Part 1 General

1.1 REFERENCES

.1 City of Winnipeg Standard Construction Specifications

1.2 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

.1 General Requirements

.1 General Requirements will be measured and paid in accordance with E3.2.

.2 Digester No. 11 Concrete Tank Restoration

.1 Digester No. 11 Concrete Tank Restoration will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of Digester No. 11 Concrete Tank Restoration completed in accordance with Divisions 03, 07 and 09 accepted and measured by the Contract Administrator.

.3 SHT No. 5 and 7 Concrete Tank Demolition and Repair

.1 SHT No. 5 and 7 Concrete Tank Demolition and Repair will be measured for payment on a cubic meter basis and paid for at the Unit Price noted on Form I. The cubic meter amount to be paid will be for SHT No. 5 and 7 Concrete Tank Demolition and Repair at the NEWPCC in accordance with Divisions 03accepted and measured by the Contract Administrator.

.4 SHT No. 5 and 7 Concrete Tank Waterproofing and Lining

.1 SHT No. 5 and 7 Concrete Tank Waterproofing and Lining will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of SHT No. 5 and 7 Concrete Tank Waterproofing and Lining completed in accordance with Divisions 09 accepted and measured by the Contract Administrator.

.5 Structural Steel to Strengthen Digester Gallery No. 5

.1 Structural Steel to Strengthen Digester Gallery No. 5 will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of Structural Steel to Strengthen Digester Gallery No. 5 works completed in accordance with Division 05, accepted and measured by the Contract Administrator.

.6 Heating and Hording

.1 Heating and Hording will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of Heating and Hording completed in accordance with Division 03, accepted and measured by the Contract Administrator.

.7 Selective Site Demolition

.1 Selective Site Demolition Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be

paid will be based on the percentage of Selective Site Demolition works completed in accordance with Divisions 02, accepted and measured by the Contract Administrator.

.8 Digester No. 11 Mixing System

.1 Digester No. 11 Mixing System Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the Payment Schedule included in the Mixing System Request For Proposals for supply, installation, start-up, commissioning and successful guaranteed performance testing of all Digester No. 11 Mixing System works in accordance with Divisions 1 and 46, accepted and measured by the Contract Administrator.

.9 Digester No. 11 Gas Handling System

.1 Digester No. 11 Gas Handling System Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of supply, installation, start-up, commissioning, and training associated with all Digester No. 11 Gas Handling System works completed in accordance with Division 1 and 46, accepted and measured by the Contract Administrator.

.10 SHT No. 5 and 7 Gas Handling System

.1 SHT No. 5 and 7Gas Handling System Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of supply, installation, start-up, commissioning and training associated with all SHT No. 5 and 7 Gas Handling System works completed in accordance with Divisions 1 and 46, accepted and measured by the Contract Administrator.

.11 Process Integration

.1 Process Integration Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of supply, installation, start-up, commissioning and training associated with all process integration works completed in accordance with Divisions 1 and 40, accepted and measured by the Contract Administrator.

.12 Electrical

.1 Electrical Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of supply, installation, start-up, commissioning and training associated with all electrical works completed in accordance with Divisions 1 and 26, accepted and measured by the Contract Administrator.

.13 Integrated Automation

.1 Integration Automation Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be based on the percentage of supply, installation, start-up, commissioning and training associated with all integrated automation works completed, in accordance with Divisions 1 and 25 (not including Section 259001), accepted and measured by the Contract Administrator.

.14 DCS System

.1 DCS System Works will be measured for payment on a lump sum basis and paid for at the Unit Price noted on Form I. The lump sum amount to be paid will be for the supply, installation, start-up, commissioning and training associated with the DCS system work in accordance with Section 259001, accepted and measured by the Contract Administrator.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All other specification Sections.

1.2 ADMINISTRATIVE

.1 Submit to 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 Verify field measurements and affected adjacent Work are co-ordinated.

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

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

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

1.3 SHOP DRAWINGS AND PRODUCT DATA

.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 Submit drawings stamped and signed by professional Contract Administrator registered or licensed in Province of Manitoba.

.3 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.

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

.5 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.

.6 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.

.7 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.

.8 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, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Contract Administrator's review, distribute copies.

.10 Submit 6 hard copies or 1 electronic copy of shop drawings for each requirement requested in specification Sections and as Contract Administrator may reasonably request.

