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1 INTRODUCTION

This Construction Quality Assurance Project Plan (CQAPP) has been prepared by WSP Engineering of NY, P.C. (WSP) to describe the quality assurance (QA) observation and testing activities to be performed during implementation of the Remedial Design (RD) for Operable Unit (OU) No. 3 of the former Morse Industrial Corporation site (currently Emerson Power Transmission); the East Spencer Street Sewer Line Focused Excavation and Venting.

1.1 PURPOSE

The purpose of this CQAPP is to establish the minimum standards for independent QA observation that will be used to verify the Contractor's conformance with the material and construction quality control (QC) requirements for the project.

1.2 ORGANIZATION, RESPONSIBILITIES, AND QUALIFICATIONS

A description of the project organization and the QA/QC roles and responsibilities of those involved in this project are described in the following paragraphs and illustrated in Figure 1-1.

Project Owner – As Owner, Emerson the parent of Emerson Power transmission (EPT) is ultimately responsible for the successful completion of the remedial action phase of work at the Site. The Owner has retained WSP Engineering of New York (WSP) to perform all construction quality assurance (CQA) activities for the remedial action work. The Owner will also hire a qualified Contractor (based on a bid and negotiation process) to perform the construction work in accordance with the approved Contract Drawings and Specifications, and Contract Documents.

Design Engineer – WSP is the Design Engineer and is a qualified, licensed engineering firm registered in the state of New York. WSP is responsible for developing the remedial design and specifications, engineering drawings, schedule, and all documents required for the work. WSP will furnish interpretations and clarifications of the design documents to the CQA representatives during implementation, as applicable and required. WSP will perform the role of Resident Engineer.

Resident Engineer – The Resident Engineer is Kevin Sullivan, P.E., of WSP who is a licensed professional engineer having experience in the support and implementation of similar remedial actions. The Resident Engineer will provide oversight of the remedial action phase of work. The Resident Engineer may (1) be the same or a different person or entity than the Design Engineer and/or (2) serve as an "Owner's Representative". The Resident Engineer will primarily be responsible for reviewing and approving (on behalf of the Owner) all submittals furnished by the Contractor, all work completed, and all payment requests submitted by the Contractor during and following completion of required construction work. All project changes affecting the design will be routed through the Resident Engineer to the Design Engineer.

The Resident Engineer will also perform CQA functions including:

- attending significant issue resolution meetings, as required
- reviewing field reports and providing engineering review of all design and/or final certification issues
- providing QC oversight of CQA activities, including conducting site visits on a random basis or as required
- review of any field changes that would constitute a change in design from the original design Drawings or Specifications

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- preparing or reviewing the final Certification Report, including review of the Record Drawings

Construction Quality Assurance (CQA) Official – The CQA Official will be Scott Petersen of WSP. Mr. Petersen will be responsible for observing, testing, and documenting all construction activities related to the specified remedial work. He is responsible for issuing a final Certification Report and As-Built Drawings documenting that the construction was performed in compliance with approved design documents. The Resident Engineer, a Professional Engineer registered in the State of New York will review and stamp the Certification Report.

Mr. Petersen will report directly to Mr. Sullivan, the Resident Engineer and will be onsite at all times during construction activities and be responsible for the following activities:

- directing implementation of this CQAPP
- serving as point of contact with the on-Site and off-Site project personnel regarding all QA issues related to the remedial work
- leading all on-site project coordination meetings (i.e., resolution, pre-construction, daily, weekly, etc.)
- preparing daily report(s) and logs, as appropriate
- ongoing preparation of the Record Drawings
- checking borrow source testing and other materials test results for compliance with the Specifications
- verifying that completed areas of work are protected before backfill materials are placed
- providing oversight of the Contractor's sampling of waste materials and labeling the samples for chemical conformance testing by the Contractor's selected QC testing laboratory
- identifying and reporting all problems/observations; resolutions to construction problems will also be noted in the daily reports
- collecting samples of materials of construction on behalf of the Owner

Contractor – The Contractor shall have a demonstrated history of successful remedial construction projects of a similar nature to this project. The Contractor may utilize qualified subcontractors and engineering firms to perform specialty work. The Contractor will be responsible to provide a structural design for the shoring system to be used at the site and will need to employ the services of a licensed structural engineer. The Contractor will be solely responsible for all construction QC activities and requirements, including QC functions provided by subcontractors. The Contractor shall be responsible for all work activities performed by all subcontractors.

