



# Public Works and Government Services Canada

Requisition No: EZ899-151223

DRAWINGS & SPECIFICATIONS  
for

**Steveston North Jetty  
DFO Rock Channel Training Structure  
Rock Repairs**

**Fraser River, BC**

Project No. R.068745.001

September, 2014

**APPROVED BY:**

*[Signature]*  
Regional Manager, AES

09/23/2014  
Date

*[Signature]*  
Construction Safety Coordinator

2014-10-03  
Date

**TENDER:**

*[Signature]*  
Project Manager

Oct. 02, 2014  
Date

**SPECIFICATIONS**

**Division 1**

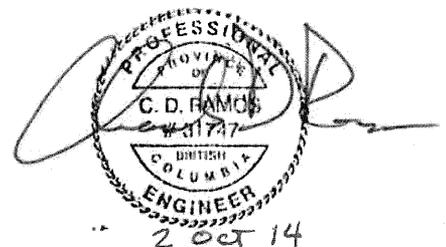
01 11 05	Marine General Instructions.....	5 Pages
01 33 00	Shop Drawings, Product Data and Samples .....	3 Pages
01 35 33	Marine Health and Safety Requirements .....	8 Pages
01 35 43	Environmental Procedures .....	4 Pages

**Division 35**

35 05 51	Marine General Site Work.....	5 Pages
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**DRAWINGS – BOUND SEPARATELY**

C01 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs - Title Sheet
C02 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs - Typical Sections, Design Templates and Drawing List
C03 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs - Site Plan and General Notes
C04 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs – Plan, Profile and Sections Sta. 4+380 to 4+660
C05 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs – Plan, Profile and Sections Sta. 4+660 to 4+940
C06 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs – Plan, Profile and Sections Sta. 4+940 to 5+220
C07 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs – Plan, Profile and Sections Sta. 5+220 to 5+500
C08 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs – Plan, Profile and Sections Sta. 5+500 to 5+780
C09 of 09	Steveston North Jetty, Fraser River, BC, DFO Rock Channel Training Structure Rock Repairs – Plan, Profile and Sections Sta. 5+780 to 6+060



**APPENDIX A – BOUND WITH SPECIFICATIONS**

- Port of Metro Vancouver EAP 14-180 – Authorization to Carry out Proposed Works
- Vancouver Fraser Port Authority (VFPA) – Environmental Review Report and Schedule of Environmental Conditions

**APPENDIX B – BOUND WITH SPECIFICATIONS**

- DFO BEST MANAGEMENT PRACTICES FOR PILE DRIVING

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 Related Sections

- .1 Section 35 05 51 - Marine General Sitework.

1.3 Site Conditions

- .1 Visit site before submitting tender. Make inquiries or investigations necessary to become thoroughly acquainted with site, soil, climatic, tidal conditions, and site access along with the nature and extent of the work.
- .2 The Work Area is identified on the Drawings, complete with UTM coordinates.
- .3 Submission of a tender will be deemed confirmation that the Contractor is familiar with the site and is conversant with all relevant conditions.
- .4 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.

1.4 Location of Site

- .1 The work is located on the north edge of the South Fraser River Shipping Channel, between the Sand Heads Light Station and Steveston. An approximate total length of jetty is 7.4 km. The co-ordinates of the end of the jetty near the Sand Heads Light Station are 49° 06.34' N, 123° 18.19' W.
- .2 The only structure on the site undergoing construction is the Steveston North Jetty that is to be reconstructed.
- .3 No alterations are permitted to any navigation aids on or near the structure and/or waterlot.
- .4 The jetty construction is to proceed in the areas of jetty as shown on the drawings. Along the length of the jetty there are four (4) weirs. One (1) weir is located within the extent of the work area of this contract and is to be repaired as indicated on the

drawings. Eleven (11) Navigation lights are located on the top of the jetty along the entire length. Three (3) navigation lights are located within the extent of the work area of this contract.

- .5 Work includes adding rock to correct any undermining of navigational aids and correction if needed to the crest elevation of the navigational aids.

#### 1.5 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 Supply and install rock to the grades and elevations indicated on the Contract Drawings.

#### 1.6 References

- .1 National Research Council of Canada (NRC):
  - .1 National Building Code of Canada (NBC) 2010.
  - .2 See Section 01 35 33 for additional references.

#### 1.7 Codes and Standards

- .1 Perform work in accordance with the National Building Code, the Workers' Compensation Board of B.C., the Canada Labour Code, 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.