.11 Submit 6 hard copies of product data sheets / brochures or 1 electronic copy 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.

.12 Submit 6 hard copies of test reports or 1 electronic copy for requirements requested in specification Sections and as requested by Contract Administrator.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 1 year of date of contract award for project.

.13 Submit 6 hard copies or 1 electronic copy of certificates for requirements requested in specification Sections and as requested by Contract Administrator

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit 6 hard copies or 1 electronic copy 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.

.15 Submit 6 hard copies or 1 electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Contract Administrator.

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

.17 Delete information not applicable to project.

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

.19 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.

.20 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.

1.4 SAMPLES

.1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Contract Administrator's address.

.3 Notify Contract Administrator in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples 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.

.6 Make changes in samples which Contract Administrator may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status and all other forms required by this contract.

.2 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 General Conditions C11 Inspection

.2 Section 01 98 13 - General Commissioning Requirements

.3 Section 01 78 00 – Closeout Submittals.

1.2 INSPECTION

.1 Allow Contract Administrator access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Contract Administrator.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Contract Administrator will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Contract Administrator shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor.

.2 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised Contract Administrator at no cost to Contract Administrator. Pay costs for retesting and reinspection.

1.4 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

.1 Notify appropriate agency Contract Administrator in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Contract Administrator as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the City will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Contract Administrator.

1.7 REPORTS

.1 Submit 6 hard copies or 1 electronic copy of inspection and test reports to Contract Administrator.

.2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

1.9 MOCK-UPS

.1 A masonry mock-up is required for the brick and stone.

.2 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.3 Construct in locations acceptable to Contract Administrator as specified in specific Section.

.4 Prepare mock-ups for Contract Administrator’s review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.5 Failure to prepare mock-ups 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.

.6 If requested, Contract Administrator will assist in preparing schedule fixing dates for preparation.

.7 Remove mock-up at conclusion of Work or when acceptable to Contract Administrator.

1.10 MILL TESTS

.1 Submit mill test certificates as required of specification Sections.

1.11 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 All other specification Sections.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)

- .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
- .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
- .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.3 SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

.1 Refer to the Drawing 1-0101D-C0001-001 for the location of the Contractor’s lay down area.

.2 Provide construction facilities in order to execute work expeditiously.

.3 The Contractor is responsible for the power feed to the construction facilities.

.4 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, ladders, platforms, temporary stairs as required to complete the Work.

1.6 HOISTING

.1 Provide, operate and maintain hoists required for moving of workers, materials and equipment.

.2 Hoists to be operated by qualified operator.

1.7 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site within the Contractors lay down area noted on Drawing 1-0101D-C0001-001.

.2 Provide and maintain adequate access to project site.

1.9 SECURITY

.1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.10 OFFICES

.1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate seating for 12 people at site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary.

.4 Contract Administrator's Site office.

.1 Provide temporary office space for Contract Administrator.

.2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 2 - 50% opening windows and one lockable door.

.3 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature. Provide a cooling system for when ambient temperatures exceed 25 degrees C

.4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

.5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures.

.6 Equip office with 1 x 2 m table, 2 chairs, 3 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.

.7 Maintain in clean condition. Clean at a minimum weekly

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13 CONSTRUCTION SIGNAGE

.1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by Contract Administrator.

.2 Construction sign size to be approved by the Contract Administrator and shall be constructed of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.

.3 Indicate on sign, City of Winnipeg, name of Funding Agencies, Contract Administrator, Contractor and Sub Contractors.

.4 No other signs or advertisements, other than warning signs, are permitted on site.

.5 Provide project identification site sign as required.

.6 Locate project identification sign as directed by Contract Administrator.

.7 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Contract Administrator.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary roads as required.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Contract Administrator.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.12 Provide snow removal during period of Work.

1.15 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways as required to maintain the roadway in clean condition .

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to [requirements of authorities having jurisdiction] [sediment and erosion control drawings] [sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent].

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 General Conditions C-3

.2 Section 01 78 00 – Closeout Submittals.

1.2 REFERENCES

.1 City's identification of existing survey control points and property limits.

1.3 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Contract Administrator.

.4 Report to Contract Administrator when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

.1 Establish lines and levels, locate and lay out, by instrumentation.

.2 Establish pipe invert elevations.

.3 Establish lines and levels for mechanical and electrical work.

