Marginal wharf construction.
Barre-de-Cocagne, NB

REGISTERED PROFESSIONAL ENGINEER
Province of New Brunswick
#M4875
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Signature
Dec. 3, 2016
Date
Province du Nouveau-Brunswick
INGÉNIEUR IMMATRICULÉ

END OF SECTION

Drawing No.	Title	Date
M1 of M10	Existing Site Plan	August 2016
M2 of M10	Existing Sections	August 2016
M3 of M10	Plan of New Work and Section	August 2016
M4 of M10	Plan of Pile Layout and Elevation	August 2016
M5 of M10	Sections and Details	August 2016
M6 of M10	Sections and Details	August 2016
M7 of M10	Reinforcing Sections and Details	August 2016
M8 of M10	Borehole Record, Sections and Details	August 2016
M9 of M10 and Details	Plan of New Work 402/403, Sections	August 2016
M10 of M10	Sections and Details	August 2016

Electrical Drawings

E1 of 3	Electrical Existing & New Layouts & Details
E2 of 3	Electrical Lighting, Shroud, Service Layouts & Details
E3 of 3	Electrical Lighting Control, Panels, Power Riser & Service Calculations

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

.1 The work covered under this project consist of the furnishing of all plant, labour, equipment, hardware and materials for "New Marginal Wharf, structure no. 407 and new concrete deck on structure no. 403 located at Barre de Cocagne, Kent County, N.B., in strict accordance with Specifications and accompanying drawings and subject to all terms and conditions of contract.

1.2 DESCRIPTION OF WORK

.1 In general, work under this Contract shall consist of but not be limited to the following:

.1 The removal and disposal of existing treated timber cribwork structure 402 from deck elevation to limits of excavation/dredging including cribwork remnants as shown on drawings to permit new work. This will include concrete slabs, concrete retaining wall, asphalt pavement, timber wheelguard and wheelguard chocks, timber sheathing, treated timber cribwork, rock ballast, timber ladders c/w all fasteners, holdfasts, backfill material, armour stone and all other items or services that interfere with the work as shown and/or directed.

.2 The removal of electrical services such as wires, cables, conduits, receptacle outlets, power pole with light fixture and any other services to allow for new work..

.3 The relocation of one power pole as shown on drawings.

.4 The transportation and proper disposal of un-recyclable treated timber materials to an approved regional land fill site.

.5 Excavation and proper disposal of un-recyclable fill material including underwater dredging materials. Materials will be stockpiled in the area of the existing containment cell as shown.

.6 The construction of new concrete deck and Berlin wall structure as shown.

.7 New concrete deck, timber wheelguard and sheathing on structure 403.

.8 Supply and installation of granular fill materials, filter fabric, geogrid, asphalt pavement, metal wheelguard as shown on drawings.

.9 Parking area within the limits of work will require reshaping to attain proper surface drainage as shown.

.10 New eletrical work as per electrical drawings and specifications.
.11 Carry out work as per Environmental requirements.
.12 Supply and installation of a floating boom/silt curtain surrounding the work area during work.

1.3 FAMILIARIZATION WITH SITE

.1 Before submitting a bid, it is recommended that bidders inspect and examine the site of work and satisfy themselves as to the form and nature of the work, materials, the means of access the site, and the temporary facilities required for completion of the work.

.2 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

.3 Bidders are required to review the list of potential site hazards provided in Section 01 35 29.

.4 Bidders are required to wear all appropriate personal protective equipment and take all precautionary measures necessary to ensure their safety during any pre-tender site visit.

.5 Contractor shall make own assessment of the site conditions, and the difficulties in carrying out the work as specified.

1.4 CODES AND STANDARDS

.1 Perform work in accordance with the National Building Code of Canada and any other code of provincial or local application including all amendments up to project tender closing date provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

.2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.5 INTERPRETATION OF DOCUMENTS

.1 Supplementary to the Order of Precedence article of the General Conditions, the Division 01 Sections take

precedence over the technical division sections of these Specifications.

1.6 TERM ENGINEER

.1 Unless specifically stated otherwise, the term Engineer when used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract.

1.7 SETTING OUT WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.2 Provide devices needed to lay out and construct work.

.3 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.

.4 Supply stakes and other survey markers required for laying out work.

.5 Setting out the work, mob, demob, and other costs associated with the work but not included as part of specific bid items will be considered as incidental to the Construction/Demolition lump sum bid item in section 01 74 21.

1.8 MEASUREMENT FOR PAYMENT

.1 Notify Departmental Representative sufficiently in advance of operations to permit required measurements for payment.

1.9 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each of the following:
.1 Contract Drawings
.2 Specifications
.3 Addenda
.4 Reviewed Shop Drawings
.5 List of outstanding Shop Drawings
.6 Change Orders
.7 Other modifications to Contract

.8 Field Test Reports
.9 Copy of Approved Work Schedule
.10 Health and Safety Plan and other safety related documents
.11 Electrical Lock-Out
.12 Fire Safety Hot Work Permit
.13 Permits, Codes and Acts.
.14 Waste Management Plan
.15 Other documents as stipulated elsewhere in the Contract Documents, Drawings and these Specifications.

1.10 PERMITS

.1 In accordance with the the General Conditions, obtain and pay for building permit, certificates, licenses and other permits as required by municipal, provincial and federal authorities.

.2 Provide appropriate notifications of project to municipal and provincial inspection authorities.

.3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.

.4 Submit to Departmental Representative, copy of application forms and approval documents received from above referenced authorities.

1.11 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines and notify Departmental Representative of findings in writing.

.2 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.

.3 Be aware that the Harbour Facilities must be kept operational for the full duration of Work of this Contract. Services to areas used by the public, fishers and harbour users must also be maintained at all times

as directed.

.4 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

.5 Removal and reinstatement of pipes, services, utilities, poles, etc., (in accordance with service provider's or owner's requirements) will be incidental to the Work.

1.12 Site Conditions

.1 Existing section and detail shown on drawings are provided solely as general information only and actual construction details and configurations, elevations and dimensions may differ.

.2 Contractor shall make own assessment of the actual construction details and the difficulties in carrying out the work as specified.

1.13 Ice and Snow Removal

.1 Assume full responsibility for snow and ice removal to gain access to the construction site, access to the wharf and storage areas, if required.

1.14 Site Utilities

.1 Provide sanitary facilities, fresh water and electricity, in accordance with governing regulations and ordinances. Contractor will make his own arrangements for utilities at contractor's own expense.

PART 1 - GENERAL

1.1 SUBMITTALS

.1 Upon award of contract and prior to commencement of work, submit to Departmental Representative the following work management documents:
.1 Work Schedule as specified herein.
.2 Shop Drawing Submittal Schedule specified in section 01 33 00
.3 Health and Safety Plan specified in section 01 35 29
.4 Hot Work Procedures specified in section 01 35 24
.5 Lockout Procedures specified in section 01 35 25

1.2 WORK SCHEDULE

.1 The contractor will coordinate his work with the Harbour Authority's directives.

.2 The contractor is advised that a lobster fishery is in effect from early August to mid October. There is also a spring fishery. Fishermen, fish buyers, traffic will be utilizing these structures on a regular basis during fishing seasons.

.3 Upon acceptance of bid submit:
.1 Detailed work schedule submitted within 7 calendar days of contract award.

.4 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.

.5 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

.6 Work schedule content to include as a minimum the following:

.1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;

.7 Work schedule must take into consideration and reflect the work phasing, and operational restrictions as indicated on drawings.

.8 Schedule work in cooperation with the Departmental Representative. Incorporate within Work Schedule, items identified by Departmental Representative during review of schedule.

.9 Completed schedule shall be reviewed by Departmental Representative. Take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.

.10 Ensure that all sub trades and subcontractors are made aware of the work restraints and operational restrictions specified.

.11 Schedule Updates:
.1 Submit when requested by Departmental Representative.
.2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
.3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.

.12 Departmental Representative will make interim reviews and evaluate progress of work based on most currant schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.

.13 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.3 OPERATIONAL RESTRICTIONS

.1 The Contractor must recognize that Harbour activities and occupants will be affected by implementation of this Contract. The Contractor must perform the work with utmost regard to the safety and convenience of all Harbour users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any portion of the Harbour without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas.

.2 Facility circulation maintained:
.1 Ensure that entrances, roadways, loading zones and other circulation routes are maintained free and clear providing safe and uninterrupted passage for Facility users and public at all times during the entire Work.

1.4 PROJECT MEETINGS

.1 Schedule and administer project meetings, held on a minimum bi-monthly basis, for entire duration of work and more often when directed by Departmental Representative as deemed necessary due to progress of work or particular situation.

.2 Prepare agenda for meetings

.3 Notify participants 4 working days in advance of meeting date.
.1 Ensure attendance of all subcontractors.
.2 Departmental Representative will provide list of other attendees to be notified.

.4 Hold meetings at project site or where approved by Departmental Representative.

1.5 WORK COORDINATION

.1 The General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.
.1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.

.2 Work Cooperation:
.1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.
.2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays and the need to remove and replace completed work.

.3 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the Work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor to be resolved at his own cost.

1.6 OTHER CONTRACTS

.1 Further contracts may be let during the period that this Contract is in progress.

.2 Cooperate with other Contractors in carrying out their respective work and carry out all instructions from the Departmental Representative in this regard.

.3 Connect properly and coordinate work with that of other Contractors.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 78 00 - Closeout Submittals.

1.2 SUBMITTAL GENERAL REQUIREMENTS

.1 Submit to Departmental Representative for review requested submittals specified in various sections of the Specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.

.2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time.

.3 Do not proceed with work until relevant submissions have been reviewed.

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

.5 Review submittals prior to submission. Ensure that necessary requirements have been determined and verified and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.

.6 Verify field measurements and affected adjacent Work are coordinated.

.7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.8 Contractor's responsibility for errors, omissions or deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.

.9 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, identify in writing of any revisions other than those requested.

.10 Keep one reviewed copy of each submittal document on site for duration of Work.

1.3 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Shop Drawing Submittal Schedule:
.1 Submit, within 10 working days of contract award, in format acceptable to Departmental Representative, a submittal schedule listing all shop drawings to be submitted for project as specified in various sections of the Specifications.
.2 Schedule to indicate proposed submission date for each item, status of review and anticipated product delivery date to site. Track all submissions for entire project.
.3 As work progresses, revise schedule identifying items which have been reviewed and finalized and indicating those outstanding.
.4 Update schedule at stipulated dates or project time intervals predetermined and agreed upon with Departmental Representative at commencement of Work.

.3 Shop Drawing Quantities: submit sufficient copies required by the General Contractor and sub-contractors plus 3 copies which will be retained by Departmental Representative.

.4 Shop Drawings Format:
.1 Opaque white prints or photocopies of original drawings or standard drawings modified to clearly illustrate work specific to project requirements. Maximum sheet size to be 1000 x 707 mm.
.2 Product Data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be original full colour brochures, clearly marked indicating applicable data and deleting information not applicable to project.
.3 Non or poorly legible drawings, photocopies or facsimiles will not be accepted and returned not reviewed.

.5 Shop Drawings Content:
.1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work have been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.
.2 Supplement manufacturer's standard drawings and literature with additional information to provide details applicable to project.
.3 Delete information not applicable to project on all submittals.

.6 Allow 14 calendar days for Departmental Representative's review of each submission.

.7 Adjustments or corrections made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.

.8 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If shop drawings are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected shop drawings, through same submission procedures indicated above.

.9 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a financial holdback to the Contract.

.10 Accompany each submissions with transmittal letter containing:
.1 Date.
.2 Project title and project number.
.3 Contractor's name and address.
.4 Identification and quantity of each shop drawing, product data and sample.
.5 Other pertinent data.

.11 Submissions shall include:
.1 Date and revision dates.
.2 Project title and project number.
.3 Name and address of:
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 Contractor's stamp, signed by Contractor's authorized Representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
.5 Cross references to particular details of Contract Drawings and Specifications section number for which shop drawing submission addresses.
.6 Details of appropriate portions of Work as applicable:
.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.
.3 Setting or erection details.
.4 Capacities.
.5 Performance characteristics.
.6 Standards.
.7 Relationship to adjacent work.

.12 After Departmental Representative's review, distribute copies.

.13 The review of shop drawings by Public Works and Government Services Canada (PWGSC) or its authorized Consultant is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of the construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SAMPLES

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

.2 Deliver samples to Departmental Representative's office or to other address as directed. Do not drop off samples at construction site unless pre-approved.

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

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Informational and Warning Devices.

.2 Protection and Control of Public Traffic.

.3 Operational Requirements.

1.2 References

.1 Uniform Traffic Control Devices for Canada, (UTCD) (distributed by Transportation Association of Canada).

.2 Manual of Uniform Traffic Control Devices for Streets and Highways, US FHWA, Part IV.

1.3 Protection of Public Traffic

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:
.1 Place equipment in position to present minimum of interference and hazard to travelling public and harbour users.
.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
.3 Do not leave equipment on travelled way overnight.

.3 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of Departmental Representative.

1.4 Informational and Warning Devices

.1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D of UTCD.

.3 Place signs and other devices in locations recommended in UTCD manual.

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

.5 Continually maintain traffic control devices in use by:
.1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
.2 Removing or covering signs which do not apply to conditions existing from day to day.

1.5 Control of Public Traffic

.1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD in following situations:
.1 When public traffic is required to pass working vehicles or equipment which block all or part of travelled roadway.
.2 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Fire Safety Requirements

.2 Hot Work Permit

1.2 RELATED WORK

.1 Section 01 35 29 - Health and Safety Requirements.

1.3 REFERENCES

.1 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:
.1 FCC No. 301-(08.2011) Standard for Construction Operations.
.2 FCC No. 302-(08.2011) Standard for Welding and Cutting.
.3 FCC standards, may be viewed at the Regional Fire Protection Services' office (previously known as the Fire Commissioner of Canada) located at 99 Wyse Road, 8th Floor, Dartmouth, NS, Tel: (902) 426-6053.

1.4 DEFINITIONS

.1 Hot Work defined as:
.1 Welding work
.2 Cutting of materials by use of torch or other open flame devices
.3 Grinding with equipment which produces sparks.
.4 Use of open flame torches.

1.5 SUBMITTALS

.1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days after contract award.

1.6 FIRE SAFETY REQUIREMENTS

.1 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code
.2 Fire Protection Standards FCC 301 and FCC 302.
.3 Federal and Provincial Occupational Health and Safety Acts and Regulations.

.2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.7 HOT WORK AUTHORIZATION

.1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site.

.2 To obtain authorization submit to Departmental Representative:
.1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
.2 Description of the type and frequency of Hot Work required.
.3 Sample Hot Work Permit to be used.

.3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
.1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
.2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.

.4 Requirement for individual authorization will be based on:
.1 Nature or phasing of work;
.2 Risk to Facility operations;
.3 Quantity of various trades needing to perform hot work on project or;
.4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.

.5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

1.8 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Hot Work Procedures to include:
.1 Requirement to perform hazard assessment of site and immediate work area before hand for each hot work event in accordance with Safety Plan specified in section 01 35 28.
.2 Use of a Hot Work Permit system with individually written permit issued by Contractor's Superintendent to specific worker or subcontractor granting permission to proceed with Hot Work.
.3 Permit required for each Hot Work event.
.4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.
.5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.

.4 Procedures shall clearly establish responsibilities of:
.1 Worker performing hot work,
.2 Person issuing the Hot Work Permit,
.3 Fire Safety Watcher,
.4 Subcontractor(s) and Contractor.

.5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

.6 Failure to comply with fire safety procedures may result in the issue of a Non-Compliance notification as specified in Section 01 35 28.

1.9 HOT WORK PERMIT

.1 Hot Work Permit to include the following:
.1 Project name and project number;
.2 Area where hot work will be performed;
.3 Date of issue;
.4 Description of hot work type needed;
.5 Special precautions to be followed, including type of fire extinguisher needed;
.6 Name and signature of permit issuer.
.7 Name of worker to which the permit is issued.
.8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
.9 Worker's signature with time/date of hot work completion.
.10 Stipulated time period of safety watch.
.11 Fire Safety Watcher's signature with time/date.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.10 DOCUMENTS ON SITE

.1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.

.2 Upon request, make these available to Departmental Representative or to authorized safety Representative for inspection.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Procedures to isolate and lockout electrical facility and other equipment from energy sources.

1.2 RELATED WORK

.1 Section 01 35 29: Health and Safety

1.3 REFERENCES

.1 CSA C22.1-2012 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.

.2 CSA C22.3 No. 1-2010) - Overhead Systems.

.3 CSA C22.3 No. 7-2010 - Underground Systems.

.4 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

1.4 DEFINITIONS

.1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.

.2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment has been isolated.

.3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).

.4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.

.5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.

.6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.5 COMPLIANCE REQUIREMENTS

.1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:
.1 Canadian Electrical Code
.2 Federal and Provincial Occupational Health and Safety Acts and Regulations.
.3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
.4 Procedures specified herein.

.2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.6 SUBMITTALS

.1 Submit copy of proposed lockout procedures and sample of lockout permit or lockout tags to Departmental Representative for review, within 14 calendar days after contract award.

1.7 ISOLATION OF EXISTING SERVICES

.1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.

.2 To obtain authorization, submit to Departmental Representative the following documentation:
.1 Written request to isolate the particular service or facility and;
.2 Copy of Contractor's Lockout Procedures.

.3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, as follows:
.1 Make written request indicating:
.1 The equipment, system or service to be isolated and it's location;
.2 Duration of isolation period (ie: start time & date and completion time & date).
.3 Voltage of service feed to system or equipment being isolated.
.4 Name of person making the request.

