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### **DIVISION 1**

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## **FIELD ENGINEERING**

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### **1. GENERAL**

#### **1.1 Requirements Included**

- .1 Field engineering survey services to measure and stake the Site.
- .2 Survey services to establish (and confirm) invert measurements for the Work.
- .3 Subsurface conditions

#### **1.2 Survey Reference Points**

- .1 Existing base horizontal and vertical control points are designated on Drawings.
- .2 Locate, confirm, and protect control points. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to the Contract Administrator.
- .4 Report to the Contract Administrator when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require Manitoba Land Surveyor to replace control points in accordance with the original survey control.

#### **1.3 Survey Requirements**

- .1 Employ a Manitoba Land Surveyor to establish two (2) permanent benchmarks on-site, referenced to establish benchmarks by survey control points. Record locations with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels; locate and lay out by instrumentation.
- .3 Stake for grading, fill and topsoil placement, and landscaping features.
- .4 Stake slopes and berms
- .5 Establish pipe invert and centerline elevations
- .6 Establish lines and levels for mechanical and electrical Work

#### **1.4 Records**

- .1 Maintain a complete accurate log of control and survey Work as it progresses.

**FIELD ENGINEERING**

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**1.5 Submittals**

- .1 On request of the Contract Administrator, submit documentation to verify accuracy of field engineering Work.
- .2 Submit certificate signed by Manitoba Land Surveyor certifying that elevations and locations of completed Work are in conformance or non-conformance with Contract Documents.

**2. PRODUCTS**

- .1 Not used

**3. EXECUTION**

- .1 Not used

**END OF SECTION**

## SCOPE OF WORK

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### 1. GENERAL

#### 1.1 Description of Work

- .1 The Work to be performed under this Contract shall include the labour, equipment, and materials required to complete the Nitrogen Removal Facility components of the Centrate Nutrient Treatment for the North End Water Pollution Control Centre in Winnipeg, Manitoba, all as specified in the Contract Documents.
- .2 The Work includes, but is not limited to, the following elements:
  - .1 Construction of new structures with associated process equipment, mechanical systems, and electrical systems for:
    - .1 Two (2) sequencing batch reactors
    - .2 One (1) equalization tank
    - .3 Process air blower building
    - .4 Exhaust fan building
    - .5 One (1) exhaust stack
    - .6 Chemical storage and feeding facilities
  - .2 Installation of City-supplied equipment consisting of
    - .1 Decanter systems
    - .2 Aeration diffuser systems
  - .3 Tie-ins to existing plant to service all inlet and outlet streams to and from the sequencing batch reactor, including all piping, fitting, valves, demolition, excavation, Site Works, etc.
  - .4 Upgrade, additions, and modifications to the electrical supply system and services as detailed in Division 16 Electrical Scope of Work.
  - .5 Upgrades and modifications to the distributed control system (DCS) to control new systems.
  - .6 Site and utility Work associated with the new facilities and with the general Site.
  - .7 Heating, ventilation, and cooling (HVAC) systems.
  - .8 All other auxiliary equipment, structures, and systems required to complete the Work.

## SCOPE OF WORK

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### 1.2 Coordination

- .1 Cooperate and liaise with other contractors, utility agencies, City employees or their appointed representatives, in order to make appropriate working arrangements to ensure satisfactory execution and timely completion of the Work. Specifically, the following Contract is anticipated to be under construction concurrently with this Contract:
  - .1 Centrate Nutrient Treatment - Phosphorus Removal Facility Bid Opportunity 611-2005
- .2 Attend coordination meetings, as directed by the Contract Administrator, when the Contract Administrator considers that they are necessary for ensuring the sufficiency of the liaison and cooperation with other contractors. The Contractor shall be deemed to have allowed in his Total Bid Price for any interference to his operations, which may result from any of the above. The Contractor must also take all precautions necessary to ensure that there are no hindrances or delay in any way the progress of these other parties or cause damage to their completed Work.

### 1.3 General Sequence of Construction

- .1 The following sequence of construction does not encompass all items of this Contract. It is only intended to draw the Contractor's attention to major milestone events which must be completed before subsequent steps are started.
  - .1 Construct the proposed asphalt turnaround and the proposed gravel service road prior to removing the existing asphalt turnaround and existing gravel service road and beginning excavation for the SBR structure.
  - .2 Excavate and construct the SBR structure after the road realignments are complete.
  - .3 Install internal mechanical equipment (pumps, piping, aeration system, decanters).
  - .4 Confirm proper operation of internal mechanical devices.
  - .5 Install and make operational the process air blower system allow aeration system testing prior to SBR being covered.
  - .6 Do not install concrete cover until all other work is complete.
  - .7 Equipment outside of the SBR tank, not specifically mentioned in the preceding, can generally be installed at the Contractor's convenience.

### 1.4 Contractor Use of Premises

- .1 Generally restrict operations to the designated Construction and Contractor laydown areas indicated on the Drawings. With the exception of performing control system Work, access to the NEWPCC will not be permitted.
- .2 The City will make reasonable efforts to accommodate the Work of the Contractor. However, the NEWPCC must remain in operation through the Construction Period.

## **SCOPE OF WORK**

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- .3 Obtain written authorization from the respective landowners to enter private lands, which will be the subject of temporary working easements. Obtaining temporary working easements will be the responsibility of the Contractor.
- .4 Ascertain and abide by conditions pertaining to the use of temporary working easements or rights-of-way.
- .5 Obtain and pay for use of additional storage, access, or work areas needed for Work under this Contract.

### **1.5 Completion Dates**

- .1 Time and all time limits stated in the Contract Documents are of the essence of the Contract. The Contractor shall perform his Work expeditiously and with adequate forces to achieve the completion dates.

## **2. PRODUCTS**

- .1 The fine bubble aeration diffuser equipment for installation in the sequencing batch reactors is being supplied under City of Winnipeg Bid Opportunity 196-2006.
- .2 The decanter equipment for installation in the sequencing batch reactors is being supplied under City of Winnipeg Bid Opportunity 31-2006.

## **3. EXECUTION**

- .1 Not used

**END OF SECTION**

## **SITE CONDITIONS**

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### **1. GENERAL**

#### **1.1 Site Conditions and Limits**

- .1 Examination of Site
  - .1 Prior to commencing actual construction Work, inspect field conditions, obtain and confirm actual Site dimensions, examine surface conditions as required to ensure correct execution of the Work.
  - .2 Maintain or arrange for the removal, relocation, and replacement as appropriate of any existing utilities, which may be affected by the Work.
  - .3 Arrange for the removal, relocation, and replacement as appropriate, of process piping, equipment, electrical conduit, and concrete pads and supports.

#### **1.2 Documents and Instructions**

- .1 Documents Provided
  - .1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Documents (including Drawings) and five (5) copies of any revised Drawings or Addenda to the Bid Documents, which may have been issued during the Bid Period. Should the Contractor require additional sets of Drawings or documents, these will be supplied to him at cost.
- .2 Discrepancies and Omissions
  - .1 Notify the Contract Administrator immediately upon discovery of discrepancies or omissions in the Contract Documents or of any doubt as to the meaning or intent of any part thereof.
  - .2 To proceed with the Work when an error is suspected or when there is doubt as to the interpretation of the project requirements constitutes full acceptance of any cost associated with any remedial Work, which may be required.
- .3 Documents On-Site
  - .1 Maintain one (1) copy of all current Contract Documents and all Shop Drawings on-site, in good order and available to the Contract Administrator or his representatives.
  - .2 This requirement does not include the executed Contract Documents.
- .4 Changes to the Work
  - .1 Refer to the Contract General Conditions regarding changes to the Work.

## **SITE CONDITIONS**

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- .2 Contemplated Change Notice: issued after award of Contract, does NOT constitute an order to perform the change but is a notice of a proposed change only. Submit to the Contract Administrator within seven (7) days after receipt of Contemplated Change Notice a statement of cost adjustments and effect upon construction schedule required by the proposed change. Itemize statement in accordance with all items separately listed.
- .3 Field Order: during Construction, the Contract Administrator may issue a Field Order to authorize a change or additional Work of an emergency nature. A firm total cost (extra or credit) or a method for determining this cost must be included (unit price, cost plus, or time basis).
- .4 Authorization for Contract Change: after receipt of the statement of cost adjustment and the City's approval, the Contract Administrator will issue an Authorization for Contract Change in the amount of the approved cost adjustment, which will authorize the Contractor to proceed with the change to the Work, or alternatively will notify the Contractor that the proposed change is cancelled.
- .5 Field Instructions: the Contract Administrator may issue during construction, a Field Instruction to supplement or clarify the Contract Documents. Neither the Contract Price nor the Contract Time is affected by a Field Instruction.

### **1.3 Subsurface Conditions**

- .1 A copy of the Geotechnical Report with respect to the project is included for general information only. The contents of this report shall not be construed as a requirement of this Contract. The Bidder shall make his own interpretation of the data provided and shall carry out such additional investigations, as he deems necessary for the preparation of his Bid at his own expense.
- .2 The Contractor shall take appropriate precautions to protect existing structures and any underground utilities that could be affected by the Work.

### **1.4 Site Preparation**

- .1 Description
  - .1 This Specification shall cover Site preparation, including mobilization, field office facilities, equipment and fuel compounds, Site drainage, access roads, storage areas, and turnarounds, Site contamination and clean-up, demobilization and Site restoration, and other Contractor related tasks required, as a portion of the Works for this Contract.
  - .2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour materials, all things necessary for and incidental to the satisfactory performance and completion of all Work, as hereinafter specified.

## SITE CONDITIONS

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### 1.5 Construction Methods

- .1 Use of Public Roads and Rights-of-Way
  - .1 Maintenance
    - .1 It shall be the responsibility of the Contractor to keep public roads and rights-of-way used by their construction activities and traffic clean and maintained during the Construction Period.
    - .2 Earth, gravel, sand, or other construction materials spilled from hauling equipment onto public roads and rights-of-way shall be picked up promptly and continuously at the Contractor's expense.
    - .3 Any damage to public roads and rights-of-way caused by the Contractor's construction activities shall be repaired at the Contractor's expense as directed by the Contract Administrator or the authority having jurisdiction.
    - .4 Public roads and rights-of-way on the Site are used daily for delivery of septage and other materials. The Contractor shall ensure the roadways are kept unobstructed and not used for stockpiling or storage of materials, equipment, garbage, or Contractor's vehicles and parking.
  - .2 Construction Traffic Crossing and Entering Public Roads
    - .1 The Contractor shall limit their construction traffic crossing or entering public roads to as few locations as possible. Crossing and entrance locations shall be provided to the Contract Administrator for review and approval prior to construction starting.
    - .2 Where construction traffic crosses or enters onto public roads and rights-of-way the Contractor shall obtain the necessary approvals and provide signage and temporary traffic controls detailed in the Workzone Traffic Control Manual from the Manitoba Transportation and Government Services.
- .2 Site Drainage
  - .1 Provision of adequate Site drainage during the Work shall be the Contractor's responsibility. No extra payments or time extensions will be granted as a result of difficulties associated with Site access resulting from poor Site drainage during any part of the Work.
  - .2 Any areas requiring clearing and grubbing to maintain adequate Site drainage shall be reviewed with the Contract Administrator prior to commencement of the Work.
  - .3 Maintain surface drainage in groundwater recharge areas.

## **SITE CONDITIONS**

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### **.3 Demobilization and Site Restoration**

- .1 Further to GC:6.29, the Contractor shall demobilize, clean up, and remove all repair Work related surplus materials, tools, equipment, waste and debris, access roads, storage areas, turnarounds, approaches to public roads, ditch crossings, and temporary culverts and dispose off-site and backfill excavations by the day set for Substantial Performance.
- .2 The Contractor shall at his own expense, restore all surface areas damaged or disturbed by his activities at or adjacent to the Site to a condition equal to or better than was existing.

### **.4 Restricted Access Areas**

- .1 Refer to the Site plan for any areas identified as restricted access. No admittance shall be permitted to these areas by the Contractor or Contractor's personnel without the Contract Administrator's permission.

