Part 1 General

1.1 RELATED REQUIREMENTS

.1 All other sections.

1.2 SUMMARY

.1 This section defines the submittals necessary before, during and after construction, which include:

- .1 Shop Drawings
- .2 Certificate of Satisfactory Delivery
- .3 Certificate of Satisfactory Installation
- .4 Certificate of Satisfactory Performance
- .5 Commissioning Plan
- .6 Commissioning Report
- .7 Training Plan
- .8 Operation and Maintenance Manuals

1.3 ADMINISTRATIVE

.1 Submit to the Contract Administrator submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Contract Administrator, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

.8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator review.

.9 Keep one reviewed copy of each submission on site.

1.4 SHOP DRAWINGS

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow 14 working days for Contract Administrator 's review of each submission.

.4 Adjustments made on shop drawings by Contract Administrator are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Contract Administrator prior to proceeding with Work.

.5 Make changes in shop drawings as Contract Administrator may require, consistent with Contract Documents. When resubmitting, notify Contract Administrator in writing of revisions other than those requested.

.6 Accompany submissions with transmittal letter, containing:

.1 Date.
.2 Project title and number.
.3 Contractor's name and address.
.4 Identification and quantity of each shop drawing, product data and sample.
.5 Other pertinent data.

.7 Submissions include:

.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
.5 Details of appropriate portions of Work as applicable:
.1 Fabrication.
.2 Layout and elevation drawings showing dimensions and clearances.
.3 Setting or erection details.
.4 Design criteria.
.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Process and instrumentation drawings.

.11 Hydraulic profile.

.12 Process narrative.

.13 Start-up description.

.14 Product information sheets.

.8 After Contract Administrators review, distribute copies as required.

.9 Submit 6 prints of shop drawings for each requirement requested in specification Sections and as Contract Administrator may reasonably request.

.10 Submit 6 hard copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Contract Administrator where shop drawings will not be prepared due to standardized manufacture of product.

.11 Submit 6 hard copies of test reports for requirements requested in specification Sections and as requested by Contract Administrator.

.12 Submit 6 hard copies of certificates for requirements requested in specification Sections and as requested by Contract Administrator.

.13 Submit 6 hard copies of manufacturer’s instructions for requirements requested in specification Sections and as requested by Contract Administrator.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.14 Submit 6 hard copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Contract Administrator.

.15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Delete information not applicable to project.

.17 Supplement standard information to provide details applicable to project.

.18 If upon review by Contract Administrator, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.19 The review of shop drawings by the Contract Administrator is for the sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Contract Administrator approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor

submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.5 CERTIFICATES

.1 Submit 6 copies of the completed Certificate of Successful Delivery following delivery.

.2 Submit 6 copies of the completed Certificate of Successful Installation following installation.

.3 Submit 6 copies of the completed Certificate of Satisfactory Commissioning following commissioning.

.4 Submit 6 copies of the completed Certificate of Satisfactory Performance following performance testing.

1.6 COMMISSIONING PLAN

.1 Submit 6 copies of the commissioning plan to the Contract Administrator for review a minimum of 30 days prior to the anticipated start of commissioning.

.2 The Commissioning Plan shall include as a minimum:

.1 A proposed schedule for the Equipment Start-up, 5 Day Commissioning Period and the Guarantee Performance Test (GPT).

.2 List of tasks to be completed during Equipment Start-up and personnel on-site responsible for completing each task.

.3 Proposed method of introducing sludge to Digester No. 11over the 5 Day Commissioning Period.

.4 List of tasks to be completed during the 5 Day Commissioning Period and personnel on-site responsible for each task.

.5 List of tasks to be completed during the GPT and personnel responsible for each task.

1.7 COMMISSIONING REPORT

.1 Submit 6 copies of the commissioning report to the Contract Administrator following commissioning.

.2 The Commissioning Report shall include as a minimum:

.1 Written description of tasks undertaken during the 5 Day Commissioning Period and GPT.

.2 Summary of influent and effluent sampling analysis undertaken during the 5 Day Commissioning Period and GPT.

.3 Identify all adjustments made to the operational set points.

1.8 TRAINING PLAN

.1 Submit 6 copies of the Training Plan to the Contract Administrator for review a minimum of 30 days prior to training.

.2 Training plan shall be a complete outline of the material that will be covered during the training period.

1.9 OPERATION AND MAINTENANCE MANUALS

.1 Submit 6 complete manuals including:

.1 Installation, operation and maintenance instructions relevant to the mixing system.

