east of Page Avenue (portion of OU-1) and 600 feet west of Arthur Kill Road (OU-3). Mill Creek bisects the VCA property, discharging to the Arthur Kill.

Operable Unit 3 (also referred to as the “Embayment Area”) is identified as Section 5, Block 7983, Lot 100 on the Richmond County Tax Map. OU-3 is approximately 8.9 acres in size and consists mostly of the mouth of Mill Creek; tidally influenced wetland areas; and wetland adjacent and upland areas. This area is physically separated from OU-1 and OU-2 by Arthur Kill Road (Figure 2).

Wetlands along Mill Creek were delineated by Roux Associates in coordination with the NYSDEC as part of the remedial design phase of the project. Prior to remediation, wetlands were delineated as vegetated coastal shoals, bars and mudflats located within the 4-foot elevation contour. Salt meadow cordgrass (*Spartina patens*) and smooth cordgrass (*Spartina alterniflora*) were primarily observed in small patches along the one foot (above mean sea level) contour of the north and south banks of Mill Creek, consistent with the mean water level. Common reed (*Phragmites australis*) was the dominant vegetation in the wetland above the 2-foot contour. Marsh elder (*Iva frutescens*) was the most common shrub located intermittently along both banks of Mill Creek, between the *Phragmites* and the uplands. The south bank of Mill Creek between Arthur Kill Road and Page Avenue was characterized by relatively sparse vegetation interspersed with exposed fill, rocks, boulders, and debris. Areas that were temporarily or permanently disturbed during the work were restored or mitigated to a higher quality wetland than that which

existed prior to remediation in accordance with the approved plans. The mitigation/ restoration of the wetlands are described in Section 4.

Prior to remediation, the wetlands areas located upstream and east of Page Avenue were primarily dominated by *Phragmites australis* and *Iva frutescens*. Due to the influx of stormwater runoff into Mill Creek and tidal restrictions along Mill Creek, these areas are classified as formerly connected (“FC”) tidal marshes. These marshes contain minimal salinity, less than 0.5 parts per thousand (“ppt”), and consequently do not support intertidal vegetation (i.e., *Spartina spp.*). The lack of significant tidal flux and resulting salinity, in addition to the introduction of fresh stormwater runoff, has resulted in the establishment of a monoculture stand of *Phragmites australis*. Areas that were temporarily disturbed during the work were restored to a higher quality wetland than that which existed prior to remediation in accordance with the approved plans. The restoration of the wetlands is described in Section 4.

Mill Creek and the Arthur Kill are the surface water bodies located at the VCA Property. Mill Creek bisects the VCA Property, while the Arthur Kill lies to the west of Arthur Kill Road. Flow in Mill Creek is generally westward through the VCA Property where it discharges to the Arthur Kill waterway. Tidal influence extends through the VCA Property and into the wetland east of the Page Avenue Bridge. Tidal fluctuations are approximately 5 feet near Arthur Kill Road and 2 feet east of Page Avenue.

On March 13, 2002, Roux Associates collected *in situ* salinity measurements from numerous locations along Mill Creek, from Arthur Kill Road to the *Phragmites* wetland located east of Page Avenue. Salinity measurements were collected with a Horiba™ U-22 water quality meter during low and high tidal fluctuations. Salinities in Mill Creek range from moderately high 19.5 ppt near Arthur Kill Road to essentially fresh water (0.0 ppt) conditions east of Page Avenue.

The water table underlying the VCA Property occurs within portions of the base of the fill material and in the glacial moraine, which comprise the groundwater aquifer beneath the VCA Property. Groundwater is encountered at depths from 2 to 12 feet below land surface (“bls”).

Groundwater at the VCA Property flows toward and discharges into Mill Creek. Tidal influences on Mill Creek generally do not affect the overall groundwater flow directions, except in the immediate vicinity of Mill Creek.

## **2.2 Operational History**

Manufacturing at the former facility located within the limits of the VCA Property began around 1900. All manufacturing operations occurred east of Arthur Kill Road. The Tottenville Copper Company was the original operator at the VCA property, and used copper, lead, tin, and zinc as part of their manufacturing process. In 1923, a fire destroyed a portion of the facility, which was subsequently rebuilt. In 1931, Nassau Metals became the operator of the facility. The facility became the centralized site for the reclamation of non-ferrous scrap metals from Western Electric plants as well as from other telephone companies. The scrap metals were refined and formed into metal products, including copper wire, solder, and lead sleeving. The facility contained two primary manufacturing operations: 1) copper was handled in Building 10/10X (formerly known as the “red metals” building), and 2) lead and tin were handled in Building 2 (formerly known as the “white metals” building). These buildings were located south of Mill Creek, within the limits of OU-1.

Small quantities of organic chemicals were used for equipment maintenance during the facility’s history.

Much of the VCA Property east of Arthur Kill Road has been filled in over the years to support the expansion of the facility. Fill material consisted of soil, construction debris, telephone equipment, slag, and refractory bricks. The filled areas were then occupied by buildings, on-site roadways, or pavement. The creation of land using fill material ceased by the 1970s.

In 1973, a wastewater treatment facility was built within the limits of the VCA Property to treat metals bearing wastewater. The wastewater treatment facility was located in the southeastern portion of the VCA Property within OU-1. During the initial operation of the wastewater treatment facility, approximately 6 to 7 cubic yards of dry, vacuum-filtered sludge were generated per week. Until 1979, the sludge was stockpiled on the ground underneath the Page

Avenue overpass. From 1979 through 1981, the sludge was stored in the “red metals” building in containers, and processed for precious metals recovery. Starting in 1981, the sludge was sent off site for precious metals recovery.

In 1981, copper operations in the “red metals” building ceased. The building was decommissioned and demolished in 1984-1985. Lead and tin operations in Building 2 (the “white metals” building) continued until 1991. The “white metals” building was demolished in 1996-1997. Demolition activities are documented in the May 7, 1997 Building Demolition Completion Report prepared by Roux Associates. Additional building demolition on the south side of the VCA Property was performed by Roux Associates in 1998. Demolition activities are documented in the June 3, 1998 Phase I Building Demolition Completion Report. In 1999, all electroplating manufacturing operations moved from the south side of the VCA Property (OU-1) to 236 Richmond Valley Road, also known as Building 41 on the north side of the VCA Property in OU-2. Following the transfer of operations, all remaining buildings on the south side of Mill Creek, including the wastewater treatment facility, were demolished. Decommission and demolition activities for these buildings are documented in the August 2000 Completion Report for Nassau Metals Corporation Phase II Building Closure and Demolition Project prepared by Environmental Engineering Services. All manufacturing operations were terminated at the VCA Property in 2001. Nassau Metals does not currently have any buildings or conduct any operations within the limits of OU-3.

### **2.3 Regulatory History**

After all decommissioning and demolition activities were performed at the VCA Property and manufacturing operations were subsequently terminated in 2001, Nassau Metals entered into a VCA (W3-081-97-09) with the NYSDEC to evaluate environmental conditions at the VCA Property in preparation for anticipated redevelopment of the Nassau Metals-owned portion of the VCA Property. In accordance with the VCA, a Remedial Investigation (“RI”) was performed to characterize the nature and extent of contamination at the VCA Property as discussed in Section 2.5 below. Based on the results of the RI, a RAWP and subsequent remedial design were developed to address sources of contamination identified at the VCA Property. A summary of the Remedial Action (“RA”) is provided in Section 4.0. Following the performance of the RA,

Nassau Metals initiated the process to amend the existing VCA, which subdivides the VCA Property into three operable units (OU-1, OU-2 and OU-3), as discussed previously. The VCA Amendment #1 was fully executed on April 16, 2010. Accordingly, separate FERs and SMPs have been prepared for each operable unit. OU-3 is the subject of this FER.

## **2.4 Geologic Conditions**

The VCA Property is located in the southwestern portion of Staten Island, New York (Figure 1). Prior to the Remedial Action, the majority of the VCA Property east of Arthur Kill Road was underlain by fill material, which varied in thickness but averaged approximately 8 feet. Over 450,000 cubic yards of fill underlie the VCA Property, assuming an 8-foot thickness of fill across the VCA Property, east of Arthur Kill Road. The fill material is comprised of fine to coarse sand with minor amounts of silt and clay, wire, slag, bricks, glass, plastic, wood, metal and parts of old telephones. The fill material is directly underlain by low permeability estuarine deposits in the vicinity of Mill Creek, and glacial moraine deposits in areas of the VCA Property furthest from Mill Creek. The estuarine deposits are comprised of peat, clay and silt, and range in thickness from 2 feet (“ft”) to 9 ft. Previous geotechnical analyses indicate that the vertical permeability of the estuarine deposits is very low, measuring  $3.96 \times 10^{-8}$  centimeters per second (“cm/sec”). Where present, the estuarine deposits will act as a low permeability barrier between the overlying fill and the underlying glacial moraine deposits.