## **1.6 Environmental Protection**

- .1 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the environmental protection measures as herein specified.
- .2 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work.
  - .1 Federal
    - .1 Canadian Environmental Protection Act c.16
    - .2 Transportation of Dangerous Goods Act and Regulations c.34
  - .2 Provincial
    - .1 The Dangerous Goods Handling and Transportation Act D12
    - .2 The Endangered Species Act E111
    - .3 The Environment Act c.E125
    - .4 The Fire Prevention Act F80
    - .5 The Manitoba Nuisance Act N120
    - .6 The Public Health Act c.P210
    - .7 The Workplace Safety and Health Act W120
    - .8 Other current associated regulations that may be applicable

## SITE CONDITIONS

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- .3 The Contractor is advised that the following environmental protection measures apply to the Work.
  - .1 Materials Handling and Storage
    - .1 The Contractor shall abide by the requirements of Manitoba Conservation for handling and storage of fuels.
    - .2 All fuel handling and storage facilities shall comply with the Dangerous Goods and Transportation Act, Storage and Handling of Petroleum Products Regulation and any local land use permits.
  - .2 Fuel Handling and Storage
    - .1 Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
    - .2 The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage. Damaged or leaking fuel storage containers shall be promptly removed from the Site.
    - .3 When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill. This groundsheet may be supplemented with absorbent fabric material.
    - .4 Refuelling of mobile equipment and vehicles shall take place at least 100 m from a water reservoir shoreline.
    - .5 The areas around storage areas and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
    - .6 A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.
  - .3 Waste Handling and Disposal
    - .1 The construction area shall be kept clean and orderly at all times during and at completion of construction.
    - .2 At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be acceptable to the Contract Administrator.
    - .3 Indiscriminate dumping, littering, or abandonment shall not take place.

### SITE CONDITIONS

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- .4 No on-site burning of waste is permitted.
- .5 The Contractor shall provide waste collection bins within the laydown area acceptable to the Contract Administrator.
- .4 Dangerous Goods/Hazardous Waste Handling and Disposal
  - .1 Dangerous goods and hazardous waste are identified by, and shall be handled according to, the Dangerous Goods Handling and Transportation Act and Regulations.
  - .2 The Contractor shall be familiar with the Dangerous Goods Handling and Transportation Act and Regulations.
- .5 Emergency Spill Response
  - .1 The Contractor shall ensure that due care and caution is taken to prevent spills.
  - .2 The Contractor shall report all major spills of petroleum products or other hazardous substances with the potential for impacting the environment and threat to human health and safety to the Contract Administrator and Manitoba Conservation, immediately after occurrence of the environmental accident, by calling the 24-hour emergency telephone number (204) 944-4888.
  - .3 The Contractor shall designate a qualified supervisor as the on-site emergency response coordinator for the project. The emergency response coordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
  - .4 The following actions shall be taken by the person in charge of the spilled materials or the person(s) arriving at the scene of a hazardous material accident or the on-site emergency response coordinator.
  - .5 Notify emergency response coordinator of the accident:
    - .1 Identify exact location and time of accident.
    - .2 Indicate injuries, if any.
    - .3 Request assistance as required by magnitude of accident (Manitoba Conservation 24-hour Spill Response Line (204) 944-4888, Police, Fire Department, Ambulance, company back-up).
  - .6 Assess situation and gather information on the status of the situation, noting:
    - .1 Personnel on-site
    - .2 Cause and effect of spill
    - .3 Estimated extent of damage

### **SITE CONDITIONS**

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- .4 Amount and type of material involved
- .5 Proximity to waterways and the reservoirs
- .7 If safe to do so, try to stop the dispersion or flow of spill material:
  - .1 Approach from upwind
  - .2 Stop or reduce leak if safe to do so
  - .3 Dike spill material with dry, inert absorbent material or dry clay soil or sand
  - .4 Prevent spill material from entering waterways and utilities by diking
  - .5 Prevent spill material from entering manholes and other openings by covering with rubber spill mats or diking
- .8 Resume any effective action to contain, clean up, or stop the flow of the spilled product.
- .9 The emergency response coordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Conservation according to the Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

## **2. PRODUCTS**

- .1 Not used

## **3. EXECUTION**

- .1 Not used

**END OF SECTION**

## **REGULATORY REQUIREMENTS**

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### **1. GENERAL**

#### **1.1 Permits and Inspections**

- .1 The City shall obtain and pay for the Building Permit. The Contractor shall obtain and pay for all other permits, licences, certificates, and governmental inspections required for the performance of the Work.
- .2 Give all required notices and comply with all local, provincial and federal laws, ordinances, rules, regulations, codes, and orders relating to the Work, which are or become in force during the performance of the Work.
- .3 The Contractor shall make application, obtain and pay for all development permits required for the project, and shall make application, obtain and pay for all relevant permits.

#### **1.2 Applicable Codes and Standards**

- .1 The applicable codes and standards for the performance of Work are generally indicated in this Specification.
- .2 Where specified codes and standards are not dated, conform to the latest issue of specified codes and standards as amended and revised to the Bid closing date.
- .3 Confine apparatus, the storage of products and the operations of workers to limits indicated by-laws, ordinances, and permits and by directions of the Contract Administrator. Do not unreasonably encumber the premises with products.
- .4 In the event of discrepancies between codes, standards, and other provisions, the most stringent shall apply.

#### **1.3 Safety**

- .1 General
  - .1 In case of an emergency the Contractor shall immediately contact the McPhillips Control Centre at 204-986-4781 or the shift operator at 204-794-4468.
  - .2 Observe and enforce all construction safety measures required by code, Workers' Compensation Board, Manitoba Workplace Safety and Health, and all applicable statutes. Appoint a suitably qualified employee who has sole responsibility on-site on behalf of the Contractor, for compliance with the requirements and so advise the City in writing with copy to the Contract Administrator. The Contractor shall follow safe working practices.
  - .3 Conform to the requirements of the City of Winnipeg Water and Waste Department Asbestos Response Guide in working with or near asbestos.
  - .4 In the event of discrepancies between such provisions, the most stringent provision shall apply.

## **REGULATORY REQUIREMENTS**

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- .5 Employ a qualified Professional Engineer, registered in the Province of Manitoba, for the design of all shoring and falsework for the temporary supports of all structural elements.
- .6 Employ employees, agents, and sub-contractors who are properly qualified and skilled to do the Work.
- .7 Provide ongoing training in safe working practices and safety manuals for employees, agents and sub-contractors.
- .8 Use safe tools and equipment.
- .9 Obtain all permits, licenses, and clearances.
  - .1 Establish compliance procedures and take all other necessary measures to protect the safety of workers and all other persons who may be in the vicinity of the Work Site.
- .10 Hard hats and safety boots are mandatory requirements for all workers while on-site. Make available four (4) "VISITOR" safety helmets for authorized visitors.
- .11 No smoking regulations are in effect in all areas of the Work. Ensure that all workers comply with the regulations.
- .12 Ensure that all workers comply with the City's safety regulations where such regulations are in effect.
- .13 Do not load or permit to be loaded any part of the Work with a weight, load or force that will exceed the design load or endanger its safety or integrity.
- .2 Safety Measures and Services
  - .1 The Contractor shall be responsible for the safety of all his employees and other persons entering the Site and shall take all measures necessary to ensure their safety. In particular such measures shall include but shall not be limited to the following:
    - .1 Observation and provision of proper safety and emergency regulations, fire, gas, and electric shock precautions, stretchers, and a first aid box generally for each place of Work.
    - .2 Safe storage, handling and use of explosives, gases, fuels, and other dangerous goods.
    - .3 Provision of approved safety helmets for all personnel including authorized visitors to the Site.
    - .4 Control of water, including the provision of standby pumping and generating plant where necessary.

## REGULATORY REQUIREMENTS

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- .5 Provision of lighting to provide adequate illumination of Work, including spares and standby equipment.
- .6 Provision and maintenance of safe, sound mechanical cranes, hoists, and conveying facilities for the transport of materials and personnel, each item of plant having an up to date test certificate. All cranes, hoists, and the like shall be fitted with audible overload warning devices.
- .7 Provision and maintenance of safe, sound ropes, slings, blocks, and other lifting tackle, each appliance having an up to date test certificate.
- .8 Provision of competent operators for control of all lifting and hoisting equipment, with operating personnel.
- .9 Provision and maintenance of all temporary electrical installations.
- .10 The Contractor shall provide and securely fix into position temporary timber covers not less than 50 mm thick to all openings in floors and roofs.
- .11 Provision and maintenance of all welding equipment and concrete cutting/coring equipment.
- .12 All equipment to be used by qualified, trained personnel.
- .13 Provision of adequate ventilation and testing of air quality prior to and while working in all indoor or enclosed locations. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The conditions that must be monitored include oxygen deficiency, explosive and toxic gases. The ventilation equipment must work continuously.
- .2 The Contractor shall allow the City timely and complete access to the Contractor's records and documentation, to allow the City to confirm the Contractor's ongoing compliance with the safety requirements in the Specification. At all times, the Contractor shall, at the City's request, provide copies of documentation related to safety at no extra cost to the City, including without limitation, copies of:
  - .1 Resumes, licenses, certification papers, and like documentation for employees of the Contractor, its agents and sub-contractors engaged in the Work.
  - .2 Specifications, permits, test results and licenses, for all equipment to be used in the Work.
  - .3 All other permits and licenses for the Work.
- .3 At all times, the City may inspect and test the equipment to be used in the Work.
- .4 The Contractor shall maintain a Workplace Hazardous Materials Information System (WHMIS) file for all hazardous materials used at each Work Site. Prior to commencement of the Work, the Contractor shall submit Material Safety Data Sheets

## **REGULATORY REQUIREMENTS**

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(MSDS) to the City for all hazardous materials at Work Site. Material brought to a Work Site without prior submission of a MSDS shall not be used in the Work.

- .5 The Contractor shall comply with the requirements of the Manitoba Labour Guidelines for Confined Entry Work, and the Manitoba Labour Fall Protection Guideline.
- .6 If deemed necessary, the Contractor may be required to submit a Safety Mitigation Plan for approval by the City.

### **1.4 Noise Control On-Site**

- .1 All plant and equipment supplied by the Contractor for use on the Work shall be effectively "sound-reduced" by means of silencers, mufflers, acoustic linings or shields or acoustic sheds or screens to a level of 85 decibels (dBA) measured outside the nearest occupied property or to the satisfaction of the Contract Administrator.
- .2 Provided that the provisions of this clause shall not be applicable in the case of emergency Work necessary for the saving of life, property, or for the safety of the Work.
- .3 Record any public noise complaints and modify construction activities that are causing excessive noise.

### **1.5 Cleaning of Streets**

- .1 Conform to local ordinances and by-laws relating to littering of streets.
- .2 Take precautions to prevent depositing mud or debris on public or private roadways adjacent to the Work. Clean up any debris or detritus immediately. The Contract Administrator may direct necessary cleanup with all costs deducted from the Contractor's first succeeding progress billing.

### **1.6 Working Limits**

- .1 Confine all operations within the City's property limits and within the general area of the Work and away from any restricted access zones as identified on the site plan. Keep existing roadways and access routes open to regular vehicular and pedestrian traffic throughout the duration of the Work.

### **1.7 Existing Utilities**

- .1 Conform to Provincial and Municipal regulations during construction in proximity to utility structures.
- .2 Notify appropriate utility companies and municipal departments a minimum one week in advance of commencing such Work.
- .3 Make arrangements with utility companies and municipal department for protection of pipelines, conduits, drainlines, wiring and other structures, whether underground, on the surface or overhead, and satisfy the company or department that the methods or operations are effective.

**REGULATORY REQUIREMENTS**

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**2. PRODUCTS**

.1 Not used

**3. EXECUTION**

.1 Not used

**END OF SECTION**

## PROJECT MEETINGS

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### 1. GENERAL

#### 1.1 Preconstruction Meeting

- .1 Within 15 days after award of Contract, the Contract Administrator will request a project meeting of parties in the Contract to discuss and resolve administrative procedures and responsibilities.
- .2 Representatives of the City, Contract Administrator, Contractor, and major sub-contractors must be in attendance.
- .3 Representatives of the Contractor and sub-contractors attending the preconstruction meeting must be qualified and authorized to act on behalf of the party each represents.
- .4 After the time and location of this meeting has been established, the Contractor shall notify all parties concerned a minimum of ten days before the meeting.
- .5 The Contract Administrator will arrange space and facilities for this meeting.
- .6 The Contract Administrator will chair and record discussions and decisions, and circulate the meeting notes to all parties concerned.
- .7 Agenda to include the following:
  - .1 Appointment and notification of official representatives of participants in the Work
  - .2 Schedule of the Work, progress scheduling
  - .3 Schedule of Shop Drawing and Sample submissions
  - .4 Schedule for the procurement and delivery of specified equipment
  - .5 Plant orientation program
  - .6 Requirements for temporary facilities, Site signs, offices, storage sheds, utilities, hoarding, Site access, and use
  - .7 Site security
  - .8 Health and Safety issues
  - .9 Modification procedures, Contemplated Change Notices and Authorization for Contract Changes procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements as originated by the City or in the case of a savings, by the Contractor.
  - .10 Product and tool storage
  - .11 Weather protection
  - .12 As-Constructed Drawings
  - .13 O&M Manuals

## PROJECT MEETINGS

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- .14 Commissioning, acceptance, and handover
- .15 Warranties
- .16 Monthly progress claims, administrative procedures, photographs, holdbacks
- .17 Appointment of inspection and testing agencies or firms
- .18 Insurances and transcript of policies
- .19 Communications routing and logistics
- .20 Access to the Site and Work areas (security)
- .21 Survey
- .22 A schedule for progress meetings
- .23 Photographs
- .24 Emergency telephone numbers
- .25 Other items as arise at the meeting