.4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorization to proceed with the work.

.5 Conduct safe, orderly shut down of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.

.6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.

.7 Plan and schedule shut down of existing services in consultation with the Departmental Representative. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard.

.8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 29.

1.8 LOCKOUTS

.1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.

.2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.

.3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by work force to safely isolate an active piece of equipment or electrical facility and effectively lockout and tag out it's sources of energy.

.4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.

.1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.

.2 Duties of person managing the permit system to include:

.1 Issuance of permits and lockout tags to workers.

.2 Determining permit duration.

.3 Maintaining record of permits and tags issued.

.4 Making a Request for Isolation to Departmental Representative when required as specified above.

.5 Designating a Safety Watcher, when one is required based on type of work.

.6 Ensuring equipment or facility has been properly isolated.

.7 Collecting and safekeeping lockout tags returned by workers as a record of the event.

.5 Clearly establish, describe and allocate responsibilities of:
.1 Workers.
.2 Person managing the lockout permit system.
.3 Safety Watcher.
.4 Subcontractor(s) and General Contractor.

.6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.
.1 Clearly label the document as being the Lockout procedures applicable to work of this contract.

.7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.

.8 Use industry standard lockout tags.

.9 Provide appropriate safety grounding and guards as required.

1.9 CONFORMANCE

.1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.

.2 Failure to follow lockouts procedures specified herein may result in the issuance of a Non-Compliance notification as specified in section 01 35 29.

1.10 DOCUMENTS ON SITE

.1 Post Lockout Procedures on site in common location for viewing by workers.

.2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work

.3 Upon request, make these available to Departmental Representative or to authorized safety Representative for inspection.

END OF SECTION

PART 1 - GENERAL

1.1 DEFINITIONS

.1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

.2 Competent Person: means a person who is:
.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
.3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

.4 PPE: personal protective equipment

.5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan prior to commencement of Work.
.1 Submit within five 5 work days of notification of Bid Acceptance. Provide 2 copies.
.2 Departmental Representative will review Health and Safety Plan and provide comments.

.3 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.
.4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
.5 Submit revisions and updates made to the Plan during the course of Work.

.3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.

.4 Submit building permit, compliance certificates and other permits obtained.

.5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
.1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

.6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.7 Submit copies of incident reports.

.8 Submit WHMIS MSDS - Material Safety Data Sheets.

1.3 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act for Province of New Brunswick, and General Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.
.1 The Canada Labour Code can be viewed at: www.http://laws.justice.gc.ca/en/L-2/

.2 COSH can be viewed at: www.http://laws.justice.gc.ca/eng/SOR-86-304/n e .html
.3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: (819) 956-4800 (1-800-635-7943) Publication No. L31-85/2000 E or F)

.3 Observe construction safety measures of:
.1 Part 8 of National Building Code
.2 Municipal by-laws and ordinances.

.4 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.

.5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

.6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.4 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.5 SITE CONTROL AND ACCESS

.1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.

.1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means.
.1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment.
.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
.3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm.

1.6 PROTECTION

.1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.

.2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.7 FILING OF NOTICE

.1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.
.1 Departmental Representative will assist in locating address if needed.

1.8 PERMITS

.1 Post permits, licenses and compliance certificates.

.2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.9 HAZARD ASSESSMENTS

.1 Perform site specific health and safety hazard assessment of the Work and its site.

.2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.

.3 Record results and address in Health and Safety Plan.

.4 Keep documentation on site for entire duration of the Work.

1.10 PROJECT/SITE CONDITIONS

.1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:

.2 .1 Existing hazardous and controlled products stored on site:
.1 none identified
.2 Existing hazardous substances or contaminated materials:
.1 none identified
.3 Known latent site and environmental conditions:
.1 Working near and over water.
.2 Cold weather and exposure.
.3 Public access to the site.
.4 Heavy Equipment.
.5 Working with lights.
.6 Load losses Roll overs.
.4 Facility on-going operations:
.1 none identified

.3 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.

.4 Include above items in the hazard assessment of the Work.

.5 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.11 MEETINGS

.1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
.1 Superintendent of Work
.2 Designated Health & Safety Site Representative
.3 Subcontractors

.2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.

.3 Keep documents on site.

1.12 HEALTH AND SAFETY PLAN

.1 Prior to commencement of Work, develop written Health and Safety Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.

.2 Health and Safety Plan shall include the following components:
.1 List of health risks and safety hazards identified by hazard assessment.
.2 Control measures used to mitigate risks and hazards identified.
.3 On-site Contingency and Emergency Response Plan as specified below.
.4 On-site Communication Plan as specified below.
.5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
.6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.

.3 On-site Contingency and Emergency Response Plan shall include:
.1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
.2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire fighting equipment and other related data.
.3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
.4 Emergency Contacts: name and telephone number of officials from:
.1 General Contractor and subcontractors.
.2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
.3 Local emergency resource organizations.

.5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Department Representative will provide pertinent data including name of PWGSC and Facility Management contacts.

.4 On-site Communication Plan:
.1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
.2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

.5 Address all activities of the Work including those of subcontractors.

.6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.

.7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.

.8 Post copy of the Plan, and updates, prominently on Work Site.

1.13 SAFETY SUPERVISION

.1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.

.2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
.1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work
.2 Monitor and enforce Contractor's site-specific Health and Safety Plan.

.3 Conduct site safety orientation session to persons granted access to Work Site.
.4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
.5 Stop the Work as deemed necessary for reasons of health and safety.

.3 Health & Safety Site Representative must:
.1 Be qualified and competent person in occupational health and safety.
.2 Have site-related working experience specific to activities of the Work.
.3 Be on Work Site at all times during execution of the Work.

.4 All supervisory personnel assigned to the Work shall also be competent persons.

.5 Inspections:
.1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken.

1.14 TRAINING

.1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.

.2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

.3 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.15 MINIMUM SITE SAFETY RULES

.1 Not withstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
.1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.
.2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
.3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
.4 Obey warning signs and safety tags.

.2 Brief persons of disciplinary protocols to be taken for non compliance. Post rules on site.

1.16 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.17 INCIDENT REPORTING

.1 Investigate and report the following incidents to Departmental Representative:
.1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
.2 Medical aid injuries.
.3 Property damage in excess of $10,000.00,
.4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of $5000.00.

.2 Submit report in writing.

1.18 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site.
.1 Post on site.
.2 Submit copy to Departmental Representative.

1.19 BLASTING

.1 Blasting or other use of explosives is not permitted on site without prior receipt of written permission and instructions from Departmental Representative.

1.20 POWDER ACTUATED DEVICES

.1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.

1.21 CONFINED SPACES

.1 Abide by occupational health and safety regulations regarding work in confined spaces.

1.22 SITE RECORDS

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.23 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

.2 Post other documents as specified herein, including:
.1 Site specific Health and Safety Plan.
.2 WHMIS data sheets.

END OF SECTION

PART 1-GENERAL

1.1 REFERENCES

.1 WHMIS: Workplace Hazardous Materials Information System, Health Canada.

.2 Transportation of Dangerous Goods Act. Transport Canada, updated 2008-02-21.

.3 Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, Department of Fisheries and Oceans Canada, 1998.

.4 MBCA: Migratory Birds Convention Act, Environment Canada, 1994.

.5 Canadian Coast Guard Regulations, Department of Fisheries and Oceans Canada.

.6 Canadian Shipping Act, Transport Canada, 2001.

.7 AWPA: American Wood Preserver Association

1.2 DEFINITIONS

.1 Hazardous Materials: Product, substances, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

.2 Wetlands: land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands," and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat

.3 Watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year.

.4 Alien species: refers to a species or subspecies introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.

.5 Buffer zone: a vegetated land that protects watercourses from adjacent land uses. It refers to the land adjacent to watercourses, such as streams, rivers, lakes, ponds, oceans, and wetlands, including the floodplain and the transitional lands between the watercourse and the drier upland areas.

1.3 TRANSPORTATION

.1 Transport hazardous materials and hazardous waste in compliance with Federal Transportation of Dangerous Goods Act.

.2 Do not overload trucks when hauling material. Secure contents against spillage.

.3 Maintain trucks clean and free of mud, dirt and other foreign matter.

.4 Avoid potential release of contents and of any foreign matter onto highways, roads and access routes used for the Work. Take extra care when hauling dredged material and other hazardous materials. Immediately clean any spillage and soils.

.5 Before commencement of work, advise the Departmental Representative of the existing roads and temporary routes proposed to be used to access work areas and to haul material to and from the site, including roads to the dredged disposal field.

1.4 HAZARDOUS MATERIAL HANDLING

.1 Handle and store hazardous materials on site in accordance with WHMIS procedures and requirements.

.2 Store all hazardous liquids in location and manner to prevent their spillage into the environment.

.3 Maintain written inventory of all hazardous materials kept on site. List product name, quantity and storage date.

.4 Keep MSDS data sheets on site for all items.

1.5 PETROLEUM, OIL AND LUBRICANTS

.1 Comply with Federal and Provincial laws, regulations, codes and guidelines for the storage of fuel and petroleum products on site.

.2 Do not place fuel storage tanks and store fuel or other petroleum products within a 30 metre buffer zone of watercourses and wetlands. Do not fuel or lubricate equipment within this 30 metre buffer zone. Obtain approval from Departmental Representative of acceptable location on site for fuel storage and equipment service.

.3 Do not dump petroleum products or any other deleterious substances on ground or in the water.

.4 Be diligent and take all necessary precautions to avoid spills and contaminate the soil and water (both surface and subsurface) when handling petroleum products on site and during fuelling and servicing of vehicles and equipment.

.5 Maintain on site appropriate emergency spill response equipment consisting of at least one 250-litre (55 gallon) overpack spill kit for containment and cleanup of spills.

.6 Maintain vehicles and equipment in good working order to prevent leaks on site.

.7 In the event of a petroleum spill, immediately notify the Departmental Representative and the Canadian Coast Guard (CCG) at 1-800-565-1633 (24 hour report line). Perform clean-up in accordance with all regulations and procedures stipulated by authority having jurisdiction.

1.6 DISPOSAL OF WASTES

.1 Do not bury rubbish, demolition debris and waste materials on site.

.2 Dispose and recycle demolition debris and waste materials to Waste Facility.

.3 Do not dispose of hazardous waste, volatile materials (such as mineral spirits, paints, thinners etc...) and petroleum products into waterways, storm or sanitary sewers or in waste landfill sites.

.4 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

.5 Concrete waste:
.1 Do not discharge residual or rejected concrete on site.
.2 Immediately clean any accidental release of concrete on site prior to solidification.
.3 Do not wash and clean concrete vehicles on site.
.4 Perform dumping of residual material and truck cleaning operations only at the concrete plant. Follow environmental regulations and good practices as approved by the Provincial Department of the Environment and other authorities having jurisdiction.

1.7 WATER QUALITY

.1 Conduct excavation work of a watercourse or wetland in such a manner to limit turbidity and reduce sediment suspension in the water to an absolute minimum at all times.
.1 Maintain appropriate production speed and momentum of the excavation equipment. Make adjustments as required and as approved by Departmental Representative.
.2 Strategically position excavator equipment and haul vehicles to avoid over the water swings of excavated material whenever possible.

.2 Where work may affect the water quality adjacent to water intake lines used by Lobster Holding Facilities, Fish Processing Facilities and other harbour users, schedule work in cooperation with the Harbour Authority as directed by Departmental Representative to minimize interference and impact to harbour users.

.3 Visually monitor the water turbidity of the surrounding areas adjacent to the work and up to the established dredge limit of 200 metre.
.1 Should excessive change occur in the turbidity beyond the dredge limit which differs from existing conditions of the surrounding water bodies, such as a distinct color difference; notify the Departmental Representative to obtain appropriate mitigation measures to be followed.

.4 Water quality during suction dredging:
.1 Minimize out-fall of the dredge material at the disposal site by placing the pipeline outfall at or near the water level surface.
.2 Restrict vessel traffic adjacent to the disposal site to an absolute minimum to avoid the re-suspension of dredged material from propeller wash.

.5 Water contamination by preservative treated wood:
.1 Preservative treated lumber and timber, whether plant or site treated, shall be cured for a minimum of 30 days from date of the treatment application before their installation in areas which will be in contact with the water.
.2 Do not cut treated wood lumber over the surface of a watercourse or wetland.
.3 Do not use liquid applied preservative products over the surface of a watercourse or wetland.
.4 Wood treated with Chromate Copper Arsenate (CCA) or Ammoniac Copper Zinc Arsenate (ACZA) must be CSA or AWPA approved.
.5 Do not use timber and lumber treated with creosote, petroleum and pentachlorophenol for any part of the Work.

.6 Do not washdown equipment within a 30 metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area.

1.8 SOCIOECONOMIC RESTRICTIONS

.1 Abide by municipal and provincial regulations for any restrictions on work performed during the night time and on flood lighting of the site. Obtain applicable permits.

.2 Place flood lights in opposite direction of adjacent residential and business areas.

.3 Equip equipment and machinery with purposely designed mufflers to reduce noise on site to lowest possible level. Maintain mufflers in good operating condition at all times.

1.9 BIRD AND BIRD HABITAT

.1 Become knowledgeable with abide by the Migratory Birds Convention Act (MBCA) in regards to the protection of migratory birds, their eggs, nests and their young encountered on site and in the vicinity.

.2 Minimize disturbance to all birds on site and adjacent areas during the entire course of the Work.

.3 Do not approach concentrations of seabirds, waterfowl and shorebirds when anchoring equipment, accessing wharves or ferrying supplies.

.4 During night time work, position flood lights in opposite direction of nearby bird nesting habitat.

.5 Do not use beaches, dunes and other natural previously undisturbed areas of the site to conduct work unless specifically approved by the Departmental Representative.

.6 Should nests of migratory birds in wetlands be encountered during work, immediately notify Departmental Representative for directives to be followed.

.1 Do not disturb nest site and neighbouring vegetation until nesting is completed.
.2 Minimize work immediately adjacent to such areas until nesting is completed.
.3 Protect these areas by following recommendations of Canadian Wildlife Service.

1.10 FISH AND FISH HABITAT

.1 Be aware of the risk for contamination of the fish habitat at the site as a result of alien species being introduced in the water.

.2 To minimize the possibility of fish habitat contamination, all construction equipment which will be immersed into the water of a watercourse, or has the possibility of coming into contact with such water during the course of the work, must be cleaned and washed to ensure that they are free of marine growth and alien species.
.1 Equipment shall include boats, barges, cranes, excavators, haul trucks, pumps, pipe lines and other all miscellaneous tools and equipment previously used in a marine environment.

.3 Cleaning and washing of equipment shall be performed immediately upon their arrival at the site and before use in or over the body of water.

.4 Conduct cleaning and washing operations as follows:
.1 Scrap and remove heavy accumulation of mud and dispose appropriately.
.2 Wash all surfaces of equipment by use of a pressurized fresh water supply.
.3 Immediately follow with application of a heavy sprayed coating of undiluted vinegar or other environmentally approved cleaning agent to thoroughly remove all plant matter, animals and sediments.
.4 Check and remove all plant, animal and sediment matter from the all bilges and filters.
.5 Drain standing water from equipment and let fully dry before use.

.6 Upon removal from the water, drain standing water from equipment and let fully dry before removal off the site.

.5 Do not perform cleaning and washdown within a 30 metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area.

.6 Record of Assurance Logbook:
.1 Maintain an on-going log of past and present usage and washdowns of all equipment to illustrate mitigation measures undertaken against fish habitat contamination by alien species.
.2 Write data in a hard cover bound logbook,
.3 Include the following:
.1 Date and location where equipment was previously used in a watercourse or wetland;
.2 Type of work performed.
.3 Dates of washdown for each piece of equipment;
.4 Cleaning method and cleaning agent(s) used.

.7 Keep Record of Assurance Logbook updated from project to project. Upon request, submit logbook to Departmental Representative for review.

.8 Abide by requirements and recommendations of the Federal Department of Environment and the Department of Fisheries and Oceans - Habitat Protection and Sustainable Development Branch in cleaning and washdown of equipment.

1.11 AIR QUALITY

.1 Keep airborne dust and dirt resulting from the work on site to an absolute minimum.

.2 Apply dust control measures to roads, parking lots and work areas.

.3 Spray surfaces with water or other environmentally approved product. Use purposely suited equipment or machinery and apply in sufficient quantity and frequency to provide effective result and continued dust control during the entire course of the work.

.4 Do not use oil or any other petroleum products for dust control.

1.12 FIRES

.1 Fires and burning of rubbish on site is not permitted.

END OF SECTION

PART 1 - GENERAL

1.1 INSPECTION

.1 Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.

.2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

.3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.

.4 Pay costs to uncover and make good work disturbed by inspections and tests.

1.2 TESTING

.1 Tests on materials as specified in various sections of the Specifications is the responsibility of the Departmental Representative except where stipulated otherwise.

.2 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Department.

.3 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Departmental Representative may engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities:

.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.2 Inspection and testing performed exclusively for Contractor's convenience.

.3 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.

.2 Provide sufficient advance notice to Departmental Representative of time when the Work will be ready for testing by designated Testing Agency in order for Departmental Representative to make attendance arrangements with such Agency. When directed by Departmental Representative notify the Agency directly.

.3 When specified or directed, submit representative samples of materials, in required quantities, to Testing Agency for testing purposes. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.4 Provide labour and facilities to obtain, handle and deliver samples.

.5 Provide sufficient space on site for Testing Agency's exclusive use to store equipment and cure test samples.

