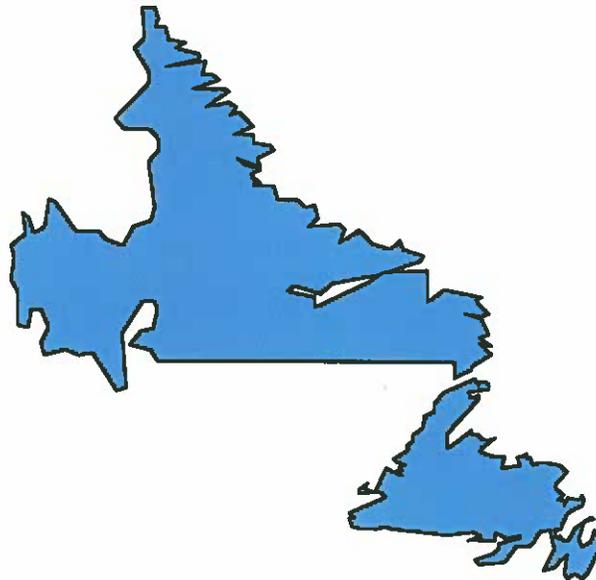


**PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
REAL PROPERTY CONTRACTING
NL DIVISION**

SPECIFICATION

**ROCK SLOPE STABILIZATION
GRAND FALLS FISHWAY, GRAND FALLS, NL
SOLICITATION #: EA003-161352/A**



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SPECIFICATION
ROCK SLOPE STABILIZATION
GRAND FALLS FISHWAY
GRAND FALLS, NL
P/N: R.075582.003

PREPARED BY

Public Works and Government Services Canada

ON BEHALF OF:

Fisheries and Oceans Canada

DATE

September 15, 2015

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- 1.1 SCOPE .1 The work consists of the furnishing of all plant, labour, equipment and material for Rock Slope Stabilization at the Grand Falls Fishway, NL, in strict accordance with specifications and accompanying drawings and subject to all terms and conditions of the Contract.
- 1.2 DESCRIPTION OF WORK .1 In general, work under this contract consists of, but will not necessarily be limited to, the following:
- .1 Scaling rock face to remove loose rock and debris from the rock face. Due to site access, it is likely that scaling will be done through the use of portable and hand held tools such as pry bars, splitters, jacks, etc.
 - .2 Installation of rock bolts and anchors; rock bolt orientation to be mostly at an incline downwards of approximately -10 degrees from the horizontal.
 - .3 Removal of material and rock debris from the area and along the toe of the slope.
- .2 It is noted that the water levels in the river can change quickly. The contractor shall include in the work plan a safety method for accessing the site and a plan for quickly removing workers and equipment from the site if the water levels in the river should start to rise.
- .3 Access to the site for larger sized operating mechanical equipment is limited. The contractor shall be responsible for devising an appropriate method for accessing the site in a safe and effective manner to do the work without damaging

existing infrastructure.

- .4 Prior to starting any work, the contractor will be responsible for coordinating the proposed activities with the operations of the hydro plant and the Salmonid Interpretation Centre, and doing the work during periods when water levels can reasonably be controlled to safe levels for the work to be undertaken.
- .5 Work at the site shall only be permitted after/before the Salmon migration period of July 1st to September 15th

1.3 SITE OF WORK

- .1 The Lower Grand Falls Fishway is one of three separate fishways that constitute the Grand Falls fish ladder system, located on the Exploits River in Grand Falls-Windsor, Newfoundland. The fish ladder system is in place to transport salmon above the Grand Falls hydro dam. The lower fishway is located approximately 300 m downstream of the main hydro dam. The rock face to the left of the entrance to the lower fishway has previously failed, resulting in a rock slide.
- .2 Bedrock is generally exposed in the area and consists of sedimentary type rocks. The surrounding area is sparsely vegetated with limited moss and shrubbery growing along the fishway rock face. Access to the fishway entrance and to the top of the rock outcrop is facilitated by public walkways and an observation deck.
- .3 Work will be carried out at Salmonid Interpretation Centre Fishway, Grand Falls, NL. The Fishway is open to the public; therefore public safety will be an issue that needs to be addressed.

Contractor will be responsible for all snow clearing as required to carry out the work.

- 1.4 DATUM .1 Datum used for this project is Lowest Normal Tides (LNT). If requested by the Contractor, the Departmental Representative will establish a benchmark prior to the start of deconstruction activities.
- 1.5 FAMILIARIZATION WITH SITE .1 Before submitting a bid, it is recommended that bidders visit the site and its surroundings to review and verify the form, nature and extent of the work, materials needed for the completion of the work, the means of access to the site, severity, exposure and uncertainty of weather, soil conditions and in general shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid or costs to do the work. No allowance shall be made subsequently in this connection on account of error or negligence to properly observe and determine the conditions that will apply.
- .2 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 - Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.
- 1.6 CODES AND STANDARDS .1 Perform work in accordance with the latest edition of the National Building Code of Canada, and any other code of provincial or local application including all

amendments up to project bid closing date provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

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

1.7 TERM ENGINEER

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

1.8 SETTING OUT WORK

- .1 Set grades and layout work in detail from control points and grades established by Departmental Representative.
- .2 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated or as directed by Departmental Representative.
- .3 Provide devices needed to layout and construct work.
- .4 Supply such devices required to facilitate Departmental Representative's inspection of work.
- .5 Supply stakes and other survey markers required for laying out work.

1.9 COST BREAKDOWN

- .1 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price.
- .2 Provide cost breakdown in same format as

the numerical and subject title system used in this specification project manual and thereafter sub-divided into major work components as directed by Departmental Representative.

.3 Upon approval by Departmental Representative, cost breakdown will be used as basis for progress payment.

.4 All work items are to be included in the lump sum arrangement, as noted on the Bid and Acceptance Form.

1.10 WORK SCHEDULE

.1 Submit within 7 work days of notification of acceptance of bid, a construction schedule showing commencement and completion of all work within the time stated on the Bid and Acceptance Form and the date stated in the bid acceptance letter.

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

.3 As a minimum, work schedule to be prepared and submitted in the form of Bar (GANTT) Charts, indicating work activities, tasks and other project elements, their anticipated durations and planned dates for achieving key activities and major project milestones provided in sufficient details and supported by narratives to demonstrate a reasonable plan for completion of project within designated time. Generally Bar Charts derived from commercially available computerized project management system are preferred

but not mandatory.

- .4 Submit schedule updates on a minimum bi-weekly basis and more often, when requested by Departmental Representative, due to frequent changing project conditions. Provide a narrative explanation of necessary changes and schedule revisions at each update.
- .5 The schedule, including all updates, shall be to Departmental Representative's approval. Take necessary measures to complete work within approved time. Do not change schedule without Departmental Representative's approval.
- .6 All work on the project will be completed within the time indicated on the Bid and Acceptance Form.

1.11 ABBREVIATIONS

- .1 Following abbreviations of standard specifications have been used in this specification and on the drawings:

CGSB - Canadian Government Specifications Board
CSA - Canadian Standards Association
NLGA - National Lumber Grades Authority
ASTM - American Society for Testing and Materials
DR - Departmental Representative
- .2 Where these abbreviations and standards are used in this project, latest edition in effect on date of bid call will be considered applicable.