Contract Laboratories – (1) WSP will retain one or more laboratories for waste material, backfill material and other material physical and/or chemical analysis as required by the Specifications. These laboratories will be independent of the Owner, Contractor, and CQA Official. Laboratories shall meet "Recommended Requirements for Independent Laboratory Qualifications" published by American Council of Independent Laboratories. Some of these requirements include the following:

- Must be a United States Environmental Protection Agency Contract Laboratory Program (USEPA CLP) certified laboratory, or at least perform USEPA analytical methods equivalent to those in the current CLP work scopes for inorganic and organic analysis.
- Must have a Laboratory Quality Assurance Plan (LQAP) that can be provided to the Contractor.
- Must be certified by the New York State Department of Health under the Environmental Laboratory Approval Program (NYSDOH-ELAP) in order to perform various analyses on non-potable water and environmental solid and hazardous waste samples. Certificates must be provided.



- Must participate in the QA/QC program that includes NYSDOH audits and evaluated testing through semi-annual analysis of proficiency testing samples, which shall be provided to the Contractor. This is similar to the CLP Performance Evaluation system.

1.3 SCOPE OF WORK

QA oversight of the sanitary sewer replacement project will be provided for the definable features of the project, as described below. Details of each of the features are provided in the drawings and specifications.

In general, the definable features of the remedial design are:

- Removal of the existing sanitary sewer from MH-9 located on Turner Place to the abandoned manhole, MH-18, located on East Spencer Street (Section 1), and further to MH-17 located approximately 300-ft south of MH-18 on East Spencer Street (Section 2).
- Replacement of sewer piping using SDR 35 PVC pipe with gasketed fittings and installation of a new manhole at the turn between Sections 1 and 2.
- Installation of the ventilation system including the bedding vent piping, the ventilation stack, and the ventilation turbine.
- Backfilling and restoration of East Spencer Street including replacement of water and storm sewer appurtenances, installation of the new road surface, installation of the new curb, and repair and/or replacement of the retaining wall along the project boundary.



2 PROJECT INITIATION AND PRE-CONSTRUCTION MEETING

Prior to the start of construction a kickoff meeting will be held to discuss the conduct of the work. The Pre-Construction Meeting will be attended by representatives from WSP, City of Ithaca, and the Contractor. The objectives of the meeting are: (1) to establish lines of communication between the various parties during construction, and (2) to discuss the project as a team in order to identify and/or resolve outstanding issues.

The meeting agenda will include, at a minimum, the following:

- introduction of all attendees and their respective roles and responsibilities
- review of the project scope and objectives
- review of the project drawings, specifications, and the site procedures
- review of the project schedule
- coordination of QC and QA activities
- review of document control and change control procedures
- establishing meeting schedules and objectives
- establishing dispute/resolution procedures



3 THREE PHASES OF CONTROL

To control the quality of the work, a three-phase QA program will be implemented.

3.1 PREPARATORY PHASE

A preparatory meeting will be held with WSP and the Contractor prior to the start of work on each definable feature of work. The meeting will include the following:

- review of applicable Drawings and Specification sections
- review of QC and QA requirements
- verification of submittal and material approval process
- review of Contractor's means, methods, and schedule

3.2 IMPLEMENTATION PHASE

During this phase, progress inspections of the work being completed will be performed for each definable feature of work. The quality of workmanship will be examined, and the QC testing protocols will be reviewed for compliance with the contract documents. During this phase, random or continuous QA inspections will be performed on a daily basis until the definable feature of work is completed to verify continuing compliance with QC requirements.

3.3 FOLLOW-UP PHASE

The Follow-Up Phase consists primarily of two milestone inspection, the Pre-Final and Final Inspections, discussed below.

3.3.1 Pre-Final Inspections

At the completion of all the work or some portion of the work, the Contractor's QC Representative will schedule a pre-final inspection. The QA and QC Representatives will develop a list of deficiencies, commonly called a "punch list", of items not meeting the requirements of the drawings, specifications, and site procedures. The punch list will be included in the Daily QA Report. The completed portion of the work will not be covered up by subsequent work until all of the punch list items have been resolved, and final acceptance of the work has been granted.

