

6. PHASE 3 - CONSTRUCTION PHASE

6.1 CONSTRUCTION PHASE PROCEDURES

6.1.1 SAFETY

1. The entire project team shall ensure that safe work practices are followed and deficiencies in safe work practices will be immediately reported to the Contractor's designated representative and TW's Construction Manager.
2. In some cases, a full time on Contractor's Site Safety Supervisor is required.
3. Requirements for site safety are described in the NL Master Specification Guide for Public Funded Buildings.
4. The Contractor shall develop and submit to the Construction Manager a Site Specific Safety Plan, which shall include but not limited to:
 - a. Detailed hazard assessment of the project detailing methodologies for addressing site specific safety issues that will arise in individual phases of the project.
 - b. Hazard assessment results.
 - c. Engineering and administrative demonstrative controls (work-practices and procedures) to be implemented for managing identified and potential hazards, and comply with applicable federal and provincial legislation and more stringent requirements that have been specified in these specifications.
 - d. An organizational structure which shall establish the specific chain of command and specify the overall responsibilities of Contractor's employees at the work site.
 - e. Define work tasks and objectives of site activities/operations and the logistics and resources required to reach these tasks and objectives.
 - f. Accident incident investigation model and process.
 - g. Identification of company safe work practices, both generic and project specific.

- h. If required, fall protection and confined space entry plans complete with assessments, safe work practices and rescue plans.
- i. Training and planning surrounding disposal and handling of waste, hazardous and contaminated materials.
- j. Housekeeping policies and requirements for site and Sub-Contractors.
- k. Site security and public access, along with, a site orientation program.
- l. Identification and planning of persons responsible for site safety compliance, documentations, non-compliances, and sub-Contractor safety coordination and management and overall site supervision
- m. Smoke-Free site policy
- n. establish personnel requirements for implementing the plan
- o. A personal protected equipment (PPE) Program which shall detail PPE:
 - i. Selection criteria based on site hazards.
 - ii. Use, maintenance, inspection and storage requirements and procedures.
 - iii. Decontamination and disposal procedures.
- p. Inspection procedures prior to during and after use, and other appropriate medical considerations.
- q. Limitations during temperature extremes, heat stress and other appropriate medical consideration.
- r. An emergency response procedure, refer to the specification for Supervision and Emergency Response Procedure for requirements.
- s. A hazard communication program for informing workers, visitors and individuals outside of the work area as required. This will include but not be limited to a visitor safety and orientation policy and program that will include education on hazards, required PPE and accompaniment while on site.
- t. A hearing conservation program in accordance with the OHS Regulations.
- u. A recent (current year) inspection form for all powered mobile equipment that will be used in fulfilling the terms of the contract. The inspection form shall, at a minimum, state that the equipment is in a safe operating condition.
- v. A complete listing of employee names, their driver's license classification, expiry date, endorsements and the type of equipment that they are qualified to

operate for the complete scope of work for this project. The Driver's License Number should not be provided as this is confidential information. Provision of the License Number may breach PIPEDA - the Personal Information Protection and Electronic Documents Act. (Federal Act) or ATIPPA - Access to Information and Protection of Privacy Act - Part IV. (Provincial Act of Newfoundland and Labrador). This shall also include documentation where required of certification in power line hazards.

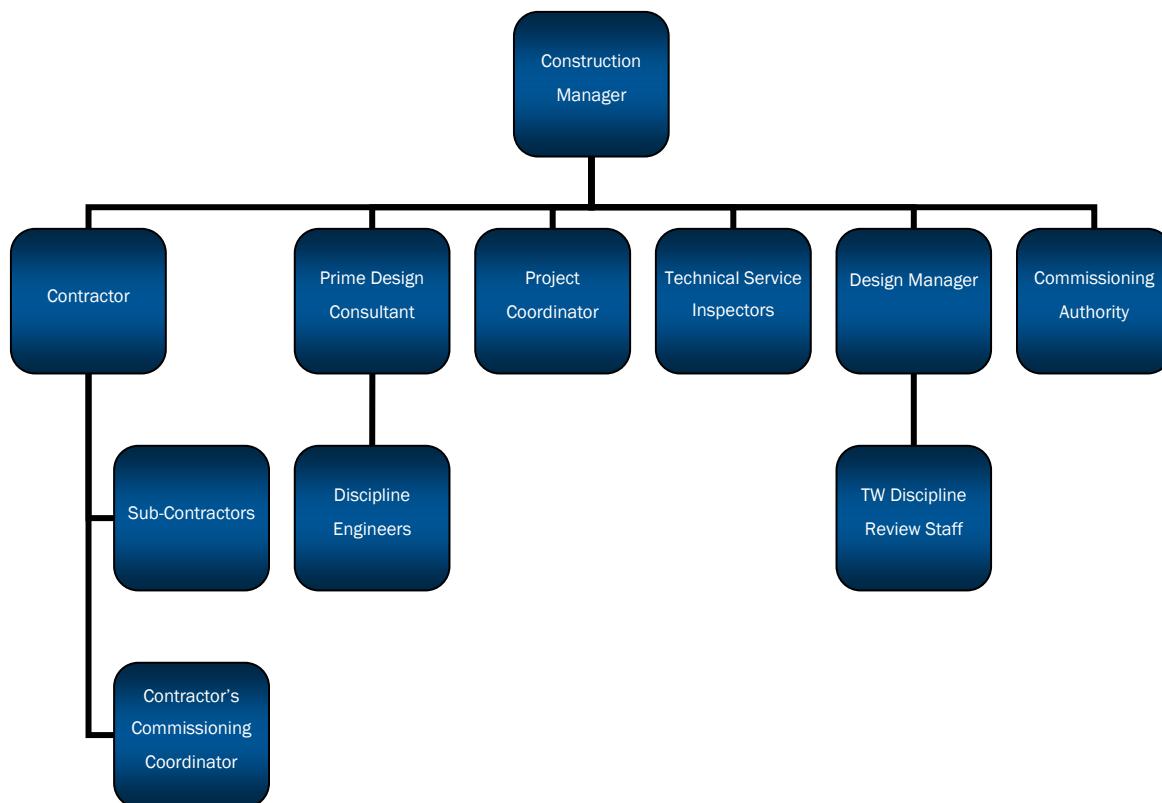
- w. An acceptable parking policy for all powered mobile equipment to be used on this project. The policy shall, at a minimum, be based on a hazard assessment that considers factors such as equipment type, potential for roll over, load capacity of the parking area, pedestrian and vehicular traffic, and potential for equipment tampering, equipment energy, and equipment contact with power lines.
- x. A diving program which shall contain standard operating procedures to be followed in the diving operation.
- y. A health and safety training program which includes a safety training matrix.