1.12 SITE OPERATIONS

- .1 Arrange for sufficient space adjacent to project site for conduct of operations, storage of materials and so on. Exercise care so as not to obstruct or damage public or private property in area. All

arrangements for space and access will be made by Contractor in conjunction with the Salmonid Interpretation Centre.

1.13 PROJECT MEETINGS

- .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording minutes.
- .2 Project meetings will take place on site of work unless so directed by the Departmental Representative.
- .3 Departmental Representative will assume responsibility for recording minutes of meetings and forwarding copies to all parties present at the meetings.
- .4 Have a responsible member of firm present at all project meetings.

1.14 PROTECTION

- .1 Store all materials and equipment to be incorporated into work to prevent damage by any means.
- .2 Repair or replace all materials damaged in transit or storage to the satisfaction of Departmental Representative and at no cost to Canada.

1.15 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to site operations, and tenant operations.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any

shut-down or closure of active service or facility.

- .4 Provide temporary services when directed by Departmental Representative to maintain critical facility systems.
- .5 Provide adequate bridging over trenches which cross walkways or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

1.16 DOCUMENTS
REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings
 - .2 Specifications
 - .3 Addenda
 - .4 Change Orders
 - .5 Other modifications to Contract
 - .6 Test Reports
 - .7 Copy of Approved Work Schedule
 - .8 Site specific Health and Safety Plan and other safety related documents
 - .9 Other documents as stipulated elsewhere in the Contract Documents.

1.17 PERMITS

- .1 Obtain and pay for all permits, certificates and licenses as required by Municipal, Provincial, Federal and other Authorities.
- .2 Provide appropriate notifications of

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project to municipal and provincial inspection authorities.

- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy of application submissions and approval documents received for above referenced authorities.
- .5 Comply with all requirements, recommendations and advice by all regulatory authorities unless otherwise agreed in writing by Departmental Representative. Make requests for such deviations to these requirements sufficiently in advance of related work.

1.18 CUTTING,
FITTING AND
PATCHING

- .1 Execute cutting, including excavation, fitting and patching required to make work fit properly.

1.19 ACCEPTANCE

- .1 Prior to the issuance of the Certificate of Substantial Performance, in company with Departmental Representative, make a check of all work. Correct all discrepancies before final inspection and acceptance.

1.20 WORKS
COORDINATION

- .1 Responsible for coordinating the work of the various trades, where the work of such trades interfaces with each other.
- .2 Convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required. Provide each

trade with the plans and specifications of the interfacing trade, as required, to assist them in planning and carrying out their respective work.

- .3 Canada will not be responsible for or held accountable for any extra costs incurred as a result of the failure to carry out coordination work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor and shall be resolved at no extra cost to Canada.

1.21 CONTRACTOR'S
USE OF SITE

- .1 Responsible for arranging the storage of materials on or off site, and any materials stored at the site which interfere with any of the day to day activities at or near the site will be moved promptly at the Contractor's expense, upon request by Departmental Representative.
- .2 Exercise care so as not to obstruct or damage public or private property in the area.
- .3 At completion of work, restore area to its original condition. Damage to ground and property will be repaired by Contractor. Remove all construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

1.22 WORK
COMMENCEMENT

- .1 Mobilization to project site is to commence immediately after acceptance of bid and submission of Site Specific Safety Plan and insurance and bonding documentation, unless otherwise agreed by Departmental Representative.

- .2 Project work on site is to commence as soon as possible, with a continuous reasonable work force, unless otherwise agreed by Departmental Representative.
- .3 Weather conditions, short construction season, delivery challenges and the location of the work site may require the use of longer working days and additional work force to complete the project within the specified completion time.
- .4 Make every effort to ensure that sufficient material and equipment is delivered to site at the earliest possible date after acceptance of bid and replenished as required.

1.23 INTERPRETATION
OF DOCUMENTS

- .1 Supplementary to the Order of Precedence article of the General Conditions of the Contract, the Division 01 sections take precedence over the technical specification sections in other Divisions of the Specification Manual.

PART 1 - GENERAL

1.1 SECTION
INCLUDES

- .1 Product data.
- .2 Samples.
- .3 Certificates.

1.2 SUBMITTAL
GENERAL REQUIREMENTS

- .1 Submit to Departmental Representative for review submittals listed, including samples, certificates and other data, as specified in other sections of the Specifications.
- .2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.
- .4 Present product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units, provide soft converted values.
- .6 Review submittals prior to submission to Departmental Representative. Ensure during review that necessary requirements have been determined and verified, required field measurements or data have been taken, and that each submittal has been checked and co-ordinated with requirements of Work and

Contract Documents.

- .1 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.
- .7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .8 Verify field measurements and affected adjacent work and coordinate.
- .9 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .11 Submittal format: paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.
- .12 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, notify Departmental Representative in writing of any revisions other than those requested.
- .13 Keep one reviewed copy of each submittal document on site for duration of Work.

- 1.3 PRODUCT DATA .1 Product data includes drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit sufficient copies of product data which are required by the General Contractor and sub-contractors plus 2 copies which will be retained by Departmental Representative. Ensure sufficient numbers are submitted to enable one complete set to be included in each of the maintenance manuals specified, if applicable.
- .3 Allow 10 calendar days for Departmental Representative's review of each submission.
- .4 Adjustments or corrections made on product data by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.
- .5 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If product data are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected product data, through same submission procedures indicated above.
- .6 Accompany each submission with transmittal letter, containing:
- .1 Date.
 - .2 Project title and project number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each product data and sample.
 - .5 Other pertinent data.

- .7 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and project number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Cross references to particular details of contract drawings and specifications section number for which product data submission addresses.
 - .6 Details of appropriate portions of Work.
- .8 After Departmental Representative's review, distribute copies.
- .9 The review of product data by the Departmental Representative or their delegated representative is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Public Works and Government Services Canada approves the detail design inherent in the product data, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in product data or of responsibility for meeting all requirements of the construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SCHEDULES,
PERMITS AND
CERTIFICATES

- .1 Upon acceptance of bid, submit to Departmental Representative copy of Work Schedule and various other schedules, permits, certification documents and project management plans as specified in other sections of the Specifications.
- .2 Submit copy of permits, notices, compliance Certificates received by Regulatory Agencies having jurisdiction and as applicable to the Work.
- .3 Submission of above documents to be in accordance with Submittal General Requirements procedures specified in this section.

- 1.1 SECTION INCLUDES .1 Fire Safety Requirements.
.2 Hot Work Permit.
- 1.2 RELATED WORK .1 Section 01 35 29 - Health and Safety Requirements.
- 1.3 REFERENCES .1 National Fire Code - latest edition.
FCC standards, may also be viewed at the Regional Labour Canada Office located at Baine Johnson Centre, 10 Fort William Place, St. John's, NL, A1C 1K4; Telephone 1-800-641-4049; fax 1-709-772-5985.
- 1.4 DEFINITIONS .1 Hot Work defined as:
.1 Welding work.
.2 Cutting of materials by use of torch or other open flame devices.
.3 Grinding with equipment which produces sparks.
- 1.5 SUBMITTALS .1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within seven (7) calendar days after notification of acceptance of bid.
.2 Submit in accordance with the Submittal General Requirements specified in Section 01 33 00.
- 1.6 FIRE SAFETY REQUIREMENTS .1 Implement and follow fire safety measures during Work. Comply with following:

- .1 National Fire Code, latest edition.
- .2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health and Safety Requirements.