.6 Employment of Independent Inspection and Testing Agencies by Departmental Representative does not relax responsibility to perform Work in accordance with Contract Documents.

1.4 ACCESS TO WORK

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Furnish labour and facility to provide access to the work being inspected and tested.

.3 Co-operate to facilitate such inspections and tests.

1.5 REJECTED WORK

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to new and existing subtrades and finishes resulting from removal or replacement of defective work.

END OF SECTION

PART 1 - GENERAL

1.1 SITE ACCESS AND PARKING

.1 Parking facilities at site are limited. Make arrangements for Contractor's vehicles including those of subcontractors and workers.

.2 Provide snow removal and dust control during period of work for all roads and paved areas.

.3 Maintain roads and parking areas at site, where used by Contractor, for duration of contract.

.1 Keep clean and free of mud and dirt by washing on a regular basis.

.2 Make good and repair damage resulting from Contractor's use of roads, asphalted areas and lawns on site.

1.2 CONTRACTOR'S SITE OFFICE

.1 Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as advised by Departmental Representative.

.2 Provide all required facilities and shelter by legislation or code for use of workers and Departmental Representative and/or their identified field staff.

1.3 MATERIAL STORAGE

.1 Locate site storage trailers in location of least interference with existing Facility operations.

.2 Material storage space on site is limited. Contractor to make arrangements.

1.4 SANITARY FACILITIES

.1 Provide sanitary facilities for work force and Departmental Representative and/or their identified field staff in accordance with governing regulations and ordinances.

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

1.5 POWER

.1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.

.2 Supply and install all temporary facilities for power such as pole lines, meter socket, underground cables, etc...as required and to approval of local power supply authority.

1.6 WATER SUPPLY

.1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

1.7 CONSTRUCTION SIGN AND NOTICES

.1 Upon request by Departmental Representative, erect a self supporting project sign in location indicated.

.2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately 1200 x 2400 mm in size complete with required wood framing at 400 mm o.c and support posts.

.3 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.

.4 Contractor or subcontractor advertisement signboards are not permitted on site.

.5 Safety and Instruction Signs and Notices:
.1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN3-Z321-95.

.6 Maintenance and Disposal of Site Signs:

.1 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.8 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when Work is complete.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

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

1.2 CLEANING DURING CONSTRUCTION

.1 Maintain work site in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.

.2 Provide on-site containers for collection of waste materials and debris.

.3 Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.

.4 Remove waste materials, and debris from site on a daily basis.

1.3 FINAL CLEANING

.1 In preparation for acceptance of the project on an interim or final certificate of completion perform final cleaning.

.2 Broom clean and wash exterior paved surfaces and walks; rake clean other surfaces of grounds.

.3 Ensure work site and adjacent access and wharf structures are returned to pre-construction conditions.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

.1 Environmental Protection: Section 01 35 44

1.2 GENERAL

.1 Carry out work placing maximum emphasis on the areas of:
- .1 Waste reduction;
- .2 Diversion of waste from landfill and;
- .3 Material Recycling.

1.3 MEASUREMENT PROCEDURES

.1 Site Work: Costs associated with this Section, unless indicated otherwise, including all labour, plant, equipment and necessary materials will constitute a fixed price, and shall consist of but not be limited to the following:
- .1 The removal, temporary storage and reinstatement of all material(s) and equipment that interferes with the installation of the new work.
- .2 Temporary services are included in this section.
- .3 The removal of existing treated timber cribwork structure 402 from deck elevation to limits of removal including cribwork remnants as shown. This will include concrete slabs, concrete retaining wall, asphalt pavement, timber wheelguard and wheelguard chocks, timber sheathing, treated timber cribwork, rock ballast, timber ladders c/w all fasteners, holdfasts, backfill material, armour stone protection, concrete barriers and all other items or services that interfere with the work as shown and/or as directed.
- .4 The armour stone protection will be stored on site and reinstalled in the work as directed. Concrete barriers will be stored on site.
- .5 Supply and installation of steel bent plates between new and existing structures as shown on drawings.

.6 The removal of electrical services such as wires, cables, conduit, receptacle outlets, power pole with fixture as shown and any other services as required to allow for new work.

.7 The installation of 5 (five) new power pole as shown on drawings including the supply and installation of 2 (two) 600mm diameter 8mm thick steel pipes with crushed rock for poles P3 and P4 and all fastening hardware. Poles will be supplied by electrical contractor.

.8 All work associated with the reshaping, grading and spreading of existing material of the granular surface area as shown on drawings to obtain positive surface drainage.

.9 Proper disposal of existing reinforced concrete and asphalt debris in the area of new work to limits shown on drawings.

.1 Concrete, asphalt debris and miscellaneous steel to be dispose of at the contractor's construction and disposal site.

.10 The transportation and proper disposal of un-recyclable materials and debris to an approved regional landfill.

.11 The supply and installation of temporary or permanent shoring if necessary to prevent undermining of existing cribwork structure 401 will be included in this section.

.12 Carry out work as per Environmental requirements.

.13 The supply and installation of a floating boom surrounding the work area throughout the duration of the work to prevent any floating debris from escaping the waters. Any debris beyond the floating boom will be removed from the waters immediately by the contractor.

.2 Disposal of treated timber: all costs for handling, transportation and disposal of the un-reusable existing treated timber and debris removed from the structure to an approved regional landfill site will not be paid separately but will be included under 'Site Work' pay item above for measurement purposes.

1.4 WASTE REDUCTION .1 Develop waste reduction strategy for work.

.2 Structure program to prioritize actions, with waste reduction as first priority, followed by salvage and recycling effort, then disposal as solid waste.

.3 Identify materials and equipment to be:
.1 Salvaged for resale by Contractor.
.2 Sent to recycling facility.
.3 Sent to waste processing/landfill site for their recycling effort
.4 Disposed of in approved landfill site.

.4 Reduce construction waste during installation work. Undertake practices which will minimize waste and optimize full use of new materials on site, such as:
.1 Use of a central cutting area to allow for easy access to off-cuts;
.2 Use of off-cuts for blocking and bridging elsewhere.
.3 Use of effective and strategically placed facilities on site for storage and staging of left-over or partially cut materials (such as plywood, dimension timber, etc...) to allow for easy incorporation into work whenever possible avoiding unnecessary waste.

.5 Develop other strategies and innovative procedures to reduce waste.

1.5 MATERIAL SOURCE SEPARATION PROCESS

.1 Develop and implement material source separation process at commencement of work as part of mobilization and waste management at site.

.2 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.

.3 Establish methods whereby hazardous and toxic waste materials, and their containers, encountered or used in the course work are properly isolated, stored on site and disposed in accordance with applicable laws and regulations from authorities having jurisdiction.

1.6 DISPOSAL REQUIREMENTS

.1 Dispose of waste only at approved waste processing facility or approved landfill sites by authority having jurisdiction.

.2 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any construction waste materials have been banned from disposal in landfills. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.

.3 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.

.4 Sale of salvaged items by Contractor to other parties not permitted on site.

1.7 REMOVAL

.1 Remove in their entirety all materials and objects specified for removal including all fastenings. Carefully remove materials designated to be reused.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Administrative procedures preceding inspection and acceptance of Work by Departmental Representative.

1.2 RELATED SECTIONS

.1 Section 01 78 00 - Closeout Submittals.

1.3 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.

.1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.

.2 Departmental Representative's Inspection: Accompany Departmental Representative during all interim and final inspections of the Work.

.1 Address defects, faults and outstanding items of work identified by such inspections.

.2 Advise Departmental Representative when all deficiencies identified have been rectified.

.3 Note that Departmental Representative will not issue a Certificate of Substantial Completion of the Work until such time that Contractor performs following work and turns over the specified documents:

.1 Project record as-built documents Section 01 78 00.

.4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Project Record Documents.

1.2 PROJECT RECORD DOCUMENTS

.1 Departmental Representative will provide 2 white print sets of contract drawings and 2 copies of Specifications Manual specifically for "as-built" purposes.

.2 Maintain at site one set of the Contract Drawings and Specifications to record actual as-built site conditions.

.3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.

.4 As-Built Drawings:
.1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
.2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Completion.
.3 Stamp all drawings with "As-Built Drawings". Label and place Contractor's signature and date.
.4 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.

.5 Record following information:
.1 Depths of various elements in relation to survey datum.
.2 Field changes of dimension and detail;
.3 Location of all capped or terminated services and utilities.
.4 All design elevations, sections and details dimensioned and marked-up to consistently report finished installation conditions;

.5 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;

.6 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-built Specifications: legibly mark in red each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.

.2 Changes made by Addenda and Change Orders.

.3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.

.6 Maintain As-built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

.7 .1 Provide operation and maintenance data for electrical work for incorporation into maintenance manual specified in Division 01 78 00.

.2 Include in operations and maintenance data:

.1 Details with respect to design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.

.2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items and parts lists. Advertising or sales literature not acceptable.

.3 Wiring and schematic diagrams and performance curves.

.4 Names and addresses of local suppliers for all items included in maintenance manual.

.8 Provide maintenance materials in accordance with Division 01.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 03 30 00 - Cast-in-Place Concrete.

1.2 Measurement Procedures

.1 No measurement will be made under this section. Include costs in items of concrete work for which reinforcement is required.

1.3 References

.1 Canadian Standards Association (CSA)
.1 CAN/CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction.
.2 CAN/CSA A23.3-14, Design of concrete structure.
.3 CAN/CSA-G30.18-09, Billet-Steel Bars for Concrete Reinforcement.
.4 CSA W186-M1990 (R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.
.5 ASTM A82-07, Standard specification for Steel Wire, Plain, for Concrete Reinforcement.

PART 2 - PRODUCTS

2.1 Materials

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

.2 Reinforcing steel: billet steel, having a yield stress of 400 MPa, deformed bars to CAN/CSA-G30.18-09, unless indicated otherwise.

.3 Cold-drawn annealed steel wire ties: to ASTM A82.

.4 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.

2.2 Fabrication

.1 Fabricate reinforcing steel in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 Source Quality Control

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.

PART 3 - EXECUTION

3.1 Field Bending

.1 Do not field bend or field weld reinforcement.

3.2 Placing Reinforcement

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.

.2 Prior to placing concrete, obtain Departmental Representative's review of reinforcing material and placement.

.3 Ensure cover to reinforcement is maintained during concrete pour.

3.3 Splicing

.1 Where splicing of rebar is allow, the minimum splice length will be 40 times the rebar size diameter.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 03 20 00 - Concrete Reinforcing.

.2 Section 05 50 00 - Metal Fabrications.

1.2 Measurement Procedures

.1 Concrete Deck (300mm thick): cast-in-place reinforced concrete deck for the wharf 407 to be measured in square metres (m2) calculated from neat dimensions indicated or authorized in writing by the Departmental Representative. Measurements to be made on the surface area of the deck to the inside face of the concrete beam. Construction/control joints as shown will be considered incidental to this item.

.2 Concrete Beam; cast in place reinforced concrete beam as shown along the top of H-piles to be measured in cubic metres (mü) calculated from neat dimensions indicated or authorized in writing by Departmental Representative. No deductions will be made for scuppers within the beam.

.3 Refer to section 31 63 26.16 - 'Berlin Wall Construction' for other concrete work measurement.

.4 Concrete Deck (275mm thick): cast-in-place reinforced concrete deck for wharf 402/403 to be measured in square metres (m2) calculated from neat dimensions indicated or authorized in writing by the Departmental Representative. Measurements to be made on the surface of the deck. The following items will be considered incidental to this item;
.1 Reshaping and compacting of existing crushed rock to lines and grade to suit new concrete deck.
.2 Trim binder posts as required.
.3 Construction, control and expansion joints as shown.
.4 Supply and install Lag Bolts as shown.
.5 Additional concrete along longitudinal timbers/binder posts as shown.

.5 Formwork and falsework will not be measured but

considered incidental to the work.

.6 No deductions will be made for volume of concrete displaced by reinforcing steel.

.7 Heating of water and aggregates and providing cold weather protection will not be measured but considered incidental to work.

.8 Cooling of concrete and providing hot weather protection will not be measured but considered incidental to work.

.9 Concrete used in the casting of concrete cylinders for testing and other miscellaneous concrete fill-in of voids will not be measured for payment but will be considered incidental to the work.

.10 Supply and installation of concrete additives as recommended by the supplier will not be measured but considered incidental to work.

.11 Reinforcing steel will not be measured but considered incidental to the work.

1.3 References

.1 Canadian Standards Association (CSA)
.1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA A283-00 (R2011), Qualification Code for Concrete Testing Laboratories.
.3 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.2 American Society for Testing and Materials (ASTM)
.1 ASTM C260/C260M 10a, Specification for Air-Entraining Admixtures for Concrete.
.2 ASTM C494/C494M 11, Standard Specification for Chemical Admixtures for Concrete.

1.4 Formwork

.1 Fabricate and erect formwork in accordance with CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

1.5 Certificates

.1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prior to starting concrete work submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
- .1 Portland cement.
- .2 Blended hydraulic cement.
- .3 Supplementary cementing materials.
- .4 Admixtures.
- .5 Aggregates.
- .6 Water.

.3 Provide mix design and certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.

.4 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

1.6 Waste Management and Disposal

.1 Designate a cleaning area for concrete trucks off site, at a company owned site for such a purpose (meeting all federal and provincial requirements)

.2 Use trigger operated spray nozzles for water hoses.

.3 Designate a cleaning area for tools to limit water use and runoff.

.4 Carefully coordinate the specified concrete work with weather conditions.

.5 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or waterways. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal.

.6 Choose least harmful, appropriate cleaning method which will perform adequately.

PART 2 - PRODUCTS

2.1 Materials

.1 Blended hydraulic cement: Type GUb-F/SF to CAN/CSA-A3001.

.2 Supplementary cementing materials: to CAN/CSA-A3001.

.3 Water: to CAN/CSA-A23.1.

.4 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.

.5 Air entraining admixture: to ASTM C 260.

.6 Chemical admixtures: to ASTM C 494/C 494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.7 Concrete retarders: to ASTM C 494/C 494M water based,, low VOC, solvent free. Do not allow moisture of any kind to come in contact with the retarder film.

2.2 Mixes

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1.
- .1 Portland Cement: GUb-F/SF.
- .2 Minimum compressive strength at 28 days: 35 MPa.
- .3 Minimum cement content: 385 kg/mü of concrete.
- .4 Maximum water/cement ratio: 0.4
- .5 Class of exposure: C1.
- .6 Nominal size of coarse aggregate: 5-20 mm.
- .7 Slump at time and point of discharge: 50 to 100 mm.
- .8 Air content: 5 to 8 %.

PART 3 - EXECUTION

3.1 Preparation

.1 Obtain Departmental Representative's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.

.2 Pumping of concrete is permitted only after approval of equipment and mix.

.3 Ensure reinforcement and inserts are not disturbed during concrete placement.

.4 Prior to placing of concrete inform Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.6 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 Construction

.1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.

3.3 Finishing

.1 Finish concrete in accordance with CAN/CSA-A23.1.
.1 Float surfaces with wood or metal floats or power finishing machines and bring surfaces to true grade or dimensions.
.2 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

.2 Broom finish deck surface with coarse bristle obtaining a coarse textured finish with a non-slip finish. All brush strokes to be in the direction perpendicular to traffic.

.3 Exposed concrete panels to have smooth finish.

3.4 Site Tolerance

.1 Concrete tolerance in accordance with CAN/CSA-A23.1.

3.5 Field Quality Control

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CAN/CSA-A23.1/A23.2 and Section 01 45 00.

.2 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.3 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.

3.6 Formwork Removal

.1 Leave the formwork in place for the following minimum time after placing concrete provided the air temperature surrounding the concrete is above 10 degree Celcius.

.1 2 days for vertical surfaces.

.2 7 days for beam and panels or 70% of design strength.

.3 7 days for concrete anchor blocks.

PART 1 - GENERAL

1.1 DESCRIPTION

.1 The work under this section will include the supply, fabrication and installation of all machine bolts, nuts, washers, anchor bolts, angles, plates, bars, holdfast, embedded metals in concrete, tie-rods and connections to steel H-piles, channels, steel angles to support concrete wall panels at steel H-piles, ladder units, and all other miscellaneous steel.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 03 30 00 - Cast-in-Place Concrete.

.4 Section 06 10 10 -Rough Carpentry.

.5 SECTION 31 62 16.16 - Steel H-Piles

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel.
.2 CAN/CSA-S16-14, Limit States Design of Steel Structures.
.3 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
.4 CSA W59-13,Welded Steel Construction (Metal Arc Welding) (Imperial Version).
.5 ASTM A123-12/A123M-12, Zinc (Hot Dip Galvanized) Coating and Iron and Steel products.

.2 Do welding to CSA W59-13 unless specified otherwise. Welding companies and welders to be certified under CSA W47.1.

1.4 MEASUREMENT FOR PAYMENT

.1 Prefabricated ladder inserts: Include cost of supply and installation in items for payment in their respective Sections. This will also include all fabrication and galvanizing of the units and ladder holdfasts.

.2 Refer to section 31 63 26.16 - Steel H-Pile for measurement for payment.

.3 Mooring Holdfast: Measurement for payment to be measured by the unit supplied and installed in the work including surface preparation, galvanizing, nuts and washers.

.4 Metal Wheelguard: The supply and installation of the new galvanized steel wheelguard system as shown on drawings will be measured by the linear meter for payment. Handling, fabrication, welding, anchor bolts, and galvanize will be considered incidental to the pay item.

.5 Miscellaneous steel, plates, bars, angles and fasteners: Include cost of supply and installation in items for payment in their respective Sections. This will also include all welding, cutting, drilling and other work necessary in the field to complete the project.