#### 1.8 Documents Required

- .1 Maintain at job site one copy of the following:
  - .1 Contract drawings
  - .2 Specifications
  - .3 Addenda
  - .4 Change orders
  - .5 Other modifications to contract
  - .6 Copy of approved work schedule
  - .7 Health and Safety Plan and Fire Safety plan
  - .8 Environmental Emergency Response Plan (including Spill Response Plan)
- .2 Department 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.

1.9            AutoCAD Data

- .1    The AutoCAD data used in the design of the repairs will be provided to the Contractor for layout purposes.

1.10           Time of Completion

- .1    Due to permitting restrictions, all work is to be completed by 31 December, 2014.

1.11           Timing Window

- .1    All on-site work is to be carried out within the DFO Pacific Region Marine / Estuarine Timing Windows of August 16 to February 28 for all species.
  - .1    Contact the local DFO office prior to the commencement of work to confirm any variability in the timing window.
  - .2    No in-water work will be permitted during the period from March 1 to August 15.

1.12           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:
    - .1    Notify the local Fisheries Officer and the Regional Director, Environmental Services Branch, no less than 5 days before start and completion of operations.
  - .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    Canadian Coast Guard  
Victoria MCTS Centre  
Officer-in-Charge

Institute of Ocean Sciences  
P.O.Box 6000  
9860 West Saanich Road  
Sidney, BC V8L 4B2

- .3 Telephone Numbers:
  - .1 Officer in Charge: 250-363-6818
  - .2 Administration: 250-363-6836
  - .3 Shift Supervisor: 250-363-6333
  - .4 Operations: 250-363-6611
  - .5 Toll Free MCTS Operations: 1-800-661-9202
  - .6 CMB - Mount Helmcken: 250-363-6880
  - .7 CMB - Bowen Island/Mount Parke: 250-363-6492
  - .8 Facsimile: 250-363-6556
- .4 Email:
  - .1 [mctsvictoria@pac.dfo-mpo.gc.ca](mailto:mctsvictoria@pac.dfo-mpo.gc.ca)

1.13 Assistance by the Contractor

- .1 Place small work vessel at the Departmental Representative's disposal as required to perform his duties.

1.14 Use of Site

- .1 Hours of work:
  - .1 Perform work in accordance with local noise bylaws.
  - .2 Work may be performed after working hours, on weekends and holidays as approved by Departmental Representative.
- .2 Navigational safety shall be maintained during the work so there is no interference between construction vessels and all users of the area outside the work site.
  - .1 Marker buoys with appropriate signage shall be used to warn vessels as appropriate.
  - .2 Any materials or equipment used shall be marked in accordance with the Collision Regulations of The Canada Shipping Act.
  - .3 All work must comply with the Navigation Protection Act (NPA).
- .3 Access to Site:
  - .1 Access to site is by water only. All repairs must be completed from floating equipment. No land-based access

or repair operations are permitted.

1.15      Project Meetings

- .1      The Departmental Representative will arrange project meetings and assume responsibility for setting times. Contractor is responsible for recording and distributing minutes.

1.16      Construction Equipment:

- .1      On request, prove to the satisfaction of Departmental Representative that the construction equipment is adequate to finish work to quality and production rates specified. If inadequate, replace or provide additional equipment as directed.
- .2      Maintain construction equipment in good operating order.

1.17      Interpretation

- .1      In interpreting the Contract, in the event of discrepancies or conflicts refer to the hierarchy specified in the General Conditions.
- .2      Additionally, in the event of discrepancies or conflicts between the Specifications and Appendices, the Specifications govern.

PART 2   PRODUCTS

Not applicable.

PART 3   EXECUTION

Not applicable

**-END OF SECTION-**

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PART 1 GENERAL

1.1 Approval of Submittals

- .1 Submit all requested submittals.
- .2 Allow sufficient time for the following:
  - .1 Approval of submittal.
  - .2 Review of re-submission.
  - .3 Ordering of approved material and/or products.

1.2 General

- .1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples, health and safety plans, environmental documents and other specified and 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
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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 Anchoring details
      - .4 Armour installation details.
      - .5 Capacities.
      - .6 Performance characteristics.
      - .7 Standards.
      - .8 Operating weight.
      - .9 Relationship to adjacent work.
  - .6 After Departmental Representative's review, distribute copies.
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1.4 Submittals

- .1 Maximum sheet size: 850 x 1050 mm.
- .2 Submit one (1) PDF copy of submittals for each requirement requested in the specification sections and/or as requested by the Departmental Representative.
- .3 Printed copies of submittals are not required unless specified otherwise.
- .4 Cross-reference submittal information to applicable portions of the Contract documents.

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 011105.

