



Public Works and Government Services Canada

Requisition No. E0276-140735/A

MERX I.D. No. _____

SPECIFICATIONS

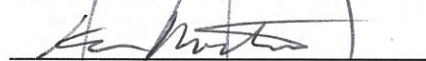
For

Rock Slope Stabilization Km 255.1 – Phase 2
Alaska Highway, B.C.

Project No. R.017173.045

July 2013

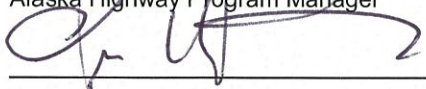
APPROVED BY:



Alaska Highway Program Manager

2013/07/26

Date



Construction Safety Coordinator

2013.07.26

Date

TENDER:



Project Manager

July-26-2013

Date

Rock Slope Stabilization Km 255.1 - Phase 2 - Alaska Highway, B.C.

Project No. R.017173.045

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PART 1 - GENERAL

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| 1.0 <u>Description of Work</u> | .1 Work to be done under this contract consists of:
.1 Installing slope mesh on rock cuts, and rock disposal from adjacent rock slopes and ditches to eliminate hazard of sudden rock falls onto the Alaska Highway.
.2 Hand scaling and tree shrub removal performed in conjunction with slope mesh installation shall be paid hourly if required. |
| 2.0 <u>Location of Work</u> | .1 Work is located between km 250 and km 260, Alaska Highway, B.C. Fort Nelson, B.C. is located at km 455 and Fort St. John, B.C. is Km 80.
.2 Drawing R.017173.045-01 shows line diagram and limits of work. |
| 3.0 <u>Work Schedule</u> | .1 Provide to the Departmental Representative in writing and within 5 working days after Contract award, a detailed construction schedule and traffic plan. The schedule shall show proposed work to be undertaken and anticipated completion dates for each category of work in the Unit Price Table.
.2 After receiving the Contractor's plan and prior to start of construction, a meeting involving Contractor and Departmental Representative will be held at a place and time to be determined by the Departmental Representative. This meeting will review implications of contract, design, schedule of work, methods of construction, environmental protection methods and traffic control.
.3 Submit Contract Schedule within 7 days of contract amendment. Indicate anticipated program stages within date of completion shown in tender documents.
.4 Complete all work by October 25, 2013.
.5 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.
.6 No work will begin until the pre-construction meeting is held.
.7 Following the pre-construction meeting and approval of the design, construction and traffic control plan, the work will be so scheduled to meet the time restraints and have the project completed on time. |
| 4.0 <u>Layout of Work</u> | .1 Departmental Representative will indicate areas of work.
.2 Contractor to layout all work on ground to satisfaction of Departmental Representative.
.3 No separate payment for layout of work. |
| 5.0 <u>Maintenance of Work During Construction</u> | .1 Maintain work during construction. Undertake continuous and effective maintenance work day by day, with adequate equipment and forces so that |

the roadway or structures are continuously kept in a condition satisfactory to Departmental Representative.

6. Highway Regulation
 - .1 Observe and obey all regulations concerning hauling and traffic.
 - .2 Restrict hauling equipment to legal loads.
 - .3 Conform to Federal, Provincial and Municipal laws and regulations related to this work, including those addressing labour, health, safety, fire, blasting and environmental protection. Execution of work is subject to provisions of Canadian Environmental Assessment Act (CEAA) of January 1995.
 - .4 All safety practices with regard to handling of explosives as required by applicable Federal and Provincial regulations shall be observed on this project by Contractor for purposes of blasting shall be properly qualified and licensed if required.
7. Traffic Accommodation
 - .1 Regulate traffic as specified in Section 01 35 14 except as outlined below:
 - .1 Contractor must endeavor to maintain at least single lane public traffic through work area at all times. Closures of highway, to a maximum of 20 minutes, will be permitted for trimming and scaling, including clean-up of blasted or scaled rock from highway.
 - .2 During major blasting activity, Contractor may delay traffic to a maximum of 1.5 hours but must provide 24 hour advance notice to Departmental Representative of each instance if required.
 - .3 To ensure efficient passage of traffic, length and section of restricted traffic flow shall be limited to 500m. Where work is conducted in non-adjacent areas simultaneously, each area shall require traffic control personnel, and may require separate equipment for clearing roadway of scaled material.
 - .4 Traffic control measures will be monitored by Departmental Representative, and modifications of these measures from time to time may be required.
 - .5 No separate payment will be made for aforementioned work. Costs of this work shall be considered incidental to contract.
7. Traffic Accommodation – con't
8. Contractor's Camp
 - .1 Contractor will be allowed to have one office and one storage trailer in PWGSC Maintenance Camp at km 254.
9. Damage to Concrete Traffic Barriers and Signs
 - .1 Any damage done to roadside concrete traffic barriers and signs by Contractor's operation shall be rectified at his expense to Departmental Representative's satisfaction.
10. Disposal of Excavated Materials from Rock Cut Sites
 - .1 All material from scaling and trimming shall be hauled to a designated location at km 262 Pit.
 - .2 All ditches in work areas where stabilization work is carried out shall be cleaned of all loose material upon completion.

- .3 All activities related to load, haul and disposal of rock materials shall be incidental to Unit Price items and will not be measured separately for payment.
11. Blasting
- .1 Departmental Representative must be provided with proposed blasting plans for review prior to start of any trimming.
- .2 Notwithstanding Departmental Representative's approval of blasting plan, contractor will be completely responsible for effectiveness of any blasting and any damage which is a direct result of his blasting or other operations.
- .3 Store explosives in accordance with all applicable regulations if required.
12. Prosecution of Work
- .1 Contractor must have a crew and supervisors experienced in scaling and trimming, including drilling and blasting, and installing mesh.
- .2 Departmental Representative also reserves right to order removal from job, any piece of equipment that is not in good operation and condition and Contractor shall immediately rectify problem or replace faulty equipment
13. Qualifications of Contractor
- .1 Contractor must have a crew and supervisors experienced in scaling and trimming, including drilling and blasting, and installing mesh.
- .2 Contractor will supply with this tender, the names of all personnel he proposes to use for work, together with a resume of each individual's experience and special qualifications to do work described in these specifications and names and addresses of some of their previous employers, who may be contacted to verify each individual's experience.
13. Qualifications of Contractor – con't
14. Rental Equipment
- .1 Make equipment available for additional work in connection with this contract. Rental rates will be in accordance with current Government of British Columbia Rental Rate Schedule. 10% Northern Allowance as referred to in the schedule will apply. Rates will be all inclusive and fully operated. Hourly rental of equipment will be measured in actual working time and necessary traveling time within project limits. Transportation to and from site to be reimbursed only if equipment is used exclusively for additional work. No separate payment for operators' board and room.
- .2 These rates do not establish allowance for plant under Article GC 6.4.1 of General Conditions "C".
15. Scope & Description of Specific Rock Cut Work Areas
- .1 Estimated quantities of work are indicated below:

