PHASE 2 DREDGING CONSTRUCTION QUALITY CONTROL/QUALITY ASSURANCE PLAN FOR 2011

Appendix A

to

Remedial Action Work Plan for Phase 2 Dredging and Facility Operations in 2011

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ACRONYMS AND ABBREVIATIONS

CD	Consent Decree
CHASP	*Community Health and Safety Plan*
CM	Construction Manager
COC	Chain-Of-Custody
CQAO	Construction Quality Assurance Officer
CQAP	Construction Quality Control and Quality Assurance Plan
CQCP	Contractor Quality Control Plan
CU	Certification Unit
D&FO	Dredging and Facility Operations
DQAP	2011 Dredging Construction Quality Control/Quality Assurance Plan
EIT	Engineer-in-Training
EPA	United States Environmental Protection Agency
FDR	Final Design Report
FE	Field Engineer
FI	Field Inspector
GE	General Electric Company
GPS	Global Positioning System
O&M	Operations and Maintenance
PE	Professional Engineer
PFOC	Processing Facility Operations Contractor
HCC	Habitat Construction Contractor
RYOC	Rail Yard Operations Contractor
NCR	Noncompliance Report
NICET	National Institute for Certification in Engineering Technologies
Parsons	Parsons Engineering of New York, Inc.
PCB	Polychlorinated Biphenyl
PSCP	Performance Standards Compliance Plan
QA	Quality Assurance

ACRONYMS AND ABBREVIATIONS (CONTINUED)

QC	Quality Control
QC/QA	Quality Control And Quality Assurance
QCM	QC Systems Manager
QMP	*Quality Management Plan*
QoLPS	Quality of Life Performance Standards
RA	Remedial Action
RAM QAPP	*Remedial Action Monitoring Quality Assurance Project Plan*
RAWP	Remedial Action Work Plan
RFW	Riverine Fringing Wetland
ROD	Record of Decision
RTK DGPS	Real Time Kinematic Differential Global Positioning System
SAV	Submerged (and floating) Aquatic Vegetation
SM	Site Manager
SOP	Standard Operating Procedure
SOW	Statement of Work
TDP	Transportation and Disposal

SECTION 1

INTRODUCTION

In 2005, the General Electric Company (GE) and the United States Environmental Protection Agency (EPA) executed a Consent Decree (CD) relating to the performance of the Remedial Action (RA) selected by EPA to address polychlorinated biphenyls (PCBs) in sediments of the Upper Hudson River, located in New York State, through dredging, as described in EPA's February 2002 Record of Decision (ROD) for the Hudson River PCBs Superfund Site (EPA, 2002). The CD was filed in federal district court on October 6, 2005 (EPA/GE, 2005) and was approved and entered by the court as a final judgment on November 2, 2006, when it went into effect.

In accordance with the ROD and the CD, the RA was to be conducted in two phases. Phase 1 was defined as the first year of dredging and was conducted by GE in 2009. Phase 2 consists of the remainder of the dredging project. The CD provided an option to GE, following EPA's decision regarding the Performance Standards and scope of Phase 2, as to whether to elect to perform Phase 2 under the CD. EPA issued its decision regarding the Performance Standards and scope of Phase 2 in December 2010; and GE has elected to perform Phase 2 under the CD.

The CD includes, as Appendix B, a Statement of Work (SOW) for Remedial Action and Operations, Maintenance and Monitoring, which sets forth a number of general requirements for the RA and includes several attachments specifying requirements for various aspects of the RA. EPA issued revised versions of the SOW and its attachments for Phase 2 in December, 2010 (EPA, 2010). For the work to be performed in each construction year of Phase 2, Section 3.1 of the revised SOW requires GE to submit a Remedial Action Work Plan (RAWP) for Phase 2 Dredging and Facility Operations for such year, along with any remaining design documents (or revisions or addenda to previously approved design documents) for the dredging and related operations to be performed in that year. The revised SOW also specifies a number of specific plans to be included in the Phase 2 RAWP, including a Phase 2 Dredging Construction Quality Control/Quality Assurance Plan.

This *Phase 2 Dredging Construction Quality Control/Quality Assurance Plan for 2011* (2011 DQAP) has been developed in accordance with the revised SOW. This 2011 DQAP is an appendix to and part of the *Remedial Action Work Plan for Phase 2 Dredging and Facility Operations in 2011* (2011 RAWP). It describes the quality control and quality assurance systems that will be established and followed to verify compliance with the technical specifications included in the Phase 2 design for 2011, as approved by EPA. GE submitted on March 15, 2011, the *Phase 2 Final Design Report for 2011* (2011 FDR) containing GE's design plans and technical specifications for the 2011 season of Phase 2.

This 2011 DQAP covers the following activities to be performed during 2011: (a) operation of the sediment processing facility, to be performed pursuant to Contact 30 by the Processing Facility Operations Contractor (PFOC); (b) dredging, transport of dredged material to the processing facility, backfilling/capping, and related in-river operations, to be performed pursuant to Contract 40 by the

Dredging Contractor; (c) habitat construction activities, to be performed pursuant to Contract 50 by the Habitat Construction Contractor (HCC); and (d) operation of the rail yard, to be performed pursuant to Contract 60 by the Rail Yard Operations Contractor (RYOC). These activities are sometimes jointly referred to herein as Dredging and Facility Operations (D&FO).

The term construction is used throughout the DQAP and refers to the dredging, facility operations, and related field activities required by the CD.

1.1 QUALITY PROGRAM OVERVIEW

GE's approach to management of the quality of the RA implementation includes an integrated system of quality control (QC) by its contractors and quality assurance (QA) by its Construction Manager (CM). This 2011 DQAP details the QC and QA systems and controls that GE has put in place so that the quality of the project work in 2011 will meet the requirements specified in the 2011 FDR. GE provides definition and overall management of the quality approach to be followed by its contractors and consultants. GE's CM is responsible for the day-to-day coordination of QA and QC measures in the field.

This 2011 DQAP is Appendix A and a companion document to 2011 RAWP. It establishes project procedures and general responsibilities for the QC/QA program to verify that the 2011 dredging operations, facility operations, and habitat construction will be executed in accordance with the relevant portions of the 2011 FDR.

The contractors are responsible for constructing the work in accordance with the plans and specifications. Each contractor is also responsible for controlling the quality of its work to meet contract plans, specifications, and related requirements. The contractor's QC is the systematic implementation of a program of inspections, tests, and production controls to attain the required standards of quality and to preclude problems resulting from noncompliance. Pursuant to Technical Specification Section 01450 (Quality Control), each contractor will establish an independent QC program and prepare a Contractor Quality Control Plan (CQCP). Each contractor's CQCP will provide for tests and inspections pursuant to various technical specifications. It will define QC and QA procedures to be implemented so that activities affecting quality are properly documented and accomplished in accordance with contract documents; written instructions; and industry standards, codes and procedures. Furthermore, the CQCP will define methods for documenting that activities affecting quality will be accomplished under controlled conditions.

Independently of the contractors, the CM will provide QA through daily monitoring and scheduled inspections to verify the effectiveness of the contractor's QC program and confirm that the quality and contract requirements are met by the contractors. The CM will confirm that the contractors' QC systems are working effectively and that the resultant construction/operation activities comply with the quality requirements established by the contracts.

1.2 DQAP OBJECTIVES

The objectives of this DQAP are to:

- Describe the quality program and organization to be implemented to verify that the project is constructed in accordance with the contract requirements and industry standards;
- Describe guidelines for inspection and documentation of construction/operational activities;
- Provide approaches and methods to confirm that the completed work will meet or exceed the requirements of the construction drawings and specifications; and
- Establish a process for detecting, documenting and addressing unexpected changes or conditions that could affect the construction/operation quality during 2011 D&FO.

The 2011 D&FO activities covered by this DQAP include the following:

- Removal of in-river debris and trim/remove shoreline vegetation to facilitate dredging;
- Dredging, loading, and barge transport of sediments to the processing facility;
- Backfilling or capping as required in dredged areas;
- Habitat construction as required in dredged areas;
- Dredged material offloading and dewatering for shipment;
- Treatment and discharge of water separated from sediment;
- Loading of dewatered sediment and debris onto rail cars for transport and disposal; and
- Operation of the rail yard for loading and preparation for shipment.

Specifications for the above-listed operations are provided in four separate contracts (30, 40, 50, and 60) that are described in Section 1.2 of the 2011 RAWP.

1.3 QUALITY MANAGEMENT PLAN

As GE's managing contractor, Parsons Engineering of New York, Inc. (Parsons) has been retained as CM for this project. Parsons will carry out work on this project in accordance with the Parsons Quality Management Plan (QMP) (Parsons, 2005), which was submitted to EPA on November 1, 2005.

1.4 2011 DQAP ORGANIZATION

Consistent with the requirements in Section 3.1.1 of the revised SOW (cross-referencing to Section 2.3.2.2.1 of that SOW), this 2011 DQAP is organized into eleven sections, as follows:

- **Section 1 - Introduction:** provides an overview of the 2011 QC/QA program and the objectives and organization of this DQAP.
- **Section 2 - Project Dredging QC/QA Organization:** presents the organizations and key personnel involved in the performance of the RA in 2011, their responsibilities and authorities, the structure of the QC/QA organization, and the minimum training and experience of the CM's Construction Quality Assurance Officer (CQAO) and QC/QA personnel.

- **Section 3 - Submittals:** presents the procedures for processing submittals from Phase 2 contractors for 2011.
- **Section 4 - Performance Monitoring Requirements**: addresses performance monitoring requirements to demonstrate that the 2011 D&FO activities are implemented in accordance with the 2011 FDR and the 2011 RAWP.
- **Section 5 - Inspection and Verification Activities:** describes the QC/QA inspection and testing activities to be conducted to monitor performance of the 2011 D&FO, as well as construction acceptance criteria, construction audits, and other construction monitoring.
- **Section 6 - Construction Deficiencies:** describes the procedures for tracking construction deficiencies from identification through acceptable corrective action.
- **Section 7 - Documentation:** describes the procedures for the project documents that will be managed through a combination of a secure document filing and storage system and computerized Document Tracking System.
- **Section 8 - EPA Approvals for Certification Units:** describes the process for obtaining EPA approvals and certifications of completion for individual Certification Units (CUs), consistent with the revised SOW.
- **Section 9 - Field Changes:** describes handling of quality plan changes to verify that QC/QA objectives are met.
- **Section 10 - Final QA/QC Reporting:** describes the QC/QA documentation for 2011 D&FO to be submitted to EPA in an annual report at the conclusion of the 2011 D&FO.
- **Section 11 - References:** provides bibliographic references to key documents referred to in the body of the plan.

Table 1-2 (below) provides a cross-index showing where each of the required elements specified in the SOW is addressed in this 2011 DQAP.

It should also be noted that, in addition to this 2011 DQAP, GE has prepared (or is preparing) a number of other submittals that address the actions that will be taken during 2011 to meet the applicable requirements set forth in the CD, the SOW, and the 2011 FDR. These submittals include the 2011 RAWP itself, other appendices to the 2011 RAWP – i.e., the Phase 2 Performance Standards Compliance Plan for 2011 (2011 PSCP), the Phase 2 Facility Operations and Maintenance Plan for 2011 (2011 Facility O&M Plan), the Phase 2 Transportation and Disposal Plan for 2011 (2011 TDP), and the Phase 2 Remedial Action Community Health and Safety Plan for 2011 (2011 CHASP) – and the Phase 2 Remedial Action Monitoring Quality Assurance Project Plan for 2011 (2011 RAM QAPP), submitted on March 15, 2011. These additional submittals are referenced herein where applicable.

This 2011 DQAP will apply to actions conducted by GE during the 2011 D&FO. It will be revised and updated as appropriate for subsequent years of Phase 2.

Table 1-2. CD SOW / 2011 DQAP Cross-Reference Table

SOW Requirement [1]	Citation	Location in DQAP
Responsibilities and authorities of all organizations and key personnel involved in construction of the RA	SOW Section 3.1.1 (page 3-17), cross-referencing Section 2.3.2.2.1 of the SOW	Section 2.1
Establish training and experience of the CQA Officer and supporting inspection personnel assigned a Phase 2 DQAP function	Same as above	Section 2.3
Phase 2 DQAP QC Organization – describe QC personnel, roles and relationships	Same as above	Sections 2.2 and 2.3
Submittals – provide procedures for processing and managing submittals for the various parties	Same as above	Section 3
Performance Monitoring Requirements – present performance monitoring requirements to demonstrate that activities are implemented according to Phase 2 FDR and RAWP for D&FO	Same as above	Section 4
Inspection and Verification Activities – describe inspections and tests to measure compliance with Phase 2 FDR and RAWP for D&FO	Same as above	Section 5
Construction Deficiencies – provide procedures for tracking and correcting deficiencies	Same as above	Section 6
Documentation – define reporting requirements and records management and storage	Same as above	Section 7
EPA Approvals – provide procedures for obtaining EPA approvals and certifications of completion for individual CUs	Same as above	Section 8
Field Changes – describe procedures for processing changes and securing EPA approval	Same as above	Section 9
Reporting – identify all final Phase 2 CQAP documentation to be submitted to EPA	Same as above	Section 10

Note:

1. For this 2011 DQAP, the listed Phase 2 requirements apply to the D&FO to be conducted in 2011.

SECTION 2

PROJECT QC/QA ORGANIZATION

This section presents the responsibilities and authorities of organizations and key personnel involved in the 2011 D&FO, the structure of the QC/QA organization, the minimum qualifications, training, and experience of the CQA personnel, and the QC/QA training given to on-site workers.

2.1 RESPONSIBILITIES AND AUTHORITIES OF ORGANIZATIONS

The organizations involved in the 2011 D&FO and their QC/QA roles and responsibilities are as follows.

2.1.1 Environmental Protection Agency

EPA is the lead agency responsible for observing and monitoring the progress of the 2011 D&FO in accordance with the CD. As such, EPA exercises approval authority for the 2011 RAWP and this DQAP.

2.1.2 General Electric Company

GE is responsible for implementing the RA in accordance with the CD and for requiring that its contractors and subcontractors perform RA construction in accordance with the CD.

The 2011 DQAP details the systems that GE has put in place in order that its responsibilities for quality are met. GE is responsible for verifying that the CM implements and manages the systems detailed in the DQAP. GE provides targeted construction oversight such that each task is generally overseen at least once during a 24-hour period. GE is also responsible for formal communications with and submittals to EPA.

2.1.3 Engineer of Record

The Engineer of Record is an independent, duly qualified, licensed design professional, retained directly by GE to provide design and engineering services in connection with the project. This definition includes all subcontractors to the Engineer of Record.

ARCADIS is the Engineer of Record for 2011 D&FO. ARCADIS will provide submittal review and resolution of design issues that may arise during dredging and processing facility operations and habitat construction.

2.1.4 Construction Manager

The CM is a duly qualified entity retained by GE to provide professional construction management and related services in connection with the project. The CM is responsible for implementation of this DQAP. The CM will manage construction contractors on behalf of GE and serve as the primary point of contact for communications to and from the contractors. The CM will provide QA and monitor the day-by-day construction quality control activities performed by construction contractors to verify compliance with the contract plans and specifications. The CM will also manage, coordinate, and administer QC/QA activities and requirements, including those of subcontractors to the CM. Additionally, the CM may be assigned management of any third party QA inspection and testing firms retained by GE.

2.1.5 Construction Contractors

The construction contractors (i.e., the PFOC, the Dredging Contractor, the HCC, and the RYOC) have been retained by GE to provide the labor, materials, and equipment required to construct the project in accordance with the contract documents. Construction contractors will be responsible for the quality control of their constructed work product as well as the necessary inspections and tests required to ensure that their work complies with the contract documents. They will exercise authority over their workforce, including QC personnel and their third-party QC support services.

Pursuant to Contract Specifications Section 01450, each contractor will submit a QC organization chart developed to show QC personnel and how these personnel will integrate with other management, production and construction functions and personnel. QC staff members will be subject to acceptance by GE. The requirements for the QC organization include a QC Systems Manager and a sufficient number of additional qualified personnel to verify contract compliance. The contractor is to provide a QC organization that is represented on the site at all times during progress of the work and provided authority to take any action necessary in order to be compliant with the contract requirements.

2.2 STRUCTURE OF QC/QA ORGANIZATION

The QC and QA functions of the project organizations are functionally integrated although contractually separate. Figure 2.1 is an organizational chart that shows the functional structure of the project QC/QA team. Note that for sake of simplicity, the positions in Figure 2.1 are referred to generically, but the qualifications and responsibilities for each position will vary according to the specific technical requirements of each contract. Differentiation of those responsibilities based upon the type of contract activity is provided below.

2.3 RESPONSIBILITIES AND AUTHORITIES OF KEY PERSONNEL

Key personnel involved in the 2011 D&FO and their QC/QA roles and responsibilities are described below in Section 2.3.1 and Section 2.3.2. The QC/QA personnel assigned DQAP functions are the CQAO and CM Field Inspectors. Since personnel assignments are subject to change over time, the CM will maintain a DQAP staffing list of DQAP personnel assignments including each person's role and organization. This DQAP Staffing List is initially provided in Attachment 1 together with resumes of current DQAP personnel. To the extent the personnel have not been identified and as personnel changes occur, GE will add supplemental names and qualifications to the staffing list and will make it available to EPA upon request.

2.3.1 Construction Manager's Quality Assurance Personnel

Construction Manager

The CM will be the primary point of contact for GE on all construction/operation management issues on all contracts. The CM will be responsible for the overall management of activities related to the construction program, including the implementation of the DQAP and the health and safety program. As such, the CM will work directly with GE to exercise approval authority over contractor submittals including the CQCPs. The CQCPs will include the names and qualifications of contractor's QC personnel pursuant to Section 2.3.2 below.

Site Managers

The Site Manager (SM) will monitor and work with GE to approve each contractor's quality and progress submittals to verify that the project is meeting the contract requirements. The SM will manage the field implementation of the DQAP at the project sites under control of the senior Field Engineer (FE) and the CQAO. Due to the distinct nature of the on-river operations vs. on-shore facilities operations, two Site Managers will oversee activities of Contracts 40 & 50, and 30 & 60, respectively.

The SM for River Operations (via Contracts 40 & 50) will be referred to as the River Operations Manager. The River Operations Manager will have a number of overall responsibilities for dredging (Contract 40) and habitat construction (Contract 50) work, as well as implementation of the associated QC/QA program. These responsibilities include:

- Directing the overall planning, scheduling, and coordination of QA procedures for dredging, habitat construction, and other river-related activities;
- Overseeing work by river contractors to confirm QC (thoroughness, technical acceptance, contract compliance and timeliness);
- Delegating assignments to FEs, dredging inspectors, and other in-river inspectors for various work areas of river operations, monitoring performance and recommending corrective action as necessary; and
- Maintaining communications with the CQAO, Contractor Project Manager, CM, and senior FEs for quality issues during the execution of work.

A separate SM, or Facility Manager, will be appointed for implementation of the DQAP during operation of the processing facility (Contract 30) and rail yard operations (Contract 60). The SM for those contracts may also function as the Senior FE. The Facility Manager will have responsibilities covering operation of the on-shore facilities as well as implementation of the associated QC/QA program. These responsibilities include:

- Directing the overall planning, scheduling, and coordination of QA procedures for processing facility operations, rail yard operations, and other facility-related activities;
- Overseeing work by facility contractors to confirm QC (thoroughness, technical acceptance, contract compliance and timeliness);
- Delegating assignments to FEs and facility inspectors for various work areas of facility and rail yard operations, monitoring performance, and recommending corrective action as necessary; and
- Maintaining communications with the CQAO, Contractor Project Manager, CM, and senior FEs for quality issues during the execution of the work.

Construction Quality Assurance Officer

The CQAO will be a full-time employee of the CM and will be targeted to have a minimum of five years of experience in related construction as well as prior QA experience on a project of comparable size

and scope to this project. Additional qualifications for the CQAO include one or more of the following requirements (or alternative requirements if acceptable to GE):

- Professional Engineer (PE) with at least one year of related experience in QA of dredging/dewatering or similar operations acceptable to GE;
- Engineer in Training (EIT) with a minimum of two years of related dredging/ dewatering or comparable experience acceptable to GE;
- Three years of related dredging/dewatering or comparable experience acceptable to GE with a Bachelor of Science Degree in civil engineering, civil engineering technology, or construction; and/or
- Construction materials technician certified at Level III by National Institute for Certification in Engineering Technologies (NICET) with more than three years of experience on dredging/dewatering or similar operations.

The CQAO will report directly to the CM. The CQAO will have full authority delegated by the CM and GE to institute actions necessary for the successful implementation of the QC/QA program to achieve compliance with the contract plans and technical specifications (including stop-work authority). The CQAO will be assigned to the project on a full-time basis during active construction.

The CQAO will work with GE to administer and oversee implementation of the DQAP. This includes controlling this DQAP, making revisions as necessary, and implementing systematic actions to verify compliance with the plan. The CQAO will coordinate activities with the various SMs to confirm that the FE, inspection staff, third-party inspection and testing firms, and contractor QC staff carry out the requirements of the DQAP.

The CQAO will be supported by the CM's QA staff, which will provide expertise, on an as-needed or as-requested basis, in the investigation and handling of significant or unique quality issues.

The CQAO will track and report non-conformances to the CM, SM, and after notification to the CM, to contractor management and contractor QC staff. The contract specifications provide GE full authority to obtain direct access to contractor QC files at any time, and GE will assign that authority to the CQAO. Other CQAO responsibilities include:

- Reviewing contractor QC reports, tests, and inspection results;
- Facilitating the implementation of the four-phase inspection program (see Section 5.1.1) and participating in the required inspections; and
- Working with FEs to ensure that QA personnel conducting inspections are adequately trained and understand assignments, limits, and time frames.

Senior Field Engineer

The Senior FE will administer the contract requirements, including the CQCP submittals by contractors, and document that each contractor consistently conforms to its approved CQCP. The FE will oversee inspection efforts, provide technical advice, and coordinate support from engineering,

administration, inspection services, third-party survey contractor, third-party testing/lab personnel, safety, and other team members.

The FE will review plans and specifications for assigned projects and estimate the type and number of QA tests that should be accomplished for each specification section. The FE will meet with third-party testing and inspection firms to review test requirements and coordinate testing and inspection services. The FE will review QC and QA testing documentation with third-party survey contractors, third-party testing/lab personnel, engineers, and inspectors, and relay the information regarding compliance with requirements to the contractors. In incidences of non-compliance, the FE will record the requirements for re-work and order the re-test, re-survey, or re-inspection when the contractor indicates corrections have been made.