3.3.2 Final Inspections

The final inspection of the Site will be conducted when it has been determined that all items previously identified as requiring corrective action have been completed. The Contractor, WSP's Resident Engineer and CQA Official, as well as the City of Ithaca participate in the final inspection of the completed work.



4 QUALITY ASSURANCE ACTIVITIES

The Contractor has the ultimate responsibility for all QC activities necessary to manage, control, and document that the work complies with the requirements established by the drawings and specifications. QA, separate from but coordinated with QC, is used to verify that the level of quality required by the drawings and specifications has been achieved by the Contractor.

This section describes the QA review, observation, and testing activities that will occur during construction of each definable feature of the remedy.

QA representatives will be responsible for observing and documenting all of the construction activities. QA activities will be documented in a daily report. The CQA official will provide written notification to Owner and Resident Engineer for any work that is not in conformance with the drawings or specifications.

4.1 SUBMITTAL REVIEWS

WSP will review all Contractor submittals identified in the specifications and any additional requests for information specifically made by the Contractor. The submittals will be reviewed for completeness and compliance with the specifications. Based on the review, the WSP will approval or disapproval of the submittals. WSP will coordinate resolution of disapproved submittals with the Contractor before the work proceeds.

If necessary, interpretations and clarifications of the contract, specifications, drawings, or other design documents will be furnished by WSP' Resident Engineer or CQA Official, who is ultimately responsible for the design. Any and all project changes that affect the design shall be routed through the WSP prior to acceptance and implementation.

4.2 REVIEW OF THE CONTRACTOR'S QC LABORATORIES

QA personnel will review the test methods and results provided by the Contractor's independent QC laboratory(ies).

4.3 RESOLUTION OF QA/QC ISSUES

Deficient Items. A deficient item is a portion of the work that is found during QA/QC activities to be incomplete and/or not in conformance with the project requirements (drawings, specifications, and site procedures). Generally the deficient item is identified at a point in the construction process in which it can be corrected in the field by additional work. The Contractor will document and control deficient items that are identified by WSP's CQA officer using a deficiency log or punch list. All punch list items will be resolved before installation of subsequent materials and before the impacted portion of the work is accepted during the Pre-Final Inspection process. WSP's CQA official and the Contractor will agree upon the method for defining the extent of a deficient work item, and on the procedure that will be used for corrective action.

Non-Conforming Items. A non-conforming item is a deficiency that is identified when the work has progressed beyond the point at which it can be easily corrected in the field by additional work. WSP's CQA official will inform and review any potential non-conforming items with WSP's resident engineer. Resolution of the non-conforming item will be reviewed with Emerson and the City, as necessary. Also, if a variance from the Contract requirements is requested by the Contractor, WSP's Resident Engineer will review with Emerson and the City, as appropriate.

For items such as a design change or a non-conforming item, that requires a variance from the Contract Documents, the Contractor will prepare a change/variation request. The request will be submitted to



WSP's Resident Engineer for review, and if the request is granted, it will be forwarded to the appropriate personnel concurrence. If a request for a non-conforming item of construction is denied, WSP's Resident Engineer and CQA official, and the Contractor will agree upon the method for defining the extent of the non-conforming work item and on the procedure that will be used for corrective action.

Quality Action Meeting. During the course of the project, WSP's CQA official and Contractor may identify the need for a meeting to resolve an issue related to the quality of the work. Project personnel will meet as a team to discuss what caused the problem, how to correct it, and how to minimize the possibility of its recurrence. The amount of increased oversight and methods to determine the extent of deficient work will be discussed at these meetings.



5 SOIL MATERIALS AND AGGREGATE

5.1 GENERAL

Soil materials are to be placed at the locations shown or specified in the Contract Documents. Soil materials, including aggregate, will be used as trench backfill; backfilling over-excavated areas, and for general site grading. Aggregate materials of the types specified at locations shown on the Contract Drawings will be used for bedding for concrete structures; trench bedding work; and for pavement courses.

5.2 REFERENCE STANDARDS

Soil materials will comply with the applicable provisions and recommendations of the State of New York Department of Transportation Design and Construction Division "Standard Specifications", Construction and Materials, dated January 1990 (NYSDOTSS) and all addenda, unless otherwise shown or specified.

Material classifications will be in accordance with the Unified Soil Classification System (USCS), ASTM D2487.