Zone	Hand Scaling (hr)	Mesh (m ²)
0+200 to 0+355 & 0+549 to 0+597	80	10 200

Approximate elevations for bottom and top of the rock face is indicated below:

Chainage (m)	Approx. Elevation at the top (m)	Approx. Elevation at the bottom (m)
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0+200	883	848
0+250	879	843
0+300	875	839
0+350	870	834

Chainage (m)	Approx. Elevation at the top (m)	Approx. Elevation at the bottom (m)
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0+550	852	813
0+600	850	807

- | | | |
|---|----|---|
| | .2 | Departmental Representative reserves the right to increase/decrease scope of work at each location during execution of this project. |
| | .3 | Incorporate anchors and cables (approximately 85 meters) installed by previous contract into work as indicated on Drawing SK#5306.00 Rev.1. |
| 16. <u>Protection of Alaska Highway</u> | .1 | Depositing of deleterious substances onto the Alaska Highway is prohibited therefore debris generated from Contractor's operations must not fall onto the Alaska Highway. |
| | .2 | No separate payment will be made for this work, as it will be considered incidental to contract. |
| 17. <u>Cutting & Patching</u> | .1 | Cut and patch as required to make work fit. |
| | .2 | Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. |

END OF SECTION

PART 1 - GENERAL

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| 1.1 | <u>Section Includes</u> | .1 | Mobilization and Demobilization |
| 1.2 | <u>Related Sections</u> | .1 | Construction Facilities – Section 01 52 00 |
| 1.3 | <u>Description</u> | .1 | Consists of preparatory work and operations including, but not limited to, those necessary for the movement of personnel, equipment, camp, buildings, shops, offices, supplies and incidentals to and from the project site. |
| 1.4 | <u>Measurement Procedures</u> | .1 | 50 percent of Lump Sum Contract Price for Mobilization and Demobilization, not to exceed 5 percent of the Contract Value, to be paid when mobilization to site is complete. |
| | | .2 | Remainder of Lump Sum Contract Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, camp, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other agencies having jurisdiction. |

PART 2 - PRODUCTS

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| 2.1 | <u>Not Used</u> | .1 | Not used. |
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PART 3 - EXECUTION

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|-----|-----------------|----|-----------|
| 3.1 | <u>Not Used</u> | .1 | Not used. |
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END OF SECTION

PART 1 - GENERAL

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| 1.1 | <u>Section Includes</u> | .1 | Coordination of work with other contractors and work by Departmental Representative under administration of contract. |
| | | .2 | Startup and progress meeting schedules, submittals and close-out procedures. |
| 1.2 | <u>Related Sections</u> | .1 | Section 01 11 00 – Summary of Work. |
| | | .2 | Section 01 33 00 – Submittal Procedures |
| 1.3 | <u>Coordination</u> | .1 | Coordinate progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction work, with progress of work of other contractors and work by Owner, under instructions of Departmental Representative. |
| 1.4 | <u>Construction Organization and Start-up</u> | .1 | Within 15 days after award of contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. |
| | | .2 | Senior representatives of the Owner, PWGSC, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance. |
| | | .3 | Establish time and location of meeting and notify parties concerned minimum five days before meeting. |
| | | .4 | Incorporate mutually agreed variations to contract documents into agreement, prior to signing. |
| | | .5 | Agenda to include following: |
| | | .1 | Appointment of official representative of participants in Work. |
| | | .2 | Schedule of work, progress scheduling in accordance with Section 01 32 18 – Construction Progress Schedule. |
| | | .3 | Schedule of submission of shop drawing, samples, colour chips in accordance with Section 01 33 00 – Submittal Procedures. |
| | | .4 | Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities. |
| | | .5 | Delivery schedule of specified equipment in accordance with Section 01 32 18 – Construction Progress Schedules. |
| | | .6 | Site security in accordance with Section 01 52 00 – Construction Facilities. |

1.4 Construction Organization and Start-up (Cont'd)

- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements (GC).
- .8 Departmental Representative furnished materials.
- .9 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 – Closeout Procedures.
- .10 Monthly progress claims, administrative procedures, photographs, and holdbacks (GC)
- .11 Insurances and transcript of policies (GC)
- .6 Comply with Department Representative's allocation of mobilization areas of site; for field offices and sheds, access, traffic, and parking facilities.
- .7 During construction, coordinate use of site and facilities through Departmental Representative's procedures for intra-project communications: Submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
- .8 Comply with instructions of Departmental Representative for use of temporary utilities and construction facilities.
- .9 Coordinate field engineering and layout work with Departmental Representative.

1.5 Project Meetings

- .1 Schedule and administer weekly project meetings throughout progress of work as determined by Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record minutes. Include significant proceedings and decisions. Identify action by parties.
- .7 Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants, affected parties not in attendance and Departmental Representative.

1.6 On-Site Documents

- .1 Maintain at job site, one copy each of the following:

- .1 Contract drawings.
- .2 Specifications.
- .3 Addenda.

1.6 On-Site Documents Cont'd

- .4 Reviewed shop drawings.
- .5 Change orders.
- .6 Other modifications to contract.

- .7 Field test reports.
- .8 Copy of approved work schedule.
- .9 Section 01 35 33 – Health and Safety
- .10 Manufacturers' installation and application instructions.
- .11 Labour conditions and wage schedules.
- 1.7 Schedules
 - .1 Submit preliminary construction progress schedule in accordance with Sections 01 32 18 – Construction Progress Schedule.
 - .2 After review, revise and resubmit schedule to comply with revised project schedule.
 - .3 During progress of work, revise and resubmit as directed by Departmental Representative.
- 1.8 Construction Progress Meetings
 - .1 During course of work and weeks prior to project completion, schedule progress meeting monthly.
 - .2 Contractor, major subcontractors involved in work and Departmental Representative are to be in attendance.
 - .3 Notify all parties minimum three days prior to meetings.
 - .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three days after meeting.
 - .5 Agenda to include following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule during succeeding work period.
 - .9 Review submittal schedules; expedite as required
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
- 1.8 Construction Progress Meetings (Cont'd)
 - .12 Health and Safety
 - .13 Other business.
- 1.9 Submittals
 - .1 Make submittal to Department Representative for review.
 - .2 Submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 – Submittal Procedures, for review for compliance with contract documents; for field

dimensions and clearances, for relation to available space, and for relation to work of other contracts. After review, revise and resubmit for transmittal to Departmental Representative.