The FE will coordinate resolution of unsatisfactory work items with contractors through final acceptance. The FE will verify that open noncompliance report (NCR) items are completed and accepted in a timely fashion. Acting in concert with GE, the SM, and the CQAO, the FE has the authority to require changes to the contractor's QC organization and plan as required to address apparent trends, to mitigate future NCRs, and to obtain the quality specified in the contract documents.

Due to the multiple operations of dredging, dredged material processing, rail yard operations, and habitat construction, as well as 24-hour-a-day, 6-day-per-week operations, it is anticipated that there may be more than one Senior FE to oversee all of these activities.

Field Inspectors

Field Inspectors (FIs) are responsible to the FE and support the FE in overseeing dredging, backfill/capping, processing operations, rail yard operations, and habitat construction. Although the credentials for each FI will vary, it is expected that each will hold a Bachelor's Degree in engineering or related field and have at least three years construction experience in the type of work or the type of processing operations being performed on this project or similar construction work, or have at least five years of related experience and hold the construction materials technician certified at Level III by the NICET, or have comparable experience acceptable to GE. The qualifications of inspection personnel will be preferably focused toward, but not limited to, experience with similar work. Additional experience and training may be substituted for educational requirements, subject to GE's approval.

FIs will monitor the day-to-day activities of the contractor. This includes documenting that contractors comply with the plans and specifications, applicable construction standards, good workmanship, and the QC requirements of the contract. As part of this effort, FIs will conduct independent inspections to verify the quality of the work, participate in contractor four phase inspections, review test and inspection reports, and check that the required documentation is submitted. The FIs must be alert to detect, record, and report any deviation from the contract documents, including calling any deficient item to the attention of the FE, the contractor's superintendent, and / or other representative. The FIs must keep accurate and detailed records of the contractor's performance and progress, delivery of materials, and other pertinent matters, including the daily inspection report. FIs will also produce other

specific reports as required by the FE as well as daily reports on labor, equipment, and material used for change work.

Observations and documentation by the FI may be used in conjunction with results from third-party survey contractor and monitoring teams to help verify that the contractor meets performance standards.

Third-Party QC/QA Surveyor

Hydrographic surveys will be performed during dredging operations and habitat construction by an independent third-party hydrographic survey contractor, on behalf of GE, to confirm completion of work to the required limits and tolerances in each CU. The third-party survey contractor will provide labor, materials, and equipment required to prepare hydrographic drawings and provide x,y,z survey data (easting, northing, elevation) using multi-beam and single-beam sonar equipment.

Land surveys will be performed during dredging operations and habitat construction by an independent third-party survey contractor or by the third-party hydrographic survey contractor, on behalf of GE, to establish the location of the 119-foot shoreline and to confirm completion of work in CU limits. The third-party surveyor will provide labor, materials, and equipment required to prepare drawings and provide survey data (easting, northing, elevation) using standard land survey equipment.

The primary quality assurance role of the third-party survey contractor(s) is to verify that the Dredging Contractor and HCC have performed their work in accordance with the contract requirements with respect to elevations and limits, as well as to independently record the contours and coverage of the completed construction. Their work will be reviewed by the appropriate FE and used to verify if requirements are met or otherwise to inform the contractor that additional work is required. The third-party survey contractor documentation will also be available for review by the EPA representative as described in Section 8 of this DQAP and to verify contractor-provided record drawings as discussed below in Section 7.

Third-Party Construction QC/QA Testing and Lab Services

The third-party construction QC/QA testing and lab services contractor will be responsible for QC/QA oversight of analytical procedures and laboratory data package production. QC/QA responsibilities include:

- Checking overall quality of laboratory operations;
- Performing internal audits of laboratory procedures and reporting results and any corrective action to QC/QA Program Manager;
- Reviewing chain-of-custody (COC) documentation;
- Verifying that sample holding times and analytical standard operating procedures (SOPs) are strictly adhered to; and
- Reviewing laboratory data packages for completeness, consistency, and accuracy.

2.3.2 Con tractor's Quality Control Personnel

QC Systems Manager

The QC Systems Manager (QCM) will be a full-time employee of the contractor, or a consultant engaged by the contractor. The QCM for each contract will have a minimum of five years of experience in dredging/dewatering operations, rail yard operations, and habitat construction or related landscape construction, and have prior QC experience on a project of comparable size and scope as this project. Additional qualifications for the QCM include at least one of the following requirements:

- PE with one year of related construction experience acceptable to GE and the CM;
- EIT with two years of related construction experience acceptable to GE and the CM;
- Three years of related experience acceptable to GE and the CM, with a Bachelor of Science Degree in civil engineering, civil engineering technology, or construction; and/or
- Construction materials technician certified at Level III by NICET or multiple years of related experience that by interview and trial performance is acceptable to GE and the CM.

The QCM will have full authority to institute any and all actions necessary for the successful implementation of the QC program to provide compliance with the contract plans and technical specifications. The QCM will report directly to a responsible officer of the construction firm. The QCM is required to be assigned to this project full time.

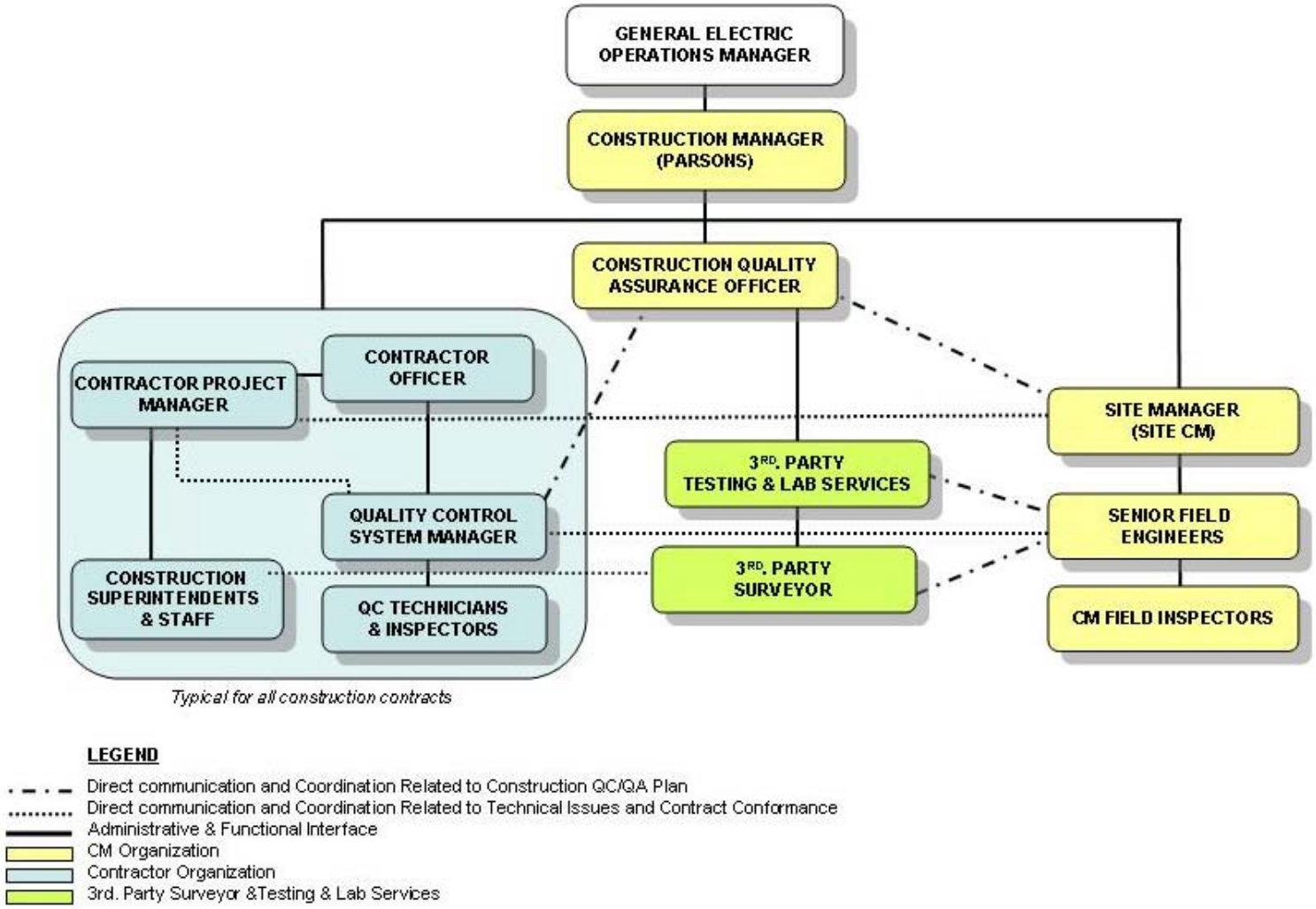
QC Technicians

The contractors' QC Technicians will perform the following functions:

- Inspect all materials, construction, plants, and equipment for conformance with the technical specifications; and
- Perform all QC tests as required by the technical specifications.

Contractor QC technicians and inspectors will be engineers, engineering technicians, or experienced craftsmen with qualifications in the appropriate field equivalent to NICET Level II (or higher) construction materials technician, and will have a minimum of two years of experience in their area of expertise. Certification at an equivalent level by a state or nationally recognized organization will be acceptable in lieu of NICET certification. Additional experience and training may be substituted for educational requirements, subject to GE's approval.

Figure 2.1
Dredging Quality Control/Quality Assurance Organization



SECTION 3

SUBMITTALS

This section describes the procedures for CM processing of submittals from various project contractors and suppliers (collectively referred to as contractors). The CM will administer and control the processing of submittals. After being reviewed for completeness, submittal documents will be transmitted to the relevant project staff for review and verification for compliance with contract requirements. The submittal's disposition will be noted on the submittal, which will be signed, dated and returned to the contractor. If required, the contractor will revise the submittal, incorporating the comments and will resubmit it for review and verification for compliance. Submittals will be logged and copies will be retained in the project files.

Contractor submittals will be received from:

- Subcontractors, such as dive safety manuals from commercial diving companies;
- Off-site fabricators, such as certifications for environmental dredge buckets;
- Suppliers, such as test results of materials to be installed;
- Designers of record, such as change order drawings;
- Consultants, such as staff medical monitoring results;
- Architects/engineers, such as design revision request drawings;
- Purchasing agents, such as invoices for time and material payments;
- Dewatered sediment transporters, such as rail car manifests; and
- Disposal facilities, such as dewatered sediment disposal documentation.

3.1 SUBMITTAL SCHEDULE

Each contractor will submit and maintain a submittal schedule. The CM will review and, after consulting GE, will approve the submittal schedule. The CM will work with the contractor to prioritize and sequence submittals so that the most critical submittals are received and processed first. The submittal schedule will become the baseline against which receipt of all required submittals will be compared. The approved submittal schedule will be forwarded to the Engineer of Record for resource availability planning.

3.2 PROCESS, REVIEW, AND ACCEPTANCE

Submittals will be managed as follows:

1. Contractors will number and certify the completeness of all submittals before submitting to the CM.
2. Contractors will also complete submittal transmittal forms and submit six paper copies and one electronic copy of all required submittals to the CM's document manager (the submittal

transmittal form will always accompany each submittal package to and from the contractor, the CM and the Engineer of Record).

3. Upon receiving the submittal, the CM will log the submittal and provide a review to ascertain whether the package is complete. If the submittal is incomplete the submittal will be returned to the contractor.
4. The original submittal transmittal and all copied attachments will be logged into the document tracking system. The CM will then forward submittals to the appropriate reviewers.
5. If the CM provides a submittal to the Engineer of Record for review, the Engineer of Record will review it for general conformance with contract design documents, will coordinate concurrent discipline reviews within the design team, will coordinate concurrent reviews by owner and other entities, and consolidate responses into a single coordinated action.
6. After reviewing the submittal, the Engineer of Record (or other designated reviewer) will make the appropriate notations and action taken on the submitted documents and returns the submittal to the CM.
7. The CM will return a minimum of one copy of the submittal to the contractor with an original stamp of the action required.
8. The six actions that may be taken for each submittal are:
   - Approved – Submittal meets contract requirements. No additional copies will be required of the contractor.
   - Approved As Noted – Submittal meets contract requirements with minor corrections noted. Re-submittal is not required. Contractor must incorporate the required corrections into the work in the field. No additional copies will be required of the contractor.
   - Revise and Resubmit – Submittal has some selected areas that do not meet requirements. These areas can be revised to meet requirements, and the entire submittal must be re-submitted for review and approval. No work will begin in the field until the revised submittal has been approved.
   - Rejected – Submittal is inadequate and does not meet contract requirements. Revise the complete submittal and resubmit for approval. No work will begin in the field until the revised submittal has been approved.
   - For Information Only – Submitted for information only; no response action required.
   - Received, No Action Taken – Receipt of submittal is noted; no further action required.
9. When a submittal is to be revised and resubmitted, the contractor will revise the submittal and indicate this revision by incrementing the revision number. The contractor's submittal process will then be repeated.

The CM is responsible for tracking the submittal package during the entire review process and advising all concerned of any schedule impacts to confirm that the review process timeframe is adhered to. The CM will retain copies of all submittal documents and revisions and make sure that an accurate file is available for ready retrieval during the life of the project. The CM will maintain all submittal files. These files will be filed by numeric sequence. Each submittal file will contain a complete submittal copy of the submittal before and after the review process.

3.3 STORAGE

The CM will maintain all submittal files in accordance with the project document control procedure. Project documents will be managed through a combination of a secure document filling and storage system and a computerized document tracking system.

SECTION 4

PERFORMANCE MONITORING REQUIREMENTS

The CM will oversee the dredging operations, the habitat construction activities, and the processing facility and rail yard operations to confirm that they are implemented in accordance with the applicable design and the 2011 RAWP. The specific monitoring, inspection, and testing activities to be conducted during the 2011 D&FO for that purpose are described in Section 5.

In addition, the monitoring that will be performed to assess achievement of the Resuspension and Residuals Performance Standards, the Quality of Life Performance Standards (QoLPS; EPA 2010a) for air quality, odor, noise, and lighting, and the substantive water quality requirements issued by EPA for constituents not subject to Performance Standards, and for discharges from the processing facility will be described in the 2011 RAM QAPP. Further, the actions that GE will take during the 2011 season to implement the Engineering Performance Standards (EPS; EPA 2010b), the QoLPS, and the substantive water quality requirements are set forth in the 2011 PSCP (Appendix D to the 2011 RAWP).

SECTION 5

INSPECTION AND VERIFICATION ACTIVITIES

The contractor QC control, verification, and acceptance testing plans set out the QC inspections and testing for implementation of each technical specification applicable to the contractor's scope of work for each of the four contracts included under this DQAP. The contractor's CQCPs will cover the type, test standard, frequency, control requirements, and assigned responsibility for inspections and tests. The CM will re0view and approve these CQCP submittals. After being approved by the CM, the contractor CQCPs will be available to EPA upon request.

Ongoing QA monitoring and oversight of contractor QC inspections and testing will be performed by the CM. In this manner, the inspections and tests required to measure compliance with the relevant portions of the 2011 Final Design for Contracts 30, 40, 50, and 60 will be established and carried out.

GE will also require QC plans to be provided by the third-party survey contractor and third-party testing and lab service contractors to include their processes to verify quality control. Equipment calibration procedures, data validation processes, and other relevant procedures will be included as part of those third-party QC plans, which will be reviewed and approved by the CQAO before third-party contractors are allowed to proceed.

5.1 GENERAL INSPECTION AND VERIFICATION REQUIREMENTS

Contractors will perform, as part of their QC programs, the inspections and tests prescribed in the technical specifications for Contracts 30, 40, 50, and 60. QA review of contractors' CQCP data and limited independent inspection and testing will be used to verify the adequacy and effectiveness of each contractor's QC program. The QA inspection and testing frequency will be at the discretion of the CQAO based on results of QC tests, evaluation of daily reports, audits of the QC program, and verification work conducted by the CM and GE's third-party survey and testing firms. Should information become available that indicates a potential problem, the CQAO will review in detail all pertinent information and order additional verification testing if necessary.

Contractor QC implementation, verification, and acceptance testing plans set out the contractor's specific QC testing and inspection pursuant to Specification 01450 and the relevant design specification. Attachment 2 provides a comprehensive set of tables that list the QC/QA inspections and tests as required in the specifications for each respective contract – Table A2-1 for Contract 30, Table A2-2 for Contract 40, Table A2-3 for Contract 50, and Table A2-4 for Contract 60. These tables include the applicable parameter, the specification reference for the requirement, the inspection or test method, the proposed frequency, and the acceptance criteria. QC inspection and tests are the primary responsibility of the respective contractor. For QA oversight, the CM will typically perform confirmatory inspections and tests for 5% to 10% of the contractor inspections and tests as determined by the CQAO.

5.1.1 Inspections

Each contractor will establish a program for inspection of activities affecting quality and will cover all pertinent on-site and off-site operations. Inspections will be performed to verify compliance with documented instructions, drawings, procedures, and specifications as required by the applicable contract. All inspections will be documented by the contractor and CM staff per Specification 01450 Section 3.06.

A four-phase inspection program will be followed for all definitive features. The four phases of inspection are:

1. Preparatory Inspection

Each contractor and the CM will perform preparatory inspections prior to beginning any work on any definable feature of the contract. This inspection will:

- Include a review of contract requirements;
- Check that all materials and/or equipment have been tested, submitted, and approved;
- Verify that provisions have been made to provide required testing;
- Examine the work area to ascertain that all preliminary work has been completed;
- Examine materials, equipment, and samples to make sure that they conform to approved shop drawings or submittal data, that all materials and/or equipment are on hand, and that all equipment is properly calibrated and in proper working condition; and
- Be documented in the contractor's QC documentation as required by Specification 01450 Section 3.06

2. Initial Inspection

Each contractor and the CM will perform an initial inspection as soon as a representative portion of the particular feature of work has been accomplished. This inspection will:

- Examine the quality of workmanship;
- Review control testing for compliance with contract requirements;
- Review dimensional aspects of the work; and
- Be documented in the contractor's QC documentation as required by Specification 01450 Section 3.06

3. Follow-Up Inspection

Each contractor and the CM will perform follow-up inspections daily. These inspections will:

- Verify continuing compliance with contract requirements;
- Verify continuing compliance with control testing until completion of particular feature of work; and

- Be documented by the contractor CQM in daily QC reports and by the CM inspection staff in their daily inspection report.

Final follow-up inspections will be conducted and deficiencies will be corrected prior to the addition of new features of work.

4. Completion Inspection

Each contractor and CM will perform a completion inspection of the work. Specifically, they will:

- Develop a "punch list" of items that do not conform to the approved plans and specifications;
- Include the punch list in the construction QC documentation, including, as required by Specification 01450, the estimated date by which the deficiencies will be corrected; and
- Perform a second completion inspection after punch list items have been completed and the contractor has notified the CM.

The daily inspection reports will identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective action taken or proposed.

Additional QA inspections may include inspection of third-party lab testing facilities, fabrication facilities, and suppliers. Other inspections outside of the four-phase program described above will be ordered or performed by the CM as required.

When deficiencies are discovered during the four-phase or other inspection processes, focused inspections will be considered by the CQAO. When material, performed work, or installation is found on the basis of focused inspections to be deficient and/or does not meet the project specifications, the CQAO will confirm that deficiency correction is implemented, as discussed in Section 6.

5.1.2 QC Testing

As required by the contract specifications, each contractor will establish a QC Plan to verify that the contractor's required testing is properly identified, planned, documented and performed under controlled and suitable environmental conditions. Testing will be performed in accordance with written test procedures in the CQCP. Such test procedures will incorporate or reference the requirements as contained in the contract technical specifications, codes, and industry standards. In accordance with the CQCP, the contractor will submit the test procedures to the CQAO for review and acceptance prior to their implementation.

The contractor will be responsible for establishing a system of daily test reports that will record all QC test results. Test results from each day's work period will be submitted to the CQAO prior to the start of the next day's work period. When required by the technical specifications, the contractor will maintain statistical QC charts. The contractor's responsible technician and the QCM will sign the daily test reports. The CQAO will review test results on a

daily basis and identify any nonconforming test results for discussion with the contractor regarding potential corrective action.

5.1.3 QA Testing

The CQAO will be responsible for the QA materials sampling and testing program – that is, QA testing of any materials that will be permanently incorporated into the project. QA testing will be performed for verification of the adequacy and effectiveness of the contractor's QC testing. QA testing will be performed by the CQAO independent of and in addition to QC testing performed by contractors. QA testing may be performed on a pre-established schedule or as directed by the CQAO. QA testing will be performed by or under supervision of the QA staff to validate the contractor's QC sampling and testing. Such testing may be performed by third party testing services. The typical test frequency will be one (1) QA test for every ten (10) to twenty (20) of the contractor's QC tests. More frequent testing during initial startup may be necessary to verify the process is under control and complies with the technical specifications of the construction contracts. In lieu of performing independent tests the CQAO may choose to witness QC testing or conduct tests on split samples from QC testing. When QA and QC test results do not compare or have wide variances, additional testing may be needed to validate the results. Additional tests to be performed by FIs or the third-party testing services will be at the direction of the CQAO. The need for QA testing will be based on the following considerations:

- Importance of the item as to its reliability, etc.;
- Need to perform quality checks for work sequences not available for inspection at completion; and
- Deficiencies are discovered.

QA testing will be performed in accordance with the following:

- The CQAO will develop a weekly quality test and inspection schedule using the construction activity forecast as a guide. The schedule will:
  - Identify the QA test activities.
  - Identify the hold points.
- The weekly quality test schedule will be distributed to the CM and CM field staff; and
- The contractor will be provided a one-day advance notice of impending hold points.

Field Inspectors conducting the quality tests and inspections will complete the Daily Construction Report included in Attachment 3. The Daily Construction Report will be distributed to the CQAO, FE, CM Site Manager, GE managers, contractor PM and/or QC Systems Manager. The CQAO will review QA tests and maintain files for all field QA documentation.

5.2 ACCEPTANCE CRITERIA

Acceptance criteria for materials qualifications, inspection, and testing are established by the approved technical specifications and are summarized in Tables A2-1 through A2-4. Criteria

for materials and equipment have been set by the Engineers of Record in accordance with applicable requirements to perform as they are intended in the design documents. Contractor material submittals and test documents are required in order to document conformance with acceptance criteria as detailed in their CQCP.

5.3 CONSTRUCTION AUDITS

Each contractor will establish and document an auditing system to verify its (or its subcontractors') implementation of and conformance to the CQCP and contract technical specification requirements. The auditing system will be used to make a determination regarding the effectiveness of the QC system.