5. The Construction Manager is to provide the Project Coordinator and others as necessary with a copy of the Contactor's Site Specific Health and Safety Plan.
6. All TW staff is to be familiar with TW's Occupational Health and Safety Program Manual.
7. Safety is to be included on the agenda of all construction progress meetings, both to review any incidents or changes and high light safety concerns on the site.
8. Project Coordinator shall take a lead role in monitoring compliance with safe work practices in accordance with the Contractor's and TW's safety manual.

6.1.2 CONSTRUCTION PHASE COMMUNICATIONS

1. Maintaining effective communication with the client department or agency is an essential part of the responsibilities of both the Design and Construction Managers. This includes regular reports, correspondence and meetings to provide information related to a project's financial and physical status and the identification of any areas of concern. It is crucial that a high level of client satisfaction is achieved.

2. Approval from the client shall be obtained in writing on any capital or maintenance projects affecting floor layouts, work disruptions, scheduling, or other relevant matters prior to start of work.
3. All communications during the design phase shall be routed through the Construction Manager. For example, the Contractor should not contact the Client Department directly. This will alleviate the sometimes misdirection and erroneous decisions by those not managing the project.



6.1.3 REQUIREMENTS PRIOR TO START OF WORK

1. Insurances, bonding and other documents in accordance with the contract documents and contract award letter are required to be in place prior to start of construction.
2. A complete Health and Safety Risk Assessment and Management Plan, including a Site Specific Health and Safety Plan must be submitted at least five (5) working days prior to commencing any work on site. Refer to Section 01 35 29.06 Health and Safety Requirements for further details.

3. Submission requirements for Consultants are outlined in the Prime Consultant's Agreement.
4. For projects in existing buildings, confirmation of a hazardous materials survey / management plan is required. This should be identified in the design stage and checked again prior to the start of construction. Contractors and Consultants will require access to relevant portions of the hazardous materials management plan.

6.1.4 PRE-CONSTRUCTION MEETING

1. Pre-construction meeting should occur before any work starts on the project convened by the Construction Manager. The designated building representative and inspectors shall attend the meeting. Client partners should be extended an invitation to attend.
2. A typical format for the meeting includes:
 - a. Present the administrative requirements for the project and contact authorities of TW
 - b. Discuss roles of Department's Technical Service Inspectors
 - c. Discuss requirements for any special inspections, testing, mock up, and authority of inspections, etc.
 - d. The schedule/frequency for project meetings
 - e. Review change order management procedures
 - f. Review progress claim and payment procedure
 - g. Review scheduling reporting procedures, including scheduling coordination,
 - h. Review site specific construction hazards and safety measures
 - i. Review requirements for temporary facilities on site (e.g. materials storage, temporary power, water & sanitary sewer)
 - j. Review project documentation management procedures such as project record drawings, shop drawings, samples, color selections, etc.
 - k. Communication matrix and decision making authorities identified
 - l. Location of project signs
 - m. Review environmental considerations applicable during construction
 - n. Timely co-ordination and scheduling for performing tests, inspections and commissioning activities by the Owner and their agents

- o. Review listing of approved Sub-Contractors and major suppliers (cannot be changed without approval from the Construction Manager.)
- p. Review LEED® requirements for construction process and documentation

3. TW will record and distribute meeting minutes; this task may be reassigned if necessary.

6.1.5 PROJECT STATUS REPORTING

- 1. On major projects the Construction Manager will prepare weekly project status reports in the prescribed format required by the Director of Design and Construction.
- 2. Quarterly updates to the Capital Project Status Report are required to be submitted in the prescribed format. This submission is led by the Design & Construction Division.