**-END OF SECTION-**

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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-S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .4 Fire Protection Engineering Services, HRSDC:
  - .1 FCC No. 301, Standard for Construction Operations.
  - .2 FCC No. 302, Standard for Welding and Cutting.
  - .3 HRSDC website:  
[http://www.hrsdc.gc.ca/eng/labour/fire\\_protection/policies\\_standards/commissioner/index.shtml](http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/index.shtml)
- .5 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 Sitework: 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.
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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.
- .3 All work must comply with the requirements of the *Navigable Waters Protection Act*.

1.5            Navigation

- .1 Navigational safety shall be maintained during the construction process to avoid interactions between construction vessels and other users of the area and shipping channel. Marker buoys with appropriate signage shall be used to warn vessels as appropriate.
- .2 Any materials or equipment used shall be marked in accordance with the Collision Regulations of *The Canada Shipping Act* if locate in or on the waterway.

1.6            Submittals

- .1 Submit to Departmental Representative submittals for review.
  - .2 Work affected by submittals is not to proceed until review is complete.
  - .3 Submit the following prior to start of work (unless noted otherwise):
    - .1 Health and 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 and emergency
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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, 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.

1.7      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 the extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of the specification, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.8      General Conditions

- .1 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
    - .1 Provide appropriate means by use of barricades, fences, and warning signs as required.
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1.9            Project/Site Conditions

- .1    Site conditions will involve:
  - .1    Construction repairs to a structure with slippery, potentially unstable rocks and steep sideslopes on both sides.
  - .2    Crane lifting/overhead work.
  - .3    Construction in a fully exposed marine environment within a shipping channel, with vessel traffic ranging from small runabouts to large deep sea vessels.
  - .4    Work within an area with significant tides, river and ocean currents, and exposure to waves on both sides of the jetty.

1.10           Regulatory Requirements

- .1    Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
- .2    In event of conflict between any provisions 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.

1.11           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.
  - .1    Provide the Departmental Representative with a copy of all notices, at least two weeks prior to commencing work.

1.12           Health and Safety Plan

- .1    Conduct a site-specific hazard assessment based on review of the specifications, 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 safety policy.
      - .2    Identification of applicable compliance obligations.
      - .3    Definition of responsibilities for project Safety/ Organization chart for project.
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- .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 as required, and re-submit to the Departmental Representative.
  - .5 Departmental Representative review: the review of Health and Safety Plan 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 or of responsibility for meeting all requirements of construction and the specifications.
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1.13      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 Department 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 Department 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.

1.14      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.

1.15      Fire Safety Requirements

- .1 Store oily/paint-soaked rags, waste products, empty containers
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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.

1.16 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.

1.17 Posted Documents

- .1 Post legible versions of the following documents on site:
  - .1 Health and Safety Plan.
  - .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 inclement 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.

1.18 Meetings

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

1.19 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.
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- .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

2.1        Not Applicable

PART 3     EXECUTION

3.1        Not Applicable

**-END OF SECTION-**

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## PART 1   GENERAL

### 1.1      Environmental Factors

- .1 All work must comply with the requirements of the Fisheries Act, the Species at Risk Act, the Migratory Birds Convention Act, and all other applicable laws, legislation, and best management practices including Best Management Practices for Raptor Conservation During Urban and Rural Land Development in BC and BC MOE Environmental Objectives, Best Management Practices and Requirements for Land Developments.
- .2 Comply with mitigation requirements as noted in the plans and specifications, and in the following documents: Port of Metro Vancouver's *Authorization to Carry Out Proposed Works* document included in Appendix A, and the *DFO Best Management Practices for Pile Driving* document in Appendix B.

### 1.2      Vessels/Equipment

- .1 Vessels and floating equipment must not come to rest below the high water mark.
- .2 Minimize noise whenever possible. Vessels will move at slow speeds (0.5 to 2 knots) within the work area, minimizing the potential for collision with marine mammals. If marine mammals come close to work area (within 100 m), halt loud work until they move away.
- .3 All equipment operating in the water must use biodegradable hydraulic oil in order to minimize potential impacts to the environment.
- .4 Marine vessels and other construction equipment shall use the lowest sulphur content fuel commercially available, where reasonable.
- .5 At no time shall any portion of the vessel be permitted to ground on the foreshore or near shore areas except through the use of spuds as required to secure the vessel in position.