Test methods for all soil materials will be carried out in accordance with approved methods including primarily, procedures developed by the American Society of Testing and Materials (ASTM). Those tests that may be required in the course of this project and the accepted test method reference are detailed in the Specifications. Substitution of a method other than that specified for a particular test is subject to the approval of the Engineer. Also, the use of test methods for those tests not listed in the Specifications, but that are deemed necessary for the work, is subject to the approval of the Engineer.

Material that is "free of contamination" will be defined in accordance with the New York State Department of Environmental Conservation guidelines: there will be no visual or olfactory evidence of contamination, and the material will meet NYCRR Part 375-6.8(a) requirements for Unrestricted Use.

5.3 MATERIALS

5.3.1 Aggregate


The Contractor will conform to the material definition provided in the Specifications for materials to be provided. The Contractor will:

- Provide representative samples of each material furnished to the Engineer upon request for approval, and will provide the source location. (Each source will be considered as a separate material entity requiring its own submittal)
- Submit certificates of compliance with reference standards for each aggregate material from approved independent laboratories.

5.3.2 Soil Materials

It is the responsibility of the Contractor to provide approved and appropriate soil materials to be used in the work of the project. The Contractor will not be permitted to bring materials into the work area until the required submittals are approved by WSP's CQA Official. No on-site materials, stockpiled or in-situ, will be permitted to be placed without WSP's approval.

Testing of stockpiled materials shall not be required, unless necessary for satisfaction of performance of QC testing (i.e., compaction).



All proposed off-site material will be free from organic or other perishable material, roots, frozen material, stones larger than six (6) inches, debris, contaminants, and any other objectionable material in accordance with the Specifications. Gap-graded or segregated materials will not be permitted. Excessively wet material will not be permitted for placement if it appears too wet to effectively compact, as determined by the WSP's CQA Official.

Prior to bringing materials on site the Contractor will submit and receive WSP's CQA Official's approval of certified laboratory test reports by an approved Independent Testing Laboratory, for all laboratory testing required by the Specifications. Each proposed borrow source and material will require representation by laboratory testing in conformance with the Specifications. For NYSDOTSS items, certifications may be submitted instead of actual laboratory test data.

The Contractor's proposed testing laboratory will be subject to the WSP CQA Official's approval. Any testing services performed by an unapproved laboratory may be disallowed by WSP's CQA Official, in which case the materials will be retested by an approved laboratory.

WSP's CQA Official may inspect any of the Contractor's proposed borrow sources. The Contractor will make all necessary arrangements to accommodate such inspections.

The Contractor will conform to the materials definition provided in the Specifications for soil materials to be provided for: grading fill, general fill, structural fill, trench backfill, and aggregate materials (as discussed in the next section).

5.4 CONSTRUCTION QUALITY EVALUATION

The Contractor will provide all necessary supervision, labor, equipment, and materials as needed to perform the specified work. WSP's CQA Official will approve the Contractor's proposed methods and equipment prior to the start of the work.

5.4.1 Aggregate Bedding and Backfill

The aggregate materials will be approved by WSP's CQA Official prior to placement. The CQA Official will perform the following during placement of the material:

- observe and document the quality of workmanship and aggregate
- materials used by the Contractor personnel in performance of the work
- perform construction quality testing (i.e., pressure testing, compaction testing, etc.)
- verify the thickness of the placed aggregate materials

Proper placement of bedding is critical to the long-term structural stability of the pipe. The contractor must follow the procedures identified in the specifications and contained in the applicable guidance documents for PVC pipe (See RD Report).

WSP's CQA Official will witness all backfilling up to 12 inches above the top of the pipe, and above that as necessary, to ensure that proper procedures are followed.

Backfill and bedding around structures and sewer piping will be placed in 6-inch thick lifts. Placement and compaction will proceed uniformly around the structure to prevent eccentric loadings. QA inspection personnel will witness all such backfilling to ensure that no damage is done to any structure or appurtenance.



5.4.2 Pipe Trenches

Pipe trenches must be excavated and prepared to provide a smooth, firm foundation for the placement of bedding stone and pipe. Unsuitable materials, as defined in the Specifications, must be identified by the Contractor during excavation, removed, and replaced with acceptable materials.



6 SANITARY SEWER PIPE AND CONNECTIONS

6.1 GENERAL

New sanitary sewer pipe will be installed to match existing slopes. Following installation the sanitary pipe will be tested using low pressure air in accordance with ASTM F1417 as indicated in the design specifications. The contractor will be responsible for the testing including setup, performing, and breakdown the testing equipment. The contractor shall provide appropriate test documentation to WSP's CQA Official relating to procedure, test data, results and conclusions.