6.1.6 REQUEST FOR INFORMATION

- 1. The Contractor may request interpretation or clarification of the design intent. This Request for Information (RFI) shall be made in writing, and appropriately identified with a unique RFI number and date of submittal.
- 2. A response to the Request For Information (RFI) shall be documented in writing by the Engineer/Architect, following the same identification system or as otherwise agreed by the contracting parties.
- 3. Urgent work considered as a change to the contract may be authorized by the Construction Manager using a Field Instruction. This procedure shall be used where the value of the change order cannot be readily established, and the work must be performed on an urgent basis. A written Change Order will be issued as soon as practical. Field Instructions are not recognized in the GC's refer to CG 19.5.
- 4. Directives may also be used to instruct the Contractor to comply with a particular aspect of the construction contract. The Contractor's response to the Instruction will be noted regarding whether or not acceptable performance has been attained. Refer to GC7 Engineer/Architect's Decisions.

6.1.6.1 Request for Information Log

1. On all projects, the Consultant will maintain, unless otherwise directed by the Construction Manager, a RFI log for each construction contract which shall summarize in a spreadsheet the following:
 - a. Numerical assignment of all RFIs
 - b. A brief summary description
 - c. Date submitted
 - d. Date response sent
 - e. Brief description of the response
2. RFI Log shall be reviewed at each construction meeting

6.1.7 CHANGE ORDERS

6.1.7.1 General

1. During the performance of a contract, it may be necessary to deviate from the drawings or specifications. Any change from the original contract documents will constitute a cause for the initiation of a change order.

6.1.7.2 Requirements

1. Any change in the contract amount shall be documented with a change order in accordance with the Contract General Conditions, GC 18 Changes in the Work, and GC 19 Valuation and Certification of Changes in the Work.
2. Change orders cannot be approved unless sufficient contract funding is available. Once approved, an encumbrance adjustment is required to add the value of the change to the contract.
3. Change orders should only be issued for necessary work within the established scope of the project. The Construction Manager should be satisfied that the issuance of a change order is the preferable method of having the work completed, that the price for the additional work is reasonable, and in accordance with the contract.
4. Change orders required are typically recommended by the Construction Manager in PARTS and approved by either the Regional Engineer or Regional or Divisional Director. Approval to

exceed the Public Tender Act change order limit is to be submitted to the Director for referral to the Executive. Approval should be requested when the Construction Manager anticipates that the limit will be exceeded. This approval should be sought well in advance of the specific change order that would cause the limit to be exceeded.

5. A Proposed Change Order form may be used to initiate the need and reason for a change order. The approved Change Order form is required to modify the contract amount and process payment on change order work. Copies of the approved Change Order will be distributed to the Contractor and Consultant.
6. In the case of a change which has no cost impact, a change order will be issued to document the occurrence of the change, and what, if any impact, the change will have on the construction schedule. These changes shall also be recorded by the Contractor for inclusion in the project record drawings.

6.1.7.3 Change Order Log

1. On all projects, the Consultant will maintain, unless otherwise directed by the Construction Manager, a change order log for each construction contract which shall summarize in a spreadsheet the following:
 - a. Numerical assignment of all change orders (and proposed change orders)
 - b. A brief summary description of the change requested
 - c. The final value or estimated value of the change requested
 - d. The total anticipated financial impact on the project
 - e. The category of change
 - f. Identification of changes in dispute with the Contractor
 - g. Date the change order was requested
 - h. Date the change order was approved
 - i. Impact on schedule if any
2. Change Order Log shall be reviewed at each construction meeting

6.1.7.4 Change Order Category

1. Category of change for each change order line item is to be identified under one of the following and indicated as such in PARTS:

- a. Category "A" - Additional Requirements
- b. Category "B" - Design Related
- c. Category "C" - Site Conditions
- d. Category "D" - Regulatory Requirements
- e. Category "E" - Additional Requirements – TW

6.1.8 SHOP DRAWINGS

1. The Contractor is required to provide shop drawings for approval in accordance with the technical specifications.
2. All shop drawings, whether prepared by the Contractor or Sub-Contractors, must be approved by the Contractor and stamped accordingly before submission to the Consultant. This ensures that the Contractor has checked and coordinated the work between trades before submission to the Consultant.
3. Approval of shop drawings by the Consultant does not relieve the Contractor of his responsibility for accuracy or quantities involved or for meeting the requirements of contract documents.
4. The Consultant is to review and stamp shop drawings to assess that the technical requirements and intent of the contract documents have been met. No substitution is to be considered without TW's approval.
5. TW may review shop drawings submitted by the Consultant and require changes to be made.
6. The Consultant may issue acceptances of shop drawings directly to the Contractor and copy TW at the same time. TW has the right to alter such acceptances if they are contrary to the contract at the discretion of the Construction Manager.
7. The turnaround time for each shop drawing shall be in accordance with technical specifications, typically ten (10) calendar days.