1.5 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Contract Administrator of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Contract Administrator.

1.6 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 Maintain a complete and accurate control and survey of foundations and major site improvements showing dimensions, locations, angles and elevations of Work.

.3 Record locations of maintained, re-routed and abandoned service lines.

.4 Record and maintain records of directional boring control and survey. Record locator instrument position and elevation at intervals of no more than 4 metres.

1.7 SUBMITTALS

.1 Submit name and address of Surveyor to Contract Administrator.

.2 On request of Contract Administrator, submit documentation to verify accuracy of field Contract Administratoring work.

.3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.8 EXISTING CONDITIONS

.1 Promptly notify Contract Administrator in writing if existing conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Contract Administrator determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Division 25

.2 Division 26

.3 Division 40

.4 Division 46

1.2 REFERENCES

1.3 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by City or other Contractors not associated with this project.

.2 Reuse and recycle the maximum amount of waste as possible.

.3 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Contract Administrator. Do not burn waste materials on site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site a minimum of 2 dump containers for collection of waste materials and debris.

.6 Clean interior/exterior Work areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.1 The City will not perform any cleaning operations prior to the Contractor starting the Work or at any time during the progress of the Work. The Contractor is responsible for all cleaning operations.

.7 Store volatile waste in anti spill covered metal containers, and remove from premises at end of each working day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris other than that caused by City or other Contractors not associated with the project.

.5 Clean existing interior building work areas affected by construction dust and debris. Clean existing piping and building areas that are affected by carry over of construction dust and debris.

.6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Contract Administrator. Do not burn waste materials on site.

.7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.8 Pay all disposal / dumping/ recycling/ tipping fees for waste disposal.

.9 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.10 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floor.

.11 Clean lighting reflectors, lenses, and other lighting surfaces. Clean dust an dirt from the interior of electrical power and control panels.

.12 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.13 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.14 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.15 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.16 Remove dirt and other disfiguration from exterior surfaces.

.17 Clean and sweep roofs, gutters, areaways, and sunken wells.

.18 Sweep and wash clean paved areas. Clean debris and dirt from catch basins and manholes.

.19 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.20 Clean roofs, downspouts, and drainage systems.

.21 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.22 Remove snow and ice from access to building.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 78 00 Closeout Submittals

.2 Section 01 79 00 Demonstrating and Training

.3 .Section 01 98 13 General Commissioning Requirements

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

- .1 Contractor's Inspection: Contractor to conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  - .1 Notify Contract Administrator in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
  - .2 Request Contract Administrator's inspection.
  - .3 Correct any incomplete work and request the Contract Administrator for a re-inspection.
- .2 Contract Administrator's Inspection:
  - .1 Contract Administrator and Contractor are to inspect Work and identify defects and deficiencies.
  - .2 Contractor to correct Work as directed.
  - .3 Re-inspect corrected incomplete work when request by the Contractor.
- .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
  - .1 Work: completed and inspected for compliance with Contract Documents.
  - .2 Defects: corrected and deficiencies completed.
  - .3 Equipment and systems: tested, adjusted and fully operational.
  - .4 Operation of systems: demonstrated to City's personnel.
  - .5 Commissioning of Work: completed in accordance with 01 918 13 - General Commissioning Requirements and all Forms executed and provided to the Contract Administrator..
  - .6 Work: complete and ready for final inspection.
- .4 Final Inspection:
  - .1 When completion tasks are done, request final inspection of Work by Contract Administrator and Contractor.
  - .2 When Work incomplete according to City and Contract Administrator, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when Contract Administrator considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: date of City's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:

.1 When Contract Administrator considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 All other specification Sections.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Warranty Meeting:

.1 Convene meeting one week prior to contract Substantial Performance with contractor's representative and Contract Administrator.

.1 Verify Project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

.2 Contract Administrator to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 A minimum of seven days prior to training and a minimum of fourteen days prior to commissioning of the Work, submit to the Contract Administrator, four final copies of Operating and Maintenance Manuals in English.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 OPERATION AND MAINTENANCE MANUALS

.1 Prepare operation and maintenance manuals and submit four hard copies and one electronic copy containing PDF files to the Contract Administrator a minimum of seven days prior to training and a minimum of fourteen days prior to commissioning.