Inspections will be performed and documented on a daily basis to ensure that the completed work is in accordance with the design.

6.2 REFERENCE STANDARDS

Installation of the sanitary sewer will adhere to standard industry practice and be in accordance with contract drawings, specifications, city standards, and applicable references, such as "Recommended Standards for Wastewater Facilities" 2004 Edition.

6.3 PRODUCTS AND MATERIALS

The Contractor will conform to the definitions provided in the specifications for products and materials provided under this contract including piping, fittings, and accessories.

6.4 CONSTRUCTION QUALITY EVALUATION

WSP's CQA Official will perform the following during sanitary sewer installation:

- Review and accept contractor submittals as required by the contract documents, prior to installation of sewer materials.
- Observe and document sanitary sewer installation including the existing pipe conditions at the beginning and end of the contract limits, as well as at each of the sewer lateral tie-ins.
- Observe and document hydrostatic (or air) testing of all sewer piping and where necessary gravity pipe.
- Verify and document proper operation of the completed sewer as well as each of the lateral tie-ins from the adjacent buildings.



7 DOCUMENTATION

7.1 FIELD LOGBOOK

The CQA Official will maintain a bound field logbook to record observations, actions, QA tests conducted, and other information related to daily QA activities. The field logbook will contain sufficient information for the CQA Official to reconstruct the day's activities and decisions for inclusion in the daily QA report. Actual field data will be recorded on the appropriate field QA forms. The field logbook will contain information such as:

- date and time
- weather conditions
- description of work
- field observations
- field measurements
- field tests observed or conducted
- field samples taken

7.2 PHOTOGRAPHIC RECORDS

The CQA Official will provide digital photographic documentation of the construction activities. The photographs will be used to illustrate construction progress, problem areas, deviations, and corrective actions.

Photographs for tracking progress will be taken on a weekly basis from a sufficient number of vantage points to adequately display the overall project activities. Subsequent photographs will be taken from the same vantage points, if possible. Photographs will be recorded on a photo log format that is acceptable to the Resident Engineer.

7.3 DAILY QUALITY ASSURANCE REPORTS

The Daily QA Report will document Contractor construction activities and also QA observations/testing. The reports will be completed each day by WSP's CQA Official and will be maintained at the field office files. At the end of each week, they will be compiled for distribution to the Resident Engineer. The format of the Daily QA Report is shown in Attachment 1.

The information contained in this report will include the: date, temperature, weather conditions, report number, names of the Contractor and any subcontractors on-site that day, visitors to the site, description of construction activities, problems including delays and extra work, discussions with the Contractor and/or other responsible parties and safety issues. Verification will be provided that soil, aggregate, pipe, and other project materials meet the project specifications and that placement quality control is being maintained. Deviations from the drawings, specifications, work plans, and quality control procedures will be noted for later resolution.

Daily field QA test reports, as well as daily Contractor QC observation/test reports, will be included with the Daily QA Report.



7.4 FIELD QA REPORTS

The results of QA observations and/or testing will be reported on the forms provided in Attachment 1.

7.5 REMEDIAL ACTION REPORT

Within 60 days after the Final Inspection has been completed and other requirements set forth in the ROD have been attained, a Draft Remedial Action Report will be prepared and submitted to NYSDEC. The Remedial Action Report will include, but not be limited to, the following elements:

- Documentation of construction activities: A description of the construction activities including completion milestones achieved; Modifications or changes to the approved plans and specifications of the Final Design Report will be documented and “as-built” drawings will be provided showing all such modifications, including rationale for the modifications. The Draft Remedial Action Report and “as-built” drawings will be signed and stamped by a New York State licensed professional engineer.
- Documentation of construction quality control: A description of the construction quality control process including documentation that the Remedial Action was constructed in accordance with the plans, specifications, and reports shall be provided. The documentation will illustrate consistency with the approved ROD.
- Pre-final and Final Inspections: Documentation of the pre-final and final inspections conducted by Stakeholders at the completion of the remedial action work will be documented. Items that are found to be deficient, including corrective measures employed to resolve the deficiency, will be documented.

The Remedial Action Report will be provided as Final once NYSDEC comments on the draft version are adequately addressed.