The glacial moraine deposits are comprised of sand with minor amounts of gravel, silt, and clay. These deposits range in thickness from 32 ft to 58 ft. The glacial moraine deposits comprise the ground-water aquifer beneath the VCA Property. However, the underlying groundwater is not used as a drinking water supply. Drinking water in Staten Island has been supplied by the upstate New York reservoirs since the early 1970s.

Underlying the glacial moraine deposits is the Raritan Clay, which was encountered during previous investigations ranging in depths from 52 ft to 72 ft. Previous geotechnical analyses indicate that the vertical permeability of the Raritan Clay is very low, ranging from  $1.95 \times 10^{-8}$  to  $2.20 \times 10^{-8}$  cm/sec. Bedrock reportedly lies approximately 300 ft bls beneath Staten Island.

The water table underlying the VCA Property occurs within portions of the base of the fill material and in the glacial moraine. Depth to water beneath the VCA Property ranged from 1 ft to 10 ft bls during April 2010. Three synoptic rounds of water-level measurements were made in selected wells at the VCA Property from May 20 through May 22, 1998. The ground-water flow direction was determined during the May 20, 1998 low tide water-level measurements to be towards Mill Creek from both the south and north portions of the VCA Property. The two remaining water-level measurement rounds were evaluated (low and high tides), and the resulting groundwater flow patterns are consistent with the May 20, 1998 water-level measurement round. These data indicate that tidal influences generally do not affect the overall ground-water flow directions. However, due to the 4-5 ft change in surface-water elevations observed during the tidal cycle, it is expected that during high tide, surface water will recharge groundwater within the immediate vicinity of Mill Creek. This phenomenon is commonly referred to as “bank storage.”

## **2.5 Nature and Extent of Contamination**

Prior to performing the RA, a RI was performed to characterize the nature and extent of contamination at the VCA Property. The results of the RI are described in detail in the following reports:

- December 1991 United States Environmental Protection Agency (“USEPA”) Site Investigation Report prepared by Malcolm Pirnie, Inc.;
- May 1997 Initial Study Report prepared by Roy F. Weston, Inc.;
- September 1998 Site Investigation Report prepared by Roux Associates;
- November 1998 Voluntary Cleanup Program Remedial Alternatives Report prepared by Roux Associates;
- October 2000 Voluntary Cleanup Program Supplemental Site Investigation Report prepared by Roux Associates; and
- February 2001 Voluntary Cleanup Program Revised Remedial Alternatives and Preliminary Design Report prepared by Roux Associates.

Over 450,000 cubic yards of fill immediately underlie the VCA Property, east of Arthur Kill Road. Based upon the results of the various investigations performed, it was determined that the fill material contains wire, slag, bricks, metal, and other manmade materials.

As part of this effort in OU-3, four soil samples were collected from two borings in the upland area (above the 10-foot contour elevation) of OU-3. The soil borings did not identify any fill material and analytical results did not exceed NYSDEC Recommended Soil Cleanup Objectives (“RSCOs”) identified in the NYSDEC Technical and Administrative Guidance Memorandum (“TAGM”) 4046.

During the performance of the RI and Supplemental RI, high concentrations of metals (i.e., copper, lead and zinc) were found in the sediment in the Embayment Area at depths ranging from zero to one foot. As part of this effort, a total of 26 samples from 13 locations throughout the Embayment Area were submitted for metals analysis. Eighteen (18) of 26 sediment analyses yielded metals concentrations exceeding NYSDEC Sediment Quality Criteria.

Preconstruction tabular and graphical summaries of analytical data generated during the performance of the RI are presented in the reports cited above. These sediments are potentially toxic to benthic organisms based upon the results of regional sediment toxicity studies and a constituent-by-constituent comparison against the New York State Sediment Screening Criteria and the Effective Range-Low (“ERL”) and Effective Range-High (“ERH”) guidelines. Similarly, copper was also found at elevated concentrations in surface water in the Embayment Area. The elevated surface water concentrations were caused by the presence of suspended sediment.

Prior to the remedial action, the source of metals, in particular lead, detected in Mill Creek included:

- the erosion of metals containing fill material at the property that was exposed along Mill Creek stream banks;
- the former discharge of suspended sediment from on-site storm sewer outfalls during significant storm events; and
- regional contributions from the Arthur Kill, which is known to be a severely impacted waterway and from Mill Creek, which drains an urban watershed.

The first two sources were addressed by the remedial action; however, addressing regional contributions from the Arthur Kill were beyond the scope of the remedial action.



### **3.0 REMEDIAL GOALS, PROPOSED REMEDY, FINAL DESIGN APPROVAL AND BIDDING PROCESS**

This section presents the objectives of the remedial action, generally summarizes the proposed remedy and describes the design approval process.

#### **3.1 Remedial Action Objectives**

The media of concern at the VCA Property include sediment and fill material. The remedial action objectives (“RAOs”) developed for the VCA Property that are applicable to OU-3 are as follows:

- address the metals-containing sediment in the defined portions of Mill Creek and the Embayment Area.

#### **3.2 Summary of Proposed Remedy**

The applicable elements of the proposed remedy for OU-3 are as follows:

- Sediment dredging/excavation and on-site stabilization.
- Wetland mitigation and restoration at a 1:1 ratio for temporarily disturbed wetland areas.
- Implementation of SMP to verify the effectiveness of the remedy.

The limits of dredging consisted of the Embayment Area located west of Arthur Kill Road, which is located entirely within the limits of OU-3 (Figure 2).

Erosion and sediment control measures and appropriate engineering controls were also required to be employed throughout the construction period.

Implementation of remedial elements applicable to OU-3, as specified in the Final Design Documents and /or rebid documents, along with noted exceptions are discussed in the following section of this FER.

#### **3.3 Final Design Approval**

On October 18, 2006, the NYSDEC provided its formal approval of the Final Design Documents. The NYSDEC determined that the Final Design Documents substantially addressed the requirements of the VCA RAWP of January 2001 and the 100% Design Documents that

were previously approved in July 2004. As noted previously, exceptions to the approved design, applicable to OU-3, are discussed herein. The October 18, 2006 approval letter is included in Appendix A.

### **3.4 Summary of Previous Attempt to Remediate OU-3**

Once the Final Remedial Design was approved, the remediation of OU-3 was scheduled to be performed during the 2006-2007 United States Army Corps of Engineers (“USACE”) imposed dredge window (October 1 through February 28) concurrent with the remediation of OU-1 and OU-2 by Shaw Environmental and Infrastructure, Inc. (“Shaw”). In preparation for the remediation of OU-3, Shaw provided numerous submittals for review and approval, as discussed in Section 4.2 of the Draft FER for OU-1 dated June 15, 2009. Conditional approval of Shaw’s Work and Waste Handling Plan (“WWHP”) was specifically provided by the NYSDEC on November 11, 2006 (Appendix A). As part of this conditional approval, the NYSDEC required the submission of additional technical documentation (plans, cross-section, and details) for review and approval regarding the use of the Aqua Dams specified in Shaw’s WWHP. This documentation, along with additional NYSDEC requested clarifications, was subsequently provided in various emails submitted to the NYSDEC on December 12, 2006 and February 13, 2007 (Appendix B). As noted in Shaw’s WWHP, Aqua Dams were going to be used to isolate the Embayment Area from the tidal effects of the Arthur Kill in support of the remediation of OU-3 “in the dry.” Key activities performed prior to constructing the Aqua Dam included clearing and grubbing of approved areas and construction of a gravel access road north of the Embayment Area.