1.5 SUBMITTALS

.1 Shop Drawings
.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.6 QUALITY ASSURANCE

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.

.2 Welding materials: to CSA W59.

.3 Welding electrodes: to CSA W48 Series.

.4 Bolts, washers, and anchor bolts etc: to ASTM A307.

.5 Tie-Rods:
.1 Cold Rolled Tread Bar to ASTM A615, grade 75, 64mm diameter.
.2 Heavy duty full hex nuts (100mm long) and hardened washers, grade 75.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Where possible, fit and shop assemble work, ready for erection.

.3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

.4 Machine bolts will have standard heads, nuts and when in position will be of sufficient length to permit a full nut and two washers. Treads shall be Coarse Thread Series as specified in latest ANS/B1-1 having a Class 2A tolerance.

.5 Standard cast iron washers suitable for the size of the bolt specified will be placed under the heads and nuts of all machine bolts bearing on timber surfaces unless noted otherwise on the drawings. Ogee washers to Timber Design Manual issued by Laminated Timber Institute of Canada and to be cast iron, free from injurious defects or impurities. As an alternative to Ogee washers, standard galvanized plate washers can be used. The washer is to be three times the bolt diameter and a minimum thickness of 8 mm. Square washers are not permitted.

2.3 FINISHES

.1 Galvanizing: all galvanized hardware as identified to be hot dipped galvanizing with zinc coating 610 g/m^2 to CAN/CSA-G164.

.2 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

.3 All anchorage to concrete will be Stainless Steel.

.4 Tie-rods and connections do not require galvanizing.

PART 3 - EXECUTION

3.1 ERECTION

.1 Do welding work in accordance with CSA W47.1 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Touch-up field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.4 Take necessary care in the handling of all galvanized steel parts to prevent damage to the galvanized coating. Evidence of damage shall be cause for rejection. Damage may be touched-up if approved by Departmental Representative.

.5 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 06 10 10 - Rough Carpentry

1.2 References

.1 Canadian Standards Association (CSA)
.1 CSA O80-R2008(2012), Wood Preservation.
.2 CSA O322-R02(2012), Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

1.3 Certificates

.1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.

.2 For products treated with preservative by pressure impregnation submit following information certified by authorized signing officer of treatment plant:
.1 Information listed in AWPA M2-R2011 and revisions specified in CSA O80, Supplementary Requirement to AWPA M2-R2011 applicable to specified treatment.
.2 Moisture content after drying following treatment with water-borne preservative.

1.4 Waste Management and Disposal

.1 Do not dispose of preservative treated wood through incineration or with other materials destined for recycling or reuse.

PART 2 - PRODUCTS

2.1 Materials

.1 Preservative Treatment: Treat to CSA 080, for coastal waters.

PART 3 - EXECUTION

3.1 Application: Preservative
.1 Treat to CSA O80.18 Series using CCA preservative to obtain minimum net retention specified.

3.2 Application: Field Treatment
.1 Comply with AWPA M4-R2012 and revisions specified in CSA O80, Supplementary Requirements to AWPA M2-R2011.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Section 06 05 73 - Wood Treatment.

1.2 References

.1 Canadian Standards Association (CSA)
.1 CAN/CSA-G164-R1992(2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
.2 CAN/CSA-O141-R2005(2009), Softwood Lumber.

.2 National Lumber Grades Authority (NLGA)
.1 Standard Grading Rules for Canadian Lumber 2014.

1.3 Quality Assurance

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

1.4 MEASUREMENT FOR PAYMENT

.1 Treated dimension timber supplied and installed for wheelguard and wheelguard blocks, sheathing and other miscellaneous timber to complete the work will be measured in cubic metres (m3) of timber secured in place including all galvanized/stainless steel fastenings, plant, material, and labour.

.2 Ladder - treated timber ladder uprights as shown including prefabricated galvanized steel ladder and one (1) steel galvanized holdfast, secured in place as specified will be measured by the unit. The item will include all galvanized/stainless steel fastenings.

.3 Sheathing and uprights must be cut as identified on drawings prior to pressure treatement.

PART 2 - PRODUCTS

2.1 Materials

.1 Use timber graded and stamped in accordance with applicable grading rules and standards of Associations or Agencies approved to grade lumber by Canadian Lumber Standards Administration Board of CSA.

.2 Species
.1 Wheelguard and chocks: Hemlock or Douglas Fir, (CCA Treated).
.2 Sheathing, Ladder uprights: Hemlock or Douglas Fir, (CCA Treated).
.3 Grade: No.1 Structural Grade with maximum of 20% of a lesser grade.

2.2 Wood Preservative

.1 In accordance with Section 06 05 73.

PART 3 - EXECUTION

3.1 Installation

.1 Comply with requirements of NBC 2015 Part 9 supplemented by following paragraphs.

.2 Install members true to line, levels and elevations, square and plumb.

.3 Construct continuous members from pieces of longest practical length.

.4 Install spanning members with "crown-edge" up.

3.2 FIELD CUTTING TREATED TIMBER

.1 Field cuts are to be minimal to suit field conditions. Follow best practices by cutting and field preserving treated timber in one location over a ground sheet and collect all saw dust, scraps and drippings for disposal at an approved disposal site.

.2 Treat, in field, cuts and damage to surface of treated material with an appropriate preservative as described in CSA O80 Series-97. Ensure that damaged areas such as abrasions, nail and spike holes are thoroughly saturated with field treatment solutions as per CSA O80.

.3 Treat bolt holes, cutoffs and field cuts in accordance with CSA O80.

3.3 WHEELGUARD AND WHEELGUARD CHOCKS

.1 Wheelguard timbers to be 200 mm by 200 mm and will be in minimum lengths 4880 mm or as specially required with butt joints made over wheelguard chocks sized as shown on the drawings. Wheelguard timbers to be chamfered on top, 25 mm on each horizontal and vertical surface.

.2 Wheelguard chocks will be installed at 1500 mm on centres as support for wheelguard.

.3 Wheelguard will be secured through wheelguard blocking, to concrete deck with 22 mm diameter stainless steel anchor bolts as shown on drawings.

3.4 LADDERS

.1 Supply and install ladders on face of wharf as shown.

.2 Ladder uprights to be 250 x 250 mm and installed from wheel guard elevation and extend a distance as to have a minimum of two(2) full rung below L.N.T. Uprights to be beveled at on top and bottom as shown on drawings.

.3 Secure timber uprights as shown on drawings.

3.5 TIMBER SHEATHING

.1 Install new 100 mm x 150 mm timber sheathing as shown on plan or as directed by the Departmental Representative.

END OF SECTION

SPECIFICATION INDEX

DRAWING INDEX

DRAWING NUMBER	DRAWING TITLE
E1 OF 3	ELECTRICAL EXISTING & NEW LAYOUTS & DETAILS
E2 OF 3	ELECTRICAL LIGHTING, SHROUD, SERVICE LAYOUTS & DETAILS
E3 OF 3	ELECTRICAL LIGHTING CONTROL, PANELS, POWER RISER & SERVICE CALCULATIONS

END OF SECTION

Part 1 General

1.1 THIS SECTION COVERS ITEMS COMMON TO SECTIONS OF DIVISION 26. THIS SECTION SUPPLEMENTS REQUIREMENTS OF DIVISION 01.

1.2 DESCRIPTION OF WORK

.1 **Work to be completed on Wharf 407 includes the following:**

- .1 Supply and install new 200A 2P circuit breaker in Panel 'A'.
- .2 Remove existing lights on light pole P2, supply and install two (2) new type 'A' LED light fixtures and arms.
- .3 Supply and install new 200A U/G duct from existing Panel 'A' to new Panel 'B' in concrete trench c/w control wire for light pole P2 to be controlled from time clock in Panel 'B' enclosure.
- .4 Supply and install new Panel 'B', contactor, time clock, photocell, receptacle, aluminum enclosure, plywood and wood posts c/w wiring.
- .5 Supply and install new U/G duct in trench and concrete deck c/w expansion joints and wiring to light poles P3 and P4.
- .6 Supply and install light pole P2, two (2) type 'A' LED lights, two (2) 15A receptacles, aluminum shroud and wiring.
- .7 Supply and install light pole P4, two (2) type 'A' LED lights, two (2) 15A and one (1) 50A 2P receptacles, aluminum shroud and wiring.

.2 **Work to be completed on Wharf 403 and 404 includes the following:**

- .1 Supply and install U/G PVC concrete ducts in trenches and deck from Panel 'B' to Wharf 403 and light poles P5, P6 and shroud.
- .2 Supply and install TECK cable and cable guard from aluminum shroud on Wharf 403 to light pole P7 on Wharf 404.
- .3 Supply and install light poles P5 and P6 c/w two (2) type 'A' LED light fixtures, one (1) 15A receptacle and shroud.
- .4 Supply and install shroud on Wharf 403.
- .5 Supply and install light pole P7, two (2) type 'A' LED light fixtures, one (1) 15A receptacle and shroud on Wharf 404.

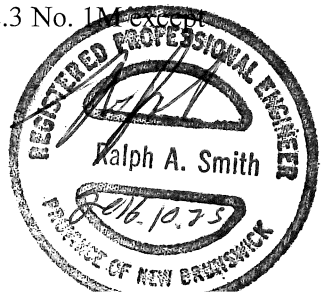
1.3 CODES AND STANDARDS

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Comply with CSA Certification Standards and Electrical Bulletins in force at time of tender submission.

.3 Do overhead and underground systems in accordance with CSA C22.3 No. 1M except where specified otherwise.

.4 Abbreviations for electrical terms: to CSA Z85.



1.4 CARE, OPERATION AND START-UP

.1 Instruct Engineer and operating personnel in the operation, care and maintenance of equipment.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.5 VOLTAGE RATINGS

.1 Operating voltages: to CAN3-C235-83.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standards. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.6 PERMITS, FEES AND INSPECTIONS

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay associated fees.

.3 Engineer will provide drawings and specifications required by Electrical Inspection - Department and Supply Authority at no cost.

.4 Notify Engineer of changes required by Electrical Inspection Department prior to making changes.

1.7 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment in accordance with Division 01.

.2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.

.3 Factory assembly control panels and component assemblies.

1.8 ELECTRIC MOTORS EQUIPMENT AND CONTROLS

.1 Supplier, installer & wiring responsibility is indicated on electrical drawings.

.2 Coordinate final connection to all equipment and controls.

1.9 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .1 Paint outdoor electrical equipment "equipment green" finish to EEMAC Y1-1.
- .2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

.2 Clean and touch up surfaces on shop-painted electrical equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean, prime and paint exposed painted non-galvanized hangers, racks and fastenings to prevent rusting.

1.10 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates as follows:

.2 Nameplates:
- .1 Lamicoid 3mm thick plastic engraving sheet, white face, black core, mechanically attached unless specified otherwise.

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

.3 Wording on nameplates to be approved by Engineer prior to manufacture.

.4 Allow for average of twenty-five (25) letter per nameplate/language.

.5 Identification to be English and French.

.6 All switchboards, panels, disconnect switches, transformers, control panels, magnetic starters, and time clocks are to be provided with ‘lamicoid’ nameplates. Nameplates are to be affixed to all metal surfaces with metal type “pop-rivets” if possible.

.7 Nameplates are to be affixed to other surfaces with contact type cement. Contact type cement is to be applied to complete backside of plate, as opposed to several points or locations on same.

.8 Nameplates are to be affixed to building exterior surfaces with nylon inserts and self-tapping screws unless specifically indicated otherwise.

.9 Lamicoid nameplates installed on distribution panelboards, motor control centres, splitter troughs, transformers, shall indicate the following:
- .1 Designated name of equipment;
- .2 Overcurrent protection device rating;
- .3 Voltages, number of phases and wires;
- .4 Designation of power source.

Example:

PANEL N - 150A
120/208V - 3PH - 4W
FED FROM MAIN SWITCHBOARD #CDP-A

.10 All junction and/or pull boxes shall be marked with an indelible ink marker to designate the circuit number of enclosed wiring, the designated panel name and electrical characteristics where applicable.

.11 Install an additional 'Lamicoid' nameplate on all, or any piece of electrical equipment, or apparatus, ie. Main Switchboard, CDP panels, panelboards, motor control centres, and fusible switches, etc. that may contain overcurrent devices, i.e. circuit breakers and/or fuses, that have been designed for, and incorporate an interrupting capacity sized "larger" than 10kAIC.

Examples:

Minimum interrupting capacity of breakers installed in this panel is to be not less than 22 kAIC.

Minimum interrupting capacity of fuses installed in this MCC is to be not less than 100 kAIC.

1.11 WIRING IDENTIFICATION

.1 Identify feeder and branch circuit wiring including neutral conductors at both ends, including in all junction and outlet boxes located in between, with permanent indelible identifying markings, indicating panel and circuit number. (i.e. A1-25).

.2 Maintain phase sequence and colour coding throughout. (Red, black, blue, white). No colour taping of wires is allowed.

.3 Colour code: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

1.12 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall or floor, and at 15m intervals.

.3 Colours to be 25mm wide prime colour and 20mm wide auxiliary colour.

Prime	Auxiliary
up to 250V	yellow
up to 600V	yellow green
Telephone	white

1.13 DEVICE IDENTIFICATION

.1 All receptacles, light poles, welder/winch and shore power outlets are to have its panel and circuit identified with a lamicoid nameplate. White letters on white background, 6mm high x 25mm long (i.e. A-3 or A-2,4,6). Nameplates to be properly secured to outlet box with screws. Receptacle number, light pole number, shore power and welder/winch number to also be identified (i.e. Recept. #1, Light #1, Shore Power #1, Welder/Winch #1).

1.14 WIRING TERMINATIONS

.1 Lugs, terminals, screws used for termination of wiring to be suitable for copper conductors.

1.15 MANUFACTURERS AND CSA LABELS

.1 Visible and legible after equipment is installed.

1.16 WARNING SIGNS

.1 As specified and to meet requirements of Inspection Department and Engineer.

.2 Use decal signs, minimum 175 x 250mm size.

.3 "DANGER HIGH VOLTAGE" signs to be installed on new enclosures.

1.17 LOCATION OF OUTLETS

.1 Change location of outlets at no extra cost or credit, providing distance does not exceed 3.0m, and information is given before installation.

.2 Locate light switches on latch side of doors.

1.18 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not indicated, verify before proceeding with installation.

.3 Install electrical equipment at the following heights unless indicated otherwise.

.1	Receptacles:	
	.1 General:	in shrouds.
.2	Panelboards:	1500mm or as required by Code.
.3	Local Switches:	1250mm
.4	Telephone Outlets:	300mm
.5	Thermostats:	1250mm

.4 Generally, masonry outlet boxes are to be installed in bottom of concrete blocks to approximate heights indicated.

.5 Refer to all detail drawings and confirm mounting of outlet boxes prior to roughing-in.

1.19 LOAD BALANCE

.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work a report listing all phase and neutral currents on panelboards operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.20 CONDUIT AND CABLE INSTALLATION

.1 Install conduit, and sleeves, prior to pouring of concrete. Sleeves through concrete: sheet metal, sized for free passage of conduit, and protruding 50mm.

.2 Install cables, conduits and fittings to be embedded or plastered over neatly and close to structure so furring can be kept to a minimum.

1.21 FIELD QUALITY CONTROL

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specified tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specified duties. The work of this division to be carried out by a contractor who holds a valid Electrical contractor license as issued by the Province of New Brunswick.

.2 Conduct and pay for tests of the following:
- .1 Power distribution system, including phasing, voltage, grounding and load balancing;
- .2 Circuits originating from branch distribution panels;
- .3 Lighting and its control;
- .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable;
- .5 Systems: communications, etc.

.3 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.4 Insulation resistance testing:
- .1 Megger circuits, feeders and equipment up to 350V with a 500V instrument.
- .2 Megger circuits, feeders and equipment between 350V and 600V with a 1000V instrument.
- .3 Check resistance to ground before energizing.

.5 Notify Engineer three days in advance, of equipment and system testing and verification. Carry out tests in presence of Engineer.

.6 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.7 Submit test results for Engineer's review.

1.22 COORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent relays, and fuses, are installed to values and settings as indicated.

1.23 SITE VISIT

.1 Contractor should visit the site and familiarize himself with the job and all conditions which may affect his costs. Ignorance of existing conditions will not be considered as basis for extra claims.

1.24 AS-BUILTS DOCUMENTS

.1 At completion of project and prior to final inspection, the electrical contractor, at his own expense, shall mark all changes in red on blueprint record drawings.

1.25 SHOP DRAWINGS, PRODUCT DATA & SAMPLES

.1 Submit shop drawings, product data and samples in accordance with Division 01 33 00.

.2 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

.3 Where applicable, include wiring, single line and schematic diagrams.

.4 Include wiring drawings or diagrams showing interconnection with work of other Sections.

1.26 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for electrical work for incorporation into maintenance manual specified in Division 01 78 00.

.2 Include in operations and maintenance data:

- .1 Details with respect to design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
- .2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items and parts lists. Advertising or sales literature not acceptable.
- .3 Wiring and schematic diagrams and performance curves.
- .4 Names and addresses of local suppliers for all items included in maintenance manual.

1.27 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Division 01.

1.28 PROTECTION

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark all live parts "LIVE 120 VOLTS" or with appropriate voltage in English & French.

1.29 CLEANING

.1 At time of final cleaning, clean lighting reflectors, lenses and other lighting surfaces that have been exposed to construction dust, dirt and fingerprints.