- .3 Submit requests for payment for review, and for transmittal to Departmental Representative.
- .4 Submit requests for interpretation of contract documents, and obtain instructions through Departmental Representative.
- .5 Process substitutions through Departmental Representative.
- .6 Process change orders through Departmental Representative.
- .7 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.
- .8 Section 01 35 33 – Health and Safety

1.10 Coordination Drawings

- .1 Provide information required by Departmental Representative for preparation of coordination drawings.
- .2 Review and approve revised drawings for submittal to Departmental Representative.

1.11 Closeout Procedures

- .1 Notify Departmental Representative when work is considered ready for Substantial Performance.
- .2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.
- .3 Comply with Departmental Representative's instructions for correction of items of work listed in executed certificate of Substantial Performance and for access to Owner-occupied areas.
- .4 Notify Departmental Representative of instructions for completion of items of work determined in Departmental Representative's Final inspection.

PART 2 – PRODUCTS

- 2.1 Not Used .1 Not Used.

PART 3 - EXECUTION

- 3.1 Not Used .1 Not Used.

END OF SECTION

PART 1 - GENERAL

- 1.1 Precedence .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.
- 1.2 Measurement Procedures .1 Cost of providing construction Progress Schedules will be considered incidental to the work and no additional payment will be made.
- 1.3 Definitions
- .1 Activity: An element of work performed during course of Project. An activity normally has an expected duration, expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT): A graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: Original approved plan (for Project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Sunday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar Chart (GANTT) submission.
- .5 Duration: Number of work periods (not including holidays or other nonworking periods) required to complete an activity or other Project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: A summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: A significant event in Project, usually completion of major deliverable.
- .8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: Overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.
- 1.4 Requirements .1 Ensure Master Plan and Detail Schedules are practical and remain

within specified contract duration.

- .2 Plan to complete work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 20 working days to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.5 Submittals

- .1 Submit to Departmental Representative within 10 working days of Award of contract Bar Chart (GANTT) as Master Plan for planning, monitoring and reporting of project progress.
- .2 Submit Project Schedule to Departmental Representative within 10 working days of receipt of acceptance of Master Plan.

1.6 Master Plan

- .1 Structure schedule to allow orderly planning, organizing and execution of work as Bar Chart (GANTT)
- .2 Departmental Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.7 Project Schedule

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Permits.
 - .3 Submission of:
 - .1 Environmental Protection Plan.
 - .2 Campsite Plan.
 - .3 Traffic Management Plan.
 - .4 Shop drawings, samples.
 - .4 Mobilization.
 - .5 Slope Mesh for rock cuts.
 - .6 Trimming.

1.8 Project Schedule Reporting

- .1 Update Project Schedule on monthly basis, reflecting activity changes and completions as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated

delays and impact with possible mitigation.

- 1.9 Project Meetings .1 Discuss Project Schedule at regular site meetings. Identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 - PRODUCTS

- 2.1 Not Used .1 Not Used

PART 3 - EXECUTION

- 3.1 Not Used .1 Not Used

END OF SECTION

PART 1 - GENERAL

- 1.1 Section Includes
- .1 Shop drawings and product data.
 - .2 Certificates and transcripts.
 - .3 Required Contractor Submittals.
 - .1 Pre-mobilization Submittals.
 - .1 Schedule.
 - .2 Contractor Chain of Command.
 - .3 Work Plan.
 - .4 Quality Control Plan.
 - .5 Traffic Management Plan.
 - .6 Construction Access Plan.
 - .7 Environmental Protection Plan (EPP).
 - .8 Campsite Plan.
 - .9 Health and Safety Plan
 - .2 Construction Phase Submittals.
 - .1 Monthly Progress Reports.
 - .2 Quality Control Inspection Reports.
 - .3 Progress Photographs.
 - .3 Project Completion Submittals.
 - .1 Record Drawings.
 - .2 Quality Control Records.
- 1.2 Precedence
- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections on other Divisions of the Project Manual.
- 1.3 Related Sections
- .1 Section 01 32 18 – Construction Progress Schedules.
 - .2 Section 01 35 33 – Health and Safety Requirements.
 - .3 Section 01 35 43 – Environmental Procedures.
- 1.4 Administrative
- .1 Submit to Departmental Representative, submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in work. Failure to submit in ample time is not considered sufficient reason for an extension of contract time and no claim for extension by reason of such default will be allowed.
- 1.4 Administrative (Cont'd)
- .2 Work affected by submittal shall not proceed until review is complete.
 - .3 Present shop drawings, product data, samples and mock-ups in SI

- metric units.
- .4 Where items or information is not produced in SI Metric units, converted values are acceptable.
 - .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
 - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Verify field measurements and affected adjacent work area coordinated.
 - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
 - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
 - .10 Keep one reviewed copy of each submission on site.
- 1.5 Shop Drawings and Product Data
- .1 The term "shop drawings" means 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 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplies and installed. Indicate cross references to design drawings and specifications.
- 1.5 Shop Drawings and Product Data Con't.
- .3 Allow 10 days for Departmental Representative's review of each submission.
 - .4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of work, state such in writing to Departmental Representative prior to proceeding with work.
 - .5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of any

revisions other than those requested.

.6 Accompany submissions with transmittal letter containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.7 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 Performance characteristics.
 - .3 Standards.

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

.9 Submit six prints and one electronic copy of shop drawings for each requirement requested in specification Sections and as consultant may reasonably request.

.10 Submit six hard copies and one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawing will not be prepared due to standardized manufacture of product.

1.5 Shop Drawings and Product Data (Cont'd)

.11 Delete information not applicable to project.

.12 Supplement standard information to provide details applicable to project.

.13 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.