.2 Operation and maintenance manuals are specified in general in this section, with regard to numbers of binders, preparation, marking, general arrangement, format and general contents. Requirements for mechanical, process equipment, electrical work and other items may be specified in other sections of the specifications, however the general format shall be in accordance with this section.

.3 Provide the services of qualified and experienced personnel to prepare manuals.

.4 Prepare sets of manuals for various divisions using identical bindings, and the same indexing system and format for all manuals (eg. if there are X number of binder for the entire project they are to be labelled Vol. 1 of X, Vol. 2 of X, Vol. 3 of X, etc..)

.5 Provide binders of suitable size to contain material.

.6 Label the Cover and Spine of each binder as follows:

- .1 Cover
  - .1 Project title (NEWPCC Rehabilitation of Digester No. 11 and Sludge Holding Tanks No. 5 and 7)
  - .2 Bid Opportunity No. (573-2012)
  - .3 Binder Title (eg. Mechanical Operation and Maintenance Manual)
  - .4 Volume No. / Contractor Name (eg. Vol. Y of X_CONTRACTOR)
- .2 Spine
  - .1 Project title
  - .2 Bid Opportunity No.
  - .3 Volume No. / Contractor Name

.7 Arrange each individual binder as follows:

- .1 Title Page (first page on inside of binder)
  - .1 Project title
  - .2 City of Winnipeg
  - .3 Name, address, telephone number for:
    - .1 Contract Administrator
    - .2 General Contractor
    - .3 Subcontractors (list all applicable to binder contents)
- .2 Index (follows Title Page)
  - .1 Project title
  - .2 Bid Opportunity No.
  - .3 Volume No.
  - .4 Table of Contents broken out into three columns as follows:
    - .1 Item No.
    - .2 Specification reference No.
    - .3 Description of item
- .3 Tabs
  - .1 Tab Title Page
    - .1 Item description
    - .2 Manufacturer
    - .3 Agent name
    - .4 Agent address
    - .5 Agent telephone number

.6 Agent fax number

.7 Item No.

.8 Specification reference No.

.9 General description

.2 Contents of each tab

.1 Part number specific to the item provided

.2 Product information specific to the item provided

.3 Operating procedures and instructions specific to the item provided

.4 Preventive maintenance program specific to the item provided

.5 Servicing schedules specific to the item provided

.6 Spare parts list specific to the item provided

.7 Start up documentation and check sheets (if applicable)

.8 An electronic copy containing PDF files is to be provided on disk for each binder. The contents of each disk are to be organized into folders as follows:

.1 Primary folder labelled with Volume Name / Contractor (eg. VOL 01 of XX_CONTRACTOR_NAME)

.1 Include a PDF of the Title Page (clause 7.1) and Index (clause 7.2) within the primary folder.

.2 Subfolders to be labelled with Tab No. (eg. TAB XX)

.1 Include a single PDF including the Tab Title Page (clause 7.3.1) and Tab contents (clause 7.3.2) within the Tab subfolder. The PDF is to be labelled with the specification reference and item description (eg. 464100_Mixing System).

1.5 PROJECT RECORD DOCUMENTS

.1 The Contractor shall keep one complete set of all construction drawings on the site.

.2 On the set of Contract Drawings on the site, the Contractor shall record any changes that are made during the actual construction of the Work. The purpose of recording these changes is to provide drawings of record at the end of the Work. The Contractor shall be responsible for the adequacy and the reliability of the information recorded on the drawings of record. Marked up drawings shall be made available for inspection by the Contract Administrator on a weekly basis during the construction period.

.3 At the completion of the construction period, the Contractor shall turn over the set of construction drawings, which have been marked up with changes during the course of the Work to the Contract Administrator to permit the Contract Administrator to prepare Drawings of Record for the Work.

.4 Use indelible marking pens, maintaining separate colours for each major system, for recording information.

.5 Record information concurrently with construction progress.

.6 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.2 Field changes of dimension and detail.

.3 Changes made by change orders.

.4 Details not on original Contract Drawings.

.5 References to related shop drawings and modifications.

.7 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.8 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.9 Provide digital photos, if requested, for site records.

.10 The submission of acceptable marked up construction drawings following the completion of the Work will be valued at **$15,000.00** for the purpose of deficiency holdback when not submitted prior to Substantial Performance.

1.6 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.1 Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional requirements: as specified in individual specifications sections.

1.7 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location at North End Water Pollution Control Centre as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Contract Administrator.