Construction of the Aqua Dams was initiated on December 6, 2006; however, due to a series of contractor delays and vandalism, the Aqua Dams could not be installed in accordance with Shaw’s proposed schedule. As a result, it was determined that Shaw would be unable to initiate and complete dredging activities within the specified dredge window of February 28, 2007 unless an extension was provided by the USACE. Therefore, a request was made, and eventually obtained, from the USACE, in cooperation with National Marine Fisheries Services (“NMFS”), to extend the dredging window to June 1, 2007 (Appendix B). Although Shaw made every effort to initiate dredging within OU-3 in a timely manner given the opportunity of an extended dredge

window, they were unable to initiate dredging activities due to a catastrophic failure of the Aqua Dams that occurred on April 20, 2007 immediately after all required dams were installed. Because of the significant amount of time associated with reinstalling the Aqua Dams and based on the regulatory constraints of completing all dredging and backfilling activities related to OU-3 by June 1, 2007, Nassau Metals decided to remove the remediation of OU-3 from the current scope of work and focus, in the short-term, on completing all Work activities east of Arthur Kill Road in OU-1 and OU-2. As a result, all used and recovered Aqua Dams were disposed off-site as construction and demolition (“C&D”) debris since none of the material could be re-used or recycled.

### **3.5 Summary of OU-3 Remediation Rebidding Process**

Following removal of the OU-3 remediation effort from Shaw’s original scope of work, Nassau Metals issued a separate bid on July 11, 2007 for the remediation of OU-3 with the intent of initiating the remediation of the Embayment Area in the 2007-2008 USACE imposed dredge window. Although six bidders were contacted, no responsive bids were submitted. Accordingly, Nassau Metals rebid the Work on December 8, 2007 with the goal of initiating the remediation of the Embayment Area in the 2008-2009 imposed dredge window. It should be noted that the July 11, 2007 and December 8, 2007 versions of the bidding documents and related addendums issued during the rebidding process did not change the essential elements of the remedy. Each document was specifically modified to only address the remediation of OU-3 and to incorporate technical requirements regarding off-site disposal of excavated sediments since consolidation of the excavated sediments within the Soil-GCL Cap located in OU-1 would no longer be an option under this scenario.

Nassau Metals believed that they would obtain more responsive bidders when the bid was reissued on December 8, 2007 based on the following feedback:

- Several contractors who declined to bid in July 2007 indicated their short-term workload was high and they would not be able to staff this project in the required timeframe. Rescheduling the work for the 2008-2009 season would increase the number of responses if contractor resources were not yet assigned.
- One contractor, who declined to bid in July 2007, cited their inability to develop cost-effective disposal/work options in the required timeframe. Delaying the work would

provide contractors with additional time to develop these costs and may increase the bid list.

- Delaying the work would provide contractors with additional time to prepare project plans for USACE/NYSDEC review and approval. Obtaining this approval in the required timeframe was a concern for those contractors who declined to bid.
- Delaying the work would provide Nassau Metals with additional time to identify and review qualifications of contractors who do not typically work in the New York City area, but who may be interested in the project.

All of these factors contributed to making the second attempt to rebid the OU-3 component of the Site-wide remediation more successful. Entact, LLC (“Entact”) was ultimately selected to perform the remedial action. The Work specifically performed by Entact is the subject of this FER.

#### **4.0 SUMMARY OF REMEDIAL ACTION**

Provided below is a summary of the remediation activities conducted within the limits of OU-3. Remedial activities for OU-3 were performed by Entact and its designated subcontractors under the direct supervision of Remedial Engineering at various times, from September 2, 2008 to May 6, 2009. Roux Associates performed the following on behalf of Nassau Metals, at various times, between September 2, 2008 and May 6, 2009:

- supported Nassau Metals in coordinating all required permitting;
- handled all regulatory agency coordination and reporting;
- attended weekly project meetings and prepared/ issued related agendas and minutes;
- provided ongoing contract document clarification to Entact, as required;
- organized and maintained the information needed to document the construction;
- provided field oversight and support, as necessary, of the specified remedial activities; and
- implemented the required Community Air Monitoring Plan (“CAMP”) during all intrusive activities.

Copies of daily construction reports and monthly construction progress reports prepared and submitted to the NYSDEC during the performance of the work are provided in Appendices C and D, respectively. The major components of the remedial action for OU-3 are identified below, and are detailed in the following sections of this FER.

- permitting;
- contractor submittals;
- implementation and management of a site-specific Health and Safety Plan;
- preconstruction meeting, mobilization and site preparation (i.e., construction of the Site access road, clearing and grubbing, soil erosion and sedimentation control, etc...);
- management of construction wastewaters;
- ongoing construction and removal of temporary embayment area haul roads and finger roads;
- sediment excavation, interim staging and stabilization;

- backfilling of the Embayment Area;
- restoration of the littoral zone;
- restoration of disturbed wetland areas;
- restoration of disturbed wetland adjacent and upland areas;
- restoration of on-site gravel access road;
- waste transportation and disposal;
- surveying and As-Built Drawings (certified by Remedial Engineering);
- equipment decontamination; and
- demobilization.

Following the performance of the remedial action, a Site Management Plan will be prepared and submitted under separate cover, as discussed in Section 4.14 of this FER, to verify the effectiveness of the remedy.

#### **4.1 Permitting**

The following key permits were obtained prior to commencement of the related remedial activities at the site and are included in Appendix E.

- USACE Permit No. 2002-01563 – Executed on November 9, 2006. The respective notification to commence work at OU-3 was issued on September 10, 2008.
- Extension to USACE Permit – On March 16, 2007, the USACE approved an extension of the dredging window from March 16, 2007 to June 1, 2007 for the 2007/2008 dredging season.
- NYSDEC Water Quality Permit No. 2-6405-00001/02004 – Executed on July 19, 2006. The respective notification to commence work at OU-3 was issued on September 10, 2008.
- Renewal of NYSDEC Water Quality Permit 2-6405-00001/02004 – Executed on January 17, 2008.
- Modification of Topography Authorization for Application No. 060355 RAR – Formally approved on October 11, 2006.
- State Pollution Discharge Elimination system (“SPDES”) Permit Equivalent for Site No. W2-0801-01-04 – Executed on November 14, 2006.

- Addendum to SPDES Permit Equivalent for Site No. W2-0801-01-04 – Executed on February 12, 2007.
- Renewal of Equivalent SPDES Permit for Site No. W2-0801-01-04 – Executed on April 21, 2008.
- Building Permit No. 510053530-01-EW-OT – Issued on December 19, 2008 with an expiration date of December 1, 2009.
- Hydrant Permit No. 515563 – Issued on August 18, 2008.

On January 26, 2009, a letter was issued to the USACE that requested a modification of the dredge restriction for the Nassau Metals remediation project, since there was a possibility that the dredging and backfilling work in OU-3 would not be completed by the end of February 2009 (Appendix B). The letter presented a summary of the project history, the status of the current remediation, the schedule moving forward, and an overview of potential impacts to extending the work. Since Entact was able to complete all dredging and related backfilling activities by February 28, 2009 (end of the approved dredge window), an extension was not required. A response to the January 26, 2009 extension request was never provided by the USACE.

## **4.2 Contract Submittals**

Prior to commencement of remedial activities at the site, Entact provided the following documents, where applicable, for review and approval by Remedial Engineering and the NYSDEC when requested:

- materials and equipment suppliers and manufacturers;
- list and qualifications of subcontractors;
- construction schedule;
- quality control procedures;
- work sequence;
- contractor Work Plans (WWHP, Health and Safety Plan {"HASP"}, Construction Quality Assurance Plan {"CQAP"}, Construction Quality Control Plan {"CQCP"}, Construction Contingency Plan {"CCP"} and Traffic Control Plan {"TCP"}); and
- preconstruction survey.

The Contractors provided numerous other submittals and shop drawings as required in the Specifications. Work did not commence in a particular area (i.e., water management, import of off-site fill materials, wetland planting, etc.) until the required submittals were received and approved by Nassau Metals, Remedial Engineering and the NYSDEC, where applicable.

Approval of Entact's May 20, 2008 WWHP (Appendix B) was provided by the NYSDEC on June 5, 2008 (Appendix A).

### **4.3 Implementation and Management of a Site-Specific Health and Safety Plan**

Remediation activities were performed in a manner consistent with 29 CFR 1910 and 1926 and in accordance with the Contractors' HASPs, where applicable. The Contractors performed work in Level D protection, which included work boots, rubber over-boots (as required) hard hats, and safety glasses.

Roux Associates and Entact conducted particulate and Volatile Organic Compound ("VOC") monitoring during the performance of intrusive remedial activities as discussed below.