### 1.2 Progress Meetings

- .1 The Contract Administrator shall schedule and administer progress meetings once a week during construction and through the commissioning period.
- .2 Provide input to the Contract Administrator for the meeting agenda.
- .3 Representatives of the City, Contract Administrator, Contractor, and major sub-contractors must be in attendance. Arrange for the attendance of other trades and suppliers as necessary to address issues on the agenda.
- .4 Representatives of the Contractor, sub-contractors, and suppliers attending meetings must be qualified and authorized to act on behalf of the party each represents.
- .5 Agenda for construction progress meetings to include the following:
  - .1 Review and approval of minutes of previous meeting
  - .2 Field observations, problems, conflicts
  - .3 Review submittal schedules: expedite as required
  - .4 Review of off-site fabrication and delivery schedule
  - .5 Progress, schedule, during succeeding Work period
  - .6 Problems, which impede construction schedule
  - .7 Corrective measures and procedures to regain projected schedule
  - .8 Revisions to construction schedule

## **PROJECT MEETINGS**

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- .9 Site coordination review
  - .10 Maintenance of quality standards
  - .11 Review of Site cleanliness
  - .12 Review of Site safety and security
  - .13 Review of temporary facilities
  - .14 Review requests for information
  - .15 Review of Contemplated Change Notices, Field Orders, Authorization for Contract Change, and Field Instructions
  - .16 Review proposed changes for effect on construction schedule and on completion date
  - .17 Review of progress payments
  - .18 Outstanding action items
  - .19 Date and location of next meeting
  - .20 Other business
- .6 The Contract Administrator will preside at the meetings.
  - .7 The Contract Administrator will record notes of the project meetings, including significant proceedings, decisions, "Action By" parties, dates for completion of duties, etc.
  - .8 The Contract Administrator reserves the right to cancel any progress meeting or call additional meetings whenever he deems necessary.

### **1.3 Special Meetings**

- .1 Special meetings may be requested by the Contract Administrator or Contractor to discuss specific issues. Generally, three days notice is required for special meetings. The agenda will be fashioned to suit the meeting. Minutes will be kept by the Contract Administrator.

### **2. PRODUCTS**

- .1 Not used

### **3. EXECUTION**

- .1 Not used

**END OF SECTION**

## SUBMITTALS

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### 1. GENERAL

#### 1.1 Shop Drawings and Product Data

- .1 "Shop Drawings" mean custom drawings, product data, diagrams, illustrations, schedules, performance charts, brochures and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.
- .2 The Contractor shall arrange for the preparation of clearly identified Shop Drawings as specified or as the Contract Administrator may reasonably request. Shop Drawings are to clearly indicate materials, weights, dimensions, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Shop Drawings are to indicate their relationship to design Drawings and Specifications. Notify the Contract Administrator in writing of any deviations in Shop Drawings from the requirements of the Contract Documents.
- .3 Shop Drawings shall be submitted with a copy of the associated Specification. For each Specification clause, note compliance or deviation from Specification. Provide full explanation for any deviation. Shop Drawings submitted without the associated Specification sections will be returned to the Contractor as "Rejected".
- .4 The Contractor shall examine all Shop Drawings prior to submission to the Contract Administrator to ensure that all necessary requirements have been determined and verified and that each Shop Drawing has been checked and coordinated with the requirements of the Work and the Contract Documents. Examination of each Shop Drawing shall be indicated by stamp, date and signature of a responsible person of the sub-contractor for supplied items and of the General Contractor for fabricated items. Shop Drawings not stamped, signed and dated will be returned without being reviewed and stamped "Re-submit".
- .5 The Contractor shall submit a Shop Drawings delivery schedule and provide Shop Drawings in an orderly sequence so as to cause no delay in the Work. Failure to submit Shop Drawings in ample time is not to be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed. Jointly prepare a schedule fixing the dates for submission and return of Shop Drawings.
- .6 The Contract Administrator will review and return Shop Drawings in accordance with the schedule agreed upon or otherwise with reasonable promptness so as to cause no delay in the Work.
- .7 Submit six (6) copies of white prints, plus one (1) copy of reproducibles, and six (6) copies of all fixture cuts and brochures.
- .8 Shop Drawing reviews by the Contract Administrator is solely to ascertain conformance with the general design concept. Responsibility for approval of detail design inherent in Shop Drawings rests with the Contractor and review by the Contract Administrator shall not imply such approval.

### SUBMITTALS

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- .9 Review by the Contract Administrator shall not relieve the Contractor of his responsibility for errors or omissions in Shop Drawings or for proper completion of the Work in accordance with the Contract Documents.
- .10 Responsibility for verification and correlation of field dimensions, fabrication processes, techniques of construction, installation, and coordination of all parts of the Work rests with the Contractor.
- .11 Shop Drawings will be returned to the Contractor with one of the following notations:
  - .1 When stamped "REVIEWED" or "NO EXCEPTIONS TAKEN", distribute additional copies as required for execution of the Work.
  - .2 When stamped "REVIEWED AS MODIFIED" or "MAKE NOTED CORRECTIONS", ensure that all copies for use are modified and distributed, same as specified for "REVIEWED".
  - .3 When stamped "REVISE AND RESUBMIT", make the necessary revisions, as indicated, consistent with the Contract Documents and submit again for review.
  - .4 When stamped "NOT REVIEWED" or "REJECTED", submit other Drawings, brochures, etc., for review consistent with the Contract Documents.
  - .5 Only Shop Drawings bearing "REVIEWED", "NO EXCEPTIONS TAKEN", "MAKE NOTED CORRECTIONS", or "REVIEWED AS MODIFIED" shall be used on the Work unless otherwise authorized by the Contract Administrator.
- .12 After submittals are stamped "REVIEWED", "NO EXCEPTIONS TAKEN", "MAKE NOTED CORRECTIONS" or "REVIEWED AS MODIFIED", no further revisions are permitted unless re-submitted to the Contract Administrator for further review.
- .13 Any adjustments made on Shop Drawings by the Contract Administrator are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of Work.
- .14 Make changes in Shop Drawings, which the Contract Administrator may require, consistent with Contract Documents. When re-submitting, notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.
- .15 Shop Drawings indicating design requirements not included in the Contract Documents require the seal of a qualified Professional Engineer, registered in the Province of Manitoba. Calculations shall be submitted for review, if requested, and sealed by a qualified Professional Engineer.
- .16 Only two (2) reviews of Shop Drawings will be made by the Contract Administrator at no cost. Each additional review will be charged to the Contractor at the Contract Administrator's scheduled rates. The Contract Administrator's charges for the additional Work will be deducted from the Contractor's Progress Certificates.

## SUBMITTALS

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### 1.2 Samples

- .1 Submit samples for the Contract Administrator's review as specified or as the Contract Administrator may reasonably request. Clearly label samples as to origin and intended use in the Work. Reference samples to Drawings and Specifications.
- .2 Submit samples with reasonable promptness and in orderly sequence so as to cause no delay in the Work. Failure to submit samples in ample time is not to be considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed. Jointly prepare a schedule fixing the dates for submission and return of samples (refer to Section 01200 – Project Meetings).
- .3 Notify the Contract Administrator in writing, at the time of submission, of any deviations in samples from requirements of Contract Documents.
- .4 The Contract Administrator's review will be for conformity of design concept and general arrangement only. Such review is not to be considered relief of responsibility for errors or omissions in samples or of responsibility for meeting all requirements of the Contract Documents.
- .5 Any adjustments made on samples by the Contract Administrator are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract Price, clearly state as such in writing prior to proceeding with fabrication and installation of the Work.
- .6 Make changes in samples, which the Contract Administrator may require, consistent with Contract Documents.

### 1.3 Operating and Maintenance Manuals

- .1 For the guidance of the City's operating and maintenance personnel, the Contractor shall prepare O&M Manuals for the Work, describing in detail the construction of each part of the Work and the recommended procedure for operation, servicing and maintenance.
- .2 Three (3) advance copies of the manuals shall be submitted two months prior to Substantial Performance of the Work for review and comments. A maximum of eight weeks after review, six (6) copies of the final manuals shall be submitted. Each copy shall be clearly titled to show all of the information required by the Specifications as well as operational information including: the item of Work concerned, a City's Contract number, the name and address of the Contractor, the issue date, operational information on equipment, cleaning and lubrication schedules, filters, overhaul and adjustment schedules.
- .3 All instructions in these manuals shall be in simple language to guide the City in the proper operating and maintenance of this installation.
- .4 In addition to hardcopies specified above, submit one (1) O&M Manual in electronic format (MS Word for text; Acrobat PDF for graphics). Organize contents into applicable sections of Work, parallel to Specifications break-down.
- .5 In addition to information called for in the Specifications, include the following:
  - .1 Title sheet, labeled "Operation and Maintenance Instructions", and containing project name and date.

## SUBMITTALS

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- .2 List of contents.
  - .1 Brochures/catalogue excerpts of all architectural, structural mechanical and electrical components of the Work
  - .2 Documentation of all test results
  - .3 Complete set of equipment and assembly drawings
  - .4 Installation, start-up, O&M Manuals
  - .5 Commissioning data sheets and reports
  - .6 Air balancing reports
  - .7 Spare parts lists and prices, and special tools requirements and prices
  - .8 Any specific product or maintenance manual requirements from the Specifications
- .3 Reviewed Shop Drawings of all equipment
- .4 As-Constructed Drawings of all civil, structural, process equipment, mechanical, electrical, instrumentation and controls installations
- .5 Full description of entire mechanical system and operation
- .6 Names, addresses, and telephone numbers of all major sub-contractors and suppliers
- .7 Detailed operations and maintenance instructions for all items of equipment, including a preventative maintenance program
- .6 The Contractor shall modify and supplement the manual as required by the Contract Administrator.
- .7 Provide list of spare parts and consumables, including name and address of nearest supplier.
- .8 The O&M Manuals shall be supplied to the City before equipment delivery and provision shall be made for additions and deletions, which may be dictated by the City's operational experience. Where these amendments to the manuals are indicated to be necessary during initial operation before acceptance, the Contractor shall supply the amended Sections free of charge.
- .9 Payment for this item of the Work, as listed in Form B: Prices, will not be issued until all requirements for the O&M Manuals have been satisfied.

### **1.4 As-Constructed Drawings**

- .1 After award of Contract, the Contract Administrator will provide a complete set of Drawings for the purpose of maintaining Project As-Constructed Drawings. Electronic files in AutoCAD format will be supplied. Accurately record significant deviations from Contract Documents caused by Site conditions and changes ordered by the Contract Administrator. Update daily.

## **SUBMITTALS**

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- .2 Record locations of concealed elements of mechanical and electrical services.
- .3 Identify Drawings as "Project As-Constructed Copy". Maintain in good condition and make available for inspection on-site by Contract Administrator at all times.
- .4 On completion of the Work, two weeks prior to final inspection, submit As-Constructed Drawings to Contract Administrator for review.
- .5 Within one month after return of As-Constructed Drawings by the Contract Administrator, obtain and pay for a complete set of original reproducible Drawings. Transfer all changes from As-Constructed Drawings to electronic Drawings (AutoCAD) and certify accuracy. Deliver electronic drawings to the Contract Administrator.

### **1.5 Photographs and Publicity**

- .1 No photographs of the Site or of any portion of the Work will be permitted without prior approval of the Contract Administrator.
- .2 No press or publicity releases will be permitted without prior approval of the Contract Administrator.

### **1.6 Procedures**

- .1 The Contractor shall, if required by the Contract Administrator, submit for the review of the Contract Administrator method statements which describe in detail, supplement with Drawings where necessary, the methods to be adopted for executing any portion of Work.
- .2 These statements shall also include details of constructional plant and labour to be employed. Acceptance by the Contract Administrator shall not relieve the Contractor of any of his responsibilities, nor shall reasonable refusal to approve entitle the Contractor to extra payment or an extension of time.

## **2. PRODUCTS**

- .1 Not used

## **3. EXECUTION**

- .1 Not used

**END OF SECTION**

## QUALITY ASSURANCE

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### 1. GENERAL

#### 1.1 Inspection and Testing of Work

- .1 The City, the Contract Administrator, and other authorities having jurisdiction shall have access to the Work. If parts of the Work are in preparation at locations other than the place of the Work, access shall be given to such Work whenever it is in progress.

#### 1.2 Independent Inspection and Testing Agencies

- .1 Independent inspection and testing agencies may be engaged by the City for the purpose of inspecting or testing portions of the Work. All costs of such services will be borne by the City. Costs of additional tests required due to defective Work shall be paid by the Contractor.
- .2 All equipment required for carrying out inspection and testing will be provided by the respective agencies.
- .3 Employment of inspection and testing agencies in no way relieves the Contractor of responsibility to perform the Work in accordance with the Contract Documents.
- .4 Allow the inspection and testing agencies access to all portions of the Work on the Site and manufacturing or fabrication plants, as may be necessary. Provide facilities for such access.