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

1.7 HOT WORK
AUTHORIZATION

- .1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot work on site.
- .2 To obtain authorization submit to Departmental Representative:
 - .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
 - .2 Description of the type and frequency of Hot Work required.
 - .3 Sample Hot Work Permit to be used.
- .3 Upon review and confirmation that effective fire safety measures will be implemented during performance of hot work, Departmental Representative will provide authorization to proceed as follows:
 - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
 - .2 Separate work, or segregate certain parts of work, into individual entities. Each entity requiring a separately written "Authorization to Proceed" from Departmental Representative. Follow Departmental Representative's directives in this regard.

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- .4 Requirement for individual authorization based on:
 - .1 Nature or phasing of work;
 - .2 Risk to Facility operations;
 - .3 Quantity of various trades needing to perform hot work on project or;
 - .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.
- .5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

1.8 HOT WORK
PROCEDURES

- .1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.
- .2 Procedures to include:
 - .1 Requirement to perform hazard assessment of site and immediate hot work area for each hot work event in accordance with Hazard Assessment and Safety Plan requirements of Section 01 35 29.
 - .2 Use of a Hot Work Permit system for each hot work event.
 - .3 The step by step process of how to prepare and issue permit.
 - .4 Permit shall be issued by Contractor's site Superintendent, or other authorized person designated by Contractor, granting permission to worker or subcontractor to proceed with hot work.
 - .5 Provision of a designated person to carry out a Fire Safety Watch for a minimum of 60 minutes immediately upon completion of the hot work.
 - .6 Compliance with fire safety codes and standards specified herein and occupational

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health and safety regulations specified in Section 01 35 29.

- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.
- .4 Hot Work Procedures shall clearly establish worker instructions and allocate responsibilities of:
 - .1 Worker(s),
 - .2 Authorized person issuing the Hot Work Permit,
 - .3 Fire Safety Watcher,
 - .4 Subcontractors and Contractor.
- .5 Brief all workers and subcontractors on Hot Work Procedures and Permit system established for project. Stringently enforce compliance.
 - .1 Failure to comply with the established procedures may result in the issuance of a Non-Compliance Notification at Departmental Representative's discretion with possible disciplinary measures imposed as specified in Section 01 35 29.

1.9 HOT WORK
PERMIT

- .1 Hot Work Permit to include, as a minimum, the following data:
 - .1 Project name and project number.
 - .2 Building name, address and specific room or area where hot work will be performed.
 - .3 Date when permit issued.
 - .4 Description of hot work type to be performed.
 - .5 Special precautions required, including type of fire extinguisher needed.
 - .6 Name and signature of person authorized to issue the permit.
 - .7 Name of worker (clearly printed) to

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which the permit is being issued.

.8 Time Duration that permit is valid (not to exceed 8 hours). Indicate start time and date, and completion time and date.

.9 Worker signature with date and time upon hot work termination.

.10 Specified time period requiring safety watch.

.11 Name and signature of designated Fire Safety Watcher, complete with time and date when safety watch terminated, certifying that surrounding area was under continual surveillance and inspection during the full watch time period specified in Permit and commenced immediately upon completion of Hot Work.

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

.3 Each Hot Work Permit to be completed in full and signed as follows:

.1 Authorized person issuing Permit before hot work commences.

.2 Worker upon completion of Hot Work.

.3 Fire Safety Watcher upon termination of safety watch.

.4 Returned to Contractor's Site Superintendent for safe keeping.

1.10 DOCUMENTS
ON SITE

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

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

- 1.1 RELATED WORK .1 Section 01 35 24 - Special Procedures on Fire Safety Requirements.
- 1.2 DEFINITIONS .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .2 Competent Person: means a person who is:
- .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
 - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
 - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.
- .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .4 PPE: personal protective equipment.
- .5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.
- 1.3 SUBMITTALS .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan prior to commencement of work.

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- .1 Submit within (5) work days of notification of Bid and Acceptance Form.
 - .2 Departmental Representative will review Health and Safety Plan and provide comments.
 - .3 Revise the Plan as appropriate and resubmit within five (5) work days after receipt of comments.
 - .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
 - .5 Submit revisions and updates made to the Plan during the course of Work.
-
- .3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Health and Safety Plan.
 - .4 Submit building permit, compliance certificates and other permits obtained.
 - .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
 - .1 Submit update of Letter in Good Standing whenever expiration date occurs during the period of work.
 - .6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .7 Submit copies of incident reports.
 - .8 Submit WHMIS MDS - Material Safety Data Sheets.

1.4 COMPLIANCE
REQUIREMENTS

- .1 Comply with the Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health and Safety Regulations made pursuant to the Act.
- .2 Comply with Canada Labour Code Part II, (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any other regulations made pursuant to the Act.
 - .1 The Canada Labour Code can be viewed at: [www.http://laws.justice.gc.ca/en/L-2/](http://laws.justice.gc.ca/en/L-2/)
 - .2 COSH can be viewed at: [www.http://laws.justice.gc.ca/eng/SOR-86-304/ne.html](http://laws.justice.gc.ca/eng/SOR-86-304/ne.html).
 - .3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: (819) 956-4800 (1-800-635-7943) Publication No. L31-85/2000 E or F).
- .3 Observe construction safety measures of:
 - .1 Part 8 of National Building Code.
 - .2 Municipal by-laws and ordinances.
- .4 In case of conflict or discrepancy between any specified requirements, the more stringent shall apply.
- .5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof through submission of Letter in Good Standing
- .6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

- 1.5 RESPONSIBILITY .1 Be responsible for health and safety of persons on site, safety of property and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to work site with safety requirements of Contract Documents, applicable Federal, Provincial, and local by-laws, regulations, and ordinances, and with site specific Health and Safety Plan.
- 1.6 SITE CONTROL AND ACCESS .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
- .1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
- .2 Isolate Work Site from other areas of the premises by use of appropriate means.
- .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment.
- .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for

access.

.3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.

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

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

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

1.7 PROTECTION

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

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

1.8 FILING OF NOTICE

.1 File Notice of Project with pertinent Provincial health and safety authorities prior to beginning of Work.

.1 Departmental Representative will assist in locating address in needed.

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1.9 PERMITS

- .1 Post permits, licenses and compliance certificates, specified in section 01 10 10, at Work Site.
- .2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.10 HAZARD ASSESSMENTS

- .1 Perform site specific health and safety hazard assessment of the Work and its site.
- .2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.
- .3 Record results and address in Health and Safety Plan.
- .4 Keep documentation on site for entire duration of the Work.

1.11 PROJECT/SITE CONDITIONS

- .1 The following are potential health, environmental and safety hazards at site for which work may involve contact with:
 - .1 Isolated site location.
 - .2 Wet and slippery conditions.
 - .3 Inclement weather conditions.
 - .4 Potential structural weakness of existing rock substrate.
 - .5 Heavy lifting.
 - .6 Falls.
 - .7 Drowning.
 - .8 Working at heights using suspended harnesses, rope systems, etc.
 - .9 Cutting tools and other construction power tools.