#### **4.3.1 Air Particulate Monitoring**

Particulate air monitoring was performed consistent with NYSDEC TAGM 4031 and the NYSDOH Community Air Monitoring Protocol provided in Appendix J of the Final Design Documents during intrusive remedial activities. Particulate dust monitoring was performed upwind and downwind of the Work areas. An exceedance of the action level of  $150 \mu\text{g}/\text{m}^3$  was recorded on the following occasion during the work:

<u>Date</u>	<u>Time</u>	<u>Concentration*</u> <u>(<math>\mu\text{g}/\text{m}^3</math>)</u>
11/20/07	8:39	406.0

\* 15 Minute Background Corrected Average.

The exceedance observed on November 20, 2008 occurred as a result of dust generated with the application of the stabilization product (Calciment) utilized on the excavated sediment. Entact temporarily stopped the stabilization work and misted the area before resuming work in the sediment stabilization area. No further exceedances were experienced that day.



The NYSDEC was immediately notified when the action level for dust was exceeded.

Dust monitoring data and the respective action level exceedance report noted above is provided in Appendix F. Data reports were not provided for days when data could not be collected due to problematic weather events (i.e., rain or snow). On several isolated occasions, complete data reports were not generated when on-site equipment malfunctioned.

#### **4.3.1.1 Dust Control**

During the course of the work, all construction activities performed by Entact were conducted to minimize dust that would cause a hazard or nuisance to others. Roux Associates and Entact were responsible for monitoring dust in accordance with the specifications and Entact implemented all necessary measures to control dust to within acceptable levels. The measures that were taken included:

- applying water on the haul roads;
- misting equipment and excavation faces;
- hauling materials in tarped or water tight containers;
- reducing speed of vehicles moving through areas of the site;
- covering excavated areas and material after excavation activity ceases; and
- stopping work.

The primary sources of water for dust control was obtained from a nearby, off-site fire hydrant once a permit (Appendix E) was obtained from the City of New York.

#### **4.3.2 Volatile Organic Compound Air Monitoring**

Air monitoring for VOCs was performed consistent with the NYSDOH Community Air Monitoring Protocol provided in Appendix J of the Final Design Documents during intrusive remedial activities. No VOC action levels were exceeded during the performance of the Work.

VOC air monitoring data is provided in Appendix F. Data reports were not provided for days when data could not be collected due to problematic weather events (i.e., rain or snow) or equipment malfunction.

#### **4.4 Mobilization, Pre-Construction Meeting, and Site Preparation**

After Entact mobilized to the Site to perform initial surveying and Site clearing work, a Pre-Construction Meeting was conducted at the Site on September 24, 2008 between Entact, Roux Associates and Nassau Metals project personnel to identify the roles and responsibilities of key project personnel, review procedures for contractor submittals, health and safety, schedule, payment requisitions, change order requests and other general administrative issues. As noted previously, Entact performed the remedial action under the oversight of Roux Associates and Nassau Metals.

Roux Associates' field representative generally provided construction oversight for the duration of the Remedial Action. Construction oversight included shop drawing review, daily inspection to verify conformance with the Contract Documents, health and safety monitoring, material tracking, preparation of daily field reports, preparation of monthly construction progress reports, photo documentation, and holding weekly progress meetings.

Concurrent with Site mobilization, Nassau Metals coordinated access agreements with adjacent property owners. It should be noted that an access agreement was not secured with the NYCDEP-owned property located directly north of the design limits of disturbance because Nassau Metals did not require use of this property, based upon its existing survey information for the Site (Figure 2). However, on February 12, 2009 a letter (Appendix B) was issued by the NYCDEP that formally identified that the limits of disturbance had encroached approximately 15 feet onto NYCDEP-owned property. Within the letter, the NYCDEP requested that the following occur by February 27, 2009 on its property: removal of encroaching silt fencing and trailers and regrading of a dirt pile that the NYCDEP perceived to be created by Entact. In response to this letter, an email was immediately sent to the NYCDEP on February 13, 2009 by Roux Associates that informed the NYCDEP that encroachment onto its property was accidental and occurred as a result of an incorrect survey that was performed (Appendix B). In order to avoid interference with the completion of the remediation, Nassau Metals requested an extension for the time frame for removing encroaching trailers and silt fence and regrading of the soil pile to be extended to March 13, 2009 (30-days). It was noted that Entact did not place a dirt pile on the NYCDEP's property; however, Nassau Metals agreed to regrade the area to blend

in with surrounding grades and to remove excess soil, consistent with the intent of the NYCDEP's February 12, 2009 letter. On March 17, 2009, the NYCDEP performed an unannounced Site inspection and confirmed that the requested work was performed as requested.

Prior to initiating major remedial construction activities, several key Site preparation tasks were performed by Entact including:

- verification of on-site utilities within the work zone prior to initiating any intrusive activities;
- performance of an initial site Survey;
- installation of soil erosion and sedimentation control measures;
- performance of a tree survey within proposed areas to be cleared;
- clearing and grubbing, as required, within the limits of disturbance;
- interim grading, as required, within the limits of disturbance;
- Removal and disposal of subsurface concrete and brick debris within the limits of the disturbance in upland areas;
- set up and operation of temporary construction utilities and facilities such as trailers, telephone and electrical service, sanitary facilities and emergency response materials;
- construction of the stabilized construction entrance with dense graded aggregate ("DGA") and 2.5-inch stone;
- improvement of the existing on-Site gravel access road with off-Site DGA;
- improvement of the existing off-Site access road with off-Site DGA;
- construction of on-site worker decontamination area;
- construction of the fill material staging area;
- construction of the sediment staging area/ equipment decontamination pad; and
- construction of the Site Access Road.

Installation of soil erosion and sedimentation control measures and construction of the fill material staging area, sediment staging area/ equipment decontamination pad and Site access road are discussed in greater detail in the following subsections of this FER.

#### **4.4.1 Installation of Soil Erosion and Sedimentation Control Measures**

Sediment and erosion control measures were implemented in accordance with New York Guidelines for Urban Erosion and Sediment. Entact implemented best management practices (“BMPs”) including the installation of silt curtains, silt fence, berms, and bales to prevent erosion and sediment migration during embayment excavation, land disturbing and sediment and soil management activities in accordance with the NYSDEC-approved WWHP. Erosion and sediment controls were installed in strategic locations based on visual observance of flow patterns and topography to control sediment entrained water from exiting and entering work and staging areas. Some erosion and sediment controls such as silt curtains and silt fence were installed sequentially as work progressed across the Embayment Area.

To prevent soil and sediment migration, silt fence was installed around the perimeter of the slack drying/ sediment stabilization area and clean fill stockpile areas and other disturbed areas with the potential for sediment migration. Silt fence was generally installed with a trencher to depth of 6 inches below ground surface. Hay bales or berms were placed in conjunction with the silt fence in areas with the potential for increased erosion and sediment migration.

As shown on Figure 1 of the NYSDEC-approved WWHP (Appendix B), silt curtains (Type II Siltdam Turbidity Barrier) as manufactured by Brockton Equipment/ Spilldam, Inc. located in Brockton, Massachusetts were installed in three locations on the western boundary of the Embayment Area and across Mill Creek just east of the Arthur Kill Road Bridge to prevent silt and sediment migration outside of the disturbed areas of the Embayment Area. Product specifications for the silt curtain used are provided in Appendix I. The silt curtains were installed from shoreline to shoreline and extended to the bottom of the Embayment Area floor at high tide. The silt curtains were equipped with a flotation boom and steel chain with ballast that provided self mooring capability in normal tidal conditions. Additional anchors were installed, as needed, to keep the silt curtains in place without any disruption to adjacent wetlands. The silt curtains were inspected on a daily basis and maintained continuously throughout the performance of the Work.

#### **4.4.2 Construction of Off-Site Fill Material Stockpile Area**

All imported clean materials were staged in the designated area on polyethylene sheeting throughout the performance of the Work as shown on As-Built Drawing AB-2 (Appendix G).

#### **4.4.3 Construction of Sediment Staging Area/ Equipment Decontamination Pad**

All sediment excavated during the remediation of Area A was placed in the on-site slack drying and sediment stabilization area (sediment staging area) located north of the Embayment Area as shown in As-Built Drawing AB-2 (Appendix G). The sediment staging area was generally constructed in accordance with the cross-section depicted on Figure 3 of the NYSDEC-approved WWHP.