### 1.3      Fires

- .1 Fires and burning of rubbish on site not permitted.
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1.4      Disposal of Wastes

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.5      Work Within and Adjacent to Waterways

- .1 All works and activities shall be carried out in a manner that minimizes induced turbidity of local waters and the release of sediment, sediment-impacted, and turbid waters to the aquatic environment.
- .2 All components on the seabed are to be removed by lifting vertically. Under no circumstance shall any component be dragged along the seabed.
- .3 Do not operate land based construction equipment in the water; land based equipment may only be used in the dry or on floating construction platforms.
- .4 Do not dump excavated fill, waste material or debris in waterways.
  - .1 Dredged materials taken from the river bed may be deposited in the immediate vicinity from which it came.
- .5 Design and construct temporary crossings to minimize erosion to waterways.
- .6 Do not skid logs or construction materials across waterways.
- .7 Avoid vessel use and anchoring in identified kelp beds.
- .8 Avoid disturbance to upper intertidal sedge beds.
- .9 Conduct work activities in a careful manner that limits the generation of deconstruction waste. Develop and implement site-specific mitigation measures which ensure that the water column and seabed are not used as a receiving environment.

1.6      Pollution Control

- .1 Maintain temporary erosion and pollution control features installed under this contract.
  - .2 Control emissions from equipment and plant to local authorities emission requirements.
  - .3 Cover or wet down dry materials and rubbish to prevent blowing
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dust and debris. Provide dust control for temporary roads.

- .4 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.

1.7      Protection of Wildlife

- .1 Make every effort to minimize disturbance to the benthic and upland wildlife communities.
- .2 Do not disturb native vegetation, aquatic or otherwise.

1.8      Archaeological Monitoring

- .1 Protect any archaeological or heritage objects discovered and report the discovery to the Departmental Representative. Protection of archaeological or heritage objects may require rescheduling of work activities or relocation of resources.
- .2 If an archaeological site is encountered, stop work and notify Departmental Representative immediately.

1.9      Site Access

- .1 Water Access
  - .1 For access to site, clearly identify proposed access path and do not allow equipment to stray from identified area.

1.10     Restoration

- .1 Any damage to plants in the intertidal marsh area is to be mitigated by replanting with the same species as existing. The general area of intertidal marsh is identified on the plans.

PART 2   PRODUCTS

2.1      Not Applicable

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PART 3   EXECUTION

3.1      Not Applicable

-END OF SECTION-

## PART 1 GENERAL

### 1.1 References

- .1 Environment Canada:
  - .1 General Water Quality Guidelines for Construction Work in and Around Water.
  - .2 Pacific and Yukon Interim Guidance for Addressing Water Quality for Work in and around Water (Feb 2007).

### 1.2 Mobilization and Demobilization

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

### 1.3 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
      - .1 Unit: a single lump sum for all mobilization and demobilization including full removal of equipment, material and waste product from the site.
      - .2 Any minor items not measured separately are to be included in the cost of this item.
    - .2 Item No. 2, Survey Layout
      - .1 Unit: a single lump sum for provision of the survey layout and control.
    - .3 Items No. 3a Armour Installation, and No. 3b Underlayer Installation
      - .1 Measurement for Armour Installation and Underlayer Installation will be the actual volume of cubic metres supplied and installed in place to lines, grades and tolerances shown on the drawings, based on final survey at completion conducted by Departmental Representative. Measurement will be based on the difference between the original survey provided during tendering, and the final survey.
      - .2 Differentiation will be made between different size classifications of rock (Armour, Type 2a and Underlayer, Type 1). Measurement will be based on
-

the total measured quantity of rock and the ratio at the time of tender between the two classes of rock.

PART 2 PRODUCT

2.1 Armour Material

- .1 All armour material placed within the project area must meet the following criteria:
  - .1 Hard, durable, abrasion-resistant material which will not disintegrate under wave action or wet-dry, freeze-thaw cycles.
  - .2 The contractor is to advise Departmental Representative of the proposed rock source within 5 days of contract award. The Contractor is to make available for inspection and provide a level compact area, at the location of rock production, of sufficient size to dump and sort typical loads of riprap armour and underlayer rock material for inspection prior to delivery to site. The Contractor to provide assistance, including mechanical equipment and weigh scale adequate to weigh individual pieces of armour material, at no additional cost to the Departmental Representative, as required to sort rocks for measurement and inspection purposes to determine if the armour and underlayer rock is within Specifications.
  - .3 Contractor is to submit test results confirming conformance to the requirements set forth in the contract documents.
  - .4 Angular in shape with ratio of maximum to minimum dimensions not exceeding 3, free of weak cleavage planes, hairline cracks or laminations.
  - .5 Soundness: The weight loss tested by 5 cycles in accordance with ASTM C131 shall not be more than 20 percent when sodium sulfate is used or more than 15 percent when magnesium sulfate is used.
  - .6 Relative density (formerly specific gravity): to ASTM C127, not less than 2.650.
  - .7 Absorption: to ASTM C127, maximum of 2%.
  - .8 Los Angeles degradation test: to ASTM C535, with 50% maximum loss.

