Public Works and Government Services Canada

Requisition No: EZ899-173002

SPECIFICATIONS
for

Harbour Redevelopment

Bedwell Harbour, South Pender Island, BC

Project No. R. 083172.001 Jan 2017

APPROVED BY:

A/ERM. Feb. 8/2017.

Regional Manager, AES — Date

2017-02-07

Construction Safety Coordinator — Date

TENDER:

2017-02-08

Project Manager — Date

Real Property Services Branch, Professional and Technical Services, Pacific Region
Room 219 - 800 Burrard Street, Vancouver, B.C., V6Z 0B9

SPECIFICATIONS

APPENDIX A – BOUND WITH SPECIFICATIONS

APPENDIX B – BOUND WITH SPECIFICATIONS

APPENDIX C – BOUND WITH SPECIFICATIONS

APPENDIX D – BOUND WITH SPECIFICATIONS

DRAWINGS – BOUND SEPARATELY

Structural

Electrical

PART 1 GENERAL

1.1 Section Includes

.1 Location of site.

.2 Site conditions.

.3 Work covered by contract documents.

.4 Time of completion.

.5 Use of site.

1.2 Precedence

.1 Division 1 Sections take precedence over technical specification sections in other Divisions of these Project Specifications.

1.3 Related Sections

.1 Section 01 33 00 – Shop Drawings, Product Data and Samples

.2 Section 35 05 51 - Marine General Sitework.

1.4 Location of Site

.1 The work is located at CBSA Bedwell Harbour, South Pender Island, B.C, as shown on the plans, excluding the Canadian Border Service Agency (CBSA) office.

.2 The site works include the replacement of the approach timber elements, gangway, floats, select mooring piles, one bearing pile, lighting and an electrical outlet.

.1 Work includes the interior of the CBSA office building. Access to the building will be restricted to 3 days, maximum 8 hours each day. CBSA staff may be present in their operations and are not to be interfered with. Contractor is to request access to the office building 2 business days in advance, to the Departmental Representative.

1.5 Site Conditions

.1 Contractors are encouraged to visit the site before submitting the tender. Make inquiries or investigations necessary to become thoroughly acquainted with site, soil, climatic, tidal conditions, replacement timber lengths, and site access along with the nature and extent of the work.

.2 All known discrepancies are to be brought to the attention of the Departmental Representative and are to be accounted for in the Contractor's Bid Price.

1.6 Work Covered by Contract Documents

.1 The principal works to be executed and for which all materials,

plant and labour are to be supplied by the Contractor as shown on the plans and in the specifications:

.1 Replace topside elements of piled approach trestle
.2 Replace bulkhead timbers
.3 Replace and repair select substructure elements of piled approach trestle
.4 Supply and install gangway
.5 Supply/Install new treated timber floats
.6 Supply/Install treated timber piles
.7 Supply/Install steel pipe piles
.8 Supply/Install new chains and concrete anchors
.9 Supply/Install new lighting and electrical outlet

1.7 References

.1 National Research Council of Canada (NRC):
.1 National Building Code of Canada (NBC) 2015
.2 See Section 01 35 33 for additional references.

1.8 Codes and Standards

.1 Perform work in accordance with the National Building Code, the Workers' Compensation Board of B.C., and any other code of provincial or local application provided that, in any case of conflict or discrepancy, the most stringent requirements shall apply.
.2 Meet or exceed requirements of specified standards, codes and referenced documents.

1.9 Documents Required

.1 Maintain at job site one copy of the following:
.1 Contract drawings and approved shop drawings
.2 Specifications and Appendices
.3 Addenda
.4 Change orders
.5 Other modifications to contract
.6 Copy of approved work schedule
.7 Permits and Approvals
.8 One set of drawings (clean) to be marked up for as-built/record drawings
.9 Workplace Hazardous Materials Information Systems (WHMIS)
.10 Manufacturer's installation and application instructions
.11 Health and Safety Plan (Company and Site Specific) and

Fire Safety Plan

.12 Environmental Emergency Response Plan (including Spill Response Plan)

.2 Departmental Representative may furnish additional drawings to assist proper execution of work. These documents will be issued for clarification only. Such documents will have the same meaning and intent as if they were included in the plans referred to in the Contract documents.

1.10 Record Drawings

.1 As work proceeds, maintain accurate records to show all deviations from the contract drawings. Note on as-built drawings as changes occur, and at completion supply one set of all drawings and specifications clearly marked.

1.11 Geotechnical Data

.1 Geotechnical data was not prepared for this project.

1.12 Datum

.1 All elevations or soundings used in the drawings and specifications refer to local low water datum.

1.13 Layout of Work

.1 Layout work on the ground and execute the work to the Departmental Representative's satisfaction.

.2 Reference points for the layout, including elevations, have been set at the site and are shown on the drawings. Protect all reference points from disturbance, with exception of one reference point located on the approach trestle, refer to drawings.

.3 Two existing mooring dolphin group to be utilized for the proposed Float C are to be verified and reviewed for determination of the suitability of the alignment of the float.

.1 The location of the two timber mooring dolphins, to remain, currently being utilized to moor the existing Floats B and C are to be measured.

.2 Measurements to identify whether or not the existing mooring dolphins will be within the clear space of the interior of each of the proposed mooring wells. Measurements are to be taken:

.1 Transversely: each pile

.2 Longitudinal: end piles of each dolphin group (4 in total). Longitudinal measurements are to be from the outside of the rubboard along Float A.

.3 Measurements are to confirm the angle between:
  .1 The existing centreline of Float A and the existing centreline of the existing Float B, at Float A.
  .2 The existing centreline of Float C at the outer end.
.4 Results to be reported to the Departmental Representative within 7 business days. The Departmental Representative will provide recommendations if required.

1.14 Assistance by the Contractor

.1 Place small work vessel at the Departmental Representatives' disposal as required to perform his duties.
  .1 Two Departmental Representatives may be present.
  .2 Include space for the layout of 850 x 1050 mm (full size) drawings.
  .3 Two work stations to include:
    .1 Chairs
    .2 Writing Surface (e.g. desk or table)
    .3 Lighting
    .4 Two electrical outlets for 110 volt AC power
    .5 May be shared space with the Contractor's personnel.

1.15 Time of Completion

.1 Complete work within 12 weeks of contract award.

1.16 Work Schedule

.1 Within 7 days of Contract award, provide a schedule of work. Observe the following requirements:
  .1 Whenever a variation from the schedule in excess of 5 working days occurs or is expected to occur, notify Departmental Representative of the change.
.2 Provide information as indicated below and copy Departmental Representative on all correspondence:
  .1 Notify the local Fisheries Officer and the Regional Director, Environmental Services Branch, no less than 5 days before start and completion of operations.
  .2 Confirm with Departmental Representative at least 5 working days prior to the commencement of work on-site.
.3 Notify Canadian Coast Guard, Regional Marine Information Centre no less than 5 days before start and completion of proposed activities at the site in order that they may issue

Notices to Shipping. Contact information is:

.1 Website: http://www.ccg-gcc.gc.ca/e0003905

.2 Mailing Address:

.1 Vancouver MCTS Centre
Canadian Coast Guard
Suite 2380, PO Box 12107
555 West Hastings Street
Vancouver, BC, V6B 4N6

.3 Telephone Numbers:

.1 604-666-6011 RMIC
.2 604-666-1004 Officer-in-Charge
.3 604-666-1003 Administration
.4 604-775-8919 Watch Supervisor
.5 Telex Number: 043-52586 CGTC VAS VCR
.6 Facsimile: 1-604-666-8453

.4 Email:

.1 mctsvancouver@pac.dfo-mpo.gc.ca

.5 RMIC Email:

.1 rmic-pacific@pac.dfo-mpo.gc.ca

.4 Provide Departmental Representative a schedule for pile driving 7 days subsequent to award. The date is to be confirmed with the Departmental Representative 7 days prior to the start of driving.

.5 Provide Departmental Representative a schedule for anchor placement 7 days subsequent to award. The dated is to be confirmed with the Departmental Representative 7 days prior to the start of anchor placement.

.6 Provide copies of all project notifications to Departmental Representative, within two days of the notifications being issued.

1.17 Use of Site

.1 Keep facility closure to a minimum. As much as possible, regulate construction activities to provide safe access to pedestrian traffic at all times. Complete facility closures are not to exceed two hours at any given time. Closures over one hour must be at least one hour apart. Contractor must post notice of closure at least 48 hrs in advance.

.1 Notice must be posted on a clearly visible sign, such that facility users can readily see it. One (1) construction sign to be:

.1 Plywood and framing for sign to be 1.2m x 2.4m.
.2 Mounting to be on the outside of the guardrail near the office building, refer to drawings. The location

to be confirmed by the Departmental Representative.

.3 One vinyl sign with an adhesive back will be provided to the Contractor to be applied to the plywood.

.2 Contact companies using the facility and make arrangements to ensure interruptions to their operations are minimized.

.3 Hours of work.

.1 Perform work between normal hours of 07:00 to 18:00, Monday to Friday, except holidays and in accordance with local noise bylaws.

.2 Work may be performed after working hours, on weekends and holidays as approved by Departmental Representative.

.4 Float C will be provided to allow for vessel/equipment tie-up.

1.18 Project Meetings

.1 The Departmental Representative will arrange project meetings and assume responsibility for setting times

.2 The Contractor is responsible for recording and distributing minutes.

1.19 Location of Equipment and Fixtures

.1 Location of existing equipment and fixtures indicated or specified is to be considered as approximate.

1.20 Material and Equipment

.1 Metric-Sized Products:

.1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.

.2 The Contractor is required to provide metric products where specified in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

.3 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric-sized products which are available on the Canadian market will not be considered sufficient reasons claiming that they cannot be provided.

.4 Claims for additional costs due to provision of specified modular metric-sized products will not be considered.

.2 Material and Equipment:

.1 Use new material and equipment unless otherwise specified.

.2 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.

.3 Use products of one manufacturer for material and equipment of the same type or classification unless otherwise specified.

.4 Within seven (7) days of written request by Departmental Representative, submit following information for any or all materials and products proposed for supply:

.1 Name and address of manufacturer.
.2 Trade name, model and catalogue number.
.3 Performance, descriptive and test data.
.4 Manufacturer's installation or application instructions.
.5 Evidence of arrangements to procure.

.3 Manufacturer's Instructions:

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.

.4 Fastenings, General:

.1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified.

.3 Bolts may not project more than one diameter beyond nuts.

.5 Fastenings, Equipment:

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.6 Delivery and Storage:

.1 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.

.2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment

from site.

.3 Store material and equipment in accordance with suppliers' instructions.

.4 Touch up damaged factory-finished surfaces to Departmental Representative's satisfaction. Use primer or enamel to match original. Do not paint over name plates.

.7 Construction Equipment and Plant:

.1 On request, prove to the satisfaction of Departmental Representative that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order.

1.21 Testing and Inspection Services

.1 Particular requirements for inspection and testing to be carried out by testing service or in laboratory approved by Departmental Representative are specified under various sections.

.2 Contractor will appoint and pay for services of testing laboratory including the following:

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

.2 Mill tests and certificates of compliance.

.3 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.

.4 Additional tests specified in paragraph following.

.3 Where tests or inspections performed by the testing service reveal work is not in accordance with the contract requirements, Contractor shall pay costs for additional tests or inspections as Departmental Representative may require to verify acceptability of corrected work.

.4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

.5 Provide Departmental Representative with two (2) copies of testing laboratory reports within 7 days of testing.

1.22 Interpretation

.1 In interpreting the Contract, in the event of discrepancies or conflicts between anything in the Plans and Specifications and the General Conditions, the General Conditions govern.

.2 In interpreting the Plans and Specifications, in the event of discrepancies or conflicts between:

.1 The Plans and Specifications, the Specifications govern;

.2 The Plans, the Plans drawn with the largest scale govern; and

.3 Figured dimensions and scaled dimensions, the figured dimensions govern.

.4 Specifications, Plans and Appendicies; the Specifications and Plans govern over the Appendicies

PART 2 PRODUCTS

Not applicable.

PART 3 EXECUTION

Not applicable

-END OF SECTION-

PART 1 GENERAL

1.1 References

.1 Section 01 11 05 – Marine General Instructions

.2 Section 35 05 51 – Marine General Sitework

.3 Section 31 62 16.19 – Steel Pipe Piles

1.2 General

.1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review.

.2 Present shop drawings and product data in SI Metric units.

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

.4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.

.5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.

.6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Departmental Representative's review of submission unless Departmental Representative gives written acceptance of specific deviations.

.7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.

.8 Notify Departmental Representative in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.

.9 Do not proceed with work until relevant submissions are reviewed and approved by the Departmental Representative.

1.3 Submission Requirements

.1 Coordinate each submission with the requirements of the work and the Contract documents. Individual submissions will not be reviewed until all related information is available.

.2 Allow (5) five days for Departmental Representative's review

of each submission, unless noted otherwise.

.3 Accompany submissions with transmittal letter, in duplicate, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification and quantity of each shop drawing.

.5 Other pertinent data.

.4 Submissions shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative, certifying approval of submissions, verification of field measurements and compliance with Contract documents.

.5 Details of appropriate portions of work as applicable.

.1 Fabrication.

.2 Layout, showing dimensions (including identified field dimensions) and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

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

1.4 Submittals

.1 Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portion of work which are specific to project requirements.

.2 Maximum sheet size: 850 x 1050 mm.

.3 Submit one digital copy in PDF format of all submittals for each requirement requested in the specification sections and/or

as requested by the Departmental Representative.

.4 Cross-reference submittals, including shop drawing, information to applicable portions of the Contract documents.

.5 Provide Departmental Representative the following submission within one day of receipt of test results:

.1 Concrete lab tests.

.2 Electrical and Lighting field quality control tests.

.6 Provide Departmental Representative the following submission within 2 days of conducting Test Piles.

.1 Provide a written report for each location and is to provide the following:

.1 Time to start and end of each test pile driving.

.2 Leadline information: time, water depth to seabed/mudline, distance from the top of the approach decking to water level at the start and end of each test driving.

.3 Presence and depth, below water level, of any hard soil layers including refusal identified by pile driving.

.4 Maximum driving depth below water, penetration and if met by refusal.

.7 Provide Departmental Representative the following submissions within 7 days of contract award:

.1 Health and Safety Plan (company and site specific) and Fire Safety Plan.

.2 Environmental Emergency Response Plan (including Spill Response Plan).

.3 Signed copy of the Hazard Assessment Form.

.4 Proposed Work Schedule.

.8 Provide Departmental Representative the following submissions within 14 days of contract award:

.1 Detailed sequence for the installation of the Anchor Blocks including:

.1 Name of proposed concrete testing lab.

.2 Pre-cast concrete mix design, certified by a Professional Engineer registered with the Province of British Columbia.

.3 Schedule and location. Date and schedule to be confirmed 2 business days prior to the placement of the anchor block.

.2 Detailed sequence for the removal of the existing floats.

.1 Schedule to be confirmed two business days before

the removal of the existing Float A.

.3 Detailed sequence for the installation of the new gangway.

.1 Schedule to be confirmed two business days before the removal of the existing gangway.

.4 Detailed sequence for the installation of the new floats.

.5 Certified copy of mill test report for the steel pipe pile, showing physical and chemical analysis and that the steel pipe meets the specification. Upon request inform the Departmental Representative of proposed source of material to be supplied.

.6 Welding certificates for the pipe fabricator, off-site welding and on-site welding.

.7 Schedule and location of steel pipe fabrication.

.8 Detailed sequence for the installation of the new mooring piles.

.9 Detailed sequence for the installation of the new electrical systems.

.10 Electrical work qualifications and names including Master Electrical Contractor license or apprentices and key electrical supervisory personal.

.11 Electrical shop drawings.

.12 All sealed shop drawings by a Professional Engineer registered with the Province of British Columbia.

.9 Detailed sequence for the installation of the fumigant including fumigant type, MSDS sheets, installation procedures and schedule.

.10 Provide a certificate from the treated wood producer that BMP's were utilized, including a description of the BMP's that were utilized, prior to shipping the material to site.

.11 Approved recycling/landfill site (approved by the BC Ministry of Environment under the Waste Management Act and by the appropriate Municipal Authority).

.1 Certificates, permits, and/or letters must be submitted from the approved facility/landfill upon recycling/disposal within 7 days to the Departmental Representative.

.12 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, one electronic and one hard final copies of operating and maintenance manuals in

English.

1.5 Review of Submittals

.1 Review of submittals by Public Works and Government Services Canada is for the sole purpose of ascertaining conformance with the general concept.

.2 This review shall not mean that Public Works and Government Services Canada approves the detail design inherent in the submittals, responsibility for which shall remain with Contractor submitting same.

.3 This review shall not relieve the Contractor of responsibility for errors or omissions in the submittals or of responsibility for meeting all requirements of the construction and Contract documents.

.4 Without restricting the generality of the foregoing, the Contractor is responsible for:

.1 Dimensions to be confirmed and correlated at the job site.

.2 Information that pertains solely to fabrication processes or to techniques of construction and installation.

.3 Coordination of the work of all sub-trades.

1.6 Progress Schedule

.1 Submit work schedule as required in Section 01 11 05.

-END OF SECTION-

PWGSC Update on Asbestos Use

Effective April 1, 2016, all Public Service and Procurement Canada (PSPC) contracts for new construction and major rehabilitation will prohibit the use of asbestos-containing materials. Further information can be found at:

http://www.tpsgc-pwgsc.gc.ca/comm/vedette-features/2016-04-19-00-eng.html

PART 1 GENERAL

1.1 References

.1 Government of Canada
- .1 Canada Labour Code, Part II
- .2 Canada Occupational Health and Safety Regulations.

.2 National Building Code of Canada (NBC):
- .1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 Canadian Standards Association (CSA):
- .1 CSA S269.1-1975 (R2003), Falsework for Construction Purposes.
- .2 CSA Z797-2009, Code of Practice for Access Scaffolding.
- .3 CSA-S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

.4 National Fire Code of Canada 2010 (as amended):
- .1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
- .2 FCC No. 301, Standard for Construction Operations.
- .3 FCC No. 302, Standard for Welding and Cutting.

.5 American National Standards Institute (ANSI):
- .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.6 Province of British Columbia:
- .1 Workers Compensation Act. Part 3 Occupational Health and Safety.
- .2 Occupational Health and Safety Regulation.

1.2 Related Sections

.1 Refer to the following sections as required:
- .1 Marine General Instructions: Section 01 11 05.
- .2 Marine General Site Work: Section 35 05 51.

1.3 Workers' Compensation Board Coverage

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.4 Compliance with Regulations

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.5 Submittals

.1 Submit to Departmental Representative submittals for review

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

.3 Submit the following prior to start of work (unless noted otherwise):

.1 Health and Safety Plan (company and site specific) and Fire Safety Plan.

.2 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.3 Emergency procedures.

.4 Copies of reports or directions issued by federal and provincial health and safety inspectors, report within one week of receipt.

.5 Copies of incident and accident reports, report within one week of incident.

.4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan (company and site specific) and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative for review upon request.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance

for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 Submission of the Health and Safety Plan (company and site specific), and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6 Responsibility

.1 Assume responsibility as the Prime Contractor under this contract.

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

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 General Conditions

.1 Provide safety barricades around work site as required to provide a safe working environment for workers, vehicles, vessels, seaplanes and protection for pedestrian traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site for public safety.

.1 Provide appropriate means by use of barricades, fences, and warning signs as required.

.2 Secure any portions of the site at night time as deemed necessary to protect site against entry to unsafe areas.

1.8 Project/Site Conditions

.1 Work at site will involve:

.1 Construction on floats and pile supported wharf structure during high and low tides.

.2 Pile driving and heavy equipment.

.3 Slippery and unstable surfaces.

.4 Preservative treated wood.

.5 Timber and Steel pile driving.

1.9 Regulatory Requirements

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 Comply with the Environmental Protection Plan (see attached Appendix C)

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

1.10 Filing of Notice

.1 The Contractor is to complete and submit a Notice of Project as required by provincial authorities, at least two weeks prior to commencing work.

.2 Provide the Departmental Representative with a copy of all notices.

1.11 Health and Safety Plan

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

.1 Contractor's company safety policy.
.2 Identification of applicable compliance obligations.
.3 Definition of responsibilities for project Safety/ Organization chart for project.
.4 General safety rules for project.
.5 Job-specific safe work procedures.
.6 Inspection policy and procedures.
.7 Incident reporting and investigation policy and procedures.
.8 Occupational Health and Safety Committee/Representative procedures.
.9 Occupational Health and Safety meetings.
.10 Occupational Health and Safety communications and recordkeeping procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work.

.4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Health and Safety Plan (company and site-specific) as required, and re-submit to the Departmental Representative.

.5 Departmental Representative review: the review of Health and Safety Plan (company and site-specific) by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility of errors and omissions in the Final Health and Safety Plan (company and site-specific) or of responsibility for meeting all requirements of construction and the Contract documents.

1.12 Emergency Procedures

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work with hazardous substances.

.2 Work on, over, under and adjacent to water.

.4 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

1.13 Hazardous Products

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents.

1.14 Overloading

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.15 Falsework

.1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003).

1.16 Scaffolding

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA-Z797-2009.

1.17 Fire Safety and Hot Work

.1 Obtain Departmental Representative authorization before any welding, cutting or any other hot work operations are carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

1.18 Fire Safety Requirements

.1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC

approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.19 Unforeseen Hazards

.1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

1.20 Posted Documents

.1 Post legible versions of the following documents on-site:

.1 Health and Safety Plan (company and site-specific).

.2 Emergency procedures.

.3 Notice of Project.

.4 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.

.5 Workplace Hazardous Materials Information System (WHMIS) documents.

.6 Material Safety Data Sheets (MSDS).

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, protected from inclimate weather, visible to all workers and in locations accessible to users of the facility when work of this Contract includes construction activities adjacent to occupied areas.

1.21 Meetings

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.22 Correction of Non-Compliance

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

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

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The Prime Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

PART 2 PRODUCTS

Not applicable.

PART 3 EXECUTION

Not applicable

-END OF SECTION-

PART 1 GENERAL

1.1 Environmental Factors

.1 Ensure that operations meet all applicable environmental regulations and standards.

.2 Comply with mitigation requirements as noted in the plans and specifications.

.3 The contractor is not responsible for the completion of the Notification to DFO of Construction of Docks and Floats, found in Appendix A and the Notice of Project Application, found in Appendix B.

.4 Comply with all of the requirements of the Environmental Protection Plan (EPP) found in Appendix C.

.1 The Contractor is not responsible for engaging an Environmental Monitor (EM), as PWSGC will engage for this service.

1.2 Vessels

.1 Vessels and floating equipment must not come to rest on the intertidal or sub-tidal zones unless specified otherwise.

.2 Minimize the use of barge stabilizing spuds and their disturbance to the seabed and/or foreshore.

.3 During maintenance or construction propwash/scour of the foreshore must not occur from tending vessels. This may require manoeuvring of barges in shallow water with ropes ties to the shore and/or piles.

1.3 Fires

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

1.4 Disposal of Wastes

.1 All refuse that is removed must be recycled and/or disposed of at an approved recycling/landfill site (approved by the BC Ministry of Environment under the Waste Management Act and by the appropriate Municipal Authority).

.1 Certificate, permits, and/or letter documentation must be submitted from the approved facility/landfill upon recycling/disposal within 7 days to the Departmental Representative.

.1 Documentation shall include details of disposal/recycling including, but not limited to, general description, quantities, date(s), etc.

.2 Do not bury rubbish and waste materials on site.

.3 Do not dispose of waste or volatile materials, such as mineral

END OF SECTION

spirits, timber field treatment, oil or paint thinner into waterways, storm or sanitary sewers.

1.5 Work Adjacent to Waterways

.1 Do not operate land based construction equipment within waterways.

.2 Do not use waterway beds for borrow material.

.3 Contractor is responsible for the safe overwater and terrestrial transport of all waste materials, including all augered or dredged sediment, debris, treated timber materials, wastewater and associated run-off, in accordance with this document and federal, provincial, regional/municipal laws and regulations.

.1 Contractor to assume liability for misplaced waste and debris material arising out of their activities and is required to notify the Departmental Representative and any appropriate authorities if material is misplaced or lost during the transport or during completion of offloading, transport and disposal activities.

.4 Ensure hydraulic machinery, if required, uses environmentally sensitive hydraulic fluids that are non-toxic to aquatic life and are readily or inherently biodegradable.

.5 Do not dump excavated fill, treated timber shavings/cuttings/sawdust, waste material or debris in waterways.

.6 Design and construct temporary crossings to minimize erosion to waterways.

.7 Do not skid logs/piles or other construction materials across waterways.

.8 Avoid indicated spawning beds when constructing temporary crossings of waterways.

1.6 Timing of Work

.1 It is anticipated that the work may need to be conducted outside the DFO work windows. The preferred DFO work windows are as follows:

.1 Summer Window: July 1 – Oct 1

.2 Winter Window Dec 1 – Feb 15

.2 There will be no restriction of work outside the work windows, except during fish spawning, provided the Contractor employs and exclusion device around the work area to restrict fish access or when required an effective method of mitigation shock waves

END OF SECTION

(e.g. bubble curtain).

1.7 Pollution Control

.1 Maintain temporary erosion and pollution control features installed under this contract. Work is to be conducted in a manner that minimizes any induced turbidity outside the work area and does not result in exceedance of water quality criteria outside the work area.

.2 Control emissions from equipment and plant to local authorities' emission requirements.

.3 Wastewater produced on the site (e.g. individual floatation unit effluent, equipment decontamination wastewater, etc.) should be tested prior to discharge within the project area to ensure compliance with applicable water quality performance objectives for where it is intended to be released.

.1 If criteria cannot be met wastewater shall be treated at an authorized wastewater treatment facility. No deleterious substances may be released into any watercourse.

.4 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.6 Spill kits and containment are to be maintained on site and ready for deployment in case of spills.

.1 Spill kits are to contain sufficient quantities of absorbent material on site in close proximity to working machinery.

.2 During the work there are to be trained and qualified personnel on site that are ready to deploy spill kits when necessary.

.7 Construction wastes must be prevented from entering the marine environment. If large debris should fall to the ocean bed during repairs/replacement, it must be lifted off of the bottom taking care to minimize as much as practical, disruption to the sea bed and the suspension of sediments in the water column. Debris is to be removed either by hand or by crane system from the wharf or from a barge.

.1 Particular attention must be taken to ensure that shavings, cuttings and sawdust from treated wood is not permitted to enter the marine environment;

.2 Field treating with wood preservative of cuts to treated wood is to be done in a manner that ensures that there is no deposit of this deleterious substance to the marine

environment.

1.8 Protection of Wildlife

.1 Make every effort to minimize disturbance to the benthic and upland wildlife communities.

.2 Motile and semi-motile marine invertebrates must be removed from portions of the approach, floats, piles and/or chains affected by construction activities, direct or indirect by the Contractor and placed in a bucket containing site water for inventory by the Environmental Monitor.

.1 Following the inventory, marine invertebrates collected during the salvage operations must be relocated by the Contractor's representative to a suitable site identified by the Environmental Monitor within waterlot 395, refer to the drawings, as directed by the Departmental Representative.

.2 Large macroalgae must be removed from affected portions of the approach, floats, piles and/or chains to the marine environment as directed by the Department Representative.

.3 All work is to be conducted in accordance with the EPP, located in Appendix C.

.3 Do not disturb eel grass or kelp beds.

.4 The Departmental Representative has authority to suspend any construction activities if spawning fish are observed or suspected within or near the Site. In the absence of the Departmental Representative, the Environmental Monitor (EM) may suspend the work activities until otherwise directed by the Departmental Representative.

1.9 Pile Driving

.1 Comply with the mitigation requirements in the BC Marine and Pile Driving Contractors Association Best Management Practices for Pile Driving and Related Operations located within the Environmental Protection Plan (EPP) found in Appendix C,

.2 Pile installation causing fish kills must cease immediately. The Contractor will be responsible for introducing measures to protect fish from entering the area of Work including the use of bubble curtains.

.1 Fish kills detected following the implementation of mitigation measures will cause work to stop immediately until the preventative measures can be reviewed and corrected.

.2 Mitigation measures must not compromise the efficiency

of other environmental protection measures.

.3 All reasonable attempts should be made to remove the entire pile.

.1 Should a pile break below the biologically-active sediment zone, an assessment in conjunction with the Departmental Representative should be conducted to assess the need and options for the removal of the remaining structure.

.4 Appropriate turbidity control measures must be installed and functional prior to any pile driving operations.

.1 The use of surface to bottom silt curtains must be used around piles during extraction and pile driving when debris or sediment re-suspension is anticipated.

1.10 Documentation

.1 The Contractor must produce and maintain on site copies of the approved Environmental Protection Plan, and Spill Response Plan.

.2 Environmental Emergency Response Plan and Spill Response Plan are to be submitted to the Departmental Representative for review within 7 days of contract award.

.3 Construction may not commence until the plans have been approved.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

-END OF SECTION-

PART 1 GENERAL

1.1 References

.1 Canadian Standards Association (CSA International)

.1 CSA-0121-M1978, Douglas Fir Plywood.

.2 CAN/CSA-S269.2, Access Scaffolding for Construction Purposes.

.3 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment.

1.2 Action and Information Submittals

.1 Provide submittals in accordance with Section 01 33 00 – Shop Drawings, Product Data and Samples.

1.3 Installation and Removal

.1 Indicate use of supplemental or other staging areas.

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

.3 Remove from site all such work after use.

1.4 Scaffolding

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

.2 Provide and maintain scaffolding, ramps, ladders and/or platforms, as required.

1.5 Hoisting

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

.2 Hoists and / or cranes to be operated by qualified operator.

1.6 Site Storage/Loading

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

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

1.7 Construction Parking

.1 Parking will be permitted on site provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

1.8 Equipment, Tools and Materials Storage

.1 Provide and maintain, in clean and orderly condition, lockable

weatherproof sheds for storage of tools, equipment and materials.

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

1.9 Sanitary Facilities

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

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

1.10 Protection and Maintenance of Traffic (Vehicle and Pedestrian)

.1 Provide access and temporary relocated roads and / or footpaths as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads and / or footpaths during construction period except as otherwise specifically directed by Departmental Representative.

.3 Provide measures for protection and diversion of traffic, including the erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs, if required.

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

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

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

.7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of vehicle and pedestrian traffic.

.8 Lighting: to assure full and clear visibility for work areas during night work operations, if applicable.

.9 Provide snow removal during period of Work, if applicable.

1.11 Clean-up

.1 Clean dirt or mud tracked onto paved or surfaced roadways.

.2 Stack stored new or salvaged material not in construction

facilities.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 Section Includes

.1 Administrative procedures preceding Departmental Representatives inspections of Work for Substantial Performance and Final Completion Certificates.

1.2 Related Sections

.1 Section 01 11 05 – Marine General Instructions

.2 Section 01 33 00 – Shop Drawings, Product Data and Samples

.3 Section 35 05 51 – Marine General Sitework

.4 Section 26 05 01 – Common Work Results for Electrical

1.3 Submittals

.1 Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portion of work which are specific to project requirements.

.2 Maximum sheet size: 850 x 1050 mm.

.3 Submit one digital copy in PDF format of all submittals for each requirement requested in the specification sections and/or as requested by the Departmental Representative.

.4 Cross-reference submittals, including shop drawing, information to applicable portions of the Contract documents.

.5 Operation and maintenance manuals.

1.4 Review and Declaration

.1 Contractor's review: Contractor and all Subcontractors shall conduct a thorough review of Work, identify deficiencies and defects, and correct as required to conform to the Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's review and that corrections have been made. Written notice to identify that the following have been performed.

.1 Work has been completed up to Substantial Performance or Final Completion and reviewed for compliance with the Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted, and balanced and are fully operational.

.4 Certificates required by authorities having

jurisdiction have been provided.

.5 Commissioning of all systems: Final Commissioning reports have been submitted to the Departmental Representative.

.6 Operation of systems have been demonstrated to Departmental Representative.

.2 Request for the Departmental Representative to review for Substantial Performance or Final Completion certificate.

.3 Departmental Representative's Review: the Departmental Representative and the Contractor will perform a review of the Work to identify obvious defects or deficiencies.

1.5 Correction of Work

.1 As necessary, the Contractor is to correct the Work in accordance with the Departmental Representative's review and resubmit.

1.6 Completion

.1 Submit a written certificate that the following have been performed:

.1 Work has been completed and inspected for compliance with the Contract documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems: tested and fully operational.

.4 Work is complete and ready for final inspection.

PART 2 PRODUCTS

2.1 Not Used

PART 3 EXECUTION

3.1 Not Used

-END OF SECTION-

PART 1 GENERAL

1.1 Section Includes

.1 This Section covers items common to Sections of Divisions 26. This section supplements requirements of Division 1.

.2 Section 26 05 01 refers to those portions of the Work that are unique to the supply and installation of all electrical, control, and related appurtenances. This section must be referred to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.2 References

.1 Definitions:

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

.2 Reference Sections:

.1 Section 01 11 05 – Marine General Instructions

.2 Section 01 33 00 – Shop Drawings, Product Data and Samples

.3 Section 01 35 43 – Environmental Procedures

.4 Section 35 05 52 – Marine General Sitework

.3 Reference Standards:

.1 CSA Group

.1 CSA C22.1-15, Canadian Electrical Code, Part 1 (23nd Edition), Safety Standard for Electrical Installations.

.2 C22.2 NO. 48-15 – Nonmetallic Sheathed Cable

.3 CSA C22.2 No. 1-10 (R2015), General Requirements - Canadian Electrical Code, Part 2.

.4 CAN3-C235-83(R2015), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.5 C22.2 NO. 45.2-08 (R2013) – Electrical Rigid Metal Conduit.

.6 CSA Z462-15, Workplace electrical safety, provides assistance in determining the severity of potential exposure, planning safe work practices, and selecting personal protective equipment to protect against shock and arc flash hazards.

.2 American National Standards Institute – ANSI

.1 ANSI Z535.4-2011, Product Safety Signs and Labels

1.3 Summary of Work

.1 This project involves the removal and replacement of electrical equipment at CBSA Bedwell Harbour on South Pender Island, BC. The electrical equipment to be replaced is located on the fixed wharf, existing building, gangway and adjacent floating docks. The scope of work includes, but is not limited to, the following items:

.1 The removal and disposal of existing electrical components including existing luminaires, luminaire supports, weather heads, photocells, emily knobs, and overhead cabling between the luminaires and the circuit breaker within the adjacent CBSA building.