6.1.8.1 Shop Drawing Log

1. The Consultant shall maintain a shop drawing log for each construction contract on the project; this shall be discussed at monthly construction meetings. The log shall incorporate the following as a minimum:
 - a. Specification Section reference

- b. Products Section Reference
- c. Product Description
- d. Reviewed By
- e. Review Status
- f. Planned Submittal Date
- g. Actual Submittal Date
- h. Planned Return Date
- i. Actual Return Date

6.1.9 PAYMENT OF CONTRACTOR'S INVOICES

6.1.9.1 Construction Cost Breakdown

1. Construction cost breakdown will be supplied by the Contractor and approved by the Construction Manager applying TW's construction cost template contained within TW's PARTS application as appropriate.
2. Review of the Contractor's submitted contract cost breakdown by each discipline is recommended prior to acceptance by the Construction Manager.
3. Once accepted, a contract price breakdown shall be prepared, and entered into PARTS. Care is to be exercised to ensure reasonable costs are allocated to Division 1 - General Requirements, Commissioning and LEED®.

6.1.9.2 Payment of Invoices

1. Contractor's invoices shall to be processed in accordance with Contract General Conditions GC-21 Certificates and Payments.
2. The Construction Manager is to check that required contract documentation is in place and sufficient funding is encumbered before recommending certification of Contractor payments.
3. Once the Construction Manager certifies that the claim represents the true value of work completed, the claim is entered into PARTS and sent to their manager for approval.

6.1.9.3 Materials on Site Payment

1. The contract provides for payment of materials delivered to the site, but not yet incorporated into the work.
2. The Construction Manager shall ensure the following conditions are met with respect to such certification of payment:
 - a. The material is secured
 - b. An inventory of materials must be supplied with the request for payment
 - c. Supporting invoices from the supply source are provided pertaining to the inventory on hand
 - d. No markups for Contractor's overhead and profit are included in the payment request

6.1.9.4 Payment for Materials Off Site

1. In exceptional circumstances, a payment request for materials stored off site may be considered.
2. In order for such a request to be entertained, the Contractor shall provide satisfactory evidence of meeting the following conditions:
 - a. all the conditions for a "Materials On Site Payment" request are to be met
 - b. a letter from the Contractor's surety acknowledging its agreement to allow payment for materials stored offsite
 - c. proof of insurance against material loss or damage
 - d. leased space for storage of project materials shall be prepaid and proof of such provided

6.1.10 OWNER'S RIGHT To Do WORK

1. In the event of unacceptable performance or default by the Contractor, the Construction Manager should apply Contract General Condition "GC 9 – Owner's Right to Do Work".
 1. A copy of all relevant correspondence should be forwarded to the bonding company.
 2. Notice shall be sent by registered mail, request signature on delivery.

6.1.11 OWNER'S RIGHT TO TERMINATE THE CONTRACT

1. The Owner's right to terminate or stop work is described in Contract General Condition GC 10 – "Owner's Right to Stop or Terminate Contract".
2. Notice shall be sent by registered mail, request signature on delivery.
3. The Director, upon the advice of legal counsel will write the bonding company to invoke the terms of the bond and begin negotiations to have them complete the contract.
4. A copy of relevant correspondence should be forwarded to the bonding company and Tendering and Contracts.
5. The Department of Justice should be consulted when extenuating circumstance exist.
6. The Construction Manager will write the bonding company to invoke the terms of the bond, and begin negotiations to have the contract completed.

6.1.12 ENVIRONMENTAL CONSIDERATIONS DURING CONSTRUCTION

1. Common environmental issues include:
 - a. surface water runoff control and silt sediment transport
 - b. soil erosion of embankments and siltation impacts
 - c. site fires
 - d. construction debris collection, storage and disposal
 - e. sanitation facilities
 - f. excavation and disposal of hydrocarbon impacted soils
 - g. accidental fuel spills
 - h. storage, handling and disposal of hazardous substances
 - i. dust control
 - j. fuel fired temporary heat and ventilation requirements
2. The Construction Manager will liaise with environmental authorities as may be required to identify environmental concerns.
3. The Construction Manager will issue instructions to the Contractor to mitigate environmental impacts which may arise during construction.

6.1.13 DISPUTE RESOLUTION AND MANAGEMENT

1. Disputes on the project may arise between the contracting parties. The Design and Construction Managers are expected to manage the resolution of disputes and claims in an equitable and professional manner.
2. A cooperative approach is encouraged whereby the Contractor's position is clearly presented in writing.
3. Design and Construction Managers should recognize the overall objective of sound project management is to quality complete the work in a timely manner.
4. If the dispute cannot be resolved, it is to be documented by the Design or Construction Manager, with reference to the specific sections of the relevant construction contract or Consultant agreement, and forwarded to their Manager who will then discuss with the applicable Director.
5. In conjunction with the Assistant Deputy Minister (Works) and TW's legal counsel, a final settlement offer may be developed.
6. If the final offer is rejected, three options remain for settlement:
 - a. Mediation (mutual settlement negotiated with assistance of an independent party)
 - b. Litigation
 - c. Arbitration (decision rendered by an independent party)
7. In general, the preferred option is mediation. A mediation conference would normally proceed with:
 - a. the selection of a mutually acceptable mediator
 - b. agreement on the sharing and payment of the mediation costs, including those associated with witness travel and accommodations
 - c. agreement on representation by legal counsel
 - d. both TW and the disputing party shall be represented by a member with sufficient authority to sign a binding agreement, should the mediation conference result in a settlement being reached