#### 1.3 Reference Standards and Acronyms

- .1 Within the Drawings and Specifications, reference may be made to the following standards and organizations by their acronyms, as defined below. Conform to such standards, in whole or in part, as specified.

AABC	Associated Air Balance Council
AFBMA	Anti-Friction Bearings Manufacturers Association
ACI	American Concrete Institute
AMCA	Air Movement and Control Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APHA	American Public Health Association
ARI	Air-conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air-conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BS	British Standard
CCA	Canadian Construction Association
CCMC	Canadian Construction Materials Centre
CEA	Canadian Electricity Association

## QUALITY ASSURANCE

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CEC	Canadian Electrical Code
CEMA	Canadian Electrical Manufacturers Association
CGSB	Canadian Government Specification Board
CISC	Canadian Institute of Steel Construction
CLA	Canadian Lumberman's Association
CPCA	Canadian Painting Contractors Association
CPCI	Canadian Prestressed Concrete Institute
CRCA	Canadian Roofing Construction Association
CSA	Canadian Standards Association
CSSBI	Canadian Sheet Steel Building Institute
DIN	Deutsche Industrie Norm
EEMAC	Electrical and Electronic Manufacturers Association of Canada
EJMA	Expansion Joint Manufacturers Association
FM	Factory Mutual Engineering Corporation
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrumentation, Systems, and Automation Society
MSDS	Material Safety Data Sheets
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAAMM	National Association of Architectural Metal Manufacturers
NABA	National Air Barrier Association
NACE	National Association of Corrosion Engineers
NBC	National Building Code
NECA	National Energy Conservation Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NLGA	National Lumber Grading Authority
RSIC	Reinforcing Steel Institute of Canada
SAMA	Scientific Apparatus Makers Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
TTMAC	Terrazzo Tile and Marble Association of Canada
ULC	Underwriters Laboratories of Canada
WCB	Workers Compensation Board
WEF	Water Environment Federation
WHMIS	Workplace Hazardous Materials Information System

- .2 If there is question as to whether any product or system is in conformance with applicable standards, the Contract Administrator reserves the right to have such products or systems tested to prove or disprove conformance. The cost for such testing will be borne by the City in the event of conformance with Contract Documents or by the Contractor in the event of non-conformance.
- .3 Where specified standards are not dated, conform to latest issue of specified standards as amended and revised to the Bid closing date.

## QUALITY ASSURANCE

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### 1.4 Design Standards and Code Requirements

- .1 Inspection and testing will be performed in accordance with, but not limited to, the following:
  - .1 Concrete to CSA A23.2 and mix designs to CSA-A23.1
  - .2 Welding to CSA W59.1 and ASTM E109
  - .3 Bolted connections to CSA S16 or S16.1
  - .4 Roofing to CRCA Manual

### 1.5 Tests and Mix Design

- .1 Prior to start of the Work, submit to the Contract Administrator the following:
  - .1 Test results and mix designs of each class of concrete
  - .2 Mill test certificates for all structural steel and bolts

### 1.6 Procedures

- .1 Notify the Contract Administrator two working days in advance of the requirements for tests in order that necessary arrangements can be made.
- .2 Submit samples and materials required for testing with reasonable promptness so as to cause no delay in the Work.
- .3 Provide facilities to allow inspection and testing and make available space for storage and curing of the test samples.
- .4 If defects are revealed during inspection and testing, then the Contract Administrator may issue instructions for removal or correcting defective Work and irregularities. The Contractor shall notify the Contract Administrator within two working days if such instructions are in error or at variance with the Contract Documents.
- .5 Costs for re-inspection and retesting of rejected Work shall be borne by the Contractor.

## 2. PRODUCTS

- .1 Not used

## 3. EXECUTION

- .1 Not used

**END OF SECTION**

## TEMPORARY FACILITIES

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### 1. GENERAL

#### 1.1 Contractor's Office

- .1 Accommodation for the Contractor's office, plant, tools, equipment, and materials (including fuel) shall be the responsibility of the Contractor. Such accommodation at the Site shall be located after consultation with the Contract Administrator. The Contractor shall be responsible for the protection of its plant, tools, equipment, and materials stored on-site. Materials stored on the City's premises shall be neatly stacked and protected from the weather.
- .2 Provide and maintain in clean condition during entire progress of the Work, a suitable office adequately lighted, heated and ventilated, for own use.
- .3 Locate where directed by Contract Administrator in area shown on the Site plan.
- .4 Provide within office space adequate first aid facilities as recommended by the Ministry of Labour and Worker's Compensation regulations.
- .5 The Contractor shall further confine their activities to the minimum area necessary for undertaking and completing the Work. Material and equipment storage areas shall be at locations acceptable to the Contract Administrator.
- .6 The Contractor's construction activities shall not encroach or enter onto private property without written consent from the owner of the property concerned. The Contractor shall provide the Contract Administrator with a copy of the written agreement with the property owner.
- .7 Subcontractors are to provide their own offices as necessary, as directed by the Contract Administrator.

#### 1.2 Contract Administrator's Office

- .1 Provide a separate facility for the Contract Administrator's office.
- .2 Provide and maintain in a clean condition, during the entire progress of the Work, two (2) lockable offices, and one (1) multi-purpose space for conducting general progress meetings. These spaces shall be adequately lighted, heated, and ventilated, for use by the Contract Administrator or designate. The general meeting room shall be sized to suit the requirements of the regular progress meetings.
- .3 Locate where directed by the Contract Administrator in area shown on the Site plan.
- .4 Provide within office space adequate first aid facilities as recommended by the Ministry of Labour and Worker's Compensation regulations.
- .5 The offices are to be a minimum of 20 square metres each, with a minimum of 2.4 m headroom, and a minimum of two (2) 900 mm x 1200 mm sash windows per office.

### TEMPORARY FACILITIES

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- .6 Furnish each office with a drawing layout table, desk, chair, and lockable file cabinet with minimum dimensions of 1800 mm high x 300 mm wide by 450 mm deep.
- .7 Furnish the general meeting room with table and chairs adequate to accommodate the progress meetings.
- .8 All finishes including walls, ceilings, and floors to be finished in a manner acceptable to the Contract Administrator.
- .9 The Contractor shall supply and maintain the toilet and washroom in the Contract Administrator's trailer adjacent but separate from the office and meeting room spaces. The toilet and washroom shall comply with the requirements of The Public Health Act, R.S.M. 1987, c. P210, including sewage holding facilities and water storage. Sewage connections are not available.
- .10 Provide and pay for all heating, lighting, telephone, and communications services.
- .11 Provide one (1) fire extinguisher in each office space.

#### **1.3 City Project Manager's Office**

- .1 Provide a separate office facility for the use of the City's Project Manager.
- .2 Provide and maintain in a clean condition, during the entire progress of the Work, one (1) lockable office, and one (1) multi-purpose space. These spaces shall be adequately lighted, heated, and ventilated, for use by the Contract Administrator or designate. The multi-purpose space shall be sized to suit the requirements of the regular progress meetings.
- .3 Locate where directed by the Contract Administrator.
- .4 Provide within office space adequate first aid facilities as recommended by the Ministry of Labour and Worker's Compensation regulations.
- .5 The offices are to be a minimum of 20 square metres each, with a minimum of 2.4 m headroom, and a minimum of two (2) 900 mm x 1200 mm sash windows per office.
- .6 Furnish each office with a desk, chair, and lockable file cabinet with minimum dimensions of 1800 mm high x 300 mm wide by 450 mm deep.
- .7 Furnish the multi-purpose room with table and chairs adequate to accommodate the progress meetings.
- .8 All finishes including walls, ceilings, and floors to be finished in a manner acceptable to the Contract Administrator.
- .9 Provide and pay for all heating, lighting, telephone, and communications services.

## **TEMPORARY FACILITIES**

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### **1.4 Laydown and Storage**

- .1 All construction materials shall be stored at designated Site laydown and storage areas. Stored combustible materials shall be separated by clear space to prevent fire spread and allow access for manual fire fighting equipment, including fire hoses, extinguishers, hydrants, etc.
- .2 Designated areas shall be used for storage of flammable and combustible liquids and gases, which shall be properly equipped for grounding and bonding when refueling vehicles and equipment. Spills shall be contained as required by Provincial Regulations.
- .3 Pressurized dry chemical fire extinguishers of suitable capacity or equally effective extinguishers as per NFPA 10 shall be provided where:
  - .1 Flammable liquids are stored or handled.
  - .2 Temporary oil or gas fire equipment is used.
  - .3 Welding or flame cutting is performed.

### **1.5 Temporary Construction Materials**

- .1 Tarpaulins and plastic coverings shall consist of fire retardant materials, which are UL or FM listed or approved, or which have passed the Large Scale Test specified in NFPA-701.

### **1.6 Contractor's Trailers**

- .1 The Contractor shall provide construction power at 120/240 V, 1 phase, and 600 V, 3 phase to the service points designated at the Work Site and to the Contractor's and Contract Administrator's temporary Site office trailers.
- .2 The Contractor shall, at its own cost, supply, install, maintain, and move extensions to the above services as required during the Construction Period, subject to CSA C22.1 latest edition and Manitoba Hydro Standards and approval.
- .3 The Contractor shall:
  - .1 Prevent hazardous accumulations of dust, fumes, mist, vapours, or gases in areas occupied during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4 Ventilate storage spaces containing hazardous or volatile materials.
  - .5 Ventilate temporary sanitary facilities.

## **TEMPORARY FACILITIES**

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- .6 Continue operation of ventilation and exhaust system for time after cessation of Work process to assure removal of harmful elements.
- .4 Suitable fire control equipment shall be provided by the Contractor for protection of its facilities, the portion of the City's building under construction and materials and equipment at all Work areas. All fire protection equipment and fuel storage shall meet the approval of the Contract Administrator. Storage of fuel will not be permitted in the vicinity of the Work.
- .5 Unless approved by the Contract Administrator, burning of any materials is **NOT** allowed at the Site of the Work.
- .6 The Contractor shall be responsible for any damage resulting from fires caused by the Contractor or its employees and shall be solely responsible for all costs, which may be incurred in extinguishing such fires.

### **1.7 Toilets and Washrooms**

- .1 Washroom facilities are not available at the NEWPCC for the Contractor's use.
- .2 The Contractor shall supply and maintain all necessary toilets and washrooms for its employees engaged in the Work. These toilets and washrooms shall comply with the requirements of The Public Health Act, R.S.M. 1987, c. P210, including sewage holding facilities and water storage. Sewage connections are not available.

### **1.8 Disposal of Waste Materials**

- .1 Spoiled and waste materials shall not be dumped, under any circumstances, in any locations other than those approved by the local authorities. Any cost for permits and fees for disposing of waste materials shall be at the Contractor's expense.
- .2 Disposal of all excavated and waste materials shall be in accordance with the requirements of the appropriate provincial regulatory agencies.
- .3 When working anywhere within the Works the Contractor shall at the end of each working day remove the rubbish and leave the Site in a clean and tidy state, to the satisfaction of the Contract Administrator. If this is not done, the City will clean the Site and charge the Contractor.

### **1.9 Parking**

- .1 The Contractor shall provide parking in the area designated on the plans for Contractor laydown and trailers. The Contract Administrator may designate additional parking areas for the Contractor's vehicles. The parking shall be arranged and maintained so that it does not disrupt the plant's operation and access for the City's operations and maintenance staff.
- .2 The Contractor shall provide appropriate base course material for the laydown, trailer and parking area to allow vehicle traffic and parking. The Contractor shall restore this area to its original state at the completion of construction.

## TEMPORARY FACILITIES

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### **1.10 Contractor's Site Storage for Equipment and Materials**

- .1 The Contractor shall provide and maintain in a clean and orderly condition an adequately sized storage facility on-site, which will provide weather protected storage for all the tools, equipment, and materials necessary for the undertaking and completion of the Work.
- .2 The storage facility shall be located where directed by the Contract Administrator in the area identified on the Site plan.
- .3 The storage facility shall be temperature controlled to provide a minimum interior temperature of 10°C, and be large enough to provide access to equipment for periodic maintenance.
- .4 The compound shall have a hard base suitable for the storage of heavy equipment. Adequate temporary drainage shall be provided around the facility.
- .5 The storage of equipment and materials shall be limited to the storage facility only.
- .6 The responsibility for the security of the Site storage and the condition of all the equipment and materials therein shall rest solely with the Contractor.
- .7 The Contractor will be responsible for removal of this facility prior to issuance of Total Performance.