.2 The supply and installation of LED-based float lighting components including cable trays, conduit, electrical cabling, conductors, LED luminaires, motion sensors, luminaire support structures c/w mounting plates, connection to existing electrical panel, and other miscellaneous items required to create an operational lighting system

.3 The supply and installation of building-mounted LED lighting, building-mounted switched electrical outlet, outdoor-rated GFI receptacle, interior switch for controlling power to the receptacle, connection of the LED luminaires to the lighting control devices, connection of the switch and receptacle to the existing electrical panel and any other miscellaneous items required to create an operational installation.

1.4 Removal of Redundant Material and Equipment

.1 All equipment removals shall be coordinated with the Departmental Representative.

.2 Equipment to be removed as indicated on drawings and to be disposed of off-site at the Contractor's expense, in accordance with Section 01 35 43 Environmental Procedures and the Environmental Protection Plan (EPP, located in Appendix C).

1.5 Work Restrictions

.1 Portions of the electrical work to be completed fall within the CBSA office building. Work within this area shall be limited to three days in total, with a maximum of 8 hours per day. CBSA staff may be present within the office building during construction; interruptions to CBSA operations are not permitted. Access to the CBSA office building shall be

coordinated through the Departmental Representative a minimum of two business days in advance of required access.

1.6 Responsibility and Coordination

.1 Provide all labour, materials, equipment, tools, and incidentals necessary to provide a complete electrical installation as specified and shown on the drawings.

.2 Without relieving the Contractor of his responsibilities, the Specifications have been divided into approximate trade sections for convenience. These Sections do not, however, limit the responsibility of any subcontractor or supplier. The Departmental Representative will not arbitrate on any dispute between the subcontractors' responsibilities. The onus of defining the extent of the subcontractors' work remains with the Contractor, who, when awarding subcontracts, will ensure that the area of responsibility of any particular subcontractor is set out in full detail.

.3 The Contractor shall advise the Departmental Representative during the tender period of any specified material or equipment which is either no longer available from manufacturers or whose delivery is likely to exceed the requirements of the anticipated Construction Schedule. Failure of the Contractor to perform the above shall cause the Contractor to supply, at his own expense, alternate material or equipment as selected by the Departmental Representative at a later date. Alternatively, the Contractor shall procure the specified material or equipment at his own additional expense by means of air freight or other special means of transportation.

.4 The Drawings and Specifications complement each other and what is called for by one is binding as if called for by both. If there is any doubt as to the meaning or true intent due to a discrepancy between the Drawings and Specifications, obtain a ruling from the Departmental Representative prior to tender closing. Failing this, the most expensive alternative is to be allowed for.

.5 Advise the Departmental Representative of any specified equipment, material, or installation of same which appears inadequate or unsuitable or which is in violation of laws, ordinances, rules, or regulations of authorities having jurisdiction. Provide all labour and materials which are obviously necessary or reasonably implied to be necessary to complete the work as if the work was shown on the Drawings and/or described in the Specifications.

.6 Check Drawings of all trades and coordinate the installation of all material and equipment to ensure adequate space and free access and to maintain headroom limitations for all proposed and indicated future work. Work out jointly, with all Subcontractors on the site, solutions to interference problems. Coordinate all work before fabricating or installing any material or equipment. It is incumbent on all Subcontractors on the site to ensure that all materials and equipment fit into the allocated spaces and that all equipment can be properly inspected, serviced, and replaced if and when required. Advise the Departmental Representative of space problems before fabricating or installing any material or equipment. Demonstrate to the Departmental Representative on completion of the work that all equipment and material installed can be properly and safely serviced and replaced. Make no deviations from the intent of the design, or any involving additional cost, without the Departmental Representative's written direction.

.7 Where electrical work and materials are noted as being provided by the Owner or under other Divisions of these Specifications, the responsibility for integrating, to the extent required, such work and materials into the complete installation, shall remain within Division 26.

.8 Ensure that any building structure loaded during the installation is adequate to carry such load.

.9 A contractor is entitled to engage in the regulated work for which the contractor is licensed.

.1 A licensed contractor must not:

.1 Manage or do regulated work that is:

.1 Outside the scope of the license,

.2 Contrary to any term or condition of the license, or

.3 Contrary to any term or condition imposed by the regulations on the use of the license

.2 Permit regulated work to be undertaken by persons under the control of the licensed contractor if they are not authorized.

.2 A licensed contractor must:

.1 Maintain current knowledge of the Acts, relevant regulations, relevant directives, relevant safety orders and any other relevant material that the minister makes publicly available, and

.2 Ensure that individuals who do regulated work for the

licensed contractor maintain similar current knowledge.

1.7 Drawings, Measurements and Notations

.1 Electrical drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of work.

.2 The electrical drawings show approximate locations of equipment and apparatus but the right is reserved to make such changes in location before installation of the work as may be necessary to meet the exigencies of construction in any way. No extra will be allowed and conversely, no credit shall be expected for such changes unless for each item of work the distance moved exceeds 3m prior to final installation of same.

.3 Take field measurements where equipment and material dimensions are dependent upon building dimensions.

.4 The Contractor shall assume that it has to supply and install all electrical equipment. Standard notations are used on the Plans to assist the Contractor in identifying what work needs to be done. These standard notations are defined as follows:

.1 "All equipment is proposed unless noted otherwise" – This notation is used on Plans where the majority of the equipment on the drawing is to be supplied and installed by the Contractor. The notation means that the Contractor shall perform all work shown on the drawing except for equipment shown as existing (i.e. to remain).

.2 "All equipment is existing unless noted otherwise": - This notation is used on Plans where the majority of the equipment is existing. The notation means that the Contractor shall perform only the work identified.

.5 The words "provide" and "install" shall be taken to mean supply, install, test, and commission.

1.8 Codes and Standards

.1 Complete installation in accordance with CSA C22.1-2015 except where specified otherwise.

1.9 Permit, Fees and Inspection

.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 Arrange for inspection of the work as the installation progresses and as further required by all applicable authorities having jurisdiction.

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

.5 Furnish Certificates of Acceptance from authorities having jurisdiction on completion of work to Departmental Representative.

.6 The Departmental Representative will carry out inspections and prepare deficiency lists for corrective action by Contractor, during construction, upon completion of work, and during the Warranty period.

1.10 Delivery and Storage

.1 Store all electrical equipment and devices other than float luminaire supports, conduits, fittings, boxes, and ducts in a heated and ventilated space, and protect from construction damage. Include in the tender price all costs related to such storage.

.2 Float luminaire supports, conduits, fittings, boxes, and ducts may be stored outside if properly protected against the weather.

.3 Ship and store floor mounted equipment in upright position.

.4 Ship equipment in adequate containers to assure it arrives undamaged at the site.

.5 Keep equipment doors locked. Protect equipment from damage and dust.

.6 Block moving parts when necessary to prevent damage during movement and shipment of equipment.

1.11 Quality Assurance

.1 Qualifications: Electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Electrical Safety Regulation within the Electrical Safety Act and the Building Code and By-Laws.

.2 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform installation tasks.

1.12 Safety and Precautions

.1 Safety practices shall include, but are not limited to, the following requirements:

.1 Workers' Compensation Board Regulations

.2 Municipal By-Laws

.3 Canadian Electrical Code

.4 Electrical Safety Act of BC

.5 Municipal, Provincial and Canadian Building Code

.2 Tests shall be performed with apparatus de-energized unless otherwise specified (e.g., rotation, phasing).

.3 Power circuits shall have conductors shorted to ground by an approved hotline grounded device.

.4 In all cases, work shall not proceed until the Contractor's safety representative has determined that it is safe to do so.

.5 The Contractor shall have sufficient protective barriers and warning signs available, where necessary, to conduct specified tests safely.

.6 The Project safety procedures shall be reviewed and accepted by the Contractor and all sub-trades.

1.13 Care, Operation and Startup

.1 Provide Departmental Representative with the operation, care and maintenance manuals of systems, system equipment and components.

.2 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.

1.14 Approvals

.1 All submissions shall conform to Section 01 33 00 – Shop Drawings, Product Data and Samples.

.2 Materials, equipment, apparatus, light fixtures, or other products specified by manufacturers' brand name, type, or catalogue number are so specified in one of two ways:

.1 Specified item followed by the words “or equal” or “approved equal” or preceded by the words “equivalent to” or “equal to”; when the Specification is so worded, it is intended to establish a specific standard of quality and style, or alternative approved by addendum during tender.

.3 Where such substitutions alter the design or space requirements indicated on the Drawings, include all material, labour, design, and engineering costs for the revised design and construction including costs of all other trades affected and those incurred by the Architect and/or Engineer.

.4 It is the Contractor's responsibility to ensure substituted products are approved and that suppliers have written approval indicating conditions of any such approval. Alternate manufacturers who do not have such approval shall not be used in the work. If requested by the Departmental Representative, the Contractor for Division 26 shall submit for inspection, samples of both the specified and the proposed substitute items on short notice.

1.15 Substantial Performance Inspections

.1 Before the Departmental Representative is requested to make a Substantial Performance inspection, submit written confirmation that:

.1 All wiring devices, cover plates, lighting fixtures, and other equipment are operational, plumb, clean, and correctly labelled.

.2 All distribution equipment (cabinets, panels, distribution transformers, etc.) has been cleaned and vacuumed.

.3 All Test Reports have been submitted.

.4 All auxiliary systems have been tested as required and are in good and proper working order.

.5 All certificates of final acceptance from the authorities having jurisdiction have been received and submitted to the Departmental Representative.

.6 Factory finished equipment has been cleaned, touched up, or refinished as necessary to present a new appearance.

.7 All sealing of conduits, cables, cable trays, wireways, etc. at wall, ceiling, and floor penetrations have been completed, as applicable.

.8 All lighting fixtures including lenses and reflectors have been properly cleaned as specified.

.9 All loose equipment including spare parts and replacement parts have been turned over to the Owner and receipts obtained for same.

.10 The Maintenance Manuals have been submitted.

.11 All demonstrations and instructions to the Owner have been completed.

.2 Provision of the above shall not be construed as compliance with all administrative documentation required.

.3 Notwithstanding any other provisions of the Contract, failure to complete all of the above shall give cause to deny the issuance of a Substantial Performance Certificate.

1.16 Action and Informational Submittals

.1 Shop Drawings

.1 Refer to Section 01 33 00 – Shop Drawing, Product Data and Samples.

.2 Detailed wiring diagrams of component assemblies need not be included with shop drawings unless requested by the Departmental Representative. However, such wiring diagrams shall be included as part of the Maintenance Manual as required by these Specifications.

.3 Indicate details of construction, dimensions, locations of cable pits and trenches, capacities, weights and electrical performance characteristics of equipment and materials.

.4 Shop drawings may be prepared by the Contractor, or manufacturer's drawings will be accepted. Drawings required for one and the same system shall be submitted as a complete package. Incomplete system packages will not be reviewed and will be returned unmarked.

.5 Shop drawings shall be reviewed by the Contractor prior to submission to the Departmental Representative. Shop drawings not bearing Contractor's approval stamp, approval date, signature, and project name will be returned without comment.

.6 Manufacturers' brochures (product data) submitted as shop drawings shall clearly indicate type (i.e., lighting fixture Type AD, intercom station Type B, etc.) and all features as specified as part of the unit(s).

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for all equipment and include product characteristics, performance criteria, physical size, finish and limitations, as applicable.

1.17 Closeout Submittals

.1 Closeout procedures shall conform to Section 01 77 00 –

Closeout Procedures & Submissions.

.2 Maintenance Manuals:

.1 Submission:

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Departmental Representative's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.5 If requested, furnish evidence as to type, source and quality of products provided.

.6 Defective products will be rejected, regardless of previous inspections. The Contractor shall replace products at their own expense.

.7 Pay costs of transportation.

.2 Format

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: Manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.3 Contents – Each Volume:

.1 Table of Contents: provide title of project;

.2 Date of submission; names,

.3 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties;

.4 Schedule of products and systems, indexed to content of volume.

.4 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.5 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.6 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.7 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

.8 Guarantees, Warrantees and Bonds

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

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

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

.4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

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

.9 Equipment and Systems:

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.12 Additional requirements: As specified in individual specification sections.

.3 "As-Built" Drawings

.1 Refer to Specification 01 11 05 – Marine General Instructions.

.2 Notwithstanding the above, maintain in the job site office in up-to-date condition, one (1) complete set of whiteprints of each of the Electrical Contract Drawings and one (1) set of Specifications, including Revision Drawings, marked clearly and indelibly in red, indicating "As-Built" conditions where such conditions deviate from the original directions of the Contract Documents, and indicating final installation of feeders and branch circuits.

.4 "As-Built" drawing markings shall include but shall not be limited to the following:

.1 All changes in circuiting.

.2 Size and routing of all conduits for branch circuits including power, lighting, and systems. Note that

branch circuit wiring is generally not shown on Drawings. Accurately record on "As-Built" drawings the size and routing of all installed raceways and cables.

.3 Number and size of conductors in raceways and cables

.4 Location of all junction and pull boxes

.5 Location of all access panels

.6 Location of all conduit or duct stubs, installed equipment, devices, and fixtures

.7 All changes to electrical installation resulting from Addenda, Change Orders, and Field Instructions (Architectural / Engineering Instructions)

.8 Exact location of all services left for future work

.9 Location by accurate horizontal and vertical dimensions of the routes and terminations of all raceways and cables installed underground beyond the building.

.10 Where extensive changes have been made to an area to the point where it is not practical to update the original tender drawing, the area in question shall be enclosed with a heavy dotted line and reference made to the applicable Change Order, Instruction, and/or associated Revision Drawing.

.11 For each and every "As-Built" drawing, reference shall be neatly drawn inside the framed space above the title block, listing all Contemplated Change Orders, Instructions, and Revision Drawing Numbers applicable to the particular "As-Built" drawing in question.

.12 Each "As-Built" drawing as defined above shall bear the Contractor's identification and signature, the date of record, and the notation: "We hereby certify that these Drawings represent the building as built."

.13 All Addenda and Revision Drawings not having their details transferred onto the submitted "as-built" drawings shall be included in the submission using the same drawing format as previously described.

PART 2 PRODUCTS

2.1 Design Requirements

.1 Operating voltages: to CAN3-C235.

.2 Equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language operating requirements: provide identification nameplates and labels for control items in English.

2.2 Materials and Equipment

.1 Material and equipment to be CSA certified. Where CSA certified material and/or equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

2.3 Warning Signs

.1 Warning Signs: in accordance with requirements of authority having jurisdiction and Specification 01 11 05 – Marine General Instructions.

.2 Porcelain enamel signs, minimum size 175 x 250 mm.

2.4 Wiring Terminations

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5 Equipment Identification

.1 Identify electrical equipment with nameplates as follows:

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self-tapping screws.

.2 Sizes as follows:

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

.2 Labels: stainless steel embossed plastic labels with 6 mm high letters unless specified otherwise.

.3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.

.4 Allow for minimum of twenty-five (25) letters per nameplate or label.

.5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.6 Disconnects: indicate equipment being controlled and voltage.

.7 Terminal cabinets and pull boxes: indicate system and voltage.

2.6 Wiring Identification

.1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

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

2.7 Conduit and Cable Identification

.1 Cabling: use stainless steel embossed cable identifiers secured with UV-stabilized cable ties.

.2 Colour code conduits, boxes and metallic sheathed cables.

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

.4 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 Finishes

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel. Finish colours as indicated on Drawings.

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

.3 Repair or replace, at no cost to the Owner, any equipment or structures damaged by the execution of Contract to its original condition.

2.9 Conduit

.1 Rigid metal conduit: to CSA C22.2 No. 45, aluminum threaded.

.2 Provide bell ends at each end of conduit for cabling on gangway.

.3 Stainless steel beam clamp hardware to secure conduits to marine structures.

.4 Fish cord - polypropylene

2.10 Building Wiring

.1 Conductors: Minimum size: 12 AWG.

.2 Interior Concealed wiring: type NMD-90, size as indicated, two or three annealed (soft) copper conductors, with 90°C XLPE (R90) insulation, rated 600V. Bare bonding wire and overall jacket of moisture resistant and flame retardant PVC, rated FT-4. CSA certified for indoor use.

.3 Interior surface wiring: type AC90, size as indicated, two or three annealed (soft) copper conductors, with 90°C XLPE (R90) insulation. Bare bonding wire. Conductor assembly paper wrapped and covered with bare interlocked aluminum armour, rated FT4. CSA certified for indoor use.

.4 Provide detailed data sheets for proposed products.

2.11 Float Cabling

.1 Conductors: Minimum size: 12 AWG, including bond.

.2 Type SOOW, size as indicated, three annealed (soft) copper conductors, with coloured 90°C EPDM insulation. Conductor assembly covered with Black 90°C CPE jacket. Suitable for use in oil, water, moisture; abrasion resistant. CSA certified for outdoor use.

.3 Stainless steel single-hole straps for connecting float cabling to floats; stainless steel wire mesh cable grips where indicated.

.4 Provide data sheets for proposed products.

2.12 Connectors

.1 Manual twist-on type wire connectors, with current carrying parts of copper sized to fit copper conductors as required. CSA certified for outdoor/wet location use.

2.13 Junction Boxes

.1 Construction: RPVC construction, rated NEMA 4X, with external screw holes for surface mounting.

.2 Covers Surface Mounted: screw-on turned edge covers with gasketed edge. Fastening hardware shall be stainless steel.

.3 Liquid-tight threaded strain relief connectors for connecting type SOOW cabling to junction boxes.

2.14 Float Luminaire Support Structures:

.1 Welded marine grade aluminium construction, with hand hole, baseplate, flanges, top cap, luminaire mount and wire chase between deck and luminaire.

.2 All fastening hardware, including float anchors, shall be stainless steel.

.3 Provide detailed shop drawings for proposed products. Shop drawings shall detail construction and detail attachment methods to floats, and shall be sealed by a professional engineer registered in the Province of British Columbia.

.4 Finish of poles shall be powder coated black in colour and have a wall thickness of 3.05mm.

2.15 Float Luminaires:

.1 Construction: Aluminium with hinged removable door and back box; tool-less electrical connections; luminaire mounted threaded conduit entry points; wall mount. TGIC carbon bronze finish.

.2 Optical: 18W LED light source, suitable for operation in -40°C to 40°C; 2,103 delivered lumens; color temperature: 4000 kelvin.

.3 Integrated photocell electric control.

.4 Electrical: 120V AC power

.5 Provide data sheets for proposed products.

.6 Minimum acceptable product shall be a pole mount Lumark 18W LED luminaire with model number XTOR2B-W-N-BL-PC1

2.16 Float Luminaire Motion Sensors:

.1 Construction: Polycarbonate construction with adjustable aluminium extension arm with provisions for mounting via a ½" NPS threads. Suitable for mounting on the bottom or side of boxes/luminaires.

.2 Sensor Range: 15.2m x 180° when mounted at 2.4m.

.3 Load Rating: 200W.

.4 Voltage: 120 – 277W.

.5 Surge Suppression: 4kW.

.6 Integrated photocell electric control.

.7 Electrical: 120V AC power.

.8 On-Time adjustment: 5 seconds to 7 minutes.

.9 Operating Temperature: -40°C to 40°C

.10 Provide data sheets for proposed products.

.11 Minimum acceptable product shall be: RAB MS180S On/Off Motion Sensor.

2.17 Building Luminaires:

.1 Construction: Impact resistant white polycarbonate housing and acrylic lenses; corrosion resistant anodized aluminum top plate; ceiling mount on 102mm junction box square, rectangular or octagonal junction boxes.

.2 Optical: 33W LED light source, suitable for operation in -40°C to 40°C; 3,910 delivered lumens; color temperature: 4000 kelvin; Type V short distribution.

.3 Electrical: 120V AC power

.4 Provide data sheets for proposed products.

.5 Minimum acceptable product shall be a ceiling mount Cree 33W LED luminaire with model number IG-A-NM-5S-A-40K-UL-WH.

2.18 Photoelectric Lighting Controls:

.1 Photoelectric Lighting Controls: to CSA C22.1.

.2 Wall mounting.

.3 Capable of switching 1000W of lighting at 120V.

.4 Voltage variation: plus or minus 10%.

.5 Temperature range: -40°C to 40°C.

.6 Rated for 5000 operations.

.7 Options:

.1 Lightning arrester.

.2 Fail-safe circuit completed when relay de-energized.

.3 Terminal strip.

.4 Sensitivity adjustment.

.5 Switching time delay of 30s.

.6 Wall mounting bracket.

.7 Colour coded leads: size 12 AWG, 460 mm long.

2.19 Receptacle:

.1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA C22.2 No.42 with following features:

.1 White urea moulded housing.

.2 GFCI protected

.3 Suitable for No. 10 AWG for back and side wiring.

.4 Break-off links for use as split receptacles.

.5 Eight back wired entrances, four side wiring screws.

.6 Triple wipe contacts and riveted grounding contacts.

.2 Clear weatherproof while-in-use cover shall be included.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for use in installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Installation

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

.2 Do overhead, float and underground systems in accordance with CAN/CSA-C22.3 No.1 except where specified otherwise.

3.3 Nameplates and Labels

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.4 Conduit and Cable Installation

.1 Install conduit as specified and shown on the drawings.

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

3.5 Location of Outlets

.1 Locate outlets as specified and shown in drawings.

.2 Do not install outlets back-to-back in wall; allow minimum 150mm horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000mm, and information is given before installation.

.4 Locate light switches on latch side of doors.

.1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

3.6 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 specified or indicated, verify before proceeding with installation.

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

.1 Local switches: 1400mm.

.2 Wall receptacles:

.1 General: 300mm.

.2 Above top of continuous baseboard heater: 200mm.

.3 Above top of counters or counter splash backs: 175mm.

.3 Panelboards: as required by Code or as indicated.

3.7 Co-Ordination of Protective Devices

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

3.8 Conduit

.1 Surface mount conduits as indicated on drawings using stainless steel hardware.

.2 Use rigid aluminum threaded conduit.

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

.4 Remove and replace blocked conduit sections.

.5 Dry conduits out before installing wire.

.6 Run parallel to gangway.

.7 Install bell ends on each end of conduit.

3.9 Building Wiring

.1 Install interior wiring concealed behind walls (NMD90) or surface mounted (AC90) within the building.

.2 Terminate cables in to electrical panel and field devices.

.3 Connect wiring to exterior SOOW wiring using threaded twist on connectors. Wrap rubber-based waterproof electrical tape around threaded connector and adjacent 100mm of wiring.

.4 Lace or clip groups of cables at electrical panel and within pullboxes.

.5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

3.10 Float Cabling

.1 Connect wiring to interior building wiring using threaded twist on connectors. Wrap rubber-based waterproof electrical tape around threaded connector and adjacent 100mm of wiring.

.2 Strap to floats and trestle using stainless steel one-hole straps spaced at 1200mm, or as otherwise indicated on the drawings.

.3 Pull through conduit as noted on the gangway.

.4 Provide slack in cable to allow for movement between floats, and to allow for movement of the gangway due to fluctuations in tide levels, as specified and shown on the drawings.

3.11 Connectors

.1 Use twist-on type connectors for splicing wiring throughout the project. Wrap rubber-based waterproof electrical tape around threaded connector and adjacent 100mm of wiring.

3.12 Junction Boxes

.1 Mount plumb, true and square to building lines using stainless

steel hardware.

.2 Install pull boxes in inconspicuous but accessible locations.

3.13 Float Luminaire Support Structures

.1 Modify deck boards to suit installation of float luminaire supports, including provisions for wire chases.

.2 Attach to floats using method identified by pole manufacturer using stainless steel components.

.3 Provide bird-deterrent spikes at the top of each pole.

3.14 Float Luminaires

.1 Attach float luminaires to support structures using stainless steel hardware.

.2 Connect to power cabling per manufacturer's directions.

.3 Provide bird-deterrent spikes at the top of each luminaire.

.4 Float luminaires shall be controlled via local photocells installed and motion sensors (where noted).

3.15 Float Luminaire Motion Sensors

.1 Attach sensors to float luminaire conduit knock-outs.

.2 Connect to power cabling per manufacturer's directions.

.3 Aim motion sensors.

3.16 Building Luminaires

.1 Connect building luminaire to soffit-mounted junction box using stainless steel hardware.

.2 Connect to power cabling per manufacturer's directions.

.3 Building luminaires shall be controlled via photocell installed on building.

3.17 Photoelectric Lighting Controls:

.1 Install photoelectric controls in accordance with manufacturer's written instructions and to CSA C22.1.

.2 Mount controls box plumb, true and square to building lines using stainless steel hardware.

.3 Connect to power cabling per manufacturer's directions.

3.18 Receptacles

.1 Mount plumb, true and square to building lines using stainless steel hardware.

.2 Connect to power cabling per manufacturer's directions. Receptacle shall be controlled using existing switch within building.

3.19 Field Quality Control

.1 Load Balance:

.1 Measure phase current to panel boards 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 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests.

.1 Circuits originating from branch distribution panels.

.2 Lighting and lighting control.

.3 Insulation resistance testing:

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Check resistance to ground before energizing.

.3 Carry out tests in presence of Departmental Representative.

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

3.20 System Startup

.1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.

3.21 Cleaning

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 In accordance with:

.1 Section 01 35 43 – Environmental Procedures

.2 Section 35 05 551 – Marine General Sitework

END OF SECTION

Part 1 GENERAL

1.1 Related Requirements

.1 Section 01 11 05 – Marine General Instructions

.2 Section 01 33 00 – Shop Drawings, Product Data and Samples

.3 Section 01 35 33 – Marine Health and Safety Requirements

.4 Section 01 35 43 – Environmental Procedures

.5 Section 35 05 51 – Marine General Site Work

.6 Best Management Practices for Pile Driving and Related Operations – BC Marine and Pile Driving Contractors Association - November, 2003, located in Appendix C.

.7 Bedwell Harbour Float Redevelopment - Environmental Protection Plan (EPP), located in Appendix C.

1.2 Measurement Procedures

.1 Measurement as per Section 35 05 51 – Marine General Site Work

1.3 References

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM A252-98(2002), Standard Specification for Welded and Seamless Steel Pipe Piles.

.2 Canadian Standards Association (CSA International)

.1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA-G40.20/G40.21-2004, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.3 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel Structures.

.4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.

.5 CSA W59-03, Welded Steel Construction (Metal Arc Welding) (metric version).

.6 CSA-Z245.1-02, Steel Pipe.

1.4 Action and Informational Submittals

.1 Provide submittals in accordance with Section 01 33 00 - Shop Drawings, Product Data and Samples.

.2 Grout pours: provide accurate records of poured grout items indicating date and location of pour, quality, water temperature, air temperature and test samples.

1.5 Delivery, Storage, and Handling

.1 Deliver, store and handle in accordance with Section 01 11 05 – Marine General Instructions.

.2 Storage and Protection:

.1 Store and handle pipe piling in accordance with manufacturer's written instructions to prevent permanent deflection, distortion or damage to interlocks.

.2 Support pipe piling on level blocks or racks spaced not more than 3 m apart and not more than 0.60 m from ends.

.3 Store pipe piling to facilitate required inspection activities and prevent damage to coatings and corrosion prior to installation.

.3 Waste Management and Disposal:

.1 Follow waste management and disposal procedures in accordance with Section 01 35 43 – Environmental Procedures.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Steel pipe:

.1 Sizing and wall thickness as indicated on the drawings:

.2 To ASTM A252 Grade 2, seamless

.3 Pipe material to have the following minimum properties:

.1 Yield strength: 310 MPa
.2 Tensile strength: 455 MPa
.3 Splices: to CSA-G40.20/G40.21, Grade 2
.4 Welding electrodes: to CSA W48 series

.4 Pipe allowable tolerances:

.1 Deviation from a straight line, specified diameter, wall thickness and out-of-roundness on body of pipe and at pipe ends to conform to API SPEC 5L.

.2 Pipe to be checked for deviations prior to leaving

mill.

.2 Steel pile caps: to CSA-G40.20/G40.21, Grade 2

.3 Grout:

.1 Grout: suitable for underwater applications, premixed compound consisting of aggregate, Portland cement, water reducing, set accelerators and plasticizing agents to CSA A23.1/A23.2.

.2 Compressive strength: 32 MPa at 28 days.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with the steel and grout manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

.1 Submit details of the proposed method for protection of grout during placing and curing to the Departmental Representative.

.2 Pumping of grout is permitted only after review of equipment and mix by Departmental Representative.

.3 Provide 48 hours minimum notice to the Departmental Representative prior to placing of grout.

3.3 FABRICATION

.1 Fabricate full length piles to eliminate splicing during installation wherever possible.

.2 Full length piles may be fabricated from piling material by splicing lengths together.

.1 Use complete joint penetration groove welds for all splices.

.3 Submit details of planned use of pile material stock to Departmental Representative for review prior to start of fabrication.

.4 Allowable tolerance on axial alignment to be 0.25% as measured by 3 m straight edge.

.5 Repair defective welds as reviewed by Departmental Representative.

.1 Repairs: to CSA W59.

.2 Unauthorized weld repairs may be rejected.

3.4 INSTALLATION

.1 If approved by Departmental Representative, splice piles in-place during installation by welding.

.1 To prevent distortion, tack opposite points first and then weld opposite sections, for pipe walls thinner than 10 mm weld against a back up ring. Hold members in alignment during splicing operation.

.2 Make splice by complete joint penetration groove welds.

.3 Spliced to be located a minimum of 2m below mudline.

.2 Rock Socketing:

.1 If ground conditions are such that specified penetrations cannot be obtained without damaging the pile, rock socketing may be required.

.1 If the penetration of the pile is less than 0.5 m less than specified on the drawings, notify Departmental Representative within 5 hours. The Departmental Representative will provide direction.

.2 Install steel pipe piles to the depths and specifications contained within and as shown on the drawings.

.3 Secure equipment in position during drilling.

.4 Drill sockets into sound bedrock to a minimum depth as indicated on the drawings.

.5 Grout:

.1 Gout work to CSA A23.1/A23.2

.2 Use grout mix that has been demonstrated to produce required strength at temperature prevailing in socket and pile in specified time.

.1 Grout mix and grouting pressure to be reviewed by the Departmental Representative.

.3 Hold pile securely in position so that it does not move during grouting and until grout has attained specified strength.

.4 Place grout in one continuous operation to fill socket to specified level.

.1 Provide sufficient supply of grout to complete pour without interruption.

.5 Tremie method:

.1 Provide water-tight tremie pipe sized to allow free flow of concrete. Diameter of tremie pipe to be minimum 200 mm.

.2 Provide hopper at top of tremie pipe and means to raise and lower tremie pipe.

.3 Provide plug or foot valve at bottom of tremie pipe to permit filling pipe with grout initially.

.4 Provide minimum of one tremie pipe for every 30 m2 of plan area and to maximum spacing of 6 m centre to centre. Do not move tremie pipes laterally through grout.

.5 Start placement with tremie pipe full of grout. Keep bottom of pipe buried minimum 900 mm in freshly placed grout.

.6 If seal is lost, allowing water to enter pipe, withdraw pipe immediately. Refill pipe, and continue placing as specified.

.7 If tremie operation is interrupted so that horizontal construction joint has to be made, cut surface laitance by jetting, within 24 to 36 hours and remove loose material by pumping or air lifting before placing next lift.

.8 Do not place concrete in flowing water when current exceeds 3 m/min. Do not vibrate, disturb or puddle concrete after placement.

.6 Pumped concrete method:

.1 Follow procedures as for tremie method in placing grout using discharge line from concrete pump as tremie pipe.

.2 Pump discharge line diameter: 125 mm minimum.

3.5 WELDING

.1 Weld to CSA W59.

.2 Welding certification of companies: to CSA W47.1.

.3 Welding certification of companies welding steel reinforcing bars placed in reinforced concrete: in accordance with CSA W186.

END OF SECTION

PART 1 GENERAL

1.1 References

.1 American Society for Testing and Materials (ASTM):

- .1 ASTM A123/A123M-02, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A307-04, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- .3 ASTM A106/A106M-[04b], Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
- .4 ASTM A252-[98(2002)], Standard Specification for Welded and Seamless Steel Pipe Piles.

.2 Canadian Institute of Treated Wood/Western Wood Preservers Institute (CITW/WWPI):

- .1 Best Management Practices for the Use of Treated Wood in Aquatic Environments (BMP), July 1996.
- .2 BMP Amendment #1, 17 April 2002.

.3 Canadian Standards Association (CSA):

- .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
- .2 CSA G40.21-04, Structural Quality Steels.
- .3 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 CSA-O80 Series- 15, Wood Preservation.
- .5 CSA O121-M1978 (R2003), Douglas Fir Plywood.
- .6 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .7 CSA-A23.3-14, Design of Concrete Structures.
- .8 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
- .9 CSA-G40.20/G40.21-[2004], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .10 CSA-S157-05, Strength Design in Aluminum
- .11 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.
- .12 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
- .13 CSA W48-[06], Filler Metals and Allied Materials for Metal Arc Welding.
- .14 CSA W59-03, Welded Steel Construction (Metal Arc

Welding).

.15 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.16 CSA-A23.3-14, Design of Concrete Structures.

.17 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.18 CSA-G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.19 CSA-Z245.1-[02], Steel Pipe.

.20 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

.4 National Lumber Grades Authority (NLGA):

.1 Standard Grading Rules for Canadian Lumber, 2003 edition.

1.2 Inspection and Acceptance

.1 At their discretion, the Departmental Representative may inspect materials and products at any stage of manufacture, transportation and assembly. Satisfactory inspection at any stage does not preclude future rejection if the materials or products are subsequently found to lack uniformity or fail to conform to the specified requirements.

.2 The Contract work will not be accepted until the materials or products are satisfactorily installed in the completed structure as specified.

.3 Additional costs incurred by Canada that result from unsatisfactory materials or workmanship will be charged to the Contractor.

1.3 Mobilization and Demobilization

.1 Mobilization will include all work required to supply the material, plant and labour to the site of the work, unless specified otherwise.