- .9 Stones to meet the following gradations as governed by mass:
- .2 Stones to meet the following gradations as governed by mass per piece:
  - .1 Riprap Armour, Type 2a
    - .1 Armour rock gradation to be in accordance with Table 2.1:

<b>Mass Per Piece(kg)</b>	<b>Nominal Size (mm)</b>	<b>Percent Total Weight Finer</b>
2388	1111	100
2011	1049	90-100
509	661	35-55
126	416	0-25
50	307	<15

**Table 2.1: Riprap Armour, Type 2A Gradation**

- .2 Underlayer, Type 1:
  - .1 Underlayer, Type 1 gradation to be in accordance with Table 2.2:

<b>Mass Per Piece (kg)</b>	<b>Nominal Size (mm)</b>	<b>Percent Total Weight Finer</b>
376	600	100
218	500	75-100
112	400	50-75
47	300	30-55
5.9	150	0-30
0.22	50	<15

**Table 2.2: Underlayer, Type 1 Gradation**

3.1            Installation of Rock

- .1 Daily barge measurements are to be taken by the contractor and reviewed by Departmental Representative. Barge measurements will be used for tracking material delivered/placed at site, as well as overall progress. Due to mixed salt/fresh water environment, a water density of  $1015 \text{ kg/m}^3$  will be used to determine the displaced mass. An overall density of  $2000 \text{ kg/m}^3$  will be used as an estimate to convert the mass of the rock delivered to the volume of rock placed on the jetty.
  - .2 Slopes to be constructed to be dressed to a reasonably smooth surface, within tolerances shown on the Drawings.
  - .3 Armour and underlayer placement to proceed up the slope from the lowest point indicated on the Drawings. Dumping will not be allowed.
  - .4 Armour and underlayer rock to be placed and distributed by mechanical means to provide a uniform mass of stones. All stones to be so placed and distributed that there are no large accumulation or areas composed mainly of either the larger or smaller sizes of stones within the accepted gradation. Segregated areas consisting predominantly of smaller or larger stones to be adjusted and redistributed by mechanical means.
  - .5 Placement control and quality control is to be implemented throughout the work by contractor supplied survey. Survey to date has been done using the Metro Vancouver (MV) RTK network. All survey during construction is to use the same network. Contractor is to provide a copy of their current license to use the MV – RTK system.
  - .6 Survey requirements to include the following:
    - project layout
    - submissions to Departmental Representative as identified in Clauses 3.1.7 and 3.1.8
    - Survey of completed underlayer and armour surfaces
  - .7 Contractor to submit proposed survey, layout, and equipment control procedures to Departmental Representative for review prior to beginning work.
  - .8 Contractor to submit survey results allowing comparison between the design grade and installed materials in AutoCAD or alternate format acceptable to the Departmental Representative. Survey results to be provided daily or following each survey, whichever is more frequent, and within 24 hours of survey
-

completion.

- .9 All armour and underlayer to be placed uniformly to provide a reasonably uniform surface. Sort and manipulate stones by mechanical equipment to conform with contract drawings and specifications. Manipulate, consolidate and tamp shoulder and slopes as required to achieve uniform planes.
- .10 Voids in the armour and underlayer layers to be filled with smaller stones within the gradations in Tables 2.1 and 2.2. The rock to be manipulated sufficiently by means of an excavator, rock tongs, or other suitable equipment to secure a regular surface plane and mass stability.
- .11 Final acceptance of the work in whole will be based on final survey by Departmental Representative. It may take up to month between substantial completion of the work and receiving the survey results for final acceptance of the work and determination of volumes for payment.
- .12 Rock determined at the site to not meet the specification is to be removed at the contractor's expense.

**-END OF SECTION-**

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# **Appendix A**

**Port of Metro Vancouver EAP 14-180 – Authorization to Carry  
out Proposed Works**

**Vancouver Fraser Port Authority (VFPA) – Environmental  
Review Report and Schedule of Environmental Conditions**



PORT METRO  
vancouver

Via email [Gouin.Barford@pwgsc-tpsgc.gc.ca](mailto:Gouin.Barford@pwgsc-tpsgc.gc.ca)

August 28, 2014

Gouin Barford  
Architectural and Engineering Services  
Real Property Services Branch  
Public Works and Government Services Canada  
219 - 800 Burrard Street  
Vancouver, BC V6Z 0B9

Attn: Gouin Barford, Regional Discipline Manager Civil Engineering

Dear Mr. Barford:

**Re: Steveston North Jetty Repairs and Maintenance, Richmond, BC  
EAP 14-180 - AUTHORIZATION TO CARRY OUT PROPOSED WORKS**

Reference is made to your August 12, 2014 email re: *DFO Steveston North Jetty Rock Repair - PMV environmental permit application*. The Vancouver Fraser Port Authority doing business as Port Metro Vancouver (PMV) understands that the purpose of the proposed Project is to conduct maintenance and repair works to a section of the Steveston north jetty, located on the north side of the lower 6 km of the Fraser River, Richmond, BC. PMV has undertaken and completed a review of these works.