- .14 The review of shop drawings by Public Works & Government Services Canada (PWGSC) is for the sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of 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 coordination of work of all sub-trades.
- 1.6 Certificates and Transcripts .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.
- 1.7 Required Contractor Submittals .1 General
- .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.
- .2 Pre-Mobilization Submittals
- .1 Submittal Schedule and Acceptance
- .1 Submit the following plans and programs to the Engineer for review a minimum of 10 days prior to mobilization to the project site. The Contractor shall not begin any sit work until the Departmental Representative has authorized acceptance of the submittals in writing. The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them:
- .1 Project Schedule, detailing the schedule of the workdays and manpower required to complete each phase of the project (e.g., mobilization, construction sequencing, excavation, steel

erection, backfilling, roadway reconstruction and demobilization).

- .2 Contractor Chain of Command, listing key Contractor personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers. The list shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.
- .3 Work Plan, describing the Contractor's intended methods of construction including, but not limited to, the environmental mitigation strategies and projected number of personnel on site.
- .4 Construction Access Plan, which shall include, but not be limited to, engineering drawings and procedures for accessing all areas of the work.
- .5 Environmental Protection Plans (EPP), which shall meet the requirements of Section 01 35 43 – Environmental Procedures.
- .6 Camp Site Plan, showing the layout of fences, parking areas and buildings, and describing the facilities for food and waste storage in accordance with Section 01 35 43 – Environmental Procedures. The maximum area of the campsite shall be 50 m by 50 m.
- .7 Occupational Health and Safety Program – The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The contractor shall implement and maintain the Health and Safety Plan during the work.

1.7 Required Contractor Submittals (Cont'd)

.3 Construction Phase Submittals

- .1 Monthly Progress Reports in accordance with Section 01 32 18 – Construction Progress Schedules – Bar Chart (GANTT).
- .2 Quality Control Inspection Reports – The Contractor shall maintain a daily inspection report that itemizes the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Engineer upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each request for payment.
- .3 Shop Drawings – The Contractor shall submit all shop drawings required to fabricate and conduct the work a minimum 30 days prior to fabrication.
- .4 Progress Photographs:

- 1.7 Required Contractor Submittals (Cont'd)
- .1 Formats:
 - .1 Prints 200 x 300 mm, colour, glossy, complete with binding edge or in three hole plastic sleeves.
 - .2 Electronic: jpg files, minimum three mega pixels.
 - .2 Submission requirements: three sets prints and one set of electronic files.
 - .3 Identification: typewritten name and number of project, description of photography and date of exposure on 25 x 50 mm white patch in upper right hand corner.
 - .4 Viewpoints: viewpoints determined by Construction Manager or Engineer.
 - .5 Submission Frequency: prior to commencement of work and monthly thereafter with progress statement, or as directed by construction Manager or Departmental Representative.
 - .6 Submit all negatives of all photographs before final acceptance. Submit CD with all electronic pictures as part of closeout package.
 - .7 Insert negatives in envelopes and identify with name and number of project.
 - .8 Indicate exposure dates and viewpoints of each frame of 35 mm film strips.
 - .9 Weekly traffic control reports detailing any traffic accidents, near misses, disruption to traffic or observed abnormal traffic patterns.
 - .4 Project Completion Submittals
 - .1 Record Drawings – The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the work.
 - .2 Quality Control Records – The Contractor shall submit a bound and itemized set of project quality control.

PART 2 - PRODUCTS

2.1 Not Used .1 Not Used

PART 3 - EXECUTION

3.1 Not Used .1 Not Used

END OF SECTION

PART 1 - GENERAL

- | | | | |
|-----|--|----|--|
| 1.1 | <u>Description</u> | .1 | This section specifies requirements for traffic control on work site. |
| 1.2 | <u>Reference Standard</u> | .1 | Do traffic regulations in accordance with Traffic Control manual for Work on Roadways, distributed by Province of British Columbia, Ministry of Transportation and Highways. Ensure that current copy of manual is available on site at all times. |
| | | .2 | Nothing in this section limits the Contractor's responsibility to safely accommodate traffic through unique or varied construction situations. |
| 1.3 | <u>Requirements of Regulatory Agencies</u> | .1 | Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out work or haul materials or equipment. |
| 1.4 | <u>Measurement of Payment</u> | .1 | Measurement for payment will be included in the contract amount and no separate payment for Traffic Control will be issued. |

PART 2 - PRODUCTS

- | | | | |
|-----|--|----|---|
| 2.1 | <u>Information and Warning Devices</u> | .1 | Supply new signs, delineators, barricades, traffic cones and miscellaneous warning devices as specified in Traffic Control Manual for Work on Roadways. |
| | | .2 | Supply all signs except those shown on plan as supplied by others. |
| 2.2 | <u>Traffic Markers</u> | .1 | Have minimum of 100 Type D traffic markers and all necessary traffic signs on site and in place before interfering with traffic. |

PART 3 – EXECUTION

- | | | | |
|-----|-------------------------------------|----|---|
| 3.1 | <u>Protection of Public Traffic</u> | .1 | When working on traveling way: |
| | | .1 | Place equipment in position to present minimum of interference and hazard to traveling public. |
| | | .2 | Keep equipment units as close together as working conditions will permit and preferably on same side. |
| | | .3 | Do not leave equipment on traveled way overnight. |

- 3.1 Protection of Public Traffic (Cont'd) .2 Do not close any lanes of road or highway without approval of Departmental Representative. Before rerouting traffic, erect suitable signs and devices in accordance with instructions contained in Traffic Control Manual for Work on Roadways.
- .3 .1 Provide minimum 7 m wide roadway exclusively for traffic in two-way sections through work and on detours. Widen roadway as necessary in curves to provide room for transport trucks to meet safely.
- .2 Provide minimum 5 m wide roadway exclusively for traffic in one-way sections through work and on detours.
- .4 Provide well graded detours or temporary roads to facilitate passage of traffic around restricted construction area. Provide and maintain signs and maintain roadway.
- .5 Provide and maintain reasonable road access and egress to property fronting along or in vicinity of work under contract unless other reasonable means of road access exist.
- 3.2 Information and Warning Devices .1 Erect and maintain sign and other devices required to indicate construction activities and other temporary and unusual conditions resulting from project work which may require road user response as specified in Traffic Control Manual for Work on Roadways.
- .2 Continually maintain traffic devices in use by:
- .1 Checking signs daily for legibility, damage, suitability, and location. Clean, repair or replace to ensure clarity and reflectance.
- .2 Removing or covering signs which do not apply to existing conditions.
- 3.3 Traffic Control Persons .1 Provide traffic control persons who have been instructed in, and have demonstrated adequate knowledge of WCB Regulations, and the relevant procedures from the Traffic Control manual.
- .2 Employers of traffic control persons must train and instruct those workers in a course acceptable to the board which covers:
- .1 Environmental factors such as heat, cold and sun.
- .2 Personal protective clothing and safety equipment
- .3 Communication with traveling public.
- .4 Working around heavy equipment.
- .5 Setting up traffic control devices at a work site.
- .6 Applicable requirements of the Transportation of Dangerous Goods Act, 1992 (Canada) and the regulations made under it.
- 3.3 Traffic Control Persons (Cont'd) .7 Proper positioning of traffic control persons.