.2 Instructions for installation, adjustment and operation, lubrication and maintenance for each individual piece of equipment.

.3 Equipment, valve and hardware schedules.

.4 Part list with catalogue numbers.

.5 Recommended spare parts list.

.6 Manufacturer's representative signed certificates and reports.

.7 Material safety data sheets.

.8 Written warranties and process guarantees.

.9 Shop drawings revised to show construction revisions.

.10 Wiring loop and control drawings revised to show construction revisions.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 All other sections.

1.2 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Contract Administrator reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be borne by City in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should disputes arise as to quality or fitness of products, decision rests strictly with Contract Administrator based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Contract Administrator of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Contract Administrator at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Contract Administrator

reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 TRANSPORTATION AND DELIVERY

.1 Pay for the costs of delivering the equipment to the Work site.

.2 Coordinate delivery with the installation contractor.

.3 The installation contractor will be required to unload the equipment at the Work site.

.4 Inspect equipment after it has arrived on the Work site and Complete Certificate of Satisfactory Delivery.

1.6 STORAGE AND HANDLING

.1 The installation contractor will be required to store the equipment on the site in such a manner as to prevent deterioration and damage.

.2 Provide instructions to the installation contractor regarding storage and handling of the mixing system equipment.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Contract Administrator if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Contract Administrator reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Contract Administrator, whose decision is final.

1.8 CO-ORDINATION

.1 Co-ordinate with installation contractor in laying out Work. Maintain efficient supervision of installation of supplied equipment. Be responsible for coordination and placement of equipment and accessories.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All other specification Sections.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate scheduled operation and maintenance of equipment and systems to City's staff.

.2 The Contract Administrator will provide a list of personnel to receive instructions, and co-ordinate their attendance at agreed upon times.

.3 Preparation:

.1 Verify conditions for demonstration and instructions comply with requirements.

.2 Verify designated personnel are present.

.3 Ensure equipment has been inspected and put into operation.

.4 Ensure testing and adjusting has been performed in accordance with Section 01 91 13 – Start-Up, Commissioning and Performance Testing and equipment and systems are fully operational.

.4 Demonstration and Instructions:

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.

.2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.

.3 Review contents of manual in detail to explain aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Contract Administrator's approval.

.3 Submit reports within two weeks after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

.5 Ensure completed operation and maintenance manuals are on-site for use in demonstrations and instructions.

1.4 TRAINING

.1 Training must be provided by a factory certified trainer.

.2 Provide a minimum of two (2) training seminars for the City's staff.

.3 Submit a detailed training session outline to the Contract Administrator at least 30 days prior to the first training seminar.

.4 The first training seminar shall be of one (1) day duration on-site.

.5 The training seminar shall be provided following the 5 Day Commissioning Period or as directed by the Contract Administrator.

.6 The training session as a minimum shall provide information on mixing system theory, detailed process operation, and trouble shooting. Training shall include both class room type setting and hands-on demonstration of mixing System. The training shall include an over view of the Operation and Maintenance manual and identify a day to day operating protocol for operations and maintenance procedures associated with the mixing system.

.7 The second training session shall be one (1) days duration at a time scheduled by the City, but within six (6) months following successful commissioning. The second training session shall cover topics discussed in the first seminar plus additional areas depending on the need of the City's staff.

.8 Demonstration of detailed maintenance procedures shall be discussed as part of the first and second training seminars.

.9 The City may choose to retain an independent videographer to tape the training seminars.

.10 Provide for a period of up to a minimum of 24 months (from the date of substantial completion), technical support via phone or e-mail regarding mixing system operation and troubleshooting.

1.5 QUALITY ASSURANCE

.1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:

.1 Instruct City's staff.

.2 Provide written report that demonstration and instructions have been completed.

END OF SECTION

Approved: 2005-09-30

Part 1 General

1.1 SUMMARY

.1 General requirements relating to start-up, commissioning and performance testing of the mixing system associated with Digester No. 11.

1.2 DEFINITIONS

.1 Equipment Start-up: A test or tests performed to satisfy the installation contractor that the installed mixing system components meet the installation and adjustment requirements for individual pieces of equipment and other requirements specified including, but not limited to, noise vibration, alignment, speed, proper electrical, instrumentation and control, mechanical connections, proper rotation, initial servicing and instrumentation calibration.

.2 Commissioning: Perform tests on the respective mixing system to ensure proper operation of the mixing system as a whole.