- .2 . Above items shall not be construed as being complete and inclusive of potential health, and safety hazards encountered during work.
- .3 Include above items into hazard assessment process.
- .4 It is recommended that the contractor have completed similar type projects within the last five years (e.g., scaling, rock bolting, etc., in areas with limited access requiring specialized equipment and personnel trained in high angle remote access).
- .5 It is expected that successful completion of the work will require use of held/suspended and/or portable equipment by personnel trained and experienced with the use of suspended harnesses, rope systems and working over steep slopes and vertical rock faces.

1.12 MEETINGS

- .1 Contractor to hold pre-construction health and safety meeting prior to commencement of Work. Ensure attendance of:
 - .1 Superintendent of Work.
 - .2 Contractor's designated Health & Safety Site Representative.
 - .3 Subcontractor's Health and Safety Site Representative.
 - .4 Health and Safety Site Coordinator.
- .2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.
- .3 Keep documents on site.

1.13 HEALTH AND
SAFETY PLAN

- .1 Prior to commencement of Work, develop written Health and Safety Plan specific to the work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
- .2 Health and Safety Plan shall include the following components:
 - .1 List of health risks and safety hazards identified by hazard assessment.
 - .2 Control measures used to mitigate risks and hazards identified.
 - .3 On-site Contingency and Emergency Response Plan as specified below.
 - .4 On-site Communication Plan as specified below.
 - .5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
 - .6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.
- .3 On-site Contingency and Emergency Response Plan shall include:
 - .1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
 - .2 Evacuation Plan: site and floor plan layouts showing escape routes, marshaling areas. Details on alarm notification methods, fire drills, location of firefighting equipment and other related data.
 - .3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
 - .4 Emergency Contacts: name and telephone

- number of officials from:
- .1 General Contractor and subcontractors.
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
 - .5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PWGSC and Facility Management contact.
 - .4 On-site Communication Plan:
 - .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
 - .2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health & safety of Facility users.
 - .5 Address all activities of the Work including those of subcontractors.
 - .6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.
 - .7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.
 - .8 Post copy of the Plan, and updates, prominently on Work Site.

1.14 SAFETY
SUPERVISION

- .1 Employ Health & Safety Site Representative responsible for daily supervision of Health and Safety of the Work.
- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
 - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work
 - .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
 - .3 Conduct site safety orientation session to persons granted access to Work Site.
 - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
 - .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
 - .1 Be qualified and competent person in occupational health and safety.
 - .2 Have site-related working experience specific to activities of the Work.
 - .3 Be on Work Site at all times during execution of the Work.
 - .4 All supervisory personnel assigned to the Work shall also be competent persons.
 - .5 Inspections:
 - .1 Conduct regularly scheduled safety inspections of the Work on a minimum daily basis. Record deficiencies and remedial action taken.
 - .2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection

forms. Distribute to subcontractors.

- .3 Follow-up and ensure corrective measures are taken.
- .6 Keep inspection reports and supervision related documentation on site.
- .7 Cooperate with Facility's Occupational Health & Safety representative.

1.15 TRAINING

- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
- .3 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.
- .4 All workers dealing with hazardous materials are required to provide evidence of training, in accordance with Provincial regulations.

1.16 MINIMUM
SITE SAFETY RULES

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
 - .1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses safety vest and hearing

- protection.
 - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.
-
- .2 Brief persons of disciplinary protocols to be taken for non compliance. Post rules on site.
-
- 1.17 CORRECTION OF NON-COMPLIANCE
- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
 - .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
 - .3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.
-
- 1.18 INCIDENT REPORTING
- .1 Investigate and report the following incidents to Departmental Representative:
 - .1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
 - .2 Medical aid injuries.
 - .3 Property damage in excess of \$10,000.00.
 - .2 Submit report in writing.
-
- 1.19 HAZARDOUS PRODUCTS
- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

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

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

- 1.21 Powder Actuated Devices .1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representatives.

- 1.22 Confined Spaces .1 Abide by occupational health and safety regulations regarding work in confined spaces.

- 1.23 SITE RECORDS .1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
 - .2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

- 1.24 POSTING OF DOCUMENTS .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.
 - .2 Post other documents as specified herein, including:
 - .1 Site specific Health and Safety Plan.
 - .2 WHMIS data sheets.

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- 1.1 RELATED WORK .1 Section 01 35 29 - Health and Safety Requirements.
- 1.2 DEFINITIONS .1 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- 1.3 FIRES .1 Fires are not permitted on site.
- 1.4 DISPOSAL OF WASTES AND HAZARDOUS MATERIALS
- .2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.
- .3 Store, handle and dispose of hazardous materials and hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.
- .4 Dispose of construction waste materials and demolition debris, resulting from work, at approved landfill sites only. Carry out such disposal in strict accordance with provincial and municipal rules and regulations. Separate out and prevent improper disposal of items banned from landfills.
- .5 Establish methods and undertake construction practices which will minimize waste and optimize use of construction materials. Separate at source all construction waste materials, demolition debris and product packaging and delivery containers into various waste categories in order to maximize

recycling abilities of various materials and avoid disposal of debris at landfill site(s) in a "mixed state". Where recycling firms, specializing in recycling of specific materials exist, transport such materials to the recycling facility and avoid disposal at landfill sites.

- .6 Communicate with landfill operator prior to commencement of work, to determine what specific construction, demolition and renovation waste materials have been banned from disposal at the landfill and at transfer stations.

1.5 DRAINAGE

- .1 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
- .3 Pumped water must meet applicable federal, provincial, and municipal standards before it can be discharged to a surface water body. If regulatory guidelines exceedences are noted, the Departmental Representative has the right to issue stop pumping instructions to the Contractor. Contractor will not be compensated for any delays associated with retrofitting equipment to meet guidelines.

1.6 PERMITS

- .1 All guidelines and instructions stated on permits must be strictly adhered to.

1.7 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.

- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 At borrow sites, design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial and federal environmental regulations.
- .5 Do not skid logs or construction materials across waterways.
- .6 Ensure refueling of any type of equipment does not, either directly or indirectly, create pollution by causing or permitting any leaks or spills.
- .7 Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

1.8 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 dust and debris.
- .4 Have emergency spill response equipment and rapid clean-up kit, appropriate to work, at site. Locate adjacent to work and where hazardous materials are stored. Provide personal protective equipment as required for clean-up.
- .5 Report, to Federal and Provincial Department of the Environment, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment. Also notify Departmental

Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

1.9 WILDLIFE
PROTECTION

- .1 Should sea bird nests be encountered during work, immediately notify Departmental Representative for directives to be followed.
 - .1 Do not disturb nest site and neighboring vegetation until nesting is completed.
 - .2 Minimize work immediately adjacent to such areas until nesting is completed.

-
- 1.1 SANITARY FACILITIES .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.2 WATER SUPPLY .1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.
- 1.3 SCAFFOLDING .1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CSA797-09.
- .2 Erect scaffolding independent of walls. Remove when no longer required.
- 1.4 CONSTRUCTION SIGN AND NOTICES .1 Contractor or subcontractor advertisement signboards are not permitted on site.
- .2 Only notices of safety or instructions are permitted on site.
- .3 Safety and Instruction Signs and Notices:
.1 Signs and notices for safety and instruction shall be in both official languages.
- .4 Maintenance and Disposal of Site Signs:
.1 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Departmental Representative.
- 1.5 REMOVAL OF TEMPORARY FACILITIES .1 Remove temporary facilities from site when directed by Departmental Representative.