1.30 COORDINATION WITH OTHER TRADES

.1 The Electrical Contractor shall totally review all architectural, structural and mechanical drawings and specifications to coordinate and determine work associated with electrical work prior to submitting tender price. Also, review all Addendums associated with all trades.

.2 After review of all documents associated with other trades, forward any questions and obtain answers by Addendum, prior to tender submission.

.3 Submission of tender by Electrical Contractor acknowledges coordination with other trades as part of these contract documents

1.31 PROJECT WASTE MANAGEMENT

.1 Contractor must adhere to project waste management guidelines as detailed in Section 01 78 00 – Closeout Procedures.

1.32 PROJECT RECORD DOCUMENTS

.1 Provide Project Record Documents to Division 01.

1.33 SCHEDULE

.1 Overtime work and work outside normal work hours as deemed necessary to accomplish scheduling are the responsibility of the contractor and must meet the requirements of the Department of Labour. All costs resulting from such overtime must be included in the contractor's estimated total tender price.

1.34 COORDINATION OF EXISTING AND NEW

.1 In order to install new services while maintaining existing, coordination between old and new must be provided. This may restrict installation of new services and how the work is carried out.

.2 All costs for this coordination must be included in the total tendered price.

1.35 MEASUREMENT FOR PAYMENT

.1 Measurement for payment for Division 26 is lump sum.

1.36 SINGLE LINE ELECTRICAL DIAGRAMS

.1 Provide single line electrical diagrams in metal frames with clear polycarbonate glazing as follows:
.1 Electrical distribution systems: locate in main electrical room.

.2 Drawings: 600 x 600mm minimum size.

1.37 ELECTRICAL CONSTRUCTION CERTIFICATION

.1 The electrical contractor bidding this project must have electrical experience on at least three previous wharf projects and must have at least three journeymen electrician personnel who have been with the company for the past three years.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF SYSTEM

.1 In general, work of this Section consists of the complete removal of all existing electrical equipment and materials on the wharf to be renovated.

1.2 RELATED WORK

.1 Electrical General Provisions: Section 26 05 00.

.2 Wharf Removals.

1.3 SITE SURVEY

.1 Prior to Tender submission, visit the site and survey the extent of the removals/modifications required for this contract and include for all costs in the total tendered price. Any existing conditions information indicated on the drawings is for general guidance only.

.2 In conjunction with site visit, review structural, mechanical and electrical drawings and include all costs due to existing conditions in total tendered price.

1.4 REFERENCE STANDARDS

.1 All removal or modification work of electrical construction to be done in accordance with the safety standards outlined in the Canadian Electrical Code.

1.5 PROTECTION

.1 Be responsible for any damages to existing structure as a result of the work.

1.6 SALVAGE MATERIAL

.1 Materials and equipment identified on the drawing as being reused are to be taken down, stored, reinstalled, etc. as required to allow for new construction.

.2 Contractor must identify any damaged equipment or materials intended for reuse prior to demolition and point out deficiencies to the Engineer at that time.

1.7 DISPOSAL

.1 Prior to demolition Owner will identify any items of electrical equipment which are to be set aside as directed for future use by Owner.

.2 All other materials and equipment removed under work of this Section becomes the property of the Contractor for disposal off of property.

.3 Comply with all municipal, provincial and federal bylaws and standards when disposing of waste.

.4 Existing pole light fixture will be removed by NB Power. Contractor to remove existing wood poles off the wharf for pick-up by NB Power.

1.8 SCHEDULE

.1 The Contractor is to note that the Owner intends to carry on business as usual and work activities must be coordinated to maintain electrical services in occupied areas. Provide any required temporary work.

.2 Overtime work and work outside normal work hours as deemed necessary to accomplish this scheduling are the responsibility of the Contractor and must meet the requirements of the Department of Labour. All costs resulting from such overtime must be included in the Contractor's Estimated Total Tender Price.

.3 Coordinate with NB Power to remove all equipment, poles, lines, services, etc. from the site.

Part 2 Products

Not applicable.

Part 3 Execution

3.1 GENERAL REMOVALS

.1 Remove all existing electrical services including exposed wire and conduit, except those designated for reuse.

.2 Remove electrical services associated with existing systems.

.3 Coordinate work of this Section with other trades.

.4 Schedule all removal work with the Owner. Do not disrupt operations except as permitted by the Schedule.

3.2 CUTTING

.1 Cutting required for removals and alterations to be to the approval of the Engineer and performed with appropriate power tools.

3.3 CLEANING

.1 Reused existing equipment to be cleaned in accordance with 26 05 00.

END OF SECTION

Part 1 General

Not applicable.

Part 2 Products

2.1 MATERIALS

.1 Pressure-type wire connectors: with current-carrying parts of copper sized to fit copper conductors as required. Use twist-on connectors for #14 and smaller.

.2 In-line insulated compression connectors for #12 conductors and larger.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
- .1 Connector body and stud clamp for stranded round copper conductors;
- .2 Clamp for stranded round copper conductors;
- .3 Stud clamp bolts;
- .4 Bolts for copper conductors;
- .5 Sized for conductors as indicated.

.4 Steel clamps or connectors for flexible conduit, as required.

.5 Crimp style wire connectors, nylon insulated, with current carrying parts of copper alloy, for conductors #16 and smaller.

.6 Fork tongue, nylon insulated, crimp style terminals for connecting conductors #16 and smaller to screw down terminals.

.7 Crimp style wire connectors, nylon insulated with current carrying parts of copper alloy, for connecting solid to stranded conductors.

.8 Heavy wall shrinkable tubing with 600V insulation: 3M “Cold Shrink Splice” or approved equal.

.9 Use in-line insulated compression connectors for splices in panelboards to reduce from oversize conductors (due to voltage drop) to smaller conductors that will fit on circuit breakers.

Part 3 Execution

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:
- .1 Install mechanical pressure type connectors and tighten. Installation shall meet secureness tests in accordance with CSA C22.2 No. 65.
- .2 Install fixture type connectors and tighten.
- .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

3.2 RESTRICTION

.1 No splices are allowed in underground cables or panelboards (distribution, lighting and power) or in equipment enclosures, unless indicated otherwise.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

.1 Submit product data in accordance with Section 26 05 00.

Part 2 Products

2.1 BUILDING WIRES

.1 Conductors: minimum size 12 AWG (solid) for power and lighting; stranded for size 8 AWG and larger except as noted.

.2 Copper conductors sized as indicated with 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90 for all work.

.3 Overhead triplex 3#4/0 aluminium to be NSF-2 ACSR full size neutral.

2.2 TECK CABLE

.1 Conductors:
- .1 Grounding conductor: copper
- .2 Circuit conductors: copper size as indicated.

.2 Insulation:
- .1 Chemically cross-linked thermosetting polyethylene rated type RW90 1000V.

.3 Inner jacket: polyvinyl chloride material.

.4 Armour: flat interlocking aluminium.

.5 Overall covering: thermoplastic polyvinyl chloride material, FT4 rated.

.6 Fastenings:
- .1 One-hole steel straps to secure surface cables 50mm and smaller. Two-hole steel straps for cables larger than 50mm.

.7 Connectors:
- .1 Watertight, approved for TECK cable.

2.3 FIXTURE WIRING

.1 Temperature rating of fixture wiring entering ballast compartment of fixtures to meet manufacturer's recommendations.
- .1 For 90°C, use R90
- .2 For 105°C, use TEW
- .3 For 125°C, use GTF

2.4 COLOUR CODING

.1 All conductors to be colour coded in accordance with Section 26 05 00.1.11.

Part 3 Execution

3.1 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:
- .1 In conduit systems in accordance with Section 26 05 34.
- .2 In underground ducts in accordance with Section 26 05 44.
- .3 In trenches in accordance with Section 26 05 41.
- .4 In surface and lighting fixture raceways in accordance with Section 26 50 00.
- .5 In wireways and auxiliary gutters in accordance with Section 26 50 00.

3.2 INSTALLATION OF TECK CABLE 0 – 1000V

.1 Install cables as indicated.

.2 Group cables wherever possible on channels.

.3 Install cables in trenches in accordance with Section 26 05 41.

.4 Terminate cables in accordance with Section 26 05 20.

3.3 WIRE & CONDUIT METHODS

.1 Use standard building wire and PVC conduits or TECK cables for all branch circuits.

.2 All wire shall be #12 minimum from panel.

3.4 SITE LIGHTING

.1 Install conductors on light poles in PVC conduit from base to top of pole.

.2 Fasten at top of pole using suitable wire grip.

.3 Install conductors from junction box to luminaire as indicated. Use appropriate connectors and secure in place.

3.5 INSTALLATION OF FIXTURE WIRE

.1 Fixture wire to be installed to ballast compartment unless indicated otherwise where required for temperature rating.

END OF SECTION

Part 1 General

1.1 STANDARDS

.1 All grounding and bonding requirements shall be in accordance with the Canadian Electrical Code, Part 1.

Part 2 Products

2.1 EQUIPMENT

.1 Rod electrodes, copper clad steel 19mm dia. by 3.0m long.

.2 System and circuit, equipment, grounding conductors, bare stranded copper, untinned, soft annealed, size as indicated.

.3 Insulated grounding conductors: green, to Section 26 05 21.

.4 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
- .1 Grounding and bonding bushings
- .2 Protective type clamps
- .3 Bolted type conductor connectors
- .4 Thermit welded type conductor connectors
- .5 Bonding jumpers, straps
- .6 Pressure wire connectors

.5 Clamps for grounding of conductor, size as required to electrically conductive underground water pipe.

2.2 MANUFACTURERS

.1 Acceptable manufacturers or approved equal:
- .1 Burndy Corp.
- .2 Erico Inc. Cadweld Division
- .3 Eaton

Part 3 Execution

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including electrodes, conductors, connectors, accessories, as indicated, to conform to requirements of Engineer and local authority having jurisdiction over installation.

.2 Install connectors to manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process.

.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

.6 Soldered joints not permitted.

.7 Install an integral bonding wire in all flexible conduit connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw.

.8 Install separate ground conductor, to outdoor lighting standards.

.9 Connect building structural steel to ground by welding copper to steel.

.10 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.11 Bond single conductor, metallic armoured cables to cabinet at supply end and load end.

3.2 ELECTRODES

.1 Install ground plate electrodes and make grounding connections as indicated.

.2 Bond separate, multiple electrodes together.

.3 Use size #8 AWG copper conductors for connections to electrodes.

3.3 SYSTEM & CIRCUIT GROUNDING

.1 Install system and circuit grounding connections to neutral of secondary 208V and 600V system.

3.4 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to, the following list: Service equipment, duct systems, control panels, steel work, distribution panels, outdoor lighting.

3.5 COMMUNICATION

.1 Install grounding connections for telephone system as follows:

.1 Telephone: make telephone grounding system in accordance with telephone company's requirements: one size 6 AWG in 12mm conduit to telephone backboard ground bus with 3.0m coil left for telephone company's use.

3.6 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

END OF SECTION

Part 1 General

Not applicable.

Part 2 Products

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41mm, 2.5mm thick, stainless steel, surface mounted, suspended as required.

2.2 CHANNEL FINISH

.1 All support and fastening devices to be 316 grade stainless steel.

2.3 SPECIFIED PURPOSE SUPPORTS

.1 Specified purpose stainless, spring steel fasteners, as manufactured by Caddy, B-line or approved equal, for interior support of boxes, conduit and cable from main structures and channels.

2.2 MANUFACTURERS

.1 Acceptable manufacturers or approved equal:
- .1 Burndy Ltd.
- .2 Electrovert Ltd.
- .3 Unistrut Ltd.

Part 3 Execution

3.1 INSTALLATION

.1 Secure equipment to poured concrete with expandable inserts.

.2 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.3 Fasten exposed conduit or cables to building construction or support system using straps.
- .1 One-hole stainless steel straps to secure surface conduits and cables 53mm and smaller.
- .2 Two-hole stainless steel straps for conduits and cables larger than 53mm.

.4 Provide stainless steel metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.5 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.6 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trades and approval of Engineer.

.7 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendation.

.8 For surface mounting of two or more conduits, use channels at 1.5m oc spacing.

.9 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS & PRODUCT DATA

.1 Submit shop drawings and product data for cabinets in accordance with Section 26 05 00.

Part 2 Products

2.1 JUNCTION & PULL BOXES

.1 PVC waterproof construction with screw-on overlapping covers, complete with gasket, for surface mounting. IPEX type JB or equivalent. Use stainless steel screws/bolts for mounting. Sized as indicated on drawings.

.2 Stainless steel type 316 junction box as indicated complete with stainless screws/bolts for mounting. 150 x 150 x 100mm.

2.2 ELECTRICAL SHROUDS

.1 Aluminium shroud 9mm thick with dimensions as detailed on drawing, made from ASTM 6061 salt water rated aluminium with all seams welded on both sides. A 13mm rubber mat (type SBR-60) is to be installed between concrete deck and shroud. Provide 16mm dia. stainless steel adhesive anchors embedded 200mm into drilled holes in the concrete.

2.3 PANEL B ALUMINUM ENCLOSURE

.1 NEMA Type 4X, 9mm thick ASTM 6061 salt water rated aluminum enclosure with all seams welded on both sides, hinged door and return flange overlapping sides, handle and catch, painted white steel inner panel for surface mounting, complete with heavy-duty padlock and two (2) keys.

.2 Cabinet to be 1514mm (H) x 1000mm (W) x 305mm (D).

2.4 STAINLESS STEEL CABLE GUARDS ON WHEEL GUARDS

.1 Stainless steel 316 grade TECK cable guards for wheel guards on wharf 404.

.2 Guard to be 4.07mm thick; 2-50mm flat sections and 1-75mm 180˚ curved sections as detailed on drawing E1 of 3, detail 3.

.3 Fasten guard to wood wheel guard with 6mm 316 grade stainless steel lug bolts every 300mm horizontally on both top and bottom of guard.

2.5 MANUFACTURERS

.1 Electrical shrouds to be manufactured by the following companies:
- .1 Atelier PMC Machine Shop, Shippagan - 1-506-336-4205
- .2 The Panel Shop, Fredericton - 1-506-455-1925

.3 LITECO, Moncton - 1-506-857-4171

Part 3 Execution

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations. Location must be coordinated with other trades.

.2 Mount cabinets, with top not higher than 610mm above finished floor.

.3 Size and install cabinets to CEC requirements.

.4 Only main junction and pull boxes are indicated. Provide pull boxes so as not to exceed 30.0 m of conduit run between pull boxes.

3.2 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Install size 2 identification labels indicating system name, voltage and phase.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

.1 Submit product data in accordance with Section 26 05 00.

Part 2 Products

2.1 OUTLET & CONDUIT BOXES - GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 PVC (150 x 150 x 100)mm and (200 x 200 x 100)mm and (300 x 300 x 200)mm outlet boxes, or sized as required, for special devices and requirements. Weatherproof c/w gaskets.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 CONDUIT BOXES

.1 Cast FS or FD feraloy boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.

.2 20A TL receptacle and 50A 2P receptacle outlet.

.3 Acceptable manufacturers or approved equal:
- .1 HUBBELL Cat. #HBL60CM83 conduit box
- .2 Leviton
- .3 Pass & Seymour

2.3 FITTINGS - GENERAL

.1 PVC bushing and connectors (watertight).

.2 Knockout fillers to prevent entry of foreign materials or water.

.3 Conduit outlet bodies for conduit up to 32mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

.5 Set-screw type steel bushings and connectors for EMT fittings unless indicated otherwise. Nylon insulated throats for 25mm conduits and larger.

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 Provide correct size of openings in boxes for conduit and armoured cable connections. Reducing washers not allowed.

END OF SECTION

Part 1 General

1.1 LOCATION OF CONDUIT

.1 Drawings do not show all conduits. Those shown are in diagrammatic form only.

Part 2 Products

2.1 CONDUITS

.1 Rigid PVC conduit: size as indicated.

.2 Rigid steel conduit, hot dipped galvanized after fabrication.

.3 FRE conduit, ID based standard conduit.

.4 Electrical metallic tubing (EMT), with steel set screw couplings and connectors.

.5 Flexible metal conduit and liquid-tight flexible metal conduit.

2.2 CONDUIT FASTENINGS

.1 One-hole PVC straps to secure surface conduits 50mm and smaller. Two-hole PVC straps for conduits larger than 50mm. Use stainless steel screws/bolts for mounting hardware.

.2 Channel type supports for two or more conduits at 1.5 oc.

.3 6mm diameter threaded rods to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings manufactured for use with conduit specified. Coating: same as conduit. "O" ring expansion joints and watertight junction box adapters/couplings. Provide PVC expansion joints at all structural expansion joints and at all locations where PVC conduit exits underground.

.2 Factory "ells" where 90 degree bends are required for conduits larger than 40mm.

.3 Steel set screw connectors and couplings for EMT unless indicated otherwise.

.4 Steel watertight connectors and couplings for EMT where indicated.

.5 Acceptable manufacturer or approved equal:
- .1 Ipex-Scepter Cat. #SE-J-35 or sized to fit conduit
- .2 Cannon
- .3 Royal Pipe

2.4 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 INSTALLATION

.1 Install conduits to conserve space in exposed locations and cause minimum interference in spaces through which they pass.

.2 Use rigid PVC conduit under ground floor slab and in poured concrete unless indicated otherwise. Install an integral ground wire in all PVC conduit.

.3 Use liquid tight flexible metal conduit for connections to exterior light fixtures unless indicated otherwise and to equipment in damp or wet locations.

.4 Install fish cord in empty conduits.

.5 Where conduits become blocked, remove and replace blocked section.

.6 Dry conduits out before installing wire.

.7 Conduit sizing, where indicated, is based on copper conductors and PVC conduit. NUAL is not to be used.