.2 Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.2 Extra Stock Materials:

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location at North End Water Pollution Control Centre as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Contract Administrator.

.2 Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location at North End Water Pollution Control Centre as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Contract Administrator.

.2 Include approved listings in Maintenance Manual.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Contract Administrator.

1.9 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, seven days before planned pre-warranty conference, to Contract Administrator for approval.

.3 Warranty management plan to include required actions and documents to assure that Contract Administrator receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to Contract Administrator for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.7 Conduct joint 6 and 12 month warranty inspection, measured from time of acceptance, by Contract Administrator.

.8 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.3 Contractor's plans for attendance at 6 and 12 month post-construction warranty inspections.

.4 Procedure and status of tagging of equipment covered by extended warranties.

.5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.9 Respond in timely manner to oral or written notification of required construction warranty repair work.

1.10 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Contract Administrator.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittals

.2 Section 01 78 00 – Closeout Submittals

.3 Section 01 98 13 – General Commissioning (Rx) Requirements

.4 Section 25 30 01 – Process Controllers

.5 Section 25 30 02 – Instruments

.6 Section 26 05 00 – Electrical

.7 Section 26 29 23 – Variable Frequency Drives

.8 Section 40 05 00 – Common Work Results for Process Integration

.9 Section 40 05 23 – Process Valves

.10 Section 46 41 00 – Mixing Equipment

.11 Section 46 73 20 – Digester Gas Safety Equipment and Specialties

.12 Section 46 73 21 – Sludge Holding Tank Gas Safety Equipment and Specialties

1.2 DESCRIPTION

.1 This section contains requirements for training the City staff, by persons retained by the Contractor specifically for the purpose of proper operation and maintenance of all equipment supplied and installed under this Contract.

.2 As a minimum, the Contractor is to allow at least the minimum number of hours of operation / maintenance training per City staff shift for each equipment item or system noted in Clause 1.8. The City has 5 shifts at the NEWPCC.

.3 The intent is that the City should receive sufficient training on the equipment and systems that they are going to operate and maintain. The Contract Administrator shall have the authority to determine if the training is sufficient based on the lesson plan submitted by the Contractor.

.4 Training shall take place prior to commissioning.

1.3 SUBMITTALS

.1 Submit the following information to the Contract Administrator 30 days prior to the first training session. The material will be returned as either “Reviewed”, “Reviewed as Modified” or “Revise and Resubmit”.

.1 Lesson plan and supplemental training manuals, handouts, visual aids and other reference material required for each training session.

.2 Training schedule that indicates the date, time and subject of each training session. Concurrent classes will not be allowed.

.2 Submit Operation and Maintenance Manuals a minimum of 7 days prior to the first training session. Training will not be permitted to start if Operations and Maintenance Manuals have not been submitted.

1.4 QUALITY ASSURANCE

.1 Training sessions to be conducted by qualified factory-trained representatives of the various equipment suppliers with a minimum of two years experience.

1.5 LOCATION

.1 Classroom training sessions shall take place at the NEWPCC Training Room.

.2 Field training sessions shall take place at the equipment location.

1.6 FORMAT AND CONTENT

.1 Familiarization
.2 Safety
.3 Operation
.4 Troubleshooting
.5 Preventive maintenance
.6 Corrective maintenance
.7 Parts
.8 Local representation

.2 Classroom Training

.1 As a minimum, classroom equipment training for operations and maintenance personnel will include:

.1 The specific equipment location in the plant and operational overview. Use slides and drawings to aid discussion.
.2 Purpose and function of equipment.
.3 The operating theory of the equipment.
.4 Start-up, shutdown, normal operation and emergency operating procedures, including system integration and electrical interlocks, if any.
.5 Safety items and procedures.
.6 Routine and preventative maintenance.
.7 Disassembly and assembly of equipment if applicable.
.8 Normal and major repair procedures
.9 Inspection and troubleshooting procedures including the use of applicable test instruments and the ‘pass’ and ‘no pass test instrument readings.
.10 Calibration procedures

.3 Field Training

.1 As a minimum, field equipment training for operation and maintenance personnel will include:

.1 Identification of equipment: location of primary element; location of instrument readout; discuss purpose, basic operation, and information interpretation.

.2 Discussion and demonstration of standard operating procedures and daily visual inspection of system operation.

.3 Discussion and demonstration of the preventative maintenance activities.