.2 Demobilization will include all work require to remove, recycle and dispose of the material, clean and clear the site, remove the plant and labour to

1.4 Method of Measurement

.1 The method of measurement for the classes of labour, plant or material constituting the work will be as follows:

.1 Item No. 1, Mobilization and Demobilization (Including Health and Safety)

.1 Unit: a single lump sum for all mobilization and demobilization work, including rock socketing equipment. Any items required to complete the work as specified not measured separately elsewhere are to be included in the cost of this item.

.2 Item No. 2, Reinstate Abutment

.1 Unit: lump sum for the supply removal and disposal of deteriorated timber members and new timber planks to be supplied, installed and remaining an integral part of the completed work as specified, including reinstatement of undamaged existing planks. This item is to include excavation and backfilling.

.3 Item No. 3, Remove Approach Superstructure

.1 Unit: a single lump sum to remove and dispose of existing guardrail and decking, including shims, as shown on the drawings.

.4 Item No. 4, Remove Approach Substructure

.1 Unit. per cubic metre for the removal and disposed of existing creosote treated timber substructure. Item is to include removal and disposal of exterior approach stringers, approach pilecaps and cross-bracing, as specified and shown on the drawings. Items are to be measured along the centreline of each member and base cross-sectional area on nominal NLGA standard sizes identified from site measurements.

.1 Splice members for the existing approach exterior stringers will not be measured but will be considered incidental to the stringer removal.

.5 Item No. 5, Replace Guardrails

.1 Unit: each linear metre of timber guardrail for the approach supplied, installed and remaining an integral part of the completed work as specified and shown on the drawings. Item is to be measured along the centreline of the top rail and is to include risers, bullrails and handrails.

.6 Item No 6, Approach Decking

.1 Unit: each linear metre of approach decking supplied, installed, and remaining an integral part of the work, as specified and shown on the drawings. Item is to be measured along the axis of each deckplank.

.7 Item No. 7, Replace Stringers

.1 Unit: each lineal metre of approach stringer, supplied, installed, and remaining an integral part of the work

as specified and shown on the drawings. Item to be measure along the long axis of each stringer, and to include any fishplates (splice pieces).

.8 Item No. 8, Pilecap Repair

.1 Unit: each repair of the pilecaps, supplied, installed, and remaining an integral part of the completed work as specified on the drawings.

.9 Item No. 9, Replace Pilecap

.1 Unit: each lineal metre of new treated timber pilecap supplied, installed and remaining an integral part of the completed work as specified.

.10 Item No. 10, Pile Repair

.1 Unit: each new steel band supplied, installed and remaining an integral part of the completed work as specified.

.11 Item No 11, Replace Cross-Bracing

.1 Unit: each lineal new cross-bracing, supplied, installed, and remaining an integral part of the work, as specified and shown on the drawings. Item is to be measured along the axis of each cross-brace.

.12 Item No. 12, Pile Patch

.1 Unit: each pile patch in the treated timber pile supplied, installed and remaining an integral part of the work, as specified and shown on the drawings.

.1 Item does not include patching / plugging of unused bolt holes as a result of the work.

.13 Item No. 13, Removal of Existing Piles

.1 Unit: each pile to be removed and disposed of and remaining an integral part of the work, as specified and shown on the drawing.

.14 Item No. 14, Test Pile

.1 Unit. each test pile, supplied, installed, and removed as specified and shown on the drawings.

.15 Item No. 15, Lateral Pile Test

.1 Unit. per lateral pile test, supplied, installed, and removed an integral part of the work as specified.

.16 Item No.16, Supply Pile

.1 Unit: each linear metre new pile supplied, installed, and remaining an integral part of the completed work as specified and shown on the drawings, measured from cut-off to ground line plus actual penetration into the ground. Item includes pile hats/covers. A differentiation will be made between steel and timber piles.

.2 If ground conditions are such that specified penetration cannot be obtained without damaging the pile, measurement will include the portion of cut-off representing the difference between specified and actual penetration.

.3 Penetration in excess of specified penetration will not be measured for payment unless the Departmental Representative is satisfied that such penetration is necessary and has so notified the Contractor in writing.

.4 Make allowance in pile lengths to obtain specified penetration and to allow pile to be cut-off at a sound section below any damage from driving. No portion of cut-off will be measured for payment.

.17 Item No. 17, Drive Piles

.1 Unit: each pile driven, installed and remaining an integral part of the completed work as specified and shown on the drawings. Item does not include test piles. A differentiation will be made between steel and timber piles.

.2 Timber bearing pile is to include the reconnection to the existing pilecap and cross-braces.

.18 Item No. 18, Gangway

.1 Unit: lump sum for design, supply and installation of new aluminium gangway, installed, secured and remaining an integral part of the completed work as specified.

.19 Item No. 19, Remove Floats

.1 Unit: lump sum for the removal and disposal of floats, as specified and shown on the drawings. Item includes floatation, risers, bullrails/tie-up rails, rubboard and mooring wells.

.20 Item No. 20, New Floats

.1 Unit: each square metre new float supplied, installed and secured and remaining an integral part of the completed work, as specified.

.2 Item includes floatation, risers, bullrails, rubboard and pile wells, tires (where required), ladders and signage.

.3 Measurement will be the total area of the float measured from the inside of the rubboards and excluding any exterior pile wells.

.21 Item No. 21, Anchor Block

.1 Unit: each to supply and install a new pre-cast concrete anchor blocks, supplied, installed and remaining an integral part of the completed work as

specified and shown on the drawings. Item is to include PVC pipe sleeve and reinforcing steel.

.22 Item No. 22, Anchor Chains

.1 Unit: per linear meter to supply and install new anchor chains supplied, secured and remaining an integral part of the completed work as specified and shown on the drawings, including connecting to Float D.

.23 Item No. 23, Anodes

.1 Unit: each anode assembly supplied, installed and remaining an integral part of the completed work as specified.

.2 A differentiation will be made between (a) pile anodes and (b) chain anodes.

.1 Pile anode assembly is to include the anode, cables, plastic wheel, and mounting hardware

.2 Chain anode assembly is to include anode and connection hardware.

.24 Item No. 24, Float-Float Connection

.1 Unit: each for the float connection assemblies to be supplied, installed and remaining an integral part of the completed work as specified and shown on the drawings.

.2 Item includes clips, eye-bolts, and all other associated hardware.

.25 Item No. 25, Seaplane Signage

.1 Unit: lump sum to be supplied, installed, and remaining an integral part of the work, as specified and shown on the drawings. Item is to include new seaplane sign and reflective strips.

.26 Item No. 26, Remove Anchor Blocks

.1 Unit: lump sum of removal of existing concrete anchors and lock-blocks from the seabed as specified and shown on the drawings.

.27 Item No. 27, Electrical Demolition

.1 Unit: lump sum for the removal of existing lighting and electrical systems, complete as specified and indicated on the drawings.

.2 Item is to include the removal and disposal of existing electrical components, including existing luminaires, luminaire supports, weather heads, photocells, emily knobs, and overhead cabling between the lights and the breaker within the CBSA building.

.28 Item No. 28, New Electrical

.1 Unit: lump sum for the installation of the electrical

system to be supplied, installed and remaining an integral part of the completed work as specified.

.2 Item is to include the supply and installation of building-mounted electrical outlet conduit, outdoor-rated GFI receptacle, interior switch for controlling power to the receptacle, connection of the LED luminaires to the lighting control devices, connection of the switch and receptacle to the existing electrical panel, electrical cabling, LED luminaires, luminaire support structures, mounting plates, inclusion of the building interior-mounting lighting control panel, connection to the existing electrical panel, and other miscellaneous items required to create an operational lighting system.

.29 Item No. 29, Rock Socket Piles

.1 Unit: each metre of steel pipe pile rock socketed, installed and remaining an integral part of the completed work as specified and shown on the drawings. Item is to include removal and disposal of bedrock material and grout.

.2 Item to be measured as the distance between the refusal depth and the pile tip elevation after installation.

PART 2 PRODUCTS

2.1 General

.1 Refer to Section 01 11 05 – Marine General Instructions

.2 Prevent electrolytic action between dissimilar metals. Ensure dissimilar metal isolation.

.3 All electrical work to conform to Section 26 05 01 – Common Work Results for Electrical.

2.2 Timber

.1 Timber to NLGA, No. 1 Structural Grade Coast Douglas Fir conforming to NLGA Standard Grading Rules for Canadian Lumber 2003 unless otherwise specified.

.2 Decking: Approach and float decking is to be unsurfaced (rough sizing) and wane free, as specified on the drawings.

.3 Timber shall be graded in the following classes:

.1 Boards, sheathing and form lumber.

.2 Light framing.

.3 Joists and planks.

.4 Beams and stringers.

.5 Posts and timbers.

.4 Frame and bore timber before treating unless specified otherwise.

2.3 Piling

.1 Test Pile (minimum),

.1 305 mm diameter 7.14 mm wall thickness, Grade 2 steel pipe pile, or approved alternative.

.2 Timber piling (round):

.1 Coast Douglas Fir to CSA O56, preservative treated.

.2 Piles to be size 36, peeled, unless otherwise specified.

.3 Steel pipe piles:

.1 406 mm diameter, 9.53 mm wall thickness, Grade 2 steel pipe pile, including pile caps and anodes.

.2 610 mm diameter,12.7 mm wall thickness, Grade 2 steel pipe pile, including pile caps and anodes

2.4 Treatment of Wood Materials

.1 Produce and install treated timber products in accordance with CSA 080-15 series and the Western Wood Preservers Institute and Canadian Institute of Treated Wood Best Management Practices for Treated Wood in Western Aquatic Environments, latest edition, (BMP).

.2 Testing:

.1 PWGSC will carry out materials testing, including core sampling, at the treating plant. Data will be made available to the Contractor for information only.

.2 Notwithstanding PWGSC's testing program, Contractor will ensure that materials meet PWGSC's requirements in all respects. PWGSC reserves the right to reject materials on site.

.3 Before shipping material to site, provide a certificate from the treated wood producer that BMP's were utilized, including a description of the BMP's that were utilized.

.3 Use untreated lumber, solid sawn products, on approach superstructure.

.1 Includes approach guardrails (handrails, approach bullrails and approach risers) and approach decking.

.4 Use Category UC 3.2, solid sawn products, exposed to weather, not in ground contact. May be coated for aesthetics.

.1 Includes float decking, float bullrails and float risers.

.2 Treat in accordance with CSA O80 for products under use category UC 3.2 and Clause 9.2 of O80.1.

.1 Preservatives, retention, and penetration:

.1 ACZA, 4.0 kg/m^3 or
.2 CCA, 4.0 kg/m^3
.3 Penetration of solid sawn products in accordance with O80:
.1 10 mm and 90% of sapwood if material is less than 115 mm thick, or
.2 13 mm and 90% of sapwood if material is greater than or equal to 115 mm thick

.5 Use Category UC 4.1, contact with ground, freshwater, and/or salt water splash.
.1 Includes float and approach joists, float and approach stringers, fishplates, pile caps, corbels, dolphin blocking.
.2 For solid sawn products, treat in accordance with CSA O80 for products under use category UC 4.1 and Clause 9.2 of O80.1
.1 Preservatives, retention, and penetration:
.1 ACZA, 6.4 kg/m^3 or
.2 CCA, 6.4 kg/m^3 or
.3 Creosote
.1 160 kg/m^3 if thickness less than 115 mm
.2 120 kg/m^3 if thickness greater than or equal to 115 mm
.4 Penetration of solid sawn products in accordance with O80:
.1 10 mm and 90% of sapwood if material is less than 115 mm thick, or
.2 13 mm and 90% of sapwood if material is greater than or equal to 115 mm thick.

.6 Use Category UC5A, Marine (salt water exposure).
.1 Includes: round timber piles, solid sawn products and plywood, including piles, pile braces, pile wales, abutment timbers, float cross-ties, float flanges, lower and middle splice blocks for float flanges, approach/float stringers and plywood shims.
.2 Treat in accordance with CSA O80 for products under use category UC5A and Clause 9.8 of O80.1
.1 Preservatives, retention, and penetration:
.1 ACZA, 30 kg/m^3 or
.2 CCA, 24 kg/m^3 or
.3 Creosote, 290 kg/m^3
.4 Penetration of solid sawn products in accordance with O80:
.1 10 mm and 90% of sapwood if material is less than 115 mm thick, or

.2 13 mm and 90% of sapwood if material is greater than or equal to 115 mm thick

.5 Penetration of plywood in accordance with O80 for products under Clause 9.6.5 of O80.2.

.6 Penetration of piling in accordance with O80: 19 mm and 90% of sapwood.

.2 All bolt holes at one end of all horizontal and diagonal members or walers to be drilled prior to timber treatment at the lower end of the brace.

2.5 Fumigant

.1 Fumigant to be:

.1 Boron, or

.2 Methylisothiocyanate (MITC), or

.3 Metham Sodium (Vapam), or

.4 Solid Chloropicrin, or

.5 Granular Dazomet, or

.6 Alternate approved by addendum during tendering.

2.6 Pre-Cast Concrete

.1 Cement: to CSA A3001, Type MS (Type 20).

.2 Water: to CSA A23.1/A23.2.

.3 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.

.4 Other concrete materials: to CSA A23.1/A23.2.

.5 Provide concrete to meet the following hard state requirements:

.1 Durability and class of exposure: C-XL.

.2 Compressive strength at 28 day age: 35 MPa minimum.

.3 Aggregate size 14 mm maximum.

.4 Maximum water to cementing materials ratio of 0.4.

.5 Air Content 4 - 7%

.6 Mix to be certified by a Professional Engineer registered with the Province of British Columbia

.6 Testing:

.1 Contractor will carry out materials testing.

.1 Testing to be conducted by a CSA certified lab.

.1 Site sampling to be carried out under the supervision of the testing lab.

.2 Provide Departmental Representative with the above noted material certification as well as a quality management plan to ensure verification of concrete quality to specified performance.

2.7 Reinforcing Steel

.1 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise. Substitute different size bars only if permitted in writing by Departmental Representative.

.2 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.

.3 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.5 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.6 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to beginning reinforcing work.

.7 Upon request inform Departmental Representative of proposed source of material to be supplied.

2.8 Steel

.1 Small fastenings: to CSA B111.

.2 Drift bolts, machine bolts, washers and miscellaneous iron: to CSA G40.21 and hot dip galvanized to CAN/CSA-G164.

.3 Spikes and nails: hot dip galvanized to CAN/CSA-G164 unless otherwise specified.

.4 All other hardware specified to be galvanized: hot dip galvanized to CAN/CSA-G164 unless specified otherwise.

.5 Items manufactured or fabricated from scrap steel of unknown chemical composition or physical properties are not acceptable.

.6 Bolts: all bolts are to be machine bolts unless specified otherwise.

.1 Machine bolts:

.1 Conform to ASTM A307 (Unless noted otherwise)

.2 Provide with steel plate washers under head and nut, unless specified otherwise.

.2 Drift bolts: unpointed, with ragged edges beaten off.

.7 Steel plate washers:

.1 Shape: round, unless specified to be square.

.2 Size: select from table below, unless specified otherwise:

WASHER DIMENSIONS			
Bolt Size	Thickness	Round Plate Outside Diameter	Square Plate Side Size
12.7 mm	5 mm	62 mm	62 mm
15.9 mm	6 mm	69 mm	69 mm
19.1 mm	6 mm	75 mm	75 mm
22.2 mm	8 mm	81 mm	81 mm
25.4 mm	9 mm	87 mm	87 mm
31.8 mm	11 mm	100 mm	100 mm
38.1 mm	11 mm	112 mm	112 mm

.8 Bolt holes:

.1 Machine bolts: bore holes to provide a driving fit.

.2 Drift bolts: bore holes 1.5 mm less than bolt diameter.

.9 Welding:

.1 Unless specified otherwise, welding is to be in accordance with CSA W59.

.2 Provide evidence that welding companies are certified to CSA W47.1.

.10 Steel Grades:

.1 Channels and Angles: 350W

.2 Miscellaneous Plate: 300W

.11 Finish:

.1 All fabricated steel channels, angles and plates are to be hot dip galvanized unless otherwise noted.

2.9 Hardware

.1 Bolts (drift, machine, carriage, lag, etc.), nuts and washers: hot dip galvanized to CAN/CSA-G164.

.2 Spikes and nails: hot dip galvanized to CAN/CSA-G164 unless otherwise specified.

.3 All other hardware specified to be galvanized: hot dip galvanized to CAN/CSA-G164 unless specified otherwise.

.4 Stainless steel screws to ASTM F593 - 02(2008).

2.10 Chain and Shackles

.1 Chain:

.1 To CCG MA 2080 C.

.2 Black carbon steel, 19 mm, long-link mooring chains.

.2 Shackles:

.1 Crosby load-rated shackles or alternate approved by addendum during tendering.

.2 Secure pin against rotation after fastening with No. 12 gauge (2.052 mm) insulated copper wire.

2.11 Gangway

.1 Gangway to adhere to the follow performance specification:

.1 Dimensions:

.1 Width: 1.2 m, inside guardrail to inside guardrail, minimum, to match the existing.

.2 Length:12.0 m, total overall length, minimum

.2 Loading:

.1 Uniformly distributed load (Live Load): 2.4 kPa.

.3 Deflection:

.1 Live Load (unfactored): deflection ≤ L/300

.2 Camber to account for Dead Load

.4 Slope:

.1 Minimum: 7%

.2 Maximum: 42%

.5 Material:

.1 Aluminium Alloy 6061-T6

.2 Minimum thickness: 4.8 mm

.3 Walking surface: non-slip surface and may consist of the following:

.1 Treated timber, in accordance with Section 2.2.

.2 Aluminum grating

.3 Approved alternative to have equivalent fiction to an unsurfaced wood plank, to be approved of during tendering.

.4 Ensure dissimilar metal isolation is to be provided between the walking surface and the gangway frame.

.4 Contact surface between ramp and the gangway angle iron guides or float: UHMWPE

.5 Skids: UHMWPE.

.6 All exposed open ends of hollow structural members are to be capped/sealed with a 4.8 mm plate of appropriate dimensions and fillet welded in places.

.7 Cleats are to be provided on one side of the gangway, starting 100mm clear of the handrail and extending between 600mm and 635mm from the handrail.

.8 Gangway guardrails, toe rails, intermediate rails are to be installed as required, on each side of the gangway and are to meet the National Building Code of Canada and/or WorkSafe BC requirements.

.9 Mounting:

.1 To be mounted on the pilecap, located on the approach. The Contractor is to verify that the pile cap

to pile connection is stable for any eccentric loading that may result from the gangway location. If strengthening of the connection is required, report to the Departmental Representative.

.10 Transitions:

.1 Transition plate to be located at the approach / gangway interface to bridge the gap.

.2 Transition ramp to be fastened to the gangway at the float end.

.1 Height between the walking surface and the lower end of the gangway to be minimized and less than 15 mm.

.11 Hinges:

.1 Double hanger, or alternative approved by addendum during tendering.

.12 Gangway to allow for electrical conduit to run under the length of the gangway.

.2 Gangway is to be designed by a Professional Engineer, registered within the Province of British Columbia.

.1 Sealed (stamped) shop drawings are to submitted to the Departmental Representative, in accordance with Section 01 33 00 – Shop Drawings, Product Data and Samples.

.3 Shop drawings for the gangway, connections and transitions are to be provided to the Departmental Representative, in accordance with Section 01 33 00 – Shop Drawings, Product Data and Samples.

2.12 UHMWPE

.1 Ultra-High Molecular Weight Polyethylene (UHMWPE) to be:

.1 Tivar 100 or alternative approved by addendum during tender.

.2 38 mm thick

.3 Suitable for salt-water/marine environments

.4 UV-stabilized by the use of at least 2.5% stabilizer

2.13 Tires

.1 Outer diameter: 600mm, minimum

.2 Width: 200mm, minimum

2.14 Anodes

.1 Material:

.1 Sacrificial (galvanic) anodes shall be aluminium and conform to the following alloy composition:

Copper 0.002%

Indium 0.015% to 0.04%
Zinc 3.0% to 6.0%
Silicon 0.1%
Aluminum remainder.

.2 Chain Anodes:

.1 152 mm OD and 25 mm thick zinc anodes. Provide Departmental Representative with metallurgical ladle analysis certification of the anode material.

.2 Shape:

.1 Circular.

.3 Mounting:

.1 Single central through bolt.

.2 Anti-seize compound for metallic contact surfaces. Compound shall be Loctite # 242, or alternate approved by addendum during tender.

.3 Pile Anodes:

.1 Two - 1525 mm x 76 mm thick zinc anodes on galvanized 12.7 mm wire rope cable. Provide Departmental Representative with metallurgical lade analysis certification of the anode material.

PART 3 EXECUTION

3.1 Handling of Treated Materials

.1 Treated piling will be rejected if sharp or pointed tools (i.e. dogs, pike poles, peavies, etc.) are used beyond 1 metre from either end in handling them during construction.

.2 Treated material will be rejected if damaged in any manner during handling, including damage from strapping and slings.

3.2 Field Preservative Treatment (not including fumigant)

.1 Treated materials:

.1 Do not make field cuts in treated material unless permitted by the Departmental Representative. When specified, field treat cuts as specified with field treatment preservative.

.2 Pile tops, pile bolt holes, pile bracing bolt holes, and cap-to-pile bolt holes may be field cut. Treat as specified.

.3 All new treated timbers and existing treated timber members for the approach are to be field drilled to match existing bolt patterns. The exterior approach stringers to match existing bolt holes located in the existing pilecaps. The approach stingers may be field drilled to accommodate the new approach guardrails. Bolts holes treated in accordance with CSA 080.

.4 The bolts used to secure existing material which is to

remain in or below the intertidal zone are to be coated in a roofing tar and each surface face of the bolt hole in the timber is to be sealed with a neoprene gasket beneath the metal washer.

.5 Where field treatment is required, treat with 3 coats of preservative (for specific preservatives refer to CSA-O80 Series-15, Wood Preservation).

3.3 Fumigant

.1 Contractor is to determine the optimal drilling pattern to avoid metal fasteners, seasoning checks and severally deteriorated wood.

.2 Fumigant to be applied as per manufacture's instructions or as follows:

.1 Holes to be receive liquid fumigant should be drilled at a 45º - 60º angle downward towards the centre of the member.

.2 Holes to be no more than 1.2 m apart and arranged in a spiral pattern.

.3 Holes to extend a minimum of 50mm into the timber.

.4 Holes may be clustered or in pairs to accommodate the required amount of fumigant, if the strength of the timber element is not compromised.

.5 Hole is to be immediately plugged with a tight-fitting treated wood dowel.

.1 For liquid fumigants, sufficient room must remain within the hole to such that the dowel can be installed without loss of fumigant out of the hole.

.6 If the fumigant leaks out of the hole, the hole shall be plugged and another hole is to be drilled into the sound wood.

.3 Provide details to Departmental Representative, as per the requirements in Section 01 33 00 – Shop Drawings, Product Data and Samples.

3.4 Reinstate Abutment

.1 Two treated timber planks are to be replaced, as shown in the drawings.

.2 Three existing undamaged creosote timber planks to be reinstated.

.3 Abutment fill material, including riprap, to remain and reinstated.

.4 Upland pathway (paver stones) are to not to be disturbed. If determined to requiring removal, notify Departmental

Representative and ensure the following:

.1 Carefully removed, salvaged, stored along the walkway close to the end of the approach in a fashion which does not affect the access to the approach, to the road or, along the walkway.

.2 Any disturbed fill, including armour stone, is to be removed, salvaged, stored and reinstated

3.5 Pile Removal

.1 Piles to be removed: fully extract from ground. Full extraction of the piles governs over recommendations included in Appendix A.

.1 Expected level of effort for full extraction is the use of a vibratory hammer and straight-line pull along the axis of the pile.

.2 Minimum characteristics of vibratory hammer are to include the following:

.1 Line pull 450 kN minimum.

.2 Bare hammer weight 2,000 kg.

.3 Adjustable frequency between 0 – 2,300 vibrations per minute.

.4 Equipped with end suitable for removal of timber piles.

.3 Contractor may choose alternate extraction methods. If full extraction is not achieved, provide alternate equipment to achieve the requirements within the specifications. Provision of this alternate equipment will be at no additional cost to Canada.

.4 Fully extract piles in accordance with Section 01 35 43 and the Environmental Protection Plan, located in Appendix C.

.2 Measure, record and report the length of extracted pile which was below the mudline. The Contractor is to assist and coordinate with the Departmental Representative to verify lengths.

.3 Remove large invertebrates from the piles in accordance with Section 01 35 43

.4 Schedule of pile driving to be confirmed with Departmental Representative 3 business days prior to planned pile removal.

3.6 Test Pile

.1 Test Pile investigations to be conducted within two business days of arriving on site.

.2 Drive Test Piles to a minimum of 9 m below the seabed at the

following locations:

.1 Near the proposed location of mooring pile B4 (± 2m), refer to the drawings (bound separately).

.2 Near the proposed location of mooring pile B1 (± 2m), refer to the drawings (bound separately).

.3 Near the proposed location of mooring pile D1(± 2m), refer to the drawings (bound separately).

.4 Near the proposed location of mooring pile D7 (± 2m), refer to the drawings (bound separately).

.5 If refusal is met before the specified depth, notify the Departmental Representative within 5 hours. The Departmental Representative will provide direction.

.3 Initial results to be provided verbally to the Departmental Representative upon completion of tests.

3.7 Lateral Pile Test

.1 Lateral Pile Test to be conducted within 24hrs of driving pile

.1 Lateral Pile Tests shall be conducted on the following piles:

.1 Pile A2

.2 Pile B3

.3 Pile D3

.4 Pile D6

.2 Each test shall include the application of a 10kN, 20kN and 30kN force to a surveyed location (elevation and plan coordinate) above HWL of the pile being tested.

.3 Initial results to be provided verbally upon completion of tests.

.4 Survey shall record the plan location before and after each incremental load is applied.

.5 It shall be permissible to perform the test by pulling two piles towards one another and surveying each pile before and after application of the loads.

.6 Plan coordinates shall be taken in reference to a known project benchmark. Measurement only of relative displacement is not acceptable.

3.8 Pile Driving

.1 Equipment: to be capable of driving piles at each of the locations required by the drawings and specifications.

.1 Hammer:

.1 Capable of developing a blow at operating speed with an energy of not less than 20,000 joules per blow.

.2 When required penetration is not obtained by use of

hammers complying with minimum requirements, use a larger hammer or take other measures approved by the Departmental Representative.

.2 Vibratory Hammer:

.1 If the contractor proposes the use of a vibratory hammer for driving piles the specifications of the equipment to be used must be submitted in writing to the Departmental Representative prior to acceptance of the alternate.

.3 Leads:

.1 Pile driver leads to provide free movement of hammer. Hold leads in position at top and bottom with guys, stiff braces or other means approved by the Departmental Representative, to ensure support to pile while being driven.

.2 Provide length of leads so that use of follower is unnecessary.

.2 Drive piles so as to avoid splitting, brooming or other damage to piles. Make sufficient allowance so that, when driven to final position, pile may be cut off at a sound section.

.3 Piles damaged in driving: cut steel pile, remove damaged portion and splice with the additional pile length. Otherwise remove pile from site and replace with new piles. Final pile splice location shall be at least 1m below existing mudline.

.4 Replacement piles are to be driven at least 0.3 m further (below mudline) than the extracted pile.

.5 Drive new piles at the angles specified to the penetration shown on the drawings, or if the pile is replacing an existing one to the greater of the penetration shown or 0.3m deeper than the existing pile.

.6 specified unless solid bearing is reached at a lesser depth and approved by the Departmental Representative in writing.

.7 Cut off bearing pile at the same elevation as existing bearing pile. Mooring piles to be cut off as specified on the drawings.

.8 Pile tolerances are as follows:

.1 Driven piles shall be placed within 0.5% of plumb measured as the difference between the centreline at the bottom of the sleeve and centreline at pile cut off elevation.

.2 No pile shall be placed more than 50mm in any direction from its design location at the cut off elevation or at the mudline elevation.

.3 Contractor is responsible for field measuring the placed

location of driven piles and adjusting as required for the installation within the mooring wells and placement under the office platform.

.9 The following are the DFO work windows:

.1 July 1st – Oct 1st

.2 Dec 1st - Feb 15th

.3 The Work is to be carried out outside the DFO work windows. All Work to be carried out in accordance with Section 01 35 43 – Environmental Procedures and the EPP, located in Appendix C

.10 No motorized equipment is to be operating on the approach and office platform structures without prior approval from the Departmental Representative due to load capacity.

.1 If the contractor proposes to use motorized equipment on the approach or office platform structures, prior to the use of equipment a written proposal is to be provided to the Departmental Representative for review and approval. Details of the submission are to include:

.1 Details of the proposed equipment.

.2 Placement on the wharf.

.3 Wharf strengthening methods to ensure crane is operating within the capacity limits of the structure.

.4 Submit a proposal prepared by a Professional Engineer registered in the province of British Columbia stating the suitability of the loading for the structure in accordance with the proposed procedure, they have examined the structure(s), determination of loads, prepared the details of the above and will provide field supervision of the strengthening of the structure and the use of by the equipment.

.1 The professional engineer must examine the structure and determine that the structure has the capacity for the crane and associated loads to transit and operate in accordance with the procedure.

.2 The professional engineer must prepare the submitted procedure together with any required drawings, and will undertake any necessary field supervision.

.2 The load capacity of the facility is as follows:

.1 Approach: 6.0 kPa

.2 Office Platform:4.0 kPa

.1 Live loads are restricted in the vicinity of pile 8D.

.11 Assist the Departmental Representative to measure and record pile driving data for each pile driven. This information must include:

.1 Total length of pile.

.2 Cut off elevation.

.3 Length of pile below the mudline (for both the new and existing piles).

.4 Length of pile cut-off portion, before driving.

.5 Length of pile cut-off potion, after driving.

.6 If a drop hammer is used record hammer weight, drop height and blow count data.

.7 If a vibratory hammer is used record bare hammer weight and frequency/vibration per minute.

.8 If rock socketing is required record the depth of pile below bedrock, volume of material removed from socket, size and type of drilling equipment used, installation rate and volume of grout installed.

.12 Schedule of pile driving to be confirmed with Departmental Representative 3 days prior to pile driving.

3.9 Pile Repair

.1 Pile banding is to be adhere installed and fastened under tension, as shown in the specifications and drawings.

3.10 Gangway

.1 Remove and dispose of existing gangway assembly.

.2 Gangway to be installed to provide access from the approach trestle to the float.

.3 Install approach trestle gangway hinges to the new pile cap, as shown in the drawings.

3.11 Bolt Holes in Existing Treated Material to Remain

.1 Re-use existing bolt holes wherever possible.

.2 Plug all unused bolt holes with a tight-fitting creosote-treated plug and cover with a copper patch as specified and as shown on the drawings.

.1 This applies to all unused holes from this work.

3.12 Timber Decking

.1 Timber decking:

.1 Replace approach and float decking, as per drawings.

.2 Decking shall meet in square cut butt joints.

.2 Nails are to be installed in pre-drilled holes if the nails within the following:

.1 52 mm of end of the decking, if the deck planks are between 40 mm - 51 mm thick.

.2 100 mm of the end of the decking, if the deck planks are between 86 mm - 102 mm thick.

.3 Pre-drilled holes are to be 0.5 mm less that the diameter of the nail.

.3 Decking joints are to be centered over supports.

.4 Deck planks are to be spaced at 10 mm +/-

.1 Deck spacing is to be measured at 15% moisture content.

.5 Sort and place deck boards such that the thickness does not vary by more than 5 mm in any location.

.6 Decking under gangway to service electrical cables.

.1 Leave a gap in the decking, between one and four planks, between two float joists where there is a floatation unit to accommodate the electrical cabling, as specified and shown on the drawings.

.2 Refer to Section 26 05 01 – Common Work Results for Electrical.

3.13 Anchor Blocks

.1 Anchor blocks to be precast concrete, in accordance with the drawings and specifications.

.2 Concrete work to be in accordance with CSA-A23.1/A23.2.

.3 Anchor blocks are to be within allowable tolerances as indicated in the drawings and specifications.

.4 Situate anchor block units in place, as indicated on the drawings.

.5 Ensure concrete suppliers meets the requirements in accordance with the drawings and specifications.

.6 All unused materials, including concrete and wash down water are to be disposed of at facilities operating under permits to dispose of waste concrete.

3.14 Re-Securing/Replacing Existing Members

.1 Unless otherwise stated, when re-securing existing members, replace all connection hardware with new and reuse existing bolt holes wherever possible. Plug all unused bolt holes as specified and shown on the drawings

.2 Unless otherwise stated, when replacing existing members, replace with original dimensions and connection hardware as specified for new installations. Reuse existing bolt holes wherever possible.

3.15 Removal of Anchor Blocks

.1 Remove debris from the seabed including:

.1 Two existing lock blocks, located within the intertidal zone, refer to drawings.

.2 Four existing offshore concrete anchor units: including associated anchor chain and anodes, refer to drawings.

3.16 Material Disposal

.1 General:

.1 Construction debris including all surplus and cut off members and items specified to be removed and disposed of becomes the property of the Contractor. Disposal of the debris shall be performed in an environmentally sensitive manner at upland site(s) approved by the Ministry of Water, Land and Air Protection under the B.C. Waste Management Act, and by other agencies having jurisdiction, including municipal authorities.

.2 Timber debris:

.1 The approach decking and guardrail (bullrail, risers and handrails) are assumed to be untreated.

.1 The existing handrail posts are coated/painted.

.2 The approach stringers, cross-bracing, bearing pile, mooring pile and existing floats is assumed to be treated.

.3 It should be noted that disposal sites for untreated and treated timber have different operational requirements. The treated and untreated timber required separation before disposal.

.3 All disposal sites must be operating with up-to-date permits and licences.

.4 The Contractor shall submit proof of approval(s), copies of current permits and licences to the Departmental Representative 10 days before the initial disposal of debris.

.5 Disposal of materials may be sent to recycling centres, with appropriate permits (i.e. metal recyclers).

.6 Material may be used for the Contractors' direct use or for resale.

.1 For any retention for reuse or resale the Contractor is to submit certification describing the materials retained and provide a statement that they will be resused, sold and/or disposed of in accordance with federal, provincial, regional district and municipal regulations.