.8 Use rigid steel conduit for exterior exposed above grade work.

.9 Use FRE conduit for underground wharf services, unless indicated otherwise.

.10 Use EMT for interior feeders and branch circuit work except in poured concrete, underground and where subject to mechanical damage, unless indicated otherwise. When used for panel feeders, install a separate integral ground wire sized in accordance with the CEC.

.11 Use flexible metal conduit for connection to motors in dry areas and interior light fixtures.

.12 Bend conduit cold. Replace conduit if kinked or flattened more than $1/10^{th}$ of its original diameter.

.13 Mechanically bend steel conduit over 19mm diameter.

.14 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

3.2 SURFACE CONDUITS

.1 Run parallel or perpendicular to construction lines.

.2 Run conduits in center portion of concrete wharf deck.

.3 Group conduits wherever possible.

.4 Do not pass conduits through structural members.

3.3 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel. Install in centre one-half of slab.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall.

.4 Where conduits pass through waterproof membrane, provide oversized sleeve before membrane is installed. Use cold mastic between sleeve and conduit.

.5 Encase conduits completely in concrete.

3.4 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

.1 Run conduits 25mm and larger below slab. Provide 50mm of sand over conduits below floor slab.

3.5 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Conduits rising up from below grade to penetrate the floor/wharf at 90° angles. Slanted conduits not permitted.

3.6 CONDUIT SEALANT

.1 All conduit terminations entering buildings or enclosures, to be sealed to prevent entrance of water and condensation.

.2 Sealant to be a two-part polyurethane conduit, sealing compound installed as per manufacturer's instructions.

.3 Standard of acceptance:
.1 Multiurethanes Multi-Paste.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

.1 Work included in this section consists of the excavating, backfilling and trenching required to install cables and ducts by general contractor and supply and installation of ducts, spacers and marker tape by Division 26.

1.2 RELATED WORK

.1 Concrete-encased underground cable duct: Section 26 05 41.

1.3 PROTECTION

.1 Protect excavated earth to be reused from freezing by approved method.

.2 Grade around excavations to prevent surface water runoff into excavated area.

1.4 INSPECTION & TESTING

.1 Testing of materials and compaction will be carried out by testing laboratory designated by Engineer.

.2 Engineer will pay costs for inspection and testing.

1.5 UTILITY LINES

.1 Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify Engineer of findings.

.2 Make good damage to existing utility lines resulting from work.

1.6 PERMITS, FEES & INSPECTIONS

.1 Obtain prior approval from the Municipality/Owner for street cuts. Pay any fees required.

.2 Repairs to meet Municipality/Owner standards and approval.

Part 2 Products

2.1 BACKFILL MATERIALS

.1 Bedding sand: clean, washed, coarse bank sand free from clay, shale and organic matter.

.2 Common backfill materials: excavated soil selected from trench bottom or from other source, free from roots, rocks larger than 75mm and building debris and approved by Engineer before used as fill.

.3 Granular backfill:

.1 Clean, hard, durable, uncoated particles free from clay lumps, cementation, organic or other objectionable material, meeting following gradation limits:

ASTM Sieve Designation	% Passing
50.0 mm	100
31.5 mm	60 -100
16.0 mm	40 - 75
4.75 mm	25 - 60
2.0 mm	20 - 45
425 micrometers	10 - 25
75 micrometers	0 – 10

2.2 CABLE MARKER SHEET

.1 Polyethylene marker sheet: to be 150mm wide for burial 300mm below grade directly over buried cable.

.2 Marker sheet to be orange in colour with the following words printed in large black block letters: "CAUTION CAUTION CAUTION - BURIED ELECTRIC LINE BELOW".

The above-described message is to be printed every 914mm minimum of marker sheet.

Part 3 Execution

3.1 EXCAVATIONS

.1 Excavate to lines, grades, elevations and dimensions as indicated on drawings or as directed.

.2 Cut edges of asphalt pavement with suitable cutting wheel or jack hammer and saw cut reinforced concrete deck prior to excavation. Cut only to width required to install services.

.3 Remove unsuitable material from trench bottom to extent and depth directed by Engineer.

.4 Stockpile suitable excavated materials required for trench backfill in approved location.

.5 Dispose of surplus and unsuitable excavation material off site.

.6 Where required due to removal of unsuitable material or unauthorized over excavation, bring bottom of excavation to design grade with common backfill material.

.7 Compact trench bottom to density at least equal to density of adjacent surrounding soil.

.8 Excavations require inspection and approval prior to commencement of installation operations.

3.2 BEDDING INSTALLATION

.1 Place sand bed in trenches where cable ducts are direct buried.

.2 Ensure that trench has been excavated to the proper required depth.

.3 Cover bottom of trench with 75mm of sand.

.4 Lay cable ducts in trench in accordance with Section 26 05 41.

3.3 BACKFILLING & COMPACTION

.1 Do not proceed with final trench backfilling operations until installation of cable ducts is complete and that Engineer has inspected installations.

.2 Use approved common backfill material as indicated or directed.

.3 Backfill around installation as shown.

.4 Place backfill material in uniform layers not exceeding 150mm in thickness up to sub-grade elevation or top of trench. Compact each layer before placing succeeding layer.

.5 Compact common backfill materials as follows:

- .1 In non-pavement areas to a density at least equal to density of adjacent, undisturbed soil.
- .2 In pavement areas and sod areas to a minimum of 95% density for ASTM D698-78 maximum density.

.6 Dispose of surplus backfill material off property after backfilling operations are complete.

3.4 CABLE MARKER TAPE

.1 Install polyethylene marker tape in trenches where cables are installed in cable ducts.

.2 Place marker tape 300mm below final grade; continuous over full length of cable run.

3.5 RESTORATION OF EXISTING SURFACES AFFECTED

.1 The following paragraphs are intended for complete reinstatement of all the existing surfaces disturbed by the excavations of this section.

.2 Where existing grassed areas are encountered during excavations, stock pile reusable materials for replacement after cable or duct installation and backfilling are completed.

.3 Where existing asphalt pavement is encountered during excavations, remove all asphalt debris from site and after cable duct installation and backfilling are completed, provide new base coarse and asphalt pavement to match existing.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Trenching: Section 26 05 40.

.2 Concrete Formwork: Section 03 30 00.

.3 Concrete Reinforcement: Section 03 20 00.

.4 Cast-in-place Concrete: Section 03 30 00.

Part 2 Products

2.1 MATERIALS

.1 PVC underground telecommunications cable ducting: to CSA B196.3.

.2 Plastic underground power cable ducting: to CSA B196.1.

2.2 PVC DUCTS

.1 PVC ducts, type DB2, encased in reinforced concrete, size as indicated for power and telephone.

2.3 PVC DUCT FITTINGS

.1 Rigid PVC opaque solvent welded type couplings, balloon-end fittings, plugs, caps, adapters as required to make complete installation.

.2 Expansion joints as indicated.

.3 Rigid PVC 5° angle couplings as indicated.

.4 Base and intermediate plastic spacers as required.

.5 Rigid PVC 90° & 45° bends as required.

2.4 RIGID STEEL CONDUITS

.1 To Section 26 05 34.

.2 Couplings, reducers, plugs, caps, adapter and supports as required to make a complete installation.

.3 Use long sweep bends only.

2.5 CABLE PULLING EQUIPMENT

.1 6mm stranded polypropylene bare pull rope tensile strength 5kn continuous throughout each duct run with 3m spare rope at each end.

2.6 MARKERS

.1 Over all underground duct and pipe runs, install continuously, at 300mm below grade, 75mm wide electrical underground polyethylene marking tape with warning "CAUTION CAUTION CAUTION, UNDERGROUND LINES BELOW".

Part 3 Execution

3.1 INSTALLATION - GENERAL

.1 Install reinforced concrete encased underground duct banks, including form work.

.2 Build duct bank on undisturbed soil or on well-compacted granular fill not less than 150mm thick, compacted to 95% of maximum proctor dry density.

.3 Open trench completely before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.

.4 Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.

.5 Install base spacers at maximum intervals of 1.5m levelled to grades indicated for bottom layer of ducts.

.6 Lay PVC ducts with configuration and reinforcing as indicated with preformed interlocking, rigid plastic intermediate spacers to maintain spacing between ducts at not less than 75mm horizontally and vertically. Stagger joints in adjacent layers at least 150mm and make joints watertight. Encase duct bank with 75mm thick concrete cover. Use galvanized steel conduit for sections extending above finished grade level.

.7 Make transpositions, offsets and changes in direction using 5 degree bends sections, do not exceed a total of 20 degrees with duct offset.

.8 Terminate duct runs with a duct coupling set flush with the end of the concrete envelope when dead ending duct bank for future extension.

.9 Cut, ream and taper end of ducts infield to manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.

.10 Allow concrete to attain 50% of its specified strength before backfilling.

.11 Use conduit to duct adapters when connecting to conduits

.12 Use anchors, ties and trench jacks as required to secure ducts and prevent moving during pouring of concrete. Tie ducts to spacers with twine or other non-metallic material. Remove weights or wood braces before concrete has set and fill voids.

.13 Clean ducts before laying. Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.

.14 Immediately after pouring of concrete, pull through each duct a mandrel followed by a stiff bristle brush to remove sand, earth and other foreign matter. Avoid disturbing or damaging ducts where concrete has not set completely. Pull stiff bristle brush through each duct immediately before pulling in cables.

.15 Install four 3m lengths of 15M reinforcing rods, one in each corner of duct bank when connecting duct to buildings.

3.2 INSPECTIONS

.1 Advise Engineer so that he may inspect ducts prior to pouring and be present during pour of concrete and clean-out.

END OF SECTION

Part 1 General

Not applicable.

Part 2 Products

Not applicable.

Part 3 Execution

3.1 CABLE INSTALLATION IN DUCTS

.1 Install cables as indicated in ducts.

.2 Do not pull spliced cables inside ducts.

.3 Install multiple cables in duct simultaneously.

.4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.5 To facilitate matching of colour coded multi-conductor control cables; reel off in same direction during installation.

.6 Before pulling cable into ducts and until cables are properly terminated, seal ends of cables with moisture seal tape.

.7 After installation of cables, seal duct ends with duct sealing compound.

.8 Install in each empty conduit a pull rope continuous throughout each duct run with 3m spare at each end.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00.

.2 Perform tests using qualified personnel. Provide necessary instruments and equipment.

.3 Check phase rotation and identify each phase conductor of each feeder.

.4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is no less than 50 megohms.

.5 Tests:

- .1 After installing cable, but before splicing and terminating, perform insulation resistance test with 1000V megger on each phase conductor.
- .2 Check insulation resistance after each termination to ensure that cable system is no less than 50 megohms.

.6 Provide Engineer with list of test results showing location at which each test was made, circuit tested and result of each test.

.7 Remove and replace entire length of cable if cable fails to meet any of the test criteria.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Excavation and Backfilling: Section 26 05 40.

Part 2 Products

2.1 MATERIALS

.1 Plastic underground power cable ducting: to CSA B196.1.

2.2 PVC DUCTS

.1 PVC ducts, size as indicated for power and telephone.

2.3 PVC DUCT FITTINGS

.1 Rigid PVC opaque solvent welded type couplings, plugs, caps, adapters as required to make complete installation.

.2 Expansion joints as indicated.

.3 Rigid PVC 5° angle couplings as indicated.

2.4 FRE CONDUITS AND FITTINGS

.1 FRE conduits for direct burial.

.2 FRE couplings, reducers, bell end fittings, plugs, caps, adaptors as required to make complete installation.

.3 FRE 90° and 45° bends as required.

.4 FRE 5° angle couplings as required.

.5 Expansion joints as required.

2.5 CABLE PULLING EQUIPMENT

.1 6mm stranded nylon pull rope tensile strength 5kn.

2.6 MARKERS

.1 150mm wide polyethylene marker tape with wording "CAUTION CAUTION CAUTION – UNDERGROUND CABLES BELOW", installed continuously over all underground ducts, 300mm below finished grade.

Part 3 Execution

3.1 INSTALLATION

.1 Install duct as indicated and in accordance with manufacturer's instructions.

.2 Clean inside of ducts before laying.

.3 Ensure full and even support every 1.5m throughout duct length.

.4 Slope ducts as indicated with 1 to 400 minimum slope.

.5 During construction, cap ends of ducts to prevent entrance of foreign materials.

.6 Pull through each duct a steel or wooden mandrel not less than 300mm long and of a diameter 6mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling in cables.

.7 In each duct, install pull rope continuous throughout each duct run with 3.0m spare rope at each end.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 26 05 00.

.2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

1.2 PLANT ASSEMBLY

.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements, manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

Part 2 Products

2.1 PANELBOARDS

.1 Panelboards: to CSA C22.2 No. 29.

.2 Panelboards to be product of one manufacturer.

.3 250V and 600V panelboards: bus and breakers rated for 22,000A symmetrical interrupting capacity or as indicated.

.4 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number.

.5 Panelboards: mains c/w 200A 2P main circuit breaker, number of circuits, and number and size of branch circuit breakers as indicated on drawings.

.6 Two keys for each panelboard and key panelboards alike.

.7 Copper bus with neutral of same ampere rating as mains.

.8 Mains: suitable for bolt-on breakers.

.9 Trim and door finish: baked grey enamel.

.10 Panelboards to have a minimum of 33% spare space unless indicated otherwise.

2.2 BREAKERS

.1 Breakers to Section 26 28 21.

.2 Breakers with thermal magnetic tripping in panelboards except as indicated.

.3 Lock-on devices for 10% of 15A to 50A breakers installed as indicated. Turn over unused lock-on devices to owner.

2.3 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Nameplate for each panelboard size 4 engraved as indicated.

.3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.

.4 Complete circuit directory and typewritten legend showing location and load of each circuit.

2.4 MANUFACTURERS

.1 Acceptable manufacturers or approved equal:
- .1 Siemens
- .2 Cutler-Hammer #PRL1a-P1aB1C2-24ED/CS2036/CFT2036S
- .3 General Electric
- .4 Schneider

Part 3 Execution

3.1 INSTALLATION

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Mount panelboards to height given in Section 26 05 00 or as indicated.

.3 Connect loads to circuits as indicated.

.4 Connect neutral conductors to common neutral bus with respective neutral identified.

.5 Commission owner’s metering.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS & PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 26 05 00.

Part 2 Products

2.1 SWITCHES

.1 15A, 120V, single pole, as indicated.

.2 Manually operated general purpose ac switches as indicated and with the following features:
- .1 Terminal holes approved for No. 10 AWG wire.
- .2 Silver alloy contacts.
- .3 Urea or melamine moulding for parts subject to carbon tracking.
- .4 Suitable for back and side wiring.
- .5 Black toggle.
- .6 Marine grade.

.3 Toggle operated fully rated for tungsten filament and fluorescent lamp, and up to 80% of rated capacity of motor loads.

.4 Switches of one manufacturer throughout project.

.5 Standard of acceptance:
- .1 For 15A, 120V almond switches:
  - .1 Arrow Hart
  - .2 Bryant
  - .3 Hubbell #CS115AL c/w HBL1795/HBL60CM84
  - .4 Leviton
  - .5 Pass & Seymour

2.2 RECEPTACLES

.1 Marine grade duplex receptacles as indicated, CSA Type 5-15 R, 125V, 20A, U ground, with the following features:
- .1 Yellow urea moulded housing, nylon front.
- .2 Suitable for No. 10 AWG for back and side wiring.
- .3 Break-off links for use as split receptacle.
- .4 Eight back wired entrances, four side wiring contacts.
- .5 Double wipe contacts and riveted grounding contacts.
- .6 Complete with backbox and in-use coverplate.

.2 Acceptable manufacturers or approved equal:
- .1 Hubbell #HBL52CM62/RW57350/HBL60CM84
- .2 Leviton
- .3 Pass & Seymour

.3 Single marine grade 50A, 120/240V receptacle twist lock c/w coverplate and backbox:
- .1 Hubbell #HBL63CM70/HBL77CM74WO/HBL60CM84

2.3 COVERPLATES

.1 Coverplates for wiring devices.

.2 Coverplate from one manufacturer throughout project.

.3 One-gang weather proof coverplate for wiring devices mounted on a surface mounted outlet box.

2.4 PLYWOOD, WOOD POSTS AND POLES

.1 Plywood to be 27mm thick marine grade.

.2 Wood posts to be 200 x 200 x 4073mm pressure treated.

.3 Wood poles to be Class 3 Jack Pine, 15 meters long, pressure treated.

.4 All bolts, washers, lock washers and nuts for wood connections to be hot dipped galvanized steel.

2.5 EXPANSION JOINTS

.1 Expansion joints to be IPEX Cat. #SE-I-35 or equal (Cannon, Royal).

2.6 PANEL HEAT STRIP

.1 Stainless steel strip heater:
- .1 Stainless steel sheathed heater.
- .2 Controlled by remote thermostat.
- .3 Direct mount.

.2 Acceptable manufacturer or approved equal:
- .1 CCI THERMAL TECH #SD2171 c/w thermostat.

Part 3 Execution

3.1 INSTALLATION

.1 Switches:
- .1 Install single throw switches with handles in “UP” position when switch closed.
- .2 Install switches in gang type outlet box when more than one switch is required in one location.
- .3 Mount toggle switches at height specified in Section 26 05 00 or as indicated.

.2 Receptacles:
- .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
- .2 Mount receptacles at height specified in Section 26 05 00 or as indicated.

.3 Cover plates:
- .1 Protect cover plate finish with paper or plastic film until painting and other work is finished.