.4 Discussion and demonstration of start-up and shutdown procedures.

.5 Demonstration of routine disassembly and assembly of equipment if applicable.

.6 Identification and review of safety items and demonstration of safety procedures, if feasible.

.7 Review of Contractor prepared Operation and Maintenance Manuals.

.8 Demonstration of operating parameter adjustment, if applicable.

1.7 VIDEO RECORDING

.1 The Contractor shall notify all training providers that the training sessions will be videotaped.

.2 The Contractor is to carry the cost of videotaping one training session for each item of equipment of system.

.3 Acceptable videographer is McNeill Media Creations (Don McNeill, (204) 224.2578, mmc@shaw.ca) or approved equal in accordance with B7.

1.8 EQUIPEMENT AND SYSTEMS FOR TRAINING

.1 Training is to be provided for the equipment and systems listed in the following table:

Equipment / System	Specification Reference	Number of Classroom Training Sessions	Minimum hours per Classroom Training session	Number of Field Training Sessions	Minimum hours per Field Training session
Electrical	26 05 00	5	1	5	2
Variable Frequency Drives	26 29 23	5	1	5	1
Instrumentation	26 29 23	5	1	5	2
PLC Control System	25 30 02	5	2	5	3
DCS System	40 41 13	5	2	5	2
Process Valves	40 05 00	5	1	5	1
Mixing System	46 41 00	2	3	2	4
Digester No. 11 Gas Equipment	46 73 20	5	1.5	5	1.5
SHT No. 5, 5, 7 and 8 Gas Collection System Equipment	46 73 20	5	1.5	5	1.5

1.9 TRAINING COMPLETION FORMS

.1 Form T1 to be signed by the trainer and City Staff representative for each City shift when training has been completed. One (1) form is to be used for each item of equipment of system for which training has been provided. Once all training sessions have been completed Form T1 is to be submitted to the Contract Administrator.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

CERTIFICATE OF SATISFACTORY TRAINING
FORM T1

We certify that the initial training for the equipment listed below has been provided as per the Specifications.

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

TAG No.: _____

REFERENCE SPECIFICATION: _____

_____ _____
(Trainer) Date

_____ _____
(Authorized Signing Representative of City Shift 1) Date

_____ _____
(Authorized Signing Representative of City Shift 2) Date

_____ _____
(Authorized Signing Representative of City Shift 3) Date

_____ _____
(Authorized Signing Representative of City Shift 4) Date

_____ _____
(Authorized Signing Representative of City Shift 5) Date

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittals

.2 Section 01 78 00 – Closeout Submittals

.3 Section 01 79 00 – Demonstration and Training

.4 Section 25 30 01 – Process Controllers

.5 Section 25 30 02 – Instruments

.6 Section 26 05 00 – Electrical

.7 Section 26 29 23 – Variable Frequency Drives

.8 Section 40 05 00 – Common Work Results for Process Integration

.9 Section 40 05 23 – Process Valves

.10 Section 46 41 00 – Mixing Equipment

.11 Section 46 73 20 – Digester Gas Safety Equipment and Specialties

.12 Section 46 73 21 – Sludge Holding Tank Gas Safety Equipment and Specialties

1.2 INTENT

.1 This section describes the Contractor's responsibilities in commissioning and handover of the integrated automation, electrical, process integration and water and wastewater equipment to be installed as part of this Work.

1.3 DEFINITIONS

.1 System: for the purpose of this section, a system shall be defined as the equipment, piping, controls, ancillary devices, electrical power, etc..., which together perform a specific function at the facility.

.2 Clean Water Test: for the purpose of this section, the clean water test shall be defined as successful operation of the system using clean water in accordance with its design requirements for a minimum period of four hours.

.3 Commissioning: for the purpose of this section, commissioning shall be defined as successful operation of the system using co-thickened sludge in accordance with its design requirements for a period of five days.

.4 Acceptance: for the purpose of this section, acceptance shall be defined as the formal turnover of a system to the City for his operation and maintenance. This shall occur after the successful end of commissioning of each system through a formal agreement between the Contract Administrator, the City, and the Contractor. Success of the commissioning is determined by the Contract Administrator.