- .8 Proper hand signals.
- .3 Provide traffic control persons in the following situations:
 - .1 At each end of restricted sections where pilot vehicles are required.
 - .2 Where traffic is required to pass working vehicles or equipment which may block all or part of roadway.
 - .3 Where construction equipment is crossing roadway.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not available.
 - .6 In situations where complete protection for personnel, working equipment and public traffic is not provided by other traffic control devices.

3.4 Pilot Vehicles

- .1 Provide pilot vehicles where it is necessary to institute one-way traffic (except for short distances in good visibility), where driving lanes are not well defined or where access through the work would be otherwise dangerous. Equip pilot vehicles with orange flashing lights and signs clearly designating vehicle as a pilot vehicle.
- .2 Do not delay traffic more than necessary and in no case longer than 20 minutes.

3.5 Approval

- .1 Do not change traffic control operation without Departmental Representatives approval.

END OF SECTION

PART 1 - GENERAL

- | | | | |
|-----|---------------------------------------|----|---|
| 1.1 | <u>Related Sections</u> | .1 | All Sections. |
| 1.2 | <u>References</u> | .1 | Government of Canada |
| | | .1 | Canada Labour Code, Part II |
| | | .2 | Canada Occupational Health and Safety Regulation. |
| | | .2 | Province of British Columbia |
| | | .1 | Worker's Compensation Act Part 3, Occupational Health and Safety. |
| | | .2 | Occupational Health and Safety Regulation. |
| 1.3 | <u>Workers' Compensation Coverage</u> | .1 | Comply fully with the Workers' Compensation Act, regulations and orders pursuant thereto, and any amendments up to the completion of the work. |
| | | .2 | Maintain Workers' Compensation Board coverage during term of the contract, until and including the date that the Final Certificate of Completion is issued. |
| 1.4 | <u>Compliance With Regulations</u> | .1 | PWGSC may terminate the contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations. |
| | | .2 | It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations. |
| 1.5 | <u>Submittals</u> | .1 | Submit the following: |
| | | .1 | Copies of reports or directions issued by Federal, Provincial, Territorial Health and Safety inspectors. |
| | | .2 | Copies of incident and accident reports. |
| | | .3 | Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements. |
| | | .4 | Emergency Procedures. |
| | | .5 | Health and Safety Plan |

- 1.5 Submittals (Cont'd)
- .2 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures and provide comments to the Contractor within two days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.
 - .3 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.
 - .4 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 of the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.
- 1.6 Responsibility
- .1 The Contractor shall be responsible for:
 - .1 Assume responsibility as the Prime Contractor or work under this contract.
 - .2 The safety of persons and property on site.
 - .3 The protection of persons off site and the environment to the extent that they may be affected by the conduct of the work.
 - .4 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan
- 1.7 General
- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
 - .2 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, warning signs, traffic control personnel and temporary lighting as required.
 - .2 Secure site at nighttime as deemed necessary to protect site against entry.
- 1.8 Regulatory Requirements
- .1 Comply with specified codes, acts, bylaws, standards and

regulations to ensure safe operations at site.

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

1.9 Filing of Notice

- .1 The Contractor is to complete and submit an Advance Notice of Project as required by British Columbia Worker's Compensation Branch.

- .2 Provide copies of all notices to the Departmental representative

1.10 Health and Safety Plan

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

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

- .1 Primary requirements:

- .1 Contractor's Safety Policy.
- .2 Identification of applicable compliance obligations.
- .3 Definition of responsibilities for project/organization chart for project.
- .4 General safety rules for project.
- .5 Job-specific safe work procedures.
- .6 Inspection policy and procedures.
- .7 Incident reporting and investigation policy and procedures.
- .8 Occupational Health and Safety Committee/Representative procedures.
- .9 Occupational Health and Safety meetings.
- .10 Occupational Health and Safety communications and record keeping 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 the 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 resubmit to Departmental Representative.
 - .5 The review of Health and Safety Plan by Public Works & Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract Documents.
- 1.11 Emergency Procedures
 - .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contact (i.e. Names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulation.
 - .3 Local emergency resources.
 - .4 Departmental Representative (site staff).
 - .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and first aid attendant of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative.
 - .3 Provide written rescue/evacuation procedures as required for but not limited to:
 - .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work on, over, under and adjacent to water.
 - .6 Workplaces where there are persons who requires physical assistance to be moved.
 - .4 Revise and update Emergency Procedures as required and re-submit to the Departmental Representative.
- 1.12 Health and Safety
 - .1 Employ and assign to work, competent and authorized

Coordinator

representative as Health and Safety Coordinator. Health and Safety Coordinator must:

- .1 Have minimum 2 years' site-related working experience specific to activities associated with Construction.
- .2 Have working knowledge of occupational safety and health regulations.
- .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of work and report directly to and be under direction of site supervisor.

1.13 Hazardous Products

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials and regarding labeling 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 or toxic waste cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the products intended for use. Submit applicable MSDS and WHMIS documents.
- .3 Comply with section 02 61 33

1.14 Unforeseen Hazards

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

1.15 Posted Documents

- .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of Work.
 - .3 Emergency Procedures.
 - .4 Site drawing showing project layout, locations of first-aid station, evacuation route and marshaling station and the emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor Plans.
 - .7 Notice as to where copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
 - .8 Workplace Hazardous Information System (WHMIS) documents.

- .9 Material Safety Data Sheets (MSDS).
- .10 List of names of joint Health and Safety Committee members of Health and Safety Representative as applicable.
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of the contract includes construction activities adjacent to occupied areas.
- .3 Postings and Insert Postings should be approved by Departmental Representative.
- 1.16 Meetings
 - .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.
- 1.17 Correction of Noncompliance
 - .1 Immediately address health and safety noncompliance issues identified by authority having jurisdiction or by Departmental Representative.
 - .2 Provide Departmental Representative with written report of action taken to correct noncompliance of health and safety issues identified.
 - .3 Departmental Representative may stop work if noncompliance of health and safety regulations is not corrected. The Contractor will be responsible for any costs arising from such a "stop work order".