The contractor's auditing will be planned, performed and documented in accordance with written instructions, procedures or checks to be included in the CQCP. The audit scope, frequency and methods will be defined in the CQCP. Audits will be performed by qualified and properly trained personnel who are familiar with the QC system, auditing procedures and techniques. Selection of auditors and the conduct of audits will ensure the objectivity and impartiality of the audit process. Auditors will not audit their own work. The auditing system will cover all the quality-affecting activities for construction, as well as laboratories and will be applicable to the onsite and offsite locations, including all subcontractors. The results of the audits will be documented and reported to the CM. All non-conformance conditions identified during the audit will be re-audited to verify the corrective actions taken by the appropriate organization were effective.

5.4 COMPLIANCE WITH HANDLING, STORAGE, PACKAGING, PRESERVATION, AND DELIVERY REQUIREMENTS

CM field staff will inspect the contractors' activities to verify technical compliance in identification, handling, storage, packaging, preservation, and delivery of materials, parts, assemblies, and end products. Related quality records and documents will be maintained and controlled in accordance with the procedures provided in Section 7 of this DQAP.

5.5 MATERIAL IDENTIFICATION AND TRACEABILITY

CM field staff will monitor the tracking logs provided by each contractor to confirm that identification and traceability requirements are met. Products and materials will be identified from receipt through all interim project stages to final installation. Documentation such as project control checklists, material receipts, material tracking forms, procedures, sample and test documentation, and reports will ensure that the applicable material item traceability is maintained. Project specifications and/or procedures define product identification and traceability requirements, which generally include the following:

- Materials or equipment intended for use on the project will be identified and segregated until inspection confirms that they conform to technical and quality requirements; and

- Materials will be traceable to documents attesting to their conformance with technical requirements as stated in specifications or drawings. Testing of materials will be conducted as necessary to verify conformance with material specifications.

5.6 CONSTRUCTION SURVEY PROCEDURES

As discussed above, multi-beam hydrographic surveys will be performed during dredging operations activities by an independent third-party survey contractor to verify dredging removal limits and tolerances, and backfill/cap placement limits and tolerances. Single-beam hydrographic surveys will be performed by an independent third-party survey contractor before habitat construction activities begin to confirm the submerged (and floating) aquatic vegetation (SAV) planting locations. In very shallow water areas, where the comparative advantage of using a multi-beam transducer over a single beam transducer is reduced, the third party survey contractor may elect to use a single-beam transducer. In addition, land surveys will be performed during the 2011 D&FO activities by an independent third-party survey contractor as necessary to confirm certain shoreline elevations, to verify completion of CU work according to required limits in areas where water depth, or similar restriction prevents the collection of hydrographic data and to confirm shoreline and riverine fringing wetland (RFW) planting locations. The Dredging Contractor and HCC may perform their own surveys to verify that required elevations or limits have been achieved.

The methods and procedures to be used for the hydrographic surveys that will be performed by the third-party survey contractor are described in the SOP provided in Attachment 5. Land surveys will be carried out in accordance with standard survey methods.

SECTION 6

CONSTRUCTION DEFICIENCIES

This section provides procedures for tracking construction deficiencies (noncompliance) from identification through acceptable corrective action. It defines the controls and related responsibilities and authorities for dealing with noncompliant products or services

6.1 DEFICIENCY IDENTIFICATION

A deficiency occurs when a material, performed work, installation or contracted operational process does not meet the plans and/or specifications for the project.

6.2 CONTRACTOR QC DEFICIENCY IDENTIFICATION AND CONTROL

When material, performed work, an installation or an operational process is found deficient, the CQAO (or designee) will take action so the nonconforming material, work, installation or operational process is identified and controlled to prevent use or delivery of an unacceptable product or nonconformance with a standard. The CM will promptly notify the contractor of any noncompliance with any of the project requirements and notify other necessary parties as appropriate. The contractor will, after receipt of such notice, immediately take corrective action and notify the CM when the corrective action has occurred. Steps taken in this deficiency identification and control process are outlined below.

Minor deficiencies noted during tests, observations or inspections will be verbally reported to the contractor's representative and noted on the Daily Construction Report. Minor deficiencies are items that do not require significant rework or repair work to correct, and will not result in significant deviations from required quality standard if corrected immediately.

Control and disposition of such deficiencies will be by the originator of the Daily Construction Report and the contractor's supervisor responsible for the work and do not require formal action by the contractor's QC System Manager or the CM. Ideally, such minor deficiencies can be corrected on the spot by agreement with the contractor's supervisory personnel.

Non-conformances are major deviations from the contract requirement and/or accepted standard of quality, which will be formally documented for corrective action by CM field staff or the third party testing group. Failure by a contractor to correct a minor deficiency after having been put on notice will also result in a non-conformance if it is not corrected within 5 days of notification. Non-conformances will be formally documented on the example NCR form shown in Attachment 3. A log will be maintained for all NCRs in accordance with the example form shown in Attachment 3.

The NCR will be distributed to the contractor QCM, CM, SM, CQAO and GE representative.

The CQAO will follow up on the NCR as required to verify that corrective action has been completed. The CM or a designated FE will verify and accept the corrected work by actual inspection.

6.3 NON-CONFORMANCE REPORT

The NCR is a formal notification to the contractor that work or an operational process does not meet the plans or the specifications for the project. Any item of work found to be deficient – i.e., out of conformance with the construction drawings and/or specifications – will be identified by the inspector on the non-conformance report as described in this section. Non-conformance reports will be included on the non-conformance log and tracked through verification that the non-conformance has been corrected.

6.4 CONTRACTOR QC DEFICIENCY CORRECTION

When material, performed work, installation or an operational process is found to be deficient and/or does not meet the project specifications, the CQAO will assure that the deficiency is corrected. The CQAO designee will take steps to see that the non-conforming material, work, installation or operational process is identified and controlled to prevent unintended use or negative consequences. Where the non-conforming issue is a material or item, it will be tagged and segregated by the contractor, when practical, from conforming material or items to preclude their inadvertent use. If segregation is impractical or impossible because of the physical characteristics of the item or other reasons, the non-conformance tag will be displayed prominently to preclude inadvertent use or tacit acceptance. A non-conforming operational process or product that cannot be tagged will be recorded, with notice transmitted to appropriate parties. The CQAO will be responsible for documenting the non-conformance in a NCR as specified in Section 6.3.

Each contractor will implement corrective actions to remedy work that is not in accordance with the drawings and specifications. The corrective actions will include removal and replacement of deficient work, re-work, modification of work procedures or separate corrective action using methods approved by the CM Removal will be done in a manner that does not disturb work that meets QC/QA criteria; otherwise, the disturbed material will also be removed and replaced. Re-work or replacement will be done in accordance with the corresponding technical specifications. Re-work or replacement will be subjected to the same scope of QC/QA inspection and testing as the original work. If the re-work or replacement work is not in accordance with the drawings and specifications, the replacement work will be removed, replaced, re-inspected, and re-tested. Changes in operational processes or best management practices are expected to result in removal of the non-conforming situation.

6.5 PREVENTIVE ACTIONS

Each contractor and QC/QA team will take preventive actions as necessary to eliminate the causes of potential deficiencies so as to prevent their occurrence. The contractors' CQCPs are to include quality improvement practices to continually improve construction practices and address

quality problems at their source. The CM and CQAO will monitor, inspect, and audit processes used to prevent erroneous information or construction products from being passed to GE. The project manager, CM, and CQAO will have the authority to implement, verify and review the project's preventive and corrective action effectiveness, and to determine and undertake steps to improve the project's work processes to eliminate the causes of potential nonconformities.

Preventive actions address the root cause of quality problems so that they can be eliminated. For example, failure to achieve the required inventory dredge prism grades in a given CU may be due to inaccurate dredge controls, poor dredge operator techniques, a mechanical problem with the excavator arm or bucket, or a number of other reasons. To prevent or reduce the occurrence of non-conforming dredge cuts, the CM staff will work with the Dredging Contractor to check the accuracy of the controls, to confirm that the equipment is operating properly, to verify that the operator is fully trained and has the skills to provide the desired product, or otherwise to determine the root cause of the problem so the problem can be prevented in the future.

SECTION 7

DOCUMENTATION

Technical Specification 01450 includes documentation and reporting requirements. Each contractor's QC documentation will cover all aspects of QC program activities, and include Daily Inspection Reports and Daily Test Reports. After approval of the CQCP by the CM, each contractor will document the QC activities pursuant to its CQCP. Ongoing QA oversight will be documented by the CM.

The results of QC/QA testing and other documentation procedures conducted to confirm that construction activities meet applicable design criteria, plans and specifications for the D&FO will be stored in the project QC/QA files and maintained as part of the permanent project record; these records will made available for EPA inspection upon request.

7.1 DAILY RECORDKEEPING

Project documents will be managed through a combination of secure document filing and storage and a computerized document tracking system.

Sufficient records will be prepared and maintained as work is performed to furnish documentary evidence of the quality of construction/operation and laboratory analysis and of activities affecting quality. Each contractor QC technician will maintain a daily log of all inspections performed for both contractor and subcontractor operations on a form acceptable to the CM.

The Daily Inspection and Daily Test reports will be signed by the responsible QC technician who prepared the report and checked by the QCM. The CM (or designee) will be provided at least one copy of each daily inspection and test report on the work day following the day of record.

The Daily QC Report will be the mechanism by which QC reporting is performed. Individually required reports, inspections, and other documentation will either be made part of the report itself or included as attachments to the report when required. Some documentation, such as surveys and photographs, will be referenced in the reports but may be filed and stored in a separate system.

7.2 DAILY REPORT OF OPERATIONS

A daily report of operations will be prepared and signed by each FI. The report will include a summary of the contractor's daily operational activities. Supporting inspection data sheets will be attached to the daily report where needed. Example forms are provided in Attachment 3.

The daily report of operations will include, but not be limited to, the following information:

- Date, project name, location, and other identification;

- Description of weather conditions, including temperature, cloud cover, and precipitation;
- Reports on any meetings held and their results;
- Record of visitors to site;
- Locations of operations underway during that day and specific locations;
- Equipment and personnel working in each activity, including subcontractors;
- Descriptions of contractors' work and inspections/tests being performed;
- Decisions made regarding approval of units of material or of work, as well as deficiencies and corrective actions to be taken;
- Description of problems or delays and resolution;
- Communications with contractor staff;
- Operational activities completed and/or in progress;
- Progress photos and other observations where applicable; and
- Signature of the report preparer.

As described in Section 7.5, the daily report of operations will be routed on a daily basis to the project QC/QA files and will be maintained as part of the permanent project record. These reports will be reviewed by the CM (or designee) and FE, and also distributed to the CQAO and GE.

7.3 INSPECTION AND TESTING REPORT FORMS

Report forms will be completed for inspections and tests conducted. The forms vary depending on inspection or test type. Representative forms for several types of inspection and testing reports are included in Attachment 3. These forms include:

- Description or title of the inspection activity;
- Location of the inspection activity or location from which the sample was obtained;
- Recorded observation or test data;
- Results of the inspection activity;
- Personnel involved in the inspection activity; and
- Signature of the inspector.

7.4 RECORD DRAWINGS

Contractors will submit draft record drawings to the CM for review and will prepare final record drawings based on CM comments. Record drawings will be required for the dredging operations and habitat construction. In addition, if, during the operation of the processing facility or rail yard, changes are made in layout or equipment to improve operations, then revisions to the record drawings already prepared for those completed facilities will be made. These records will be submitted on one set of CD-ROM disks. Record drawings submitted on CD-ROM will be the latest version of AutoCAD by Autodesk, Inc.

7.4.1 Responsibilities

The CM working with the contractor will be responsible for checking that what are traditionally referred to as "red-line record drawings" are maintained throughout the project construction and operations. Given the nature of the work and the method of recording constructed features, these "red-line record drawings" will more likely be printed plots of electronically recorded contours by the third-party survey contractor with their electronic files being used to update the design drawings to as-built status at the completion of the work. Mark-ups will also be done to the habitat construction drawings to reflect changes in substrate type, planting limits or other revisions; and the CM will make sure updates are prepared.

7.4.2 Preparation of As-Built Drawings

The contractor will be responsible for collecting actual construction data in the field as preparation for as-built drawings. The as-built drawings will record approved, actual field conditions upon completion of the work. The original design drawings will be superimposed by data collected by the contractor as the project progresses to indicate as-built conditions. Where there was a significant change to a specified material, dimension, location, or other feature, the final as-built drawing will indicate the change to the work performed. An as-built survey depicting the location and type of habitat placement will be conducted using global positioning system (GPS) and related technology. As previously noted in Section 2 above, the third-party survey contractor will verify the accuracy of the as-built results recorded by the contractor in its record drawings.

Record drawings will be compiled using the provided AutoCAD background files overlaid with each approved hydrographic acceptance survey for each CU and all shoreline survey data collected for acceptance. Note that the CM-arranged third-party hydrographic results will be used to provide CU acceptance guidance; this survey data will show dredge limits and post-capping/backfill locations and contours and therefore could be used to produce the as-built drawings.

7.4.3 Review of As-Built Drawings

Upon completion of the as-built red-line drawings, the contractor will submit the red-line mark-up drawings to the CM for review. The CM will provide the mark-ups to the engineer who will incorporate the mark-ups and issue the final as-built drawings to GE and the CM.

7.5 CONTROL OF QUALITY RECORDS

The CQAO will verify the accuracy of QA records and maintain copies of all quality-related documentation. This documentation will include, but may not be limited to:

- Daily operations QA logs and records;
- Inspection checklists and reports;
- Surveyor reports;
- Nonconformance reports;

- Material receiving and transport reports;
- Monitoring and test data; and
- Internal audit reports.

These records will be stored in files maintained in the project document control files. All original documents pertaining to project information will be maintained in the project file located at the project office in Fort Edward, New York.

The CM and SM will have primary responsibility for the centralized document control files for the project and construction documentation.

Pursuant to the contract specifications, the contractor will provide an electronic or paper copy (suitable for scanning) of all documentation associated with the work to document control within three business days of the generation of such documents, and will provide one electronic copy of all required submittals to the CM's document manager. All contractors will maintain a storage facility in their field office at the processing facility site. The storage facility will contain all inspection reports, test records, contract documents, project reports, daily field reports and other appropriate records.

Records will be available for inspection and audit, at any time, by the CM and /or GE. Project records will be retained in accordance with the requirements of Paragraph 121 of the CD.

SECTION 8

EPA APPROVALS FOR CERTIFICATION UNITS

This section describes the procedures for obtaining EPA approvals and certifications of completion for individual CUs in accordance with Section 5.2 of the revised SOW. This process is illustrated in the example CU acceptance schedule (Figure 8.1). To facilitate this process, throughout the 2011 DFO, EPA will participate in regularly scheduled progress meetings which should provide the guidance and progressive background needed to evaluate formal submittals for approval.

8.1 CU DREDGING COMPLETION APPROVAL

After the design dredging pass is reported by the Dredging Contractor to be complete within an individual CU or CU subunit, the CM will provide notification to EPA of the start of the dredging approval process for that CU or CU subunit. Bathymetric data and sediment sample data are targeted to be available to allow EPA approval within five (5) days following the contractor's notification of completion. First, a multi-beam survey will be performed by the third-party hydrographic survey contractor to identify that the target sediment has been removed and that the design dredge elevation has been achieved in 95 percent of each CU sub-unit or CU. Single-beam or land surveys may be performed for areas within the target dredging surface boundaries shown on the contract drawings that are in shallow water at depths unsuitable to be surveyed using multi-beam sonar equipment. Any shallow water single beam or land survey transects will be spaced a maximum of 50 feet apart. If target sediment is identified by the survey that is outside of the allowable dredge tolerance, the CM will inform EPA of the need for additional dredging and return to dredging operations. Once that additional dredging has been conducted, the CM will again notify EPA of completion of dredging and initiate a second bathymetry survey as described above. If the second survey confirms that all target sediments have been removed within the allowable dredge tolerance and that the design dredge elevation has been achieved in 95 percent of the sub-unit or CU, the collection and analysis of post-dredging sediment samples will be performed. In order to meet the target of completing all bathymetric surveys and sediment sampling within five (5) days, EPA is expected to be an integral part of that daily process.

Should the target elevations be confirmed to have been met but sediment chemistry of the dredged area indicates the need for re-dredging in accordance with the criteria in the 2011 PSCP (Appendix D to the 2011 RAWP). The process for re-dredging confirmation will be similar to that for the initial dredging pass – confirmation of the required dredge cut by multi-beam survey followed by sampling and sediment PCB analysis. Review and confirmation of removal in a re-dredging pass is expected to take approximately five (5) days, including the review and determination by the EPA representative.

The CM will review the vertical and horizontal limits of removal and the results of the post-dredging sediment sampling within the CU in accordance with the applicable requirements of the 2011 FDR and the 2011 PSCP (Appendix D to the 2011 RAWP).

The CM will complete the CU Dredging Completion Approval Form (included in Attachment F to the revised SOW and also included herein in Attachment 4). This form will also identify the extent of backfilling and/or capping for the CU in accordance with the applicable requirements of the 2011 FDR, the 2011 PSCP and agreements made with EPA during the course of the daily CU acceptance progress meetings.

A completed CU Dredging Completion Approval Form, all laboratory data, and supporting drawings will be presented to the EPA field representative for review and concurrence. If the EPA field representative agrees that dredging has been completed and that the specified plan for backfilling and/or capping conforms to the requirements of the above-mentioned documents, then the EPA field representative will promptly indicate concurrence by initialing and signing the CU Dredging Completion Approval Form. Due to the aggressive productivity target in the 2011 design, the EPA review process is expected to take no longer than one day from the receipt of the completed CU Dredging Completion Approval Form. Although the Dredging Contractor's weekly schedule should give an indication when CU completion is anticipated, it should be noted that the process of approving CUs will occur on a 24 hours per day, 7 days per week basis, and GE expects that EPA representatives will be available daily to concur with CU completion decisions and receive and approve CU Dredging Completion Approval Forms.

8.2 CU BACKFILL / ENGINEERED CAP COMPLETION APPROVALS

Shortly after receiving verbal agreement from EPA that dredging operations have been completed in a given CU, placement of backfill/cap materials will begin. After backfill/cap material placement is complete within an individual CU, the CM will direct the third-party survey contractor to collect multi-beam bathymetry of the installed backfill and/or cap and land survey of the near shore backfill set-points shown on the contract drawings. The CM will then review the multi-beam bathymetry and other information including land survey results and daily placement reports to determine whether the backfill and/or cap within the CU have been installed in accordance with the applicable requirements of the 2011 FDR and the 2011 PSCP.

The CM will prepare a record drawing (hard copy and electronic) of the installed backfill and/or cap and complete the CU Backfill/Engineered Cap Completion Approval Form (included in Attachment F to the revised SOW and also included herein in Attachment 4). A completed CU Backfill/Engineered Cap Completion Approval Form will be presented to the EPA field representative for review and concurrence. If the EPA field representative agrees that the backfill and/or cap within the CU have been completed, then the EPA field representative will promptly indicate concurrence by initialing and signing the CU Backfill/Engineered Cap Completion Approval Form. As stated above, this is a 24 hours a day, 7 days per week approval process that requires active participation at all times from EPA for timely approvals.

8.3 FINAL CU CONSTRUCTION COMPLETION CERTIFICATIONS

Following completion of all remedial construction activities within an individual CU, including, but not limited to, the initial installation of habitat materials in 2012 (if required under the 2011 FDR), but excluding operation, maintenance, and monitoring and adaptive management activities, the CM will review the information on the habitat construction measures installed within the CU to determine whether those measures have been installed in accordance with the applicable requirements of the 2011 FDR.

The CM will prepare a record drawing (hard copy and electronic) of the location and type of habitat construction, the bathymetry/profile of the CU after backfill/cap placement, and complete the Final CU Construction Completion Certification Form (included in Attachment F to the revised SOW and also included herein in Attachment 4). A completed Final CU Construction Completion Certification Form will be presented to the EPA field representative for review and concurrence. If the EPA field representative agrees that all remedial construction activities within the CU have been completed, then the EPA field representative will promptly indicate concurrence by initialing and signing the Final CU Construction Completion Certification Form.