### **1.11 Access to Site Office and Storage Facilities**

- .1 The Contractor shall provide vehicular access to the Site office and storage facilities from the existing access road. The access shall be suitable for use by heavy trucks and shall be kept in a clean serviceable condition and free of obstructions for as long as these offices and storage facilities are required for use.
- .2 The access roads, turnarounds, parking areas and storage areas, shall be left in a rut-free condition.
- .3 Any areas requiring clearing and grubbing for the access roads, turnarounds, parking and storage areas, and approaches to public roads shall be reviewed with the Contract Administrator prior to commencement of the Work.
- .4 Provide adequate parking for Contract Administrator and designate (minimum two (2) spaces).

### **1.12 Water Supply**

- .1 The Contractor is responsible to provide water required for the construction Works and for the water required for water tightness testing identified in Section 03300.
- .2 The Contractor shall, at its own cost, supply, install, maintain, and move extensions to water services as required during the Construction Period, subject to the City's approval.

## **TEMPORARY FACILITIES**

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### **1.13 Heating and Hoarding**

- .1 The Contractor shall:
  - .1 Provide all temporary heating required during Construction Period for storage facilities and concrete curing, including attendants, maintenance, and fuel. The Contractor will maintain temperatures of a minimum 10°C in the temporary facilities, unless indicated otherwise in Specifications. Properly ventilate all heated areas.
  - .2 Pay for all costs in maintaining and providing temporary heat to the temporary facilities.
  - .3 Be responsible for any damages to the Work due to failure in providing adequate heat and protection during construction.

### **1.14 Power and Light**

- .1 The Contractor shall provide temporary power and light for own use and for the Contract Administrator's office. Install in accordance with regulations of governing authorities.
- .2 Provide and pay for all temporary power required during Construction for temporary lighting and the operations, including power required for the Contract Administrator's office.
- .3 Wiring for temporary lighting is to be entirely separate from temporary power installation except for a common supply connection at either an electrical service or distribution centre.

### **1.15 Telephone and Internet**

- .1 The Contractor shall provide for two (2) temporary telephone lines, fax, and high-speed internet service including services to the Contract Administrator's and City Project Manager's offices.

### **1.16 Use of Permanent Water Supply, Heat, Power Light, and Telephone**

- .1 The Contractor shall not make use of permanent water supply, heat, power, lighting, or telephone inside the NEWPCC without permission from the Contract Administrator.

### **1.17 Fueled Welding Machines and Air Compressors**

- .1 Fueled welding machines and air compressors required for performance of the Work are to be the responsibility of the respective users. Locate outside of buildings.

### **1.18 Guard Rails and Barricades**

- .1 Provide guard railings and barricades, around all openings, open shafts, open stairwells. Construct as recommended by local governing authorities.

## **TEMPORARY FACILITIES**

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### **1.19 Site Security**

- .1 The City does not normally provide security forces to the plant Site. The gate is normally open during the day and closed at night.
- .2 The Contractor shall provide chainlink fencing adequate to control all access of authorized and unauthorized personnel and vehicles to all working, storage, and construction areas at all times including after working hours, nights, weekends, and holidays.

### **1.20 Scaffolding**

- .1 Provide and maintain adequate scaffolding as required. Scaffolding is to be rigid, secure, and constructed to ensure adequate safety for workers. Erect without damage to the building or finishes.

### **1.21 Ladders, Stairs**

- .1 Provide and maintain adequate temporary ladders and stairs required for construction.
- .2 Secure to structure.
- .3 Ladders and stairs are to comply with all requirements of safety authority.
- .4 Provide temporary wood treads on steel pan stairs for use prior to placement of permanent treads.

### **1.22 Explosive Actuated Fastening Tools**

- .1 Provide for the use of explosive actuated fastening tools when required. When using, conform to the requirements of CSA Z166 - "Explosive Actuated Fastening Tools" and local governing authorities.

### **1.23 Access to Site**

- .1 Provide and maintain access roads, sidewalk crossings, ramps, and construction runways as required for access to, from, and through the Site. Conform to requirements of local governing authorities when required and when necessary make arrangements with adjacent property owners. Locate these traffic facilities where they are least disruptive to normal street traffic and local Site traffic.

### **1.24 Temporary Vehicular and Pedestrian Access**

- .1 Maintain existing vehicular and pedestrian accesses properly at all times during construction.
- .2 The Contractor shall confine his equipment, storage of materials, and operations of his workmen to minimize Site damage. The Contractor shall be responsible to restore all areas damaged or affected by construction to equal or better conditions, which existed prior to construction, unless designated otherwise.

## **TEMPORARY FACILITIES**

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### **1.25 Public Traffic Flow**

- .1 Provide and maintain flag persons, traffic signals, barricades, and flares, lights, and lanterns as required to direct the flow of equipment used in performance of the Work and to protect public traffic. Make arrangements with local governing authorities when these facilities will disrupt the normal flow of public traffic.
- .2 Record public traffic complaints and modify activities causing problems wherever possible.

### **1.26 Protection for Off-Site and Public Property**

- .1 Protect adjacent private and public property from damage during the performance of the Work.
- .2 Be responsible for all damages incurred due to improper protection.

### **1.27 Fire Protection**

- .1 Provide and maintain adequate temporary fire protection equipment during performance of the Work as required by insurance companies having jurisdiction.
- .2 Provide minimum one (1) fire extinguisher in each equipment and tool shed, temporary office, material storage shed workshop.
- .3 Where subjected to low temperatures, extinguishers are to be anti-freeze type. In proximity to gas, oil, grease, or paint storage locations they are to be No. 10 - carbon dioxide type. Extinguishers for all other locations are to be soda-acid type. All extinguishers are to be minimum 10 L capacity and be ULC labelled.
- .4 Handle gasoline and like combustible materials with good, safe practice.
- .5 Remove combustible debris from Site daily.

### **1.28 Protection of Building Finishes and Equipment**

- .1 Provide adequate protection for finished and partially finished building finishes and existing equipment and services during the performance of the Work. Provide necessary screens, covers, hoardings, etc., as required. Be responsible for all damages incurred due to improper or lack of protection.
- .2 The Contractor shall use methods of construction on concrete Work that will not generate dust.
- .3 The Contractor shall protect existing mechanical and electrical equipment from damage.
- .4 Maintain and protect existing services in operation during the course of the Work. Repair services damaged at no cost to the City.

## **TEMPORARY FACILITIES**

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- .5 If service interruptions are necessary, such interruptions shall be made only at times approved by the City.
- .6 Advise the Contract Administrator of any necessary service relocations not identified by the Contract Documents.

### **1.29 Protection of Trees**

- .1 Protect trees located on or adjacent to the Site, which may be affected by the Work, from any potential damage which could occur as a result of the construction and related activities.
- .2 Site enclosures, fencing, hoarding or other protective walkways, or facilities shall not be secured, braced, or otherwise fastened to trees.
- .3 Do not remove trees unless specifically noted on the plans, or as directed and approved by the Contract Administrator.
- .4 Restore any disturbed areas with indigenous species that are well adapted to the project area.

### **1.30 Snow Removal**

- .1 Remove snow and ice from access roads, Contractor parking and laydown areas, office and storage areas. The Contractor shall be responsible for repairing any damage to the access road, and the parking and storage areas within the Contractor's Site laydown area directly attributable to their operation.
- .2 Remove snow and ice from building surfaces as necessary for construction.
- .3 Except where noted otherwise, the Contractor shall be responsible for snow removal and maintaining the access roads, turnarounds, parking areas and storage areas during the course of the Work to facilitate safe access to the Work areas.

### **1.31 Access to Site and Building**

- .1 It will be the Contractor's responsibility to check that accesses are in suitable condition before any plant, equipment, or materials are dispatched to Site.
- .2 Access on the Site is restricted by existing buried and surface utilities and structures. The Contractor is to confirm location of all potential obstructions and to review routing of construction vehicles with the Contract Administrator.
- .3 The Contractor is to maintain access at all times for City personnel or the Contract Administrator.

### **1.32 Access to Work**

- .1 Normal working hours for City staff working inside the building shall be the period between 7:30 a.m. and 4:00 p.m., Monday to Friday, except holidays.

## **TEMPORARY FACILITIES**

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- .2 The Contract Administrator shall be informed at least 24 hours in advance where the Contractor intends to carry out Work outside normal working hours and no such Work shall be done without the Contract Administrator's approval except when the Work is unavoidable or absolutely necessary for:
  - .1 Preventing injury to any person or saving the life of any person; or
  - .2 Preventing damage to property where the circumstances placing the property in danger could not reasonably have been foreseen and where the immediate carrying out of such Work is necessary in order to prevent damage to that property; in which case the Contractor shall immediately advise the Contract Administrator in writing that such Work outside the normal working hours is necessary and of the reasons for this. He shall also state the nature and extent of Work to be carried out.
- .3 The Contractor is to coordinate activities with City personnel and any other contractors that may be working concurrently on the Site.

### **1.33 Site Security Lighting**

- .1 Provide and pay for temporary Site lighting as required for non-daylight times. Install lamps in suitable locations to obtain unobstructed light over all Work areas.
- .2 Perform daily inspection of Site lighting and replace burned out and missing lamps. Relocate promptly any lights that become obstructed by new Work.

### **1.34 Warnings and Traffic Signs**

- .1 When Work is performed within public areas, provide and erect adequate warning signs as necessary to give proper warning. Place signs sufficiently in advance to enable public to respond to directions.
- .2 Warning and traffic signs shall be illuminating type, visible to public and traffic during day and night.
- .3 Provide and maintain signs and other devices required to indicate construction activities or other temporary or unusual conditions resulting from the Work.

## **2. PRODUCTS**

- .1 Not used

## **3. EXECUTION**

- .1 Not used

**END OF SECTION**

## **MATERIALS AND EQUIPMENT**

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### **1. PRODUCTS**

#### **1.1 Quality of Materials**

- .1 Provide new materials, equipment and articles incorporated in the Work, not damaged or defective and of the best quality (compatible with Specifications) for the purpose intended. If requested, furnish evidence as to type, source, and quality of products provided.
- .2 Defective materials, equipment, and articles whenever found may be rejected regardless of previous inspection. Inspection by the Contract Administrator or an inspector does not relieve the Contractor of his responsibility but is merely a precaution against oversight or error. Remove and replace defective materials at own expense and be responsible for all delays and expenses caused by rejection.
- .3 Should any dispute arise as to the quality or fitness of materials, equipment or articles, the decision rests strictly with the Contract Administrator based upon the requirements of the Contract Documents.
- .4 Unless otherwise indicated in the Specifications, maintain uniformity of manufacturer for any particular or like item throughout the Work.
- .5 Permanent labels, trademarks and nameplates on materials, equipment, and articles are not acceptable in prominent locations except where required for operating instructions and when located in mechanical or electrical rooms.

#### **1.2 Metric Project**

- .1 Unless otherwise noted, this project has been designed and is to be constructed in the International System (SI) of Units metric system of measurements.
- .2 During construction, when specified metric elements are unattainable at the time they are required to meet the construction schedule, the Contractor shall notify the Contract Administrator in writing and suggest alternative substitutions. Costs due to these substitutions shall be borne by the Contractor.

#### **1.3 Availability of Materials**

- .1 No substitution of any item will be permitted unless the item cannot be delivered to the Site in time to comply with the Schedule.
- .2 Provide documentary proof of equality, difference in price (if any) and delivery dates in the form of certified quotations from manufacturers of both the specified item and the proposed substituted item.

#### **1.4 Storage, Handling, and Protection of Materials**

- .1 Handle and store materials in a manner to prevent damage, contamination, deterioration, and soiling and in accordance with manufacturer's recommendations when applicable.

## **MATERIALS AND EQUIPMENT**

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- .2 Store packaged or bundled products in original and undamaged condition with manufacturers' seals and labels intact. Do not remove packaging or bundling until required in the Work.
- .3 Materials subject to damage from weather are to be stored in weatherproof enclosures.
- .4 Store cementitious materials clear of earth or concrete floors and away from walls.
- .5 When used for grout or mortar materials, keep sand clean and dry. Store on polyethylene and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet material, lumber, etc., on flat, solid supports and keep clear of ground.
- .7 Store and mix paints in a room assigned for this purpose. Keep room under lock and key at all times. Remove oily rags and any other combustible debris from Site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Damaged products shall be removed and replaced at the Contractor's expense.

### **1.5 Manufacturers' Directions**

- .1 Unless otherwise specified, install or erect all products in accordance with manufacturers' recommendations. Do not rely on labels or enclosures provided with products. Obtain instructions directly from manufacturers.
- .2 Notify the Contract Administrator, in writing, of any conflicts between the Specifications and manufacturers' instructions so that the Contract Administrator may establish the course of action.
- .3 Improper installation or erection of products due to failure in complying with these requirements authorizes the Contract Administrator to require any removal and re-installation that may be considered necessary, at no increase in Contract Price.