.2 For any resale which occurs before the issuance of the

Final Certificate of Completion or within 6 months after, the Contractor is to submit a copy of the agreement for sale signed by the purchaser, identifying the purchase, containing a statement that the materials will be resused or disposed of in accordance with federal, provincial, regional district and municipal regulations.

.2 Certificates of Disposal:

.1 Provide the Departmental Representative with certificates of disposal from the disposal site, noting the dates, quantities, weights and general description of the debris received and proof of payment of all disposal fees.

.2 Provide certificates within 5 days of disposal.

.3 The Contract work will not be accepted until all certificates have been received by the Departmental Representative.

3.17 Restoration

.1 Any portion of the existing structure or other facilities at the site that are damaged due to construction activities are to be restored to new condition at the Contractor's expense.

3.18 Anode Placement

.1 Chain and pile anodes shall be placed as indicated on the drawings.

.2 Each chain anode location requires an anode assembly consisting of two anodes connected to the chain, as shown on the drawings.

3.19 Shimming

.1 Any required timber shims, plywood or sawn, shall be treated to Category UC5A, Marine (salt water exposure).

-END OF SECTION-

APPENDIX A

Best Management Practices (BMPs) for Constructing Docks and Floats in the South Coast Area (Vancouver Island - Sunshine Coast)

Fisheries and Oceans | Pêches et Océans

Pacific Region

Best Management Practices (BMPs) for Constructing Docks and Floats in the South Coast Area (Vancouver Island - Sunshine Coast)

- These BMPs apply to docks, floats and gangways proposed for the marineand freshwater shoreline. They do not, however, apply to congested waterways or foreshores where there are presently numerous docks and floats in a restricted area.
- Adherence to the BMPs should allow a property owner to construct a dock or float that will not adversely affect fish habitat.
- If you are able to meet the criteria set forth in these BMPs, you do not require further advice from Fisheries & Oceans Canada (DFO) Habitat Management staff. Completion of the notification page of this document and provision of the notification to the local DFO office is all that is necessary (See notification form attached).
- It is your responsibility to ensure that you have met the requirements of other agencies with jurisdication over land and water development in your area (Land and Water BC; local government, Regional Districts, etc).

The focus of these BMPs is to protect fish habitat from the impacts of shading, fill placement and low tide grounding of both structures and vessels.

1. Access ramps or walkways should be a minimum of 1.0 metre above the highest high water mark (HHW) of the tide, lake or stream.
2. Walkways should be a maximum width of 1.5 metres.
3. The bottom of floats should be a minimum of 1.0 m above the bed of the sea, lake or stream during the lowest water level or tide. Float height above lowest water level will need to be increased if deep draft vessels are to be moored at the dock or float.
4. Grating incorporated into ramps, walkways or floats will increase light and reduce shading of the sea/lake/stream bed. If grating is impractical, deck planks should be no wider than 15cm (6in) and planks should be spaced at least 2.5cm (1in) apart to allow light penetration.
5. North/South dock alignments will further improve light penetration.
6. Floats must not to be installed over marine or freshwater vegetation (eelgrass, kelp, saltmarsh, lake weeds, etc.).
7. Concrete, steel, BMP-treated or recycled timber piles are acceptable. For detailed information on treated wood options, refer to the *Guideline to Protect Fish and Fish Habitat from Treated Wood Used in the Aquatic Environment in the Pacific Region*, available on-line at *http://www.dfo-mpo.gc.ca/Library/245973.pdf*.

8. The dock/float structure and the vessel to be moored at the structure are not to come to rest on intertidal seabed, lakebed or streambed areas during the lowest tide or lowest water period of the year.
9. Construction must not to include use of native beach materials (boulders, cobble, gravel, sand, drift logs etc.).
10. Access to the beach for construction purposes is to be from the adjacent upland property wherever possible. If heavy equipment is required to work on the beach or access is required along the beach, you should seek the advice of a professional biologist to ensure that fish habitat, including riparian, intertidal saltmarch or in-water vegetation, is not adversely affected during construction.
11. Filling, dredging or blasting below the High Water Mark is not permitted.
12. Works at the upland/water interface are to be conducted when the site is not wetted by the tide or when the water levels in lakes and streams have receded, if practical.
13. Works are to be conducted in a manner that does not result in the deposit of toxic or deleterious substances (e.g. sediment, uncured concrete, sediment, fuel, lubricants, paints, stains, etc.) into waters frequented by fish.
14. Refueling of machinery and washing of buckets and hand tools must take place a minimum of 10m away from waters frequented by fish.
15. Marine foreshore construction should take place between June 1 and February 15 of any calendar year. Freshwater construction should occur during the period July 1 to September 15 in any calendar year.
16. Terrestrial riparian vegetation and intertidal saltmarsh or in-water vegetation must not be harmfully affected by access or construction. You are advised to seek the advice of a professional biologist if vegetation will be affected in any way by your proposed works

Please be advised that works in and around fish habitat (riparian habitats adjacent to fish bearing waters, tidal foreshores, lakeshores and streams) can negatively affect fish habitat. Section 35(1) of the Fisheries Act prohibits the harmful alteration, disruption or destruction of fish habitat (HADD). The Fisheries Act may be enforced if a HADD occurs during access, construction or maintenance of the erosion control structure.

For additional information, please visit our DFO website at www.pac.dfo-mpo.gc.ca

Revised by: DFO-Habitat Management, South Coast Area, March, 2004

NOTIFICATION TO DFO – CONSTRUCTION OF FLOATS AND DOCKS

<u>You signature below indicates that you have read and understood these guidelines and will abide by them</u>.

Name: _____
Address:_____

_____

Telephone #/cell#:_____
Worksite Address (if different from above):_____

_____

Detailed Description of Works(dimensions; materials-attach a drawing if desired):

_____

_____

_____

Start Date for Works:_____End Date for Works:_____

<u>I acknowledge thatI will adhere to the conditions described for construction of floats and docks as outlined above. I will not place fill below the HHW mark, use native beach materials for construction or harmfully affect riparian or in-water vegetation or other fish habitats</u>

Signature:_____ Date Signed: _____

Fax or Mail this form to your local DFO office AT LEAST **5** BUSINESS DAYS PRIOR to the planned construction start date. A Fisheries Officer may inspect your construction site to ensure compliance with the Fisheries Act.

<u>Fax Numbers:</u>
DFO- Comox: (250) 339-4612
DFO- Duncan: (250) 746-8397
DFO- Nanaimo: (250) 754-0309
DFO- Pender Harbour: (250) 883-2152
DFO- Powell River: (250) 485-7439
DFO- Port Alberni: (250) 724-2555
DFO- Powell River: (250) 485-7439
DFO- Victoria: (250) 363-0191

APPENDIX B

Best Management Practices for Pile Driving & Related Operations – BC Marine & Pile Driving Contractors' Association, November 2003

Best Management Practices for Pile Driving and Related Operations – BC Marine and Pile Driving Contractors Association - November, 2003

The BC Marine and Pile Driving Contractors Association and Fisheries and Oceans Canada (DFO) have developed a Best Management Practices Policy for pile driving operations and related activities when working on the water within the province of British Columbia.

The Pile Driving Industry utilizes many different construction methods, equipment and materials in order to complete the contractual obligations for its client. Hammers; including drop, diesel, air, vibratory and hydraulic, vibroflot and rotary, air and churn drills are the primary instruments in a pile driving operation. These hammers and drills are supported by a wide variety of heavy equipment, including a range of conventional cranes (truck mounted, crawler and pedestal mounted), spud scows, support barges and other water borne equipment. The piling types include treated timber (primarily creosote), concrete and steel (pipe, h-beam and sheet). Construction projects have the potential to utilize a number of different combinations of equipment and materials. It is the purpose of this document to examine the characteristics of each potential combination and develop a Best Management Practices Policy that will meet the following criteria:

-Maximize environmental protection
-Avoid contravention of the Fisheries Act
-Provide construction services economically

1) Basic Rules of Operation

When in an aquatic environment, contractors will employ the following BASIC Best Management Practices:

- All equipment will be maintained in good proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products.
- Storage of fuels and petroleum products will comply with safe operating procedures, including containment facilities in case of a spill.
- Pile cut-offs, waste or any miscellaneous unused materials will be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown overboard.
- Contractors will have emergency spill equipment available whenever working near or on the water.
- Contractors, where possible, will position their water borne equipment in a manner that will prevent damage to identified fish habitat (i.e. eelgrass). Where possible, alternative methods will be employed (i.e.: use of anchors instead of spuds). In the event that, despite precautions, the contractor is aware that fish habitat has been

inadvertently damaged, the incident must be reported and discussed with DFO to ensure that appropriate action (restoration) is taken.

- Prior to the commencement of any work, the contractor will complete and forward the attached "Notice of Project" to the Department of Fisheries and Oceans. Letters of advice or Habitat Authorizations may be required, depending on the scope of work proposed.
- If contractors are working and a herring (or other fish) spawning occurs, the work will be temporarily suspended and the appropriate DFO contact notified.
- There will be no restriction of work during closure periods (the only exception being when spawning is present, all work must cease and the local DFO habitat biologist must be contacted for further instructions), provided the contractors employ an exclusion device (protective netting or geotextile material suspended in the water column around pile driving area) around the work area to prevent fish access or when required, an effective method of mitigating shock waves (bubble curtain).
- Whenever shock wave monitoring (hydrophone) is performed at a marine construction site and the findings are available to the contractor, the data will be forwarded to the BC Marine and Pile Driving Contractors Association and Svein Vagle at the Institute of Ocean Sciences in Sidney, BC. It is hoped that a database can be built that will more precisely define work procedures and reflect the safest and most economical approach to protecting the fish and their habitat.

2) Timber Piling (creosote):

When driving timber piling, the following Best Management Practices will be employed to prevent impact to marine fish and their habitat:

- Where possible, new timber piles will comply with the best Management Practices for the use of treated wood in aquatic environments as developed by the Canadian Institute of Treated Wood and the Western Wood Preservers Institute and the DFO document "Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments in the Pacific Region".
- Where the above is not possible, creosote piling will stand (weather) for a minimum of 45 days prior to installation.
- These requirements are for new piling only. Reused piling will not normally be subject to any additional treatments (timberfume is a provincially licensed preservative that is available for treatment of used piles), however, pilings with excessive creosote should be avoided. Reuse of suitable piling should be encouraged. In the case of mooring piles, exposed to significant wear, the contractor should encourage the owner to protect the piling with rub strips as per the "Guidelines for use of Treated Wood.
- Timber piling is normally driven using a drop hammer, a diesel/air impact hammer or a small vibratory hammer. Because of the relative small diameter of the timber pile, and its excellent energy absorbing quality, there is little threat of sound pressure impacts to fish and their habitat when driving timber piles.

- Environmental monitoring of sound pressure impacts is not required.
- An attempt should be made to determine whether least impact means full extraction of the piling or if leaving a stub that would not interfere with navigation is acceptable. If complete demolition is required on timber pile structures, the contractor will remove the piling by mechanical means and avoid breaking the piling at the mud line or below. It may be appropriate to cut off the piling flush with the mud line. All demolition operations should be monitored in order to control and contain the construction debris and to determine whether there are any effects on fish or fish habitat.

3) Concrete Piles

When driving concrete piles, regardless of which hammer is being used, the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

Concrete Piles 24 inch diameter and less

- The physical design of 24 inch concrete pile dictates that: 1/ the energy required must be controlled in order to prevent the pile from breaking and 2/ the concrete construction of the pile will absorb the energy. These two factors are expected to result in low level shock wave emission (less than 30 kPa.) and minimal or no effects to fish and their habitat should result.
- Environmental monitoring of sound pressure levels is generally not required.

Piles Greater than 24 inch diameter

- When driving concrete piles with a diameter greater than 24 inches using an impact or hydraulic hammer, the following Best Management Practice will be employed to minimize the impact on fish habitat:
- Visual and hydrophone monitoring of the impact on fish by the sound waves emitted will be required. If sound pressures over 30 kPa are measured or a fish kill occurs, the contractor will introduce effective means of reducing the level of the shock waves. Appropriate mitigating measures would be the deployment of a bubble curtain over the full length of the wetted pile. This should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventative measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), the work will stop immediately, DFO will be contacted, and the methods will be reviewed and corrected

4) Steel Pipe Piles

Piles less than 18 inch diameter

When driving steel piles 24 inches in diameter and less, regardless of the type of hammer being used, the following Best Management Practices will be employed to prevent impacts to fish habitat:

- Because of the small diameter of the pile it is assumed that the energy required to drive the pile to the final point of installation will not result in shock waves in excess of 30 kPa, therefore, protective measures to reduce shock waves are not expected to be required.
- If, however, ground conditions during pile installation cause a fish kill, work will cease and contractors will be responsible for introducing effective means of reducing the level of shock waves or will introduce measures that will prevent fish from entering the potentially harmful shock wave area. Appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile. This technique should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately and the methods will be reviewed and corrected (with consultation with DFO).

Piles Greater than 24 inches in diameter

When driving steel pipe piles with a diameter greater than 24 inches using impact or hydraulic hammers, the following Best Management Practices will be employed to prevent impacts to fish habitat:

- Hydrophone and visual monitoring of the effects of the shock waves on fish will be required. If a fish kill occurs, the contractor will introduce effective means of reducing the level of the shockwave. Appropriate mitigating measures would be the deployment of a bubble curtain over the full length of the wetted pile.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately and the methods will be reviewed and corrected (with consultation with DFO).

5) Steel Sheet Piles and H-piles

When driving steel sheet piles and H-piles with a drop hammer, an impact hammer or a vibratory hammer, the following Best Management Practices will be employed to minimize the impact on fish habitat:

- It is anticipated that the driving of these types of piles will not generate shock waves in excess of 30kPa, therefore, mitigating measures are not expected to be required.
- If, however, ground conditions during pile installation cause a fish kill, work will cease and contractors will be responsible for introducing effective means of reducing the level of shock waves or will introduce measures that will prevent fish from

entering the potentially harmful shock wave area. Appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile. This technique should reduce the shock waves to an acceptable level.

- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately and the methods will be reviewed and corrected (in consultation with DFO).

6) Stone Column Construction

When installing stone column using a vibroflot, the following Best Management Practices will be employed to prevent impacts to fish habitat:

- The vibrating action and air flush associated with the operation of the probe results in a high degree of turbidity. When this level exceeds the criteria as outlined in the British Columbia Approved Water Quality Guidelines, the contractor will introduce containment methods that are designed to isolate the contaminated area and to prevent fish from entering the contaminated area. Silt curtains and netting are two methods that can provide the necessary protection.
- When supplying the aggregate to the probe, the contractor will ensure that spillage is prevented, thereby providing additional protection to fish habitat.
- An independent environmental consultant will be used to monitor turbidity levels.

7) Underwater Drilling and Blasting

When performing underwater drilling and blasting the following Best Management Practices will be employed to prevent impacts to fish habitat:

<u>Underwater Drilling</u>

- Generally, drilling underwater is a process that has very little impact on fish or fish habitat. The procedure does not generate shock waves.

- Contractors will ensure that all attachments (hydraulic connections and couplings) are in good operating order and inspected prior to the start of every day. Spill kits and containment booms must be maintained on-site in case of spills.
- Depending on soil conditions and the potential for turbidity, drill cuttings will be deposited adjacent to the operation, contained on the sea bed or pumped to the surface for deposit into containment skiffs or scows for land disposal when it is determined that the drill cuttings are unsuitable for return to the environment.

Underwater Blasting

Contractors required to perform blasting underwater will provide the following protection to prevent impacts to fish habitat:

- Because of the potential for harmful shock waves resulting from a blast, a protection shield will surround the immediate blast area. This would be in the form of an air-induced bubble curtain, which has the primary purpose of absorbing the shock wave and a secondary purpose of preventing fish from entering the blast area.
- In order to protect against flying rock, mats (rubber) will be placed over the blasting area. The placement of the mats may also provide protection for any fish swimming in the immediate area.
- Monitoring of fish movement and concentrations will be conducted using a sounder to determine if fish herding or scaring techniques (seal bombs) can be utilized to reduce the presence of fish in the blast area. If fish scaring techniques are deemed necessary, the DFO habitat biologist or technician responsible for the project must be consulted to determine the risk to fish.

8) Cleaning out Pipe Piles:

When cleaning out pipe piles (i.e.: air lifting) the following Best Management Practices will be employed to prevent impacts to fish habitat:

- Generally, sediment contained in the pipe is will be pumped to the surface and processed through an approved containment system and disposed of at an approved landfill site.
- If the contractor knows that the sediment is toxic, the sediment must not be redistributed in the area. If the sediment is non-toxic, and if fish are not present in the area, and adjacent fish habitats are not a concern (contact DFO) it may be acceptable to:

1. Pump the sediment through a discharge tube and allow it to settle in the immediate area with or without a silt curtain to contain the sediment.
2. Pump the sediment through a discharge tube and additional flex hosing and redirect it back to the base of the pile.

9) Containment of Concrete Residue and Water Run Off

When placing concrete in form work over or in water, the following Best Management Practices will be employed to prevent the impacts to fish habitat:

Pouring concrete

- Spills: When pouring concrete all spills of fresh concrete must be prevented. Concrete is toxic to fish due its high pH. If concrete is discharged from the transit mixer directly to the formwork or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being

- placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews will ensure that concrete forms are not filled to overflowing.
- Sealing forms: All concrete forms will be constructed in a manner which will prevent fresh concrete or cement-laden water from leaking into the surrounding water.

Curing concrete

- When fresh water is used to cure concrete, the run off must be monitored for acceptable pH levels. If the pH levels are outside the allowable limits then the run off water must be contained and neutralized.

Grinding concrete

- When grinding cured concrete, the dust and fines entering the water must not exceed the allowable limits for suspended solids. When grinding green or incompletely cured concrete and the dust or fines are entering the water, pH monitoring will be conducted to ensure allowable ranges are maintained. In the event that the levels are outside the acceptable ranges, preventative measures will be introduced. This may include introducing silt curtains to contain the solids and prevent fish from entering a contaminated area or constructing catch basins to recover the run off and neutralizing it prior to disposal.

Patching concrete

- Spills: When patching concrete, all spills must be contained and prevented from entering the water.

Washing hand tools, pumps and transit mixer

- All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash water and excess concrete from entering the marine environment. The wash water will be contained and disposed of upland in an environmentally acceptable manner.

Whenever there is the possibility of contaminants entering water, the contractor will monitor pH levels to ensure acceptable levels.

APPENDIX

Fisheries and Oceans Canada

Contact List

Name	Telephone No.	Fax. No.

NOTICE OF PROJECT

Project Location:

To: Fisheries and Oceans Canada Attention:

Telephone/Fax/email:_____

From: "Contractor"

Telephone/Fax/email:_____

Representative:

Please be advised of the following marine/pile driving project:

Project Name:

Project Location:

Project Manager/Superintendent:

Project Telephone/Fax/email:_____

Project commencement date:

Project Information:

Type: Bearing Fender Mooring

Number of Piles:

Pile Diameter (if steel)

Type of Driving: Vibro Drop Hammer _____

Special Conditions at the Bottom (use of pins, sockets, epoxy, concrete, other)
_____

General Equipment On-Site (barge, truck, crane, etc.) _____

Signature of Contractor: _____

Date: _____

APPENDIX C

Environmental Protection Plan

Canada Border Services Agency
Bedwell Harbour Redevelopment

Environmental Protection Plan (EPP)

Submitted to

Tim Sackmann
Manager, Assessment & Evaluation
PSPC Environmental Services
Public Works and Government Services Canada
219-800 Burrard St.
Vancouver BC V6Z 0B9
tim.sackmann@pwgsc.gc.ca
Voice: 604-775-6828

Submitted By

G3 Consulting Ltd.
206-8501 162nd Street
Surrey, BC
V4N 1B2

November 2016

Contents

Appendices

ACRONYMS

AS-BMP	Activity-Specific Best Management Practices
BMP	Best Management Practices
CBSA	Canada Border Services Agency
DCIEM	Defense and Civil Institute of Environmental Medicine
DFO	Department of Fisheries and Oceans Canada
DR	Departmental Representative
EIR	Environmental Incident Report
EM	Environmental Monitor
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
G3	G3 Consulting Ltd.
G-BMP	General Best Management Practices
MSDS	Materials Safety Data Sheets (WHMIS 1988)
NTU	Nephelometric Turbidity Units
PWGSC	Public Works and Government Services Canada
QEP	Qualified Environmental Professional
SDS	Safety Data Sheets (WHMIS 2015)
SHA	Serious Harm (to Fish) Assessment
WCB	Workers Compensation Board
WHMIS	Workplace Hazardous Materials Information System

1.0 INTRODUCTION

On behalf of Canada Border Services Agency (CBSA), Public Works and Government Services Canada (PWGSC) has retained G3 Consulting Ltd. (G3), under the Marine/Freshwater Biological Assessment – Task Authorization Contract (TAC) Number E0276-132639/001/VAN, to provide and Environmental Protection Plan (EPP) for environmental services in preparation for the redevelopment of CBSA's float configuration (the Project) at Bedwell Harbour in Egeria Bay, South Pender Island, BC. The following document has been prepared in response to this request and describes Best Management Practices (BMPs) for the Project.

Best Management Practices (BMPs) are essential tools for ensuring that the mitigation of any potentially negative impacts and enhancement of positive impacts are conducted effectively during the project identified using best available science as outlined in the associated Environmental Management Plan (EMP; G3, 2016a). This document is an overview of environmental requirements of the Project and intended to be used in conjunction with legislation and other guidance documents, environmental permits and approvals issued for the Project and contract requirements specified for the Project.

The contents of this document have been organized as follows:

- **Section 1.0:** Introduction;
- **Section 2.0:** General Best Management Practices (G-BMPs); and,
- **Section 3.0:** Activity-Specific Best Management Practices (AS-BMPs).

1.1 Responsibilities

General and Activity Specific BMPs applicable to this Project are detailed within this document. It is the responsibility of contractors, sub-contractors, environmental monitors (EM), consultants and any other individuals contributing to this Project to familiarize themselves with all General and Activity-Specific BMPs. The Public Works and Government Services Canada (PWGSC) designated Environmental Monitor (EM) and Contractor's appropriately qualified personnel should ensure that redevelopment activities are being conducted consistently with applicable environmental legislation and relevant BMPs; however, ultimately the responsibility for compliance to BMPs, legislation and other environmental requirements resides with the Contractor and/or their assigned representative conducting the activity. Contractors are responsible for ensuring that all employees and subcontractors are trained and qualified to undertake specific work in an environmentally responsible manner and are aware of all environmental guidelines and criteria (e.g., contract specifications, EPP, SHA, legislation) relevant to their activity.

Public Works and Government Services Canada (PWGSC) Departmental Representative (DR) has the authority to suspend or stop work in the event that environmental protection conditions described in the BMPs are not adhered to or other negative effects are observed or suspected, as described in the EMP. Monitoring procedures, parameters and guidelines are described in the EMP. The Environmental Monitor (EM) has the responsibility to alert all involved, including the DR, when environmental conditions are not adhered to or when negative consequences are observed or expected. In the absence of the DR the EM may suspend work activities in the event that environmental protection conditions described in the BMPs are not adhered to or other negative effects are observed or suspected, as described in the EMP.

1.2 Definitions

For the purpose of these BMPs developed for the CBSA Bedwell Harbour Float Redevelopment Project, the following definitions apply:

- "Project Area" refers to area under redevelopment, specifically within Waterlot 395;
- "Work Area" refers to the specific location where a task is being carried out;
- "DR" refers to the Public Works and Government Services Canada (PWGSC) Departmental Representative (DR);

- "EM" refers to the Public Works and Government Services Canada (PWGSC) retained Environmental Monitor (EM).

2.0 GENERAL BMPS

The following are *General Best Management Practices* (BMPs) for any and all activities undertaken in and about CBSA Bedwell Harbour. They are a broad set of BMPs identifying a range of environmental goals and as such, should be used in conjunction with *Activity Specific BMPs* (Section 3.0) where applicable. These BMPs should be consulted at all times as to their applicability to a given activity. It is the responsibility of the individual conducting work at the Bedwell Harbour site to ensure compliance with all BMPs detailed below in addition to any additional *Activity Specific BMPs* (Section 3.0) that may apply.

The *General BMPs* apply to all Contractors conducting activities at the CBSA Bedwell Harbour Project Area and are divided into the following categories:

- 2.1 Regulations
- 2.2 Site Access & Use
- 2.3 Fisheries Timing Windows
- 2.4 General & Marine Construction
- 2.5 Noise & Lighting Control
- 2.6 Spill Management
- 2.7 Turbidity & Sediment Control
- 2.8 Air Quality Management
- 2.9 Waste & Hazardous Waste Management
- 2.10 Wildlife Management

Environmental monitoring associated with this section (*General BMPs*) will be undertaken by Public Works and Government Services Canada (PWGSC) designated Environmental Monitor (EM), G3 Consulting, Ltd. (G3), to ensure compliance with all relevant BMPs and assessment criteria to verify that performance objectives are being met and enable management decisions in the event that the performance objectives are not met. It is the responsibility of the individual conducting the activity to ensure the application of all applicable BMPs is implemented in accordance with the EMP (G3, 2016a). The Contractor must also monitor works to ensure compliance.

The Contractor's appropriately qualified person shall ensure that all staff members acting on behalf of the Contractor are aware and have the necessary resources to implement the BMPs.

BMP2.01 General BMPs and Activity Specific BMPs must be appropriately applied prior to, during and after commencement of work.

2.1 Regulations

BMP2.1.1 The Contractor shall meet the construction contract requirements for compliance with all local bylaws, rules, and regulations enforced at the location concerned. Although provincial laws and municipal by-laws generally do not apply on federal lands, Contractor shall, in accordance with the construction contract, respect and comply with provincial and municipal bylaws and rules at Bedwell Harbour Port of Entry.

BMP2.1.2 Meet or exceed requirements of the contract documents, specified standards, codes, referenced documents and be prepared to demonstrate this through appropriate records.

BMP2.1.3 In any case of conflict or discrepancy among specified standards, codes and reference documents, the more stringent requirements shall apply. In any case of discrepancy or conflict between the contract documents and the foregoing, the DR shall be notified and will provide direction.

BMP2.1.4 Workplace Hazardous Materials Information System (WHMIS) guidelines and procedures must be followed by all workers. Material Safety Data Sheets (MSDS) must be available to all workers for all products used on-site.

2.2 Site Access & Use

BMP2.2.1 Contractor shall clean all equipment prior to arrival at the Project Area to ensure that no invasive species are present on the equipment and to prevent the introduction of deleterious material into the surrounding environment.

BMP2.2.2 Facility closures must be kept to a minimum. Construction activities must provide safe access to pedestrian traffic using the Port of Entry whenever possible.

2.3 Fisheries Timing Windows

BMP2.3.1 *In situ* nearshore works should be scheduled when the regional least risk timing windows are open to limit adverse effects to fish during sensitive life history phases. If *in situ* works are to take place outside of the appropriate timing window, the EM (a Qualified Environmental Professional [QEP]) must supervise work.

BMP2.3.2 Bedwell Harbour is located within federal Fisheries and Oceans Fisheries Management Area 18. All work is to be carried out during the summer (July 1st to October 1st) and/or winter (December 1st to February 15th) least risk timing windows for the region, whenever possible.

BMP2.3.3 When work is occurring outside specified federal Fisheries and Oceans Marine/Estuarine Fisheries Timing Windows, the Project Area must be monitored for the presence of aggregations of herring or salmon. The EM will assess the potential for activities to disturb or interfere with the fish and communicate with the DR at which time a decisions on the impact of the activity on the fish will be assessed.

BMP2.3.4 Unattended structures and equipment must be inspected prior to removal or use should removal or use not coincide with Fisheries Timing Windows.

BMP2.3.5 Herring spawn observed by the Contractor, subcontractor or other person must be communicated to the EM as soon as possible. The contractor should be familiar with the appearance of herring spawn. The EM has the authority to suspend work is spawning herring or other fish are observed near or within the Project Area.

2.4 General & Marine Construction

Wastewater is defined as waters produced from construction activities, personal hygiene and decontamination facilities on-site.

BMP2.4.1 During the course of the Project, a Qualified Environmental Professional (QEP) shall be available to be on-site in case potentially adverse environmental incidents occur.

BMP2.4.2 Any land based construction equipment should not be operated within waterways.

BMP2.4.3 Vessels and floating equipment must not come to rest on the intertidal or subtidal zones unless specified otherwise.

BMP2.4.4 Ensure that equipment and machinery are in good operating condition, clean (power washed), free of leaks, excess oil and grease. Do not refuel or service equipment within 30 m of any watercourse or surface water drainage. Equipment shall not be washed within the Project Area without proper containment.

BMP2.4.5 Ensure hydraulic machinery, if required, uses environmentally sensitive hydraulic fluids that are non-toxic to aquatic life and that are readily or inherently biodegradable.

BMP2.4.6 Do not discharge any dredged and/or excavated material or associated effluent to on-site sewer systems (if applicable).

BMP2.4.7 Do not discharge wastewater from personnel hygiene/decontamination facility or toilet

facilities on-site. Dispose of these wastewaters off-site at a permitted Wastewater Treatment and Disposal Facility.

BMP2.4.8 Parameters to be monitored in the Project Area for wastewater include turbidity and pH. Guidelines for turbidity and pH were set by the Canadian Council of Ministers of the Environment (CCME) *Water Quality Guidelines for the Protection of Aquatic Life* (CCME, 2016).

As per the guidelines, turbidity in clear flowing marine waters may have a maximum increase of 8 NTUs (Nephelometric Turbidity Units) from background levels for a short-term exposure (e.g., 24 hour period) and/or a maximum average increase of 2 NTUs from background levels for a long term exposure (e.g., 30 days). Turbidity in high flowing or turbid waters may have a maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Turbidity should not increase more than 10% of background levels when background levels >80 NTUs (CCME, 1999).

pH of marine and estuarine waters should fall within the range of 7.0 to 8.7 units unless it can be demonstrated that such a pH is a result of natural processes. Within this range, pH should not vary by more than 0.2 pH units from the natural pH expected at that time. Where pH is naturally outside this range, human activities should not cause pH to change by more than 0.2 pH units from the natural pH expected at that time and any change should tend towards the recommended range (CCME, 1996).

BMP2.4.9 Wastewater produced at the Work Site (e.g., equipment decontamination wastewater, individual floatation unit effluent) should be assessed prior to any discharge in the Project Area to ensure compliance with applicable water quality performance objectives for where it is intended to be released. No discharge of wastewater to the marine environment must occur without authorization by the DR or EM.

- If wastewater meets *in situ* criteria (i.e., turbidity, pH; BMP2.4.8) and general observations (e.g., odour, colour, etc.) appear normal for local conditions and no water quality concerns exist then wastewater may be discharged to the marine environment at the discretion of the EM or the DR.
- If wastewater meets *in situ* criteria (i.e. turbidity, pH; BMP2.4.8) and general observations (e.g., odour, colour, etc.) appear abnormal for local conditions then no direct discharge to the marine environment may occur and wastewater shall be treated at an authorized Wastewater Treatment Facility.
- If wastewater does not meet *in situ* criteria (i.e. turbidity, pH; BMP2.4.8) then no direct discharge to the marine environment may occur and wastewater shall be treated at an authorized Wastewater Treatment Facility.

If any concerns exist about the quality of wastewater, no direct discharge to the marine environment may occur. No deleterious substances may be released into any watercourse.

BMP2.4.10 Material from waterway beds should not be dredged or excavated.

BMP2.4.11 Do not dump excavated fill, waste material or debris into or near any waterways.

BMP2.4.12 Special care shall be exercised while working near the water's edge, including implementation of site-specific erosion and sediment control. Silt fences or other appropriate control measures shall be used to minimize soil or intertidal sediment transport into marine or freshwater environment, where appropriate.

BMP2.4.13 Temporary crossings should be designed and constructed to minimize erosion to waterways and allow pedestrian traffic, where necessary.

BMP2.4.14 Logs, piles or other construction materials should not be skid across waterways.

2.5 Noise & Lighting Control

It is expected that daily operations at the Bedwell Harbour POE Project Area will adhere to criteria of the *Bylaw for the Abatement and Control of Disturbing Noise in the Electoral Area of the Southern Gulf Islands in the Capital Regional District* (Bylaw No. 3378), as applicable.

2.5.1 Lighting

BMP2.5.1.1 Lighting must be directed towards Work Areas or fitted with shrouds to direct light to the Work Area.

BMP2.5.1.2 Lighting must be shut off when not in use and limited to active work areas whenever possible.

2.5.2 Noise

BMP2.5.2.1 Contractor must adhere to the Capital Regional District "Noise Suppression Bylaw (Southern Gulf Islands) No.1, 2006" (CRD Bylaw No. 3378).

BMP2.5.2.4 Contractor shall undertake noisier work activities during daytime hours when possible and modify activities based on noise monitoring and resident feedback.

BMP2.5.2.5 All construction equipment shall be maintained in good working order and operated with exhaust systems in good repair to minimize noise and in accordance to the machines specification.

BMP2.5.2.6 Shut down equipment when not in use.

BMP2.5.2.7 Use noise barriers if applicable.

BMP2.5.2.8 EM or other entity designated by PWGSC shall monitor noise during construction activities at the Project boundary.

2.6 Spill Management

An environmental spill is the release of a deleterious substance(s) which is dangerous to health or environmentally unfriendly. Spill response procedures shall be completed in accordance with environmental and industry standards including:

2.6.1 Procedures

BMP2.6.1.1 All workers on-site must be familiar with WHMIS procedures and guidelines. Any handling, transport or storage of WHMIS "controlled products" must follow appropriate WHMIS guidelines.

BMP2.6.1.2 Contractors shall be fully aware of the spill prevention and response procedures. Report all spills in accordance with the BC Spill Reporting Regulations, BMPs and *Fisheries Act*.

BMP2.6.1.3 Contractor must advise DR prior to intended start of use of hazardous and toxic products where they cannot be avoided.

BMP2.6.1.4 In the event of a spill of any deleterious substance, the spill must be immediately contained and reported to the Provincial *Emergency Program Environmental Emergency Management Plan Incident Reporting* Hotline (1-800-663-3456) and DFO's *Observe, Record and Report (ORR)* Hotline (1-800-465-4336).