PART 1 - GENERAL

- 1.1 SECTION INCLUDES .1 Barriers.
- 1.2 INSTALLATION AND REMOVAL .1 Provide temporary controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.
- 1.3 HOARDING .1 Erect temporary site enclosure if required by governing authorities, using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m centres. Provide one lockable truck gate. Maintain fence in good repair.
- 1.4 GUARD RAILS AND BARRICADES .1 Provide secure, rigid guard rails and barricades around work site as required to protect/prevent entry by public.
- .2 Provide as required by governing authorities.

PART 1 - GENERAL

1.1 GENERAL

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.

1.2 CLEANING DURING CONSTRUCTION

- .1 Maintain project grounds and public properties in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
- .2 Provide on-site garbage containers for collection of waste materials and debris.
- .3 Remove waste materials and debris from site on a daily basis.

1.3 FINAL CLEANING

- .1 In preparation for acceptance of the Work perform final cleaning.

- 1.1 SECTION INCLUDES .1 Close out requirements for Project Record Documents.
- 1.2 RELATED SECTIONS .1 Division 01 - General Requirements.
.2 Section 31 68 13 - Rock Stabilization.
- 1.3 PROJECT RECORD DOCUMENTS .1 Departmental Representative will provide two copies of Specifications.
.2 Contractor shall record actual depth, angle, materials and location of all rock bolts installed and provide sketches/drawings showing "As-Built" site conditions.
.3 Contractor shall submit all test results including grout test, rock bolt pull out and "performance/proof testing" results.

PART 1 - GENERAL

- 1.1 SECTION INCLUDES .1 Materials and installation of rock bolts, grouting, and rock scaling and removal.
- 1.2 RELATED SECTIONS .1 Section 01 10 10 - General Requirements.
- .2 Section 01 78 00 - Closeout Submittals.
- 1.3 MEASUREMENT FOR PROCEDURES .1 Rock bolts: shall be paid by the linear meter as designated in PWGSC's Estimate. Quantities of rock bolts to be paid for will be determined from the dimensions & approximate locations shown in Appendix I, Figure 1 & 2 or as directed by the DR based on actual site conditions. The contract price paid per linear meter of rock bolts shall include full compensation for furnishing all labour, materials, tools, equipment, and incidentals, and for doing all the work involved in assessing the site, furnishing and placing rock bolts, complete in place and testing as specified in the contract documents and as directed by DR.
- .2 The Lump Sum price paid for scaling and rock removal shall include full compensation for furnishing all labour, materials, tools, equipment, and incidentals, assessing the site, and for doing all the work involved in scaling and rock removal, as shown on the plans, as specified in the contract documents and as directed by DR.

1.4 DEFINITIONS

- .1 Solid Rock: rock in solid or masses in its original position which can be removed only by drilling or blasting.
- .2 Loose Rock: rock that has defined discontinuity planes with possible separation between itself and the solid rock which can be removed by leverage, jacking or prying.
- .3 Talus & Debris: accumulated rock, soil & debris from scaling/removal operations.
- .4 Scaling & Rock Removal: refers to the removal of loose rock & soil on the face of the slope. Scaling & removal shall include the removal of all loose and potentially loose material to ensure the remaining rock mass is "Solid Rock" as defined above.

1.5 CODES

- .1 Perform work in accordance with all applicable federal, provincial, and municipal regulations provided that in any case of conflict or discrepancy the more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 contract documents
 - .2 specified standards, codes, and referenced documents.
- .3 Contractor is responsible for obtaining and paying costs for all permits and insurances required to carry out the work.

1.6 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to DR the following at least 4 weeks prior to beginning work.
 - .1 Manufacturer's information on rock bolts showing sizes of bolts and all accessories.
 - .2 Manufacturers information on all types of grout, epoxy or resin's to be use for complete rock bolt installation.
- .3 Submit to Engineer copies of mill test data and certificate, at least 4 weeks prior to start of work and in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit detailed work plan for scaling, rock removal & installation & testing of rock bolts. Plan shall include as a minimum: equipment types, methods, detailed information on project approach including information on mobilization, sequence and methods of operations, and safety measures.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 During delivery and storage, protect all materials from damage.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene,

corrugated, cardboard, packaging material for recycling in accordance with Waste Management Plan.

- .4 Fold up metal banding, flatten, and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 ROCK BOLTS AND ACCESSORIES

- .1 Rock bolt system shall consist of steel bar, face plate, washer(s), nut(s), bolt, and corrosion protection.
- .2 Rock bolts & accessories shall be galvanized conforming to ASTM A123 or ASTM A153.
- .3 Rock bolts shall be thread bar or similar approved deformed bar with no less than 500 mm (20 inches) of coarse thread suitable for tensioning by means of hexagonal nuts
- .4 The thread bar or deformed steel bars shall be 32 mm (1¼-inch) diameter & installed length of 6.1m with an allowable minimum design load capacity of 200KN (20 tons) with a minimum 2:1 safety factor, i.e. minimum yield strength of 400 KN.
- .5 Each rock bolt shall have a 200 mm x 200 mm x 16 mm thick (8 inch x 8 inch x 5/8 inch thick) galvanized bearing plate, galvanized bevelled hardened steel washers (minimum 2 per bolt) and a galvanized hexagonal nut.

2.2 ROCK BOLT TYPES

- .1 Rock bolts may utilize polyester resin grout, cement grout, or a mechanical anchor system to achieve the design capacities.
- .2 Details provided in Sections 2.3 and 2.4 below are for general guidance only. Final rock bolt details and specifications will depend upon the manufacturers design and recommendations for installation necessary to achieve the design criteria presented in Section 2.1.4 above.
- .3 Anchor type must be a two stage system, whereby the free length of the anchors will be grouted following post tensioning, testing and lock-off.

2.3 POLYESTER RESIN
GROUTED ANCHOR

- .1 Rock bolts may utilize resin set anchorage system. It is the responsibility of the contractor to determine the suitability of the resin set anchorage system for the specified application.
- .2 Resin set anchors shall be installed in accordance to the manufactures specifications and recommendations and approval by the DR.
- .3 The type of resin, the specific cartridge sizes, and the number to achieve the required capacity specified herein and shall be demonstrated to be effective prior to approval by the DR for use in the work.

.4 The DR will require tests to be carried out at the Contractor's expense to check the actual setting time of the resin in the bolt hole and confirm the anchor capacity.

.5 The free length of the bolt must be fully grouted with an acceptable product after tensioning and lock-off.

.6 Substitution of any material or process described in this section must be approved by the DR.

2.3 MECHANICAL ANCHOR

.1 Rock bolts may utilize mechanical expanded shell anchor system.

.2 Mechanical anchors shall be installed in accordance with the manufacturer's specifications and recommendations and approval by the DR.

.3 The free length of the bolt must be fully grouted with an acceptable product after tensioning and lock-off.

.4 Substitution of any material or process described in this section must be approved by the DR.

2.4 GROUTED ANCHOR

.1 Rock bolts may utilize a cement type grout set anchorage system. It is the responsibility of the contractor to determine the suitability of the cement type grout set anchorage system for the specified application.

- .2 All cement type grout set anchorage materials must consist of a non-expansive non-shrink grout type mixture with a minimum 7 day compressive strength of 25 MPa (3750 psi) and a 28 day compressive strength of 50 MPa (7500 psi). Calcium chloride shall not be used as an accelerator.
- .3 All cement type grout set anchorage products must be approved by the DR before utilization.
- .4 Grout testing will be completed by the contractor and witness by DR.
- .5 The free length of the bolt must be fully grouted with an acceptable product after tensioning and lock-off.