Prior to construction, the footprint of the slack drying and sediment stabilization area was cleared and regraded, as needed. Once graded, a 12 oz. non-woven geotextile (Mirafi 1200N) as manufactured by TenCate Geosynthetics located in Pendergrass, Georgia was placed on the native subgrade. Product specifications for the non-woven geotextile used are provided in Appendix I. An impermeable geosynthetic liner consisting of 40 mil high density polyethylene (“HDPE”) geomembrane cushioned above and below with a 12 oz. non-woven geotextile (Mirafi 1200N) was placed on the bottom and downgradient berm. A six-inch layer of DGA followed by a top course of 2.5-inch stone (refer to Sections 4.9.3 and 4.9.4 respectively) was installed over the geosynthetic liner system. Concrete jersey barriers were installed around the perimeter of the area to prevent decanted water from the stockpiles from migrating from the area into the Embayment Area. A sump was constructed on the down-gradient side inside the berms to collect decanted water from the sediment stockpiles. A submersible pump was placed in the sump and a 1.5-inch discharge hose was utilized to transfer the decanted water to the temporary treatment system. In addition, silt fencing was installed around the perimeter of the sediment staging area to prevent sediment migration from the area. Polyethylene sheeting was utilized to cover sediment stockpiles when they were not actively being managed.

The northwest corner of the sediment staging area was also used as an equipment decontamination pad. Decontamination rinse water, when generated, was captured and transferred to the temporary wastewater treatment system.

Throughout the performance of the Work, the sediment staging area, including the equipment decontamination pad, was inspected and repaired as needed.

#### **4.4.4 Construction of Site Access Road**

Concurrent with the construction of the slack drying and sediment stabilization area, a “Site Access Road” connecting the sediment stabilization area to the temporary haul road was constructed as shown on As-Built Drawing AB-2 (Appendix G). Within the limits of the Site Access Road, a 6 oz. woven geotextile (Mirafi 600X) as manufactured by TenCate Geosynthetics located in Pendergrass, Georgia was placed on the native subgrade overlain with a six inch layer of DGA and a top course layer of 2.5-inch stone (refer to Sections 4.9.3 and 4.9.4, respectively). Product specifications for the woven geotextile used are provided in Appendix I.

#### **4.5 Management of Construction Wastewaters**

Entact was responsible for construction wastewater management for OU-3 during the performance of the remedial action from the following sources:

- runoff from disturbed areas;
- runoff from stockpiles;
- “maintenance dewatering”; and
- various on-site decontamination activities.

To clarify, “maintenance dewatering” specifically involved pumping of residual water to the temporary construction wastewater treatment facility, as necessary, within the targeted area of concern at “low tide” to facilitate ongoing dredging and backfilling of the Embayment Area.

A temporary wastewater treatment facility was constructed in accordance with the NYSDEC-approved WWHP to treat all construction wastewater generated during the performance of the Work. The temporary treatment facility was installed in the portion of the Site identified in As-Built Drawing AB-2 (Appendix G) and contained the following components:

- one primary 21,000 gallon influent tank;

- bag filtration at 10 microns;
- two (2) 1,000 pound carbon absorption units; and
- one 21,000 gallon effluent tank.

Throughout the performance of the work, approximately 70,000 gallons of construction wastewater was intermittently pumped to the influent tank in batches and subsequently pumped for treatment through a series of 10 micron filter bags, carbon treatment vessels and eventually discharged into the effluent holding tank. Once containerized in the effluent holding tank, a total of five treated effluent wastewater samples were collected on a bi-monthly basis that corresponded to each batch of construction wastewater generated when the treatment system was operational. Each sample was analyzed prior to discharging each respective batch of treated wastewater to the NYSDEC-approved location in the Embayment Area as required by the Site-specific SPDES Permit Equivalent (Appendix E). The analytical results of the samples collected are provided in Appendix H and were below all specified treatment levels that are also referenced in the Site-specific Equivalent SPDES Permit (Appendix E).

Prior to demobilizing the influent frac tank, the residual solids in the influent frac tank, the spent carbon media and used bag filters were disposed with the non-hazardous sediments shipped off-site as discussed in Section 4.10 of this FER.

#### **4.6 Temporary Road Construction, Sediment Excavation and On-Site Stabilization**

Construction of temporary haul roads/ embayment finger roads, sediment dredging and on-Site stabilization are discussed in the following subsections of this FER.

##### **4.6.1 Temporary Haul Road/ Embayment Finger Road Construction and Removal**

To facilitate dredging within all limits of the Embayment Area, a temporary haul road and embayment area finger roads were generally constructed consistent with Section 7.2 of the NYSDEC-approved WWHP. The temporary haul road was connected to the sediment staging area by the Site Access Road (refer to Section 4.4.4). The temporary haul road was extended to the west as the excavation proceeded along the roadway foot print allowing access to the western most portion of the impacted area. As work progressed across the Embayment Area, temporary

embayment finger roads were constructed connecting the temporary haul road to points south within the embayment, providing access for a standard long reach excavator as well as transport routes back to the sediment staging area. The actual locations of the temporary haul road and embayment finger roads installed during the performance of the Work are shown on As-Built Drawing AB-2 (Appendix G).

The temporary haul road and embayment finger roads were constructed using biaxial geogrid (embayment finger road only), high strength woven geotextile, 2.5-inch stone (refer to Section 4.9.4) and wooden swamp mats. The embayment finger roads were prepared by placing the biaxial geogrid on the subgrade during low tide and placing the stone over the geogrid. The geogrid used was a Fornit 20 Geogrid manufactured by Huesker, Inc. located in Charlotte, North Carolina. The high strength woven geotextile was a Comtrac P 80/80 geotextile also manufactured by Hueseker, Inc. Product specifications for the geogrid and high strength woven geotextile are provided in Appendix I.

Initially, Entact was planning to install a series of under drains across the main channel within the Embayment Area using 18 inch corrugated HDPE pipe as shown on Figure 9, Detail 4 of the NYSDEC-approved WWHP. However, as documented in the December 30, 2009 email to the NYSDEC (Appendix B), the under drain for the embayment finger road installed parallel to Arthur Kill Road was modified. The improvements to the construction of the under drain channel (i.e., adding an additional pipe and increasing the diameters of the pipes) were implemented to expedite and aid in working with low tide conditions in and around the main channel. These actions were also a proactive measure to accommodate additional storm surges. These efforts improved Entact's capability to continue working at low tide, for as long as possible, without the need for additional bypass pumping or handling increased amounts of construction waters.

As sediment removal in an area was completed the portion of corresponding temporary haul road or temporary embayment finger road servicing that area was removed. During this process, Entact continuously reused salvageable stone to create new finger roads as work progressed across the Embayment Area. At the conclusion of the sediment removal process the temporary



embayment finger road system and temporary haul road were removed to the extent practical. Stone and geotextile were removed provided that the removal effort did not require the gross removal of underlying sediments. The recovered stone and geotextile was disposed of off-site as discussed in Section 4.10 of this FER. All material remaining in place was capped with a minimum of twelve inches of clean off-site sand as discussed in Section 4.7 of this FER.

#### **4.6.2 Sediment Excavation**

Excavation within OU-3 was performed utilizing traditional long reach excavators from the temporary haul roads and embayment area finger roads after the segmented portions to be remediated were isolated, bypassed and dewatered, if applicable. A total of 2,838.58 in-place cubic yards of sediment, including allowable overdredge, were removed to a minimum depth of 1 foot from the Embayment Area within OU-3. Final excavation elevations along with the final horizontal limits of remediation are depicted on As-Built Drawing AB-3 (Appendix G). The corresponding location of each excavation depth depicted is presented in a spreadsheet that is also provided in Appendix G. Removed sediments were loaded into off-road dump trucks, temporarily staged and stabilized in the sediment staging area prior to off-site disposal.

#### **4.6.3 Stabilization of Dredged Sediments**

All sediment excavated from the Embayment Area was placed in the on-site sediment staging area located north of the Embayment Area as shown in As-Built Drawing AB-2 (Appendix G). Prior to off-site disposal, the excavated sediment was dewatered and then stabilized consistent with the requirements of the NYSDEC-approved WWHP with the specified stabilizing agent, Calciment as manufactured by Mintek Resources, Inc. located in Beavercreek, Ohio.

#### **4.7 Backfilling of Embayment Area**

Following sediment removal and grading, a minimum of one foot of sand backfill was installed in the excavated areas within the Embayment Area. The Work was performed utilizing traditional long reach excavators from the shoreline and embayment area finger roads after the segmented portions to be remediated were isolated, bypassed, dewatered and excavated. Final backfill elevations along with the final horizontal limits of remediation are depicted on As-Built Drawing AB-4 (Appendix G). The corresponding location of each backfill elevation depicted is

presented in a spreadsheet that is also provided in Appendix G. A total of 3,017.20 in-place cubic yards of off-site sand were utilized to backfill the Embayment Area.