PART 2 - PRODUCTS

- 2.1 Not Used
 - .1 Not used.

PART 3 - EXECUTION

- 3.1 Not Used
 - .2 Not used.

END OF SECTION

PART 1 - GENERAL1.1 Scope of Environmental Protection

- .1 This section specifies the environmental requirements that the Contractor will adhere to as a minimum. The scope of environmental protection includes the following tasks.

1.2 Regulatory Framework

- .1 The Contractor shall observe all applicable Federal, Provincial and Municipal legislation, regulations, guidelines and codes of practice including but not limited to the following:
 - .1 Canadian Environmental Protection Act
 - .2 Transport of Dangerous Goods Act
 - .3 National Fire Code, 1995
 - .4 Underwriters' Laboratories of Canada
 - .5 National Building Code, 1995 (with all current amendments)
 - .6 Work Site Hazardous Material Information System Regulations (WHMIS)
- .2 Soil Criteria/Guidelines:
 - .1 CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, 2001.
 - .2 CCME Canada Wide Standards for Petroleum Hydrocarbons in Soil, 2001.
 - .3 BC CSR Generic and Matrix Numerical Soil Standards.
 - .4 BC CSR Leachate Quality Standards.
 - .5 Yukon CSR Generic and Matrix Numerical Soil Standards
- .3 Surface Water and Groundwater Criteria/Guidelines
 - .1 CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life, 2001.
 - .2 BC CSR Generic Numerical Water Standards.
 - .3 Yukon CSR Generic Numerical Water Standards.
- .4 Sediment Criteria:
 - .1 CCME Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 2001 (freshwater and marine).
 - .2 BC Generic Sediment Quality Criteria.
- .5 The Contractor shall observe the regulations and standards of other local governing agencies.

- | | |
|--|--|
| 1.2 <u>Regulatory Framework (Cont'd)</u> | .6 In case of conflict or discrepancy, the more stringent requirement shall apply. The Contractor shall meet or exceed requirements of contract documents, specified standards, codes and referenced documents. The Contractor will ensure that all on-site personnel are familiar with the mitigation measures included in the Contractor Health and Safety Plan should a spill on site occur. |
| 1.3 <u>WHMIS</u> | <p>.1 The Contractor shall comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials and labeling and provision of material safety data sheets (MSDS) acceptable to Labour Canada and Health and Welfare Canada.</p> <p>.2 WHMIS is a Canada wide system designed to give employers and workers information about hazardous materials used in the workplace.</p> <p>.3 The Contractor shall deliver copies of WHMIS data sheets to PWGSC for each hazardous material prior to bringing hazardous material on site.</p> |
| 1.4 <u>Hazardous Material</u> | <p>.1 Storage and Handling of Hazardous Materials.</p> <p>.2 Transportation of Hazardous Materials.</p> <p>.3 Disposal of Hazardous Materials.</p> |
| 1.5 <u>Handling and Transportation of Dangerous Goods</u> | <p>.1 The Contractor will observe and enforce all Acts, Regulations and Guidelines required by the regulatory agencies of the Federal, Territorial and potentially provincial governments including but not limited to Environment Canada, Department of Environment and Transport Canada Transportation of Dangerous goods Act and Regulations. In the case of conflict, the more stringent requirements will apply. The Contractor will maintain complete records, including Bills of Lading, Manifests and descriptions of any actions undertaken under the handling and transportation of dangerous goods.</p> |
| 1.6 <u>Compliance of Aboveground/Underground Storage Tanks</u> | <p>.1 Technical Guidelines for Aboveground Storage Tank Systems Containing Petroleum Products (Aboveground Technical Guidelines)</p> <p>.2 The Aboveground Technical Guidelines incorporate the CCME Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products. Subject to the modifications set out in the Aboveground Technical Guidelines, the Code of Practice is adopted as the guidelines to be used by Federal Departments.</p> |

1.6 Compliance of
Aboveground/Underground
Storage Tanks (Cont'd)

.3 The modifications are:

- .1 Non-application of some Sections of the Codes Practice is defined.
- .2 The wording "shall" shall be replaced by "should".
- .3 "Authority having jurisdiction" is defined for each clause it appears in.
- .4 Allowance is made for equivalents and alternative to materials, systems and procedures not already specified.
- .5 Review and certification of the design by a Professional Engineer is recommended.
- .6 Product transfer requirements are specified.
- .7 A table for upgrading existing tank systems is set out.

1.7 Emergency Spill Response

- .1 The Contractor shall prepare an Emergency Spill Response Plan that must be submitted to PWGSC for review of adequacy. The Contractor shall be responsible for the implementation and supervision of this plan and its application to the Contractor's personnel and its subcontractors. The plan shall require that a designated Health and Safety representative (Site Health and Safety Officer (SHSO)) is present on-site while personnel are working in association with hazardous materials, fueling and other environmentally sensitive operations. This Health and Safety representative must have received training equivalent to OSHA 40-hour Hazardous Waste Operation and Emergency Response Training Course.

1.8 Clean up

- .1 The work is to be conducted on the Alaska Highway and designated Maintenance Camps and the highest standards of site cleanliness and control must be maintained on and off the Alaska Highway. The Contractor must include in its tender price all costs relating to removal of all surplus materials, debris and equipment on completion and cleaning up the site to PWGSC's satisfaction.

1.9 Relevant Standards

- .1 The Contractor shall be responsible for ensuring that all of its materials and workmanship are in compliance with relevant standards, codes, regulations and generally in accordance with good practice. Proof of good standing with the local Workers' Compensation Board (WCB) is required.

PART 2 - PRODUCTS

- .1 Mandatory Insurance Requirements
 - .1 As a minimum, the Contractor shall maintain the following:
 - .1 Environmental Liability Insurance
 - .1 Pollution Liability insurance for sudden pollution incidents;
 - .2 Pollution Liability insurance for non-sudden pollution incidents in the amount no less than \$2,000,000 per incident.

PART 3 – EXECUTION

- 3.1 Not Used
 - .2 Not used.