.3 The following tests shall be performed as a minimum during commissioning for each mixing system provided i.e. Digester No. 11:

- .1 Clean Water Test. A test performed using clean water to ensure proper functioning of all processes and systems.
- .2 5 Day Commissioning Test. A test performed using co-thickened sludge to ensure proper operation of the mixing system as a whole.
- .3 Guaranteed Performance Test (GPT): A test performed in the presence of the Contract Administrator and City and after any required equipment start-up and commissioning, to demonstrate and confirm that the mixing system meets the specified performance requirements.

.4 The mixing system equipment start-up and commissioning must be successfully completed prior to the mixing system being considered ready for use as set out in the Builder's Lien Act which is a requirement that must be satisfied in order to declare Substantial Performance of the Works.

1.3 SUBMITTALS

.1 In accordance with Section 013300.

1.4 EQUIPMENT START-UP

.1 Preparation for equipment start-up:

- .1 Submit a testing plan and schedule for review and acceptance.
- .2 Provide related operating and maintenance manuals, spare parts and special tools required before testing any unit or system.
- .3 Provide services of qualified manufacturer's representatives to assist in testing.
- .4 Provide temporary valves, gauges, piping, test equipment and other materials and equipment required to conduct testing.
- .5 Calibrate testing equipment for accurate results.

.6 Inspect and clean equipment, devices, connected piping and structures so they are free of foreign material.

.7 Lubricate equipment in accordance with manufacturer's instructions.

.8 Turn rotating equipment by hand and check motor-driven equipment for correct rotation.

.9 Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.

.10 Check power supply to electric-powered equipment for correct voltage.

.11 Adjust clearances and torques.

.12 Complete equipment and electrical tagging.

.13 Complete and submit Certificate of Satisfactory Installation to the Contract Administrator.

.2 Tests for Equipment Start-Up:

.1 Following submission of the Certificate of Satisfactory Installation the installation contractor shall fill the digester with clean water for use during equipment start-up and commissioning.

.2 All rotating equipment shall be checked, witnessed by the Contract Administrator and City's staff and tested for vibration level. Peak vibration level shall not exceed 1 mm/sec. Measurement shall be carried out with a Real Time analyzer (Nicolet 100A or equal).

.3 Equipment base to be true and level.

.4 Conduct start-up tests until each individual component has undergone one continuous hour of satisfactory operation. Demonstrate all operational features and control functions during this period.

.5 Additional tests as specified in each specific equipment section.

.6 Complete the start-up tests on standardized forms submitted to the Contract Administrator for review and acceptance. Ensure all parties sign the respective forms.

.1 Mechanical Installation / Start-up Checklist

.2 Instrumentation Calibration Form

.3 Control Loop Verification Form

.4 Panel / PLC Installation / Start-up Checklist

.5 Electrical Installation / Start-up Checklist

.7 Complete all necessary modifications or adjustments to the system based on the start-up tests. Verify that the equipment and its installation conform to the requirements of the Contract for the service intended and is ready for permanent operation.

.8 If, in the Contract Administrator's opinion, each component meets the start-up requirements specified, such component will be accepted as conforming for purposes of advancing to the commissioning phase. If, in the Contract Administrator's opinion, start-up test results do not meet the requirements specified, the components will be considered as non-conforming.

.9 Commissioning shall not commence until all components of the system meet the required start-up test requirements specified.

1.5 COMMISSIONING

.1 Lead the commissioning of the mixing system associated with Digester No. 11 with assistance from the installation contractor.

.2 Commissioning shall include a clean water functional test, 5 Day Commissioning Test, GPT using co-thickened sludge.

.3 The description of the tests of this section is provided as a general outline of the tests to be performed. Submit to the Contract Administrator for review and acceptance a commissioning plan specific to the installed mixing system a minimum of 30 days in advance of the start of commissioning.

.4 Clean water test as follows:

.1 Digester No. 11 shall be filled with clean water by the installation contractor.

.2 Operate respective mixing system for at least four hours.

.3 Confirm proper operation of the mixing system as a whole.

.4 Verify in writing the successful operation of the mixing system as a whole.

.5 5 Day Commissioning Test as follows:

.1 Submit a detailed procedure and schedule to the Contract Administrator for approval to commission the mixing system associated with Digester No. 11.

.2 Begin 5 Day Commissioning Test after successful completion of all start-up and clean water tests.

.3 Instruct the installation contractor as to the proper procedures for introducing co-thickened sludge into Digester No. 11.

.4 Attend for the entire 5 Day Commissioning Test associated with Digester No. 11.