.5 Guaranteed Performance Test (GPT): for the purpose of this section, GPT shall be defined as testing of the mixing system to confirm that it meets the specified performance requirements. GPT is to take place following commissioning. GPT protocol is defined in the Mixing System Request For Proposal

(www.winnipeg.ca/MatMgt/FolderContent.asp?FOLDER_NAME=187-2012&YEAR=2012).

1.4 COMMISSIONING TEAM

.1 The Work of commissioning will be conducted by the Contractor, the City and the Contract Administrator.

.2 The City's appointed staff shall represent process personnel and operating staff.

.3 The Contractor shall provide personnel representing the appropriate automated integration, electrical, process integration and water and wastewater equipment trades. These personnel shall be skilled workmen, able to expedite and minor repairs, adjustment, etc.., as required to complete commissioning with as few delays as possible.

1.5 COMMISSIONING PLAN

.1 Develop a detailed methodology for the commissioning of each system at least 90 calendar days prior to planned start of commissioning. The plan shall be drafted by the Contractor and submitted to the Contract Administrator for review. The plan shall include the following as a minimum:

.1 Detailed schedule of events. The schedule shall include the date and time for start-up and testing of the individual components identified in Clause 1.6.6, clean water test, commissioning and GPT for the mixing system.

.2 Method for filling the digester with clean water for the clean water test.

.3 Method for emptying the digester following the clean water test.

.4 Method for introducing co-thickened sludge into the digester.

.5 Contingency plans in the event of a process malfunction.

.6 Drawings and sketches to illustrate the planned sequence of events.

.7 List and details for any temporary equipment required to facilitate commissioning and the GPT.

.8 List of all personnel required for commissioning and handover with information indicating their qualifications for this Work.

.2 The commissioning plan shall be reviewed by the Contract Administration and returned as either "Reviewed", "Reviewed as Modified" or "Revise and Resubmit".

1.6 EQUIPMENT START-UP

.1 Form 101 – Certificate of Satisfactory Delivery is required for certain equipment to certify that equipment has been successfully delivered to site.

.2 Form 102 – Certificate of Satisfactory Installation is required for certain equipment to certify that the equipment has been installed correctly and is ready for start-up.

.3 All integrated automation, electrical, process integration and water and wastewater equipment shall be successfully installed and tested in accordance with the requirements identified for each equipment item. Following successful commissioning Form 103 – Certificate of Satisfactory Commissioning is to be completed.

.4 Form 104 – Certificate of Satisfactory Performance is required for certain equipment to certify that the equipment is performing in accordance with the specification.

.5 Install temporary equipment required to ensure that equipment operates reliably and consistently during the commissioning period.

.6 Refer to the following table for form requirements for specific equipment:

Equipment	Specification Reference	Form 101	Form 102	Form 103	Form 104
Electrical	26 05 00			X	
Variable Frequency Drives	26 29 23		X	X	
Instrumentation	26 29 23		X	X	
PLC Control System	25 30 02		X	X	
DCS System	40 41 13		X	X	
Process Valves	40 05 00		X	X	
Mixing System	46 41 00	X	X	X	X
Digester No. 11 Gas Equipment	46 73 20		X	X	
SHT No. 5 & 7 Gas Equipment	46 73 20		X	X	

1.7 CONTROLS

.1 All controls which are part of this Work shall be installed and tested prior to commissioning.

.2 The Contract Administrator shall arrange for the simulation of the control sequence identified in the Appendix C – Process Narrative

1.8 MANPOWER

.1 Supply all staff required during commissioning as necessary to assist the City's staff in operation of the system.

.2 Supply competent staff capable of maintaining, repairing and adjusting the equipment and controls to achieve the intended design functions during the commissioning period.

.3 Ensure equipment manufacturer's representatives are available as necessary to certify adjustments in equipment, to guide in setting correct operating limits and to generally provide input as required for the appropriate operation of the equipment.

1.9 SEQUENCE

.1 Systems shall be commissioned in a logical manner.

.2 The following sequence of events shall be followed:

.1 Submit Operation and Maintenance Manuals a minimum of 14 days prior to commissioning.

.2 Operator training shall be completed prior to commissioning.

.3 Individual equipment components shall be operated to confirm proper operation and Forms 102 – Certificate of Satisfactory Installation submitted to the Contract Administrator.

.4 Fill Digester No. 11 with clean water.

.5 Operate the system in manual mode.

.6 Operate the system in automatic mode.

.7 Commence the 5 day commissioning period.