BMP2.6.1.5 Personnel trained and qualified to deploy spill kits are to be on site during work and have access to an on-site spill kit.

BMP2.6.1.6 Spill kits are to contain sufficient quantities of absorbent material on site in close

proximity to working machinery.

BMP2.6.1.7 Spill kits including: *Universal or General Purpose Kits*, made with grey absorbents to clean up both water based fluids and hydrocarbons; *Oil Only Kits*, made with white absorbents that repel water and float on water to clean up hydrocarbons only (e.g., motor oil, jet fuel, diesel, gasoline, hydraulic oil); and, *Hazmat Kits*, made with yellow absorbents to clean up aggressive fluids such as acids and solvents, must be kept at the Project Area and ready for deployment.

BMP2.6.1.8 DR shall be immediately informed of all spills resulting from contract specific activities that occur at the Project Area and at Contractor's Off-Site Offload Facility. All spills should be captured on the spill response form (EIR). Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666.

BMP2.6.1.9 In the event of a spill resulting from contract specific activities, the Contractor shall immediately notify DR, contain and assess the spill, and take necessary steps to prevent further discharge. Contractor is responsible for immediate cleanup of the spill and restoration of the area to the satisfaction of DR or other regulatory agencies, when involved.

BMP2.6.1.10 Contractor shall take due care to ensure no deleterious materials resulting from contract specific activities, including sediment- or concrete- laden runoff, paints, coatings or preservatives and fuel or oil, leave the Project Area or Contractor's Off-Site Offload Facility or enter any surface water or stormwater at or near the Project Area or Contractor Off-Site Offload Facility.

2.6.2 Spill Prevention

BMP2.6.2.1 Equipment must not be refueled or serviced within 30 m of any watercourse or surface water drainage. Do not place oil/fuel storage and transfer equipment near pathways to marine or freshwater environment (i.e. storm drains, edge of the dock etc.).

BMP2.6.2.2 Machinery shall not be washed within the Project Area without proper containment.

BMP2.6.2.3 Machinery working in the marine and nearshore environment must be inspected regularly and in good working condition. Ensure equipment and machinery is free of leaks, excess oil and grease.

BMP2.6.2.4 If the Contractor is expecting to require discharging of any deleterious materials, including water discharge (e.g., effluent from individual floatation units, etc.) or sediment-laden or concrete-laden runoff, the Contractor is responsible for ensuring that appropriate discharge permits are obtained and remain on-site at all times and discharge meets permit requirements and applicable compliance criteria.

BMP2.6.2.5 Use of any paints, corrosion protective coatings, wood preservatives or any other potentially deleterious substances that may be applied to surfaces that could have potential contact with the marine environment or vector to the environment, shall be applied in accordance with the BMPs and environmental protection measures.

BMP2.6.2.6 Any equipment remaining on-site overnight shall have appropriately placed drip pans or other spill/leak containment measures and must be placed as far away from the marine environment as possible.

BMP2.6.2.7 Measures for the containment of potentially harmful substances due to rinses, cleaning water, solvents for glues, wood preservatives and other potentially harmful or toxic substances shall be identified and implemented by Contractor in a manner to prevent leakage, loss or discharge into the sewers, storm drain system or marine environment. Any waste materials should be collected, stored and disposed of in an appropriate manner.

BMP2.6.2.8 Prevent the application of fog seals, tack coats or other coatings during periods when rainfall is likely.

BMP2.6.2.9 During the purging of tanks and associated lines, procedures must prevent the release of any fuels or other deleterious substances to the surface, surface water, catch basins or soils within.

2.6.3 Spill Clean-Up

BMP2.6.3.1 All workers on-site must be familiar with WHMIS procedures and guidelines. Any handling, transport or storage of WHMIS "controlled products" must follow appropriate WHMIS guidelines.

BMP2.6.3.2 Personnel trained and qualified to deploy spill kits are to be on site during work, have access to an on-site spill kit and must clean a spill immediately if it is safe to do so. Logistical safety issues must be corrected in order to permit immediate spill clean-up.

2.6.4 Storage

BMP2.6.4.1 All stored materials that have the potential to negatively impact the environment, infrastructure or workers must be appropriately labelled following WHMIS protocols, including the product name, first aid information and personal protective equipment (PPE) requirements.

BMP2.6.4.2 Materials must be stored in storage areas that are suitable for the materials (e.g., protected from the weather, ventilated if necessary).

BMP2.6.4.3 For long-term storage, appropriate secondary containment suitable for the quantity and nature of the product being stored must be present.

BMP2.6.4.4 Short-term storage and working areas must be clearly labelled and located away from pathways to any watercourse on impervious surfaces protected from the weather.

BMP2.6.4.5 All materials must be secured appropriately during transport.

2.7 Turbidity, Erosion & Sediment Control

BMP2.7.1 Contractors operating marine vessels in the Project Area should minimize re-suspension of sediments resulting from propwash by running propellers at minimal speed.

BMP2.7.2 Turbidity control measures must be available during construction operations.

BMP2.7.3 Provide and maintain temporary erosion and pollution measures which may include silt curtains or other construction required to minimize turbidity, sediment and particulate resuspension in the marine environment. Control measures must be monitored during operations, as appropriate.

BMP2.7.4 Plan construction procedures to avoid equipment encroachment onto marine environment or drainage ditch banks which may deposit into the marine environment. In event of damage, promptly notify DR and EM and take action to mitigate effects; restore affected bank or water body to existing condition.

BMP2.7.5 Plan construction procedures to ensure BMP efficiency is maintained.

BMP2.7.6 Augering, pile driving or any activities on or within substrate in the intertidal area must be conducted in a manner that prevents the release of contaminated sediment.

BMP2.7.7 Any contaminated sediment (e.g., containing treated wood fragments) brought to the surface of the substrate must be removed and disposed of as appropriate.

BMP2.7.8 Unless otherwise directed by DR or EM, remove temporary erosion and sediment control devices upon completion of work. Spread accumulated sediments to form a suitable surface or dispose of and shape area to reflect natural conditions to satisfaction of DR or EM. Materials, once removed, become the property and responsibility of the Contractor.

BMP2.7.9 Do not disturb existing embankments or embankment protection except as indicated in the construction contract.

BMP2.7.10 If sediment and debris from site accumulate in low areas or other areas where it is undesirable and has the potential to migrate to the marine environment, the Contractor must remove accumulation and restore area to original condition.

BMP2.7.11 Loose aggregate and material (e.g., gravel, sand, etc.) must be covered to prevent erosion and sedimentation

BMP2.7.12 The Contractor's appropriately qualified person shall establish an effective Work Plan that considers location, timing and tidal influences to minimize impacts of sediment release.

2.8 Air Quality Management

BMP2.8.1 Emissions from equipment should be controlled to requirements from local authorities.

BMP2.8.2 Dust and airborne particulate containment should be large enough to adequately enclose or segregate the working area. To reduce potential dust emissions during hot, dry weather, if being left overnight or if there are strong winds, sediment on barges, in trucks, or stockpiled on land will be covered or wetted as required.

BMP2.8.3 Ensure that dust arising from all Contractor operations, such as barge or truck transportation, material stockpiling and demolition work, is controlled by dust screens and/or water application if necessary.

BMP2.8.4 Apply water as required for dust control, and when directed by the EM. Dust control methods shall be chosen such that a minimal amount of water is required. Apply water with distributors equipped with spray system to ensure uniform application and with means of shut off.

BMP2.8.5 Temporary enclosures, covering or wetting down should be provided and applied to dry materials, rubbish, sandblast and other extraneous materials as required to prevent contamination beyond immediate application area.

BMP2.8.6 Runoff from water used for dust control shall be collected and handled as other Project wastewater.

BMP2.8.7 Temporary dust tight screens or partitions must be provided to localize dust generating activities, and for protection of workers, finished areas of work, marine environment and public.

BMP2.8.8 Maintain and relocate dust screens as necessary and remove dust screens at completion of those portions of the work that may generate airborne dust.

BMP2.8.9 Secure and cover material in open trucks hauling excavated material and re-use the covers.

BMP2.8.10 If Contractor's dust and particulate control is not sufficient for controlling dust and particulates into atmosphere a stop-work-order may be enacted. Discuss with EM and PWGSC procedures to resolve the problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dust or particulates.

BMP2.8.11 Spray coatings (e.g., paint, sealants) must not be applied under conditions that render containment ineffective.

BMP2.8.12 Contact the DR or EM in the event of a nuisance odour or airborne discharge.

BMP2.8.13 Vehicle idling should be avoided especially near building doorways or air intakes.

BMP2.8.14 The Contractor should maintain equipment and vessels in good working order and use environmentally considerate fuels wherever possible.

BMP2.8.15 Perform routine checks of exhaust systems to identify actual or potential deficiencies and correct them in a timely manner. Repair or change out chronically deficient or severely defective equipment.

2.9 Waste & Hazardous Waste Management

Wastewater is defined as waters produced from construction activities and personal hygiene and decontamination facilities on-site and excludes barge dewatering effluent.

BMP2.9.1 Disposal/recycling/reuse of waste generated during the project shall be done in compliance with federal, provincial and municipal legislation, regulations, and bylaws, as applicable. Refuse removed from the site must be disposed of at an approved landfill site (approved by BC Ministry of Environment in the *Waste Management Act* [WMA] and appropriate Municipal Authority.

BMP2.9.2 Documentation (e.g., certificate, letter, etc.) must be obtained from the approved facility upon disposal.

BMP2.9.3 Rubbish and waste material must not be buried, burned, dumped or left on site and must be removed by the Contractor.

BMP2.9.4 Construction wastes must be prevented from entering the marine environment. If large debris should fall to the ocean bed during repairs/replacement, it must be lifted off the bottom taking care to minimize as much as practical, disruption to the sea bed and the suspension of sediments in the water column. Debris should be removed either by hand or by crane system from the wharf or from a barge.

BMP2.9.5 Wastewater produced at the Work Site (e.g., sanitary facilities, equipment decontamination, etc.) must be disposed of in compliance with federal, provincial and municipal legislation, regulations and bylaws, as applicable. Marine wastewater (e.g., water accumulated within individual floatation units) should be assessed prior to any discharge in the Project Area to ensure compliance with applicable water quality performance objectives for where it is intended to be released. No discharge of wastewater to the marine environment must occur without authorization by the DR or EM.

- If marine wastewater meets *in situ* criteria (i.e., turbidity, pH; BMP2.4.8) and general observations (e.g., odour, colour, etc.) appear normal for local conditions and no water quality concerns exist then wastewater may be discharged to the marine environment at the discretion of the EM or the DR.
- If marine wastewater meets *in situ* criteria (i.e. turbidity, pH; BMP2.4.8) and general observations (e.g., odour, colour, etc.) appear abnormal for local conditions then no direct discharge to the marine environment may occur and wastewater shall be treated at an authorized Wastewater Treatment Facility.
- If marine wastewater does not meet *in situ* criteria (i.e. turbidity, pH; BMP2.4.8) then no direct discharge to the marine environment may occur and wastewater shall be treated at an authorized Wastewater Treatment Facility.

If any concerns exist about the quality of wastewater, no direct discharge to the marine environment may occur. No deleterious substances may be released into any

watercourse.

BMP2.9.6 Use of a barge-mounted derrick to remove waste materials from within the Project Area may occur during any tidal condition.

2.9.1 Storage

BMP2.9.1.1 Regularly inspect the Site for unidentified or improperly stored materials.

BMP2.9.1.2 Ensure all containers (i.e., drums, totes, etc.) are in good condition and have a clean exterior at all times.

BMP2.9.1.3 Store equipment decontamination facility wastewater in separate tanks from those used for wastewater from personnel hygiene/decontamination facility.

BMP2.9.1.4 Provide, operate and maintain wastewater storage tanks when and where appropriate.

BMP2.9.1.5 Store batteries in a manner that prevents leakage of acid to the environment. Dispose of dead batteries at an appropriate facility.

BMP2.9.1.6 Ensure waste accumulation areas are organized and covered to reduce exposure to environment and wildlife.

2.9.2 Solid Waste

BMP2.9.2.1 Recycle solid waste such as plastic, glass, aluminum, mixed paper and cardboard. Recycling areas should be conveniently located and easily identifiable.

BMP2.9.2.2 Encourage the use of recyclable products to reduce the solid waste impact on the environment.

BMP2.9.2.3 Segregate other solid waste, such as scrap metal, wood, electronics, polystyrene foam and soft plastics for recycling at an approved facility.

BMP2.9.2.4 Clean debris from work areas immediately after any maintenance activity. Dispose of collected material appropriately.

BMP2.9.2.5 Do not bury rubbish and/or waste materials at the Project Area. Rubbish or waste generated on-site should be disposed of in appropriate manner and at an appropriate facility.

2.9.3 Non-Solid Waste

BMP2.9.3.1 Do not dispose of waste or volatile materials, such as mineral spirits, oil, or paint thinner into marine waters, waterways, storm sewers or sanitary sewers. Generated waste should be placed in waste specific containers and deposed of appropriately.

BMP2.9.3.2 Do not discharge wastewater from personal hygiene/decontamination facility or toilet facilities on-site. Disposal of these wastewaters must be at an off-site permitted Wastewater Treatment Facility.

BMP2.9.3.3 Connect pumps, piping, valves, miscellaneous items and necessary utilities as required for operation of facilities; and protect tanks, valves, pumps, piping and miscellaneous items from freezing, leaks or systemic failure.

2.9.4 Hazardous Waste

BMP2.9.4.1 Hazardous waste should be segregated into separate containers. Ensure designated hazardous waste storage areas are away from active work areas. Does not apply to Hazardous Waste Quality Sediment.

BMP2.9.4.2 Hazardous waste/materials shall be transported in compliance with the *Transportation of*

Dangerous Goods Act and BC *Hazardous Waste Regulation.*

BMP2.9.4.3 All means of containment and transport of hazardous waste, including Hazardous Waste Quality Sediment must comply with the safety standards of the *Transportation of Dangerous Goods Act* and display all applicable prescribed safety marks and labels.

BMP2.9.4.4 Do not dilute or mix hazardous waste with other hazardous or non-hazardous wastes.

2.10 Wildlife Management

Contractors operating in and about the Bedwell Harbour POE Project Area may encounter a variety of marine animals during the course of work. Some of these animals might include Species At Risk (SAR) which are protected under the federal *Species At Risk Act* (SARA). It is an offense to disturb any species protected by the Act and is the responsibility of the Contractor to be familiar with marine animals likely to be present in the Project Area.

Rockfish (*Sebastes* sp.), Pacific herring (*Clupea pallasii*) and several Pacific salmon species (*Oncorhynchus* sp.) are known to occur in areas nearby to the waterlot; however, finfish observations in the immediate waterlot were primarily sea perch (G3, 2016b). Aquatic animals not classed as SAR observed in Bedwell Harbour include Harbour seals (*Phoca vitulina*), northern river otters (*Lontra canadensis*) and lion's mane jellyfish (*Cyanea capillata*). Northeast Pacific southern resident population of killer whale (*Orcinus orca*; endangered [SARA]; red-listed provincially) are known to frequent the southern Gulf Islands.

In addition to General and applicable Activity Specific BMPs, the following BMPs should be employed to mitigate marine mammal interactions at the Work Site:

BMP2.10.1 All wildlife must be left alone. Care must be taken not to damage attached sea life (e.g., barnacles, seastars, algae, etc.) during operations and salvage BMPs (Section 3.7) must be followed during marine salvage operations.

BMP2.10.2 Every effort should be made to minimize disturbance to the benthic and upland wildlife communities.

BMP2.10.3 Marine salvage must be undertaken on all portions of the wharf, floats, piles or chains that will be removed, resettled or likely to be affected by the removal or resettlement (Section 3.7). Salvage work should be overseen by the EM or a Qualified Environmental Professional (QEP). See Section 3.7 for further details.

BMP2.10.4 If any cetacean (finned marine mammal) enters within sight of the Project Area during in-water activities, in-water work may be suspended by the DR or EM at their discretion. The DR or EM will assess the potential for activities inside and outside the Project Area to disturb or interfere with the cetacean. Low risk activities may continue within the Project Area at the discretion of the DR or EM and normal operations may resume once the cetacean has been observed leaving the area or has not been sighted for 10 minutes.

BMP2.10.5 If any pinniped (seal) enters within sight of the Project Area during in-water activities, in-water work may be suspended by the DR or EM at their discretion. The DR or EM will assess the potential for activities inside and outside the Project Area to disturb or interfere with the pinniped. Low risk activities may continue within the Project Area at the discretion of the DR or EM and normal operations may resume once the pinniped has been observed leaving the area or has not been sighted for 10 minutes.

BMP2.10.6 The DR or EM will assess the potential for activities to disturb or interfere with the marine mammal and have authority to suspend operations or activities at their discretion.

BMP2.10.7 When work is occurring outside specified DFO Marine/Estuarine Fisheries Timing Windows, the Project Area must be monitored for the presence of aggregations of

herring or salmon. If fish or eggs are present the DR may notify DFO. The EM will assess the potential for activities to disturb or interfere with the fish and communicate with the DR at which time a decisions on the impact of the activity on the fish will be assessed.

BMP2.10.8 Unattended structures and equipment must be inspected prior to removal or use should removal or use not coincide with Fisheries Timing Windows.

BMP2.10.9 Herring spawn observed by the Contractor, subcontractor or other person must be communicated to the EM as soon as possible. The contractor should be familiar with the appearance of herring spawn.

3.0 ACTIVITY SPECIFIC BMPS

In addition to *General BMPs* identified, specific BMPs for individual activities are detailed in this section. This list should not be considered exhaustive and the Contractor is required to implement all industry standards surrounding specific activities. In addition, the Contractor must also implement all permitting and regulatory requirements associated with the activity. It is the responsibility of all Contractors to identify and implement all BMPs applicable to their activity. The Contractor's appropriately qualified person shall ensure that all personnel acting on behalf of the Contractor are also aware and have the necessary experience, training and resources to appropriately implement the BMPs. The Environmental Monitor (EM) shall conduct monitoring and ensure compliance with applicable BMPs relating to specific activities detailed in this section.

Environmental monitoring will be undertaken by the Contractor's appropriately qualified person, as deemed necessary, to ensure compliance with the EMP and other regulations. In addition, PWGSC's EM will conduct monitoring in accordance the EMP to ensure Contractor compliance with all relevant BMPs and other regulations. When necessary, management decisions will be made by Public Works and Government Services Canada (PWGSC) Departmental Representative (DR).

3.1 Marine Construction

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.1.1 All work must abide by the conditions of all applicable legislation and regulations.

BMP3.1.2 Vessels and equipment will be well maintained and kept in good working order.

BMP3.1.3 Contractors operating marine vessels inside or outside the Work Site should minimize re-suspension of sediments resulting from propwash or thrusters by operating at minimal speed whenever possible.

BMP3.1.4 The Contractor assumes ownership of any soil, sediment or other material once it is loaded on to a barge or other vessel for transport from the Work Site for disposal.

BMP3.1.5 Contractor shall be responsible for the safe overwater and terrestrial transport of all waste materials (including all augered or dredged sediment, debris, and associated runoff and debris) in accordance with federal, provincial, regional/municipal laws and regulations and all Project specific documents.

BMP3.1.6 Ensure hydraulic machinery, if required, uses environmentally sensitive hydraulic fluids that are non-toxic to aquatic life and that are readily or inherently biodegradable.

BMP3.1.7 Wastewater produced at the Work Site (e.g., individual floatation unit effluent, equipment decontamination wastewater, etc.) should be tested prior to discharge in the Project Area to ensure compliance with applicable water quality performance objectives for where it is intended to be released.

If criteria cannot be met wastewater shall be treated at an authorized Wastewater Treatment Facility. No deleterious substances may be released into any watercourse.

BMP3.1.8 Work will be conducted in a manner that minimizes induced turbidity outside the Work Area and does not result in exceedance of water quality criteria outside the Work Area.

3.2 In-water Transportation

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.2.1 Contractors shall be responsible for the safe transport of any and all waste materials (including all removed contaminated water, sediment and debris) in accordance with federal, provincial and regional/municipal laws and regulations and conditions as set forth in the permits and contract terms.

BMP3.2.2 Contractor shall assume liability for misplaced waste and debris material arising out of their activities, and is required to notify and coordinate with appropriate authorities if material is misplaced or lost during transport to the certified Off-Site Offload Facility or during completion of offloading, transport and disposal activities.

3.3 Wood Treatment

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.3.1 Field treatment of newly exposed wood components for re-use (e.g., cutting, cracking, holes) is to be done in a manner to prevent preservative from entering any watercourse.

BMP3.3.2 Do not apply field treatment in conditions that render containment ineffective (i.e., raining). End treating of fresh cuts is to be done in a manner that ensures there is no deposition of this deleterious substance to the marine environment.

BMP3.3.3 Dispose of any unused preservative at a Hazardous Waste Facility and any treated wood waste (including sawdust) at a facility approved to dispose of treated wood material.

BMP3.3.4 Any treated wood waste must be disposed of in accordance with federal, provincial and municipal laws and policies.

BMP3.3.5 Particular attention must be taken to ensure that shavings, cuttings and sawdust from treated wood are not permitted to enter the marine environment.

3.4 Pile Extraction & Driving

In addition to the General BMPs stated in Section 2.0, the following BMPs may also apply:

BMP3.4.1 All pile extraction and driving activities must comply with existing criteria and adhere to the *Best Management Practices for Pile Driving and Related Operations* (BC MPDCA, 2003).

BMP3.4.3 Coordinate pile driving activities and mitigation measures (e.g., avoiding multiple piles been driven at one time, deployment of a bubble curtain over the length of the wetted pile to reduce the shock waves, etc.) to be implemented as appropriate to control effects of underwater noise on the surrounding environment.

BMP3.4.4 Underwater noise during pile foundation and any other underwater activities should not exceed 30 kPa <2 m outside the Work Area for the protection of aquatic life. The Contractor's appropriately qualified person will be required to monitor sound within 2 m of the activity in accordance with industry BMPs.

The EM will monitor noise outside the Work Area at a safe distance from any activities. In the event that underwater sound level exceeds 30 kPa <2 m outside the Work Area, work will cease immediately until shock wave levels can be mitigated successfully. An *Environmental Incident Report* (EIR) will be prepared as described in the *Bedwell Harbour Float Redevelopment Environmental Management Plan (EMP;* G3, 2016a) and the incident reported to the DR immediately.

BMP3.4.5 Shock wave dissipation methods (e.g., bubble curtain, etc.) must be employed during pile driving activities if any risk for underwater noise > 30 kPa <2 m outside of Work Area exists due to pile driving or extraction method, equipment, substrate type (e.g., sand, clay, bedrock, etc.; BC MPDCA, 2003). Shock wave dissipation methods must not interfere with any necessary sediment control methods.

BMP3.4.6 Any fish kills occurring in the vicinity of pile driving activities (inside or outside of the Project Area) will be reported immediately to the DR and work will cease immediately.

BMP3.4.7 In the event that pile installation causes a fish kill, the DR shall issue a stop-work-order. The Contractor will be responsible for introducing effective means to reduce the level of shock waves or similar measures that will prevent fish from entering the potentially

harmful shock wave area.

BMP3.4.8 The use of vibratory pile driving and removal methods, where practical and feasible, is preferred over impact pile driving to minimize noise and sound pressure effects on aquatic life.

BMP3.4.12 Pile removal and driving should be conducted from a floating structure (i.e., barge) to prevent disturbance to the substrate, if required for construction or maintenance, where feasible.

BMP3.4.14 If pile removal or driving activities are required to be conducted from a barge, ensure activities adhere to the following:

- sufficient water must be present to prevent the barge from grounding on the foreshore;
- minimize the use of barge stabilizing spuds and their disturbance to the bottom and foreshore;
- during maintenance or construction prop scour of the foreshore must not occur from tending vessel(s). This may require maneuvering of barges in shallow water with ropes tied to the shore and/or piles.

BMP3.4.15 Prior to commencement of any work that is longer than five (5) working days in duration and falling under this Project, the contractor will complete and forward a “Notice of Project” to the Department of Fisheries and Oceans (DFO; BC MPDCA, 2003). The Contractor will provide the DR with all the information required for the DR to submit the notice through the EM.

BMP3.4.16 The DR has the authority to suspend any construction activities if spawning fish are observed or suspected within or near to the Project Area. The EM has the responsibility to alert all involved, including the DR, when spawning fish are observed or expected within or near to the Project Area. In the absence of the DR, the EM may suspend work activities if spawning fish are observed or suspected within or near to the Project Area until otherwise directed by the DR.

BMP3.4.17 There will be no restriction of work outside Fisheries Timing Windows (except during spawning; Section 2.3) provided the contractors employ an exclusion device around the work area to restrict fish access or when required an effective method of mitigating shock waves (e.g., bubble curtain; BC MPDCA, 2003).

BMP3.4.19 Remove the entire pile using a slow steady pull to minimize the disturbance of the substrate and avoid bringing contaminated sediments to the surface.

BMP3.4.20 Where appropriate vibratory methods should be employed for pile removal.

BMP3.4.21 All reasonable attempts should be made to remove the entire pile.

BMP3.4.22 Should the pile break below the biologically-active sediment zone, an assessment in conjunction with the DR should be conducted to assess the need and options for removal of the remaining structure.

BMP3.4.23 Removed piles should be stored in an area away from the water.

BMP3.4.24 Surface runoff that comes in contact with the treated piles should be directed away from the watercourse, captured, stored and treated as contaminated.

BMP3.4.25 Recovered materials and obstructions must be disposed of in an appropriate manner and in accordance with applicable federal, provincial and municipal laws and policies.

BMP3.4.26 Minimize or prevent debris, dust, materials or sediment-laden waters from treated wood pile extraction from entering any drainage system, watercourse or marine environment.

BMP3.4.27 Appropriate turbidity control measures must be installed and functional prior to any pile

extraction or driving operations.

BMP3.4.28 Use of surface to bottom silt curtains must be used around piles during extraction and pile driving when debris or sediment re-suspension is anticipated.

BMP3.4.29 Buoyant items removed from their original location must not float beyond the Project Area.

3.4.1 Treated Wood

In addition to the General BMPs stated in Section 2.0 and Activity Specific BMPs, the following BMPs may also apply when driving treated wood pilings to minimize impacts to marine fish and their habitat:

BMP3.4.1.1 New wood piles without damage must be used.

BMP3.4.1.2 New wood piles must comply with the Best Management Practices for the Use of Treated Wood in Aquatic Environments (WWPI, 2011). Where this is not possible, creosote pilings will stand for a minimum of 45 days prior to installation (BC MPDCA, 2003).

BMP3.4.1.3 Appropriate turbidity control measures must be installed and functional prior to any pile extraction or driving operations.

BMP3.4.1.4 Use of surface to bottom silt curtains must be used around piles during extraction and driving when debris or sediment re-suspension is anticipated.

BMP3.4.1.5 Wood piling is normally driven using a drop hammer, a diesel/air impact hammer or a small vibratory hammer. Given the relative small diameter of the wood pile, and its capacity for energy absorption, there is little threat to fish and their habitat when driving wood piles (BC MPDCA, 2003). No acoustic monitoring using a hydrophone is required; however, the Work Site must be monitored for fish kills and other indicators of harm to fish as well as other environmental monitoring as per G-BMPs and other AS-BMPs.

BMP3.4.1.6 Piles must be removed using a slow steady pull to minimize the disturbance of the substrate and avoid bringing PAH-contaminated sediments to the surface. If a pile breaks off below the biologically-active zone in the sediment, it may not be advisable to dredge the remainder depending on site sensitivity, existing PAH levels (Hutton and Samis, 2000) and if it is not considered a marine hazard, etc.

BMP3.4.1.7 When demolition is required on wood pile structures, the contractor will remove the piling by mechanical means and avoid breaking the piling at the mud line or below. All demolition operations must be monitored in order to control and contain the construction debris.

BMP3.4.1.8 Creosote-treated wood piles must be shielded from direct sun to prevent creosote loss using caps (Hutton and Samis, 2000).

BMP3.4.1.9 Treated wood piles should not be stored in the water prior to installation.

BMP3.4.1.10 Losses of treated wood into the aquatic environment through abrasion can be minimized by armouring the wood with protective high-density polyethylene wear strips (Hutton and Samis, 2000), if appropriate.

BMP3.4.1.11 All treated wood pile fragments resulting from splintering during pile driving or handling must be immediately contained and recovered from the water, intertidal and coastal habitat to minimize contamination by PAHs and other contaminants (Hutton and Samis, 2000).

BMP3.4.1.12 Initial surface contamination of creosote can be mitigated by deploying absorbent booms or pads during pile installation (Hutton and Samis, 2000).

3.4.2 Steel Pipe Piles (<24 inches [0.61 m] in diameter)

In addition to the General BMPs (Section 2.0) and Activity Specific Pile Extraction and Driving BMPs (Section 3.4), the following BMPs may apply when driving steel piles < 24 inches (0.61 m) in diameter regardless of the type of hammer being used:

BMP3.4.2.1 Appropriate turbidity control measures must be installed and functional prior to any pile driving operations.

BMP3.4.2.2 Use of surface to bottom silt curtains must be used around piles during extraction and driving when debris or sediment re-suspension is anticipated.

BMP3.4.2.3 Small diameter piles do not typically result in shock waves >30 kPa. No acoustic monitoring using a hydrophone is required (BC MPDCA, 2003); however, the Work Site must be monitored for fish kills and other indicators of harm to fish as well as other environmental monitoring required by G-BMPs and AS-BMPs.

BMP3.4.2.4 Pile installation causing fish kills must cease immediately. Contractors will be responsible for introducing effective means of reducing the shock wave or introducing measures to protect fish from entering the area of harm. An appropriate mitigation measure includes the deployment of an appropriately designed bubble curtain over the full length of the wetted pile (BC MPDCA, 2003; Vagle, 2003). Fish kills detected following the implementation of mitigation measures will cause work to stop immediately until the preventative measures can be reviewed and corrected.

BMP3.4.2.5 Fish kill mitigation measures must not compromise the efficiency of other environmental protection measures (e.g., bubble curtains and silt screens; Vagle, 2003).

3.4.3 Steel Pipe Piles (>24 inches [0.61 m] in diameter)

In addition to the *General BMPs* (Section 2.0) and *Activity Specific Pile Extraction and Driving BMPs* (Section 3.1), the following BMPs may apply when driving steel piles > 24 inches (0.61m) in diameter when using impact of hydraulic hammers:

BMP3.4.3.1 Appropriate turbidity control measures must be installed and functional prior to any pile driving operations.

BMP3.4.3.2 Use of surface to bottom silt curtains must be used around piles during extraction and driving when debris or sediment re-suspension is anticipated.

BMP3.4.3.3 Acoustic monitoring of steel pipe driving using a hydrophone by the EM is required until it can be suitably determined that no shockwaves will occur in exceedance to 30 kPa (i.e., several piles monitored well below 10 kPa). Mitigation measures must be implemented if shock waves >30 kPa are recorded (Vagle, 2003).

BMP3.4.3.4 Pile installation causing fish kills must cease immediately. Contractors will be responsible for introducing effective means of reducing the shock wave or introducing measures to protect fish from entering the area of harm. An appropriate mitigation measure includes the deployment of an appropriately designed bubble curtain over the full length of the wetted pile (BC MPDCA, 2003; Vagle, 2003). Fish kills detected following the implementation of mitigation measures will cause work to stop immediately until the preventative measures can be reviewed and corrected.

BMP3.4.3.5 Fish kill mitigation measures must not compromise the efficiency of other environmental protection measures (e.g., bubble curtains and silt screens; Vagle, 2003).

3.5 Underwater Augering & Rock Socketing

In addition to the General BMPs (Section 2.0) and Activity Specific Pile Extraction and Driving BMPs (Section 3.4), the following BMPs may apply:

BMP3.5.1 Underwater augering and rock socketing does not generate shock waves (BC MPDCA, 2003). No acoustic monitoring using a hydrophone is required; however, the Work Site must be monitored for fish kills and other indicators of harm to fish as well as other environmental monitoring as per G-BMPs and other AS-BMPs.

BMP3.5.2 Water generated from augering or rock socketing activities must be disposed of in a manner not detrimental to any portion of the environment, work completed or under construction.

BMP3.5.3 Work will be conducted in a manner that does not result in the deposit of a toxic or deleterious substance into waters.

BMP3.5.4 Appropriate turbidity control measures (e.g., surface to bottom silt curtains) must be installed and functional prior to any pile extraction or driving operations. Any turbidity generated during drilling or augering must be contained within a silt curtain and monitored by the EM as per the EMP.

BMP3.5.6 Drill cuttings will be deposited adjacent to the operation, contained on the sea bed or deposited into containment skiffs or scows when it is determined that the drill cuttings are unsuitable for return to the environment.

BMP3.5.7 Any treated wood fragments extracted during drilling, augering or rock socketing must be removed from the water and disposed of appropriately.

3.6 Excavation

In addition to the General BMPs (Section 2.0), the following BMPs may apply:

BMP3.6.1 Excavation work in medium compaction substrate areas must be scheduled for suitable low tides.

BMP3.6.2 Sea life must be salvaged before and during excavation (BMP3.7.5).

BMP3.6.3 Excavated fines must be separated from surface substrate. Surface substrate must be replaced in the same location once work is completed.

BMP3.6.4 Erosion and sediment control measures must be in place and operational prior to and during excavation operations.

3.7 Marine Salvage

In addition to the General BMPs stated in Section 2.0, the following BMPs may apply:

BMP3.7.1 All marine salvage activities described below are to be completed by trained personnel (e.g., commercial divers) in compliance with existing bylaws, rules and regulations enforced at the location concerned and overseen by the Environmental Monitor (EM).

BMP3.7.2 All marine salvage activities must be completed prior to commencements of construction activities on structures (e.g., docks, floats, piles, chains, anchors, etc.) identified for removal and any other nearby surfaces expected or likely to be affects (e.g., scraped, impacted, etc.) by removal activities.

BMP3.7.3 Salvaged organisms must not be exposed to excessive, extended or careless handling, conspecific aggression, predation, adverse weather or temperature extremes during salvage.

BMP3.7.4 Substrate in intertidal areas affected by excavation, augering or equipment traffic must be inspected for the presence of sea life. Surface rocks with attached sea life must be manually moved away from the affected area. Surface substrate must be replaced in same location once activities are complete.