8.4 CU COMPLETION COORDINATION AND DOCUMENTATION

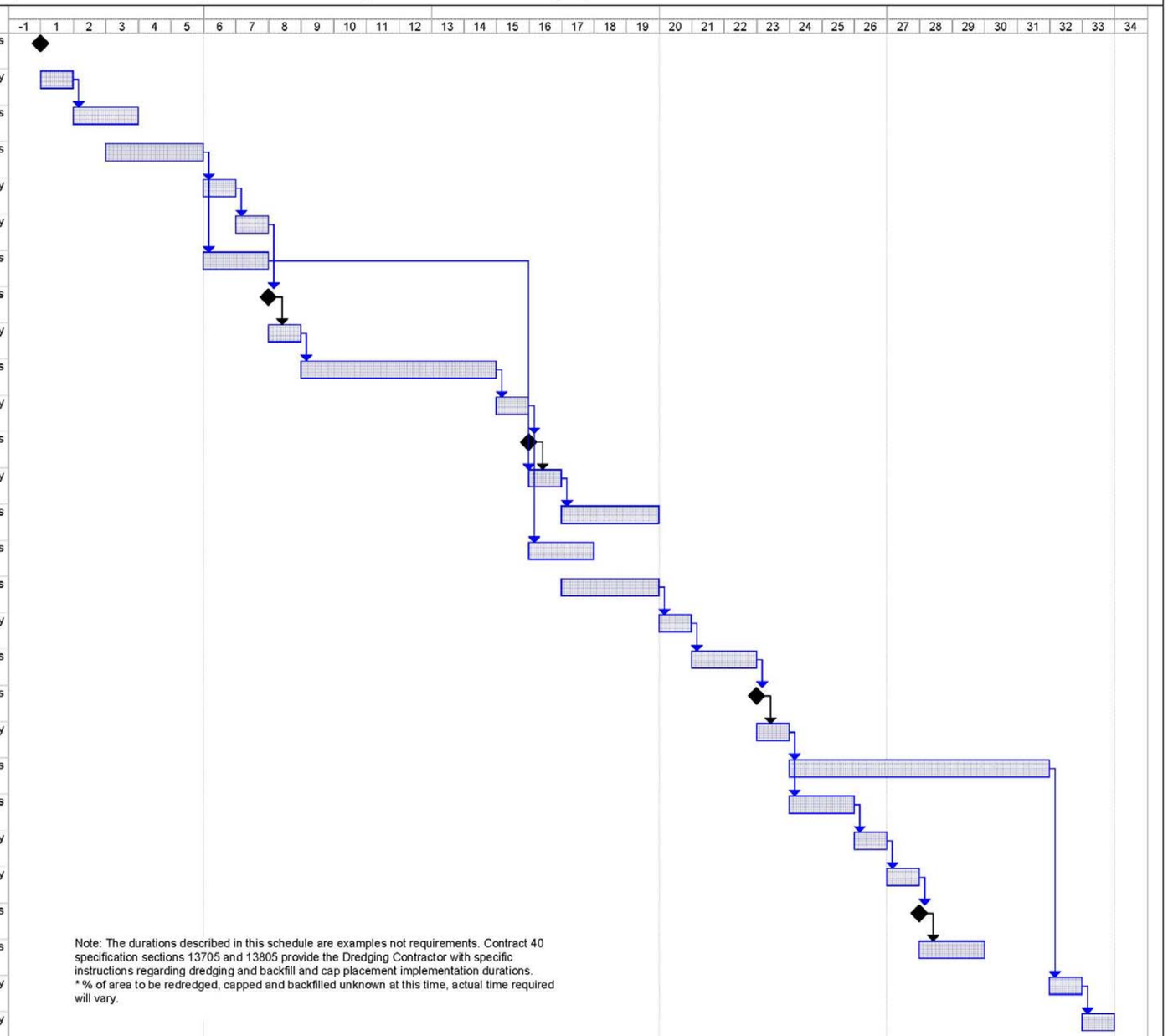
To facilitate the CU acceptance process EPA and GE will participate in regularly scheduled CU acceptance progress meetings (generally daily). Progress of Dredging Operations as well as the latest bathymetric and sediment sampling data will be presented at the meetings using maps and data tables. It is anticipated that at these meetings the progress of the work will be reviewed, issues discussed and decisions made to ensure the Dredging Operations may continue to progress in accordance with the planned work schedule. These meetings will include the following procedural practices:

1. Results of monitoring, core samples, laboratory data and survey data will be presented and reviewed in detail.
2. Issues related to field conditions and potential impediments to the progress of the work will be reviewed.
3. Decisions made during the course of the meeting will be captured and documented by the CM.
4. The decisions will be reviewed and confirmed by GE and EPA at the end of each meeting.
5. A record of decisions made will be included as support documentation with CU certification forms.
6. GE will proceed with CU completion actions based on the daily meeting decisions. The CM will promptly provide CU acceptance forms for all completed work to EPA for signature soon thereafter.

Figure 8.1 CU Acceptance Example Schedule

Example Durations for a Single Additional Dredge Pass and Backfill/Cap Cycle in a CU

ID	Task Name	Duration
1	Contractor Notification that Design Dredge Pass is Complete	0 days
2	Post Dredging Bathymetry	1 day
3	Sediment Sample Collection	2 days
4	Sample Analysis & Validation	3 days
5	EPA Review and Approval of Proposed Actions	1 day
6	Engineering Design of Additional Dredge Pass	1 day
7	Engineering Design of Backfill in Areas Upstream of Dredging	2 days
8	Written Release to Begin Additional Dredge Pass	0 days
9	Prepare to Perform Additional Dredge Pass	1 day
10	Allowance - time to complete Additional Dredge Pass*	6 days
11	Post Dredging Bathymetry	1 day
12	Written Release to Begin Backfill Placement in Upstream portions	0 days
13	Prepare to Perform Upstream Backfill Placement	1 day
14	Allowance - time to complete Upstream Backfill Placement*	3 days
15	Sediment Sample Collection	2 days
16	Sample analysis & Validation	3 days
17	EPA Review & Approval of CU - Dredging Complete (Form 1)	1 day
18	Engineering Design	2 days
19	Written Release to Begin Cap and Remaining Backfill Placement	0 days
20	Time to begin Cap or Remaining Backfill Placement	1 day
21	Allowance - time to complete Remaining Backfill Placement*	8 days
22	Allowance - time to complete Cap Isolation Layer Placement*	2 days
23	Post Cap Isolation layer Bathymetry + Core Collection	1 day
24	TOC Analysis	1 day
25	Written Release to Begin Cap Armor layer placement	0 days
26	Allowance to complete Cap Armor layer placement*	2 days
27	Post Backfill/Cap Bathymetry	1 day
28	EPA Review & Approval of CU - Backfill / Cap Complete (Form 2)	1 day



Note: The durations described in this schedule are examples not requirements. Contract 40 specification sections 13705 and 13805 provide the Dredging Contractor with specific instructions regarding dredging and backfill and cap placement implementation durations.
* % of area to be redredged, capped and backfilled unknown at this time, actual time required will vary.

SECTION 9

FIELD CHANGES

Field changes described herein are limited to changes to this DQAP. The procedures for making and obtaining EPA approval for changes to design plans and specifications or construction/operation processes are discussed in Section 1.6 of the 2011 RAWP. Design change-order procedures are described in the contracts between GE and the various contractors.

9.1 DQAP CHANGES

GE, the CM, SM, or CQAO may initiate revisions to this DQAP. The DQAP may be revised when it becomes apparent that the DQAP procedures or controls are inadequate to support work being produced in conformance with the specified quality requirements or are deemed to be more excessive than required to support work being produced in conformance with the specified quality requirements. Changes to QA procedures necessitating modification to this DQAP will be initiated by the CQAO for CM and GE approval. They will then be submitted to EPA for review and approval. Updates to DQAP staffing will be made by GE notification to EPA as described in Section 2.3 without submission of a fully revised DQAP.

9.2 QC CHANGES

The contractors' CQCPs required by Technical Specification 01450 may require revisions as necessary to achieve the goal of continual improvement and to correct unsatisfactory performance. At any time after approval by the CM, GE and the CM may require a contractor to make changes to its CQCP, including personnel changes, as necessary to obtain the quality specified. Moreover, the contractor may initiate CQCP changes to correct QC process problems, and is required to notify the CM in writing of any desired changes; all changes are subject to GE and CM acceptance. Revisions to the CQCPs will not be submitted to EPA for approval, but will be available for EPA review upon request.

SECTION 10

FINAL QC/QA REPORTING

As discussed in Section 7 of the 2011 RAWP, within 30 days of the end of work activities for the 2011 season – i.e., 30 days after completion of dredging, backfilling, capping, shoreline reconstruction/stabilization, and sediment process/water treatment for that season – GE will submit to EPA an annual report on those activities. That report will include the following DQAP-related documentation:

- The record (as built) drawings as described in Section 7.4 of this DQAP;
- Copies of the Final CU Construction Approval and Completion Certification forms for each completed CU; and
- Copies of Certificates of Disposal received from the disposal sites.

In addition, QA/QC documentation for the work conducted in 2011 will be included in the final Remedial Action Report to be submitted to EPA at the conclusion of Phase 2 in accordance with Paragraph 57.b of the CD.

SECTION 11

REFERENCES

Parsons. 2005. GE Response to US EPA Region 2 Consent Order Item 10b *Parsons Commercial Technology Group Inc. Quality Management Plan (QMP).* (October 7, 2005).

United States Environmental Protection Agency. 2002. *Superfund Record of Decision.* February 1, 2002.

United States Environmental Protection Agency and General Electric Company. 2005. *Consent Decree in United States v. General Electric Company, Civil Action No.1:05-cv-1270,* lodged in United States District Court for the Northern District of New York, October 6, 2005; entered November 2, 2006.

United States Environmental Protection Agency, 2010. *Statement of Work for Remedial Action and Operations, Maintenance and Monitoring.* December.

United States Environmental Protection Agency, 2010a. Technical Memorandum - *Quality of Life Performance Standards Phase 2 Changes.* December.

United States Environmental Protection Agency, 2010b. *Hudson River PCBs Site – Revised Engineering Performance Standards for Phase 2*. Prepared for EPA by Louis Berger Group. December.

ATTACHMENT 1

DQAP STAFFING LIST AND RESUMES

DQAP STAFFING LIST

Dredging Construction Quality Control/Quality Assurance Plan (DQAP)
2011 Dredging and Facility Operations
Hudson River PCB's Superfund Site

April 1, 2011

The following personnel are assigned DQAP functions effective as indicated below. Periodic updates to this list are to be issued by the Construction Manager.

FUNCTION	NAME	ORGANIZATION
CQA Officer	Richard Wiser	Construction Management
CQA Field Inspector	Torry Dorsey	Construction Management
CQA Field Inspector	Douglas Dumont	Construction Management
CQA Field Inspector	Zachary Evans	Construction Management
CQA Field Inspector	Lisa Gorton	Construction Management
CQA Field Inspector	Susan Green	Construction Management
CQA Field Inspector	Grigory Khaitov	Construction Management
CQA Field Inspector	Stephan Lemieux	Construction Management
CQA Field Inspector	Steven Tomlinson	Construction Management

/s/ Larry Hartman — CM Approval

1 April 2011 — Date

Years of Experience
30+

Education / Training

- Studies, Tennessee Temple College, Chattanooga, TN, 1969

License / Registration

- State of West Virginia Contractor License (WV014960)
- State of Kentucky Boiler Contractor's License (1675)
- State of Michigan Boiler Repairer's Contractor's License (320382 IV)
- American Welding Society/ Certified Weld Inspector (AWSCWI / 98041024)

Special Training

- American Management Association (Certified Trainer)
- PHCC Purdue University/ Change Order Seminars
- International School of Construction Estimating (Richardson)
- Microsoft Word/Excel Certificate of Training (C.E.)
- Microsoft Windows/Certificate of Training (C.E.)
- American Management Association/ Techniques Certification of Training (C.E.)
- Primavera Scheduling Training (P-3) Certificate of Training (C.E.)
- Project Management / Fred Pryor Resources, Inc. (C.E.)
- American Management Association (TCCIC) (C.E.)
- American Welding Society / Welding Inspection Seminar (C.E.)
- State of Tennessee Mechanical Contractor License (Mech. I, Mech. II, Business Law)
- State of Ohio Hydronics Contractor's License (Business & Law)
- SNT-TC-1A Level III Visual Inspector
- SNT-TC-1A Level II Ultrasonic Testing Inspector
- SNT-TC-1A Level III Positive Material Identification Inspector

Richard B. Wiser

CQA Officer

Summary of Relevant Qualifications

Richard Wiser is a member of the ASME, the ASNT, the ACI, the SSPC, and the AWS. He is a Certified Welding Inspector (CWI) from the American Welding Society. His is a certified Estimator from the Richardson International School of Cost Estimating. He is a certified P-3/Primavera Scheduler. Received Contractor's License for the State of Tennessee Mechanical License for Mechanical I, Mechanical II, and Business Law requirements. Also, maintain multiple State Contractor's License including Mississippi, Montana, Utah, California, Ohio, Kentucky, Michigan, West Virginia, South Dakota, Nebraska, Iowa, Louisiana, Illinois, and Minnesota. He is computer literate, having completed many computer classes.

He has the training, education, and drive it takes to produce a proper environment conducive to long-term commitment to Quality Assurance and Quality Control endeavors. His past work experience could be an obliging addition to your already well-versed staff. To reiterate, He has written, established, and implemented Quality on the corporate and field levels, respectively. He has a good working knowledge of the NEC Codes, as well as ASME, NBIC, AISC, BOCA, API, NFPA, ASTM, AWS, ACI, UL, and OSHA Construction Compliance.

Work Experience

QA/QC Director. ProEnergy services, LLV Sedalia, MO - Responsibilities: Wrote and implemented the PES Quality Manual and Program. Maintained multiple State Contractor's License including Mississippi, Montana, Utah, California, Ohio, Kentucky, Michigan, West Virginia, South Dakota, Nebraska, Iowa, Louisiana, Illinois, and Minnesota. Wrote numerous QA Policies and Procedures. Obtained ISO 9001-2000 Certification and maintenance of the full Program. Performed Auditing for ISO and also Shop Surveillances in all PES Facilities and Suppliers. Responsible for obtaining the ASME S-Stamp, and the U-Stamp and also the NBIC R-Stamp. My responsibilities also extend to ProSteel Inc. and all of the Code related fabrication including ASME Section VIII, Division I Pressure Vessels, AWS D1.1 Structural Steel, and API Tanks. Achieved Underwriters Laboratory Certification (UL) for the fabrication of electrical control panels. I was able obtain AISC Certification and the ASME UM-Stamp. ProEnergy is a full service provider for the Power Industry with offices in Atlanta Georgia, Houston Texas, Caracas Venezuela, Merida Mexico, Buenos Aires Argentina, Panama, and Pakistan

QA Manager / Site Manager. Atlantic Plant Maintenance, Inc, Mason, OH - Was employed by Enterprise to work as a QA Manager and Site Manager for the construction of the Pioneer Cryo Gas Plant, in Opal Wyoming. My immediate superior was Paul Broussard the Project Manager. Supported a staff of 10 employees, serving as civil, mechanical, and I&E inspectors. My responsibility was to implement the Quality Program regarding all construction including concrete, grout, welding, mechanical, structural steel, millwright, electrical, plumbing, buildings, and instrumentation. My office was also responsible for all subcontractors' QA programs and the implementation thereof. I was responsible for all Environmental Issues including the Wyoming State Bureau of Land Management, and WYPDES and SWPPP.

QA / QC Manager. Hake Group of Companies (Matrix Services, Inc), Eddystone, PA – Responsibilities: Was employed as QA/QC Manager for Atlantic Plant Maintenance, Inc., a GE subsidiary. I worked directly with the Ohio Valley Manager located in Cincinnati Ohio and the VP of Operations in Chicago Illinois. Wrote the Quality Assurance Manual for APM. Produced Job Specific QA Manuals for APM General, APM MCV (Midland Michigan), GE

Wind (Western United States), and GE 7H (California). Received the highest rating afforded by GE for APM "GE Wind" QA Manual. Responsibilities include writing and implementing the Quality Assurance Program encompassing welding, structural steel, electrical, civil, mechanical, general construction, and millwright work. Duties also consisted of traveling to construction sites within the United States in order to further the implementation of the APM QA Program.

Site QC Engineer. Granite services (GPTS) On assignment with GE (PPSD) Norcross, GA - Responsibilities: Was employed by General Electric (PPSD Division), as a Quality Control Engineer at the Armstrong Energy, LLC Project in Shelocta Pennsylvania, (ProjectValue$230 MM). GE installed four simple cycle Gas Turbine/Generators for Dominion Power. Was responsible to GE for the Quality of the entire project including concrete, electrical, mechanical, structural steel, plumbing, all welding, concrete placement, grout applications, millwright, mechanical piping, civil, underground, and above ground. Duties also include performing ISO Auditing for compliance. Prior to my involvement with this project, I was QC Engineer for the Ladysmith CT Project in Ladysmith Virginia (value $313 MM) and Pleasants Energy Project in Parkersburg West Virginia, (value $336MM). I was awarded two GE Power Awards and presented with a commensurate cash performance bonus, for my contribution to these projects, in both 2000 and 2001. Since leaving GE, have worked on several special projects as a private consultant.

Project Manager / Q.C. Mgr. / ASME Code Specialist. Foley Company/Tennessee Division, Oak Ridge, TN - Responsibilities: Was employed as the Quality Control Manager for the Foley Company, Kansas City Missouri. Worked for the Tennessee Division, in Oak Ridge Tennessee. Was able to secure the R-Stamp, from the NBIC and the U-Stamp, the PP-Stamp, and the S-Stamp from the ASME. I wrote and implemented their entire Quality Program. Because of my previous affiliation with many of the A&E Firms, General Contractors, Mechanical Contractors, and the Building Trades, was also involved with the Marketing.

VP Boiler Division / QA/QC Manager / Project Mgr – Shoffner Mechanical & Industrial Contractors, Inc., Knoxville TN - Responsibilities: Was employed by Shoffner Mechanical Contractors, Inc., in Knoxville Tennessee as the Vice President of the Boiler Division and Quality Control Manager. Was able to write and implement their entire QA/QC Program and was able to secure all of their ASME Code Stamps and NBIC Code Stamps. Wrote proper documentation with regards to welding, leak testing, electrical, millwright, plumbing, mechanical piping, structural steel, concrete placement, grout applications, thermal protection, inspection services, equipment installation, and HVAC.

Wrote documentation for the certification of Level I, Level II, and Level III inspectors, under the guidance of SNT-TC-1A's Recommended Practice. Addressed the following NDE methods; Radiographic Examination (RT), Magnetic Particle Testing (MT), Ultrasonic Testing (UT), Liquid Dye Penetrant (PT), Visual Weld Testing (VT), Leak Testing (LT), and Positive Material Identification (PMI). I have written in excess of 100 ASME approved welding procedures for the following base materials; carbon steel, stainless steel, inconel, monel, copper, red brass, hastelloy, and nickel, using SMAW, GTAW, GMAW, FCAW, SAW, OAW, and PAW processes. During my first year, I was able to market and produce almost $40MM in revenues for the production of ASME Section VIII, Division I Unfired Pressure Vessels.

Started as Helper, then to Welder, then to QA Manager, eventually President (CEO). Boiler Service & Repair Company, Inc. Knoxville, TN

Responsibilities: Started as helper, then to ASME Qualified Welder, eventually President (CEO). My duties and responsibilities varied due to my length of service and progression of growth. This was a family owned company, of which I sold the company in 1996

Years of Experience
30+

Education / Training

- A.A. – Construction Technology, Hudson Valley Community College, Troy, NY

Special Training

- Nicet Level III/CET
- NYS Licensed Home Inspector
- NYS Code Certified
- ACI Certified
- HazCom Training

Torry Dorsey

CQA Field Inspector

Summary of Relevant Qualifications

Mr. Dorsey is results oriented, hands-on construction and development professional with over 30 years experience in all facets of the industry: construction, Project management, Inspection, Sales, and consulting. Proven ability to work on multi-million dollar projects with owners, architects, engineers, and municipalities to complete design and development specifications to meet and exceed goals.-

Work Experience

Senior Sales Consultant – DA Collins, Inc., (Jointa Galusha/Palette Sonte), Wilton, NY – responsible for the sales, design, and product specifications, testing of construction products including asphalt, concrete and stone products, milling and paving, road construction/infrastructure, and construction services for residential, commercial and bridge replacement projects.

Projects included:

- GE Dredging Project – 700M+ PCB Removal Project/Provided site development for materials $120M Expansion of Irving Tissue – Removal and abatement of 7 existing building with the construction of 3 new buildings for paper making process
- General Falls Hospital Expansion – site development and tie into existing utilities/All structural foundations through 5 floors
- Route 8 Hudson River Bridge Replacement – Bridge replacement/New Bridge construction

Project management/Estimating) – Peckham Road Corporation, Hudson Falls, NY – managed projects from beginning with reviewing specifications, developing estimates and overseeing project through completion; evaluated and hired subcontractors determined through a bidding process and monitored quality of performance

Projects included:

- Relocation of Mount McGregor Entrance Road
- Reconstruction of Route 8 – Loon Lake to Pottersville
- Reconstruction of Warren county Runways

Private Consultant and Inspector – locations throughout New York State, 30+ years - Companies include: Greenman Pederson, Inc., EW Finley, DKI Engineering, URS Greiner/ Greiner, Inc., Sear Brown Engineering

Projects included:

- Chief Inspector for Fort Edward Yacht Basin / NYS Thruway Authority Project
- Inspector for Exit 23 Bridge / NYS Thruway Authority Project
- Chief Inspector for Exit 34 I-87 Bridge Demolition and Reconstruction / NYS DOT

Owner/Licensed Inspector – Home Technology Inspections, Gansevoort, NY – Provided commercial and residential building inspection: structural, roofing, plumbing, heating, and electrical inspections.

Years of Experience
18

Education / Training

- A.S. - Civil Engineering Technology, State University of New York, 1993

Special Training

- State of California Department of Public Health Water Treatment Plant Operator-T1; Expires 7/1/2013
- OSHA 40-Hour Hazardous Waste Safety Training
- OSHA 10-Hour Construction Safety Course
- OSHA 8-Hour Supervisor Training
- LPS-Loss Prevention System Training Certification
- Confined Space Entry
- Advanced PLC Programming
- TWIC Card
- Troxler Certified
- ACI Concrete Field Technician – Grade I Certification
- DBO2 Safety Software
- Primavera P6

Douglas D. Dumont

CQA Field Inspector

Summary of Relevant Qualifications

Mr. Dumont has 18 years of experience in civil and environmental remediation projects with roles that include: resident project representative, facility operations specialist, construction quality assurance inspector, construction oversight and inspection. Mr. Dumont is currently working on the Bayonne Crossing Development. Environmental remediation experience includes the following:

- Hazardous Waste Excavation, Treatment, Stabilization, Dewatering, and Transportation.
- Clean up of PCB's, Cyanides, Chromium 6 TCE, and other hazardous waste sites.
- Environmental Mechanical Dredging
- Slurry Walls
- Landfill Caps.
- Liner Construction
- Waste Water Treatment
- LNAPL Recovery Systems
- Bio-Venting
- Soil and Water Sampling
- Site Characterization Investigations

ACI certified as a concrete field technician- Grade I. He has served as a field and soils laboratory technician, procurement officer, and data manager on both private and public sector projects. His additional experience includes the operation of Geoprobes for collection of subsurface soil samples, well development, groundwater sampling, and sample preparation and shipment. He has been responsible for plant startups, developing facility operations and maintenance (O&M) manuals and lesson plans, plant evaluations, and implementation of computerized operational monitoring, control, and maintenance systems. Mr. Dumont has had oversight of concrete pours including inspection of formwork; re-bar installation, and concrete pours consisting of slump tests, entrained air tests, and compression cylinders. His college courses in concrete design included a concrete lab where he performed slump tests, an entrained air test, and created and tested compression cylinders.

Work Experience

Parsons – Senior Construction Engineer/Specialist, Bayonne, New Jersey. Mr. Dumont is currently the onsite representative at the Bayonne Crossing Development, overseeing and reporting on remedial activities onsite while development of the site is happening simultaneously. Which includes the installation of steel sheet piling for a NAPL Barrier Wall a construction of a Bio-Sparge Containment Trench which has vinyl sheet piling installed as a component of the Containment Trench.