PART 3 - EXECUTION

3.1 SCALING

- .1 Scaling and removal shall include all works to scale the rock face and removal all scaled rock, talus and debris from the area as shown on the Drawings. The limits and extent of scaling as noted in Appendix I, Figure 3 & 4 shall be done to ensure all loose and potentially loose material is removed to the limits defined by a rock mass described as "Solid Rock".
- .2 All scaling and removal operations are to be conducted completed to the satisfaction of DR. The extent of scaling and removal in all areas and the suitability of equipment being used will require the approval of

DR.

- .3 The Contractor is to assess the appropriateness of the methods in order to safely and effectively carry out the scaling and removal operations. Prior to the initiation of the work, the Contractor must advise DR in writing, or as otherwise agreed, of how Contractor intends to complete operations and must obtain DR's approval.
 - .4 Scaling and removal operations must be completed before proceeding with other slope work such as installation of rock bolts.
 - .5 Rock slope scaling and removal shall include the areas of the site as identified in Appendix I, Figures 3 & 4.
 - .6 All scaling operations must be completed starting from the top and proceeding downwards.
 - .7 Comply with all safety requirements during the scaling operation.
 - .8 Notify DR 48 hours prior to initiation of scaling for inspection of scaled rock surface. DR may request the Contractor to do further work which DR deems necessary.
- 3.2 INSTALLATION OF ROCK BOLTS
- .1 Procedures and equipment used for drilling holes in rock, preparing, installing, grouting, and tensioning rock bolts shall be in strict accordance with the manufacturer's specifications to ensure the

required design anchorage is achieved.

- .2 Discrepancies between the manufacturer's specifications and those presented within this specification should be reviewed and approved by the DR.
- .3 Provide appropriate drilling platform or equivalent for drilling, installation, and testing of rock bolts on the slopes.
- .4 Do not commence rock bolting operation in any area of the rock face until completion of the rock scaling.
- .5 Prepare rock surface or provide resin pad on rock surface at bolt position to provide even bearing surface for bearing plate.
- .6 Rock bolts shall be installed into the rock at locations as determined by the DR.
- .7 Depth of hole shall be in accordance with the project requirements and anchor specifications.
- .8 All damaged galvanized surfaces, welds and others free of galvanized coatings shall be cleaned with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich coating. Procedures should follow ASTM A780.
- .9 In order to confirm the anchorage methods, products, and procedures proposed by the contractor, the Contractor at his expense shall have an independent testing company to

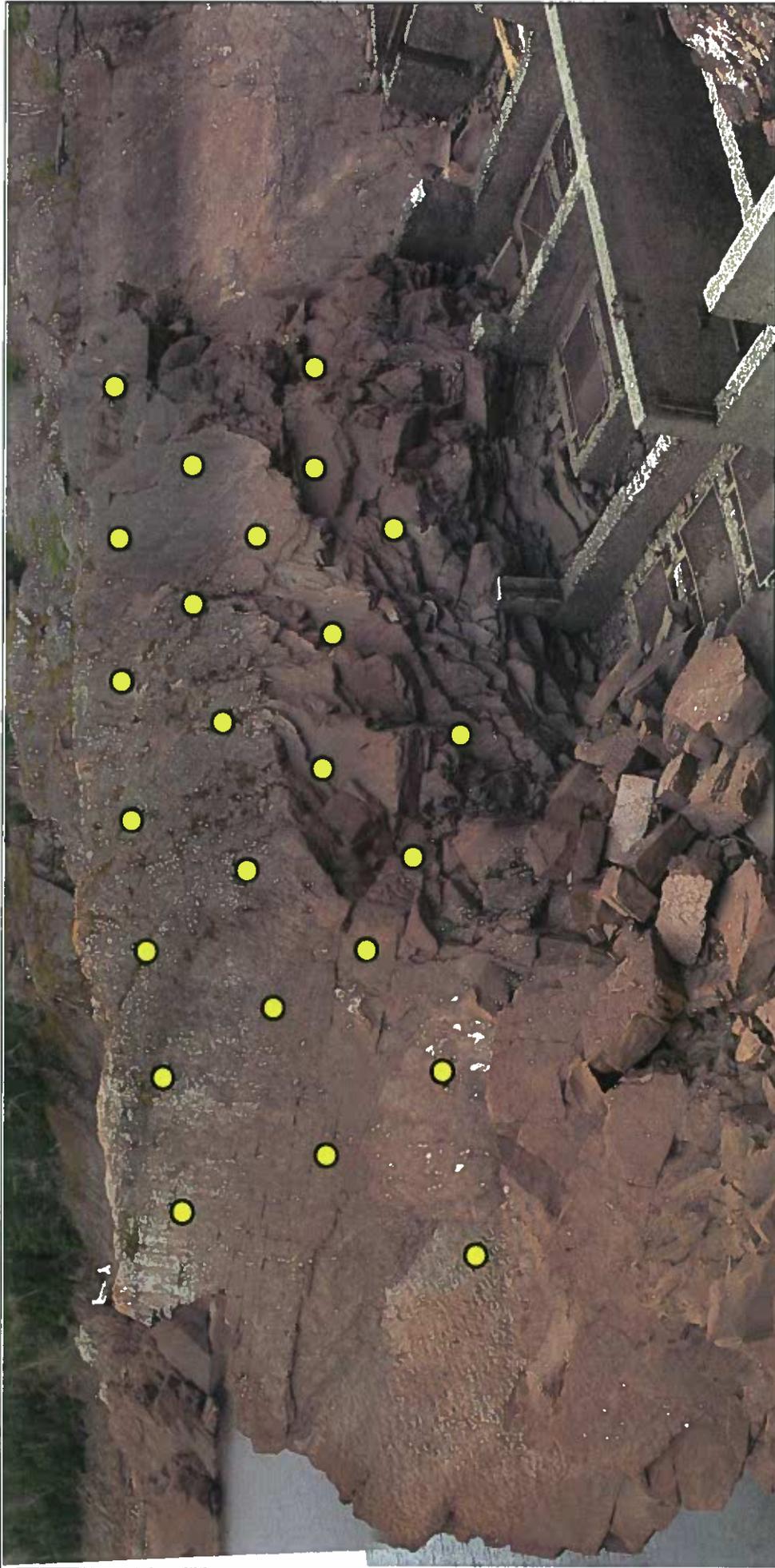
conduct rock bolt pull 'performance testing' on the first three anchors and a minimum of 3% of the remaining anchors in accordance with the International Society for Rock Mechanics (ISRM) and Post Tensioning Institute Standard methods.

- .10 All other bolts shall be pull 'proof' tested in accordance with the International Society for Rock Mechanics (ISRM) standard. The Contractor at his expense shall supply all equipment to complete the testing and shall be witnessed by the DR
- .11 Failed rock bolts shall be removed and reinstalled by the contractor at his expense.
- .12 All bolts shall be post tensioned to 200 KN and locked off. The free length of all anchors shall be fully grouted following lock off.

3.3 LAYOUT/DESIGN OF ROCK BOLTS

- .1 Rock Bolt Pattern as illustrated on the project Drawings
- .2 Installation Angle at negative 10° (downward) from horizontal.