.5 Set all operational set points.

.6 Place the mixing system into operation and for a period of 5 days and operate the mixing system with assistance from the installation contractor. The installation contractor will be required to provide supervisory personnel, mechanics, electricians, instrument technologists on the site during normal working days to ensure continuous operation of the mixing system. If operation is not successful for the 5 Day Commissioning Test, continue until operation is satisfactory to the Contract Administrator or re-schedule a new 5 Day Commissioning Test.

.7 Provide all test equipment, including instrumentation, analyzers and sample containers required to conduct sampling and analysis over the 5 Day Commissioning Test.

.8 Bear all costs for sampling and analysis required during the 5 Day Commissioning Test.

.9 The Contract Administrator and City's staff will act as observers during the 5 Day Commissioning Test.

.10 At the end of the 5 Day Commissioning Test verify successful commissioning in by completing and submitting the Certificate of Satisfactory Commissioning.

.6 Guaranteed Performance Test

.1 The GPT shall be undertaken following the completion of the 5 Day Commissioning Test.

.2 Test all pumps in accordance with the Hydraulic Institute Standards.

.3 Conduct performance tests on each of the tanks to demonstrate compliance with the specified performance guarantees. The City will fill the Digester respectively to the normal operating level prior to the start of the tests.

.4 The feeding of sludge shall be discontinued during the GPT by the City.

.5 Following 30 minutes of continuous operation of Digester No. 11, collect grab samples of sludge from each wall-mounted sampling well (four provided) at six (6) different elevations for a total of 24 samples. The sampling elevations shall be evenly spaced from the liquid surface to within 600 mm of the tank floor.

.6 Solids profile testing shall be completed for Digester No. 11 as follows:

.1 Take grabs sample from each of the four (4) sampling locations located at different elevations in Digester No. 11.

.2 A total of five (5) grab samples shall be taken from each sampling location. The sampling frequency for samples from the same location shall be one (1) sample per hour.

.3 Analyze each sample for total solids using standard laboratory procedures. Sample analysis and reporting shall be carried out by an accredited laboratory.

.4 Acceptance Criteria: The total solids concentration of every sample shall be within plus or minus 10 percent of the mean value of the total solids concentration of all samples.

.7 Temperature profile testing shall be completed for Digester No. 11 as follows:

.1 The City will discontinue sludge feed to the Digester and stop the sludge recirculation and heating system prior to the start of the test.

.2 Following 8 hours of continuous operation of the Digester mixing system, measure the sludge temperature at the same locations as for the solids profile test.

.3 Position a thermocouple type temperature measuring device at each location for sufficient length of time to accurately measure the temperature at that point. At the City's option, temperature measurements shall be witnessed by the City.

.4 Acceptance Criteria: The temperature reading at every location shall be within plus or minus 1.0 degree Celsius of the mean value of the temperature reading at all locations.

.8 Document the sampling procedure, sampling data and analysis and other pertinent information in a performance test report to be submitted to the Contract Administrator a minimum of three (3) days following receipt of the test results.

.9 The Installation Contractor shall verify successful GPT by completing and submitting the Certificate of Satisfactory Performance to the Contract Administrator.

.10 Re-testing will be undertaken as follows:

.1 In the event of unacceptable performance, perform any supplemental testing, analysis, equipment adjustment, modifications, changes or additions and re-test of the unacceptable system at no additional cost to the City.

.2 Submit a detailed procedure and schedule for the re-test to the Contract Administrator for approval.

.3 The Contract Administrator will review the results of the re-test, as summarized by the Installation Contractor in the re-test report and determine whether the mixing system has complied with the specified performance requirements.

.4 If, in the opinion of the Contract Administrator, the mixing system fails to meet the performance requirements specified herein following the conclusion of the re-test, the Contract Administrator will notify the Installation Contractor.

.11 Action upon failure of re-test is as follows:

.1 If the re-test is not successful, the Contract Administrator, at its sole discretion may reject the equipment and require replacement or additional equipment as necessary to meet the specified requirements. The cost for replacement of additional equipment shall be the responsibility of the Installation Contractor. If in the opinion of the Contract Administrator, the Installation Contractor has not supplied a mixing system that meets the specified performance and has not corrected the deficiencies, then the Contract Administrator will holdback payment from the Installation Contractor in the amount identified in the Supplemental General Conditions for successful completion of the Guaranteed Performance Test and Total Performance until such time that all deficiencies are corrected and the mixing system successfully meets the specified performance requirements.

END OF SECTION