Parsons – Second Shift Assistant Site Manager, Ft. Edward, New York. Mr. Dumont was the Parsons Lead on the night shift, overseeing operations that were conducted 24 hours a day seven days a week and include unloading and processing six to eight sediment hopper barges (35' x 98' long) a day at a peak capacity of approximately 22,000 CY per week. Processing material initially through a size separation process that includes a trommel, intermediate screen, and hydrocyclones. Sediment slurry is then pumped and conditioned with polymer to a 750,000 gallon gravity thickener tank. The sediment is then

dewatered by plate filter pressing with up to 12 custom filter press units with 2M x 2M plates. The dewatered material is then staged in designated areas and loaded into rail cars for off-site disposal. At peak capacity a loaded unit train of 81 cars leaves the facility three times a week. Water from the process including stormwater is treated on-site through a 2 million gallon per day treatment plant that consists of clarifiers, multi-media filters, granular activated carbon vessels, and final polishing filtration.

CDM - Construction Inspection, Fernley, Nevada. Mr. Dumont was the onsite inspector for CDM during construction of a $40 million Drinking Water Micro Filtration Plant. Duties include inspection of structural, mechanical and electrical construction activities and writing of daily reports.

CDM - Resident Project Representative, St. Petersburg, Florida. Mr. Dumont was the night shift resident project representative (RPR) to observe capital project work being performed at the Pinellas County Waste to Energy (WTE) Facility. His duties were to observe construction and implementation of the projects contained within 7 Exhibits to Veolia Environmental Services Inc., contract with Pinellas County, and to assure that Veolia Environmental Services Inc. complied with the contracts and all applicable codes. The work overseen by Mr. Dumont was on the following: Exhibit #1 Construction of Residue Storage Processing Building (RSPB), including rebar and concrete for building pad and erection of steel framing; Exhibit #2 Retrofitting of Boiler #3, removal and replacement of furnace water wall tube panels, including the final walk down of the hydrostatic test, feed chute assembly, grate drive traverse assembly, Martin stoker controls and feeders. Mr. Dumont also provided oversight on an overhaul and start up of a 25 MW Steam Turbine generator.

CDM - Construction Oversight and Inspection, Livingston, Montana. Mr. Dumont was the construction oversight and inspector under contract for Montana DEQ for the construction of the BNSF Livinston Shop Complex LNAPL recovery, soil bioventing and water treatment system. Mr. Dumont's duties included oversight of consturction and inspection of 1000 ft utilidor installed in an active railyard that connects the multi-use groundwater extraction/LNAPL recovery/bioventing well piping to a water treatment facility that houses granular activated carbon treatment of air and water streams, air blowers for the bioventing wells, and the system controls. Construction of a treatment building included numerous concrete pours, installation of piping, equipment and electrical work. Mr. Dumont's duties also included oversight of start-up and shake down of the treatment system once constructed.

CDM - Wastewater Treatment Plant Operator, Ashtabula, Ohio. Mr. Dumont was the wastewater treatment plant (WWTP) operator at the Ashtabula Closure Project, DOE site remediation in Ashtabula, Ohio. Operations of the WWTP included air stripping, sludge management, NPDES sampling and record keeping.

CDM - Construction Quality Assurance Inspector, Massena, New York. Mr. Dumont was a construction quality assurance inspector (CQAI) at the Alcoa Inc., Massena Operations, West Plant Secure Landfill Cell 3 construction and operation.

CDM - Operations Specialist, Livermore, California. Mr. Dumont was a startup operator for the 8-mgd Patterson Pass/Zone Seven Ultrafiltration Water Treatment Plant.

CDM - Operations Specialist, Glendale, California. Mr. Dumont directed the startup of a $25 million, 7.2-million-gallon-per-day (mgd) water treatment plant, which uses air stripping

and granular activated carbon to treat groundwater. His responsibilities included assisting with the startup, permit compliance, operation, maintenance, and monitoring for the plant.

CDM - Operations Specialist, Redlands, California. For a confidential client in Redlands, California, Mr. Dumont was responsible for directing the initial on-line operation of 24 carbon treatment vessels and troubleshooting the startup of equipment for two groundwater treatment facilities designed to treat groundwater contaminated with trichloroethylene (TCE).

CDM - Treatment Plant Operator, Sparks, Nevada. For the Sparks Solvent/Fuel Site remediation project in Nevada, Mr. Dumont served as the treatment plant operator, operating a dual-phase soil and groundwater treatment system. As lead operator at the Sparks facility for the past three years, he has also been responsible for training other personnel in operations and maintenance procedures.

CDM - Lead Operator, Groundwater Remediation Project. Mr. Dumont was also the lead operator for a remediation project for a confidential client in Lake Tahoe, Nevada. The system included a conventional pump-and-treat groundwater treatment process and an air sparging treatment process. In addition to system operation, his responsibilities included running system analysis reports and providing data to the regulators overseeing the site.

CDM - Quality Assurance Inspector, Construction Remediation. Mr. Dumont was a member of CDM's construction quality assurance team associated with the $150 million Alcoa remediation project in Massena, New York. His responsibilities included construction inspection for a 40-acre Toxic Substances Control Act (TSCA) landfill with a composite liner, cap, and leachate collection/pumping systems; management of the field test database; well development; and groundwater sampling.

CDM - Field Operations Coordinator, Military Reservation Study. Mr. Dumont also served as a member of CDM's Massachusetts Military Reservation study. For this study, he was the field operations coordinator and the Geoprobe operator. He performed surveys and groundwater sampling; monitored supplies; managed inventory control; and processed purchase and expense vouchers. Additional duties on this project included oversight of the installation of monitoring wells and operation of a granular activated carbon (GAC) system for drilling operations.

CDM - Systems Operator, Groundwater Recovery Treatment System. Mr. Dumont also worked on the AMERCO project in Canton, New York. His duties included the operation and maintenance of a groundwater recovery treatment system with carbon adsorption and counter current air stripping. Maintenance on the system included the repair of an air stripping tower and electrical wiring of pumps and sensor probes.

USNR - U.S Naval Reserve Heavy Construction Equipment Operation. Mr. Dumont was a heavy equipment operator with the SEABEES (Construction Battalion) U.S. Naval reserves, while in the reserves he worked on the construction of roads on the Fallon Naval Air Station, in Fallon NV. And he also worked on construction of a runway and access road in Ketchikan, Alaska.

USACE - Team Leader, Heavy Construction Equipment Operation. Mr. Dumont also served in the U.S. Army Corps of Engineers (USACE) for four years, where he was a team leader for heavy construction equipment operation. USACE projects in which he was involved consisted primarily of highway and airport construction and upgrades in the Federal Republic of Germany. He operated equipment, including a Cat D-7 bulldozer, a Case

MW-24C 2.5-yard bucket loader, a John Deere 310 backhoe, and an AM General 916 tractor with a 40-ton low bed trailer.

Years of Experience
4

Education / Training

- B.S. Civil Engineering, Syracuse University, Syracuse, NY 2009
- Minor Engineering Management, Syracuse University, Syracuse, NY 2009

License / Registration

- E.I.T.: Fundamentals of Engineering, New York – April 2009

Special Training

- 40-Hour HAZWOPER: Hazardous Waste Operations and Emergency Response
- OSHA 10-Hour: Construction Training
- Boaters Certificate: New York State
- First Aid, CPR, AED
- Microsoft: Office Programs
- Primavera:
  - Project Management v621
  - Project Management v13 Oracle
  - SharePoint
- CAD:
  - MathCAD
  - MicroStation
  - AutoCAD
- dbo2 - Design Build Own Operate:
  - Health & Safety Inspections
- Surveying:
  - Proficient in surveying techniques – Traditional, Theodolite, and GPS

Zachary T. Evans

CQA Field Inspector

Summary of Relevant Qualifications

Mr. Evans has experience as a construction and field inspector, and engineering experience in the Structural and Transportation fields.

Work Experience

Field Inspector - Parsons – Fort Edward, NY - Parsons Commercial Technology Group – General Electric Co. Hudson River Dredging Project - • Oversaw eight of seventeen dredge and backfill plants in the targeted dredging of 265,000 cy of Tri+ PCB laden sediments from the Hudson River • Tracked quantities and percent complete • Addressed concerns relating to historical artifacts and quality of life issues – Light, Noise, Air, Odor, and Navigation • Oversaw activities associated with the following: • Environmental and Navigational Dredging – Conducted with excavators using watertight hydraulic level cut buckets controlled by Hypack Dredgepack software • Resuspension Controls – Including installation, operation and removal of a rock dike with control structures, sheet piling, and silt curtains • Shoreline Stabilization – Using biologs, planks, and riprap • Backfill and Capping – Using various combinations of sand, crushed stone, and riprap depending on residual contaminant concentrations • Habitat Construction – Planting native plant species on the post-dredged river bottom and in designated wetland areas • Onshore activities – Including mobilization/demobilization of work sites and dredge equipment • Spill containment and reporting • Tree cutting and trimming • Debris removal • Scow, manpower and equipment tracking • Monitoring well inspection • Water treatment plant operations • Loading and shipping of railcars • Post-dredging data analysis of all tracked quantities • Review of material certifications, chemical analyses, contractor submittals, requests for information, and equipment costs

Transportation Engineer Intern - Herbert, Roland & Grubic, Inc – Dunmore, PA - • Detailed roadway cross-sectional designs using MicroSation • Performed inspections of concrete and reinforcing bars for installation of interstate logo signboards • Performed trip generation calculations • Contributed to CAD drawings of Highway Occupancy Permits • Updated property deeds in accordance with CAD drawing details to assure accuracy of work

Structural Engineer Intern - Dubai Contracting Company, L.L.C., – Dubai, U.A.E. - • Performed inspection work on high-rise construction sites including the Rolex, Sama, Code, and 014 Towers • Oversaw operations associated with construction of the following: • Reinforced concrete sheer walls • Foundations – Raft and pile • Foundation water tanking and repair • Block walls • Utilities – HVAC, Plumbing and Electrical • Curtain walls • Parking garages • Snagging of finishing works for both residential and commercial space • Conducted weekly site progress meetings

ESTI Construction Inspector - Pennsylvania Department of Transportation, District 4-0 – Construction Unit – Dunmore, PA - Performed inspections and maintained accurate legal documentation of daily roadway construction processes including manpower, equipment, safety, and quality control • Assured compliance with codes, standards, and project contract • Oversaw crews of 15 persons • Documented and issued pay for daily work performed by subcontractors • Inspected procedures including: • Paving – Shoulder repair, Binder leveling, Scratch course, Wearing surface • Milling of roadway • Pipe and drainage installation • Line

painting and testing • Shoulder backup placing and testing

Related Projects

Utica Street Bridge Rehabilitation Capstone Design

• Adhered to New York State Department of Transportation standards • Prepared calculations, drawings, and reports for specified products and procedures for the 600-foot span bridge • Project scope encompassed replacement of bearings, joints, rails, and secondary members, as well as the rehabilitation of deteriorated concrete abutments, piers, deck, and sidewalks • Maintained an overall goal of cost management while improving bridge aesthetics

Years of Experience
18

Education / Training

- B.S. – Civil/Environmental Engineering, Clarkson University, Potsdam, NY 1995
- A.A. – Civil Engineering Technology, New York State University of NY at Canton, 1993

License / Registration

- Professional Engineer, New York State #088292
- Engineer in Training, New York State #077644

Special Training

- Dredge Engineering Short Course, Texas A&M University, 2005
- OSHA HAZWOPER Refresher 40-hour /8-hour supervisory training/Respirator Fit test and Medical Monitoring
- OSHA 10-Hour Construction Safety

Professional Affiliates & Awards

- American Council of Engineering Companies (ACEC) – Diamond Award for Technical Excellence in Environmental Project Division (2007)
- USACE Heartland Award for dedicated service and teamwork– Alcoa East (former Reynolds Metals) –St. Lawrence River Remediation Project (2002).
- AECOM (formerly AECOM), Gold Environmental Engineering Excellence award (2005); Silver Technical Excellence Engineering Award (2007)

Lisa A. Gorton, P.E.

CQA Field Inspector

Summary of Relevant Qualifications

Ms. Gorton is a Professional Engineer with 18 years of combined consulting and regulatory experience directly related to the remediation of PCB and MGP impacted sediment and soils under New York State/New Jersey and Federal Superfund Programs. Primary responsibilities have involved;

- Technical Project Manager/ Task Manager – Preparation of remedial investigation sampling plans and reports, and remedial design development for various State and Federal sediment remediation, thermal desorption systems and MGP remediation projects. Experience managing teams of junior technical staff. Deputy project director assisting with preparation of budgetary estimates and monthly status reports.
- Construction Management – Lead construction manager, field engineer and inspection duties related to sediment and MGP remediation projects. Managed teams of junior technical and inspection staff.

Business Development – Assisting program director with preparation of qualification packages, cost estimates and proposals related to contaminated sediments and Manufactured Gas Plant remedial pursuits.

Work Experience

Senior River Operations Inspector - Parsons Corporation, Hudson River Remediation - General Electric, Fort, Edward, New York. Responsible for production tracking and evaluation of in-river operations such as: shoreline tree trimming, debris removal, dredging, backfilling and capping, bank stabilization and lock passages, and other dredging support activities. Additional responsibilities include project controls (scheduling and document management) and Contracts in the development and evaluation of request for proposals.

Project Engineer - AECOM - US Army Corps of Engineers - Kansas City District and USEPA - Region II, PRP Oversight for Alcoa (formerly Reynolds Metals) Company Site, Massena, New York- providing PRP oversight for the USEPA under an interagency agreement. Coordinating field oversight for PRP remedial construction activities involving the mechanical dredge (environmental clamshell) removal of 90,000 cubic yards of PCB-contaminated sediments from the St. Lawrence River, Responsibilities included documentation and conformance review for the following activities:

- Development and oversight of the environmental monitoring program including the analysis, management, and interpretation of air, water, and sediment quality data and the preparation of daily and weekly progress reports.
- Provided third party review of dredge hydrographic data generated by dredge operations and third party survey data to confirm volume estimates and bottom cut/backfill elevations conformed to design criteria.
- Oversight and documentation for the restoration and capping of the river bottom and bank stabilization.
- Daily coordination activity with contractor, engineer, regulatory agencies and community with respect to any change in condition, design modifications, and corrective actions.
- Provided technical engineering support after construction completion to evaluate overall project performance.

Project Engineer - AECOM - US Army Corps of Engineers - Kansas City District and USEPA - Region II, PRP Oversight for Alcoa, Grasse River Site, Massena, NY - to provide

PRP oversight for the USEPA under an interagency. Coordinating field oversight for PRP remedial construction pilot study activities involving mechanical debris removal, hydraulic dredging of contaminated sediment, and filter pressing of 60,000 cubic yards of PCB-contaminated sediments from the Grasse River. Responsibilities included; oversight of the environmental monitoring program; review and verification of pre and post dredge bathymetry data using HYPACK generated dredge reports; evaluation and interpretation of air, water, and sediment quality data. During the course of the project, extensive PRP and interagency coordination was required to communicate performance criteria exceedances and document corrective actions. Responsible for the preparation of daily and weekly progress reports.

Dredge Operation Coordinator Specialist - AECOM - Passaic River Dredge Pilot Study - . Responsible for monitoring dredge operational performance criteria (i.e., re-suspension, cycle times, and tug positioning); verifying dredge bathymetry data using a ClamVision/ Cable Arm environmental dredge system with HYPAK and multi-beam survey verification. Responsible for coordinating operational changes with the client, regulatory agencies and technical sampling crew. Prepared daily progress reports and assisted with the construction completion documentation that is to be applied to a full-scale dredge design.

Engineering Task Manager - AECOM/Earth Tech under contract to US NAVY CLEAN, Pearl Harbor Sediment, Oahu, Hawaii - assisting in the development of a feasibility study work plan for Harbor sediments related to source identification techniques and dredge alternatives.

Environmental Engineer/Task Manager - AECOM under contract to New York State Department of Environmental Conservation, Onondaga Lake RI/FS, Syracuse, New York - for the development Onondaga Lake Remedial Investigation report. Co-authored the re-write of the RI/FS remedial investigation report describing the nature and extent of contamination resulting from numerous inorganic and organic compounds. Assisted in the development of habitat enhancement and restoration features based on varying site conditions. Assisted project manager with budget estimates, progress reports, and work plans.

Project Manager Serving and the Lead Technical and Construction Manager AECOM (formerly Earth Tech) under contract to New York State Department of Environmental Conservation, Standby Superfund 34 Freeman's Bridge Road Site, Glenville, NY - Design-CM services under NYSDEC Superfund - for the investigation, design and construction of an on-site temporary thermal (direct and indirect) thermal desorption systems to treat 75,000 tons TSCA and Non-TSCA regulated wastes. Managed a team of 10 inspectors, data quality assurance staff and surveyors on a 24 hour/7 day/week schedule.

Field engineer - Camp Dresser & McKee under contract to Alcoa Remediation Projects Organization, Massena, NY - supporting a multi-year remedial design- build effort related to the construction of TSCA/RCRA and remediation of six contaminated land sites. Efforts included the construction of a RCRA/TSCA landfill, installation of slurry walls, lagoon solidification programs, drum extraction, installation of treatment systems and site-wide sampling activity. Typical responsibilities included QA/QC inspection, submittal review, and development of contract documents, preparation and execution of sampling plans, QA/QC Plans and certification report.

Project Manager in the Division of Environmental Remediation, Manufactured Gas Plant Voluntary Program - New York State Department of Environmental Conservation, Albany, NY - Responsible for managing several sites under voluntary consent decrees with major electric utilities to address the investigation, design and remediation of MGP- impacted streams and rivers.

Project Manager - Key Project: Central Hudson Gas and Electric, MGP Site Remediation, Newburgh, NY - Project Manager – design /construction of $16MM dredging effort of the Hudson River in Newburgh, N.Y. Lead agent under the execution of Nationwide Permit No.

38, Scope of work included mechanical dredging of 3,800 CY of PAH and 21,000 cubic yards (CY) of NAPL contaminated river sediment. Installation of 17,300 SF combination wall consisting of king piles and steel sheet pile within (4) archeologically sensitive riverbed areas. Sediment solidification and preparation for offsite disposal was largely performed while inside a 95' x 213' temporary fabric structure with three TIGG NB-20 vapor control systems. Utility relocation of approximately of 42" HDPE pipe (200 LF), 30" HDPE pipe (180LF), and 3 manholes required extensive coordination with municipality and NYS water quality permitting. Author and Poster Presentation at Battelle's Conference for Contaminated Sediments

Years of Experience
15+

Education / Training

- B.S., Iowa State
- Graduate Coursework, Physical geography and Geology, University of Utah

License / Registration

- Licensed Professional Geologist in Arkansas, Delaware (inactive), and Pennsylvania

Special Training

- 40-hour OSHA Hazwoper
- OSHA 40-hour HAZWOPER Training,
  - Level B-trained,
  - Level C Site Safety Coordinator, certification current
- OSHA 10-hour Site Construction Outreach Safety Training

Publications and Presentations

- Completed twelve professional publications, technical papers, or presentations

Professional Affiliations

- Association of Environmental and Engineering Geologists
- National Ground Water Association
- Pennsylvania Ground Water Association

Susan Ann Green, P.G.

CQA Field Inspector

Summary of Relevant Qualifications

Ms. Green is accomplished in groundwater geologist with more than 15 years experience in multi-disciplinary environmental, geologic and drinking water supply project management, design, and implementation. She is also skilled in designing and executing investigations and detailed accurate reports within complex technical and regulatory environments for Federal, state, municipal, and industrial clients. She has proven abilities in managing projects to schedule and budget; in problem solving; in nurturing cohesive teams.

Work Experience

Senior Construction Inspector/Processing Office Engineer Parsons, Fort Edward, NY

Senior Geologist - Property Solutions, Inc., Moorestown, NJ - Hydrogeologist (Stephens Environmental, Inc., part-time) Newark, DE -

Field Geologist (Self-employed, part-time) -

Geologist - Pennsylvania Ground Water Association, volunteer -

Home Renovator - Residential family properties, part time -

Senior Geoscientist Weston Solutions Holdings, Inc. (Formerly Roy F. Weston, Inc.), West Chester, PA -

Project, Associate, and Assistant Geoscientist -

Continuing Education and Professional Development

- Conferences on Design and Construction Issues at Hazardous Waste Sites, United States Environmental Protection Agency and United States Army Corps of Engineers
- Construction Blueprint Reading, DE Technical and Community College, Stanton, DE
- Design and Construction Considerations in Ground Improvement Seminar, Virginia Polytechnic Institute and State University and Hayward Baker, Inc., Odenton, MD
- Geophysics for Water Resources and Contaminants and Geophysics Applied to Engineering, Society for Environmental and Engineering Geophysics Short Courses, Philadelphia, PA
- Advances in Subsurface Exploration Methods, Delaware Geological Survey, University of Delaware and GeoProbe Systems
- Design and Analysis of Aquifer Tests Short Course, Association of Environmental and Engineering Geologists-Baltimore, Washington, Harrisburg Section
- Understanding and Addressing Well Performance Issues, Kleinfelder, Inc., Baltimore, MD
- Pennsylvania Department of Environmental Protection, Land Recycling Program Client Workshops and Seminars: Act 2 Workshops and Vapor Intrusion Seminar
- Ground Water in Fractured Bedrock, University of Wisconsin, Madison Engineering Extension Short Course
- Penn State's Ag Progress Days Field Trials, Ground Water Flow Model Educational Demonstrations for the Pennsylvania Ground Water Association, Annual Volunteer
- DELMARVA Master Well Owners Network Training, Participant and Volunteer
- Christina River Watershed Cleanup, Annual Volunteer

Susan Ann Green, P.G. (Continued)

Skills, Attributes

- Project and technical management
- Construction inspection
- Procurement and inventories
- Cost estimation and tracking
- Staff mentoring & training
- Basic familiarity with water treatment systems
- Knowledge of heavy equipment operations and material handling
- Familiar with filter press operations
- Able to interpret data logs, SCADA displays, gauges, test results
- Able to read, interpret, verify and document conformance to contract
- Familiar with rail yard operations
- Health and safety plan design, implementation, recommendations
- Familiar with construction safety practices
- Extensive engineering file reviews and data compilations
- Quality assurance review of barge trip reports and rail car weights
- Final QA inspection of heavy equipment and wipe test data
- Microsoft Office Suite and Adobe Acrobat software proficient
- Primavera P6 Construction Reports
- Technical document preparation
- Familiar with geology of fluvial environments
- Detailed geotechnical logging and multi-media sample collection
- Completed projects in 21 states.

Years of Experience
15

Education / Training

- B.S. – Industrial and Civil Engineering, Poltava Building Construction Institute, Poltava Ukraine 1977

Professional Affiliates & Awards

- National Institute of Civil Engineering Technologies
  - Level I – Highway Construction
  - Level II – Sewer and Pipe Line Construction

Grigory Khaitov

CQA Field Inspector

Summary of Relevant Qualifications

Mr. Khaitov supervised various construction projects as a project manager and field engineering.