.8 Complete GPT for the mixing system.

.9 Upon completion of the commissioning period and GPT, the system shall be granted formal acceptance by the Contract Administrator.

1.10 CLEAN WATER TEST

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

.2 The system shall be operated in manual mode and automatic mode.

.3 The system shall be operated for a minimum of 4 hours.

1.11 COMMISSIONING

.1 During the commissioning period co-thickened sludge shall be introduced into Digester No. 11.

.2 All components shall be operated in manual mode, automatic mode, remote mode and local mode.

.3 The system shall be operated through all sequences identified in the process narrative (Appendix C).

.4 Ensure all backup provisions function satisfactorily.

.5 All alarm conditions will be simulated to ensure that the system reacts as intended and the applicable alarms are enunciated.

1.12 GUARANTEED PERFORMANCE TEST

.1 GPT shall be undertaken following completion of the 5 day commissioning.

.2 The GPT shall be conducted to demonstrate compliance of the mixing system with the specified performance guarantee.

.3 The feed of sludge shall be discontinued during the GPT.

.4 Following 30 minutes of continuous operation of Digester No. 11, the Contractor shall collect grab samples from four (4) roof mounted sampling wells as six (6) different elevations for a total of twenty-four (24) samples. The sampling elevations shall be evenly spaced from the liquid surface to within 600 mm of the digester floor.

.5 Solids profile testing shall be completed as defined in the Mixing System Request for Proposal (www.winnipeg.ca/MatMgt/FolderContent.asp?FOLDER_NAME=187-2012&YEAR=2012)

.6 Temperature profile testing shall be completed as defined in the Mixing System Request For Proposal (www.winnipeg.ca/MatMgt/FolderContent.asp?FOLDER_NAME=187-2012&YEAR=2012)

.7 Upon receipt of results indicating successful GPT complete Form 104 – Certificate of Satisfactory Performance and submit it to the Contract Administrator.

.8 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 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 Contractor.

.9 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 Contractor. If in the opinion of the Contract Administrator, the 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 Contractor in the amount identified in the Mixing System Request For Proposal (www.winnipeg.ca/MatMgt/FolderContent.asp?FOLDER_NAME=187-2012&YEAR=2012), 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.

1.13 ACCEPTANCE

.1 The commissioning of a system shall be considered acceptable when the process has operated in a stable manner, satisfying the design criteria for a period of 5 days and the GPT has been successful completed.

.2 All forms identified in Clause 1.6.6 shall be submitted for the Contract Administrator considers the system as acceptable.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

CERTIFICATE OF SATISFACTORY DELIVERY

FORM 101

I have inspected the equipment delivered and unloaded at the site and have confirmed that delivery and unloading is satisfactory except as noted below. I have also informed the installation contractor of the storage requirement for the equipment at the site.

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

REFERENCE SPECIFICATION: _____

OUTSTANDING DEFECTS: _____

_____ _____
(Authorized Representative for Contractor) Date

_____ _____
(Authorized Representative for Installation Contractor) Date

CERTIFICATE OF SATISFACTORY INSTALLATION

FORM 102

I have completed my check and inspection of the installation listed below and confirm that it is satisfactory and that defects have been remedied to my satisfaction, except as noted below:

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

REFERENCE SPECIFICATION: _____

OUTSTANDING DEFECTS: _____

_____ _____
(Authorized Representative for Contractor) Date

_____ _____
(Authorized Representative for Installation Contractor) Date

CERTIFICATE OF SATISFACTORY COMMISSIONING

FORM 103

Commissioning has been completed in accordance with the specification, except as noted below:

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

REFERENCE SPECIFICATION: _____

OUTSTANDING DEFECTS: _____

_____ _____
(Authorized Representative for Contractor) Date

_____ _____
(Authorized Representative for Contract Administrator) Date

_____ _____
(Authorized Representative for City of Winnipeg) Date

CERTIFICATE OF SATISFACTORY PERFORMANCE

FORM 104

Guaranteed Performance Acceptance Testing has been completed and meets the requirements stated in the specification, except as noted below:

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

REFERENCE SPECIFICATION: _____

OUTSTANDING DEFECTS: _____

_____ _____
(Authorized Representative for Contractor) Date

_____ _____
(Authorized Representative for Contract Administrator) Date

_____ _____
(Authorized Representative for City of Winnipeg) Date

END OF SECTION