BMP3.7.5 Motile marine invertebrates (e.g., crabs, nudibranchs, seastars, etc.) must be removed from the affected areas (e.g., piles, individual floatation units, docks, chains, anchors, etc.) to a bucket containing site water. The EM will inventory collected species and return them to the marine environment beyond the affected Work Area at the earliest possible opportunity.

Care should be taken to minimize any injury to salvaged macroinvertebrates. For example, seastars use a hydraulic seawater system to move the hundreds of tube feet on their undersides. Given that many species of seastars (i.e., species that can adhere to vertical surfaces) rely on suction cups at the base of their tube feet to anchor themselves, they should be gently removed by dislodging the tube feet to minimize risk of injury. Seastars should not be torn from their resting surface, but gently pried off. Seastar vascular systems are open and rely on marine water rather than internal pressure; subsequently, seastars should be kept in the water at all times unless otherwise necessary.

BMP3.7.6 Sessile marine invertebrates (e.g., barnacles, tunicates, etc.) are not to be relocated as they are not expected to survive attempts at translocation.

Barnacles cement themselves to solid underwater surfaces using an insoluble proteinaceous adhesive produced in glands at the base of antennules. Although the cement is reapplied throughout the adult life stage of the barnacle, they cannot be successfully removed and relocated without causing mortality. Barnacles could be relocated by removing the wood they are cemented to and allowing them to migrate; however, this method would require the deposition of treated wood fragments in the marine environment. For this reason, barnacles are not recommended for marine salvage.

Ascidians have no independent means of locomotion. Although ascidians may survive being dislodged during storm events, they are structurally fragile and are unlikely to survive direct detachment attempts. As such, ascidians are not recommended for marine salvage.

BMP3.7.7 Attempts should be made to relocate semi-motile marine invertebrates (e.g., anemones) only if suitable habitat may be identified prior to salvage. Anemones must be removed **gently and slowly** from structures selected for marine salvage. Given that a **torn foot will likely result in mortality**, care should be taken to reduce injury. An anemone can be coaxed from a surface by massaging the foot away from the anchor point (i.e., not by scraping, tearing or pulling away). If the anemone is not responsive, a flat, blunt object (e.g., a credit card or the reverse edge of a dull knife) can be used to gently release the foot. If the anemone cannot be safely removed from the structure without injury, it should be left in place.

BMP3.7.8 Large macroalgae (e.g., *Laminaria saccharina*, *Ulva lactuca*, *Polyneura latissima*) must be removed from the structures selected for salvage. Although macroalgae are not likely to successfully translocate, they will continue to provide habitat value, including cover from predators, to invertebrates during salvage operations.

3.8 Anchor, Chain & Underwater Extraction Works

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.8.1 All marine salvage activities must be completed on structures to be relocated within the Project Area or removed from the Project Area as per BMPs in Section 3.7.

BMP3.8.3 Turbidity and sediment control measures must be completed following BMPs in Section 2.7, where applicable.

3.9 Concrete Works

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.9.1 Ensure that all works involving use of concrete, cement, mortars and/or other cement or lime-containing construction materials will not deposit (directly or indirectly) sediments, debris, concrete, leachate, concrete fines or wash water into or about any watercourse.

BMP3.9.2 The Contractor must immediately contact appropriate spill response agencies in the event of a spill of sediment, debris, concrete fines, wash or contact water of reportable quantities resulting from contract activities in the Project Area and begin clean-up. Appropriate agencies include PEP *Environmental Emergency Management Plan Incident Reporting* Hotline (1-800-663-3456) and Department of Fisheries and Oceans (DFO) *Observe, Record and Report* Hotline 1-800-465-4336. The Contractor is to contact the agencies directly with copies to the DR. The Contractor is also to advise the DR and include provision of notice of the agencies that were contacted.

BMP3.9.3 When grinding, cutting or demolishing cured concrete, dust and fines should be prevented from entering the water using vacuum grinders or other methods, as appropriate.

BMP3.9.4 Monitoring of pH should be measured to an accuracy of +/- 0.2 pH units from the background level to ensure allowable ranges are maintained when performing any concrete works about water (e.g., grinding concrete where dust or fines may enter the water, pouring concrete, washing equipment). In the event that the levels change by more than 1.0 pH units or are outside the acceptable ranges (7.0 to 8.7 [BCMOE, 1991]) The DR must be notified and preventative measures are to be introduced (e.g., catch basins to recover the runoff and neutralizing prior to disposal).

BMP3.9.5 All equipment for concrete work must be properly sealed and have locked connections where present. Crews will ensure that concrete forms are not filled to overflowing. Excess or spilled concrete must be collected immediately and disposed of in an appropriate location.

BMP3.9.6 Barriers will be used as appropriate to prevent splashing of the concrete over the forms and into the water or intertidal area during pouring.

BMP3.9.7 Concrete washout water and solids will be collected and retained in leak proof containers, so that this caustic material does not reach the soil surface then migrate to surface waters, groundwater or adjacent watercourses. Collected water must be monitored for acceptable pH levels. If the pH levels are outside the allowable limits then the runoff water must be contained until the pH is between 7.0 and 8.7 pH units and turbidity is < 25 nephelometric turbidity units (NTU), measured to an accuracy of +/- 2 NTU.

BMP3.9.8 Equipment and tools that have come into contact with concrete will be washed down in a designated area away from the intertidal and drainages (e.g., streams and municipal drains) to prevent concrete products from entering watercourses (tidal waters, streams, drains).

3.10 Finishes

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.10.1 Use containment such as tarps, shrouds or portable structures to prevent airborne particles from entering the atmosphere and depositing on surface waters or surfaces leading to watercourse.

BMP3.10.2 Airborne particle containment should be large enough to adequately enclose or segregate working areas.

BMP3.10.3 Place containment beneath and around structures being painted to ensure overspray or runoff does not reach waters or surfaces leading to watercourse.

BMP3.10.4 Do not paint during conditions that render containment ineffective (e.g., windy).

BMP3.10.5 Ensure paint, solvents and other applicable materials are stored securely when working alongside structure and water edges.

BMP3.10.6 Ensure any floor grates are covered to prevent spills from reaching waters or surfaces leading to watercourses.

BMP3.10.7 Waste generated from grinding and hand tooling must be prevented from entering any watercourse.

BMP3.10.8 Ensure empty paint cans and other associated wastes from painting are stored properly, protected from the weather and removed as soon as possible.

BMP3.10.9 Left over paint and paint derived materials should be disposed of appropriately in accordance with manufactures guidelines and, where appropriate, at a registered facility.

3.11 Material Disposal

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.11.1 Some dredge debris, such as anchors, chains, cables, rebar and wood, may not be accepted with dredged material by Disposal Facilities. Contractor must coordinate with the Disposal Facility to determine if debris needs to be screened and sorted prior to upland transport and disposal.

BMP3.11.2 The location of the Treatment, Hazardous Waste Management or Disposal Facility shall not change without notification, review and acceptance by the DR.

BMP3.11.3 Contractor shall not move waste from one Disposal Facility/Hazardous Waste Management Facility to another once the Certificate of Disposal has been submitted.

BMP3.11.4 Treatment and/or destruction of sediment or other waste materials must be completed in accordance with the EMP and applicable federal, provincial and regional/municipal regulations, guidance, procedures, and protocols.

BMP3.11.5 Disposal and/or treatment of any sediment, debris, water or other waste material will only occur at licensed and approved Disposal, Treatment or Hazardous Waste Management Facilities.

BMP3.11.6 Contractor must provide appropriate information to be able to track all material from the Work Site to the Treatment, Hazardous Waste Management or Disposal Facility.

BMP3.11.7 Sediment or other material sent to a Disposal Facility or Hazardous Waste Management Facility must be permanently stored at that facility.

3.12 Welding

In addition to the General BMPs stated in Section 2.0 the following BMPs may apply:

BMP3.12.1 No welding debris or waste may enter the marine environment.

4.0 REFERENCES

BC Marine and Pile Driving Contractors Association (BC MPDCA). March 2013. Best Management Practices for Pile Driving and Related Operations.

BC Workers Compensation Act Occupational Health and Safety Regulation (2016). Retrieved 7 October 2016.

Canadian Council of Ministers of the Environment (CCME). 2016. Water Quality Guidelines for the Protection of Aquatic Life. Available from: http://st-ts.ccme.ca/en/index.html.

Canadian Council of Ministers of the Environment (CCME). 1999. Water Quality Guidelines for the Protection of Aquatic Life (Turbidity, Marine). Available from: http://st-ts.ccme.ca/en/index.html.

Canadian Council of Ministers of the Environment (CCME). 1996. Water Quality Guidelines for the Protection of Aquatic Life (pH, Marine). Available from: http://st-ts.ccme.ca/en/index.html.

G3 Consulting, Ltd. (G3). 2016a. Bedwell Harbour Float Redevelopment Environmental Monitoring Plan (EMP). Prepared for Public Works and Government Services Canada (PWGSC), October 2016.

G3 Consulting, Ltd. (G3). 2016b. Bedwell Harbour Float Redevelopment Serious Harm Assessment (SHA). Prepared for Public Works and Government Services Canada (PWGSC), October 2016.

Hutton, K.E. and S.C. Samis. 2000. Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments in the Pacific Region. Canadian Technical Report of Fisheries and Aquatic Sciences 2314: vi + 34 p.

Vagle, S. 2003. On the Impact of Underwater Pile-Driving Noise on Marine Life. Ocean Science and Productivity Division, Institution of Ocean Sciences. Department of Fisheries and Oceans Canada (DFO), Pacific and Yukon Region. 44p.

Western Wood Preservers Institute (WWPI). 2011. Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments. 36p.

APPENDICES

Appendix 1: Activity and Industry Best Management Practices (BMPs)

Appendix 1

Activity and Industry Best Management Practices (BMPs)

Best Management Practices for Pile Driving and Related Operations – BC Marine and Pile Driving Contractors Association - March, 2003

The BC Marine and Pile Driving Contractors Association and Fisheries and Oceans Canada (DFO) have developed a Best Management Practices Policy for pile driving operations and related activities when working on the water within the province of British Columbia.

The Pile Driving Industry utilizes many different construction methods, equipment and materials in order to complete the contractual obligations for its client. Hammers; including drop, diesel, air, vibratory and hydraulic, vibroflot, and rotary, air and churn drills are the primary instruments in a pile driving operation. These hammers and drills are supported by a wide variety of heavy equipment, including a range of conventional cranes (truck mounted, crawler and pedestal mounted), spud scows, support barges and other water borne equipment. The piling types include treated timber (primarily creosote), concrete and steel (pipe, h-beam and sheet). Construction projects have the potential to utilize a number of different combinations of equipment and materials. It is the purpose of this document to examine the characteristics of each potential combination and develop a Best Management Practices Policy that will meet the following criteria:

-Maximize environmental protection
-Avoid contravention of the Fisheries Act
-Provide construction services economically

1)- Basic Rules of Operation

When in an aquatic environment, contractors will employ the following BASIC Best Management Practices:

- All equipment will be maintained in good proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products.
- Storage of fuels and petroleum products will comply with safe operating procedures, including containment facilities in case of a spill.
- Pile cut-offs, waste or any miscellaneous unused materials will be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown overboard.
- Contractors will have emergency spill equipment available whenever working near or on the water.
- Contractors, where possible, will position their water borne equipment in a manner that will minimize damage to identified fish habitat (i.e. eelgrass). Where possible, alternative methods will be employed (i.e.: use of anchors instead of spuds). In the event that circumstances will not allow an alternative, contractors will minimize the

damage and where required restore habitat to its original state at the completion of the project.

- Prior to the commencement of any work, the contractor will complete and forward the attached "Notice of Project" to the Department of Fisheries and Oceans. Letters of advice or Habitat Authorizations may be required, depending on the scope of work proposed.
- If contractors are working and a herring (or other fish) spawning occurs, the work will be temporarily suspended and the appropriate DFO contact notified.
- There will be no restriction of work during closure periods (the only exception being when spawning is present), provided the contractors employ an exclusion device (protective netting or geotextile material suspended in the water column around pile driving area) around the work area to prevent fish access or when required, an effective method of mitigating shock waves (bubble curtain).
- Whenever shock wave monitoring (hydrophone) is performed at a marine construction site and the findings are available to the contractor, the data will be forwarded to the BC Marine and Pile Driving Contractors Association and Svein Vagle at the Institute of Ocean Sciences in Sidney, BC. It is hoped that a database can be built that will catalogue work procedures and reflect the safest and most economical approach to protecting the fish and their habitat.

2)-Timber Piling (creosote):

When driving timber piling, the following Best Management Practices will be employed to minimize/prevent impact to marine fish and their habitat:

- Where possible, new timber piles will comply with the best Management Practices for the use of treated wood in aquatic environments as developed by the Canadian Institute of Treated Wood and the Western Wood Preservers Institute and the DFO document "Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments in the Pacific Region".
- Where the above is not possible creosote piling will stand (weather) for a minimum of 45 days prior to installation.
- These requirements are for new piling only. Reused piling will not be subject to any additional treatments, however, pilings with excessive creosote should be avoided.
- Timber piling is normally driven using a drop hammer, a diesel/air impact hammer or a small vibratory hammer. Because of the relative small diameter of the timber pile, and its excellent energy absorbing quality, there is little threat of sound pressure impacts to fish and their habitat when driving timber piles.
- Environmental monitoring of sound pressure impacts is not required.
- When demolition is required on timber pile structures, the contractor will remove the piling by mechanical means and avoid breaking the piling at the mud line or below. All demolition operations should be monitored in order to control and contain the construction debris and to determine whether there are any effects on fish.

3)-Concrete Piles

When driving concrete piles, regardless of which hammer is being used, the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

Less than 24 inch diameter

- The physical design of 24 inch concrete pile dictates that: 1/ the energy required must be controlled in order to prevent the pile from breaking and 2/ the concrete construction of the pile will absorb the energy. These two factors are expected to result in low level shock wave emission (less than 30 kPa.) and minimal or no effects to fish and their habitat should result.
- Environmental monitoring of sound pressure levels is generally not required.

Greater than 24 inch diameter

- When driving concrete piles with a diameter greater than 24 inches using an impact or hydraulic hammer, the following Best Management Practice will be employed to minimize the impact on fish habitat:
- Visual and hydrophone monitoring of the impact on fish by the sound waves emitted will be required. If sound pressures over 30 kPa is measured or a fish kill is evident, the contractor will introduce effective means of reducing the level of the shock waves. Appropriate mitigating measures would be the deployment of a bubble curtain over the full length of the wetted pile. This should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately and the methods will be reviewed and corrected.

4)-Steel Pipe Piles

Less than 18 inch diameter

When driving steel piles 18 inches in diameter and less, regardless of the type of hammer being used, the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

- Because of the small diameter of the pile it is assumed that the energy required to drive the pile to the final point of installation will not result in shock waves in excess of 30 kPa, therefore, protective measures to reduce shock waves are not expected to be required.

- If, however, ground conditions during pile installation cause a fish kill, work will cease and contractors will be responsible for introducing effective means of reducing the level of shock waves or will introduce measures that will prevent fish from entering the potentially harmful shock wave area. Appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile. This technique should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately and the methods will be reviewed and corrected.

Greater than 24 inches in diameter

When driving steel pipe piles with a diameter greater than 24 inches using impact or hydraulic hammers, the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

- Hydrophone and visual monitoring of the effects of the shock waves on fish will be required. If a fish kill occurs, the contractor will introduce effective means of reducing the level of the shockwave. Appropriate mitigating measures would be the deployment of a bubble curtain over the full length of the wetted pile.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately and the methods will be reviewed and corrected.

5)-Steel Sheet Piles and H-piles

When driving steel sheet piles and H-piles with a drop hammer, an impact hammer or a vibratory hammer, the following Best Management Practices will be employed to minimize the impact on fish habitat:

- It is anticipated that the driving of these types of piles will not generate shock waves in excess of 30kPa, therefore, mitigating measures are not expected to be required.
- If, however, ground conditions during pile installation cause a fish kill, work will cease and contractors will be responsible for introducing effective means of reducing the level of shock waves or will introduce measures that will prevent fish from entering the potentially harmful shock wave area. Appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile. This technique should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately and the methods will be reviewed and corrected.

6)-Stone Column Construction

When installing stone column using a vibroflot, the following Best Management practices will be employed to minimize/prevent impacts to fish habitat:

- The vibrating action and air flush associated with the operation of the probe results in a high degree of turbidity. When this level exceeds the criteria as outlined in the British Columbia Approved Water Quality Guidelines, the contractor will introduce containment methods that are designed to isolate the contaminated area and to prevent fish from entering the contaminated area. Silt curtains and netting are two methods that can provide the necessary protection.
- When supplying the aggregate to the probe, the contractor will ensure that spillage is prevented, thereby providing additional protection to fish habitat.
- An independent environmental consultant will be used to monitor turbidity levels.

7)-Underwater Drilling and Blasting

When performing underwater drilling and blasting the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

<u>Underwater Drilling</u>

- Generally, drilling underwater is a process that has very little impact on fish or fish habitat. The procedure does not generate shock waves.
- Contractors will ensure that all attachments (hydraulic connections and couplings) are in good operating order and inspected prior to the start of every day. Spill kits and containment booms must be maintained on-site in case of spills.
- Depending on soil conditions and the potential for turbidity, drill cuttings will be deposited adjacent to the operation, contained on the sea bed or pumped to the surface for deposit into containment skiffs or scows for land disposal when it is determined that the drill cuttings are unsuitable for return to the environment.

<u>Underwater Blasting</u>

Contractors required to perform blasting underwater will provide the following protection to minimize/prevent impacts to fish habitat:

- Because of the potential for harmful shock waves resulting from a blast, a protection shield will surround the immediate blast area. This would be in the form of an air-induced bubble curtain, which has the primary purpose of absorbing the shock wave and a secondary purpose of preventing fish from entering the blast area.
- In order to protect against flying rock, mats (rubber) will be placed over the blasting area. The placement of the mats may also provide protection for any fish swimming in the immediate area.

- Monitoring of fish movement and concentrations will be conducted using a sounder to determine if fish herding or scaring techniques (seal bombs) can be utilized to reduce the presence of fish in the blast area.

8)-Cleaning out Pipe Piles:

When cleaning out pipe piles (i.e.: air lifting) the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

- Generally, sediment contained in the pipe is will be pumped to the surface and processed through an approved containment system and disposed of at an approved landfill site.
- In exceptional circumstances, if the sediment is non-toxic, fish are not present in the area, and adjacent fish habitats are not a concern (contact DFO) it may be acceptable to:

1. Pump the sediment through a discharge tube and allowed it to settle in the immediate area with or without a silt curtain to contain the sediment.
2. Pump the sediment through a discharge tube and additional flex hosing and redirect it back to the base of the pile.

9) Containment of Concrete Residue and Water Run Off

When placing concrete in form work over or in water, the following Best Management Practices will be employed to minimize/prevent the impacts to fish habitat:

<u>Pouring concrete</u>

- Spills: When pouring concrete all spills of fresh concrete must be prevented. Concrete is toxic to fish due its high pH. If concrete is discharged from the transit mixer directly to the formwork or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews will ensure that concrete forms are not filled to overflowing.
- Sealing forms: All concrete forms will be constructed in a manner which will prevent fresh concrete or cement-laden water from leaking into the surrounding water.

<u>Curing concrete</u>

- When fresh water is used to cure concrete, the run off must be monitored for acceptable pH levels. If the pH levels are outside the allowable limits then the run off water must be contained and neutralized.

<u>Grinding concrete</u>

- When grinding cured concrete, the dust and fines entering the water must not exceed the allowable limits for suspended solids. When grinding green or incompletely cured concrete and the dust or fines are entering the water, pH

monitoring will be conducted to ensure allowable ranges are maintained. In the event that the levels are outside the acceptable ranges, preventative measures will be introduced. This may include introducing silt curtains to contain the solids and prevent fish from entering a contaminated area or constructing catch basins to recover the run off and neutralizing it prior to disposal.

Patching concrete

- Spills: When patching concrete, all spills must be contained and prevented from entering the water.

Washing hand tools, pumps and transit mixer

- All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash water and excess concrete from entering the marine environment. The wash water will be contained and disposed of upland in an environmentally acceptable manner.

Whenever there is the possibility of contaminants entering water, the contractor will monitor pH levels to ensure acceptable levels.

APPENDIX

Fisheries and Oceans Canada

Contact List

Name	Telephone No.	Fax. No.

NOTICE OF PROJECT

To: Fisheries and Oceans Canada

Attention:

Fax. No.:

From: “Contractor”

Telephone No.:

Fax. No.:

Representative:

Please be advised of the following marine/pile driving project:

Project Name:

Project Location:

Project Manager/Superintendent:

Project Telephone No.:

Project Fax. No.:

Project commencement date:

CAPITAL REGIONAL DISTRICT

BYLAW NO. 3378

****

A BYLAW FOR THE ABATEMENT AND CONTROL OF DISTURBING NOISE IN THE ELECTORAL AREA OF THE SOUTHERN GULF ISLANDS IN THE CAPITAL REGIONAL DISTRICT

****

WHEREAS: the Capital Regional District, pursuant to Section 724 of the *Local Government Act* is empowered to regulate or prohibit the making of noise or sounds;

NOW THEREFORE, the Regional Board of the Capital Regional District, in open meeting assembled, enacts as follows:

SECTION 1 DEFINITIONS AND INTERPRETATIONS

In this Bylaw:

"Board" means the Board of the Capital Regional District;

"Enforcement Officer" means a person appointed by the Capital Regional District as a Bylaw Enforcement Officer, or any member of the Royal Canadian Mounted Police;

"Electoral Area" means the Electoral Area of the Southern Gulf Islands;

"Ticket" means municipal ticket information in the form described in the *Community Charter* Bylaw Enforcement Ticket Regulation, B.C. REG. 425/2003.

"Public Facility" means any facility that is permitted to hold public assemblies in accordance with local government land use and building bylaws and includes facilities that are licensed pursuant to the *Liquor Control and Licensing Act*.

SECTION 2 GENERAL PROHIBITION

No person shall make, cause to be made, or continue to make any noise or sound in the Electoral Area which creates a noise that disturbs or tends to disturb the quiet, peace, rest, enjoyment, comfort or convenience of the neighbourhood or of persons at or near the source of such noise or sound.

SECTION 3 SPECIFIC PROHIBITIONS

Without limiting the generality of the prohibition contained in Section 2:

1. No person shall load or unload any truck, motor vehicle, or trailer in or upon any public or private place or premises before the hours of 7:00 am (8 am on Saturdays, Sundays or Holidays) or after 7:00 pm.

2. No person shall construct or use construction equipment before the hours of 7:00 am (8 am on Saturdays, Sundays or Holidays) or after 7:00 pm.

3. No person or business shall play amplified music outdoors between the hours of 11:00 pm and 7:00 am (8 am on Saturdays, Sundays or Holidays), that disturbs or tends to disturb other people as described in Section 2 of this Bylaw.

4. No person or business shall play amplified music indoors between the hours of 11:00 pm and 7:00 am (8 am on Saturdays, Sundays or Holidays), unless all reasonable measures have been taken to abate the noise that disturbs other people as described in Section 2 of this Bylaw.

5. No person shall operate on a property any automobile, truck, motorcycle, trail bike, bus, motorized hang glider, or other vehicle which by reason of disrepair, lack of a sufficient muffler, or any other cause, creates noise or sound that disturbs the quiet, peace, rest, enjoyment or comfort of individuals or the public.

6. No person shall discharge a firearm before the hours of 9 am or after 7 pm that disturbs or tends to disturb other people as described in Section 2 of this Bylaw.

SECTION 4 EXEMPTIONS

The provisions of this Bylaw shall not apply to:

1. Any vehicle of the police, fire department, or other public body, or any ambulance or any other public services or emergency vehicle, while engaged in service of public convenience or necessity.

2. The sounding of a horn or other signalling device where such sounding is properly and necessarily used as a danger or a warning signal.

3. The use of bells or chimes by churches, schools or any public body.

4. Forestry, farming, construction or industrial activities where hours of operation are determined by factors such as tides, ferry schedules, weather conditions or fire hazards in forests, providing all reasonable measures have been taken to abate noise as described in Section 2.

5. The operation of farm equipment and the noise associated with normal farm operations, providing all reasonable measures have been taken to abate noise as described in Section 2.

6. A public assembly use or activity in a public park or public facility in connection with a public meeting, public celebration or other public gathering.

SECTION 5 OFFENCE

1. No person, owner, tenant, or occupier of private premises, shall do any act or permit any act or thing to be done which contravenes this Bylaw.

2. Any person who contravenes any provision of this Bylaw is guilty of an offence and is liable upon conviction to the penalties prescribed by the *Offence Act* provided that the minimum penalty is not less than ONE HUNDRED ($100.00) DOLLARS.

3. A separate offence shall be deemed to be committed if a contravention of this Bylaw occurs or continues to occur upon receipt of a subsequent complaint.

4. The penalties imposed under Subsection (2) hereof, shall be in addition to and not a substitution for any other penalty or remedy imposed by this Bylaw or any other statute, law, or regulation.

SECTION 6 INSPECTIONS

An Enforcement Officer is hereby authorized to enter, at all reasonable times, on any property subject to this Bylaw, to ascertain whether this Bylaw is being observed.

SECTION 7 SEVERABILITY

If any section or lesser portion of this Bylaw is held to be invalid by a Court, such invalidity shall not affect the remaining portions of the Bylaw.

SECTION 8 REPEAL

Capital Regional District Bylaw No. 1552 “Noise Suppression Bylaw (North and South Pender Island) No.1, 1987” and Capital Regional District Bylaw No. 1217 “Noise Suppression Bylaw No. 2, 1984” are repealed and replaced by this Bylaw.

SECTION 9 CITATION

This Bylaw may be cited as Bylaw No. 3378 “Noise Suppression Bylaw (Southern Gulf Islands) No.1, 2006”.

READ A FIRST TIME THIS	13th	day of	September	2006
READ A SECOND TIME THIS	13th	day of	September	2006
READ A THIRD TIME THIS	8th	day of	November	2006
ADOPTED THIS	8th	day of	November	2006

_____ _____

Chair Corporate Secretary

Best Management Practices

For the use of treated wood in aquatic and wetland environments

Wood Preservation Canada
Préservation du bois Canada

SOUTHERN FOREST PRODUCTS ASSOCIATION

DISCLAIMER: *While the Western Wood Preservers Institute, Wood Preservation Canada, the Southern Pressure Treaters' Association and the Southern Forest Products Association believe the information contained in this document is accurate and current as of the date of publication, this document is intended for general information purposes only. The four organizations make no warranty or representation, either expressed or implied, as to the reliability or accuracy of the information presented herein. The organizations do not assume any liability resulting from use of or reliance upon such information by any party. This document should not be construed as an endorsement or warranty, direct or implied, of any specific treated wood product or preservative, in terms of performance, environmental impact or safety. Nothing in this document should be construed as a recommendation to violate any federal, provincial, state or municipal law, rule or regulation, and any party using or producing pressure treated wood products should review all such laws, rules or regulations prior to using or producing treated wood products. This document does not represent an agreement by members of the organizations to act or refuse to act in any prescribed manner. Any decision to buy or sell a treated wood product or preservative, or the terms thereof, is in the sole discretion of the buyer and seller.*

REVISED November 1, 2011
Developed for the United States and Canada by:
Western Wood Preservers Institute • Wood Preservation Canada • Southern Pressure Treaters' Association • Southern Forest Products Association

TABLE OF CONTENTS

Mussels (Mytilus trossulus) and bryozoans (Phylum bryozoa)

PLEASE NOTE:
The marine organisms shown in this document represent a small subset of the 67 different invertebrate species that were identified in six inch square samples collected from treated wood piling.

Chapter One: The Importance of BMPs

Introduction

Protection of the quality of water and the diversity of life forms found in lakes, streams, estuaries, bays and wetlands environments of North America is a goal and responsibility shared by everyone. An endless list of activities can impact these environments: storm waters that run off streets, exhaust from boats and cars, municipal and industry discharges, and construction of homes, docks and piers. It is everyone's responsibility to maintain the quality of our treasured resources.

Pressure treated wood is a building material widely used to construct piers, docks, buildings, walks and decks used in or over aquatic and wetland environments. The pressure treated wood products industry is committed to assuring its products are manufactured and installed in a responsible manner that minimizes any potential for adverse impacts to these important environments. To achieve this objective the Western Wood Preservers Institute (WWPI), Wood Preservation Canada (WPC), the Southern Pressure Treaters' Association (SPTA) and the Southern Forest Products Association (SFPA) hereafter referred to as the "Supporting Organizations", have developed and encourage the use of these BEST MANAGEMENT PRACTICES (BMPs).

What are the Best Management Practices?

The BMPs are recommended guidelines for the production and installation of treated wood products destined for use in aquatic and wetland environments. The guidelines were developed by the Supporting Organizations through a consensus process, based on the core philosophy of chemical minimization. Both environmental and economic concerns support the goal of placing enough preservative into a product to provide the needed level of protection while also minimizing use of the preservative above the required standard minimum in order to reduce the amount potentially available for movement into the environment.

Specification Considerations

There are a variety of preservative systems and treated wood products approved for use in or above aquatic and wetland environments. The first step in specifying a particular treatment is to assure the preservative is approved for the intended application through the U.S. Environmental Protection Agency (U.S. EPA) and Canadian Pest Management Regulatory Agency (Canada PMRA) registration and/or review process. These government agencies establish the legal parameters for use of wood preservatives. To meet any BMP guideline a treatment must comply with these restrictions. The common goal of using the BMPs is to produce products having effective levels of protection with minimum environmental impact by minimizing the potential for migration or leaching of the preservative chemicals from the treated wood products.

The second step in specifying involves the application of the appropriate product standard from the Use Category System developed and maintained by the American Wood Protection Association [AWPA] (U.S.) or Canadian Standards Association [CSA] (Canada). These product specifications establish the minimum amount of chemical (retention) and depth of injec-

tion (penetration) that is needed to assure effective performance against decay or other wood destroying organisms. The BMPs along with the additional processing requirements are separate from and in addition to the product standards. There is a shared responsibility between the specifier and treater to assure the level of chemical application selected will meet the goal of minimizing the migration or leaching of the treating chemicals into the environment.

BMP Product Production Systems

The material preparation, treatment and post treatment procedures and technologies for achieving the BMP objectives vary among preservatives and individual treating plants. A treating plant may choose to produce some or all products in compliance with production BMPs or a purchaser may specify compliance with BMPs in a particular purchase agreement. In either case compliance with production BMPs for products leaving the plant that are designated for use in aquatic or wetland environments is the responsibility of the treating firm.

It is not recommended for a specifier or regulator to designate a specific BMP treatment process for a product where more than one method of meeting a performance goal is available. It is the quality of the final product that matters, not how that end result is achieved.

BMPs are in a state of evolution. While this document incorporates the best available production technologies and knowledge, efforts are continuing to better understand the environmental performance of wood preservatives. In addition, periodic reviews of the treatment procedures and BMP quality assurance processes are ongoing goals to help improve the overall effectiveness of the BMPs. As knowledge and technology advance, the BMPs will be updated through amendment or at the time of the regular five-year scheduled reviews. Amendments will be posted at WWPInstitute.org.

BMP Applicability

The BMPs have been developed by the "Supporting Organizations" and are applicable to product processes and species produced in the United States and Canada.

Added time, additional cost and sourcing constraints may result from meeting the production and quality assurance BMP guidelines; and a user or permit regulator should specifically require compliance with BMPs where it is determined there is a sufficient need or justification. The focus of these BMPs is on uses in aquatic and wetland environments; their use is not germane for any treated wood application in a non-aquatic or wetland area.

NOTE: *This document is designed to serve market needs in both the U.S. and Canada even though there are some slight differences in product standards established by the American Wood Protection Association for the U.S. market and the Canadian Standards Association for Canada.*

BMPs Quality Assurance

Quality oversight and inspection to assure compliance with production standards is important in any manufacturing process. For BMPs this is accomplished at two levels: Internal Quality Control at the production level; and inspection with certification by an independent third party agency. Inspection standard and protocols have been established in **Quality Assurance Inspection Procedures for Best Management Practices (BMPs) for the Use of Treated Wood in Aquatic and Wetland Environments**, included in Appendix A.

A specification for BMPs is not complete or accurate unless it includes a requirement for independent third party inspection by an accredited agency, and certification documented by either the BMPs Mark or a letter issued by the agency certifying inspection and compliance.

Virtually all treated wood is inspected by agencies accredited by the American Lumber Standard Committee, Inc. (ALSC). While ALSC does not accredit BMP inspection since the requirements are outside AWPA and CSA standards, those agencies accredited to inspect treated wood are most qualified to apply the BMP inspection guidelines and determine compliance. ALSC accredited agencies are the only firms accepted for the BMP Mark Program. A list of ALSC accredited treated wood agencies may be found at www.alsc.org/contacts_treatedlist_mod.htm.

BMP User Responsibilities

Achieving the shared goal of the BMPs cannot be accomplished unless the user of the product follows the appropriate guidelines regarding transportation, handling, inspection, storage, installation, demolition, maintenance and disposal of the product. These recommended guidelines are contained in **Chapter 4** of this document.

Chapter Two: Guide to Selection, Specification and Quality Assurance

Preservative Selection

A key step in designing a project in an aquatic or wetland environment is the specification of the treated wood to be used. There are a variety of available treated wood products approved for use in and/or above such environments depending upon the intended use, species, required performance and environmental conditions. The specifier should carefully consider the options in terms of required retention levels (AWPA or CSA Standard) as well as potential environmental impacts. The industry treats only with preservative chemicals registered for the specific uses by the federal, provincial or state agencies. The most common products, addressed by this document, are those treated with ACQ (Alkaline Copper Quaternary), ACZA (Ammoniacal Copper Zinc Arsenate), CA-B & CA-C (Copper Azole), CCA (Chromated Copper Arsenate), EL2 (DCOI/Imidacloprid/Stabilizer), PTI (Propiconazole Tebuconazole Imidacloprid), Creosote, Copper Naphthenate, and Penta (Pentachlorophenol).