Work Experience

Project Manager - Sano-Rubin Construction –Supervised Projects with Construction Budgets of $3mm to $40mm - responsibilities Included:

- Review of construction documents and specifications.
- Develop budgets, schedules and bid packages.
- Field coordination of multiple trades.
- Daily inspection of installed work for compliance with contract documents.
- Daily photo logs of progress and issues.
- Identification of non-conforming work.
- Preparing notices to comply as required.
- Coordinating remedial work.
- Preparing daily reports of project activities and conditions.
- Change management.
- Project closeout.

Project Manager - Plaza Latham, LLC - Additions, Renovations and Store Build Out at Latham Circle Mall - responsibilities Included:

- Review of construction documents and specifications.
- Secure permits for construction activities.
- Coordinate work of multiple trades.
- Daily inspection of installed work.
- Coordinated corrective work as required.
- Prepare weekly reports to ownership.
- Develop final punch lists and coordinated list completion.

Field Engineer - C.T. Male Associates - responsibilities Included:

- Civil construction inspections for the NYS Thruway Authority
- Verify field test results – water, sanitary, storm and soils.
- Assure work was completed in accordance with plans and specifications.
- Performed field inspections and developed punch lists for the Town of Colonie Highway Department – soils, pavement, drainage and utilities.
- Inspection services for on-site sewage disposal system for Price Chopper Markets.
- Site utility inspection for Shop-N-Save warehouse expansion Schodack, NY.

Engineer – Supervisor - Poltava-Ukraine Building, Poltava, USSR - Supervised 50 workers for building and renovation of civil, industrial, commercial and residential buildings using reinforced concrete, steel and wood construction. Worked all phases of construction from design to final finishing.

Years of Experience
15

Education / Training

- B.S. - Geology, Plattsburgh State University, Plattsburgh, NY, 1999
- AOS – Science, Adirondack Community College, Queensbury, NY, 1996

Special Training

- 40-Hr O.S.H.A – 29 CFR 1910.120 HAZWOPER w/ Eight Hour Refresher
- Asbestos Supervisor – NYS DOL CERT # 05-04823
- 10-Hr O.S.H.A Construction & Safety Course
- Forklift O.S.H.A Certification – 29 CFR 1910.178
- PADI Open Water, Advanced Open Water, Ice Diver
- NYS Boaters Safety Course

Stephen J. Lemieux

CQA Field Inspector

Summary of Relevant Qualifications

Mr. Lemieux has years experience supporting environmental projects as an environmental technician, supervisor and field geologist.

Work Experience

Environmental Technician - Environmental Products & Services, Glenmont, NY - Standby spill response for the gulf oil spill crisis in the Gulfport/Biloxi Mississippi area

Asbestos Supervisor and Equipment Operator - Capital Environmental Services, Albany, NY - Supervised ten or more employees during the removal, cleaning, and disposal of asbestos containing materials from various schools, plants, and commercial buildings in New York State. Operated skid steers, loaders, scissor lifts, and forklifts to expedite disposal efforts on job sites. Interacted with contractors, sub-contractors, project monitors, and state agencies on regular basis in regards to project progress/completion, state/federal adherence asbestos regulations, and health and safety concerns.

Asbestos Worker and Equipment Operator – LVI Environmental services, Albany, NY - Participated in the removal, cleaning, and disposal of asbestos containing materials from various schools. Operated skid steers, loaders, scissor lifts, and forklifts to expedite disposal efforts on job sites.

Engineering Geologist - NYS Department of Transportation, Albany, NY - Prepared quarterly groundwater monitoring and subsurface investigation reporting for NYSDOT station sites throughout New York State. Gauged and sampled contaminated monitoring wells at various NYSDOT sites. Participated in global positioning satellite (GPS) field training for establishing monitoring well networks on state geographic information system (GIS) software.

Environmental Technician, Equipment Operator, Asbestos Supervisor - Op-Tech Environmental Services, Rotterdam, NY –

- Environmental Technician: Performed on-call, twenty-four (24) hour spill response for NYSDEC spill response contract, rail road companies, and private sector clients. Performed system operation and maintenance checks for pump and treat and soil vapor remedial systems. Gauged and sampled contaminated monitoring & drinking water wells for NYS DEC and DOH agencies. Conducted lead, mold, and pigeon fecal abatements for commercial and industrial companies. Non-Hazardous waste transport of drums, contaminated soil, and asbestos waste to disposal facilities. Underground storage tank cleaning, dismantling, and removal for state and private clients.
- Equipment Operator: Operated heavy/light equipment for various state and private sector project remedial excavation projects such as skid-steers, excavators, loaders, and backhoes.
- Asbestos Supervisor: Supervised ten or more employees during asbestos abatements of various schools, colleges, plants, and commercial buildings in New York and Massachusetts. Interacted with contractors, sub-contractors, project monitors, and state agencies on regular basis in regards to project progress/completion, state/federal adherence asbestos regulations, and health and safety concerns.

Field Geologist (Part-time or as needed basis) – Specialized Environmental Monitoring, Saratoga Springs, NY - Gauged and sampled on-site monitoring wells at various commercial, industrial & municipal landfill sites. Prepared quarterly groundwater monitoring reporting and mapping for private sector clients. Operated heavy equipment when needed to expedite soil sampling of excavations at contaminated sites. Participated in the sediment core sample processing at the Fort Edward General Electric Facility for the PCB dredging of the Hudson

River. Duties entailed breaking down sediment cores into sections for description cataloging, decontamination of tools used during the description process, and hazardous waste disposal into drums

Environmental Geologist – Precision Environmental services, Ballston Spa, NY

- Office Duties : Report preparation using Microsoft word and excel software for subsurface investigations, quarterly groundwater monitoring, remedial system operation and maintenance and installation, contaminated soil excavations, underground storage tank decommissioning and removal, residential drinking water well installation and testing, test pit investigations, and aquifer yield pump tests. Project management of approximately twenty to twenty-five sites to included client interactions, technician/sub contractor scheduling, budgeting, billing/payments, quality/quantity control for the NYS DEC standby remediation contract and for private sector clients.
- Field Duties: Conducted oversight of subsurface/bedrock investigations, monitoring and residential/municipal drinking water well installations by sub-contractor drilling companies throughout New York State. Gauged and sampled three to thirty on-site monitoring wells at a time for various state and private sector clients during all seasons. Performed oversight and inspection for decommissioning of various commercial & residential underground storage tanks. The oversight of contaminated soil excavations of various sizes, including dewater activities if applicable. Participated in the installations of various remedial technologies such as sparge & vent, pump and treat, and soil vapor extraction. Performed routine operation and maintenance compliance of the above said remedial technologies and conducted corrective action when necessary.

MILITARY

Specialist (E-4) - Field Artillery of the Vermont Army National Guard in Vergennes, VT

- Attended a two week 13B Military Occupation School (MOS) for field artillery operations in Phoenix, AZ.
- Military police operations involving security in and out of military installations and convoy escorts in and around Baghdad, Iraq during activation in for Operation Iraqi Freedom II.

Specialist (E-4) - Infantry of the New York Army National Guard in Ticonderoga, NY

- Attended active duty for basic training and 11B MOS advanced infantry training (3 months) in Fort Benning, GA.
- Served in the infantry for training one weekend a month and two weeks a year at a New York State armory in Ticonderoga, NY.

Years of Experience
12

Education / Training

- B.S. – Civil Engineering, University , , MA, 1999
- NCEES Fundamentals of Engineering 1998

Special Training

- Microsoft Word, Excel and PowerPoint
- HYPACK software
- Trimble RTK Surveying systems
- AutoCAD

Professional Affiliates & Awards

- Foster Award, Outstanding Civil & Environmental Engineering Student, University of Massachusetts – Dartmouth, 1999)

Steven J. Tomlinson

CQA Field Inspector

Summary of Relevant Qualifications

Mr. Tomlinson is seeking a position with a Marine Construction company where I can utilize my prior experience and training in the dredging industry.

Work Experience

Quality Assurance Specialist - Shaw Environmental, Venice, LA - Louisiana Barrier Berm Project - Responsible for overseeing all dredging activities, documenting work performed and preparing daily quality assurance reports.

Quality Assurance Inspector - Parsons Corporation, Ft Edward, NY - Hudson River Dredging Project - Responsible for observing the contractor's performance to ensure all work is done to specifications. Documented all work performed and prepared daily quality assurance reports.

Field Engineer, Great Lakes Dredge & Dock, Oakbrook, IL - Worked on various Harbor Improvement and Beach Renourishment projects throughout the United States. Responsibilities included:

- Hydrographic surveying using HYPACK software and Odom Fathometer
- Daily reports, Dredge monitoring and Quality Control
- Pre-fill and Post-fill volume calculations

ATTACHMENT 2

DREDGING AND FACILITY OPERATIONS TEST AND INSPECTION TABLES

Table A2-1 Contract 30 Processing Facility Operations Inspections and Tests

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Sediment dewatering – filter cake and coarse material	Not applicable	Visual observation for appearance of free liquid or conditions that may result in the release of free liquid	Every batch	No apparent free liquid or sufficiently saturated condition of the material that could result in the release of free liquid
Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Sediment dewatering – filter cake	Contract 30, Section 13750 3.09	Paint Filter Liquids Test	To be performed on initial batches of filter cake until consistency is achieved; then periodically thereafter if visual observation indicate free liquid	Passes Paint Filter Liquids Test
Sediment dewatering -coarse material	Contract 30, Section 13750 3.09	Visual + Paint Filter Liquids Test	Periodically to confirm visual observation	Pass: Paint Filter Liquids Test

Note: Technical Specification, Contract 30, Section 13750 (Processing Facility Operations)

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

DREDGING

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Water quality	Contract 40 Section 13805	Visual observations for turbidity plume, floatables or sheen	Daily during each shift by visual observations	Per contract specifications
(Note: This is operational monitoring, not compliance monitoring under Resuspension Performance Standard.)				
Bucket closure	Contract 40 Section 13803	Operator observation and limit switch monitor	Ongoing throughout dredging via operator and inspector observations	To the extent possible, complete closing of the dredge bucket before it is lifted from the river bottom, unless prohibited by debris.
Dredge positioning	Contract 40 Section 13803	Operator observation of in-cab monitor	Ongoing throughout dredging via real time kinematic differential global positioning system (RTK DGPS)	No dredging outside project limits
Heavy equipment inspection	01350 1.03 J 1.14 A&D	Visual	Daily	No leakage of liquids observed
Crane inspection	01350 1.05 P 1.14 G	Visual	Annual by qualified third party and daily (each shift) for QC	Annual Certificate of Compliance Per manufacturer requirements for safety and per specifications for quality (deficiencies)

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

DREDGING

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Marine vessel inspection	01350 1.14H 1.03 S	Visual	Prior to Mobilization CM visual 45 days prior to start	Pre-mob: Certificate of Compliance Per Coast Guard and project specifications Monthly: No deficiencies
RTK & GPS: Field Verification Calibration Check	13803 2.01 B (5)	Visual	Verify:30 days before equipment usage Calibrate: Daily	Per contract specifications and manufacturer's procedures
Night Work Lights	13803 2.01 E	Visual	Each shift	Per manufacturer and project specifications
Anchor Systems Check	13820 3.02 A	Visual	Daily: Prior to deployment	Per manufacturer requirements
Noise Management Reports	02931 3.01 C	Decibel meter	Daily or per approved noise control plan	Per contract specifications
(Note: This is contractor monitoring, not compliance monitoring under Noise Performance Standard.)				
Light Management Reports	02936 3.01 C	Footcandle meter	Nightly or per approved light control plan	Per contract specifications
(Note: This is operational monitoring, not compliance monitoring under Lighting Performance Standard.)				

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

DREDGING

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Dredging depths (elevations)	Contract 40 Section 13803 Drawings D-2101 thru D2104 Note: Includes CUs 9 through 16	Post-dredge survey by third-party survey contractor	At completion of each CU	Required dredge depths (plus allowable over dredge depth)
Dredging extents (northings and eastings)	Contract 40 Section 13803 Drawings D-2101 thru D2104 Note: Includes CUs 9 through 16	Post-dredge survey by third-party survey contractor	At completion of each CU	Required dredging extents

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

[Note: This table provides samples of required tests and inspections - confirmatory sampling is detailed in RAM QAPP]

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Water quality (Note: This is operational monitoring, not compliance monitoring under Resuspension Performance Standard. Remedial action monitoring crews will note in field records any significant visual contrast due to increased turbidity and cause if known.)	Contract 40 Section 13805	Visual observations for turbidity plume, floatables or sheen	Daily during each shift by visual observations	Per contract specifications
Bucket positioning	Contract 40 Section 13720 & Section 13803	Operator observation of in cab monitor and limit records from Third-party survey contractor	Ongoing throughout via differential global positioning system (DGPS) system	No material placement outside project limits

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

[Note: This table provides samples of required tests and inspections - confirmatory sampling is detailed in RAM QAPP]

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Backfill and cap layer depths	Contract 40 Section 02206 & Section 13720	Multi-beam bathymetric surveys	Post-backfill/cap surveys completed after placement in each CU	Meet layer and thickness requirements (plus allowable over placement)

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Tests for backfill/cap materials gradation by weight (per Contract 40 Specification 02205 Part 2.02)				
Granular Materials Type "1" & "2"	02206 2.02	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02206 2.01 A, B
Granular Materials Type "2" with TOC"	02206 2.02	ASTM D2974	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02206 2.01 C
Topsoil (Physical test only)	02206 2.02	ASTM D422	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02206 2.01 I.3 & 2.01 I.4

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Granular Materials Type "3" (Blend of Type 1 and topsoil)	02206 2.02 B	ASTM D422	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02206 2.01 D
Granular Materials Type "N"	02206 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02206 2.01 E 703 NYSDOT, 2002
Granular Materials Type "O", "P"	02206 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02206 2.01 F, G 620 NYSDOT, 2002

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Granular Materials Type "Q"	02206 2.02 B	ASTM D2974 620 NYSDOT, 2008	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02206 2.01 H
Backfill/cap materials tests for chemical constituents (per Contract 40 Specification 02206), including laboratory analysis for PCBs, pesticides, VOC, SVOC, herbicides, TAL metals, cyanide, TOC				
Granular Materials Type "1" & “2”	02206 2.02 C & D	EPA SW-846 Region 2 Method	Once every 20,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acceptance criteria are that no organic compounds shall be detected and inorganics shall be within background range for Eastern United States as identified in Table 4 of the New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum #4046 (1994) with the exception of magnesium and calcium.

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Granular Materials Type "2 with TOC"	02206 2.02 C & D	EPA SW-846 Region 2 Method	Once every 20,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Minimum pre-placement TOC content is 0.5 % As determined by ASTM 2974
Topsoil (Multiple chemical analyses)	02206 2.02	ASTM D4972	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acidity Range (pH): 5.5 to 7.5
	02206 2.02	ASTM D2974	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Contains minimum 2 percent and maximum 5 percent Total Organic Carbon (TOC)

Table A2-2 Contract 40 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Topsoil (cont'd)	02206 2.02.D	ASA Mehlich 3	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acceptance criteria as identified in Table 4 of the New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum #4046 (1994) with the exception of magnesium and calcium.
Granular Materials Type "N", "O", "P"	02206 2.02 C & D	EPA SW-846 Region 2 Method	Once every 20,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acceptance criteria are that no organic compounds shall be detected and inorganics shall be within background range for Eastern United States as identified in Table 4 of the New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum #4046 (1994) with the exception of magnesium and calcium.

Notes:

1. Technical Specification: Contract 40, Section 13803 (Dredging); Contract 40, Section 13720 (Backfilling/Capping) and 13898 (Shoreline Stabilization).
2. QC Testing will be performed by Contractors. Quality analytical source QA Testing by CM via CM's third party testing contractor.
3. Borrow soil must be from approved on-site borrow source with test results provided in Specification 02206. Any change in material must be consistent with approved material characteristics as determined by CM. New moisture content curves will need to be plotted for change in material.

Table A2-3 Contract 50 Habitat Construction Inspections and Tests

[Note: Table A2-3 will be provided in an Addendum after contractor 50 selection.]

Table A2-4 Contract 60 Rail Yard Operations Inspections and Tests

[Note: Table A2-4 will be provided in an Addendum after contractor 60 selection]

ATTACHMENT 3

TYPICAL CONSTRUCTION FORMS

The following typical forms are included in this attachment:

- Quality Inspection Report
- Receiving Inspection Report
- Dredging Report 13803
- Backfill/Capping Report 13720
- Estimated Daily Dredging and Facility Operations Production Report
- Inspection Notification Form
- Nonconformance Report
- Nonconformance Report Log
- Contractor Nonconformance Letter (Sample)
- Barge Trip Log

PARSONS **Quality Inspection Report**	Job Number	Project	Page of **1/1**

CONTRACTOR: _____ REPORT NUMBER: _____

TYPE OF INSPECTION: ☐ Preparatory Inspection. ☐ Initial Inspection. ☐ Follow-up Inspection. ☐ Completion Inspection.

DESCRIPTION/INTENT OF INSPECTION: _____

_____

_____

COMPONENTS/MATERIALS REVIEWED: _____

_____

_____

CONTRACTOR PERSONNEL CONTACTED: _____

_____

_____

APPLICABLE CONTRACTOR PROCEDURES, CHECK LISTS, INSTRUCTIONS: _____

_____

_____

RESULTS OF INSPECTION: _____

_____

_____

_____

DEFICIENCIES NOTED: _____

_____

_____

RECOMMENDED CORRECTIVE ACTION: _____

_____

_____

NON-CONFORMANCES: _____

_____

_____

QA Inspector Signature: Date:

PARSONS **Receiving Inspection Report**	Job Number	Project	Page of **1/1**

PURCHASE ORDER _____ C.O. _____ REPORT NUMBER _____
SPECIFICATION _____ REV. _____ DRAWING _____ REV. _____
SUPPLIER _____ ITEM _____ QUANTITY _____

DOCUMENTATION

DOCUMENTS COMPLETE PER CONTRACTUAL REQTS: _____ LEGIBLE: _____
DOCUMENTS TRACEABLE TO ITEMS REC'D: _____ STAMPED BY SURV. REP: _____
LIST DOCUMENT PKG. DISCREPANCIES (IF ANY): _____
_____
_____
RESOLUTION: _____
_____
_____
DOCUMENT PKG. ACCEPTABLE: _____ QC SIGNATURE: _____
DATE: _____
REMARKS: _____
_____
_____

PHYSICAL INSPECTION

CHECK LIST NO: _____ ITEMS PROPERLY TAGGED/MARKED: _____
ENTER SERIAL AND/OR HEAT NO: _____
RESULTS OF INSPECTION: _____
_____
_____
_____
DEFICIENCY NO. (IF ANY): _____ DEFICIENCY RESOLVED: _____
INSPECTION ACCEPTABLE TAG ATTACHED: _____

QC SIGNATURE: _____ DATE: _____

SECTION 13803 – DREDGING

HUDSON RIVER DREDGING PROJECT -- DREDGE ACTIVITY SUMMARY

Dredge ID:	*	Date:	*	Bkt. Size:	*
CU:	*	Activities Performed:	*	Round-trip Tow to Facility:	*

NON-EFFECTIVE / EFFECTIVE TIME	TODAY	TO DATE	% TOTAL
Weather	*	†	†
Project Traffic	*	†	†
Wait Scows	*	†	†
Wait Tug	*	†	†
Equipment Repair	*	†	†
EPS Stoppage	*	†	†
QoLPS Stoppage	*	†	†
Move Dredge	*	†	†
Other (Detail in Comments)	*	†	†
Dredging	*	†	†
Shoaling	*	†	†
Debris Removal	*	†	†
Transloading	*	†	†
TOTAL NON-EFFECTIVE / DOWNTIME	†	†	
TOTAL EFFECTIVE TIME	†	†	
TOTAL AVAILABLE HOURS	*	†	
TIME EFFICIENCY %	†	†	

LOCATION		STATION		RANGE		AREA
CU	Cut	FROM	TO	FROM	TO	SF
*		*	*	*	*	†
*		*	*	*	*	†
*		*	*	*	*	†
*		*	*	*	*	†
*		*	*	*	*	†
*		*	*	*	*	†
*		*	*	*	*	†
*		*	*	*	*	†

PRODUCTION SUMMARY	UNIT	TODAY	TO DATE
Time to Load/ Scows	Hour	†	†
Total Volume/ Scows	CY	†	†
# Scows/ Day	Number	*	†
Travel	FT	†	†
Travel/ Day	FT	†	†
Width Avg.	FT	†	†
Area	SF	†	†
Area / W.H.	SF	†	†
Clay Area	SF	*	†
Bucket Refusal Area	SF	*	†
Volume to Prism Removed	CY	*	†
Total Volume Removed	CY	*	†
Prism / Total Ratio	n/a	†	†
Avg. Prism Face	FT	†	†
Avg. Total Face	FT	†	†
Prism Quantity/ Eff Hr	CY	†	†
Prism Quantity/ Available Hr	CY	†	†
Total Quantity/ Eff Hr	CY	†	†
Total Quantity/ Available Hr	CY	†	†

BUCKET SUMMARY	UNIT	TODAY	AVG/TODATE
# Bucket Attempts	#	*	†
# Closed Buckets	#	*	†
Average Volume / Bucket	cy	†	†
Average Bucket Fill Factor	%	†	†

PCB SUMMARY	UNIT	TODAY	AVG/TODATE
Estimated Avg PCB Concentration	mg/kg	*	†
Estimated Mass of PCBs removed	kg	†	†

SCOW ID	DRAFT START/END		TIME STARTED	TIME FINISHED	TIME TO LOAD	Est Vol	CY / load time	% Cobble / Boulders	% Gravel	% Sand	% Silt	% Clay	% Wood Debris
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*	*
Comments				Totals:	†	†	†						

*

REQUIRED SIGNATURE BLOCK		Date
Reporter:	*	*
QC:	*	*

* Contractor Data Input Required

† Calculated from Contractor Input Data

- END OF SECTION -

SECTION 13720 – BACKFILLING/CAPPING

HUDSON RIVER DREDGING PROJECT -- BACKFILL - CAP PLACEMENT SUMMARY

Dredge ID:	*	**Date:**	*	**Bkt. Size:**	*
CUs:	*	**Activities Performed:**	*	**Round-trip Tow to Loader:**	*

NON-EFFECTIVE / DOWNTIME	**TODAY**	**TO DATE**	**% TOTAL**
Weather	*	†	†
Project Traffic	*	†	†
Wait Scows	*	†	†
Wait Tug	*	†	†
Equipment Repair	*	†	†
Other (Detail in Comments)	*	†	†