6.1.14 CONSULTANT SERVICES - ADDITIONAL SERVICES

1. The following additional services are outside the basic services fees recommended by PEGNL & NAA Joint Fee Guideline:
 - a. field services other than monthly construction review and meeting
 - b. provision of full time or part time inspection
 - c. facility commissioning services
 - d. extended construction administration costs arising from circumstances outside the control of the Consultant
 - e. provision of contract administration and advisory services to the Construction Manager in the case of contractual default by the Contractor
 - f. provision of record drawings showing Owner requested changes
2. The Consultant Agreement shall specify the services to be provided, and the applicable fee.
3. LEED® certification duties as required for the project.
4. All documentation shall be completed, compiled, and submitted in a timely manner. A copy of the final submittal shall be supplied to TW in paper and Adobe (.pdf) formats. The (.pdf) copy shall be bound so that only one file is to be transmitted.
5. The Consultant shall provide updates to TW on a bi-weekly basis, which shall include at a minimum:
 - a. status of credits/points achieved
 - b. factors limiting the achievement of any points planned for the project
 - c. issues with documentation submittal from all parties

6.1.15 QUALITY CONTROL & INSPECTION SERVICES

6.1.15.1 Building in Quality

1. TW is in the business of building and managing quality public buildings on behalf of its clients. During the design process, the Consultant plays a key role in establishing the quality of the building systems selected, as well as the quality of design drawings and specifications prepared for the project. The Contractor is responsible for the quality of the construction and to ensure the standards and specifications presented in the contract documents are achieved.

2. The goal should be to achieve “zero” recalls during the statutory warranty period, arising either from the design of the systems or its installation. While such a goal is particularly difficult to achieve in practice, substantial strides towards the reduction of warranty period defects can be achieved by:
 - a. a cohesive teamwork approach to design and construction
 - b. advance planning during construction
 - c. timely inspections of workmanship and material (prior to being covered up)
 - d. a thorough facility commissioning program

6.1.15.2 Inspection Services

1. The Construction Manager will discuss the inspection requirements of the contract with the TSIs and ensure a sufficient number of inspections are undertaken. On major projects inspections should be performed at least twice monthly, with one inspection scheduled at the monthly construction review meeting.
2. Where Consultants perform monthly construction reviews, joint inspections with the inspection group shall be arranged where practical. In particular, a single deficiency list should be issued at the Substantial Completion stage. This list shall be managed by the Construction Manager.
3. A final inspection is to be completed before a Total Performance Certificate is issued and the Contractor’s final invoice is processed.
4. A warranty inspection should be conducted prior to the end of the one year warranty period and reported to the Construction Manager for appropriate action. This should be scheduled 10 months following start of warranty period.
5. Facility users and building management personnel should be notified in advance of the warranty inspection.
6. Field inspections are intended to assess the quality of work and report in writing to the Construction Manager all defects and deficiencies observed at time of such inspection. Where applicable use predefined test inspection reports as contained in Commissioning Manuals.

7. Inspection reports are to be filed electronically with the Construction Manager within three (3) days of the inspection. It is recommended that the Inspection Report be copied to the full inspection team and others as may be required.
8. Progress photographs should be taken and appended to the inspection report. Photographs are to be dated, along with a description of the photograph.
9. Where applicable, code and specification references are to be included in the inspection report.
10. Report on the status of materials delivered to the site, and the value of work performed when requested. Typically, each inspector will receive a copy of the applicable portion of the monthly progress claim and will identify whether they are in agreement that the Contractor is entitled to receive the amounts claimed for each item.
11. The Construction Manager will review with the Consultant prior to issuing clarifications or changes to the contract documents to ensure the design intent and quality is not compromised.
12. The Inspector is to report on observations regarding construction safety and take appropriate action as necessary which may include stop work directions where necessary. The Owner's representative may stop work if non-compliance of health and safety regulations are not corrected.
13. The Technical Service Inspector and Project Coordinator shall have access to all shop drawings for review and comparison of materials on site. It is the Construction Manager's responsibility to ensure TSIs and Project Coordinators have shop drawings.

6.1.15.3 Consultant Design Team Services

1. The responsibility for design intent interpretation and design integrity rests with the Consultant. The Construction Manager may contact the Consultant to obtain an opinion whenever a variance observed on the project requires professional judgment with respect to design intent or interpretation. The Construction Manager as Engineer/Architect has the authority to make design, quality and cost decisions, independent of the Consultant, and assumes the liability of such professional authority.
2. The Consultant is expected to provide timely service to the Construction Manager whenever a clarification regarding design intent or interpretation is needed. An initial response to a

Construction Manager request should be acknowledged within 48 hours by the Consultant. A time frame provided by the Construction Manager to resolve an issue or concern shall be met, otherwise the Construction Manager may refer the matter to another professional for direction and decision. The additional costs for such professional services may be charged to the Consultant.