Pursuant to the Port Authorities Operations Regulations under the *Canada Marine Act*, the proposed work is authorized to proceed **provided that all of the Conditions outlined on the attached Schedule of Environmental Conditions are adhered to**. In the event of any breach of any of the Conditions, or of any of the background information being determined by PMV to be incorrect or misleading, then PMV, acting at its sole discretion, may arbitrarily cancel this authorization. This authorization may also be cancelled for any other reasons set out in section 29 of the Port Authorities Operations Regulations. Please contact Ms. Kim Keskinen, Environmental Programs, at 604-665-9121 if you have any questions regarding the Conditions.

Yours truly,

Carrie Brown  
Director, Environmental Programs

cc: Michael Liang, DFO Technical Support [Michael.Liang@dfo-mpo.gc.ca](mailto:Michael.Liang@dfo-mpo.gc.ca)  
Katrina Johnston, PWGSC [Katrina.Johnston@pwgsc-tpsgc.gc.ca](mailto:Katrina.Johnston@pwgsc-tpsgc.gc.ca)

 <b>PORT METRO vancouver</b>		<b>VANCOUVER FRASER PORT AUTHORITY (“VFPA”) ENVIRONMENTAL REVIEW REPORT AND SCHEDULE OF ENVIRONMENTAL CONDITIONS</b>		VFPA Review Number: <b>14-180</b>
				Page 1 of 4
Project:	<b>Steveston North Jetty Repairs and Maintenance</b>	Location:	<b>Sturgeon Bank Richmond, BC</b>	
		VFPA Site/Area No.:	<b>RIC363</b>	
Proponent(s):	<b>Public Works and Government Services Canada, on behalf of Fisheries and Oceans Canada Technical Support</b>		Track: 1	

### Project Description

In this Schedule, “**Project**” means the physical activities authorized by VFPA to be carried out pursuant to Review Number 14-180, as described below.

- Public Works and Government Services Canada (PWGSC), on behalf of Fisheries and Oceans Canada Technical Support (DFO, the “**Proponent**”), proposes to conduct maintenance and repair works to a section of the Steveston north jetty, located on the north side of the lower 6 km of the Fraser River, Richmond, BC. Similar maintenance works were previously completed under VFPA Review Number 13-164.
- The activities reviewed as part of the Project include maintenance works within the provincial head lease which will be completed prior to December 31, 2014. The Proponent is responsible for obtaining appropriate approvals for works occurring after this date.
- The Project includes placing filter rock and rip rap in deteriorated areas along the jetty to re-establish the sideslopes and crest elevation to previous design conditions. No changes to the jetty footprint or design are associated with the Project.
- Barge-mounted equipment will be used to place the underlayer and armor rock between Stn 4+680 and Stn 6+000. Rock material and equipment required to undertake the works will be transported to the site by tug and barge and will operate from barges on the south side of the jetty.
- The works are expected to take approximately two months to complete and are proposed to start in November 2014.

### Information Sources

VFPA has relied upon the following sources of information in its assessment of the potential adverse environmental effects of the Project:

- Email correspondence from Gouin Barford (PWGSC) to Cari St. Pierre (VFPA), Lilian Chau (VFPA) and Kim Keskinen (VFPA), August 12, 2014, 6:25 pm, re: *DFO Steveston North Jetty Rock Repair - PMV environmental permit application*, with the following attachments:
  - VFPA Project Review Application Form, dated August 12, 2014;
  - Document titled “Description of Proposed Repairs, Steveston North Jetty, Fraser River, B.C.”;
  - Drawing No. SK#5416.00, Rev. 0, “Sketch Plan of District Lot 5738, Plan 25TR03, and District Lot 7681, Plan 4TU1543, Group 1, New Westminster District Over Steveston North Jetty”; and,
  - A series of “Steveston North Jetty Fraser River, BC Rock Channel Training Structure Rock Repairs” drawings, prepared by Herold Engineering:
    - Drawing No. C-01, Rev. 3, “Site Plan, Location Plan, Typical Sections, Design Templates and Drawing List”, dated 13JUN14;
    - Drawing No. C-02, Rev. 3, “Plan and Profile Sta. 0+200 to 1+1600”, dated 13JUN14;
    - Drawing No. C-03, Rev. 3, “Plan and Profile Sta. 1+600 to 3+000”, dated 13JUN14;