LOCATION	STATION		RANGE		AREA
CUT	FROM	TO	FROM	TO	SF
*	*	*	*	*	†
*	*	*	*	*	†
*	*	*	*	*	†
*	*	*	*	*	†
*	*	*	*	*	†
*	*	*	*	*	†
*	*	*	*	*	†
*	*	*	*	*	†
*	*	*	*	*	†

EFFECTIVE TIME	**TODAY**	**TO DATE**	**% TOTAL**
Backfill / Cap Material Placement	*	†	†
Spot Placement / Shoaling	*	†	†
Transloading	*	†	†
TOTAL NON-EFFECTIVE / DOWNTIME	†	†	
TOTAL EFFECTIVE TIME	†	†	
TOTAL AVAILABLE HOURS	*	†	
TIME EFFICIENCY %	†	†	

PRODUCTION SUMMARY	**UNIT**	**TODAY**	**TO DATE**
Time to Unload / Barge	Hour	†	†
Total Volume / Barge	CY	†	†
# Barges / Day	Number	*	†
Travel	FT	†	†
Travel/ Day	FT	†	†
Width Avg.	FT	†	†
Area	SF	†	†
Area / Eff Hr	SF	†	†
Volume to Prism Placed	CY	*	†
Total Volume Placed	CY	*	†
Prism / Total Ratio	CY	†	†
Avg. Prism thickness	FT	†	†
Avg. Total thickness	FT	†	†
Prism Quantity/ Eff Hr	CY	†	†
Prism Quantity/ Available Hr	CY	†	†
Total Quantity/ Eff Hr	CY	†	†
Total Quantity/ Available Hr	CY	†	†

TYPE	SF / LF	CY	Eff Hours	SF / Eff Hr	CY / Eff Hr
Initial Cover	*	*	*	†	†
3" T1	*	*	*	†	†
3" T2 w TOC	*	*	*	†	†
6" Type N	*	*	*	†	†
6" Type O	*	*	*	†	†
15%	*	*	*	†	†
Nearshore	*	*	*	†	†
RFW	*	*	*	†	†

Barge ID	DRAFT START/END		TIME STARTED	TIME FINISHED	TIME TO UNLOAD	Est Vol	CY / Unload time	CY T2 w TOC	CY T1	CY T3	CY Type N	CY Type O
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
*	*	*	*	*	†	*	†	*	*	*	*	*
Comments				Totals:	†	†	†					

*

REQUIRED SIGNATURE BLOCK		**Date**
Reporter:	*	*
QC:	*	*

* Contractor Data Input Required

† Calculated from Contractor Input Data

- END OF SECTION -

PARSONS

Estimated Daily Dredging & Facility Operations Production Report

Page of **1/1**

DATE: _____

PREPARED BY:_____

DESCRIPTION OF MATERIAL:	**EST, QTY.**
ESTIMATED *IN SITU* DESIGN MATERIAL DREDGED	_____CY
ESTIMATE OF ALL *IN SITU* MATERIAL DREDGED	_____CY
TOTAL EST. QUANTITY OF DREDGED MATERIAL PROCESSED	_____CY
TOTAL EST. QUANTITY OF MATERIAL SHIPPED OFF-SITE	_____TONS
TOTAL EST. QUANTITY OF MATERIAL STAGED ON-SITE	_____CY

NOTE: THE QUANTITIES OF MATERIALS SHOWN ON THIS FORM ARE ESTIMATED AND ONLY INTENDED TO PROVIDE AN INDICATION OF DAILY PERFORMANCE. THESE QUANTITIES WILL DIFFER FROM ACTUAL SURVEYED OR WEIGHED MEASUREMENTS AND SHOULD NOT BE USED FOR CONTRACTUAL COMPLIANCE, OR CONTRACTOR PAYMENT.

PARSONS **Inspection Notification Form**	Job Number	Project	Page of **1/1**

CONTRACTOR: _____ DATE: _____

TYPE OF INSPECTION REQUESTED: _____

_____

_____

DATE AND TIME OF INSPECTION REQUESTED: _____

_____

_____

LOCATION OF INSPECTION REQUESTED: _____

_____

_____

OTHER COMMENTS: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

CONTRACTOR SIGNATURE: _____ DATE: _____

PARSONS **Non-Conformance Report**	Job Number	Project	Page of **1/1**
CONTRACTOR	REPORT NO.	DATE	
SPECIFICATION/DRAWING NO.			
ITEM			

PART I – To be completed by the inspector who detects a deviation.

DESCRIPTION OF NON-CONFORMANCE:

_____
_____
_____
_____

RECOMMENDED DISPOSITION: USE AS IS ☐ REWORK ☐ REPAIR ☐ SCRAP ☐

_____
_____
_____
_____

SIGNED _____ DATE _____

PARSONS FIELD ENGINEER

PART I I– To be completed by the contractor who proposed the corrective action.

DESCRIPTION OF CORRECTIVE ACTION:

_____
_____
_____
_____
_____
_____
_____

SIGNED _____ DATE _____

CONSTRUCTION ENGINEER

PART III – To be completed by the design engineer.

RECOMMENDATION AND REMARKS:

_____
_____
_____
_____

Proposed corrective action status: Approved ☐ Rejected ☐

_____
_____
_____
_____

SIGNED _____ DATE _____

DESIGN ENGINEER

PART IV – QUALITY CONTROL DISPOSITION (To be determined by QC System Manager (Construction Engineer)

DECISION AND DISPOSITION INSTRUCTIONS: USE AS IS ☐ REWORK ☐ REPAIR ☐ SCRAP ☐

_____
_____
_____

SIGNED _____ DATE _____

PARSONS FIELD ENGINEER

SIGNED _____ DATE _____

PARSONS CONSTRUCTION MANAGER

PART V – ENGINEERING DISPOSITION

METHOD OF APPROVALS:

☐ TELEPHONE ☐ MEMORANDUM ☐ TELEX ☐ SPEC. CHANGE ☐ DRAWING CHANGE

CONVEYED BY

☐ PROJECT MANAGER _____ DATE _____

☐ PROJECT MANAGER _____ DATE _____

PART VI – DISPOSITION VERIFICATION

☐ CORRECTIVE ACTION WAS ACCOMPLISHED ON _____

SIGNED _____ DATE _____

PARSONS FIELD ENGINEER

SIGNED _____ DATE _____

PARSONS CONSTRUCTION MANAGER

PARSONS

Job Number Project Page of

Non-Conformance Report Log

CONTRACTOR

NCR No.	CONDITION DESCRIPTION	ORIGINATOR	DATE RECORDED	DATE TO CONTRACTOR	PROPOSED CORRECTIVE ACTION BY CONTRACTOR	PROPOSED APPROVED BY ENGINEER	DISPOSITION DATE	DISPOSITION VERIFICATION BY

PARSONS **Contractor Nonconformance Letter (Sample)**	Job Number	Project	Page of 1/1

Attention: _____

Subject: Nonconformance Report No. _____

Gentlemen:

The attached Nonconformance Report (NCR) details discrepancies on your contract.

Please review and take appropriate action to remedy this situation, also changing any procedures, methods and/or personnel necessary to preclude similar problems in the future. Your attention is specifically drawn to Item 10, disposition date.

We are available to discuss the attached with you.

Very truly yours,
PARSONS

_____
Construction Manager

cc: Program Manager
Project Manager
Construction Manager
Quality Assurance Department
Contract File

Barge #	
Trip #	
Date	

Date + Time	
Depart Processing Facility	
Return Processing Facility	
Begin Unloading	
Complete Unloading	

A	Date + Time arriving at Lock 7	C	Date + Time arriving at Lock 7
	Date + Time departing at Lock 7		Date + Time departing at Lock 7
B	Date + Time arriving at Lock 7	D	Date + Time arriving at Lock 7
	Date + Time departing at Lock 7		Date + Time departing at Lock 7

	Origin		Depart (Date+ Time)		Names of Tugs	Activity at Destination		
						Inventory	Residual	Debris
	Destination (CU + Dredge or Mooring)		Arrive (Date+ Time)					
1	Inspected By	Material in Hopper	Bow Draft	Stern Draft	Barge Inspector Comments			
	Confirm that no visibile sediment is on exterior deck or coaming of barge:						yes	no

	Origin		Depart (Date+ Time)		Names of Tugs	Activity at Destination		
						Inventory	Residual	Debris
	Destination (CU + Dredge or Mooring)		Arrive (Date+ Time)					
2	Inspected By	Material in Hopper	Bow Draft	Stern Draft	Barge Inspector Comments			
	Confirm that no visibile sediment is on exterior deck or coaming of barge:						yes	no
	Confirm that barge is not overflowing after loading:						yes	no

	Origin		Depart (Date+ Time)		Names of Tugs	Activity at Destination		
						Inventory	Residual	Debris
	Destination (CU + Dredge or Mooring)		Arrive (Date+ Time)					
3	Inspected By	Material in Hopper	Bow Draft	Stern Draft	Barge Inspector Comments			
	Confirm that no visibile sediment is on exterior deck or coaming of barge:						yes	no
	Confirm that barge is not overflowing after loading:						yes	no

Provide Copy of Completed Forms To CM on Same Day as Barge Unloaded.

4	Origin		Depart (Date+ Time)		Names of Tugs	Activity at Destination		
						Inventory	Residual	Debris
	Destination (CU + Dredge or Mooring)		Arrive (Date+ Time)					
	Inspected By	Material in Hopper	Bow Draft	Stern Draft	Barge Inspector Comments			
	Confirm that no visibile sediment is on exterior deck or coaming of barge:						yes	no
	Confirm that barge is not overflowing after loading:						yes	no

5	Origin		Depart (Date+ Time)		Names of Tugs	Activity at Destination		
						Inventory	Residual	Debris
	Destination (CU + Dredge or Mooring)		Arrive (Date+ Time)					
	Inspected By	Material in Hopper	Bow Draft	Stern Draft	Barge Inspector Comments			
	Confirm that no visibile sediment is on exterior deck or coaming of barge:						yes	no
	Confirm that barge is not overflowing after loading:						yes	no

6	Origin		Depart (Date+ Time)		Names of Tugs	Activity at Destination		
						Inventory	Residual	Debris
	Destination (CU + Dredge or Mooring)		Arrive (Date+ Time)					
	Inspected By	Material in Hopper	Bow Draft	Stern Draft	Barge Inspector Comments			
	Confirm that no visibile sediment is on exterior deck or coaming of barge:						yes	no
	Confirm that barge is not overflowing after loading:						yes	no

7	Origin		Depart (Date+ Time)		Names of Tugs	Activity at Destination		
						Inventory	Residual	Debris
	Destination (CU + Dredge or Mooring)		Arrive (Date+ Time)					
	Inspected By	Material in Hopper	Bow Draft	Stern Draft	Barge Inspector Comments			
	Confirm that no visibile sediment is on exterior deck or coaming of barge:						yes	no
	Confirm that barge is not overflowing after loading:						yes	no

Provide Copy of Completed Forms To CM on Same Day as Barge Unloaded.

ATTACHMENT 4

CU ACCEPTANCE FORMS

CU____DREDGING COMPLETION APPROVAL – FORM 1 (Page 1 of 6)								
CU Number		**Dredging Start Date**		**Dredging End Date**		**Reporting Date**		
CU Subunit ID (if applicable)								**TOTAL (acres)**
Size (acres)								

Summary of Nodal Capping Index Worksheet (Attachment Y)
(List the final disposition of each node within the CU, as appropriate)

EPS Tracking Category	Structural Offsets	Cultural Resource Areas / Offsets	Shoreline Areas	Bedrock / Boulder Areas	Clay / GLAC	Other River Bottom	TOTALS (count)
Inventory Approved for Capping in Place							
Residuals Approved for Capping in Place							
Compliant Areas Approved for Backfilling							
TOTALS (count)							

CU Checklist (see Page 3)

Item	Indicate One of the Following		Reviewer Initial Acceptance	
	Attached	Not Applicable	GE	EPA
Drawings of Target DoC and Post-Dredge Mudline Elevations				
Drawing of Confirmatory Sampling Locations, Resulting Tri+ PCB Data, and Identification of Non-Complaint Nodes				
Sediment Imaging (if performed)				
Dredge Pass Tracking Worksheets (Attachment X)				
Drawing of Areas to be Backfilled				
Drawing of Non-Compliant Areas to be Capped				
Drawing of Inventory Areas to be Capped				
Nodal Capping Index Worksheet (Attachment Y)				

CU____DREDGING COMPLETION APPROVAL – FORM 1 (Page 2 of 6)	
Comments: 1. See: CUx Certification Form 1 Attachment 1 "Table of Contents of CUx Certification Form 1." This attachment itemizes the contents of this CU Certification Package, including any associated narratives, data and/or work sheets, plans, and underlying electronic files; including revision dates (for hard copy maps) and version dates (for electronic files on accompanying CDs).	
Upon signing this document, GE certifies that all data are for this CU only and that the sediment removal for the aforementioned CU is complete and that no additional dredging is necessary. This document also serves to certify that removal activities are complete and that the CU can be backfilled or capped as indicated. EPA accepts this certification and the CU can be backfilled or capped as indicated.	
Signature of GE Representative	**Signature of EPA Representative**
Signature	Signature
Name	Name
Date	Date

CU____DREDGING COMPLETION APPROVAL – FORM 1 (Page 3 of 6)

Information To Be Included on Drawings and/or on Calculation Sheets
(NOTE: Some items listed below may be combined on the same drawing and/or calculation sheet)

1. Drawing of Target DoC and Post-Dredging Mudline Elevations

Target DoC elevations.
Target elevations and horizontal extent of missed inventory and non-compliant nodes.
Mudline elevations following the single dredging pass (and second dredging pass, if necessary).
Navigation channel boundaries.
Description of sediment type(s) encountered with discussion of any contingency actions taken.

2. Drawing of Confirmatory Sampling Locations, Resulting Tri+ PCB Data and Identification of Non-Complaint Nodes

Narrative summary explaining the depth of cut for the single dredging pass (and second dredging pass, if necessary).
Shows the number of samples locations per CU is in compliance with the PSCP.
Sample locations (coordinates), depths, Aroclor and Tri+ PCB concentrations collected after single dredging pass (and second dredging pass, if necessary) including analytical data, field observations, [in database format or equivalent] of the data will be provided); results of data verification/validation.
Integration of EPA split samples (if available within time to be used in decision-making).
Non-compliant nodes locations and concentrations at each node and the non-compliant area to be capped (or re-dredged, if necessary).
Table of summary statistics by subunit and by CU.
Horizontal extent of areas to be backfilled or capped (or redredged, if necessary) with associated summary statistics.
Locations of sediment imaging collection points, if performed.

3. Sediment Imaging (if performed)

Photographs of sediment images collected from each location and associated interpretation.

4. Dredge Pass Tracking Worksheets (Attachment X)

Table of sample node residual concentrations and river bottom types by subunit for each dredge pass.
Table of results and summary statistics.

5. Drawing of Areas to be Backfilled (with specifications and appropriate section details)

Horizontal extent of areas to be backfilled.
Predicted change in original bottom elevation, after backfilling.
Reference to appropriate backfill material specifications and applicable design information.
Backfill material specifications and/or cross-section details, if variance from reference documents necessary.
Navigation channel boundaries.

6. Drawing of Non-Compliant Areas to be Capped (with specifications and appropriate section details)

Horizontal extent of areas to be capped, for each cap type.
Predicted change in original bottom elevation, after capping.
Reference to appropriate cap material specifications and applicable design information.
Cap material specifications and/or cross-section details, if variance from reference documents necessary.
Navigation channel boundaries.

7. Drawing of Inventory Areas to be Capped (with specifications and appropriate section details)

Horizontal extent of areas to be capped, for each cap type.
Predicted change in original bottom elevation, after capping.
Reference to appropriate cap material specifications and applicable design information.
Cap material specifications and/or cross-section details, if variance from reference documents necessary.
Navigation channel boundaries.

8. Nodal Capping Index Worksheet (Attachment Y [if needed, for 1-acre subunits, if used per EPS Section 3.3.3])

Node ranking and average calculation worksheets.
Table of sample node compliance categories and river bottom types used in CU Area Capped and Nodal Capping Index Computations.
Table of results and summary statistics.

CU ____CERTIFICATION FORM 1 (PAGE 4 OF 6)

Attachment X: Dredge Pass Tracking Worksheets

(To be Attached to Final CU Cert Form, Pass Data, and Daily or Periodic Data Submittals)

Data Collected/Calculated After First Dredge Pass

Subunit ID (if applicable)								Total
Number of Nodes Sampled								
Average Tri+ PCBs Concentration								
Median Tri+ PCBs Concentration								
Nodes < 1 mg/kg Tri+ PCBs								
Nodes ≧ 1 mg/kg Tri+ PCBs								
Nodes ≥ 6 mg/kg Tri+ PCBs								
Nodes ≥ 27 mg/kg Tri+ PCBs								
Nodes ≥ 500 mg/kg TPCBs								
Shoreline Nodes ≥ 50 mg/kg TPCBs								
Nodes in Navigation Channel								
Nodes in Bedrock/Boulders								
Nodes in Glacial Lake Albany Clay (GLAC)								
Nodes Proposed for Backfilling								
Nodes Proposed for Capping								
Nodes Proposed for 2nd Dredge Pass								

Data Collected/Calculated After Second Dredge Pass (enter data only for those applicable subunits/nodes)

Subunit ID (if applicable)								Total
Number of Nodes Sampled								
Average Tri+ PCBs								
Median Tri+ PCBs								
Nodes < 1 mg/kg Tri+ PCBs								
Nodes ≥ 1 mg/kg Tri+ PCBs								
Nodes ≥ 6 mg/kg Tri+ PCBs								
Nodes ≥ 27 mg/kg Tri+ PCBs								
Nodes ≥ 500 mg/kg TPCBs								
Shoreline Nodes ≥ 50 mg/kg TPCBs								
Nodes in Navigation Channel								
Nodes in Bedrock/Boulder								
Nodes in Glacial Lake Albany Clay (GLAC)								
Nodes Proposed for Backfilling								
Nodes Proposed for Capping								
Nodes Proposed for Subsequent Dredge Pass								

CU ____CERTIFICATION FORM 1 (Page 5 of 6)

Attachment X: Dredge Pass Tracking Worksheets

(To be Attached to Final CU Cert Form, Pass Data, and Daily or Periodic Data Submittals)

Data Collected/Calculated After Second Dredge Pass (enter data only for those applicable subunits/nodes)

Pass No: _____ (add sheets as needed)

Subunit ID (if applicable)								Total
Number of Nodes Sampled								
Acreage of Nodes Sampled								
Average Tri+ PCBs								
Median Tri+ PCBs								
Nodes < 1 mg/kg Tri+ PCBs								
Nodes ≥ 1 mg/kg Tri+ PCBs								
Nodes ≥ 6 mg/kg Tri+ PCBs								
Nodes ≥ 27 mg/kg Tri+ PCBs								
Nodes ≥ 500 mg/kg TPCBs								
Shoreline Nodes ≥ 50 mg/kg TPCBs								
Nodes in Navigation Channel								
Nodes in Bedrock/Boulder								
Nodes in Glacial Lake Albany Clay (GLAC)								
Nodes Proposed for Backfilling								
Nodes Proposed for Capping								

CU Certification Form 1 (Page 6 of 6) **Attachment Y: Nodal Capping Index Worksheet (To be attached to Draft and Final CU Cert Form 1 Submittals, add additional sheets, as needed)**

Node ID	Ranked Nodal Residuals Concentration	COMPLIANCE CATEGORY (Check as Appropriate)			RIVER BOTTOM TYPES (Check as Appropriate)						CU Area Capped & Nodal Capping Index Equation Components (Sum of Boxes Checked at Left as Appropriate)		
		A	B	C	1	2	3	4	5	6	N*field capped*	*Nfield*	*Nshoreline*
		Inventory Capped In Place	Residuals Capped In Place	Compliant Areas Backfilled	Structural Offsets	Cultural Resource Areas/Offsets	Shoreline Areas	Exposed Bedrock / Boulder Fields	Exposed Glacial Lake Albany Clay	Any Other River Bottom Type	If Compliance Category A or B and River Bottom Type 6	Any Compliance Category and River Bottom Types 4, 5, or 6	Any Compliance Category and River Bottom Type 3 only
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
17													
17													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
Total Area (square feet) A_{CU}													

CU ____BACKFILL/ENGINEERED CAP COMPLETION APPROVAL – FORM 2 (Page 1 of 2)									
CU Number		**Placement Start Date**		**Placement End Date**		**Reporting Date**			
CU Subunit ID (if applicable)									**TOTAL (acres)**
Size (acres)									

Backfill Surface Mean Tri+ PCBs Concentration (when required)		mg/kg
Number of Nodes Sampled		

Extent of Backfilling and Capping Within the CU (acres)

Backfill	**Types of**	**Area (acres)**	**Reference to Appropriate Drawings Attached to Certification Form 1**
	TOTAL		
Cap	**Types of Cap**	**Area (acres)**	**Reference to Appropriate Drawings Attached to Certification Form 1**
	TOTAL		

CU Checklist

Item	**Indicate One of the Following**		**Reviewer Initial Acceptance**	
	Attached	**Not Applicable**	**GE**	**EPA**
Drawing of Installed Backfill/Cap (with record drawing details, thickness and sample locations [where backfill/cap are placed])				
Where applicable in backfill areas provide the following: Sample locations (coordinates), depths, Aroclor and Tri+PCB concentrations collected including analytical data, field observations, (hard copy and electronic copies [in database format or equivalent])				

CU____ BACKFILL/ENGINEERED CAP COMPLETION APPROVAL – FORM 2 (Page 2 of 2)
Comments: 1. See: CUx Certification Form 2 Attachment 1 "Table of Contents of CUx Certification Form 2." This attachment itemizes the contents of this CU Certification Package, including any associated underlying electronic files, including revision dates (for hard copy maps) and version dates (for electronic files on accompanying CDs).
Upon signing this document, GE certifies that the backfill/cap has been installed satisfactorily and that no further backfill placement or capping is required for this CU. These remedial activities exclude short and long term operation, monitoring, maintenance and adaptive management at the CU. EPA accepts this certification.