3. Reviews by the Consultant during key stages of construction may be established by the Construction Manager.
4. On major projects the Consultant is expected to attend monthly construction review meetings, at which time a general assessment of the work with respect to the conformance of the contract documents will be performed and reported in writing to the Construction Manager. Monthly Consultant invoices will not be processed if these reports are not submitted, either in part or in full.
5. Additional periodic reviews by the Consultant during key stages of construction may be established by the Construction Manager.
6. Consultant Design Team shall participate in Substantial Completion and Total Performance inspections.
7. The Consultant shall be responsible for carrying out Shop Drawing Reviews within the time frame indicated in the specifications. The Construction Manager shall ensure that the reviewed shop drawings are in place before installation of the work is started.

6.1.15.4 Project Coordinators

1. A Project Coordinator may be engaged based on an assessment of the project by the Regional Office.
2. The duties of the Project Coordinator include:
 - a. inspection, co-ordination, and administration of construction within the limits of authority assigned by the Construction Manager
 - b. monitoring compliance with the site safety plan and regulatory requirements
 - c. ensuring that the intent of the plans and specifications are carried out
 - d. ensuring adherence to contract terms

- e. maintenance of complete job site records (e.g. shop drawings, change orders, inventory of materials on site, contract progress claims, quantity measurements for unit price work)
- f. initiation of action and required follow up to ensure prompt decision making to permit normal progress of work
- g. preparation of daily construction reports or daily journal in a format required by the Construction Manager
- h. preparation of reports and other documents as established by the Construction Manager specific for the project
- i. co-ordination of the client's and department's activities on the work site during construction

6.1.15.5 Inspections by Regulatory Agencies

1. The Contractor is obliged to have the work inspected by regulatory agencies as required by law and/or the contract technical specifications on a timely basis.
2. The Construction Manager shall be advised two (2) weeks in advance of the requested regulatory inspections.
3. The Construction Manager should obtain a copy of the inspection report, prepared by regulatory agencies, from the Contractor.
4. Acceptance by regulatory agencies will not relieve the responsibility of the Contractor in meeting the contract documents with respect to quality of materials, workmanship, or operation.

6.1.15.6 Deficiencies

1. Construction Manager when considering deficiencies shall include in addition to construction items the following:
 - a. O&M Manuals
 - b. LEED®
 - c. Commissioning
 - d. Permits
 - e. As-Builts

- f. Warranties
- g. Spare parts

6.1.16 PERMITS

6.1.16.1 Electrical Permits

1. Contractors shall be obliged to obtain and pay electrical permits from the applicable regulatory body.
2. The Construction Manager should advise Contractors that electrical inspections by the applicable regulatory body will be in addition to those conducted by TW staff.

6.1.16.2 Building Accessibility Regulations

1. The Contractor will be obliged to obtain and pay for any inspection permit fees levied by Service NL.

6.2 PHASE 3, STEP 1 - CONTRACT ADMINISTRATION

6.2.1 CONSULTANTS ROLE IN CONTRACT ADMINISTRATION

1. Normally the negotiated basic service fee includes contract administration services as follows:
 - a. Site Meetings and Inspections
 - b. Attendance at construction site meetings as required, typically these occur monthly, however may be bi-weekly. Prior to submittal of proposal, Consultant is to clarify with the Design or Construction Manager frequency of meetings.
 - c. Prepare construction review reports, commenting on compliance with design and status of deficiencies
 - d. Submittals
 - i. Perform shop drawing reviews for compliance with technical specifications
 - ii. Maintain a shop drawing review log

- iii. Review operation and maintenance data manuals compiled by Contractor
- iv. Review reports from testing/inspection agencies and initiate any required corrective action
- e. Advise Construction Manager on maintenance materials and spare parts to be turned over at project completion. A table format referencing specification section number, required materials descriptions, quantity and space for receipt sign off shall be submitted to the Construction Manager on start of construction
- f. Provide additional instructions as per “GC-3 Additional Instructions and Schedule of Work”, as required
- g. Progress Payments review
 - i. Review format and price breakdown structure submitted by the Contractor certification of construction progress payments
 - ii. Comment on the Contractor’s applications for progress payments, including evaluation of materials on site and completion of work according to the terms of the construction contract
 - iii. Undertake field reviews to assist Construction Manager to certify payment requests, substantial completion and final completion requests.
- h. Requests for Information and Change Orders
 - i. Advise on the interpretation of drawings and specification, and if required issue supplementary details and instructions
 - ii. Comment on requested changes to the contract and prepare appropriate change orders
 - iii. Respond to “Request for Information” from the Contractor with formal supplementary details and instructions within a reasonable time period. It is expected that this should be less than 10 days on most requests.
- i. Commissioning
 - i. Attend startup of systems and report on any operational difficulties
 - ii. Provide advice during the normal construction one (1) year warranty period

- iii. Conduct 10 month warranty inspection in conjunction with the Commissioning Authority and TW
- j. Obtain from the Contractor a declaration signed and sealed by a professional engineer, stating that all structural work is in accordance with the drawings and specifications.
- k. Review record drawings prepared and submitted by the Contractor to reflect condition of the project as turned over to the client.

2. Provide record drawings to TW in hardcopy (3 sets) and electronic AutoCAD (.dwg) and Adobe (.pdf) formats

6.2.1.1 Geotechnical Services During Construction

1. Further to the carrying out of a geotechnical investigation and report, various additional activities to be performed by the geotechnical Consultant shall be considered during the construction phase.