All soil/ sand imported to the site was compared with the chemical criteria presented in Table 1. Chemical and physical testing and related certifications for imported sand are discussed in Section 4.9.2 of this FER.

## **4.8 Site Restoration**

As part of Site restoration activities, the littoral zone; wetland, wetland adjacent and upland areas; and the on-site gravel access road were backfilled, graded and restored as discussed in the following subsections of this FER.

### **4.8.1 Restoration of Littoral Zone**

During the performance of the remedial action, the littoral zone was disturbed as the temporary haul road was constructed. Accordingly, the littoral zone was restored, as the temporary haul road was removed, with sand and topsoil to the grades shown on As-built Drawing AB-5 (Appendix G). The amount of topsoil and sand installed in the littoral zone was not quantified during the performance of the Work. All soil/ sand imported to the site was compared with the chemical criteria presented in Table 1. However, chemical and physical testing and related certifications for all imported topsoil and sand are specifically discussed in Section 4.9 of this FER.

### **4.8.2 Restoration of Disturbed Wetlands**

Due to the close proximity of planned remediation activities to jurisdictional wetland areas, disturbances were unavoidable in certain areas of the site during the performance of the remedial action. In accordance with the NYSDEC-approved Wetland Mitigation Plan and the subsequent Addendum dated November 16, 2006, wetland restoration was performed at a 1:1 ratio for temporarily disturbed wetland areas. The specific cause of each “unavoidable” wetland disturbance and a summary of Entact’s efforts to restore these disturbances consistent with the requirements specified in its NYSDEC-approved WWHP are provided below.

#### **4.8.2.1 Cause of Temporary Wetland Disturbances**

The wetland areas that were disturbed during the performance of the Work were primarily caused by the construction of the main temporary haul road along the northern edge of the Embayment Area as discussed in Section 4.6 above. In addition, a secondary area was disturbed during the performance of the Work as part of Entact's efforts to remove one of its excavators from the Embayment Area that accidentally slid off of the main haul road during its construction. Because Entact could not immediately remove the Excavator on October 20, 2009 when the incident occurred, Entact immediately installed preemptive controls such as sausage booms and turbidity barrier around the stuck excavator. No leak was observed in the vicinity of the stuck excavator, within the limits of the sausage booms. Entact eventually utilized a total of five wrecker tow trucks to facilitate the removal of the stuck excavator on October 21, 2008, which resulted in some wetland disturbance. Once the excavator was removed from the Embayment Area, Entact utilized a bay crane to relocate the removed excavator to the slack drying area in preparation for its demobilization from site on October 23, 2009. The details of the incident were specifically documented in Monthly Progress Report No. 20 (Appendix D).

#### **4.8.2.2 Summary of Efforts to Restore Temporary Disturbed Wetland Areas**

As part of the wetland restoration effort, an uncompacted, 12-inch topsoil layer was installed over the existing subgrade between the 1-foot and 4-foot elevations across temporary disturbed wetland areas. Entact's subcontractor, Enviroscapes, Inc. ("Enviroscapes"), installed goose exclusion fencing around the perimeter of the areas to be restored. The actual limits of the goose exclusion fencing/ restored wetland areas are shown on As-Built Drawing AB-5 (Appendix G). The low and high marsh areas were restored with the specified seed and plants for each respective area. Tables 2 and 3 provide complete details on the vegetation species (common name and scientific name), planting/ seeding density (for each of the selected species), and plant/ seeding quantity for the low marsh and high marsh areas, respectively. The percentage of actual species planted within each respective low marsh and high marsh area deviated from the NYSDEC-approved Wetland Mitigation Plan and subsequent Addendum due to lack of availability for certain types of plants. Specifically, *Juncus gerardii* was replaced with additional quantities of *spartina patens* and *distichlis spicata*.

All soil/ sand imported to the site was compared with the chemical criteria presented in Table 1. Chemical and physical testing for imported topsoil utilized for the topsoil layer is discussed in Section 4.9.1.

#### **4.8.3 Restoration of Wetland Adjacent and Upland Areas**

Prior to disturbance and mobilization to OU-3 by Entact, Kelly Brothers Tree Care, Inc. (“Kelly Brothers”) conducted a field survey of the trees greater than three inches in diameter located within the proposed limits of disturbance; a total of 280 trees were identified. The following dominant species were observed: sassafras and American locust. The subdominant species observed included red maple, hackberry, cottonwood, choke cherry, catalpa, and mulberry.

In preparation for the performance of Site restoration activities, a restoration plan for wetland adjacent and upland areas was prepared and submitted to the NYSDEC on February 20, 2009 for review and consideration (Appendix B). The plan recommended that the following trees be used to restore the Site: sassafras, hackberry, red maple, sweet gum, pin oak, gray birch, eastern red cedar, and red mulberry. However, based on email feedback from the NYSDEC on March 5 and 12, 2009 (Appendix A), red maple, grey birch and hackberry species were removed from the list of species to be used. Informal NYSDEC approval was provided for the proposed tree restoration plan in the March 12, 2009 email from the NYSDEC (Appendix A). Other species identified during the Kelly Bros field survey that were not selected for replanting include American locust (black locust), cottonwood, choke cherry, and catalpa. Black locust and cottonwood trees are native to New York; however, they are considered invasive. Choke cherry trees are highly susceptible to black knot disease and serve as hosts trees for the tent caterpillar, which is a pervasive pest of the northeast. Catalpa trees although native, are not typically commercially available. Ultimately, species were selected from the Kelly Brothers survey in addition to native tree species that either were observed by Roux Associates during a previous Site survey or are known to grow locally as summarized in Table 2. These species included marsh elders, groundsel bushes, pin oaks, sweet gums, black gums, cottonwoods, and eastern red cedars.

Once the tree restoration plan was formally approved by the NYSDEC, approximately 34,625 square feet of wetland adjacent and upland areas were regraded with on-site fill to the contours shown on As-Built Drawing AB-5 (Appendix G). Once the areas were regraded, they were seeded at a rate of 20 pounds per acre above the 4-foot elevation in accordance with the following mix rate: 25% switchgrass, 25% annual ryegrass, and 50% northeast wildflower mix. Erosion control matting (ECS-2B) as manufactured by EastCoast Erosion Blankets, Bernville, Pennsylvania was subsequently installed to protect the newly seeded areas. Product specifications for the erosion control matting are provided in Appendix I.

Once the area was seeded, the wetland adjacent and upland areas were planted as noted in Table 2, which provides complete details on the vegetation species (common name), approximate planting/seeding density, and total seed/plant quantity installed.

#### **4.8.4 Restoration of Gravel Access Road**

As part of Site restoration activities, wetland adjacent and upland areas were regraded and a gravel access road, with an average width of 25 feet, was concurrently installed across the property as shown on Drawing AB-5 (Appendix G) to facilitate future access across the Site. Off-site DGA was imported and placed within the limits of the gravel access road.

Physical testing for imported DGA utilized for the stone cover layer is discussed in Section 4.9.3.

#### **4.9 Off-Site Fill Materials**

During the performance of the remedial action for OU-3, several types of fill materials were imported and placed on-site as discussed in this FER. This section of the FER discusses the chemical and physical quality, where applicable, of the following fill materials utilized during the performance of the remedial action.

- 330 total cubic yards of topsoil from Nature's Choice Belvidere, New Jersey site;
- 5,635.69 tons of sand from Amboy Aggregates Facility located in South Amboy, New Jersey;
- 2,464.76 tons of DGA from Stavola Company, Inc.'s ("Stavola") quarry located in Bridgewater Township in New Jersey; and

- 4,924.53 tons of 2.5-inch stone from Stavola's quarry located in Bridgewater Township in New Jersey.

Clean fill certifications for all imported topsoil, sand, DGA, and 2.5-inch stone are provided in Appendix J. Chemical and physical data for each type of material, where applicable, is discussed in the following subsections of this FER.

#### **4.9.1 Imported Topsoil from Nature's Choice**

Three hundred thirty cubic yards of topsoil was imported from a clean, virgin source, which was provided by Nature's Choice Facility located in Belvidere, New Jersey. The facility was formerly a farm and has since been operated as a supplier of organic landscaping products facility for 15 years.