### **1.6 Transportation Costs of Materials**

- .1 Pay all costs for transportation of materials required for the Work.

## **2. PRODUCTS**

- .1 Not used

## **3. EXECUTION**

### **3.1 Workmanship**

- .1 Workmanship is to be of the best quality executed by workers fully experienced and skilled in their respective trades.

## **MATERIALS AND EQUIPMENT**

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- .2 At all times enforce discipline and good order among workers. Do not employ any unfit person or anyone unskilled in the duties assigned to him. The Contract Administrator reserves the right to require the removal from Site of workers deemed incompetent, careless, insubordinate, or otherwise objectionable.
- .3 Decisions as to the quality or fitness of workmanship in cases of any dispute rests solely with the Contract Administrator whose decision is final.

### **3.2 Coordination**

- .1 Coordinate the Work of all sub-contractors.
- .2 Ensure that all sub-contractors examine the Drawings and Specifications for other parts of the Work, which may affect the performance of their Work.
- .3 Ensure that sleeves, openings, and miscellaneous equipment bases are provided as required for the Work.
- .4 Ensure that items to be built in are supplied when required with all necessary templates, measurements, and Shop Drawings.

### **3.3 Concealment**

- .1 In finished areas conceal all pipes, ducts, and wiring except where indicated otherwise on Drawings or in Specifications.
- .2 Before installation inform the Contract Administrator if there is a contradictory situation. Install as directed.

### **3.4 Location of Fixtures**

- .1 Consider the location of fixtures, outlets, and other mechanical and electrical items indicated on Drawings as approximate. The actual location of these items is to be as required or directed to Site conditions at the time of installation and as is reasonable.
- .2 Before installation inform the Contract Administrator if there is a contradictory situation. Install as directed.

### **3.5 Cutting and Remedial Work**

- .1 Perform all cutting and remedial Work that may be required to make the several parts of the Work come together properly. Coordinate and schedule the Work to ensure that cutting and remedial Work are kept to a minimum.
- .2 Employ specialists familiar with the materials affected in performing cutting and remedial Work. Perform in a manner to neither damage nor endanger any portion of the Work.
- .3 Do not cut, drill, or sleeve any load-bearing members without written acceptance of the Contract Administrator.

## **MATERIALS AND EQUIPMENT**

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- .4 The Contractor is to perform Work so that no dust is generated.

### **3.6 Fastenings**

- .1 Provide metal fastenings and accessories in same texture, colour, and finish as adjacent material unless otherwise specified.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive, non-staining fasteners and anchors for securing exterior Work unless otherwise specified.
- .4 Space anchors within their load limit or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and lay out neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

### **3.7 Protection of Work In Progress**

- .1 Adequately protect all Work completed and in progress. Repair or replace all damaged Work.
- .2 Prevent overloading of any part of the Work.

### **3.8 Cleaning**

- .1 Remove waste materials and debris from the Site at regular intervals. Do not burn waste materials and debris on-site.

**END OF SECTION**

## EQUIPMENT INSTALLATION

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### **1. GENERAL**

#### **1.1 Intent**

- .1 This Section describes general requirements for all equipment supplied under the Contract relating to the supervision of installation, testing, operation, and performance verification. The Contractor shall be responsible for the supply, installation, testing, operation, and performance verification of the specified equipment.
- .2 Decanters and Aeration equipment is being supplied by the City under separate Contracts and are subject to the requirements specified in this Section.

#### **1.2 Definitions**

- .1 **Manufacturer:** the manufacturer is the person, partnership, or corporation responsible for the manufacture and fabrication of equipment provided to the Contractor for the completion of the Work.
- .2 **Manufacturer's Representative:** the manufacturer's representative is a trained serviceman empowered by the manufacturer to provide installation, testing, and commissioning assistance to the Contractor in his performance of these functions.

#### **1.3 Expertise and Responsibility**

- .1 The Contract Administrator recognizes the expertise of the manufacturer.
- .2 Should the Contract Administrator issue a Field Order, Authorization for Contract Change, or Instruction to Change the Work, which would, in the opinion of the Contractor, compromise the success or safety of the Work, then it shall be incumbent on the Contractor to notify in writing the Contract Administrator to this effect within two days.

### **2. PRODUCTS**

- .1 Not used

### **3. EXECUTION**

#### **3.1 Equipment Delivery**

- .1 The equipment shall be delivered to the NEWPCC construction Site to the Contractor who shall be responsible for taking delivery of the equipment. Written acceptance of receipt, at delivery, by the Contractor shall constitute "Delivery to Site" under this Contract. A representative from each of the following groups will be in attendance at the time of delivery: the Supplier, Contractor, and Contract Administrator. A duly executed "Certificate of Equipment Delivery" (Form 100) shall be completed. Any minor damage identified during the inspection shall be repaired as per the manufacturer's recommendations by the Contractor at no cost to the City. Any severe damage will be grounds for rejection of the equipment. The severely damaged equipment will be replaced at no cost to the City.

## **EQUIPMENT INSTALLATION**

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- .2 Ten days before delivery, notice shall be given to the Contract Administrator so that arrangements for receipt and for inspection can be made. The shipping lists of materials will be carefully checked by the supplier in the presence of the Contract Administrator and the Contractor.
- .3 The Contractor shall be responsible for receiving, off-loading, and placing into storage all equipment at the Site.
- .4 The Contractor shall ensure that he is fully informed of precautions to be taken in the unloading of equipment and its subsequent storage.

### **3.2 Installation Assistance**

- .1 Before commencing installation of equipment, the Contractor shall arrange for the attendance of the manufacturer's representative to provide instructions in the methods, techniques, precautions, and any other information relevant to the successful installation of the equipment.
- .2 The Contractor shall inform the Contract Administrator, in writing, of the attendance at the Site of any manufacturer's representative for installation training at least 14 days prior to arrival.
- .3 When the manufacturer's representative is satisfied that the Contractor is aware of all installation requirements, he shall so certify by completing Form 101 attached to this Specification.
- .4 The completed form shall be delivered to the Contract Administrator prior to departure of the manufacturer's representative from the Site.
- .5 Installation of the equipment shall not commence until Contract Administrator has advised that he has received the completed Form 101.
- .6 Separate copies of Form 101 shall be used for different equipment.

### **3.3 Installation**

- .1 The Contractor shall install all equipment including equipment supplied by the City as defined in the Specifications. If necessary, or if so directed by the Contract Administrator during the course of installation, the Contractor shall contact the manufacturer to receive clarification of installation procedures, direction, or any other additional information necessary to continue or complete the installation in an appropriate manner.
- .2 If it is found necessary, or if so directed by the Contract Administrator, the Contractor shall arrange for the manufacturer's representative to visit the Site to provide assistance during installation, all at no cost to the City.
- .3 Prior to completing installation, the Contractor shall inform the manufacturer and arrange for the attendance at the Site of the manufacturer's representative to verify successful installation.

## EQUIPMENT INSTALLATION

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- .4 The manufacturer's representative shall conduct a detailed inspection of the installation including alignment, electrical connections, belt tensions, rotation direction, running clearances, lubrication, workmanship, and all other items as required to ensure successful operation of the equipment.
- .5 The manufacturer's representative shall identify any outstanding deficiencies in the installation.
- .6 The deficiencies shall be rectified by the Contractor and the manufacturer's representative will be required to re-inspect the installation, at no cost to the City.
- .7 When the manufacturer's representative accepts the installation, he shall certify the installation by completing Form 102, attached to this Specification.
- .8 Deliver the completed Form 102 to the Contract Administrator prior to departure of the manufacturer's representative from the Site.
- .9 Tag the equipment with a 100 mm by 200 mm card stating "Equipment Checked. Do Not Run." stenciled in large black letters. Sign and date each card.
- .10 Provide separate copies of Form 102 for different equipment.

### **3.4 Operation and Performance Verification**

- .1 Equipment will be subjected to a demonstration, running test, and performance tests after the installation has been verified and any identified deficiencies have been remedied.
- .2 Inform the Contract Administrator at least 14 days in advance of conducting the tests and arrange for the attendance of the manufacturer's representative. The tests may be concurrent with the inspection of satisfactory installation if mutually agreed by the Contractor and the Contract Administrator.
- .3 The manufacturer's representative will conduct all necessary checks to equipment and if necessary, advise the Contractor of any further checking, flushing, cleaning, or other Work needed prior to confirming the equipment is ready to run.
- .4 The Contractor shall then operate the equipment for at least one hour to demonstrate to himself the operation of the equipment and any required ancillary services. Any remedial measures required to ensure satisfactory operation shall be promptly undertaken.
- .5 The Contractor shall then notify the Contract Administrator of his readiness to demonstrate the operation of the equipment. The Contract Administrator shall attend, as expeditiously as possible.
- .6 With the assistance of the manufacturer's representative, the Contractor will demonstrate that the equipment is properly installed. Alignment, piping connections, electrical connections, etc., will be checked and if appropriate, code certifications provided.

### **EQUIPMENT INSTALLATION**

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- .7 The equipment shall then be run for one hour. Local controls shall be satisfactorily verified by cycling the equipment through several start-stop operations, modulating its output, or some combination. Operating parameters such as temperature, pressure, voltage, vibration, etc., will be checked to ensure that they are within the specified or manufacturer's recommended limits, whichever is more stringent.
- .8 On satisfactory completion of the one-hour demonstration, the equipment will be stopped and critical parameters, such as alignment, will be rechecked.
- .9 The equipment will be restarted and run continuously for three days. During this period, as practicable, conditions will be simulated which represent maximum or most severe, average, and minimum or least severe conditions. These conditions will be mutually agreed by the manufacturer's representative, the Contractor, and Contract Administrator on the basis of the information contained in the Specifications, as well as the methods utilized to create the simulated conditions and the time periods allotted to each.
- .10 Performance tests will be conducted either concurrent with or subsequent to the running test, as practicable and agreed between the Contract Administrator, the manufacturer's representative, and the Contractor.
- .11 Performance tests shall be as dictated in the Specifications for each item of equipment or as reasonably required by the Contract Administrator to prove adherence to the requirements listed in the Specification.
- .12 The Contractor shall submit the results of the performance tests to the Contract Administrator, documented and summarized in a format acceptable to the Contract Administrator. The Contract Administrator reserves the right to request additional testing. No equipment shall be accepted and handed over to the City prior to the satisfactory completion of the performance tests and receipt of the test reports.
- .13 All water, chemicals, temporary power, heating, or any other ancillary services required to complete the initial demonstration, running test and performance tests are the responsibility of the Contractor.
- .14 Should the initial demonstration, running test or performance tests reveal any defects, then those defects shall be promptly rectified and the demonstration, running tests, and/or performance tests shall be repeated to the satisfaction of the Contract Administrator. Additional costs incurred by the Contractor, the Contract Administrator, or the City, due to repeat demonstration, running tests, and/or performance tests shall be the responsibility of the Contractor.
- .15 On successful completion of the demonstration, running test, and performance tests, Form 103 attached to this Specification will be signed by the manufacturer's representative, the Contractor, and the Contract Administrator.
- .16 The Contractor shall affix to the tested equipment a 100 mm by 200 mm card reading "Operable Condition - Do Not Operate without Contractor's Permission." stenciled on in large black letters.

**EQUIPMENT INSTALLATION**

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**CERTIFICATE OF EQUIPMENT DELIVERY  
FORM 100**

We certify that the equipment listed below has been delivered into the care of the Contractor. The equipment has been found to be in satisfactory condition. No defects in the equipment were found.

**PROJECT:** \_\_\_\_\_

**ITEM OF EQUIPMENT:** \_\_\_\_\_

\_\_\_\_\_

**TAG NO:** \_\_\_\_\_

**REFERENCE  
SPECIFICATION:** \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signing Representative of the Contractor)

\_\_\_\_\_  
Date

\_\_\_\_\_  
(Authorized Signing Representative of the Sub-contractor)

\_\_\_\_\_  
Date

\_\_\_\_\_  
(Authorized Signing Representative of the Contract Administrator)

\_\_\_\_\_  
Date

**EQUIPMENT INSTALLATION**

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**CERTIFICATE OF READINESS TO INSTALL  
FORM 101**

I have familiarized the installer of the specific installation requirements related to the equipment listed below and am satisfied that he understands the required procedures.

**PROJECT:** \_\_\_\_\_

**ITEM OF EQUIPMENT:** \_\_\_\_\_

**TAG NO:** \_\_\_\_\_

**REFERENCE  
SPECIFICATION:** \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signing Representative of the Manufacturer)

\_\_\_\_\_  
Date

\_\_\_\_\_  
(Authorized Signing Representative of the Subcontractor)

\_\_\_\_\_  
Date

I certify that I have received satisfactory installation instructions from the equipment Manufacturer/  
Supplier.