.2 Do not use cover plates meant for flush outlet boxes on surface mounted boxes.
.3 Install suitable common cover plates where wiring devices are grouped.

.4 Use only screw down terminals for connecting wiring devices to circuits.

.5 Install pin and sleeve receptacles and convenience receptacles as indicated.

3.2 IDENTIFICATION

.1 Identify all outlets with size 5 nameplate indicating source, circuit number, voltage, ampacity and phasing.

.2 Provide separate nameplate to identify outlets for use by “Fisherman” or “Buyer”.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS & PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 26 05 00.

1.2 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Section 26 05 00.

.2 Three spare fuses of each type and size installed up to and including 600A.

1.3 DELIVERY & STORAGE

.1 Ship fuses in original containers.

.2 Do not ship fuses installed.

.3 Store fuses in original containers in storage cabinet.

Part 2 Products

2.1 FUSES - GENERAL

.1 HRC fuses: to have interrupting capability of 200,000 A symmetrical.

.2 Fuses: product of one manufacturer.

2.2 FUSE TYPES

.1 HRC-1 fuses (formerly Class L):
  .1 Type L2, fast acting, plus two spares.

.2 Time delay 45A for welder/winch.

.3 100% rates fuses where indicated (Type J).

.4 Fuses in junction box at bottom of wood pole to be GEC #CRS30H fuse fitted with 6 Amp Type C fuse for camera disconnect; and GEC #CRS30H fuse fitted with 12 Amp Type C fuse for 2-353W LED light fixtures.

2.3 MANUFACTURERS

.1 Acceptable manufacturers or approved equal:
  .1 English Electric
  .2 GEC Canada Ltd.
  .3 Gould-Shawmut Company
  .4 Littelfuse

Part 3 Execution

3.1 INSTALLATION

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Ensure correct fuses fitted to physically matched mounting devices.

.3 Ensure correct fuses fitted to assigned electrical circuit.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

.1 Submit product data in accordance with Section 26 05 00.

.2 Include time current characteristic curves for breakers with ampacity of 400A and over.

Part 2 Products

2.1 BREAKERS GENERAL

.1 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.

.2 Common-trip breakers with single handle for multi-pole applications.

.3 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3 - 10 times current rating.

.4 Circuit breakers with interchangeable trips as indicated.

.5 100% rated circuit breakers where indicated on drawings.

2.2 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping.

2.3 OPTIONAL FEATURES

.1 Include ground fault interrupting capability (5ma maximum) where indicated.

.2 Supply new 200A, 2P circuit breaker in existing Panel ‘A’ – Siemens QJ22B200.

2.4 MANUFACTURERS

.1 Acceptable manufacturer or approved equal:
- .1 Siemens
- .2 Cutler-Hammer
- .3 General Electric
- .4 Schneider

Part 3 Execution

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

.1 Submit product data in accordance with Section 26 05 00.

Part 2 Products

2.1 DISCONNECT SWITCHES

.1 Enclosed manual air break switches in non-hazardous locations: to DSA C22.2 No. 4.

.2 Fuseholder assemblies to CSA C22.2 No. 39.

.3 Heavy-duty fusible disconnect switch in CSA type 4X stainless steel enclosure. 400A fusible disconnect switch to be in watertight CSA Type 4X, 316 grade stainless steel enclosure.

.4 Provision for padlocking in ON-OFF switch position complete with heavy-duty padlock.

.5 Mechanically interlocked door to prevent opening when handle in ON position.

.6 Quick-make, quick-break action.

.7 Fuseholders in each fused switch suitable without adapters, for type of fuse as indicated.

.8 ON-OFF switch position indication on switch enclosure cover.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Indicate name of load controlled on size 4 nameplate.

2.3 MANUFACTURERS

.1 Acceptable manufacturers or approved equal:
- .1 Siemens
- .2 Cutler-Hammer Cat. #4HD 325NSS or equal
- .3 General Electric
- .4 Schneider

Part 3 Execution

3.1 INSTALLATION

.1 Install disconnect switches complete with fuses as indicated.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

.1 Submit product data in accordance with Section 26 05 00.

Part 2 Products

2.1 CONTACTORS

.1 Contactors: to EEMAC No. 1CS.

.2 Electrically held controlled by pilot devices as indicated and rated for type of load Controlled, min. 8 pole, 30A rating. Half size contactors not accepted.

.3 Breakers combination contactor as indicated.

.4 Complete with normally open and normally closed auxiliary contacts unless indicated otherwise.

.5 Mount in CSA Enclosure 3R unless indicated otherwise.

.6 Including following options in cover as indicated.
- .1 Red indicating lamp
- .2 HAND-OFF-AUTO selector switch

.7 Control transformer in contactor enclosure where indicated.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00.

.2 Size 4 nameplate indicating name of load controlled.

2.3 MANUFACTURERS

.1 Acceptable manufacturers or approved equal:
- .1 Siemens
- .2 Cutler-Hammer
- .3 General Electric
- .4 Schneider

Part 3 Execution

3.1 INSTALLATION

.1 Install contactors and connect auxiliary control devices as indicated.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Electrical General Provisions: Section 26 05 00.

1.2 PROJECT DATA

.1 Submit project data in accordance with Section 26 05 00.

Part 2 Products

2.1 ELECTRONIC TIME CLOCK

.1 Six-channel solid-state digital timer, keypad entry, digital LED readout.

.2 7-day control with skip-a-day feature.

.3 Contacts rated 30A tungsten per pole up to 120V.

.4 Contacts independent of load switches.

.5 8-hour battery carryover.

.6 CSA 1 enclosure.

.7 120V, 60Hz.

.8 Manual “ON-OFF-REVIEW-SET” selector.

.9 Astrodial.

.10 Seasonal programming.

.11 Acceptable manufacturers or approved equal:
- .1 Intermatic
- .2 Paragon
- .3 Tork #k400Z 120VAC

Part 3 Execution

3.1 INSTALLATION

.1 Install time switch controls as indicated.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Lighting Equipment: Section 26 50 00.

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section 26 05 00.

Part 2 Products

2.1 PHOTOELECTRIC LIGHTING CONTROL

.1 Swivel pipe nipple box mounting.

.2 Capable of switching 1500W of lighting at 120V.

.3 Voltage variation: + or – 10%.

.4 Temperature range: -40℃ to 70℃.

.5 Switching on lights at 12 lx.

.6 Switching on lights at 110 lx maximum.

.7 Rated for 5000 operations.

.8 Options:
- .1 Lighting arrestor
- .2 Fail-safe circuit completed when relay de-energized.
- .3 Twist-lock type double pole receptacle switch.
- .4 Terminal strip.

.9 Switching time delay of 30 s.

.10 Wall mounting bracket, stainless steel.

.11 Colour coded leads: size 10 AWG 460mm long.

.12 Standard of acceptance:
- .1 Paragon #CW-201-00
- .2 Tork #2101
- .3 Intermatic #K4221

Part 3 Execution

3.1 INSTALLATION

.1 Install photoelectric controls as indicated.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 26 05 00.

.2 Submit complete photometric data prepared by independent testing laboratory for luminaires specified, for review by Engineer.

1.2 EQUIVALENT MANUFACTURERS

.1 The manufacturer and catalogue numbers used herein are to establish an acceptable standard of quality. Equivalent products by the listed luminaire manufacturers may be used as alternatives subject to verification of photometric data and construction material at the shop drawing stage.

.2 Standard of acceptance:
- .1 Holophane
- .2 Appleton
- .3 Crouse-Hinds

Part 2 Products

2.1 LED LIGHT ENGINE

.1 Light engine to have 353W of high powered LED's with nine (9) modules.

.2 CRI to be 70 with colour temperature of 4000K.

.3 LED driver to be rated for 100,000 hours.

.4 Delivered lumens to be 29,456 with current of 1050ma @ 120V.

.5 BUG rating of B3-U3-G3.

.6 Acceptable manufacturer:
- .1 Holophane Cat. #PLLED-9-4K-10A
- .2 Appleton
- .3 Crouse-Hinds

2.2 FINISHES

.1 Baked enamel finish:
- .1 Conditioning for metal before painting:
  - .1 For corrosion resistance conversion coating to CGSB 31-GP-103M.
  - .2 For paint base, conversion coating to CGSB 31-GP-105M, CGSB 31-GP-106A.
- .2 Metal surfaces of luminaire housing and reflectors finished with high gloss baked enamel to give smooth, uniform appearance, free from pinholes or defects.
- .3 Inside surfaces finished as follows:
  - .1 White, minimum reflection factor 85%.
  - .2 Colour fastness: yellowness factor not above 0.02 and after 250 hr.

exposure in Atlas fadeometer not to exceed 0.05.

.3 Film thickness, not less than 0.3mm average, and in no areas less than 0.025mm.

.4 Gloss not less than 80 units as measured with Gardner 60 deg. glossmeter.

.5 Flexibility: withstand bending over 12mm mandrel without showing signs of cracking or flaking under 10 times magnification.

.6 Adhesion: 24mm square lattice made of 3mm squares cut through film to metal with sharp razor blade. Adhesive cellulose tape applied over lattice and bulled. Adhesion satisfactory if no coating removed.

.2 Alzak finish:

.1 Aluminium sheet fabricated from special aluminium alloys and chemically brightened, subsequently anodically treated to specifications established by Alcoa, to produce:

.1 Finish for mild commercial service, minimum density of coating 0.8 mg/sq.cm., minimum reflectivity 83% for specular and 75% for diffuse.

.2 Finish for regular industrial service, minimum density of coating 1.2 mg/sq.cm., minimum reflectivity 82% for specular and 73% for diffuse.

.3 Finish for heavy duty service, minimum density of coating 1.5 mg/sq.cm. minimum reflectivity 78% for specular 65% for diffuse.

2.3 LUMINAIRE – TYPE A

ITEM	DESCRIPTION	LED	MOUNTING
1.	FLOOD LIGHT WITH 353 WATTS OF LED's	HOLOPHANE 9-4K-10A	1. MOUNTED ON 600mm GALVANIZED STEEL LIGHTING ARM ATTACHED TO WOOD POLE WITH GALVANIZED BOLTS, WASHERS AND NUTS. SUPPLY AND INSTALL STAINLESS STEEL BIRD SPIKES ON TOP OF FLOOD LIGHT, ARM AND WOOD POLE. BIRD SPIKES TO BE BIRD-X TYPE C/W EPOXY ADHESIVE IN CASES WHERE S/S BANDING OR S/S NAILS/SCREWS ARE NOT PRACTICAL.
2.	SEALED OPTICAL SYSTEM IP65 RATED		
3.	EPA RATED AT 0.125 SQ. METERS		
4.	WEIGHT 19.1 KG		
5.	REDUCED GLARE WITH REFLECTOR AND INTERNAL PRISM REFRACTORS		

(Cont'd)

ITEM	DESCRIPTION	LED	MOUNTING
6.	LED's TO HAVE INDIVIDUAL PRE-ORIENTED LENS TO PROVIDE TYPE 3 ASYMETRICAL DISTRIBUTION		
7.	LUMINAIRE TO BE CUSTOM PAINTED WITH CLEAR COAT		
8.	ACCEPTABLE MANUFACTURER HOLOPHANE CAT. #PLLED-9-4K-10A-AS-45-5-L-GP-05-23-08657-GP		

2.4 BIRD SPIKES

.1 Stainless steel bird spikes are to be installed on top of the light fixtures, arms and wood poles.

2.5 ACCEPTABLE MANUFACTURER OR APPROVED EQUAL:

.1 Holophane
.2 Crouse-Hinds
.3 Appleton

Part 3 Execution

3.1 INSTALLATION

.1 Locate and install luminaires as indicated.

.2 Supply and install all material required for proper mounting of all luminaires.

3.2 WIRING

.1 Connect luminaires to lighting circuits.

3.3 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted individually parallel or perpendicular to building grid lines.

.2 Align luminaires at night-time under direction of Engineer. Allow for four hours time with three men and bucket truck so that alignment can be made to satisfaction of client.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Section 01 35 43 - Environmental Procedures.

1.2 Measurement Procedures

.1 Excavation above elev. +1.22m: All excavation materials above elevation +1.22m (Dry materials) will be measured for payment by the cubic metre truck measure (CMTM) for work completed. Price will include stockpiling of dry material on the existing containment cell area as shown on drawings or as directed. Supply and place a silt fence at no additional cost. Do not intermix dry and wet materials.

.2 Dredging below elev. +1.22m: All dredging materials below elevation +1.22m (Wet materials) will be measured for payment by the cubic metre truck measure (CMTM) for work completed. Price will include stockpiling of wet material on the existing containment cell area as shown on drawings or as directed. Wet material must be protected by a silt fence at no additional cost.

.3 New R5 Granular Backfill: New R5 granular backfill material will be measured by the metric tonnes of material supplied and acceptably placed in the works to the lines and grades specified. Payment will include supply, handling, stockpiling, mixing, placing, compacting, trucking and all related work.

.4 Granular Base Material: will be measured by the metric tonnes of material supplied and acceptably placed in the works to the lines and grades as shown on drawings.

.5 Granular Sub-Base Material: will be measured by the metric tonnes of material supplied and acceptably placed in the works to the lines and grades as shown on drawings.

1.3 References

.1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.2 American Society for Testing and Materials (ASTM)
.1 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.4 Submittals

.1 Samples:
.1 Submit samples in accordance with Section 01 33 00.
.2 Inform Departmental Representative at least 4 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling.

1.5 Protection of Existing Features

.1 Existing buried utilities and structures:
.1 Maintain and protect from damage, water, electric, and other utilities and structures encountered.
.2 Where utility lines or structures exist in area of excavation, obtain direction of the Departmental Representative before removing or re-routing. Costs for such Work to be paid by the Departmental Representative.
.3 Record location of maintained, re-routed and abandoned underground lines.

PART 2 - PRODUCTS

2.1 Materials

.1 New R5 Granular Backfill: to consist of hard, durable, quarry or pit run material of an approved quality. The material will be free from frost, snow stumps, weeds, sod, roots, logs, silt, organic material, garbage, or any other waste materials and must be capable of being compacted to degree as specified herein and meeting approval of the Departmental Representative. Material to be uniformly graded having a stone size between 75 and 200 mm (R5 random rip-rap) on any dimension. Slate, sandstone or shale rock will not be accepted. Specific gravity not less than 2.65 when tested to ASTM C127-12 (AASHTO T85-14).

.1 Gradation to meet NBDOT 'R5' Random Rip-Rap limits as follows:

ASTM Sieve size	% passing
220 mm	100
190 mm	70 - 90
150 mm	40 - 55
70 mm	0 - 15

.2 Granular Base and Sub-Base:

.1 Granular Base rock, clear, hard durable, angular, crushed quarried rock aggregate free from silt, clay lumps, organic matter, foreign substances and free from splits, seams or defects. Specific gravity not less than 2.6 when tested to ASTM C127-12 (AASHTO T85-14).

.2 Gradation to be within following limits when tested to ASTM C136-06 and ASTM C117-13 and giving a smooth curve without sharp breaks when plotted on a semi-log grading chart.

.3 Gradation - Granular Base:

ASTM Sieve Size	% Passing
31.5 mm	95-100
25.0 mm	81-100
19.0 mm	66-90
12.5 mm	50-77
9.5 mm	41-70

4.75 mm	27-54
2.36 mm	17-43
1.18 mm	11-32
300 µm	4-19
75 µm	0-8

.4 Gradation - Granular sub-base material:

ASTM Sieve Size	% Passing
75.0 mm	100
0.425 mm	30 max
0.075 mm	8 max

PART 3 - EXECUTION

3.1 EXCAVATION

.1 Site excavation/dredging to consist of the removal of all material and substrate bottom material to the excavation/dredging limits as indicated on the drawing and as directed by the Departmental Representative.

.2 Contractor to submit excavation/dredging method adjacent to existing wharf structures. Method to define protection of existing structures and foundations.

3.2 Backfilling

.1 Do not proceed with backfilling operations until the Departmental Representative has inspected and approved areas to be backfilled.

.2 Install filter fabric on back side of panels and as shown.

.3 Place R5 random rip-rap backfill material into the bottom of the backfilled areas. Backfilling below LNT and up to 400 mm above LNT may be end dumped.

.4 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.5 Do not use backfill material which is frozen or contains ice, snow or debris.

.6 Place backfill material in uniform layers not exceeding 300 mm compacted thickness. Compact each layer to create a firm, dense and rigid base before placing succeeding layer.

.7 When using hand operated tamping devices, place backfill material in layers not exceeding 100 mm in thickness.

.8 Backfilling around installations.
.1 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.9 Place backfill material in uniform layers simultaneously on sides of the tie-back anchor blocks so that loading is equivalent.

3.3 Granular Base

.1 Do not place granular base until sub-base surface is compacted, inspected and approved.

.2 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.

.3 Place materials to the lines, grades, and depths as indicated on Plan or as directed by the the Departmental Representative.

.4 Remove and replace portion of work in which material becomes segregated during spreading.

.5 Compact to a density not less than 98% of maximum dry density ASTM D698-12, (AASHTO T99-10, Method D).

.6 Shape and roll alternately to obtain a smooth, even and uniformly compacted base.

.7 Apply water as is necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.8 In areas not accessible to rolling equipment, compact to required density with approved mechanical tampers.

3.4 Granular Sub-Base

.1 Do not place granular sub-base until finished sub-grade is inspected and approved by the Departmental Representative.

.2 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.

.3 Begin spreading sub-base material on a crown line or high side of a one way slope.

.4 Place material in uniform layers not exceeding 150mm when compacted or to such other depth as approved by the Departmental Representative.