A total of one pre-qualification and two post-qualification samples from the proposed topsoil source were collected and analyzed for VOCs, semi-volatile organic compounds ("SVOCs"), metals, polychlorinated biphenyls ("PCBs") and pesticides/ herbicides with the respective analytical results being summarized in Tables 4 through 8. The analytical data reports are included in Appendix K for this fill material source. The clean fill certification is provided in Appendix J.

All chemicals of concern were below NYSDEC TAGM 4046 RSCOs cited in the remedial design or below the Part 375 unrestricted standards from the Nature's Choice topsoil site. For reference purposes, minor detections for chemical parameters (benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, cadmium and chromium) that exceeded NYSDEC TAGM 4046 RSCOs; but are below Part 375 unrestricted standards, are highlighted in bold, where applicable, in Tables 4 through 8.

The representative physical data reports (Appendix L) for the topsoil from the Nature's Choice site indicated the following:

- The organic content of 6.85% is within specified acceptable range of 6 to 12%.
- The percent of topsoil material passing the No. 10 Sieve is 73.5%, which is below the minimum specification requirement of 90%.

- The percent of sand is 53.9%, which is slightly below the acceptable upper limit of 55%.
- The percent of clay is 8.3%, which is slightly below the acceptable lower limit of 12%.

All of the imported topsoil was utilized within the limits of OU-3. The topsoil was utilized for several purposes (i.e., restoration of disturbed wetland areas and the littoral zone) during the performance of the remedial action for OU-3. Therefore, an allocation between the quantity and quality of topsoil used for individual elements of the remedial action within OU-3 cannot be made in this FER. The delivery tickets for all imported fill materials are provided in Appendix M.

#### **4.9.2 Imported Sand**

5,635.69 tons of sand was imported from a clean, virgin source, which was provided by Amboy Aggregates' Facility located at Block 161, Lot 25, 175 Main Street, City of South Amboy, County of Middlesex, New Jersey. The imported sand originated from the Ambrose Channel in Lower New York Bay under Federal Permit No. 2001-00492 and NJDEP Permit No. 84-0745.

A total of one pre-qualification and three post-qualification samples from the proposed sand source were collected and analyzed for VOCs, SVOCs, metals, PCBs and pesticides/ herbicides with the respective analytical results being summarized in Tables 4 through 8. The respective analytical data reports are included in Appendix K for this fill material source. The respective clean fill certification is provided in Appendix J.

All chemicals of concern were below NYSDEC TAGM 4046 RSCOs cited in the remedial design or below the Part 375 unrestricted standards. In addition, the chemicals of concern, where applicable, were also below the standards for "Class A Sediments" as defined in Table 2 (excluding dioxin) of the guidance document titled "Division of Water ("DOW") Technical Operational Guidance Series ("TOGS") 5.1.9: In-Water and Riparian Management of Sediment and Dredged Material". For reference purposes, minor detections for chemical parameters (benzo(a)pyrene) that exceeded TAGM 4046 RSCOs; but are below Part 375 unrestricted standards, are highlighted in bold, where applicable, in Tables 4 through 8.

The representative physical data reports (Appendix L) for the sand from the Amboy Aggregates' Facility indicated the following:

- Percent of sand passing the No. 200 Sieve is 1.8%, which is within the specified range of 0 to 5%.
- Percent of sand passing the No. 100 Sieve is 17.9%, which is slightly higher than the specified range of 4 to 15%.
- Percent of sand passing the No. 10 Sieve is between 97.7 and 98.2%, which is slightly higher than the specified range of 85 to 95%.
- Percent of sand passing the No. 4 Sieve is 99%, which is slightly below the specified 100% requirement.

All of the imported sand was utilized within the limits of OU-3. The sand was utilized for several purposes (i.e., backfilling of Area A and restoration of the adjacent littoral zone) during the performance of the remedial actions for OU-3; therefore, an allocation between the quantity and quality of sand used for individual elements of the remedial action within OU-3, cannot be made in this FER. The delivery tickets for all imported fill materials are provided in Appendix M.

#### **4.9.3 Imported Dense Graded Aggregate**

2,464.76 tons of DGA was imported from a clean, virgin source, which was provided by Stavola's Facility located at Block 6.01, Lot 711 in Bridgewater Township, New Jersey. The respective clean fill certification is provided in Appendix J.

Consistent with the requirements of the Final Design Documents, no chemical analysis was required or performed for any imported DGA. The representative physical data report for this fill material is provided in Appendix L.

Imported DGA from Stavola was utilized for several purposes (improvement of preconstruction on-site and off-site gravel access roads and construction of the Site access road, the slack drying area, laydown areas for temporary facilities and the stabilized construction entrance/ exit) during the performance of the remedial action for OU-3; therefore, an allocation between the quantity of



DGA used within individual elements of the remedial action within OU-3, cannot be made in this FER. The delivery tickets for all imported fill materials are provided in Appendix M.

#### **4.9.4 Imported 2.5-Inch Stone**

A shipment of 4,924.53 tons of 2.5-inch stone was imported from a clean, virgin source, provided by Stavola's Facility located in Bridgewater Township, New Jersey. The respective clean fill certification is provided in Appendix J.

Consistent with the requirements of the Final Design Documents, no chemical analysis was required or performed for any imported 2.5-inch stone. The representative physical data report for this fill material is provided in Appendix L.

Imported 2.5-inch stone was utilized for several purposes (construction of temporary haul roads/ embayment area finger roads, Site access road, the slack drying area and the stabilized construction entrance/ exit) during the performance of the remedial action for OU-3; therefore, an allocation between the quantity 2.5-inch stone used within OU-3 cannot be made in this FER. The delivery tickets for all imported fill materials are provided in Appendix M.

#### **4.10 Waste Transportation and Disposal**

All C&D debris, bulky waste, and tires generated/ recovered during the performance of the remedial action by Entact was transported and disposed at an appropriate recycling facility/ transfer station. In addition, the following contaminated wastes were generated, transported, and disposed at appropriate treatment, storage and disposal facilities ("TSDFs") during the performance of the remedial action:

- Non-hazardous sediments;
- Non-hazardous spent carbon media and bag filters; and
- Non-hazardous impacted stone.

All TSDFs were permitted by the State in which the TSDF is located. The haulers of all wastes were permitted and licensed to transport wastes in New York and all localities and states through which they transported the wastes. All transporters, where applicable, were permitted in

accordance with United States Department of Transportation (“USDOT”), state and local requirements, and possessed an EPA identification number. All vehicles used for the transportation of wastes, where applicable, were also in conformance with requirements of all states through which the wastes were transported. All applicable manifesting and placarding transportation requirements were implemented. In accordance with the Final Design Documents, all trucks were visually inspected by Entact and Roux Associates on-site personnel and properly decontaminated prior to leaving the VCA Property.

Entact coordinated the transportation and disposal of all C&D debris, bulky waste and tires, non-hazardous sediments, non-hazardous spent wastewater media and non-hazardous stone generated/ recovered during the performance of their component of the RA performed at the VCA Property, as discussed below. For reference purposes, a summary of all waste shipped off-site by Entact is presented in Table 9 through 11.

#### **4.10.1 Construction and Demolition Debris and Bulky Waste**

A summary of the C&D debris, bulky waste and tires recovered/generated, transported and disposed of off-site during the course of the remediation project for OU-3 and general Site cleanup of the property owned by the NYCDEP is provided below:

- 40 cubic yards of tires (2 loads); and
- 110 cubic yards of miscellaneous C&D debris and bulky waste (4 loads).

All tires, C&D debris, and bulky waste was transported by R. Cipriano, Inc. with its headquarters located in Staten Island, New York to Gaeta Recycling located in Staten Island, New York. The disposal tickets for each shipment of C&D debris are provided in Appendix N.

#### **4.10.2 Non-Hazardous Solid Waste**

A summary of the non-hazardous waste generated, transported, and disposed of off-site during the course of the remediation project for OU-3 is provided below:

- 5,964.15 tons of non-hazardous sediments, including 2,000 pounds of spent carbon and used filter bags) generated from the remediation of the Embayment Area was transported and disposed of at Waste Management’s GROWS North (“GROWS”) Facility located in Morrisville, Pennsylvania; and

- 2,322.38 tons of non-hazardous impacted stone generated in support of the remediation of the Embayment Area was transported and disposed of at the Burlington County Resource Recovery (“Burlington”) Facility, Columbus, New Jersey.