\_\_\_\_\_  
(Authorized Signing Representative of the Contractor)

\_\_\_\_\_  
Date

\_\_\_\_\_

\_\_\_\_\_

**EQUIPMENT INSTALLATION**

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**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 any as noted below:

**PROJECT:** \_\_\_\_\_

**ITEM OF EQUIPMENT:** \_\_\_\_\_

\_\_\_\_\_

**TAG NO:** \_\_\_\_\_

**REFERENCE**

**SPECIFICATION:** \_\_\_\_\_

**OUTSTANDING DEFECTS:** \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signing Representative of the Manufacturer)

\_\_\_\_\_  
Date

\_\_\_\_\_  
(Authorized Signing Representative of the Contractor)

\_\_\_\_\_  
Date

**EQUIPMENT INSTALLATION**

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**CERTIFICATE OF EQUIPMENT SATISFACTORY PERFORMANCE  
FORM 103**

We certify that the equipment listed below has been continuously operated for at least three (3) consecutive days and that the equipment operates satisfactorily and meets its specified operating criteria. No defects in the equipment were found. The equipment is therefore classed as "conforming".

**PROJECT:** \_\_\_\_\_

**ITEM OF EQUIPMENT:** \_\_\_\_\_

\_\_\_\_\_

**TAG NO:** \_\_\_\_\_

**REFERENCE  
SPECIFICATION:** \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signing Representative of the Manufacturer) \_\_\_\_\_ Date

\_\_\_\_\_  
(Authorized Signing Representative of the Sub-contractor) \_\_\_\_\_ Date

\_\_\_\_\_  
(Authorized Signing Representative of the Contractor) \_\_\_\_\_ Date

\_\_\_\_\_  
(Authorized Signing Representative of the Contract Administrator) \_\_\_\_\_ Date

Acknowledgement of Receipt of O&M Manuals.

\_\_\_\_\_  
(Authorized Signing Representative of the City) \_\_\_\_\_ Date

**EQUIPMENT INSTALLATION**

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**END OF SECTION**

## TRAINING

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### 1. GENERAL

#### 1.1 Description

- .1 This Section contains requirements for training the City staff, by persons retained by the Contractor specifically for the purpose, in the proper operation and maintenance of the equipment and systems installed under this Contract.
- .2 Training sessions are required during the equipment testing.
- .3 As a minimum, the Contractor is to allow at least four hours of training per shift, as required for each item of equipment or system. Refer to the equipment Specifications for specific time periods.
- .4 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 the duration and content of each training session required.

#### 1.2 Quality Assurance

- .1 Where required by the equipment Specifications, provide on-the-job training of the City staff. Training sessions will be conducted by qualified factory-trained representatives of the various equipment suppliers with a minimum of two years experience. Training includes instruction of City staff in equipment operation and preventive maintenance and instruction on mechanics, electricians, instrumentation, and communications technicians in normal maintenance up to major repair.
- .2 The trainers proposed by the Contractor shall be experienced in training plant operators and shall have relevant experience in similar Work.

#### 1.3 Submittals

- .1 Submit the following information in accordance with Section 01300. For phased testing and start-up activities, separate submittals can be prepared for equipment items or systems. The material will receive a "REVIEWED" or "REVIEWED AS MODIFIED" status by the Contract Administrator no later than four weeks prior to delivery of the training:
  - .1 Lesson plans and training manuals, handouts, visual aids, and other reference materials for each training session to be conducted by the Contractor's trainer(s).
  - .2 Date, time, and subject of each training session.
  - .3 Training schedule. Concurrent classes will not be allowed.

#### 1.4 Location

- .1 Where specified, conduct training sessions for the City staff, operations and maintenance personnel, on the operation, care, and maintenance of the equipment and systems installed under this Contract. Training will take place at the Site of the Work and under the conditions specified in the following paragraphs.

## **TRAINING**

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- .2 Field training sessions will take place at the Site of the equipment. Classroom training is to take place in the boardroom in the NEWPCC Administration Building. The Contract Administrator may direct the classroom training to take place at another suitable location.

### **1.5 Lesson Plans**

- .1 Prepare formal written lesson plans for each training session and coordinate with the Contract Administrator. Lesson plans to contain an outline of the material to be presented along with a description of visual aids to be utilized during the session. Each plan will contain a time allocation for each subject. Furnish ten (10) copies of necessary training manuals, handouts, visual aids, and reference materials at least two weeks prior to each training session.

### **1.6 Format and Content**

- .1 Include time in the classroom and at the location of the equipment or system for each training session. As a minimum, cover the following topics for each item of equipment or system:
  - .1 Familiarization
  - .2 Safety
  - .3 Operation
  - .4 Troubleshooting
  - .5 Preventive maintenance
  - .6 Corrective maintenance
  - .7 Parts
  - .8 Local representatives

### **1.7 Video Recording**

- .1 Advise all suppliers providing training sessions that the training material may be videotaped. The City may record each training session, and the material may be edited and supplemented with professionally produced graphics to provide a permanent record for the City's use.

## **2. PRODUCTS**

- .1 Not used

## TRAINING

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### 3. EXECUTION

#### 3.1 General Requirements

- .1 Conduct training in conjunction with the equipment testing period. Schedule classes such that classroom sessions are interspersed with field instruction in logical sequence. Arrange to have the training conducted on consecutive days, with no more than four hours of classes scheduled for any one shift.
- .2 Provide final O&M Manuals, as defined in Section 01300, for the specific equipment to the City at least four weeks prior to the start of any training. Video recording may take place concurrently with all training sessions.

#### 3.2 Operator Classroom Training

- .1 As a minimum, classroom equipment training for operations personnel will include:
  - .1 The equipment's specific location in the plant and an operational overview. Use slides and drawings to aid discussion.
  - .2 Purpose and plant function of the 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 preventive maintenance
  - .7 Operator detection, without test instruments, of specific equipment trouble symptoms
  - .8 Required equipment exercise procedures and intervals
  - .9 Routine disassembly and assembly of equipment if applicable for purposes such as operator inspection of equipment
  - .10 Exam

#### 3.3 Operator Hands-On Training

- .1 As a minimum, hands-on equipment training for operations personnel will include:
  - .1 Identifying instrumentation: location of primary element; location of instrument readout; discuss purpose, basic operation, and information interpretation
  - .2 Discussing, demonstrating, and performing standard operating procedures and daily visual inspection of system operation.
  - .3 Discussing and performing the preventive maintenance activities

## TRAINING

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- .4 Discussing and performing start-up and shutdown procedures
- .5 Performing the required equipment exercise procedures
- .6 Performing routine disassembly and assembly of equipment if applicable
- .7 Identifying and reviewing safety items and performing safety procedures, if feasible

### **3.4 Maintenance Classroom Training**

- .1 Classroom equipment training for the maintenance and repair personnel will include:
  - .1 Basic theory of operation
  - .2 Description and function of equipment
  - .3 Routine start-up and shutdown procedures
  - .4 Normal and major repair procedures
  - .5 Equipment inspection and troubleshooting procedures including the use of applicable test instruments and the "pass" and "no pass" test instrument readings.
  - .6 Routine and long-term calibration procedures
  - .7 Safety procedures
  - .8 Preventive maintenance and up to and including major repairs such as replacement of major equipment part(s) with the use of special tools.

### **3.5 Maintenance Hands-on Training**

- .1 Hands-on equipment training for maintenance and repair personnel will include:
  - .1 Locating and identifying equipment components
  - .2 Reviewing the equipment function and theory of operation
  - .3 Reviewing normal repair procedures
  - .4 Performing routine start-up and shutdown procedures
  - .5 Reviewing and performing the safety procedures
  - .6 Performing City – approved practice maintenance and repair job(s), including mechanical and electrical adjustments and calibration and troubleshooting equipment problems
  - .7 Reviewing and using Contractor's manuals in the hands-on training

## TRAINING

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### 3.6 Equipment and Systems for Training

- .1 Provide training during the equipment testing period for the following equipment and systems:
  - .1 SBR system, including decanters and all pumps
  - .2 Process air blowers and aeration systems
  - .3 Soda ash system
  - .4 Methanol system
- .2 Coordinate and finalize with the Contract Administrator on training schedules and duration of each training session.

### 3.7 Training Completion Forms and Payment

- .1 Training for the Contractor - supplied equipment shall be conducted before the operation period as described in Form 103, included in Section 01650.
- .2 The Contract shall not be considered complete, for the purpose of issuing a Certificate of Substantial Performance, until the training has been provided and Form 103 has been completed and signed.
- .3 Form T1: to be completed for initial training. One (1) form is to be used for each item of equipment or system for which training has been provided.
- .4 Form T2: to be completed for training during the warranty period. One (1) form is to be used for each equipment/system for which training has been provided.
- .5 Payment for this Work will be released only when the training has been completed to the City's satisfaction and the respective forms are signed.
- .6 A sample of Forms T1 and T2 are attached to this Specification Section.

**TRAINING**

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**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 the City)

\_\_\_\_\_  
Date

**TRAINING**

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**CERTIFICATE OF SATISFACTORY TRAINING  
FORM T2**

We certify that the final 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 the City)

\_\_\_\_\_  
Date

**TRAINING**

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**END OF SECTION**

## COMMISSIONING

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### **1. GENERAL**

#### **1.1 General**

- .1 At the time of the commissioning, the Contract Administrator shall advise the Contractor of the commissioning requirements. These requirements are dependent on the anticipated operational requirements of the City's water supply system to meet the water demands at the time.
- .2 The Contractor shall refer to all Divisions for details on the commissioning procedures not included in this Section.
- .3 The Contractor shall note that on materials and equipment installed in this Contract, warranty will not begin until issuance of Total Performance.

#### **1.2 Intent**

- .1 This Section describes the Contractor's responsibilities in the commissioning and handover of the process, electrical, and other systems to be installed as part of this Work.

#### **1.3 Definitions**

- .1 System: for the purpose of this Specification 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 Commissioning: for the purpose of this Specification Section, commissioning shall be defined as the successful operation of a system in accordance with its design requirements for a period of 28 days, the last 7 of which shall be consecutive, unless otherwise specified.
- .3 Acceptance: for the purpose of this Specification 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 period is determined by the Contract Administrator.

#### **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 trades, including I&C personnel during the commissioning. These personnel shall be skilled workmen, able to expedite any minor repairs, adjustments, etc., as are required to complete commissioning with as few delays as possible.

## COMMISSIONING

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### 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 Contract Administrator and include the following:
  - .1 Detailed schedule of events, including but not limited to the schedule for completion of testing of all component parts of the system in accordance with Section 01650 prior to commissioning of a system.
  - .2 Method for introducing flow, disposing of partially treated effluent, and disposing of any sludge or other residual solids generated during the commissioning process. The Contractor will take responsibility for the implementation of these measures.
  - .3 Sampling and analytical program for tests necessary to verify compliance with performance specifications.
  - .4 Planned attendance schedule for manufacturer's representatives.
  - .5 Contingency plans in the event of a process malfunction.
  - .6 Drawings and sketches as required to illustrate the planned sequence of events.
  - .7 List and details for all temporary equipment (pumps, etc.) required to facilitate Commissioning.
  - .8 List of all personnel who the Contractor plans for commissioning and handover with information indicating their qualifications for this Work.
- .2 The commissioning plan shall be reviewed prior to its implementation. The Contract Administrator shall be the final arbiter.

### 1.6 Equipment

- .1 All process, mechanical, electrical, control, and miscellaneous equipment related to a system shall be successfully installed and tested in accordance with Section 01650 and any specific requirements noted in other Divisions. Form 103 shall be executed for each item.
- .2 As required in Section 01300, O&M Manuals will be submitted and reviewed by the Contract Administrator.
- .3 Staff training sessions shall be completed.
- .4 Temporary equipment will be installed and tested as necessary to ensure that it functions reliably and consistently through the commissioning period.
- .5 Conduct sampling and analysis in accordance with the requirements of the latest version of "Standard Methods for the Examination of Water and Wastewater", AWWA/WEF.

## COMMISSIONING

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### 1.7 Controls

- .1 All controls which are the responsibility of this Contractor shall be installed and tested prior to commissioning.
- .2 The Contract Administrator shall arrange for the simulation of the control sequences or shall allow for the operation of the system without the features included in the Work of others. Every effort shall be made to ensure that the commissioning period provides for the full and comprehensive operation of the equipment under all anticipated normal and adverse operating conditions.

### 1.8 Plant Utility Services

- .1 The City shall provide power, chemicals, and other ancillary services as necessary to operate the plant through the commissioning period. Provision of these services shall be limited to reasonable levels.

### 1.9 Manpower

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

### 1.10 Operating Descriptions

- .1 Operating descriptions shall be prepared by the Contract Administrator for the plant systems. Other information outlining the operating requirements shall also be available from the Contract Administrator. The Contractor will review these descriptions and will make himself familiar with the requirements in order that he can undertake commissioning in an appropriate manner.