APPENDIX I

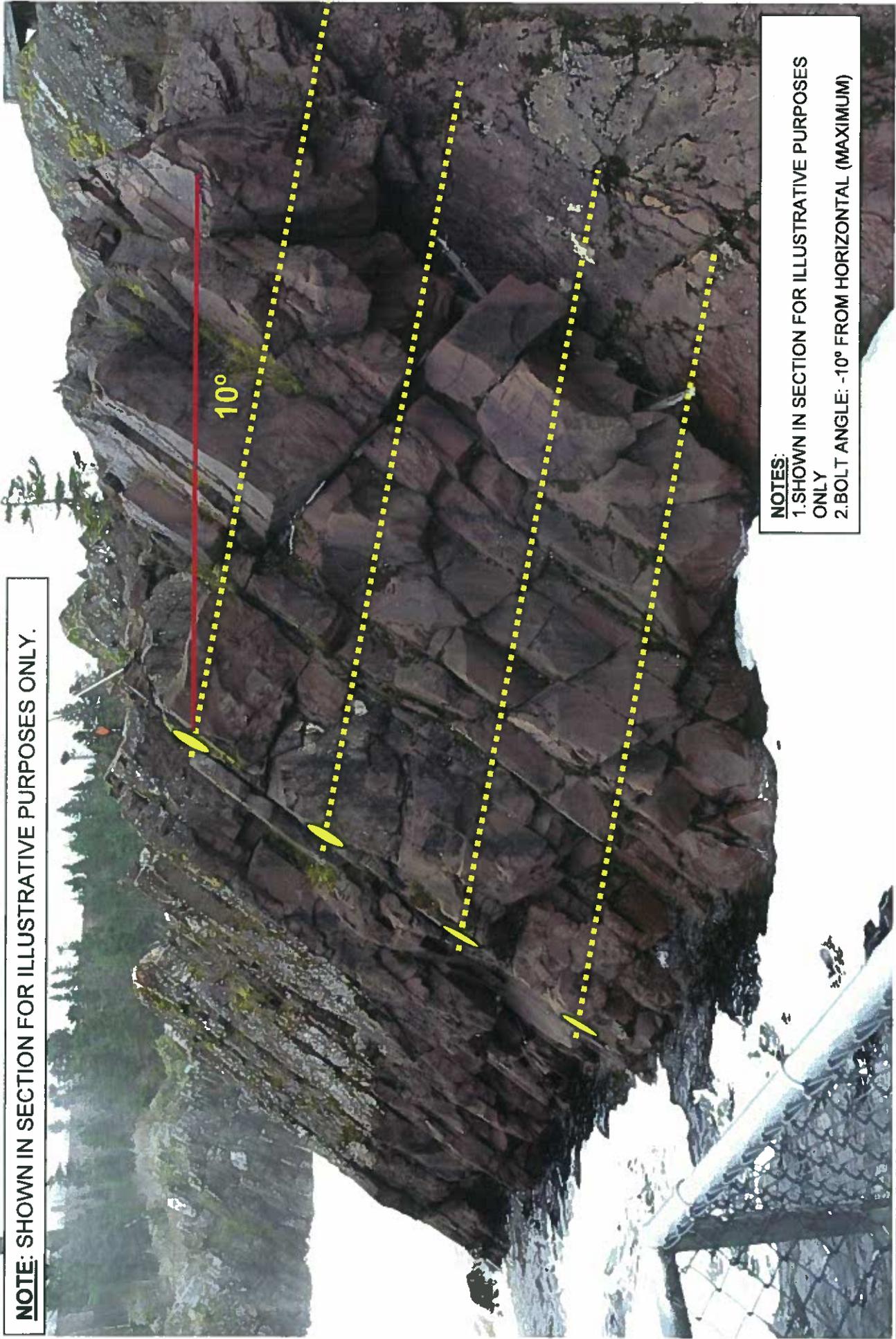


NOTES:

1. ROCK BOLT LOCATIONS AND NUMBER OF ROCK BOLTS SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY. FINAL LOCATIONS WILL BE DETERMINED BY THE ENGINEER IN THE FIELD FOLLOWING COMPLETION OF SCALING.
2. THE ENGINEER RESERVES THE RIGHT TO ADJUST ROCK BOLT LOCATIONS AND THE TOTAL NUMBER AS REQUIRED.
3. APPROXIMATE NUMBER OF ROCK BOLTS = 24
4. ROCK BOLT LENGTH: 6.1 m (~20 ft)
5. ROCK BOLT ANGLE: -10° FROM HORIZONTAL (MAXIMUM)
6. DESIGNB ROCK BOLT LOADING: 200 kN (~20 t)

PROJECT TITLE: GRAND FALLS FISHWAY, SLOPE STABILIZATION	SCALE:	DATE:	DRAWN BY:
	NTS	September 2, 2015	MCM
FIGURE TITLE: ROCK BOLT LAYOUT CONCEPT - PLAN VIEW	APPROVED:	FIGURE NO.:	REV. NO.:
	PDD	01	3
			

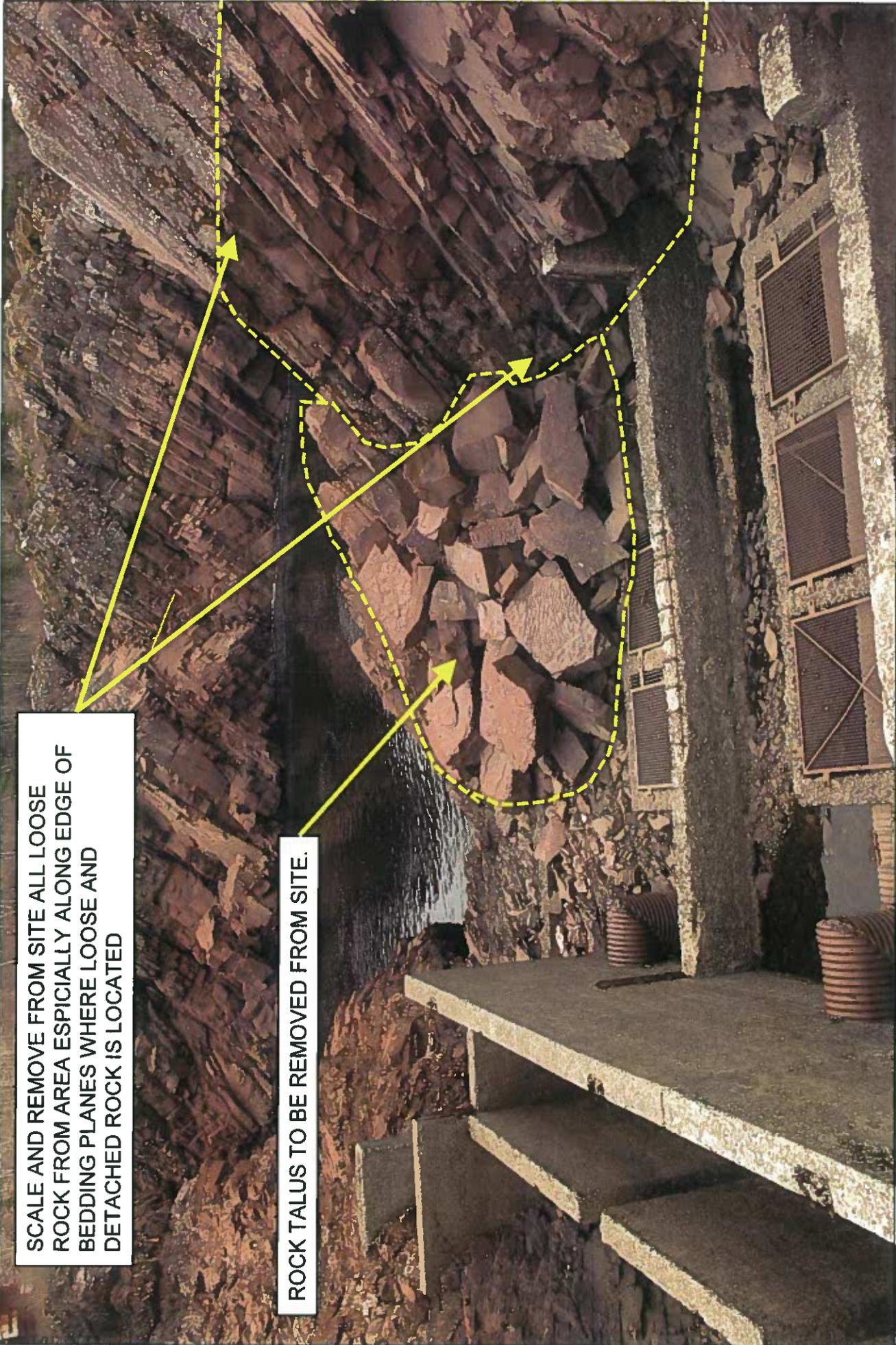
NOTE: SHOWN IN SECTION FOR ILLUSTRATIVE PURPOSES ONLY.