Signature of GE Representative	**Signature of EPA Representative**
Signature	Signature
Name	Name
Date	Date

CU Certification of Completion

FINAL CU____ CONSTRUCTION COMPLETION CERTIFICATION - FORM 3 (Page 1 of 1)					
Completion Date				**Reporting Date**	
CU Number					
Approximate CU Centroid	**Northing**		**Easting**		NY State NAD 83
CU Size		Acres			(Units _____)

Extent of Habitat Construction Within the CU (acres)

Habitat	Total Area (acres)	Reference to Appropriate Drawings Attached to this Certification Form 3
Riverine Fringing Wetland-Zone A		
Riverine Fringing Wetland-Zone B		
Submerged Aquatic Vegetation-Active Planting		
Submerged Aquatic Vegetation-Natural Recolonization		
Unconsolidated River Bottom		

CU Checklist

Item	Indicate one of the Following		Reviewer Initial Acceptance			
	Attached	Not Applicable	GE		EPA	
Record drawing of Location and Type of Habitat Replacement/Reconstruction (including method)						
Record Drawing of Final Mudline Elevation and Profile noting changes from original profile						

Comments

1. See: CUx Certification Form 3 Attachment 1 "Table of Contents of CUx Certification Form 3." This attachment itemizes the contents of this CU Certification Package, including any associated underlying electronic files, including revision dates (for hard copy maps) and version dates (for electronic files on accompanying CDs).

Upon signing this document, GE certifies that the remedial activities related to the CU are complete and that no further action is required. These remedial activities exclude replantings and other activities that are part of initial restoration/reconstruction efforts, long term operation, monitoring, maintenance and adaptive management at the CU. EPA accepts this certification.

Signature of GE Representative	**Signature of EPA Representative**
Signature	Signature
Name	Name
Date	Date

ATTACHMENT 5

STANDARD OPERATING PROCEDURE FOR 2011 DREDGING OPERATIONS BATHYMETRIC SURVEYS

STANDARD OPERATING PROCEDURE FOR 2011 DREDGING OPERATIONS BATHYMETRIC SURVEYS

APRIL, 2011

I. Scope and Application

This Standard Operating Procedure (SOP) is applicable to multi-beam and single-beam bathymetry surveys conducted to support the 2011 Dredging Operations work for the for the Hudson River Polychlorinated Biphenyls (PCBs) Site. This SOP is based on the SOP used for the Remedial Design work for the Hudson River PCBs Site and describes the procedures that the third-party survey contractor will use to conduct multi-beam or single-beam surveys as part of the 2011 Dredging Operations work including Certification Unit (CU) acceptance surveys and daily or weekly progress surveys. Wherever possible, the procedures and documentation for this survey will be conducted in accordance with the *Field Procedures Manual for Hydrographic Surveying* produced by the National Oceanic and Atmospheric Administration's (NOAA's) Office of Coastal Survey (OCS) (OCS, 1998).

The objectives of 2011 Dredging Operations multi-beam surveys are to collect georeferenced elevation data regarding sediment removal or backfill/cap placement work performed by the Dredging Contractor. To the extent possible, multi-beam surveys will cover the riverbed in and adjacent to the 2011 Dredge CUs and satisfy the applicable data quality objectives (DQOs) of the remedial design (RD). In areas too shallow or small to survey using a manned vessel land survey techniques will be used. In areas too shallow for multi-beam surveys to be practical, single-beam hydrographic survey techniques may be employed. Topographic maps and digital terrain models will be generated from the survey data to support the RD. Single-beam hydrographic surveys will be used to verify the depth of submerged (and floating) aquatic vegetation planting areas before the commencement of Habitat Construction activities.

At the time of writing this SOP the third-party survey contractor has not been retained, as such the third-party survey contractor's actual SOP may differ from certain of the details described in this SOP but will not differ from the substantive requirements of this SOP.

II. Equipment and Supplies

Equipment and supplies needed for the bathymetric survey include:

- Shallow draft survey vessel;
- Navigational charts and permits;
- Global positioning system (GPS) navigation equipment and real-time kinematic (RTK) control monuments;
- Marine communications equipment;
- Multi-beam or Single-beam depth sounding equipment;

- Motion sensor (heave pitch and roll);
- Gyro compass;
- Electronic data acquisition equipment;
- Electronic data storage equipment;
- Field logs and charting paper;
- Boat supplies (e.g., fuel, safety equipment); and
- Personnel supplies (e.g., protective clothing).

II. a. Survey Vessel

The third-party survey contractor will conduct the bathymetric survey from a shallow bottomed work boat or skiff with a fully enclosed cabin and dual outboard engines. The boat will either be equipped with a bow or side mount for the multi-beam or single-beam transducer and surveyed positions for the gyro compass and motion sensor. The survey vessel will meet all requirements of the USCG for safety equipment for the vessel, survey crew and visiting representatives.

II. b. Navigation Equipment

Navigational control monuments for the Supplemental Engineering Data Collection (SEDC) Program (BBL, 2004) survey operations have been established along the Upper Hudson River at the Troy Lock, Champlain Canal Locks 1 through 7, and along Rt. 4 north of Stillwater. Each control monument has known coordinates and elevation referenced to North American Vertical Datum 1983 (NAD83) and North American Vertical Datum 1988 (NAVD88) respectively and is located such that GPS receivers will have clear visibility of the sky from approximately 15 degrees above the horizon in all directions.

The third-party survey contractor will employ Trimble 7400 Msi GPS receivers (or the equivalent) to acquire navigation data based on GPS satellites and the shore-based control monuments. Differential correctors determined at the control stations will be transmitted to the survey vessel where they will be used by the onboard receiver using RTK OTF (on-the-fly) software to determine the accurate position of the GPS antenna in both the horizontal and vertical planes. These data will be logged on board at one-second intervals for the duration of the project. Data quality parameters will also be logged and monitored by the onboard navigator with flags put on all data points that do not meet the quality limits set. The specified accuracy for this system is +/- 2 centimeter (cm) when satellite configuration is sufficient. Where coverage is determined by GPS filters and navigational software flags to be insufficient, additional control stations will be added or, if there are only small gaps in coverage, the navigation data will be interpolated between points of adequate coverage based on boat speed and heading.

II. c. Multi-beam Depth Sounding Equipment

Swath bathymetric data will be recorded using a Reson SeaBat 8125 multi-beam system (or the equivalent) operating at 455 kilohertz (kHz) with 240 individual 0.5 degree beams profiling a swath 120 degrees wide, oriented perpendicular to the alignment of the survey vessel. The system consists of a power supply, microprocessor, and transducer. In operation, the system generates a narrow (1 degree) fan

shaped high frequency acoustical pulse in the water column that propagates downward and outward to the riverbed where it is reflected back to the transducer and received by the 240 individual 0.5 degree transducer elements. The system uses beam forming to determine the echo timing (and thus distance) from each elliptical area of the riverbed insonified.

The multi-beam sounder outputs digital depth data to the navigation and data logging computer. During survey operations, digital depth data will be merged with navigation data via the HYPACK® HYSWEEP software (or the equivalent), and saved for post-processing. Additionally, data from the motion sensor and the gyro compass will be inputted to the HYSWEEP software (or the equivalent) where they will be used to orient each of the 240 beams to assure that each riverbed reflection is assigned the correct geodetic coordinates. The HYSWEEP software (or the equivalent) also provides a means to view each profile (up to 50 profiles per second) and the swath coverage. The swath coverage map is critical to the field operation as it "paints" the riverbed (on the computer screen) with the swath from each survey line, allowing the survey crew to see any gaps in the coverage and fill these in with additional lines. As water depth varies the profile coverage will also vary (a 120 degree profile covers a swath 3.46 times the water depth), and line spacing will be adjusted to maintain full bottom coverage. As the vessel rolls or changes heading, the location and width of the profile also change, requiring in-field adjustments to the survey line plan.

The multi-beam sounder incorporates means for draft corrections and a capability for local water mass sound speed calibration. Calibration for water mass sound speed is accomplished by performing conductivity temperature casts at frequent intervals during the survey day. The data from these casts are used to determine sound velocity throughout the water column. The sound velocity profile not only corrects time of travel for each beam of the multi-beam, but also allows calculation of adjustments for ray bending as the acoustic pulses travel at an oblique angle through the water column. These precise ray bending calculations are used to adjust the location where each acoustic beam reflects from the riverbed.

II. d. Single-beam Depth Sounding Equipment

Equipment used for single-beam hydrographic surveying is similar to that described above for multi-beam surveying except that rather than using a sonar system with multiple beams a transducer emitting a single beam is utilized. The single beam transducer will operate in the 200 – 210 kHz range and will be used with an Odom Echotrak DF 3200 Mk II (or the equivalent) echo sounder.

The single-beam sounder outputs digital depth data to the navigation and data logging computer. During survey operations, digital depth data will be merged with navigation data via the HYPACK MAX software (or the equivalent), and saved for post-processing. Additionally, data from the motion sensor and the gyro compass will be inputted to the HYPACK MAX software (or the equivalent) where they will be used to correct for heave, pitch and roll. The HYPACK MAX software (or the equivalent) also provides a means to view the survey data as it is logged.

The single-beam sounder incorporates means for draft corrections and a capability for local water mass sound speed calibration. Calibration for water mass sound speed is accomplished by performing

conductivity temperature casts at frequent intervals during the survey day. The data from these casts are used to determine sound velocity throughout the water column.

II. e. Data Acquisition and Processing Equipment

Hypack Inc.'s software packages HYPACK® MAX and HYSWEEP (or the equivalent) will be used for track line design, navigation, track line control, and multi-beam or single-beam depth and RTK differential global positioning system (DGPS) data logging. The survey data is processed using HYSWEEP and AutoCAD software (or the equivalent) to generate maps. An example, data acquisition equipment, software, and file formats are summarized in Table 1. The third-party survey contractor may use a system that differs from that detailed in Table 1 in terms of specified equipment but not in terms of function.

Table 1 - Summary of Multi-beam Bathymetric Data Collection/Processing Equipment and Software Equipment

Equipment Type	Manufacturer	Model	Data File Format
OTF DGPS Receiver	Trimble	7400 Msi	Logged by HYPACK® MAX
Navigation Software and Sounding Data Collection Platform	Hypack, Inc.	HYPACK® MAX	HYPACK® RAW
High Resolution Multi-beam Echo Sounder	Reson	8125	Logged by HYSWEEP
Data Processing Software	Hypack, Inc.	HYPACK® HYSWEEP	XYZ, DXF, TIFF
CAD Software	AutoCAD	Release 2000	DXF, DWG

III. Survey Procedures

III. a. Multi-beam Survey Procedures

As directed by the Construction Manager (CM) the third-party survey contractor will conduct multi-beam surveys within designated 2011 CUs of the Upper Hudson River. Survey lines will generally be run parallel to the shore with their spacing determined by the water depth in each area. Line spacing is determined by multiplying the depth of water below the transducer head by 3.46 for the theoretical swath width, then adding factors for vessel roll, heading variation, and off-line deviations as the vessel traverses the pre-plotted line. After a series of lines have been run to "cover" an area, the swath coverage map will be reviewed and any data gaps will be filled in with additional lines. The following survey procedures will be used:

1. Before leaving dock, the hydrographic crew will open a daily survey log form and fill in pertinent site conditions and check to make sure all navigation and instrument systems are working properly. The crew will: 1) calibrate and set navigation instruments based on the instrument-specific standard

operating procedures, and 2) prepare survey equipment for start of daily survey operations by deploying the multi-beam transducer into the water, prior to the first survey of a field season/ mobilization measure survey equipment offsets, conducting the first sound velocity cast, and performing other required pre-survey activities.

2. Navigate to the coordinates of the first transect. Hypack Inc.'s HYPACK® MAX software (or the equivalent) will be used for track line design, navigation, track line control, digital depth, and real time kinematic differential global positioning system (RTK DGPS) data logging.

3. On the commencement of survey operations for a given mobilization, a "Patch Test" will be performed to align all sensors. Each time the transducer is changed from down looking to side looking, or vice versa, a roll patch test will be performed. If any part of the multibeam or navigation systems are replace then a patch test will be performed. At the end of all survey operations a patch test will be performed. The patch test involves running a series of parallel overlapping and crossing lines on flat and sloping riverbed topography to determine various offset values for the sensors (e.g., motion sensor, gyro compass, multi-beam transducer draft and orientation, and DGPS antenna position). Comparative depth data recorded during these lines are used to calculate the offset values. These offset values will be recorded and compared to the offset values currently entered into the computer. The third-party survey contractor may adjust the offset values entered into the computer based on the offset values recorded during the patch test.

4. On the first day of survey operations create a "reference surface" by performing a test survey over a relatively flat bottom. Then on a daily basis collect two check lines down the center of the reference surface and perform a "beam angle test". The beam angle test compares multibeam check lines to a reference surface and estimates the depth accuracy of the multibeam system at different angle limits.

5. At the start of each day of survey operations a "Sill" line will be collected. The sill is hard bottom area in front of the lock that will not change over time. This data will be compared to data collected during previous surveys using OSI'S MTX-DIF-AND-HISTOGRAM macro.

6. Align survey vessel along transect and confirm heading and equipment operation. Start data acquisition and commence hydrographic survey along transect at a vessel speed of 2-4 knots or less. Log the depth data to the HYPACK® HYSWEEP system (or the equivalent).

7. Note relevant observations and changes in operational procedures to the field log. These may include: coordinates of observed obstructions or artifacts, areas where interferences or other conditions limit survey resolution, etc.

8. At the end of each transect, confirm successful data acquisition and storage as well as navigation and equipment calibrations and settings. Log time and coordinates at end of each transect line surveyed.

9. Navigate to next transect and repeat steps 4-5 for collecting depth data along each transect. Maintain a safe operating distance (as determined by boat operator) from lock gates, dams, and other vessels between transects. Following completion of each survey area, review swath coverage plot and run additional lines as needed to obtain full bottom coverage. In areas where water depths are too shallow for a reasonable swath width or safe vessel operation, the third-party survey contractor may rotate transducer to 45 degree position on mount and "look" (survey) only to one side of the vessel to

increase bottom coverage in attempt to cover as much of the riverbed as possible or may use traditional land survey techniques to survey the area.

10. Backup the computer data and check for error flags periodically during the survey.

11. Output all notes and electronic target files to an ASCII file and store with the raw records. All raw survey data and information (e.g., field notes, instrumentation frequencies) will be documented electronically or in a field notebook. Back-up copies of raw electronic data and copies of field logbooks will be made at the end of each survey day.

III. b. Single-beam Survey Procedures

As directed by the CM the third-party survey contractor will conduct single-beam surveys within designated 2011 CUs or SAV planting areas of the Upper Hudson River. Survey lines will generally be run parallel to the shore with their spacing determined by the type of survey to be performed.

The following survey procedures will be used:

1. Before leaving dock, the hydrographic crew will open a daily survey log form and fill in pertinent site conditions and check to make sure all navigation and instrument systems are working properly. The crew will: 1) calibrate and set navigation instruments based on the instrument-specific standard operating procedures, and 2) prepare survey equipment for start of daily survey operations by deploying the single-beam transducer into the water, measuring survey equipment offsets, conducting the first sound velocity cast, and performing other required pre-survey activities.
2. Navigate to the coordinates of the first transect. Hypack Inc.'s HYPACK® MAX software (or the equivalent) will be used for track line design, navigation, track line control, digital depth, and RTK DGPS data logging.
3. When close to or in the survey area conduct a "Bar Check" to verify and that the sounding system is functioning correctly. The bar check involves hanging a plate or par under the single beam transducer at known depths and comparing the known depth with the depth recorded by the sounding system. Parameters such as vessel draft or sound velocity will be corrected adjusted as necessary so that the measured depths are the same as the known depths of the bar or plate. These measured vs. known depths will be recorded as will any parameters that were changed.
4. Align survey vessel along transect and confirm heading and equipment operation. Start data acquisition and commence hydrographic survey along transect at a vessel speed of 2-4 knots or less. Log the depth data to the HYPACK® MAX system (or the equivalent).
5. Note relevant observations and changes in operational procedures to the field log. These may include: coordinates of observed obstructions or artifacts, areas where interferences or other conditions limit survey resolution, etc.
6. At the end of each transect, confirm successful data acquisition and storage as well as navigation and equipment calibrations and settings. Log time and coordinates at end of each transect line surveyed.

7. Navigate to next transect and repeat steps 4-5 for collecting depth data along each transect. Maintain a safe operating distance (as determined by boat operator) from lock gates, dams, and other vessels between transects.
8. Backup the computer data and check for error flags periodically during the survey.
9. At the end of each survey remove the paper record of the transducer output from the echo sounder and mark the date, time, surveyor and survey name on it.

Output all notes and electronic target files to an ASCII file and store with the raw records. All raw survey data and information (e.g., field notes, instrumentation frequencies) will be documented electronically or in a field notebook. Back-up copies of raw electronic data and copies of field logbooks will be made at the end of each survey day.

IV. Quality Assurance and Quality Control

The third-party survey contractor will follow the guidance of the *Phase 2 Dredging Construction Quality Control / Quality Assurance Plan for 2011*, Appendix A to the *Remedial Action Work Plan for Phase 2 Dredging and Facility Operations in 2011* (2011 RAWP) (Parsons, 2011), the third-party survey contractor's in-house quality control / quality assurance plan and a site specific quality control plan prepared by the third-party survey contractor.

The third party hydrographic survey personnel will follow site specific SOPs for data transfer and transformation that ensure both the integrity of the original data set and the quality of post-processed data. Confidence checks and calibration procedures will be performed daily, or as needed, to ensure proper equipment functionality and data quality. The following sections describe Quality Assurance/Quality Control (QA/QC) procedures for the survey equipment.

IV. a. Positioning Systems and Confidence Checks

The third-party survey contractor shall initially verify the accuracy of the positioning system by occupying a survey monument set for this project. Once verified to this monument, the third-party survey contractor shall establish an accessible checkpoint. Using this checkpoint, the positioning system's accuracy will be verified at the beginning and end of each day of field operations.

IV. b. Nadir (Vertical) Beam Confidence Checks

There shall be two primary methods of performing confidence checks for the vertical beam system. First, bar checks will be conducted at a minimum on a daily basis. In cases where variations in water mass speed of sound is suspected, additional bar checks will be performed. Second, a lead line sounding below the center beam will be conducted. This lead line sounding will verify proper sound speed calibration and provide an indication of the riverbed sediment consistency.

Additionally for multi-beam surveys, overlapping data from adjacent survey lines will be assessed during data processing (see Section V) to estimate the overall accuracy of the survey results.

V. Data Processing and Reporting

V. a. Multi-beam Data Processing and Reporting

The third-party survey contractor will follow site specific SOPs for processing field survey data into project maps and elevation terrain models. Data processing and review will be accomplished employing HYPACK® HYSWEEP software (or the equivalent). The processing work flow will include review of offsets, heading, altitude, and navigation. Navigation will be recomputed with sensor offsets applied. Each line will be reviewed for data quality, and adjacent lines having overlapping data will be compared statistically. All corrections and offsets to the raw data will be applied in HYPACK® HYSWEEP (or the equivalent) during post-processing.

Depth and other applicable site information/observations gathered during the bathymetric survey will be plotted on the project base sheets using AutoCAD (or the equivalent) at an appropriate scale and resolution. Raw and edited data files will be stored for each survey along with field notations and supporting data. Final edited 10’ average XYZ data files for each CU acceptance survey will be created that represent the average elevation (Z) within each 10’ bin with each average elevation in that 10’ bin being saved at the center-point (XY) of each 10’ bin. The final edited 10’ average XYZ data files will be used to confirm that the Dredging Contractor has met the required dredging removal and backfill/cap placement tolerances.

V. b. Single-beam Data Processing and Reporting

The third-party survey contractor will follow site specific SOPs for processing field survey data into project maps and elevation terrain models. Data processing and review will be accomplished employing HYPACK® EDIT software (or the equivalent). The processing work flow will include review of offsets, heading, altitude, and navigation parameters. Navigation will be recomputed with sensor offsets applied. Each line will be reviewed for data quality and compared to the corresponding paper output from the echo sounder.

Depth and other applicable site information/observations gathered during the bathymetric survey will be plotted on the project base sheets using AutoCAD (or the equivalent) at an appropriate scale and resolution. Raw and edited data files will be stored for each survey along with field notations, echo sounder paper output and supporting data.

VI. Land Surveys in Support of 2011 Bathymetric Surveys

This Standard Operating Procedure (SOP) is applicable to land surveys conducted to support work for the 2011 Dredging Operations Bathymetric Surveys for the Hudson River PCBs Superfund Site (Project). This SOP is based on the SOP used for the Remedial Design work for the Hudson River PCBs Site and describes the procedures that the third-party survey contractor will use to conduct land surveys as part of the work including Certification Unit (CU) acceptance surveys and daily or weekly progress surveys.

Land survey services during the 2011 dredging season are to include:

1. Conduct survey transects of dredge areas (Before Dredge (BD), After Dredge (AD)) and backfill/cap placement sites at 25 foot intervals perpendicular to the river bank provided that the 2011 Dredging Operations Contractor has conducted work in these areas. Transect shall be of sufficient length to capture elevation points between 117.0 and 119.0 elevation for each transect. Shot intervals must be of sufficient density along each transect to estimate the amount of material removed and placed per Project accuracy requirements. The Contractor will integrate land survey data with the single beam and/or multi-beam bathymetric survey data to develop an elevation model encompassing the project area.
2. Other land survey work includes conformational surveys of the near-shore backfill set points as shown on the 2011 Dredging Operations Contract Drawings.
3. All land surveys to meet the requirements of the Code of Practice for Land Surveys as adopted by the New York State Association of Professional Land Surveys and the New York State Department of Transportation "Land Surveying and Procedures Manual" (www.nysdot.gov/divisions/engineering/design/design-services/land-survey/repository/land_surveying_standards_and_procedures_manual_2005.pdf). Survey accuracy shall be as per Appendix F of the Manual.

VII. Health and Safety

Refer to the *Phase 2 Remedial Action Health and Safety Plan for 2011* (2011 RA HASP) (Parsons, 2011a).

VIII. References

BBL. 2004. *Supplemental Engineering Data Collection Work Plan* (SEDC Work Plan). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. March 2004.

Parsons, 2011. *Phase 2 Dredging Construction Quality Control / Quality Assurance Plan for 2011*, Appendix A to the *Remedial Action Work Plan for Phase 2 Dredging and Facility Operations in 2011* (2011 RAWP). Prepared for General Electric Company, Albany, NY. Revision 1, April.

Parsons. 2011a. *Phase 2 Remedial Action Health and Safety Plan for 2011,* (2011 RA HASP). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. Revision 1, April.

Office of Coastal Survey (OCS). 1998. *Field Procedures Manual for Hydrographic Surveying.* National Oceanic and Atmospheric Administration, Office of Coastal Survey. March.