Review History		
Draft	August 26, 2014	KK
Final	August 28, 2014	KK

 <b>PORT METRO vancouver</b>		<b>VANCOUVER FRASER PORT AUTHORITY ("VFPA") ENVIRONMENTAL REVIEW REPORT AND SCHEDULE OF ENVIRONMENTAL CONDITIONS</b>		VFPA Review Number: <b>14-180</b>
				Page 2 of 4
Project:	<b>Steveston North Jetty Repairs and Maintenance</b>	Location:	<b>Sturgeon Bank Richmond, BC</b>	
		VFPA Site/Area No.:	<b>RIC363</b>	
Proponent(s):	<b>Public Works and Government Services Canada, on behalf of Fisheries and Oceans Canada Technical Support</b>		Track: 1	

- Drawing No. C-04, Rev. 3, "Plan and Profile Sta. 3+000 to 4+400", dated 13JUN14;
- Drawing No. C-05, Rev. 3, "Plan and Profile Sta. 4+400 to 5+800", dated 13JUN14; and,
- Drawing No. C-06, Rev. 3, "Plan and Profile Sta 5+800 to 7+200", dated 13JUN14.

### Environmental Conditions

If the "project description" summary does not accurately reflect the subject proposal, please advise VFPA Environmental Programs immediately as this may affect the assumptions underlying this assessment. If the summary does accurately reflect the subject proposal, the following are the minimum conditions that must be followed to mitigate potential or foreseeable adverse environmental effects.

1. The Proponent shall undertake and deliver the Project to total completion in a professional, timely and diligent manner in accordance with the applicable standards and specifications set out in the sections above entitled "Project Description" and "Information Sources". The Proponent shall not carry out any other physical activities unless expressly authorized by VFPA.
2. The Proponent shall at all times and in all respects comply with and abide by all applicable federal, provincial and municipal laws, statutes, by-laws, regulations, orders and policies from time to time in force and effect including, without limiting the generality of the foregoing, all rules and directions established by VFPA from time to time (collectively, "**Applicable Law**"). Any reference below to a specific law, statute, by-law, regulation, order or policy is for clarity only and in no way limits the generality of the foregoing.
3. The Proponent shall not, directly or indirectly: (i) deposit or permit the deposit of a deleterious substance of any type in water frequented by fish in a manner contrary to Section 36(3) of the *Fisheries Act*; or (ii) adversely affect fish or fish habitat in a manner contrary to Section 35(1) of the *Fisheries Act*.
4. There shall be no in-water works during the fisheries sensitive period from March 1 to July 15, inclusive.
5. The induced sedimentation or turbidity of foreshore and nearshore areas and the induced turbidity of local waters, and the release of sediment, sediment-laden waters, and turbid waters to the aquatic environment is to be minimized during the works. In this regard, reference should be made to the applicable water quality criteria as described in the British Columbia Water Quality Guidelines (Criteria): January 2010 Edition produced by the BC Ministry of Environment.
6. There shall be no disturbance to the foreshore or riverbed except within the area where the works are to be conducted. Best efforts shall be employed to minimize disturbance to the foreshore and riverbed during the Project.
7. Rip rap shall be clean and free of fines and shall be placed rather than dumped.
8. The Proponent shall not operate machinery or heavy equipment on the intertidal foreshore.

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Project:	Steveston North Jetty Repairs and Maintenance	Location:	Sturgeon Bank Richmond, BC
		VFPA Site/Area No.:	RIC363
Proponent(s):	Public Works and Government Services Canada, on behalf of Fisheries and Oceans Canada Technical Support	Track: 1	