NOTES:
1. SHOWN IN SECTION FOR ILLUSTRATIVE PURPOSES ONLY
2. BOLT ANGLE: -10° FROM HORIZONTAL (MAXIMUM)

PROJECT TITLE GRAND FALLS FISHWAY, SLOPE STABILIZATION ROCK BOLT LAYOUT CONCEPT - SECTION VIEW	SCALE: NTS	DATE: September 2, 2015	DRAWN BY: MCM
	APPROVED: PDD	FIGURE NO.: 02	REV. NO.: 3

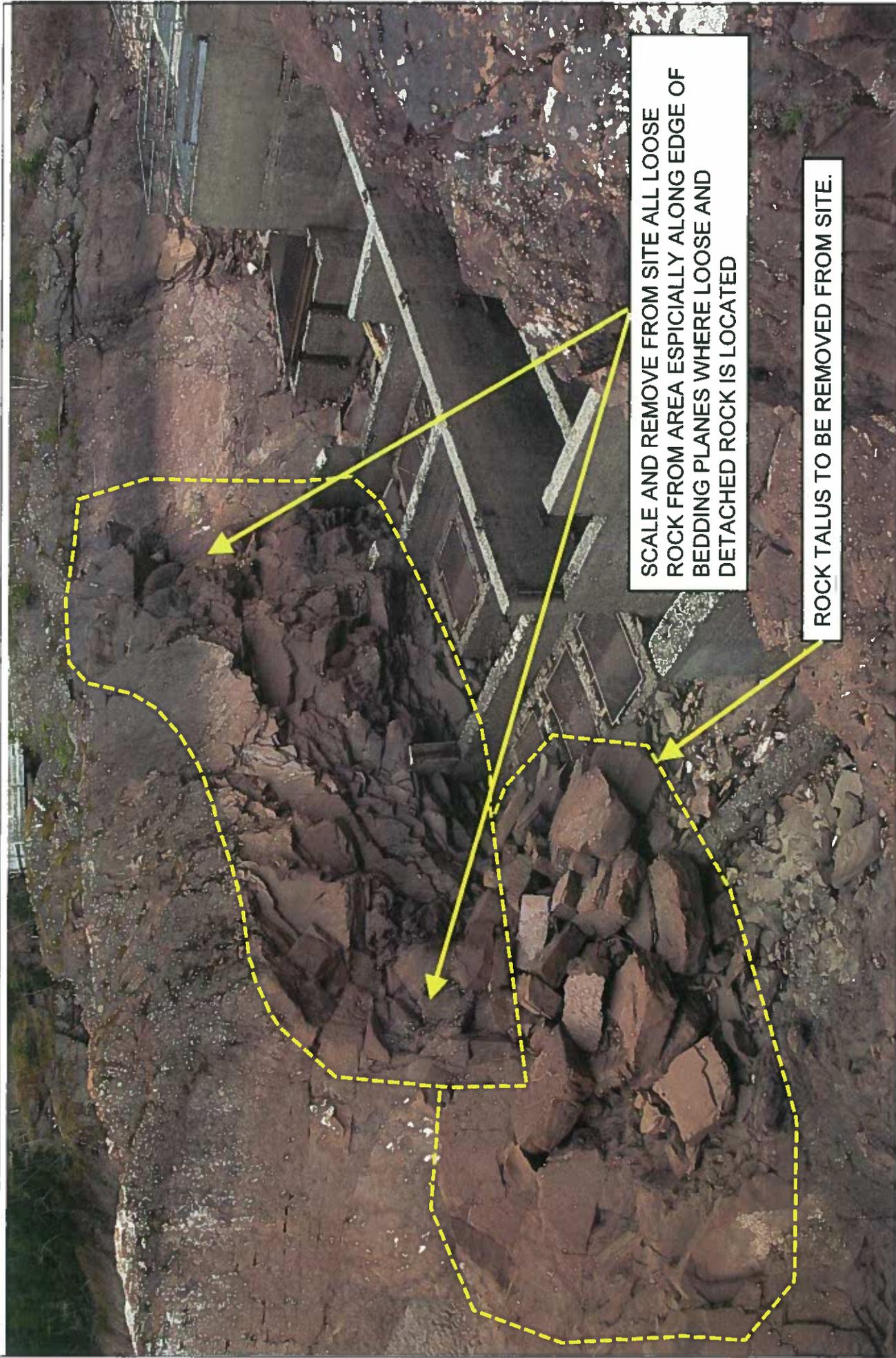




SCALE AND REMOVE FROM SITE ALL LOOSE ROCK FROM AREA ESPECIALLY ALONG EDGE OF BEDDING PLANES WHERE LOOSE AND DETACHED ROCK IS LOCATED

ROCK TALUS TO BE REMOVED FROM SITE.

PROJECT TITLE: GRAND FALLS FISHWAY, SLOPE STABILIZATION	SCALE: NTS	DATE: September 2, 2015	DRAWN BY: MCM
FIGURE TITLE: SCALING AND ROCK REMOVAL AREAS	APPROVED: PDD	FIGURE NO: 03	REV NO: 3



SCALE AND REMOVE FROM SITE ALL LOOSE
ROCK FROM AREA ESPECIALLY ALONG EDGE OF
BEDDING PLANES WHERE LOOSE AND
DETACHED ROCK IS LOCATED

ROCK TALUS TO BE REMOVED FROM SITE.

PROJECT TITLE: GRAND FALLS FISHWAY, SLOPE STABILIZATION		SCALE: NTS	DATE: September 2, 2015	DRAWN BY: MCM
FIGURE TITLE: SCALING AND ROCK REMOVAL AREAS		APPROVED: PDD	FIGURE NO: 04	REV NO: 3
		 Stantec		