6.2.1.1.1 Foundation Subgrade Inspection

1. The geotechnical engineer responsible for the original site investigation shall visit the site during construction and conduct an inspection of the foundation bearing material.
2. The geotechnical engineer shall be given the opportunity to verify the conditions at the bottom of the excavated site are consistent with what was expected during the design stage; and that no part of the excavation shows soil conditions which are substantially different than those which were anticipated.

6.2.1.1.2 Load Test Supervision

1. Where load tests of foundations are deemed necessary, the details of the load application and settlement under each increment are to be recorded as the work proceeds.
2. Load tests are to be carried out in accordance with recognized practice such as recommended by ASTM.
3. A report is to be submitted providing details of the work and the results obtained. Include graphs representing the Load/Time/Settlement curves for the footing tested.

6.2.1.1.3 Fill Compaction Testing

1. Where fill placement is a requirement of the contract, the geotechnical Consultant shall conduct inspection and testing for approval of soils (site borrow material or granular fills). Report indicating acceptance or rejection of the work is to be submitted as the work is performed.

6.2.1.1.4 Pavement Subgrade Testing

1. Road subgrades shall be tested for the eventual pavement design. Such tests may involve laboratory testing of samples recovered from the site or may involve in-situ testing of the subgrade in its prepared condition.

6.2.1.1.5 Slope Stability Monitoring

1. The installation of, and the monitoring of, slope indicators prior to, during and following construction of civil engineering works may be essential to the safety of the facility.

6.3 PHASE 2, STEP 2 - COMMISSIONING

1. The Contractor shall be responsible for completion of all commissioning, installation and performance verification activities, proving that the installed equipment and systems are correctly installed and operate according to project specifications.
2. Any cost incurred by TW or the Consultant associated with retesting caused by the Contractors failure to perform commissioning as specified will be charged to the Contractor.
3. The Commissioning Authority shall be called to site when the Contractor is ready to provide Performance Verification.
4. The Contractor shall ensure that all systems are ready to be verified prior to the Commissioning Authority arriving on site. It is not intended that the Commissioning Authority observe the Contractor troubleshooting or completing work.
5. The Contractor may be penalized for extra costs associated with calling the Commissioning Authority and related commissioning team members to site prior to all systems and equipment being ready for Performance Verification.
6. The Contractor shall utilize the Commissioning Manual provided by the Commissioning Authority. The intent is that all projects be treated as if they should achieve the intentions of the “Enhanced Commissioning Credit” in the LEED® rating system.

7. For a more in depth description of the commissioning process, reference the TW Guideline for Commissioning.

*Note: Recent projects have had a number of concerns with structural failures with the connections of various finish items. As such, the connections for the following items need to be reviewed during the commissioning process:

- Gym Diffusers	- Gym Light Grilles
- Gym Heaters	- Basketball Backstops
- Stage Lighting	- Curtain and Tracks
- Score clocks	- Cord Reels
- Uni-Strut Track Systems	- Speakers
- Intercom Equipment	- De-Stratification Fans
- TV Monitors	- Stair Lift System
- Light Pole Bases	- Flagpoles
- Chimney Supports	- Ladders/Alternating Stairs
- Folding Partitions	- Light Fixtures (Clipped or Chained)
- Overbed Lighting	- Examination Lighting
- Surgical Lighting	- Patient Lift Systems
- Patient Monitor Mounts	- Ceiling Mounted Diagnostic Equipment
- Bariatric Equipment	- Cantilevered Diagnostic Equipment
- Washroom Grab Bars	- Ceiling Hung Washroom Partitions
- Wall Mounted Baby Change Tables	

Special care needs to be exercised during the design, construction and the commissioning of these items. Final documentation of the checks will be completed as part of the “Architectural Installation Verification Checklist”.

6.3.1 INSTALLATION VERIFICATION

1. Installation Verification includes all checks and balances required by the Contractor to ensure that all equipment and systems are installed properly, and operate according to contract technical documentation.
2. Prior to the performance testing of each system, the Contractor shall ensure that all physical installation of components and systems being tested are installed in accordance with the contract documents. This should include but not limited to:
 - a. Hydrostatic testing
 - b. Flushing
 - c. Alignments, leveling, etc.
 - d. Lubrication, priming, etc.
 - e. Cleaning
 - f. Start-up
 - g. Completion of Testing Adjusting and Balancing
 - h. Calibration and testing of automatic controls
3. The Commissioning Manual includes Installation Verification checklists which are to be completed by the Contractor and submitted for review by the Commissioning Authority prior to start of Performance Verification.
4. The Commissioning Authority is not required to be on site during Installation Verification, however if possible, will attend and witness. In most cases, TW's TSI's or Project Coordinators will attend and witness where possible.

6.3.2 PERFORMANCE VERIFICATION

1. Performance testing includes checks and tests to be carried out by the commissioning team assembled for the project. There may be, other Authorities Having Jurisdiction that may mandate third party verification.