Performance

The purpose of treating wood products is to provide protection from wood destroying organisms or decay, thus extending the useful life and structural performance of the material. The appropriate applications of each product, the minimum penetration, and the minimum retention (amount of preservative in the **assay zone** – the zone in which wood is subject to testing) are established by the AWPA in its Use Category System and by the CSA 080 Standards, which delineate the various limitations and results of product treatment.

Environmental and Aesthetic Considerations

In designing a project, one needs to consider the characteristics of various treated wood products in relation to the purpose of the project and the environmental characteristics of the site. Products used in a heavy industrial application will likely be different from those used in a public structure, such as a boardwalk. Similarly, the use of a moderate amount of treated wood in a fast flowing river or stream is likely to pose a minimal risk; whereas, the use of large amounts of treated wood in somewhat stagnant water may pose greater risks.

The best available science shows that pressure treated wood poses minimal risk to aquatic environments when: used in accordance with the AWPA and CSA specifications; used following the guidance provided by the appropriate required documents, such as the Consumer and Safety Information Sheets or the treated wood Material Safety Data Sheets (MSDS); the project risks are evaluated; and material produced using the BMPs.

Help is Available

Risk assessment documents and models have been developed for the use of most preservative systems used in aquatic applications. Projects that are designed to use small volumes of treated wood immersed in and/or above water can be evaluated utilizing minimal site specific information as where projects with large volumes may require more detailed site specific information. A complete set of guide materials and peer approved risk assessment tools are available to help evaluate environmental risks, select preservatives systems and specify products are available on line at www.WWPInstitute.org.

Specifying the Best Management Practices

There are three steps to assuring that products to be used in aquatic and wetland environments are produced in compliance with the BMPs.

1. **Specify the appropriate material in terms of preservative and performance as defined in the American Wood Protection Association (U.S.) or Canadian Standards Association (Canada).**

   Information on properly selecting and specifying treated wood may be obtained from AWPA, WWPI, WPC, SPTA or SFPA. See the end of this chapter for website links.

2. **Specify that the material must be produced and utilized in compliance with the BMPs.**

   Suggested language for inclusion in project specifications: Following the product and treatment specifications per #1 above insert:

   All treated wood products in this project shall be produced in compliance with the "Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments" (BMPs) published by the "Supporting Organizations, November 1, 2011 or the most current version including published amendments.

3. **Require third party independent inspection agency assurance that the products are produced in conformance with the BMPs.**

   Language suggested for inclusion to project specifications. Following the specification in #2 above, insert:

   All treated wood in this project shall be certified by an independent third party inspection agency to have been produced in compliance with the BMPs.

   Compliance will be documented by either Item A or B below:

   A. Producers Participating in BMP Mark Program
   The presence of the BMP Mark legibly stamped, branded, marked, end tagged or an equivalent designation on each piece of material or lot arriving on site.

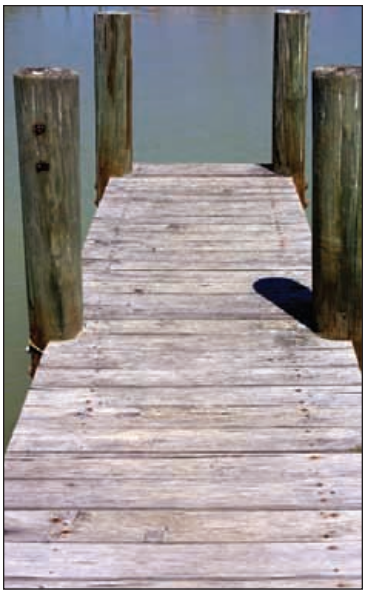
   Or

   In lieu of placing the BMP Mark on each piece of material or lot, a certificate of compliance issued and signed by a WWPI qualified inspection agency (see discussion of BMP Mark Program below) certifying that the material and/or its production was inspected in compliance with the "Quality Assurance Inspection Procedures for Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments" published by the "Supporting Organizations", November 1, 2011 or the most current version including published amendments. The BMP Mark shall be shown on the certificate of compliance.

   B. Producers Not Participating in BMP Mark Program

   A certificate of compliance issued and signed by an inspection agency certifying that the material and/or its production was inspected in compliance with the "Quality Assurance Inspection Procedures for Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments" published by the "Supporting Organizations", November 1, 2011 or the most current version including published amendments. An independent wood inspection agency of the producers choice and acceptable to the purchaser can be used to provide the inspection service.

What is the BMP Mark Program?



WWPI owns and has sole rights to authorizing the use of the BMP logo. The application or display of the logo on material is authorized to producers with which WWPI has a current contract allowing its use. As a condition of the agreement, treating companies must demonstrate in writing that they have a contractual relationship with an American Lumber Standards Committee (ALSC) accredited treated wood inspection agency with which WWPI has a contractual agreement authorizing their oversight services of the use of the BMP mark under the BMP Quality Assurance Inspection program. The presence of the logo is thus a tool to show the user that the materials were produced in compliance with the BMPs; however WWPI is not an inspection agency and conducts no oversight of the treating or inspection processes per se. Any unauthorized use of the mark is subject to civil and criminal actions. A list of producers currently authorized to use the BMP Mark and the approved agencies can be found on WWPI's website at WWPInstitute.org. WWPI should be notified immediately if the BMP logo is used by any organization not on the list.

A producer wanting to treat to the BMPs, but choosing not to participate in the BMP Mark Program, is not permitted to use the 'Mark' but is required to provide a certificate of compliance issued and signed by an independent treated wood inspection agency of its choice and acceptable to the purchaser.

In addition to production guidelines, these BMPs also include guidelines that purchasers should use for installation of treated wood products. To specify full compliance with the BMPs, the specifier should provide for on-site inspection prior to installation and conformance with applicable Installation and Maintenance Guidelines found in Chapter 4.

Suggested language for inclusion in project specifications:

Project managers, contractors and sub-contractors on this project shall be familiar with and apply as appropriate the Installation and Maintenance Guidelines of treated wood as outlined in the "Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments" published by the "Supporting Organizations", November 1, 2011 or the most current version including published amendments.

Further information on uses and specifications for each preservative treatment system can be found at the following web links.

Western Wood Preservers Institutes website:
www.wwpinstitute.org

Wood Preservation Canada website:
www.woodpreservation.ca

Southern Pressure Treaters' Association website:
www.spta.org

Southern Forest Products Association website:
http://sfpa.org

American Wood Protection Association website:
www.awpa.com

[1] *The American Lumber Standard Committee (ALSC) which oversees the inspection of treated lumber and plywood products does not endorse, oversee or provide any quality control services in regard to BMPs and has no responsibilities regarding the program. In the BMP quality assurance procedures ALSC accreditation is used only as a tool to identify agencies which would most likely be qualified and able to perform the BMP inspection and certification services.*

Chapter Three: BMPs for the Production of Treated Wood

PART A: General BMPs for the Production of Treated Wood

General

The following BMP procedures are applicable to the production of treated wood using all preservative systems. Additional preservative-specific BMPs are listed in Part B of this chapter. Treaters may obtain additional information in AWPA standard M20-01 *(Guidelines for Minimizing Oil-Type Wood Preservative Migration)* or may develop specific technologies based upon their unique plant facilities that meet or exceed the BMP criteria.

Preservatives

The preservative chemicals used to treat wood in accordance with these BMPs shall be those listed in AWPA Use Category System (UCS) Standard U1 Section 4: Standardized Preservatives and shall comply with the requirements referenced therein or as appropriately specified by the Canadian Standards Association (CSA 080).

Preservative Treating Solution

Specific solution requirements for each preservative listed in Standard U1 Section 4 can be found in the specific 'P' Standard referenced. Compliance with the AWPA treating solution requirements is a BMP treating criteria.

Plant and Product Cleaning Standards

- Follow good housekeeping practices in the plant to minimize sawdust, wood shavings, dirt and debris or residue collecting on the wood surface prior to treatment.
- The treatment cylinder (retort) should be kept clean and free of debris.
- Clean treating solutions are necessary and shall be used to produce clean products. Several process techniques have been utilized to maintain treating solutions in an acceptable condition (see individual BMPs in Chapter 3, Part B). These include, but are not limited to: filtering, turnover of tank inventory, controlling tank temperatures, using cone or dome shaped tank bottoms, minimizing storage and treating tank levels, using high quality solvents and preservatives, and periodic draining and cleaning of work tanks when residues are present.

Anemones (Metridium senile) and a featherduster annelid (Schizobranchia insignis)

Processing

- Wood products should be sorted and treated by charges containing wood of similar sizes, classes, species, species groupings, moisture content, conditioning methods, and treating characteristics and retention levels.
- Use appropriate seasoning and conditioning methods for the specified preservative treatment (i.e. air seasoning, kiln drying, steam conditioning, heating in oil, Boultonizing).
- Follow AWPA Standard T1 procedures and process limitations as appropriate for preservative and materials being treated.
- Treating should be conducted in such a manner as to seek to minimize the amount of chemical placed into the wood while assuring conformance with the AWPA retention and penetration requirements.

- Treat using a standard pressure process such as Bethel full cell, modified full cell, Lowry (modified empty cell) or Rueping empty cell as appropriate for preservative type and final application of treated product.
- Final vacuum time is recorded only after attaining a minimum 22 inches Hg (75 KPa) sea level equivalent and maintaining that minimum for the duration of the vacuum cycle.
- Apply appropriate post treatment conditioning techniques to minimize preservative loss after treatment. These processes are generally preservative specific with specific systems based upon plant equipment characteristics and capabilities at the treating facility. The following techniques or methods are shown as examples and are usually more applicable when treating with oil-type preservatives:
    - Transition between various phases of the treating process (e.g. pressure to final vacuum or final vacuum to atmospheric pressure) should be at a rate which allows the wood and preservative to reasonably adjust to such changes. Slow transitions generally result in a product with less surface exudations. The rate of transition varies with the size of the material being treated.
    - At the conclusion of the pressure period, and prior to removing preservative from the cylinder, the sealed cylinder should be allowed to remain sealed while the pressure in the cylinder equalizes with the treated wood. When the pressure has stabilized, a very slow release of pressure should be facilitated.
- Document the BMP treating techniques used with a permanent treating record document and maintain all records and procedures in accordance with the Quality Assurance Inspection Procedures for BMPs.

Inspection

The following inspection guidelines are key factors in producing and providing a quality treatment and a clean BMP product.

- **Inspection** – To the degree practical material should be inspected to assure it is reasonably clean and free of dirt and sawdust prior to treatment.

- **Monitoring of Treating Solutions** – The plant operator shall inspect treating solutions and plant process filters to assure the treating solution is free of debris and meets the requirement for the specific preservative.

- **Post Treatment Visual Inspection** – A visual inspection shall be performed to verify the treated product meets the criteria specified for BMP processed material and that no excessive residues or surface deposits are present. If the criteria are not met, the product shall be rejected or reprocessed using appropriate post treatment conditioning techniques to meet the BMP surface appearance criteria.

- **Re-inspection Option** – Since the occurrence of natural variability of wood sampled in a charge or production lot is recognized, re-inspection is permitted when there is a dispute over BMP treatment conformance. This should be conducted prior to a decision for re-treatment.

- **Pre-shipment Inspection and BMP Certification** – A final visual inspection shall be conducted prior to the material leaving the treating facility to ensure the surface and treated product have no excessive residue or preservative deposits present, have not developed any excessive bleeding and to verify the presence of the BMP trademark on the material or treating certification. Any problems detected shall be corrected prior to shipment.

Chapter Three: BMPs for the Production of Treated Wood

PART B: 1
BMPs for Specific Preservatives Used in the Production of Treated Wood

ACQ – Alkaline Copper Quaternary
CA-B & CA-C - Copper Azole
EL2 – DCOI / Imidacloprid / Stabilizer
PTI – Propiconazole Tebuconazole Imidacloprid

Best Management Practices

The BMPs are intended to minimize preservative migration from treated wood. In order to achieve this, the following BMP procedures, as well as the general guidelines referenced in Chapter 3, Part A, shall be followed.

Post-Treating Procedures

Select and apply appropriate post-treatment procedures to minimize preservative loss by using one of the following technologies, which may be chosen as a function of time, temperature and humidity, and must be adjusted based on the characteristics of the material and the process.

- Air Seasoning
- Kiln Drying
- Steam Conditioning
- Other Artificial Heating

ACQ
CA-B & CA-C
EL2 – DCOI
PTI

Technical Notes

Specifiers and installers should follow the guidance in the Material Safety Data Sheets (MSDS) and hazard labels as required by OSHA. MSDS are available from the lumber supplier.

ACQ, CA-B and C, PTI and EL2 are approved to treat Douglas-fir, Hem-fir, and Southern Yellow Pine.

None of the listed preservatives using this BMP are recommended for salt and brackish water immersion applications. ACQ and CA-B and C are approved for Above Ground, Ground Contact and Fresh Water applications. EL2 and PTI preservatives are approved for Above Ground Use only.

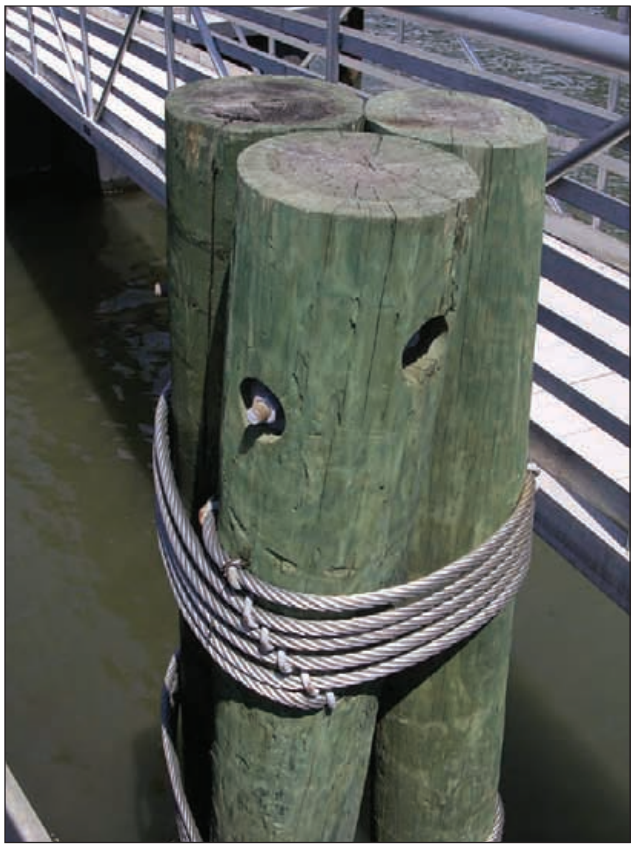
ACZA – Ammoniacal Copper Zinc Arsenate

1.0 Ammoniacal Copper Zinc Arsenate (ACZA)

ACZA is an inorganic arsenical waterborne preservative employed for industrial, commercial, agricultural and marine applications.

ACZA is used for treatment of a wide variety of species. Preservative stabilization occurs through the evolution of the ammonia, which leads to reactions between the copper, zinc, arsenic and wood.

2.0 Best Management Practices



ACZA

BMP's are generally used for wood treated to ACZA retentions greater than 0.40 pounds per cubic foot of wood (oxide basis). They are designed to produce an acceptable level of chemical stabilization before the wood leaves the treatment facility. They, in no way mean that all metals are fixed or immobilized in the wood, but are designed to reduce the initial release of metals that can occur when treated wood is immersed in water, and also minimize surface deposits.

Following the BMP procedures referenced in Chapter 3, Part A will enhance the stabilization process and help produce wood that is free of visible surface deposits.

3.0 Treatment Techniques

The treatment process used to deliver the required retention to the specified depth shall be at the discretion of the treater; however, a Lowry (modified empty cell) Process is preferred because it will result in lower overall solution loadings.

Following the pressure treatment, a final vacuum of 22 inches Hg (75 KPa) shall be drawn over the wood for a minimum of time indicated below. If possible, the temperature in the retort shall be maintained at 180 to 210 F (82-99 C) during this process.

	Vacuum	Minimum Time
Doug fir and other difficult-to-treat species	22 inches	2 hours
Hardwoods	22	1 hour
Pine	22	1 hour

4.0 Post Treatment Procedures

All ACZA BMP materials shall be processed using any one of the following procedures or a combination of the procedures. Selection shall be at the discretion of the treater.

4.1 Minimum Plant Holding Time – Products (with treating stickers in place for sawn and plywood products) shall be held in a storage area with free air circulation for a minimum of three weeks when average ambient temperatures equal or exceed 65°F (18°C). If the ambient temperature is less than 65°F (18°C), kiln drying or another source of artificial heat may be used to achieve the minimum temperature requirement. This requirement can also be achieved by using the multiplier of degree-days (for this purpose- the sums of the mean high and low daily temperature for the days of exposure). For example; 65°F times 21 days is equal to 1365 degree-days. The corresponding time at 75°F would be 18.2 days.

4.2 Post Treatment Kiln Drying – Products shall be kiln dried to a maximum moisture content of 30%.in the AWPA assay zone of outer ½ inch by employing a kiln cycle of 120°F - 160°F (50°C - 70°C) dry bulb temperature. The cycle should not exceed 160°F dry bulb anytime during the cycle.

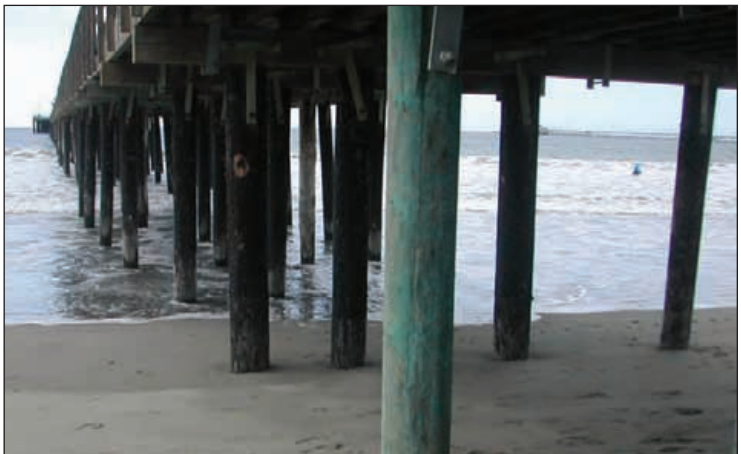
4.3 In-Retort Ammonia Removal Plus Plant Holding Time - After the final vacuum period with heat, the retort door shall be opened and ambient air drawn through the treated wood charge from the door to the rear of the retort, vented to a scrubber at a minimum rate of 250 cfm (7.08 m3/minute) for a period of three hours. The material is then handled in the same manner as under "minimum plant holding time" in Section 4.1 except the minimum holding time is one week at the specified average temperatures.

NOTE: As an option to the one week holding time, the material may also be placed into a separate closed conditioning vessel in order to draw the ambient air with appropriate vacuum and time to remove the ammonia vapors.

4.4 Aqua-Ammonia Steaming Cycle – Following the normal post-pressure period vacuum to draw excess preservative solution from the wood, the material is subjected to a post treatment steam-conditioning process. The heating coils are covered with a minimum 2% solution of ammonia in water, which is heated for about 3 hours. A minimum temperature of 190°F - 200°F (88°C - 93°C) shall be maintained for at least 1.5 hours. The heating process is followed by a final vacuum of 2 hours, then an hour of drawing fresh ambient air through the retort to remove excess ammonia vapors and to cool the surface of the material. Material will then be processed with a minimum one-week plant holding time at the average temperature requirements as stated in Section 4.1.

5.0 Plant Records

Section 5 of Appendix A states, "Product compliance with the requirements of the applicable BMP's is the responsibility of the Treater until the BMP process is validated as complete and material is shipped from the plant to Customer. The plant shall maintain records to validate that the times, temperatures and other factors were appropriate for the method selected to meet the BMP. The treater assumes this responsibility by placing the BMP mark or stamp on the material or with a certification of the BMP when it is shipped from the plant.



Technical Notes

Specifiers and installers should follow the guidance in the ACZA treated wood Material Safety Data Sheets (MSDS) as required by OSHA.

Because of its ability to treat the refractory Douglas fir heartwood to meet the AWPA penetration and retention standards, ACZA is most prevalent on the West coast for use in industrial product treatment of timbers, commercial decking for walkways and bridges or piling used in all aquatic environment applications.

Chemical stabilization is the term applied to the chemical reaction in which the active ingredients of a waterborne treating solution undergo a series of reactions with themselves and the wood that make them resistant to migration. This process also increases the durability of the product. A key to the treating process for ACZA is the presence of ammonia, which facilitates carrying the active ingredients into the cell structure of the wood during treatment. Evaporation and removal of the ammonia following treatment is critical for the remaining ingredients to become stabilized, thereby minimizing the opportunity for leaching from the product in its end use. The BMP procedures are designed to accelerate the removal of ammonia and aid in the completion of the stabilization of the chemicals in the wood where it provides lasting protection from the wood destroying organisms in service.

At the time of the revisions to this document there were no approved test methods or standards developed to accurately define the level of chemical stabilization in ACZA. This is being studied and when an acceptable test is established it will be incorporated into the ACZA BMP.

Plant records shall have the data and information used to validate the selected process meeting the particular BMP method being used be it times, temperatures or other factors used to meet the requirements for BMP. The treater assumes this responsibility by placing the BMP mark or stamp on the material or with a certification of the BMP so when it is shipped from the plant it is certified by the shipment that it meets the BMP requirements.

CCA

CCA – Chromated Copper Arsenate

Best Management Practices

The BMPs for CCA are designed to minimize preservative migration from CCA treated wood. The following BMP, as well as the general guidelines referenced in Chapter 3, Part A, shall be utilized.

Treating Procedures

Full Cell (Bethel) Pressure Treatment is recommended for most western species. Modified Full Cell procedures should be limited to sapwood species, e.g., southern yellow pine. Preservative solution quality should be closely monitored.

Post Treating Procedures

Apply appropriate post treatment procedures to maximize preservative fixation by using one of the following technologies, which may be chosen as a function of time, temperature and humidity, and must be adjusted based on the characteristics of the material and the process.

- Air Seasoning
- Kiln Drying
- Steam Conditioning
- Hot Water Bath

The best available technology for confirming fixation in CCA treated material is the Chromotropic Acid Test (AWPA Standard A3-11, Method for Determination of the Presence of Hexavalent Chromium in Treated Wood, [1995]). If testing shows that fixation has not been achieved according to the Chromotropic Acid Test, the material should not be shipped until fixation according to the Chromotropic Acid Test is confirmed.

Technical Notes

Specifiers and installers should follow the guidance in the CCA treated wood Material Safety Data Sheets (MSDS) and hazard labels as required by OSHA and use the product in conformance with the Consumer Safety Information Sheet for Inorganic Arsenical Pressure Treated Wood and product labeling.

CCA is considered an excellent treatment for most softwood species. Achieving the required penetrations in Douglas-fir may be extremely difficult. CCA is not recommended for Douglas-fir marine piling (except as the first treatment in "dual treatment") or for treatment of interior Douglas-fir.

FIXATION — In the CCA treating process, water is the carrier to move the metals or active ingredients into the wood where they become fixed to the wood. Once the chemical reaction called "fixation" occurs, the potential for migration of active ingredients is minimized.

While a complex reaction, fixation which is a function of temperature and time essentially involves the reduction of the hexavalent chromium to trivalent chromium with the formation of a complex mixture of insoluble chromates. In the process, insoluble arsenates of copper and chromium are also precipitated in the treated wood.

Chromic acid or Chromium VI is the component in the CCA process which is the basis for the Chromotropic Acid test The procedure can detect Chromium VI at concentrations as low as 15 parts per million. Material passing the test (i.e., no detection of Chromium VI) for use in aquatic environments will be 99.5 to 99.95% fixed. The Chromotropic Acid test is a rigid qualitative procedure specifically for CCA treated wood.

FIXATION PERIOD – The following post-treatment processing limits have been found to significantly enhance preservative fixation while also avoiding conditions which would cause losses in mechanical properties.

The time-temperature limitations specified below are appropriate for all species and can be found in the appropriate AWPA Specification.

a. Hot Water Bath (Liquid Fixation Processes), Maximum Temperature: 220°F (105°C) Duration: Until the outer 0-0.5 inches (0-12mm) portion in 4 out of 5 borings per charge pass the Chromotropic acid test (AWPA Standard A3, Method 11). In using this post-treatment procedure do not exceed the maximum time-temperature combination listed below.

Temperature/Time:
- *220°F (105°C) 6 hr.*
- *203°F (95°C) 9 hr.*
- *185°F (85°C) 12 hr.*
- *167°F (75°C) 18 hr.*
- *149°F (65°C) 24 hr.*

b. Air and or Kiln Drying Processes, Maximum Dry-bulb Temperature: 160°F (70°C), Maximum wet-bulb Depression Temperature: 20°F (10°C) until the outer 0-0.5 inches (0-12mm) portion in 4 out of 5 borings per charge pass the Chromotropic acid test (AWPA Standard A3, Method 11).

c. Steaming Processes, Maximum Temperature: 220°F (105°C) Duration: Until the outer 0-0.5 inches (0-12mm) portion in 4 out of 5 borings per charge pass the Chromotropic acid test (AWPA Standard A3, Method 11). Do not to exceed the maximum time-temperature combination listed below.

Temperature/Time:
- *220°F (105°C) 6 hr.*
- *203°F (95°C) 9 hr.*
- *185°F (85°C) 12 hr.*
- *167°F (75°C) 18 hr.*
- *149°F (65°C) 24 hr.*

Copper Naphthenate

Copper Naphthenate

Best Management Practices

The BMPs for Copper Naphthenate are designed to assure a clean product and minimize the potential for chemicals to enter the environment. In order to minimize the amount of Copper Naphthenate material available to migrate into the environment, the following guidelines, as well as the general guidelines referenced in **Chapter 3, Part A**, shall be used when treating material for use in aquatic, above water, or other wetland applications:

Treating Techniques

- Air drying or kiln drying wood prior to treatment may improve the surface appearance (dryness) of the wood after treatment. Accumulated moisture is also more easily removed from preservative solutions when treating kiln-dried or air-seasoned wood.
- The empty-cell process should always be used for full-length pressure treatment with oil-borne preservatives if it will provide the desired retention. Either the Rueping process (empty-cell with initial air) or the Lowry process (empty-cell without initial air) can be used.
- Full length and butt thermal treatment of naturally durable species such as Western Red Cedar for poles can also be used to minimize the potential for chemicals to enter the environment.
- Following treatment using an empty-cell process a minimum final vacuum of 22 inches Hg (-75 KPa) sea level equivalent shall be applied for a minimum of two hours. If possible, the retort should be heated between 180°F and 210°F (82°C – 99°C) during the vacuum process.

Treating Procedures

- Solution Filtration The Copper Naphthenate solution in use shall be filtered regularly or otherwise kept clean to remove solids, which may otherwise be deposited on the wood during treating.
- Any accumulation of moisture in the preservative work tank should be drained off prior to treatment.

Post Treating Procedures – Oil Carrier

For Copper Naphthenate treated products with an oil carrier to be used in aquatic or wetland environments or where bleeding of preservative is objectionable, use one of the following BMPs:

• **Expansion Bath** This process increases the temperature of the preservative solution surrounding the wood for the purpose of recovering excess preservative and improves surface cleanliness of the product. Follow the general procedures described in AWPA UCS Standard T1-10, section 2.7. Use a minimum expansion bath of one hour. The maximum temperature of the expansion bath shall be 220°F or 230°F (104°C to 110°C) depending on the specific commodity standard limitations. The expansion bath shall be followed by a vacuum period using a minimum of 22″ of Hg (-75 kPa) for a minimum of two hours.

• **Final Steaming** Following the pressure period and once the Copper Naphthenate has been pumped back to the storage tank, a vacuum shall be applied for a one-hour minimum at not less than 22″ of Hg (-75 kPa) of vacuum to recover excess preservative. Following the vacuum period, the wood shall be subjected to steaming for a two-hour time period for lumber and timbers and three hours for piling per the limitations of the AWPA Commodity Standards. The minimum temperature during steaming shall be 200°F (93°C) and the maximum shall be 240°F to 245°F (116°C to 118°C) depending on the species being treated. After steaming, apply a final vacuum for a minimum of four hours at 22″ of Hg (-75 kPa) of vacuum.

• **Extended vacuum cycle** This technique involves the use of extended vacuum cycle time or double vacuum cycles where a second vacuum is pulled after allowing the retort to equalize to atmospheric pressure following the “break” from the first vacuum cycle. Preservative collected in the cylinder during the first vacuum cycle should be pumped to the work tank before initiating the second vacuum cycle.

Additional treating information to minimize environmental exposure of oil-type wood preservatives in pressure treated wood can be found in AWPA Standard M20-01, or latest revision.

Post Treating Procedures – “Light” Solvent Carrier

For Copper Naphthenate treated products with a light solvent carrier, such as AWPA Standard P9, Type “C” solvent for aquatic or wetland applications, use the following BMP:

• A final vacuum shall be used for a minimum of 1 hour at a minimum of 22″ of Hg (-75 kPa) of vacuum.

Additional treating information to minimize environmental exposure of oil-type wood preservatives in pressure treated wood can be found in AWPA Standard M20-01, or latest revision.

Creosote

Best Management Practices

The BMPs for Creosote are intended to minimize the amount of preservative material available for migration into the environment. The following guidelines, as well as the general guidelines referenced in Chapter 3, Part A, shall be used when treating material for use in aquatic, wetland or marine applications:

Treating Procedures

- Follow recommendations in AWPA M20-01 (or most recent publication) Standard providing Guidelines for Minimizing Oil-Type Wood Preservation Migration as appropriate for Creosote P1/P13 and product treated for aquatic or wetland exposure.

- Treat using preservative specified in AWPA Standard P1/P13, "Standard for Coal Tar Creosote for Land and Fresh Water and Marine (Coastal Water) Use."

- The "in use" Creosote inventory maintained by the treating firm at the plant for BMP - treated applications shall be purchased, managed and/or processed such as to maintain a xylene insoluble (XI) of 0.5% maximum and to maintain moisture content within specifications. (Exception -- A xylene insoluble (XI) level of 1.5% will be allowed for facilities treating Ponderosa or Southern Pine due to the higher level of extractable sap and resins associated with these species).

- Techniques shall be incorporated into the treating process to minimize the amount of residual Creosote, which may occur on the surface of the treated product. (Techniques may vary depending upon the product type and wood species).

- On Southern Pine, if plant equipment allows, steam conditioning is an alternative to conditioning by kiln drying. Steam conditioning may result in energy savings by shortening post treatment cycles while producing desired cleanliness and dryness.

Post Treating Procedures

Prior to shipment, material for aquatic applications shall be processed under one of the following procedures as determined by the producer:

• **Expansion Bath** -- Following the pressure period the Creosote should be heated 10°F to 20°F (6°C to 11°C) above press temperatures (following the preservative and species temperature limitations set by AWPA) for a minimum of one hour. Pump Creosote back to storage and apply a minimum vacuum of 24 inches of Hg (610 KPa) for a minimum of 2 hours.

• **Steaming** — Following the pressure period and once the Creosote has been pumped back to the storage tank, a vacuum shall be applied for a minimum of two hours at not less than 22 inches of Hg (560 KPa) of vacuum to recover excess preservative. Release vacuum back to atmospheric pressure and steam for a two-hour time period for lumber and timbers and three hours for piling. Maximum temperature during this process shall not exceed 240°F (115.5°C). Apply a second vacuum for a minimum of four hours at 22 inches of Hg (560 KPa) of vacuum.

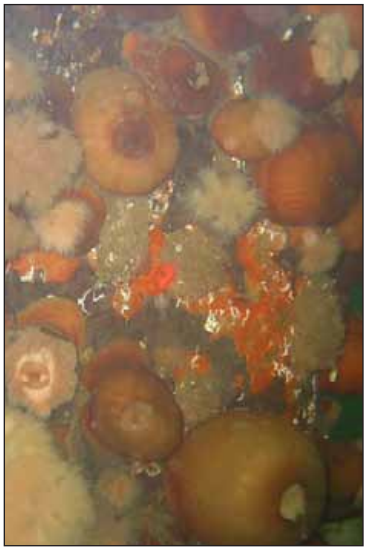
Mussels (Mytilus trossulus)

• **Vacuuming** --- Following the pressure period and once the Creosote has been pumped back to the work tank, a vacuum shall be applied for a minimum of one and half hours at not less than 22 inches of Hg (560 KPa) of vacuum to recover excess preservative. Then, depending on plant equipment: 1.) vacuum for a minimum of one and half hours at not less than 22 inches of Hg (560 KPa) or 2.) steam material for one-hour minimum and then pull not less than 22 inches of Hg (560 KPa) vacuum for a minimum of one and half hours. Maximum temperature during steaming shall not exceed 240°F (115.5°C).

Technical Notes

The purpose of the BMP for Creosote is to minimize the amount of surface residues which are available to migrate to the environment. The purchase of low xylene new Creosote and management processes to maintain low XI levels will assure that there are a minimum of contaminants on the surface of the finished product. The post conditioning requirements (e.g. steaming or expansion bath and vacuuming) help to assure that excess Creosote is removed from the product while maintaining the required amount in the assay zone to meet the product specification after treatment. Surface Sheen — when driving Creosote piling, visible oil sheen will often develop on the water surface. This sheen represents only a trace quantity of Creosote preservative and in most all instances it will dissipate within 24-48 hours through biodegradation, evaporation or oxidation of the Creosote. Available data indicates this sheen, which decreases rapidly following installation, will not harm aquatic life nor will it enter the food chain.

Specifiers and installers should follow the guidance in the Creosote treated wood Material Safety Data Sheets (MSDS) and hazard labels as required by OSHA and use the material in conformance with the Consumer Information Sheet for Creosote pressure treated wood. Creosote should not be used in those portions of projects subject to frequent public contact, i.e., handrails, sunbathing decks, etc.



Colonies of plumose anemones (Metridium senile), tubeworms (Spirobids) and coralline algae (Lithothamnium)

Dual Treated Marine Piling

Best Management Practices

The BMPs for Dual Treating requires that individual BMPs for each preservative be specified for the treatment unless the same objectives can be obtained through a combined practice. In addition to the individual BMPs for each preservative specified, the general guidelines referenced in Chapter 3, Part A shall also be utilized.