All non-hazardous sediment was transported by Battal Trucking, LLC with headquarters located in Wayne, New Jersey. All non-hazardous stone was transported by West Shore Trucking, Inc. with headquarters located in Staten Island, New York. The disposal documentation for the non-hazardous materials shipped to the GROWS and Burlington Facilities are provided in Appendices O and P, respectively. For reference purposes, the respective waste characterization data is provided in Appendix Q.

#### **4.11 Surveying and As-Built Drawings**

Surveying was performed throughout the Work to document as-built conditions for all elements of the Work performed for the Site. The surveying was performed by Lockwood, Kessler & Bartlett, Inc. (“LKB”), a New York State-certified surveyor, under the direction of Entact. The as-built drawings for OU-3 are provided in Appendix G.

#### **4.12 Equipment Decontamination**

All equipment that came into contact with impacted areas of OU-3 was decontaminated prior to removal from the site. Disposal vehicles were loaded in non-impacted areas of OU-3 and therefore did not require decontamination. Equipment decontamination certificates are provided in Appendix R.

#### **4.13 Demobilization**

Once all remedial activities were completed, Entact proceeded to demobilize from the site on May 6, 2009. As part of these efforts, the following major tasks were performed:

- All temporary utilities (electric and telephone) were disconnected.
- All major equipment was decontaminated and demobilized from the Site.
- All major temporary controls and facilities (engineering trailer, construction trailer, union trailer, erosion and sedimentation controls, slack drying and sediment stabilization area, water treatment system, sanitary units, trash units, equipment decontamination pad, etc...) were dismantled and removed from the Site.

- One storage container (with unused geotextiles, unused media, etc... from the remedial action performed on OU-1) located below Page Avenue Bridge was removed from the Site.
- All health and safety monitoring and sampling supplies and equipment, temporary work zone barriers, temporary construction fencing and soil erosion and sedimentation control measures were removed from the site.
- Perimeter jersey barriers and a locking gate were installed along the eastern portion of the property, parallel to Arthur Kill Road.
- A 12-inch diameter HDPE culvert was installed below the on-site gravel road at the western portion of the Site as shown on As-Built Drawing AB-5 (Appendix G).

#### **4.14 Implementation of Site Management Plan**

The Site contains residual contamination in soil and groundwater left after completion of the remedial action performed under the VCP. Engineering Controls have been incorporated into the remedy to provide proper management of residual contamination in the future to ensure protection of public health and the environment. A Site-specific Declaration of Covenants and Restrictions (“deed restriction” or the Declaration) will be recorded with the Richmond County Clerk that provides an enforceable means to ensure the continued and proper management of residual contamination and protection of public health and the environment. It requires strict adherence to all Engineering Controls (“ECs”) and all Institutional Controls (“ICs”) placed on the Site by the grantor of the deed restriction and any and all successors and assigns of the grantor. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs.

Site management is the last phase of the remedial process and is triggered by the approval of the Final Engineering Report and issuance of the VCA Release and Covenant Not to Sue (“VCA Release”) by NYSDEC. The SMP continues in perpetuity or until extinguished in accordance with 6NYCRR Part 375. It is the responsibility of the deed restriction grantor, and its successors and assigns to ensure that all Site Management responsibilities under the SMP are performed.

The SMP provides a detailed description of all procedures required to manage residual contamination at the Site following the completion of the Remedial Action. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls;

(2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain all treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

The ICs on the Site (“Controlled Property”) include:

- Compliance with the Declaration of Covenants and Restrictions and this SMP by the Grantor and the Grantor’s successors and assigns.
- All Engineering Controls must be operated and maintained as specified in this SMP.
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP.
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP.
- Unless prior written approval by the NYSDEC or if the Department shall no longer exist, any New York State agency or agencies subsequently created to protect the environment of the State and the health of the State’s citizens (hereinafter referred to as “the Relevant Agency”) is first obtained, there shall be no construction, use, or occupancy of the Site that results in the disturbance or excavation of the Site which threatens the integrity of the composite cover system, or which results in unacceptable human exposure to contaminated soils.
- The Controlled Property may be used for restricted industrial/restricted commercial use only (not including day care, child care, and medical care) provided the long-term Engineering and Institutional Controls included in the SMP remain in use without the express written waiver of such prohibition by the NYSDEC or other Relevant Agency.
- The owner of the Site shall maintain the sand cap, where appropriate, or after obtaining the written approval from the Relevant Agency, by modifying with alternative materials.
- Vegetable gardens and farming on the Controlled Property are prohibited.
- The site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from previous certification or that any changes to the controls were approved by the NYSDEC; and (2) nothing has occurred that impairs the ability of the controls to protect public health and the environment or that constitute a violation or failure to comply with the SMP.

- NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually or at an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.
- The owner of the Site shall prohibit the use of the groundwater underlying the Site without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Relevant Agency.
- The Declaration is and shall be deemed a covenant that shall run with the land and shall be binding upon all future owners of the Site and shall provide that the owner, and its successors and assigns, consent to the enforcement by the Relevant Agency, of the prohibitions and restrictions that Paragraph X of the VCA requires to be recorded and hereby covenants not to contest the authority of the Department to seek enforcement.
- Any deed of conveyance including the portion of the Site referred to as the Site shall recite that the said conveyance is subject to the Declaration of Covenants and Restrictions.

A description of the engineering controls, institutional controls, and post-remediation Operation, Maintenance and Monitoring (“OM&M”) associated with the site are presented in the site-specific SMP for OU-3 provided in Appendix S. The executed copy of the Declaration of Covenants and Restrictions is provided in Appendix T.

## **5.0 DEVIATIONS FROM THE APPROVED REMEDIAL DESIGN**

Nassau Metals has completed the implementation of the Remedial Action for the Nassau Metals-owned portion of Site No. V-00159-2, which is designated as OU-3, located in Staten Island, New York. In accordance with the requirements of the VCA (No. W2-0801-01-04, dated January 4, 2002) between the NYSDEC and Nassau Metals, Remedial Engineering, P.C. certifies that the remedial action was implemented in accordance with the NYSDEC-approved Specifications, Project Plans and Contract Documents dated February 14, 2006, with the exceptions noted in this FER. The exceptions noted in this FER are listed below and discussed in Section 4. Minor modifications to the remedy that did not change the essential elements of the remedy are also discussed throughout Section 4.

As discussed in Section 2.6, bidding documents and respective contract addenda were reissued for the remediation of OU-3. However, the July 11, 2007 and December 8, 2007 versions of the bidding documents and related addendums issued during the rebidding process did not change the essential elements of the remedy. Each document was specifically modified to only address the remediation of OU-3 and to incorporate technical requirements regarding off-site disposal of excavated sediments since consolidation of the excavated sediments within the Soil-GCL Cap located in OU-1 would no longer be an option under this scenario.

### **5.1 Exceptions to Design Documents**

The following list includes exceptions to the Final Design Documents applicable to OU-3 and identifies sections within this FER where these exceptions are discussed. The NYSDEC has been notified and has approved these exceptions, as appropriate.

- Discharge of treated water to the Arthur Kill Waterway was permitted during the performance of the Work (Section 4.1).
- Off-site disposal of excavated sediments was permitted with the approval of the WWHP (Section 4.2).
- An isolated dust monitoring exceedance was managed during the performance of the Work on November 20, 2008 (Section 4.3.1).
- Modifications to the NYSDEC-approved Wetland Mitigation Plan were issued in the form of an Addendum issued November 16, 2007 to the NYSDEC. The Addendum was issued to memorialize discussions and agreements regarding modifications to the wetland mitigation plan to address NYSDEC comments from a letter dated June 23, 2006,

additional issues discussed during the October 4, 2006 project kickoff meeting and telephone and email correspondence in October and November 2006.

- Use of topsoil from the Nature's Choice site. For reference purposes, minor detections for chemical parameters (benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, cadmium and chromium) that exceeded NYSDEC TAGM 4046 RSCOs; but are below Part 375 unrestricted standards, are highlighted in bold, where applicable, in Tables 4 through 8 (Section 4.9.1).
- Use of sand from the Amboy Aggregates site. For reference purposes, minor detections for chemical parameters (benzo(a)pyrene) that exceeded NYSDEC TAGM 4046 RSCOs; but are below Part 375 unrestricted standards, are highlighted in bold, where applicable, in Tables 4 through 8 (Section 4.9.2).