END OF SECTION

PART 1 - GENERAL

- | | | | |
|-----|--|----|---|
| 1.1 | <u>Installation and Removal</u> | .1 | Provide construction facilities in order to execute work expeditiously. |
| | | .2 | Remove from site all such work after use. |
| 1.2 | <u>Scaffolding</u> | .1 | Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs as necessary to carry out work. |
| 1.3 | <u>Measurement Procedures</u> | .1 | No separate payment under Construction Facilities. |
| 1.4 | <u>Hoisting</u> | .1 | Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with subcontractors for use thereof. |
| | | .2 | Hoists and cranes shall be operated by qualified operator. |
| 1.5 | <u>Site Storage/Loading</u> | .1 | Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products. |
| | | .2 | Do not load or permit to load any part of work with a weight or force that will endanger the work. |
| 1.6 | <u>Equipment, Tool and Materials Storage</u> | .1 | Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials. |
| | | .2 | Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities. |
| 1.7 | <u>Sanitary Facilities</u> | .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. |
| 1.8 | <u>Construction Signage</u> | .1 | Provide and erect, within two weeks of signing contract, a project identification site sign in a location designated by Departmental Representative. Supply, installation, maintenance, removal and all other incidental costs associated with the project identification site sign are included in the mobilization and demobilization lump sum items in the Schedule of Quantities and unit Prices. |
| | | .2 | Provide project identification site sign comprising foundation, framing, and one 1200 x 2400 mm signboard as detailed and as described below. Framework and battens: SPF, pressure treated minimum 89 x 89 mm. |
| | | .1 | Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA 0121. |

1.8 Construction Signage
(Cont'd)

- .2 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CGSB 1-GP-189.
- .3 Fasteners: hot-dip galvanized steel nails and carriage bolts.
- .4 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay supplied by Departmental Representative.
- .3 Locate project identification sign as directed by Departmental Representative.
- .4 Direct requests for approval to erect a Consultant/Contractor signboard to Departmental Representative. For consideration, general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording shall be in both official languages.
- .5 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN3-Z321.
- .6 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.

PART 1 - PRODUCTS

2.1 Not Used

- .1 Not used.

PART 3 - EXECUTION

3.1 Not Used

- .1 Not used.

END OF SECTION

PART 1 - GENERAL

- | | | | |
|-----|--|----|---|
| 1.1 | <u>Description</u> | .1 | This section specifies requirements of regulatory agencies related to establishment and removal of construction camps. |
| 1.2 | <u>Requirements of Regulatory Agencies</u> | .1 | Camp and service area locations are subject to approval of Departmental Representative and are to be established and operated in accordance with local regulations governing operations of field camps. |
| | | .2 | Prior to installation of camp and services, submit plan of layout to Departmental Representative for approval. |
| | | .3 | Apply to authority having jurisdiction for authorization for use of water and disposal of domestic sewage wastes. Obtain authorization prior to establishing camp. |
| | | .4 | Comply with Environment Regulations. |
| 1.3 | <u>Measurement for Payment</u> | .1 | No separate payment for construction camp. |
| | | .2 | Unit price to include all costs for all camps in this contract. |

PART 2 - PRODUCTS

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|-----|-----------------|----|-----------|
| 2.1 | <u>Not Used</u> | .1 | Not used. |
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PART 3 - EXECUTION

- | | | | |
|-----|---------------------|----|---|
| 3.1 | <u>Mobilization</u> | .1 | Mobilize equipment, camp, personnel and material. Establish temporary buildings, shops, offices and facilities. Obtain necessary license and approvals. |
| | | .2 | Upon vacating camp and services area sites, clean up and leave in condition satisfactory to Departmental Representative. |
| 3.2 | <u>Maintenance</u> | .1 | Maintain camps in neat and tidy condition. |
| | | .2 | No separate payment for camp clean-up. |

END OF SECTION

PART 1 - GENERAL

- | | | | |
|-----|-----------------------------------|----|--|
| 1.1 | <u>Section Includes</u> | .1 | Administrative procedures preceding preliminary and final inspections of work. |
| 1.2 | <u>Inspection and Declaration</u> | .1 | Contractor's Inspection: Contractor and all subcontractors shall conduct an inspection of work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Departmental Representative's Inspection.

.2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of work to identify obvious defects or deficiencies. Contractor shall correct work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
.4 Operation of systems have been demonstrated to Owner's personnel.
.5 Work is complete and ready for Final Inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of work by Owner, Departmental Representative and Contractor. If work is deemed incomplete by Owner and Departmental Representative, complete outstanding items and request re-inspection. |
| 1.3 | <u>Measurement for Payment</u> | .1 | No separate payment for Closeout Procedures. |

PART 2 - PRODUCTS

2.1	<u>Not Used</u>	.1	Not used.
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PART 3 - EXECUTION

3.1	<u>Not Used</u>	.1	Not used.
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END OF SECTION

PART 1 – GENERAL**1.1 Related Sections**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 35 43 – Environmental Procedures

1.2 References

- .1 Export and Import of Hazardous Waste Regulations (EIHWR Regulations), SOR/92637.
- .2 National Fire Code of Canada 1995
- .3 Transportation of Dangerous Goods Act (TDG Act) 1992, (T19.01).
- .4 Transportation of Dangerous Goods Regulations (TDGR), (SOR/8577, SOR/85585, SOR/85609, SOR/86526).

1.3 Definitions

- .1 Dangerous Goods: Product, substance, or organism that specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 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.
- .3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
- .4 Workplace Hazardous Materials Information System (WHMIS): A Canada wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.4 Submittals

- .1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
- .3 Submit hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.5 Storage and Handling

- .1 Coordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labeling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
- .3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.
- .4 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.
- .5 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
 - .1 Store hazardous materials and wastes in closed and sealed containers that are in good condition.
 - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
 - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
 - .4 Segregate incompatible materials and wastes.
 - .5 Ensure that different hazardous materials or hazardous wastes are not mixed.
 - .6 Store hazardous materials and wastes in a secure storage area with controlled access.
 - .7 Maintain a clear egress from storage area.
 - .8 Store hazardous materials and wastes in a manner and location that shall prevent them from spilling into the environment.
 - .9 Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
 - .10 Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
- .6 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- .7 Report spills or accidents immediately to Departmental Representative and the ESO. Submit a written spill report to Departmental Representative within 24 hours of incident.

1.6 Transportation

- .1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
- .2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.
- .3 If hazardous waste is generated on site:
 - .1 Coordinate transportation and disposal with Departmental Representative.
 - .2 Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
 - .3 Use only a licensed carrier authorized by provincial authorities to accept subject material.
 - .4 Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.
 - .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
 - .6 Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
 - .7 Provide a photocopy of all shipping documents and waste manifests to Departmental Representative.
 - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
 - .9 Report any discharge, emission, or escape of hazardous materials immediately to the Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

PART 2 - PRODUCTS**2.1 Materials**

- .1 Only bring on site the quantity of hazardous materials required to perform work.
- .2 Maintain MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

PART 3 - EXECUTION

3.1 Disposal

- .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
- .2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.
- .3 Send hazardous wastes only to authorized hazardous waste disposal treatment facilities.
- .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
- .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
- .6 Dispose of hazardous wastes in a timely fashion in accordance with applicable provincial regulations.