.5 Shape each layer to a smooth contour and compact to specified density before a succeeding layer is placed.

.6 Remove and replace portion of a layer in which material has becomes segregated during spreading.

.7 Compact to 95% maximum density, AASHTO T99-10, Method D except last 150mm up to subgrade elevation. Compact last 150mm to 100% maximum density, AASHTO T99-10, Method D.

.8 Shape and roll alternately to obtain a smooth, even and uniformly compacted sub-base.

.9 Apply water as is necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.10 In areas not accessible to rolling equipment, compact to required density with approved mechanical tampers.

3.5 Restoration

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21.

.2 Remove surplus materials and debris and correct defects noted by the Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Description

.1 This section specifies requirements for the supply and installation of synthetic non-woven filter fabric and geogrid to be used as shown no drawings.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.3 MEASUREMENT PROCEDURES

.1 Supply and installation of filter fabric and geogrid of surface covered as shown on drawings will be measured as a fixed price item.

.2 Damaged material shall be replaced at no cost to the owner.

.3 No extra payment will be made for overlapping of fabric i.e. overlaps are measured as a single layer of fabric.

1.4 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM D 4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permitivity.
.2 ASTM D 4595-11, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
.3 ASTM D 4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-4.2 No. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).

.2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.

1.5 SUBMITTALS

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to the Departmental Representative the following at least 2 weeks prior to beginning Work.
.1 manufactures specifications on the proposed materials to be used.
.2 samples of proposed materials.

1.6 DELIVERY, STORAGE AND HANDLING

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.7 WASTE MANAGEMENT AND Disposal.

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21.

.2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material.

.3 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 Filter Fabric

.1 Non-woven synthetic fibre fabric, rot proof, unaffected by action of oil or salt water and not subject to attack by marine life, insects or rodents to be supplied in rolls.

.2 Fabric to be of non woven construction supplied in rolls of minimum 3.0 metres width, minimum thickness of 4.0 mm and to the following properties or equivalent:
.1 Mass(g/m2) 250 to 270

.2 Tear (N) 500
.3 Tensile Strength (N) 950
.4 Elongation at Break(%) 70-100
.5 Mullen Burst Strength (kPa) 2500
.6 Opening Size (um) 50 to 150
.7 Permeability (K cm s-1)2.7x10-1.

.3 Factory seams: sewn in accordance with manufacturer's recommendations.

.4 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

2.2 Geogrid

.1 Geogrid: open grid polymer having biaxial orientation, free of striations, roughness, pinholes, blisters, undispersed raw materials or any sign of contamination by foreign matter.
.1 Roll width: 4 m minimum.
.2 Roll length: 5 m minimum.
.3 Rib thickness: 2.2 mm minimum.
.4 Junction thickness: 5 mm minimum.
.5 Aperture size:
.1 Machine direction: 39 mm.
.2 Cross machine direction: 39 mm.
.6 Polymer: polypropylene: to ASTM D 4101-02b with inhibitors added to resist deterioration by ultra-violet and heat exposure.

.2 Geogrid physical properties:
.1 Peak tensile strength: to GRI GG1. (Geosynthetic Research Institute).
.1 Machine direction: minimum 30 kN/m.
.2 Tensile secant modulus at 2% elongation: to GRI GG1, minimum 10.5 kN/m.
.3 Carbon black content: to ASTM D 4218-96(2001), minimum 2 %.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Place geotextile material by unrolling in orientation, manner and locations indicated and retain in position with securing pins and washers or weights.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.3 Overlap each successive strip of geotextile 600 mm over previously laid strip.

.4 Pin successive strips of geotextile with securing pins as recommended by manufacturer.

.5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material.

.6 Replace damaged or deteriorated geotextile to approval of Departmental Representative .

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 62 16.16 - Steel H-Piles.

1.2 SUBMITTALS

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

.2 Product Data: submit manufacturer's printed product literature, specifications and datasheet.

.3 Spliced piles are not permitted.

.4 Quality assurance submittals:
.1 Test reports: submit 3 copies of certified test reports for piles from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's instructions.

.2 Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.

.3 Piles damaged by the contractor will be replaced as directed by the Departmental Representative at contractor's cost.

1.4 EXISTING CONDITIONS

.1 Sub-surface investigation report is available for viewing at PWGSC office 4th floor Unit 100, 1045 Main Street, Moncton, N.B., during the following business hours: 8:30 to 12:00 noon and from 13:00 to 16:00, Monday to Friday. Contact the Department Representative.

.2 Any information pertaining to soils and all borehole logs are furnished by the Departmental Representative as a matter of general information only. Borehole descriptions shown on the logs are only descriptive of conditions at locations described by the boreholes themselves.

.3 The Contractor must make his own evaluation of soil conditions.

1.5 SCHEDULING

.1 Provide schedule of planned sequence of driving to Departmental Representative for review, not less than two weeks prior to commencement of pile driving.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Supply full length steel H-piles as per section 31 62 16.16 and provide equipment to handle full length piles without cutting and splicing.

2.2 EQUIPMENT

.1 Prior to pile installation, submit to Departmental Representative for review, details of equipment for installation of piles.

.1 Impact hammers: provide manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer, mass of driving cap and type and elastic properties of hammer and pile cushions.

.2 Non-impact methods of installation such as augering, jacking, vibratory hammers or other means: provide full details of characteristics necessary to evaluate performance.

.2 Hammer:
.1 When required criteria can not be achieved with the proposed hammer, use larger hammer and take other measures as required.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Protection:
.1 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.
.2 Arrange sequencing of pile driving operations and methods to avoid damages to adjacent existing structures.
.3 When damages occur, remedy damaged items to restore to original or better condition at own expense.

.2 Ensure that structures and ground conditions at pile locations are adequate to support pile driving operation.
.1 Make provision for access and support of piling equipment during performance of Work.
.2 Contractor to assess state of access structure(s) for load carrying capability.

3.2 INSTALLATION

.1 Leads: construct pile driver leads to provide free movement of hammer.
.1 Hold leads in position at top and bottom, with guys, stiff braces, or other means to ensure support to pile while being driven.
.2 Length: except for piles driven through water, provide sufficient length of leads to ensure that use of follower is unnecessary.
.3 Swing leads:
.1 Obtain approval from Departmental Representative prior to using swing leads.

.2 Firmly guy top and bottom to hold pile in position during driving operation.

.2 Installation of each pile will be subject to review of Departmental Representative.
.1 Departmental Representative will be sole judge of acceptability of each pile with respect to final driving resistance, depth of penetration or other criteria used to determine load capacity.
.2 Departmental Representative to review final driving of all piles prior to cutting and removal of pile driving rig from site.

.3 Steel H-piles to be set a minimum 1.7 metres into sandstone bedrock layer as shown on drawings. The tip elevation may vary depending on the exact elevation of the bedrock.

3.3 APPLICATION / DRIVING

.1 Use driving caps and cushions to protect piles.
.1 Reinforce pile heads as required by Departmental Representative.
.2 Piles with damaged heads as determined by Departmental Representative will be rejected.

.2 Hold piles securely and accurately in position while driving.

.3 Deliver hammer blows along axis of pile.

.4 Restrike already driven piles lifted during driving of adjacent piles to assure set.
.1 All piles should be re-tapped 24 hours after the end of initial drive.

.5 Cut off piles neatly and squarely at elevations as indicated on drawings.
.1 Provide sufficient length above cut-off elevation so that part damaged during driving is cut off.

.6 Remove cut-off lengths from site on completion of work.

3.4 Field Measurements

.1 Maintain accurate and daily records of driving for each pile, including:

.1 Type and make of hammer, rated energy, observed stroke, and observed number of blows per minute.

.2 Other installation equipment including details on use of pile cushion, follower, etc.

.3 Pile size and length, location of pile in pile group, and location or designation of pile group.

.4 Time for start and finish of driving pile and sequence of pile driving for piles in group.

.5 Penetration for own weight and weight of hammer, number of blows per meter of penetration from start of driving and numbers of blows per 100 mm for the last meter.

.6 Toe elevation upon termination of driving pile and final toe and cutoff elevations upon completion of pile group.

.7 Records of restriking.

.8 Other pertinent information, such as interruption of continuous driving, observed pile damage, etc.

.9 Records of elevations of adjacent piles before and after driving of pile.

.10 Record all information on forms provided by Departmental Representative.

3.5 Driving Criterion

.1 Installation of each pile will be subject to approval of Departmental Representative, who will be sole judge of acceptability of pile with respect to final penetration resistance, depth of penetration, or other criteria. Departmental Representative to approve final penetration resistance of all piles prior to removal of pile driving equipment from site.

.2 Each pile shall be installed as shown. Do not overdrive to cause damage to piles.

.3 Departmental Representative will determine refusal criteria for piles.

.1 Steel H-Piles: Drive each pile a minimum of 1.7 metres into the sandstone bedrock layer as indicated. Supply hammer of suitable size (minimum 100,000 joules energy) to advance the piles into substrate as indicated.

3.6 OBSTRUCTIONS

.1 Where obstruction is encountered that causes sudden unexpected change in penetration resistance or deviation from specified tolerances, proceed as directed by Departmental Representative.

3.7 REPAIR AND RESTORATION

.1 Pull out rejected piles and replace with new piles.

.2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Submittal Procedures: Section 01 33 00.

.2 Miscellaneous Metals: Section 05 50 00

.3 Berlin Wall Construction: Section 31 63 26.16

1.2 Delivery and Handling

.1 Protect piles from damage due to excessive handling during delivery, storage and bending stress, impact, abrasion or other causes handling.

1.3 MEASUREMENT PROCEDURES

.1 Steel H-piles: The supply and installation of steel H-piles as shown for this work will be paid by the linear meter of piling acceptably incorporated in the work, following trimming and cutting of the piles. Cap steel plates, pile points, mob and demob of equipment, templates and/or guides will be considered incidental to the work. Measurement will be taken from final pile tip to top of pile elevation remaining in the work.

1.4 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.
.2 CSA G40.20-13/G40.21-13,General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

1.5 SUBMITTALS

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

.2 Quality Assurance:

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel H piles: to CSA-G40.20/G40.21, Grade 350.
.1 Size and weight as indicated.
.2 It is the contractor's responsibilty to estimate the minimum length of H-Pile required for the work.

.2 Welding materials: to CSA W48.

.3 Do not splice piles.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 The steel H-piles are to be installed true and plumb along the baseline as shown on drawings.

.2 Hold piles securely and accurately in position while installation.

.3 Prior to commencement of pile installation operation, submit to the Departmental Representative for approval, details of equipment and method to be used for the installation of piles.

.4 Cut off piles squarely at required elevation.

3.2 Tolerances

.1 H-piles are to be install as shown on the plans and specified herein.

.2 Deviations from the vertical in any direction shall not exceed 1 to 50 for all piles.

.3 Piles must be install in such a manner so the face of the wharf is straight. Maximum rotation tolerance about axis of pile layout to be ± 10.

.4 The piles at the mud line to be within ± 30 mm of the location indicated on the drawing for the direction parallel to the wharf, with no two adjacent piles having a centerline spacing less than 2500 mm unless otherwise indicated. Tolerance at the top of the wharf will be ± 15 mm.

.5 Pile heads to be within 20 mm of the location indicated on the drawing.

3.3 WELDING

.1 Weld to CSA W59.

.2 Welding certification of companies: to CSA W47.1.

3.4 RECORDS

.1 Keep complete and accurate record of each pile driven.

.2 Indicate:
.1 Pile location.
.2 Deviations from design location.
.3 Cross section shape and dimensions.
.4 Original length.
.5 Ground elevation.
.6 Tip elevation.
.7 Cutoff elevation.

3.5 CLEANING

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

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 Definition

.1 This section specifies the requirements for supply and installation of the Berlin Wall Construction.

1.2 Related Work

.1	Submittal Procedures	Section 01 33 00
.2	Environmental Protection	Section 01 35 44
.3	Excavating, Dredging and Backfilling	Section 31 23 10
.4	Steel H-Piles	Section 31 62 16.16
.5	Concrete Reinforcement	Section 03 20 00
.6	Cast-in-place Concrete	Section 03 30 00
.7	Miscellaneous Metals:	Section 05 50 00

1.3 Measurement for Payment

.1 New Berlin Wall: The supply and installation of the new Berlin Wall Construction as shown including all material, equipment and labour to complete the work under this section will be a Fixed price item. This will include:
.1 Concrete Panels and anchor blocks: The supply and installation of the reinforced concrete panels (plain and ladder panels), and anchor blocks, all labour, equipment and materials for the completion of the work. Curing will be considered incidental to this work. Price will also include the supply and placement of "Lifting Anchors". Concrete used in the casting of concrete cylinders for testing will not be measured for payment but will be considered incidental to the work. There will be no additional payment for enclosures or heating of enclosures to complete cast in place concrete or precast concrete work.

.2 Ladders: the supply and installation of all the steel components and inserts as shown to complete the ladder units, and modification to reinforcing bars and formwork of concrete panels to accommodate ladder unit will be considered incidental to this section. Two(2) ladder holdfasts per ladder as shown will be included under this section. Galvanizing of all ladder components will be incidental to this section.

.3 Steel Angles, clips: The supply and installation of all the steel angles or clips, and miscellaneous steel required to complete the work for the Berlin Wall will be considered incidental to this section. The welding, cutting, drilling and other work necessary to complete the project will also be considered incidental to this Section.

.4 Steel tie rod, Washers and nuts: The supply and installation of all the tie-rods, washers, nuts, bearing plates and miscellaneous steel for connections to H-piles required to complete the work for the Berlin Wall will be considered incidental to this section. The welding, cutting, drilling and other work necessary to complete the project will also be considered incidental to this Section.

.5 Other Miscellaneous steel: The supply and installation of all other miscellaneous steel and any other associated hardware to complete the work for the Berlin Wall as indicated.

PART 2 - PRODUCTS

2.1 Steel H-piles

.1 The supply of steel H-piles for the construction of Berlin Wall must meet the requirements of Section 31 62 16.16.

2.2 Steel Angles, Tie-Rods, and Miscellaneous Steel

.1 The supply of steel angles, as shown on plan, must meet the requirements of Section 05 50 00.

2.3 Concrete Panels And Anchor Blocks .1 The supply of concrete panels and anchor wall, as shown on plan, must meet the requirements of Section 03 30 00.

2.4 Lifting Anchors .1 'Swift Lift' anchors (recessed) as per Manufacturer's recommendation; Dayton Superior or equivalent, galvanized or stainless steel.
.1 Supply shop drawings for review.

PART 3 - EXECUTION

3.1 Installation .1 The installation of the steel H-piles, steel angles, tie-rods, concrete panels and anchor blocks for the construction of the Berlin Wall must be carried out in accordance with their applicable Sections.

3.2 Lifting Anchors .1 Submit to the Departmental Representative the method for lifting the Pre-Cast Concrete panels and anchor blocks for review.

END OF SECTION

PART 1 - GENERAL

1.1 Description

.1 This section specifies requirements for supply, hauling, placing, shaping and compacting hot mix asphalt concrete paving as shown on drawings.

1.2 Source Sampling

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling.

.2 If requested, at least 1 week prior to commencing work submit samples of following materials proposed for use.
.1 One 5 litre container of asphalt cement.

.3 If materials have been tested by an independent testing laboratory within previous 2 months and have successfully passed tests equal to requirements of this specification, disregard above instructions and submit test certificates from testing laboratory showing suitability of materials for this project.

1.3 Measurement for Payment

.1 Asphalt pavement as shown will be measured in square meters (m2) of asphalt concrete incorporated into the work. Payment will include all equipment, labour and material to complete the work.

.2 The supply of asphalt cement, tack coat will not be measured for payment but considered incidental to the work.

.3 Apply the base course(s) of asphalt pavement as required in 63.5 mm minimum compacted thickness followed by a top seal coat of 38mm minimum compacted thickness.

PART 2 - PRODUCTS

2.1 Materials

.1 All materials to meet the New Brunswick Department of Transportation (NBDOT) specification for asphaltic concrete. Asphalt cement to ASTM D946, performance grade PG 58-28. Mix type D.

.2 The Contractor will supply previous test results of the proposed materials for review and approval.

.3 Submit job mix formula to Departmental Representative for approval. Design of mix to meet NBDOT specification. Do not change job-mix without prior approval. Should change in material source be proposed, a new job-mix formula to be provided to the Departmental Representative .

PART 3 - EXECUTION

3.1 General

.1 Requirements for the plant and equipment used and the mixing, transportation, placing, compaction and rolling of the materials to meet NBDOT specification unless otherwise indicated or directed.

3.2 Preparation

.1 Reshape granular bed as required to attain proper drainage as directed.
.1 Place asphaltic concrete to depths, widths and lines indicated or as directed by the Departmental Representative .
.2 An average thickness of 100 mm of asphalt (2 lifts) will be placed over the new granular base material.

.2 The contractor will need to match the new grades with the existing asphalt to ensure that service area drainage will drain to the new and existing catch basins.

3.3 Placing

.1 Place asphaltic concrete to depths, widths and lines indicated or as directed by the Departmental Representative .

.2 The maximum thickness of asphalt to be placed per lift is 63.5 mm. The finish elevation of the asphalt over the existing pavement on the ramp should have a uniform surface as much as possible.

3.4 Finish Tolerances

.1 Finished asphalt surface to be within 5 mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 5 mm when checked with a 4 m straight edge placed in any direction.

.3 Finish surface smooth, true to grade to following tolerances:
.1 Base Course: 7mm in 3m.
.2 Seal Course: 3mm in 3m.

3.5 Defective Work

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.

.2 Repair areas showing checking or hairline cracking.

END OF SECTION