Dual treatment is generally only specified on the Pacific coast in coastal areas south of San Francisco, California, the Atlantic coast between New Jersey and Florida, and along the Gulf Coast.

Treating Procedures

- Refer to the BMP for the waterborne preservative being specified and for Creosote.
- Techniques shall be incorporated into the Creosote treating process to minimize the amount of residual Creosote, which may occur on the surface of the dual treated product. Techniques will vary depending on experience, equipment, product type and wood species.

Post-Treating Procedures

After initial treatment but prior to the second treatment, follow the post treating procedures for the waterborne preservative specified.

Prior to shipment but after the second treatment with Creosote, the material shall be processed under the following procedure by the producer:

- Vacuuming – Following the pressure period and once the Creosote has been pumped back to the work tank, a vacuum shall be applied for a minimum of three hours at not less than 22 inches of Hg (560 KPa)* of vacuum to recover excess preservative and dry the material surface.

* Adjusted for geographic elevation location.

Pentachlorophenol (Penta)

Best Management Practices

The BMPs for Penta are to ensure responsible treatment and product use. Its use in marine projects should be limited to above the splash zone because Penta does not protect against marine organisms. In order to minimize the amount of Penta material available to migrate into any environment during its use, the following guidelines, as well as the general guidelines referenced in **Chapter 3 Part A**, are recommended when treating material for these applications. Following these procedures should result in a clean and dry treated wood product:

Treating Procedures

Manage the treating plant's "in-use" Penta by continuous filtration or other available methods to maintain the solution with minimum particulate matter. Such processes will result in less surface deposits, minimizing the amount of material which may be released from in-service wood.

Post Treating Procedures

- **Surface treatment** – Following the pressure period, incorporate one of the following procedures into the treating process to minimize the amount of residual treating solution which may occur on the treated product surface. Techniques may vary depending upon the product type and wood species.

- **Steaming** – Material may be cleaned by final steaming within the limits specified for that commodity in AWPA, T-1 - Section 8.

- **Expansion Bath** –When final steaming is not utilized the treater may use an expansion bath. Perform this expansion bath in accordance with AWPA T1, Section 2. This generally involves heating the preservative 10°F to 20°F (-12.22°C to -6.67°C) above pressure temperatures for a minimum of one hour, followed by pumping the preservative back to storage and applying a minimum vacuum of 22 inches (55.88 centimeters) for a minimum of two hours.

- **Extended vacuum cycle time** – This technique involves the use of extended vacuum cycle time or double vacuum cycles where a second vacuum is pulled after allowing the retort to equalize to atmospheric pressure following the "break" from the first vacuum cycle.

- Preservative collected in the cylinder during the first vacuum should be pumped to the work tank before initiating the second vacuum.

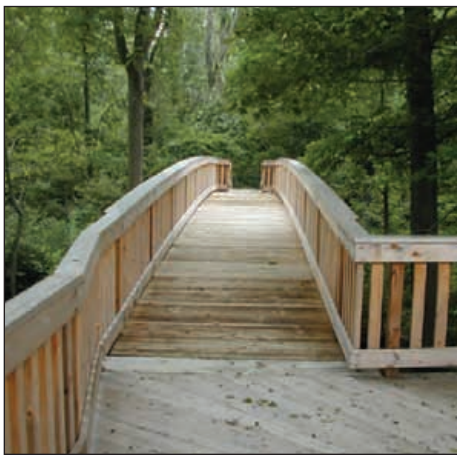
Before removal of material from the treating area, the treater should verify the material is free of surface deposits and/or drippage of excess preservative. Drippage is generally the result of product continuing to adjust to ambient conditions of temperature and pressure.

Technical Notes

Surface Sheen – Occasionally when installing Penta treated wood in or over water, a visible oil carrier sheen may develop on the water surface. This sheen contains a negligible quantity of Penta as there is generally less than 1% Penta in Penta treated wood. In nearly all instances this sheen will cease in less than 24 hours through bio and photodegradation. Available data indicates that this sheen does not represent any harm to aquatic life nor will it enter the food chain. It is basically an aesthetic concern which decreases rapidly following installation

Steaming -- Steaming may produce contaminated process water requiring waste water treatment before discharge to meet local, state or federal regulations. Consult AWPA Treatment Standards to determine if this procedure is allowable, and for the duration and temperature limitations.

Pentachlorophenol treated wood is not recommended for salt and brackish water immersion applications.



Chapter Four: Installation and Maintenance Guidelines

Achieving the goals of the Best Management Practices can only be fully achieved if the users of the products are also engaged. The following guidelines are suggested practices, but other applicable practices may be determined by the specifier or project managers.

Design and Purchasing

It is recommended that any order for the purchase of treated wood materials should involve communication between the purchaser/specifier and the seller or treating company whichever is most practicable or customary, and that the order, including the environmental concerns with the project, should be reviewed in detail with the producer.

- Projects should be designed and specified to provide for the maximum amount of cutting, prefabrication and framing prior to treatment. This allows for better treatment of product and minimizes the need for field cutting and treatment.

- Where treated wood may be subject to continual abrasion, such as floating docks against piling, the project should incorporate design features to prevent the ongoing contact. This will increase the life of the project and minimize treated material entering the environment.

Transportation

- When additional protection from precipitation is desired or warranted it is recommended preservative-treated sawn wood material be top wrapped or covered while being transported to its designated location.

- Care should be taken during the loading and unloading of the preservative-treated wood to prevent or minimize damage to the product that causes untreated areas to be exposed. If untreated areas become exposed by damage they should be field treated with an approved preservative (copper naphthenate) as per AWPA Standard M4.

Inspection, Acceptance, Rejection

- As soon as practical after receipt, the material and the accompanying paper work, should be inspected to assure it has been treated to specified AWPA standards and certified to have been treated under the BMP program by either the presence of a BMP mark with a legible stamp, brand, mark, end tag or equivalent designation on the material or by a letter of certification from an independent third party inspection agency. If any problems exist, the supplier should be contacted immediately.

- BMP materials should be inspected to assure they are reasonably free of surface debris and excess surface chemical. Material treated with oil type preservatives should be examined for signs of preservative migration, and excessive residues or bleeding.

- Where the products are of concern they should be rejected from installation and the treating company should be contacted immediately for corrective action.

Storage

• **Onsite** – The material should be stored away from the water until it is needed for installation. When preservative-treated wood is stored on the jobsite for an extended period and/or there is a threat of the material being exposed to precipitation, it is recommended the material be stacked above the ground. The area where the material is to be stacked should be free of debris, weeds and dry vegetation and should have adequate drainage to prevent the material from being subjected to standing water. Also, if warranted, all stacked material designated to be removed from service should be covered for disposal and material designated for use should remain covered until used.

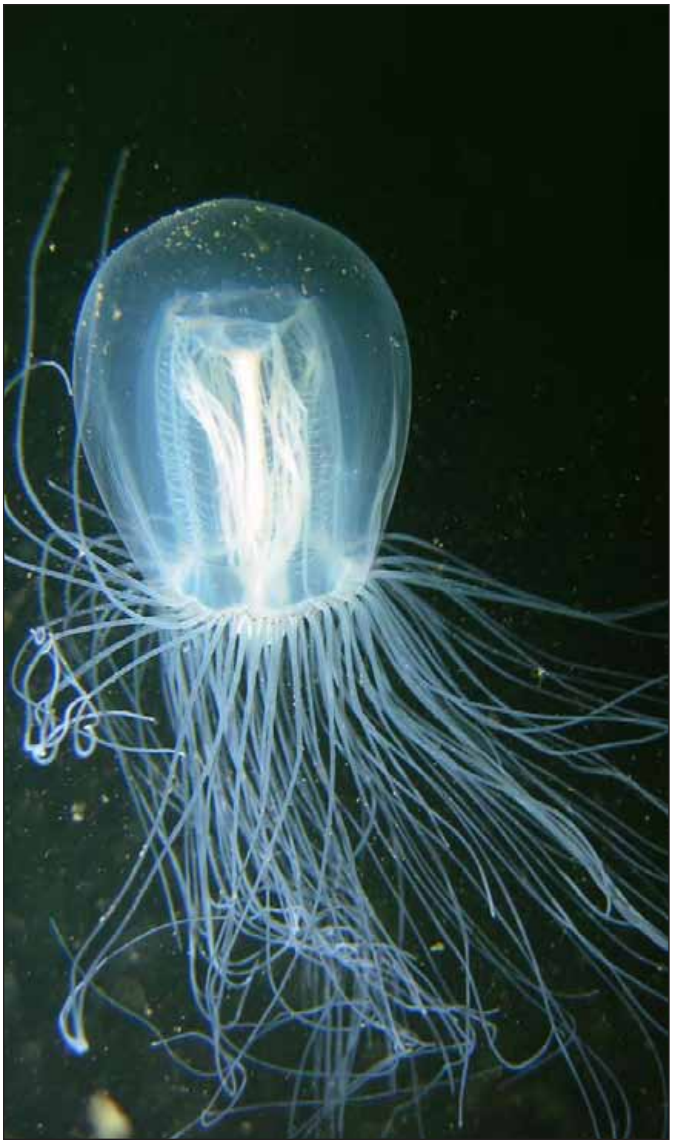
• **Offsite** - In situations where preservative-treated wood material is being inventoried prior to distribution to the jobsite or when material removed from service is taken to a storage site prior to its disposal or reuse, it should be stacked in a well-drained area free from debris, weeds and dry vegetation above the ground on bunks or pallets. The stacked material may be stored under a covered area or top wrapped with a tarp to minimize exposure to precipitation.

Field Treating Guidelines

Copper Naphthenate based solutions are commonly used in field treating of holes, cuts or injuries, which occur to the treated product. The objective of field treatment is to assure complete product treatment.

The following guidelines should be followed in field treating projects in aquatic or wetland environments:

- Follow the procedures outlined in AWPA Standard M4, Standard for the Care of Preservative-Treated Wood Products.
- When field treating by brushing, spraying, dipping or soaking do so in such a manner that the preservative does not drip or spill into the environment.
- Whenever possible, apply field treatments prior to assembling the structure over the body of water or wetland environment.
- Conduct the application of the preservative so that any overspray or drippage of preservative can be recovered or retained.
- Specifiers and installers should follow the directions for use on the Copper Naphthenate based end cut solution label and Material Safety Data Sheets (MSDS) for the product.



Jellyfish (Aglantha digitale)

Installation

• When field cutting, drilling or fabrication is necessary, it should be done away from the water or wetland area to the degree practical and all waste, including sawdust, should be collected and disposed of appropriately. (See Disposal below). There are many approaches to ensuring that the debris from field fabrication and maintenance activity is properly collected and removed, but the choice will depend on the situation and the construction or maintenance crew. It is recommended in most cases that fabrication be done at specific cutting stations in order to consolidate the collection of debris. The use of a tarp is suggested for collecting sawdust from circular saws and chainsaws, and plastic tubs or similar containers are suggested for collecting debris created from drilling holes on-site. The importance of collecting debris from construction and maintenance activities should be stressed in planning and budgeting for projects so that the crews clearly understand that debris collection is an integral part of the construction and maintenance process in order to minimize the release of preservative into the environment.

• Installation of oil borne type preserved products may initially result briefly in a thin oily sheen on the water surface. Such sheens are generally of an aesthetic rather than biological concern and will dissipate in a relatively short period of time. Absorbent booms or barriers can be used to control and collect the sheens.

Demolition

The removal of existing treated wood structures from aquatic and wetland environments should be done with care to minimize the potential for treated debris to enter the environment. The guidelines used in construction of new projects should be applied to demolition wherever applicable and the added effort should be considered in costing the project.

• Wherever practical the treated wood structure or as large a portion as practical should be removed well away from the area for final demolition.

• All scraps and sawdust from the demolition should be collected and removed for appropriate disposal. In aquatic applications absorbent booms should be considered if needed to control drift of scrap materials from the work area or to control sheens which may develop with the disturbance.

• Piling - If not otherwise specified by the regulatory permit or project plan, treated wood piling may be: 1) left in place; 2) pulled and moved off site; 3) cut off at the mud line; 4) cut off below the mud line and capped with clean material.

• Salvage and Reuse - Depending upon the condition of the treated wood materials removed, the product may retain enough of the structural and preservative characteristics to make it suitable for reuse in a manner compatible with its original purpose. Common secondary applications include use as posts, landscape timbers and retaining walls. Distribution of such materials to the market, through sale or donation, should be done with great care to assure the structural and treatment integrity of the product and to assure that the new user is provided information on the use of the material including applicable EPA-approved Consumer Information or Safety Information Sheets. Note: It is extremely difficult to detect internal degradation in any materials intended for reuse and it may be prudent to avoid the use of salvaged marine piling in foundation piling or structural applications.

Disposal

Treated wood scraps and sawdust as well as material for disposal that is not reused must be disposed of appropriately in a timely manner. The disposer should check with local authorities that have jurisdiction over this process to assure disposal is accomplished in compliance with all applicable requirements, which may supersede the following guidelines.

For a detailed discussion of Federal and State requirements see “Disposal of Treated Wood” at WWPInstitute.org.

- NEVER BURN TREATED WOOD IN OPEN FIRES OR FIREPLACES!
- Do not use treated wood as mulch.
- Do not leave the waste material on site or in stockpiles for extended time periods.
- Under federal regulations treated wood waste is classed or managed as a non-hazardous material and may be disposed of at municipal landfills approved to receive such material by state, provincial and local authorities.
- A few state or provincial governments have more stringent requirements for classification of wastes. However, in such cases the issue of treated wood has been addressed in law and/or regulations allowing for disposal in approved municipal landfills. For specifics, local state and provincial authorities should be contacted.
- There are various incinerators, waste-to-energy burners and industrial furnaces across the country, which are approved and permitted for utilization of creosote and pentachlorophenol treated wood waste.

Graceful crabs (Cancer gracilis) in a mating grasp

Appendix A: Quality Assurance Inspection Procedures for Best Management Practices (BMPs) for the Use of Treated Wood in Aquatic and Wetland Environments

Unless otherwise defined, all terms and definitions in these procedures shall be as found in the American Wood Preserver's Association (AWPA) Book of Standards.

1. SCOPE

These Quality Control and Inspection Procedures are applicable to all pressure treated wood products produced under the BMPs for use in, above or in the vicinity of aquatic and wetland environments and are supplemental to the requirements of AWPA and/or other product specifications. Inspection in regard to product specification or treating standards is separate and in addition to the BMP inspection requirements.

Producers that choose to treat to the BMPs, **but choose not to participate** in the WWPI BMP Mark Program are not permitted to use the 'Mark", as described in Paragraph 2.2 of this document, but will be required to provide a ***certificate of compliance*** issued and signed by an independent treated wood inspection agency of its choice and acceptable to the purchaser for each lot.

2. DEFINITIONS

2.1 BMPs
Best Management Practices, published parameters developed for use in specifying and producing material for use in aquatic and wetland projects in the United States and Canada. The BMPs were developed and published by the Western Wood Preservers Institute (WWPI), Wood Preservation Canada (WPC), Southern Pressure Treaters' Association (SPTA) and the Southern Forest Products Association (SFPA).

2.2 BMP Quality Mark

2.2.1 A mark registered under the Federal Trade Marks Act, as indicating certification of conformance to pressure treated processing and pressure treated product rules. A mark which when stamped or affixed to wood products, certifies that all the actions and quality certification requirements under these Quality Assurance Inspection Procedures have been met by both the treater and the Quality Control Agency which licenses the use of the mark by pressure treating plants.

2.2.2 A register protected logo which, when included with the "MARK", denotes compliance to the BMPs:

This mark remains the property of WWPI and shall only be used by authorized agencies and producers.

2.3 Quality Control Agency
An organization that either (1) is acknowledged by WWPI as authorized under the BMP Mark Program; or (2) designated acceptable by agreement between the purchaser and producer to issue a certificate of compliance for lots, to audit, by testing and sampling, the quality marked or certified BMP products treated in accordance with these Quality Assurance Inspection Procedures to assure conformance.

The Quality Control Agency shall have no financial interest in any company producing any portion of the products inspected and tested. The Quality Control Agency shall not be owned, operated or controlled by any such company.

2.4 Residence Quality Supervisor (RQS)
An individual designated by the treater and approved by the Quality Control Agency who performs the functions and meets the requirements of Paragraph 3.1.2. The Quality Control Agency shall initially and continuously thereafter determine that the Resident Quality Supervisor can demonstrate satisfactory knowledge of all manufacturing, sampling and testing requirements.

2.5 Seller
As used in these Quality Assurance Inspection Procedures, a seller is each owner of the products described by the Quality Assurance Inspection Procedures beginning with the treater and including intermediate sellers between manufacture and use.

2.6 Purchaser/User
Entities, individuals or representatives who are responsible for the acquisition and installation of BMP treated wood products.

2.7 Treater
A company or firm engaged in the treatment of the products covered by these Quality Assurance Inspection Procedures.

2.8 Lot and Lot Inspection
A lot for inspection at plants will be a single charge or a shipment, whichever is less. A lot for inspection at plant storage yards, at sales yards, in transit, or at jobsites will be that material available at the time and place of inspection which contains products from only one treating plant and will contain only one species or species group and one preservative treatment.

2.9 Suspended for Cause
Suspension of production is required by an agency when it determines that a continuous non-conformance in treating to BMPs has been identified.

3 REQUIREMENTS

3.1 Quality Control
Products conforming to this procedure shall be produced under a system of quality control with the following requirements:

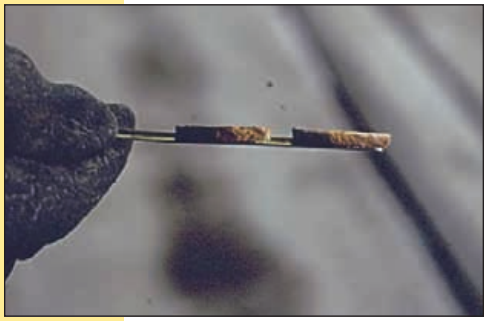
3.1.1 Treating Equipment and Records
The following are both initial and continuing minimum treating plant equipment and record requirements. The Quality Control Agency shall initially and continuously thereafter determine that the manufacturing equipment meets the minimum requirements described in these Quality Assurance Inspection Procedures. Procedures:

(a) An effective operating system or procedure to remove residuals and debris from preservative solutions.

(b) Facilities at either the plant or at a central laboratory for making all BMP test requirements.

(c) 1. An operating system of BMP record keeping which shall include records of consecutively numbered treating charges showing the basic data required in AWPA Standards M2, including the volume of wood, solution concentration, gallons absorbed, and the results of the inspection of each completed charge. Records shall be retained for one year after shipment.

Core samples are removed by a hollow drill bit called an increment borer.



Lumber under five inches thick requires a minimum of 0.40 inch penetration; lumber over five inches thick requires a minimum of 0.50 inch penetration.

2. Track and code all post treatment processes and testing to assure compliance with BMPs.
3. A statement of compliance will be attached to each program treating charge report stating conformance to BMPs.
4. A copy of the treating record and RQS report shall also be kept in a separate file and available to the quality control agency during normal working hours.

(d) An internal quality control program maintained by systematically checking treated wood for conformance to these Quality Assurance Inspection Procedures, and applicable AWPA Commodity Standards.

3.1.2 Resident Quality Supervisor (RQS)

An individual shall be appointed by the treater and approved by the Quality Control Agency to oversee and/or perform plant quality control and:

(a) Shall be responsible for conformance of all quality marked or certified products to the requirements of these Quality Assurance Inspection Procedures.

(b) Must understand all requirements of these Quality Assurance Inspection Procedures and be able to recognize these requirements in each class of material produced.

(c) Must understand the capabilities of the treating equipment and procedures in use and be able to judge its proper function in achieving the BMPs.

(d) Shall have authority to stop any operation found to be causing non-conformance attributes.

(e) Shall have authority to correct any operation found to be causing non-conforming attributes.

(f) Must determine that all requirements contained in these Quality Assurance Inspection Procedures are continuously met by reviewing treatment records and performing any and all necessary tests prescribed.

(g) Record findings certifying compliance and attach a copy to the treating records.

(h) Notify the Quality Control Agency of the availability of BMP material for review.

3.1.3 Quality Control Agency Duties

Quality Control Agency described in Paragraph 2.3 shall check and approve the plant equipment, Resident Quality Supervisor and the first five charges and shall thereafter perform continued checking and testing as specified by these quality Assurance Inspection Procedures:

(a) Initially and continually thereafter, determine that procedures and requirements of these Quality Assurance Inspection Procedures are being adhered to by the Treater.

(b) Review plant quality control records noting any deficiencies.

(c) Check plant equipment for compliance with Paragraph 3.1.1 at least once each six months.

(d) Perform the sampling and testing required by WWPI's BMPs at a ratio of 1:10 BMP charges produced or portion thereof.

(e) Generate a report of findings to be reviewed with RQS.

3.1.4 Compliance Documentation for Producers Participating in BMP Mark Program

(a) The presence of the BMP Mark legibly stamped, branded, marked, end tagged or otherwise on each piece of material or lot or;

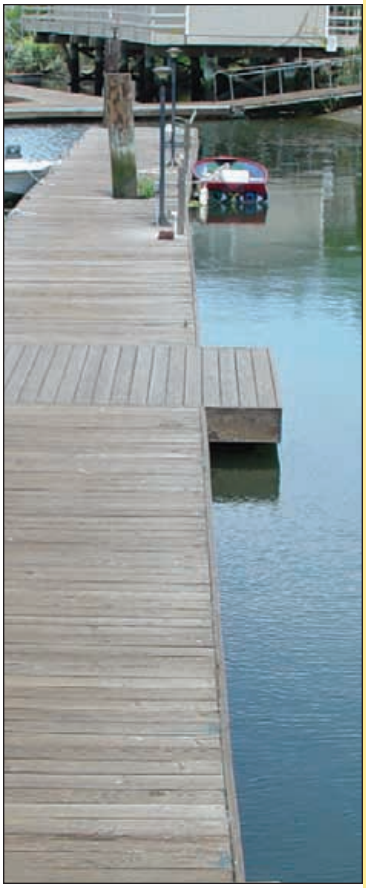
(b) A certificate of compliance for each lot as defined in Paragraph 2.8.

3.1.5 Compliance Documentation for Producers Not Participating in BMP Mark Program

(a) A certificate of compliance for each lot as defined in Paragraph 2.8.

3.1.6 Non-conformance

If a product non-conformance is found by the Quality Control Agency or the Treater, at either a point under the Treater's jurisdiction or at a location not under his jurisdiction, the Treater will correct the non-conformance or remove the Quality Mark under the supervision of the Quality Control Agency. The Treater should be afforded every opportunity to correct non-conformance. Where applicable, material may be re-treated, and all re-treatment shall be in accordance with the appropriate AWPA Standards and these Procedures. If the lot fails to conform after re-treatment, the Quality Mark shall be removed from all pieces in the non-conforming lot and any certificate of compliance shall be withdrawn for the materials.



3.1.7 Suspension and Warning
A treating plant participating in the WWPI Mark Program suspended for cause from applying the Quality Mark to its products while under license of one Quality Control Agency shall not apply the Quality Mark under license of another Quality Control Agency until it has successfully re-qualified with the original Quality Control Agency. A treating plant placed on warning for cause by its licensing Quality Control Agency shall not apply the Quality Mark under the license of another Quality Control Agency. Upon suspension and warning WWPI will be notified.

4 MARKING

4.1 Proper Identification
To insure that treated material produced by producers participating in the WWPI Mark Program is properly identified as being produced in compliance with these Quality Assurance Inspection Procedures, it shall be legibly stamped, branded, marked, end tagged, or otherwise have permanently affixed a quality mark containing the following information:

4.1.1 Identity
Identification of the treating plant.

4.1.2 Preservative
Preservative code and retention as specified.

4.1.3 Mark
BMP registered logo where authorized, i.e.:

4.1.4 Arrangement
The information required by this procedure shall be arranged in the Quality Mark format in compliance with the AWPA Standard M-6 and generally accepted industry formats. The BMP Mark may be included with other quality information or placed separately.

4.1.5 Material Packaging
A Treater may not mix in one package material which bears the quality Mark with material that does not bear the Quality Mark.

4.1.6 Location
The location of the quality marks shall be according to industry standards and/or user requirements.

5. REINSPECTION

5.1 Reinspection in General

5.1.1 The settlement of a dispute between the producer and the customer or user of the product, as to any BMP attribute, shall be made by the Quality Control Agency.

5.1.2 Reinspection privileges shall be available to both buyer and seller upon request for the purpose of determining compliance with purchaser BMP specifications and effecting the settlement of compliance and invoices.

5.1.3 Product compliance with the requirements of the applicable BMPs is the responsibility of the Treater for 10 calendar days after receipt of the shipment provided the shipment is not in use. Partial use of the shipment shall not prejudice the right to re-inspection of the remaining portion as long as the unused portion is in the form in which it was shipped.

5.2 Procedure

5.2.1 In performing Reinspection for treatment attributes, the Agency shall employ those tests approved in the applicable AWPA M or A standards (latest edition).

5.2.2 All attributes of treatment appearing on the Quality Mark or certificate shall be checked.

5.2.3 Complaints may be filed for illegible marks, incorrect marks and no marks where the Quality Mark has been specified. The Agency Quality Marks may be applied by qualified personnel of the Agency after compliance to applicable BMPs has been confirmed. Where material has been marked incorrectly, the mark shall be removed by any suitable means and any certificate of compliance shall be amended.

5.2.4 Lots failing to conform to BMP requirements shall be clearly marked as non-conforming and when possible separated from conforming material.

A minimum of twenty core samples are randomly taken from each charge of treated wood to measure depth of penetration.

Plumose anemones (Metridium senile) and compound ascidians (Dispaplia occidentalis)

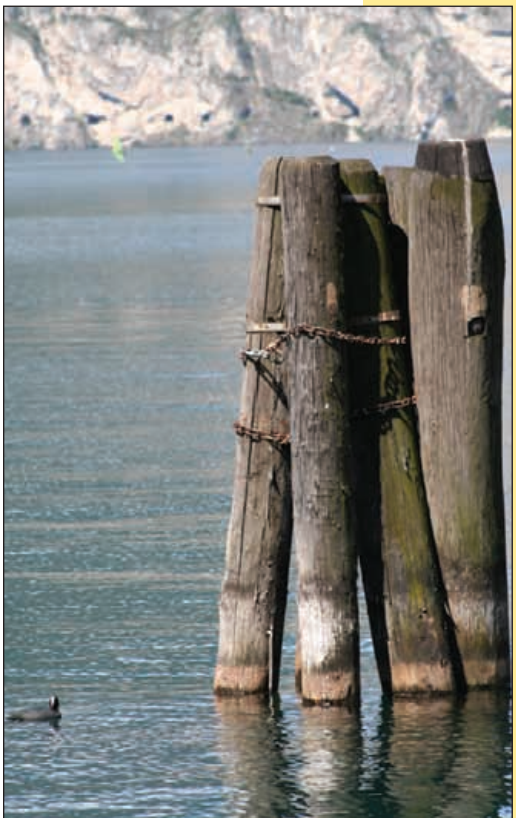
5.3 Compliance Variance

5.3.1 When 95% or less of a shipment or individual lots in a shipment conforms to the BMP requirements, the shipment or each lot of the shipment which fails shall be considered non-conforming and the Treater shall pay the cost of re-inspection. When a shipment or the lots within a shipment is more than 95% in conformance with the BMP requirements, the shipment or the lots within the shipment shall be considered conforming and the user shall pay the cost of Reinspection.

5.3.2 A customer is not required to accept non-conforming material. Non-conforming material found at Reinspection shall be corrected or have the quality mark removed or the certificate of compliance withdrawn.

5.4 Records

Reports shall be issued to all parties to the compliant and copies shall be kept by the Agency for a minimum period of two years.



Sunflower starfish (Pycnopodia helianthoides) and a leather star (Dermasterias imbricata)

If you have questions, need additional copies of this document, or guidance on specifying treated wood in aquatic environments, please contact:

Western Wood Preservers Institute
7017 N.E. Highway 99, Suite 108
Vancouver, WA 98665
Phone: 800-729-WOOD
360-693-9958 • Fax: 360-693-9967
E-mail: info@wwpinstitute.org
Internet: www.wwpinstitute.org

Wood Preservation Canada
Préservation du bois Canada

Wood Preservation Canada
202-2141 Thurston Drive
Ottawa, ON
K1G 6C9
Phone: 613-737-4337 • Fax: 613-247-0540
E-mail: info@woodpreservation.ca
Internet: www.woodpreservation.ca

Southern Pressure Treaters Association
P.O. Box 3219
Pineville, LA 71361-3219
Phone: 318-619-8589 • Fax: 318-767-1388
E-mail: sptala@bellsouth.net
Internet: www.spta.org

SOUTHERN FOREST PRODUCTS ASSOCIATION

Southern Forest Products Association
2900 Indiana Avenue
Kenner, LA 70065
Phone: 504-443-4464 • Fax: 504-443-6612
E-mail: mail@sfpa.org
Internet: www.sfpa.org

For more information on wood preservative treating standards and the Use Category System, please contact:

American Wood Protection Association
P.O. Box 361784
Birmingham, Alabama 35236-1784
Phone: 205-733-4077 • Fax: 205-733-4075
E-mail: email@awpa.com
Internet: www.awpa.com

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APPENDIX D

Preliminary Hazard Assessment Form

PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	**R. 083172.001**
Location:	**CSBA Facility, Bedwell Harbour, Pender Island**
Date:	December 22, 2016
Name of Departmental Representative:	Julian Ho
Name of Client:	Canadian Border Services Agency
Name of Client Project Co-ordinator	PH: ( )- -

Site Specific Orientation Provided at Project Location **Yes** ☐ **No** ☐

Notice of Project Required **Yes** ■ **No** ☐

NOTE:
PWGSC requires "**A Notice of Project"** for all construction work related activities.

NOTE:
OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

Important Notice: This hazard assessment has been prepared by PWGSC for its own project planning process, and to inform the service provider of actual and potential hazards that may be encountered in performance of the work. PWGSC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the service provider.

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
Examples: Chemical, Biological, Natural, Physical, and Ergonomic Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise.	**PWGSC, OGD's, or tenants**		**General Public or other contractors**		Note: When thinking about this pre-construction hazard assessment, remember a **hazard** is anything that may cause harm, such as chemicals, electricity, working from heights, etc; the **risk** is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be.
	Yes	**No**	**Yes**	**No**	

Typical Construction Hazards					
Concealed/Buried Services (electrical, gas, water, sewer etc)		no			
Slip Hazards or Unsound Footing	yes				
Working at Heights	yes				
Working Over or Around Water	yes				
Heavy overhead lifting operations, mobile cranes etc.	yes				

Marine and/or Vehicular Traffic (site vehicles, public vehicles, etc.	yes				
Fire and Explosion Hazards	yes				
High Noise Levels	yes				
Excavations		no			
Blasting	yes				Possible socketing of piles, if bedrock encountered
Construction Equipment	yes				
Pedestrian Traffic (site personnel, tenants, visitors, public)	yes				
Multiple Employer Worksite	yes				Contractor working in a occupied Federal Employee space (CBSA)

Electrical Hazards					**Comments**
Contact With Overhead Wires	Yes				Electrical wires may be fastened to the structures.
Live Electrical Systems or Equipment	yes				
Other:					
Physical Hazards					
Equipment Slippage Due To Slopes/Ground Conditions	yes				
Earthquake	yes				
Tsunami	yes				
Avalanche		no			
Forest Fires		no			
Fire and Explosion Hazards	yes				
Working in Isolation	yes				
Working Alone	yes				
Violence in the Workplace	yes				
High Noise Levels	yes				
Inclement weather	yes				
High Pressure Systems		no			
Other:					
Hazardous Work Environments					
Confined Spaces / Restricted Spaces	yes				TBD. No assessment has been carried out. Service Provider to carry out as appropriate for the work proposed.
Suspended / Mobile Work Platforms	yes				
Other:	yes				Operation of Heavy Equipment
Biological Hazards					
Mould Proliferations	yes				
Accumulation of Bird or Bat Guano	yes				
Bacteria / Legionella in Cooling Towers / Process Water		no			
Rodent / Insect Infestation	yes				
Poisonous Plants		no			

Sharp or Potentially Infectious Objects in Wastes		no			
Wildlife	yes				Includes marine mammals, fish, and birds.
Chemical Hazards					
Asbestos Materials on Site		no			
Designated Substance Present		no			
Chemicals Used in work	yes				
Lead in paint		no			
Mercury in Thermostats or Switches		no			
Application of Chemicals or Pesticides	yes				
PCB Liquids in Electrical Equipment	yes				TBD. No disturbance of any electrical equipment is expected.
Radioactive Materials in Equipment		no			
Other:	yes				Existing wood may be treated with wood preservatives including creosote, CCA, and ACZA and fumigants
Contaminated Sites Hazards					
Hazardous Waste		no			
Hydrocarbons		no			
Metals		no			
Other:					

Security Hazards					**Comments**
Risk of Assault	yes				Includes violence in the work place
Other:					
Other Hazards					

Other Compliance and Permit Requirements[1]	**YES**	**NO**	**Notes / Comments[2]**
Is a Building Permit required?		no	
Is a Electrical permit required?		no	
Is a Plumbing Permit required?		no	
Is a Sewage Permit required?		no	
Is a Dumping Permit required?		no	
Is a Hot Work Permit required?		no	
Is a Permit to Work required?		no	Mandatory for ALL AFD managed work sites.
Is a Confined Space Entry Permit required?	yes		Mandatory for any Confined Space Entry required to carry out the work. Service provider to identify confined spaces and implement permits as required. No confined space entry expected.

Is a Confined Space Entry Log required?	yes		Mandatory for all Confined Spaces
Discharge Approval for treated water required?	yes		No discharge of treated water expected

Notes:

(1) Does not relieve Service Provider from complying with all applicable federal, provincial, and municipal laws and regulations.

(2) TBD means To Be Determined by Service Provider.

Service Provider Acknowledgement: We confirm receipt and review of this Pre-Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards, and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.			
Service Provider Name			
Signatory for Service Provider		**Date Signed**	
RETURN EXECUTED DOCUMENT TO PWGSC DEPARTMENTAL REPRESENTATIVE PRIOR TO ANY WORK COMMENCING			