9. The Proponent shall not permit barges or other vessels used during the Project to ground on the foreshore or riverbed or otherwise disturb the foreshore or riverbed (including disturbance as a result of vessel propeller wash), excepting only such disturbance as is reasonably required resulting from the use of barge spuds.
10. The Proponent shall ensure that debris and waste material resulting from the Project are contained, collected, and disposed of at suitable upland locations using standards, practices, methods and procedures to a good commercial standard, conforming to Applicable Law and using that degree of skill and care, diligence, prudence and foresight which would be reasonably and ordinarily expected from a qualified, skilled and experienced person engaged in a similar type of undertaking under the same or similar circumstances.
11. Prior to commencing any physical activities, the Proponent shall establish a spill prevention, containment and clean-up plan for hydrocarbon products (including fuel, oil and hydraulic fluid) and any other deleterious substances using standards, practices, methods and procedures to a good commercial standard, conforming to Applicable Law and using that degree of skill and care, diligence, prudence and foresight which would be reasonably and ordinarily expected from a qualified, skilled and experienced person engaged in a similar type of undertaking under the same or similar circumstances. The Proponent shall ensure that appropriate spill containment and clean-up supplies are available on site at all times and that all personnel working on the Project are familiar with the spill prevention, containment and clean-up plan.
12. Equipment shall be in good mechanical condition and shall be maintained free of fluid leaks, invasive species, and noxious weeds.
13. The Proponent shall have due regard to the potential application of the *Migratory Birds Convention Act* (Canada) and/or the *Wildlife Act* (British Columbia). To reduce the risk of Project-related harm to birds and/or their active nests and eggs, the Proponent may wish to avoid certain physical activities during the general bird breeding season, which falls between April 1 and July 31. If potentially harmful activities must be undertaken during this period, the Proponent shall exercise all due diligence to avoid causing harm to birds and/or their active nests and eggs. The Proponent shall also have due regard to nests of those species of birds protected by Applicable Law at all times of the year, regardless of the time of year or whether or not the nests are occupied. The Proponent should, where circumstances warrant, retain the services of qualified environmental professionals to assist in developing and undertaking appropriate bird nest surveys immediately before, during and after the general bird breeding season.
14. The Proponent shall be familiar with vessel movements in areas affected by the work. The Proponent shall plan and execute the work in a manner that will not impede navigation or interfere with vessel operations.
15. All vessels involved in the Project must monitor VHF Channel 11, 16 and 74 at all times.
16. As per the *International Regulations for Preventing Collisions at Sea*: Rule #27 (d) and (e), the appropriate day shapes and lights shall be displayed at all times.

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				Page 4 of 4
Project:	<b>Steveston North Jetty Repairs and Maintenance</b>	Location:	<b>Sturgeon Bank Richmond, BC</b>	
		VFPA Site/Area No.:	<b>RIC363</b>	
Proponent(s):	<b>Public Works and Government Services Canada, on behalf of Fisheries and Oceans Canada Technical Support</b>		Track: 1	

17. At least two days prior to commencing any physical works, the Proponent shall notify the DFO Conservation and Protection Field Supervisor for Lower Mainland/Squamish in Steveston, British Columbia (telephone: 604-664-9250; fax: 604-664-9255). The Proponent shall copy VFPA Environmental Programs and the Harbour Master on this notification (email: EnvironmentalPrograms@portmetrovancover.com and Harbour\_Master@portmetrovancover.com; fax: 1-866-284-4271).
18. The Proponent shall be solely responsible for reviewing DFO's Projects Near Water website (<http://www.pac.dfo-mpo.gc.ca/habitat/know-savoir-eng.htm>) to assess whether the Project requires DFO's involvement. Responsibility for submitting any necessary information through DFO's Project Review Process rests solely with the Proponent.
19. This Schedule of Environmental Conditions is valid until December 31, 2014. After that date it will be void, no longer valid.
20. The Proponent shall cooperate fully with VFPA in respect of any review by VFPA of the Proponent's compliance with these conditions including, without limitation, providing any information or documentation required by VFPA.
21. The Proponent shall make a copy of this Schedule available to all employees, agents, contractors, licensees and invitees prior to commencing any physical activities. The Proponent shall be solely responsible for ensuring that all such employees, agents, contractors, licensees and invitees comply with these conditions.
22. The Proponent shall make available upon request by any regulatory authority (such as a Fishery Officer) a copy of this Schedule.

The VFPA reserves the right to rescind or revise these conditions at any time that new information warranting this action is made available to the Port.

The above conditions are based solely upon VFPA's review of the Project and in no way limits the authority of, or constitutes any form of permit, authorization or approval by, any other governmental authority having jurisdiction. The Proponent is solely responsible for obtaining any and all required permits, authorizations and approvals from any other governmental authority having jurisdiction.

### **Notice to Shipping**

The Proponent may contact the Coast Guard regarding the issuance of a Notice to Shipping in respect of the Project at the following address:

Canadian Coast Guard  
Vessel Traffic Services  
555 West Hastings  
Vancouver, BC V6B 4N6

Tel (604) 666-6011  
Fax (604) 666-8453

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# **Appendix B**

**Department of Fisheries and Oceans – Best Management**

**Practices for Pile Driving**

# **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:

### Underwater Drilling

- 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.
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**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: \_\_\_\_\_