2. The result of the testing can be expected to confirm the design intent as expressed in the contract documents has been met. However, the commissioning testing may identify variations between the design intent expectations and/or design specification and the system/equipment performance as outlined in the contract documents.
3. It is recognized that the Contractor(s) are only responsible for work which they have contracted to perform or deliver.
4. For specific performance tests refer issued for construction Commissioning Manual.
5. Prior to the start of Performance Verification of each system, the Contractor shall ensure that all Installation Verification checks are completed.
6. The Commissioning Authority is required to witness all Performance Verification

6.3.3 FACILITY START-UP

1. Equipment supplied under the construction contract is to remain under the control of the Contractor, until it is turned over to the Owner.
2. Equipment supplied by the Owner that is installed by the Contractor remains the Owner's. In this case a specific agreement for the startup responsibilities of the Contractor and the Owner needs to be established between the contracting parties.

6.4 PHASE 3, STEP 3 - TRAINING AND EDUCATION

1. Refer to the “issued” contract specifications forming part of the Contract Documents as well as the Commissioning Manual for training requirements, and forms.

6.5 PHASE 3, STEP 4 - WARRANTIES

1. Products and installation warranties require close co-ordination given the policy of the listing of all products where extended warranties are commonly available. The duration of warranties will be established by TW staff in conjunction with the Design Manager. The Consultant is responsible for ensuring this information is contained in the specifications.
2. Warranties are to be issued to the Owner under the name of the product manufacturer, and shall warrant both product and installation.
3. Warranties issued in the name of the General Contractor or Sub-Contractor should be limited to the common one (1) or two (2) year warranty,

6.6 PHASE 3, STEP 5 – OPERATION AND MAINTENANCE MANUAL

1. The Contractor shall submit one copy in final form fifteen (15) days prior to final inspection to the Contract Manager.
2. To be organized and contain all information per contract specifications.
3. Shall be separated by tabs for each piece of equipment, complete with table of contents.
4. The Commissioning Guideline details the requirement for the Maintenance Manual.

6.7 PHASE 3, STEP 6 - SUBSTANTIAL COMPLETION

1. The requirement of substantial completion as is defined in the Mechanics Lien Act Paragraph 2.2.a "...when the work or substantial part of the work is ready for use or is being used for the purpose intended" Commissioning is the test that will prove that the work is ready for use, therefore until commissioning is completed the work is not "ready".
2. Specification Section 01 91 13 – Commissioning (Cx) Requirements, paragraph 1.4.6 "The Substantial Completion Certificate will not be issued until the commissioning process is completed and the final reports and commissioning documentation are received." This is in our standard specification found online. The specification writer/Consultant should never remove this line item.
3. Substantial Completion is defined in Contract General Condition GC 21. Substantial Completion milestone represents the beneficial occupancy of the facility and the start of the one (1) year warranty period.
4. Client partners may be involved with the determination of substantial completion.
5. The Construction Manager shall issue a Certificate of Substantial Completion with a listing of incomplete work and deficiencies. The Construction Manager may withhold issuance of a certificate if facility commissioning as defined by the Contract is incomplete. A copy of the listing of incomplete work and deficiencies will be forwarded to the client partners.
6. In order to beneficially occupy a facility, most critical systems must be performance tested, verified and fully operational, for example:
 - a. fire alarm system
 - b. fire protection system
 - c. emergency & exit lighting
 - d. heating systems
 - e. mechanical ventilation systems
 - f. accessibility requirements including power assist door openers
 - g. Service NL accessibilities inspection
7. Payment due to the Contractor at Substantial Completion shall be final contract value at that date less an amount to cover uncompleted or defective work, which shall be calculated as twice the cost of completing the work as estimated by the Construction Manager.

8. Tendering & Contracts Division shall be notified of the Contractor's date of Substantial Completion so that the Labor and Materials Bond may be released.
9. The Contractor is entitled to payment of the holdback amount thirty (30) days after the date of Substantial completion subject to the following:
 - a. Notification that all sub-Contractors and suppliers have been paid in full except holdback
 - b. Letter of Good standing from the Workers Compensation Commission
 - c. Satisfactory performance being made in the completion of deficiencies
 - d. Outstanding Commissioning activities have been completed and accepted in accordance with the Mechanics Lien Act
10. Prior to issuance of Substantial Completion, the Construction Manager will confirm that:
 - a. All commissioning documentation have been received
 - b. Project record drawings have been received
 - c. All deficiencies have been completed
 - d. All spare parts and tools have been received
 - e. All maintenance materials and special tools have been received
 - f. All LEED® documentation have been received
 - g. All O&M Manuals have been received
 - h. Permits have been received
 - i. As-Builts have been received
 - j. Warranties have been received

6.8 PHASE 3, STEP 7 - FINAL COMPLETION

6.8.1 ISSUANCE OF TOTAL PERFORMANCE CERTIFICATE

1. The Total Performance milestone represents the completion of the construction contract period and is covered under Contract General Condition GC 21-Certificates and Payments.
2. Prior to issuance of final payments, the Construction Manager will confirm that all commissioning documentation, LEED® documentation and project record drawings have been received.

3. The Construction Manager will send a copy of commissioning documentation and project record drawings to the facility's management for placement in the affected building or other appropriate location, and a copy to be retained by the Region.