### 1.11 Design Parameters

- .1 Design parameters for the systems to be commissioned shall be as defined in the Specifications and/or the operating descriptions. The commissioning team will identify to the Contractor, which parameters shall be modified prior to commissioning and shall be responsible for any subsequent changes during the commissioning period.

## 2. PRODUCTS

- .1 Not used

## COMMISSIONING

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### 3. EXECUTION

#### 3.1 Preparation

- .1 Each item of equipment included in the system to be commissioned shall be satisfactorily tested and Form 103 completed.
- .2 Piping, wiring, and other conduit systems shall be finished and tested.
- .3 Electrical connections shall be completed and inspected to the satisfaction of the governing authorities.
- .4 All other regulatory inspections shall be completed to the satisfaction of the governing authorities.
- .5 Control systems shall be completed and the related control software debugged.

#### 3.2 Sequence

- .1 Systems shall be commissioned in a logical manner. Upstream components shall be commissioned first to the degree possible.
- .2 The following sequence of events shall be followed:
  - .1 O&M Manuals shall be available as per the requirements of Section 01300 at least 14 days prior to the start of commissioning.
  - .2 The Contract Administrator will make operating descriptions available prior to testing. draft operating descriptions are included in this Contract.
  - .3 Initial operator training shall be undertaken two weeks prior to commissioning.
  - .4 Equipment performance tests shall be conducted successfully.
  - .5 Start and run system in manual mode.
  - .6 Turn separate items of equipment to automatic in a planned and logical manner. Ensure that the control system is operating the equipment in a manner which precludes damage of the equipment and which is consistent with the process operating requirements.
  - .7 Commence commissioning period of 28 days. The equipment shall operate continuously and successfully through the last seven days of a commissioning period. Minor failures shall not void the commissioning period. A minor failure is defined as one which does not present a safety hazard, does not impact overall process functioning and can be temporarily overcome by the use of available standby equipment. The last seven days of the commissioning period shall be re-started if a critical failure occurs. A critical failure shall be deemed as one, which prohibits the process from functioning successfully for an eight hour period or one, which creates a safety hazard.

## COMMISSIONING

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- .8 Upon completing the commissioning period, the system shall be granted formal acceptance by the Contract Administrator.

### 3.3 Commissioning

- .1 Water will be introduced to the system in a manner which precludes the damage of any equipment or structures.
- .2 Twice during the commissioning period, plant component settings will be modified to ensure that the system is subjected to flows and loads as close to design conditions as possible. Where necessary to achieve this, flows to the area being commissioned will be augmented to exaggerate the naturally occurring flows and loads. Where it is necessary to modify settings outside the limits of this Contract area within the plant, coordinate the changes with plant staff.
- .3 Assist in the operation of the plant to achieve the process objectives.
- .4 All components and systems shall be operated in the automatic/manual and the remote/local modes as required to prove proper operation.
- .5 Ensure all bypasses and backup provisions function satisfactorily.
- .6 All minor and major alarm conditions will be induced to ensure that the process reacts as intended, the applicable alarms are annunciated.
- .7 Samples of process flows, when necessary to prove performance, will be obtained and analyzed on a regular basis.

### 3.4 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 28 days, the last 7 of which shall be continuous and consecutive, unless otherwise specified.
- .2 When a process system has been commissioned satisfactorily, the process system shall be formally accepted for operation and routine maintenance by the City's forces. On successful completion of commissioning Form 104 – Certificate of Satisfactory Process Performance attached to this Specification will be signed by the representative of the manufacturer, Contractor, Contract Administrator, and the City.
- .3 An acceptance meeting must be held at the end of the 28 day test to confirm the status of each system.
- .4 Notice of Acceptance for the entire project will be granted when all systems have been commissioned and accepted, and all requirements of the General Conditions have been completed.

**COMMISSIONING**

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**CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE  
FORM 104**

We certify that the equipment listed below has been operated and tested as per the Specifications using water and that the equipment meets its performance testing criteria. The equipment is therefore classed as “conforming”.

**PROJECT:** \_\_\_\_\_

**SYSTEM DESCRIPTION:** \_\_\_\_\_

**TAG NO (S):** \_\_\_\_\_

**REFERENCE  
SPECIFICATION (S):** \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signing Representative of the Manufacturer) \_\_\_\_\_  
Date

\_\_\_\_\_  
(Authorized Signing Representative of the Contractor) \_\_\_\_\_  
Date

\_\_\_\_\_  
(Authorized Signing Representative of the Contract Administrator) \_\_\_\_\_  
Date

\_\_\_\_\_  
(Authorized Signing Representative of the City of Winnipeg) \_\_\_\_\_  
Date

**COMMISSIONING**

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**END OF SECTION**

**CONTRACT CLOSEOUT**

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**1. GENERAL**

**1.1 Final Cleaning**

- .1 When the Work is Substantially Performed, remove surplus products, tools, construction machinery, and equipment not required for the performance of the remaining Work.
- .2 Remove waste and debris and leave the Work clean and suitable for occupancy by the City.
- .3 When the Work has reached Total Performance, remove surplus products, tools, construction machinery, equipment, waste, and debris.
- .4 Leave the Work areas broom clean before the final inspection process commences.

**1.2 Site Restoration**

- .1 The Contractor shall remove the temporary Site office and storage facilities prior to Total Performance being issued.
- .2 The Contractor will be responsible for grounds restoration to original state, as determined necessary by the Contract Administrator.
- .3 The Contractor will be responsible for any damage caused by his forces on roadways or accesses.

**2. PRODUCTS**

- .1 Not used

**3. EXECUTION**

- .1 Not used

**END OF SECTION**

## **OPERATING AND MAINTENANCE DATA**

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### **1. GENERAL**

#### **1.1 Description**

- .1 This Section supplements the requirements for the provision of O&M Manuals as described in Section 01300.
- .2 Furnish complete operations manuals and maintenance information as specified in this Section for installation check-out, operation, maintenance, and lubrication requirements for each unit of mechanical, electrical, and instrumentation equipment or system and each instrument.
- .3 In some instances, this requirement is reinforced by additional references within individual specification sections; however, the inclusion or exclusion of additional references within the Contract shall not supersede or otherwise limit the generality of the foregoing and these requirements shall govern.
- .4 Customize the operations manuals and maintenance information to describe the equipment actually furnished. Do not include extraneous data for models, options, or sizes not furnished. When more than one model or size of equipment type is furnished, show the information pertaining to each model, option, or size.

#### **1.2 Submittals**

- .1 The submission and acceptance of the "Equipment Operating and Maintenance Instruction" manual is a condition precedent to the certification of Substantial Performance.
- .2 Submit operation manuals and maintenance information in accordance with Section 01300. Submittals may be checked for general compliance with the requirements of this Section.
- .3 Submit complete operations manuals and maintenance information as soon as possible after review of project submittals but no later than 120 days before the date of Substantial Performance.
- .4 Submit operations and maintenance data in electronic format: text sections compatible with Microsoft Word 2000; drawings and graphics in PDF format.

#### **1.3 General Requirements**

- .1 Provide materials of equal clarity and quality as the originals.
- .2 Provide drawings, diagrams, and manufacturer's literature which are legible.
- .3 All instructions in the O&M Manuals are to be in simple language.
- .4 Edit manufacturer's standard documents to delete extraneous information not applicable to the equipment, assembly, subassembly, or material supplied. Cross out or remove and eliminate any extraneous material for models, options, or sizes not furnished.

**OPERATING AND MAINTENANCE DATA**

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**2. PRODUCTS**

- .1 Not used

**3. EXECUTION**

**3.1 Contents and Organization**

- .1 Arrange the O&M Manual to match the numbering system in the Specifications.
- .2 Provide the manufacturer's standard O&M Manuals for the equipment or instrument supplied. If the manufacturer's standard manuals do not contain all the required information, provide the missing information in supplementary documents and drawings.
- .3 When more than one piece of identical equipment or instruments is supplied, provide only one (1) set of operations manuals.
- .4 One (1) set of operations manuals may be provided when more than one piece of similar equipment or instruments are supplied, such as different sizes of the same model, and all similar pieces are covered in the same standard manufacturer's O&M Manual.
- .5 When similar equipment or instruments are provided by the same manufacturer, but are not covered in the same standard manufacturer's O&M Manual, their specific manuals may be included in the same electronic manual.
- .6 Provide a cover page, as the first page of each manual, with the following information:
  - .1 Contract name and number
  - .2 Equipment number or, if more than one piece of equipment is provided, equipment numbers for equipment or instruments covered by the manual. Include functional description of equipment after each number.
- .7 Provide a table of contents listing the contents of the manual and identifying where specific information can be located.
- .8 Include the specific information described below in the O&M Manuals:
  - .1 General Information
    - .1 Functional title of the system, equipment, material, or instrument
    - .2 Relevant Specification Section number and Drawing reference
    - .3 Address and telephone number of the manufacturer and the nearest manufacturer's representative

## **OPERATING AND MAINTENANCE DATA**

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### .2 Equipment Data

- .1 Insert Specification Section and completed equipment and instrumentation data sheets for equipment supplied. Attach all Addenda, Change Orders, and Change Directives that refer to that specific item of equipment.

### .3 Operation Information

- .1 Include the manufacturer's recommended step-by-step procedures for starting and stopping under normal and emergency operation. Include all specified modes of operation including recommended operation after the assembly or equipment has been in long-term storage.
- .2 Provide control diagrams with data and information to explain operation and control of systems and specific equipment. Identify normal operating setpoints and alarm conditions.
- .3 Provide technical information on all alarms and monitoring devices provided with the equipment.

### .4 Technical Data

- .1 Insert manufacturer's technical specification and data sheets.
- .2 Insert manufacturer's certified performance and calibration curves for the equipment and instruments.

### .5 Maintenance Information

- .1 Provide descriptions and schedules for manufacturer's recommended routine preventative maintenance procedures including specific lubrication recommendations. Indicate service intervals: daily, weekly, monthly, quarterly, semiannually, annually, or after "X" hours of operation.

### .6 Maintenance Instructions

- .1 Provide requirements to set up and check out each system for use. Include all required and recommended step-by-step inspections, lubrications, adjustments, alignments, balancing, and calibrations. Include protective device settings and warnings and cautions to prevent equipment damage and to insure personnel safety.
- .2 Provide manufacturer's description of routine preventive maintenance, inspections, tests, and adjustments required to ensure proper and economical operation and to minimize corrective maintenance and repair.
- .3 Provide manufacturer's recommendations on procedures and instructions for correcting problems and making repairs.

## **OPERATING AND MAINTENANCE DATA**

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- .4 Provide step-by-step procedures to isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or requires replacement.
- .5 Provide step-by-step procedures and list special required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings, and adjustments required.
- .7 Assembly Drawings
  - .1 Provide Drawings which completely document the equipment, assembly, subassembly, or material for which the instruction is written. Provide the following Drawings as applicable: fabrication details, wiring and connection diagrams, electrical and piping schematics, block or logic diagrams, shop drawings, installation drawings, layout and dimension drawings, and electrical component fabrication drawings.
  - .2 Provide clear and legible illustrations, Drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies.
- .8 Bills of Materials
  - .1 Provide a clear, legible copy of the bill of materials that was shipped with the equipment. The bill of materials should list all equipment, instruments, components, accessories, tools, and other items that were shipped with the equipment.
- .9 Lubrication Data
  - .1 Provide a table showing recommended lubricants for specific temperature ranges and applications.
  - .2 Provide charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.
  - .3 If the equipment or instrument is not lubricated, add a sheet under this Tab with the words "Not Applicable".

### **3.2 Field Changes**

- .1 Following the acceptable installation and operation of an equipment item, modify and supplement the item's instructions and procedures to reflect any field changes or information requiring field data.

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**OPERATING AND MAINTENANCE DATA**

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**3.3 Commissioning Data**

- .1 Provide hard cover three-ring binder for 215 mm x 280 mm paper labelled "Commissioning Data" three (3) copies of:
  - .1 All completed equipment testing and commissioning forms, arranged in specification section order.
  - .2 All completed equipment checklists and performance reports, including noise and vibration analysis, instrumentation calibration data, and all other relevant information.
  - .3 All system performance reports
- .2 In addition to the above specified binders, provide a disc (compact disc or DVD) of the above documents scanned into electronic format.

**3.4 Warranties**

- .1 Provide hard cover three-ring binder for 215 mm x 280 mm paper labelled "Warranties" three (3) copies of:
  - .1 A list in specification section order of all warranties and guarantees required by the Contract Documents and all manufacturers' standard warranties and guarantees. Include contact names and telephone numbers. Indicate the time frame of each warranty or guarantee on the list.
  - .2 Include, in Specification Section order, a copy of all written warranties and guarantees, which are required by the Contract Documents. Include all additional standard warranties and guarantees received by the Contractor.

**END OF SECTION**