END OF SECTION

PART 1 **GENERAL****1.1** **SECTION INCLUDES**

- .1 This Section covers the installation, by appropriate rock bolting methods, of anchored steel bars tensioned and locked off against faceplates in the areas designated by the Department Representative. Unless otherwise stated below, all rock bolts shall be installed and tensioned to the rock bolt manufacturer's specifications.

1.2 **PRECEDENCE**

- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 **SITE STORAGE/LOADING**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber or make road side site unsafe with products in any manner.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.4 **CONSTRUCTION PARKING**

- .1 Provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
- .2 Build and maintain temporary roads and provide snow removal during period of Work.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.5 **SECURITY**

- .1 If required by the Contractor, provide and pay for responsible security/traffic security personnel to keep the site safe and guard site contents of site after working hours and during holidays. For extended shut-downs, the Contractor shall provide the level of security as required to protect the Work. .

1.6 **EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.7 **CONFORMANCE DOCUMENTS**

- .1 Prior to installation the contractor shall supply documents of conformance to project specifications of all materials upon request.

1.8 MEASUREMENT AND PAYMENT

- .1 Rock Bolts - Rock bolts will not be measured.
- .2 Rock Bolts - Payment for ROCK BOLTS will be incidental to the price paid for installation of the rock mesh.

PART 2 PRODUCTS**2.1 MATERIALS GENERAL**

- .1 Steel materials shall be hot-dip galvanized to CSA G164. All resin, grout and steel materials shall be the products of established manufacturers regularly engaged in the manufacture of rock bolt materials for at least five years. Materials shall meet the following additional requirements:

2.2 ROCK BOLT BARS

- Steel hot-rolled Grade 400 meeting CAN/CSA G30.18.
- Nominal bar diameter 22 mm unless otherwise specified.
- Threadlike surface deformations for full length of bar and suitable for mechanical coupling.
- Cut-thread reinforcing bar not permitted.

2.3 MISCELLANEOUS HARDWARE

- Steel hardware to be compatible in size and strength with rock bolt bars.
- Face plates to CAN/CSA G40.21 Grade 300W.
- Faceplate dimensions 10 mm by 150 mm by 150 mm unless otherwise specified.
- Faceplates date stamped after galvanizing on the side visible when installed with the current year (in the format YYYY) in numbers 10 mm high.
- Face plates slotted for grout tube if grout is used.

2.4 RESIN

- Fast-set and slow-set resin in cartridge form. A minimum unconfined compressive strength when fully mixed and cured of 90 MPa, tested in accordance with CAN/CSA A23.2-9C.
- Encased in a plastic film that provides optimum resistance to moisture, and is easily ruptured to enable complete mixing during installation.
- Suitable thixotropic and viscous properties to permit adequate mixing of the resin components by rotation of the rock bolt bar and to contain the resin within the drill hole.
- Easily identifiable gel time and as recommended by the resin manufacturer.
- Reach 80% of its ultimate strength within a time interval equal to five times the gel time.
- Non-shrink after the gel time.
- Unaffected by mild acids or mild alkalis.
- Cartridge boxes labelled with the resin expiry date.

2.5 GROUT

- Pre-mixed, unsanded, non-metallic, and nonshrink cementitious grout containing silica fume.
- Can be mixed to a flowable consistency.
- Minimum 7 day compressive strength of 30 MPa and a minimum 28 day compressive strength of 40 MPa, tested in accordance with CAN/CSA A23.2-9C.
- Admixtures to be used according to the manufacturer's specifications.
- Calcium chloride accelerator is not permitted.

2.6 MORTAR PADS

- Portland cement based.
- Quick setting.

PART 3 EXECUTION**3.1 GENERAL**

- .1 The entire rock bolt system shall be stored under cover away from deleterious materials. All grease and other deleterious material shall be removed from the steel prior to rock bolt installation.

3.2 SITE PREPARATION

- .1 Where rock bolts may be adversely impacted, rock removal above and around proposed rock bolt locations shall be completed before installation of rock bolts commences. Any minor rock scaling performed in conjunction with rock bolting shall be considered incidental to rock bolting.

3.3 DRILL HOLES

- .1 Location, Orientation and Depth - The location, direction, angle and depth of the holes will be dependent on field conditions encountered and will be detailed by the Department Representative.
- .2 Hole Diameter - The diameter of the holes shall be suitable for the rock bolt system chosen. Where grout is used, the hole size shall be according to the rock bolt manufacturer's recommendations. Where only resin is used, the hole size shall be according to the resin manufacturer's recommendations.
- .3 Cleaning - All water, grease, oil, cuttings and other deleterious materials shall be removed from finished holes by a water and/or air jet as required.

3.4 INSTALLATION

- .1 General - Rock bolts shall be inserted (or rotated) into the drill holes and fully encapsulated in resin or grout to the drill hole collar. When resin is used, the bolt shall be advanced and rotated at a rate recommended by the resin manufacturer.
- .2 Anchorage Length - The anchorage length shall be the last 1000 mm of the inserted end of the bar, unless otherwise specified.

- .3 Centralizers - If grout is used, centralizers on 3.0 m centres shall centralize the rock bolt in the drill hole before grout is placed. Centralizers shall be suitable for holes in rock.
- .4 Resin - Resin cartridges shall be installed as follows or as specified by the resin manufacturer:
- Fast-Set Resin - A sufficient number of fast setting cartridges shall be placed at the bottom of the hole for the anchorage.
 - Slow -Set Resin - A sufficient number of slow setting cartridges shall be placed between the anchorage and the collar of the hole.
- .5 Grout - Grout shall be prepared and placed as follows unless otherwise specified by the grout manufacturer:
- Mixing - Grout shall be mixed in a colloidal or high shear grout mixer according to the grout manufacturer's published instructions. Mixing paddles shall be slotted and perforated. Mixing time shall be not less than two minutes.
 - Batching - All ingredients for the grout mix shall be batched by mass. Water shall be added to the drum first and dry ingredients afterwards. Grout shall not be re-tempered after initial mixing. Grout shall be placed immediately after mixing.
 - Grout Placement - Grout shall be pumped using a grout tube extending to the bottom of the hole. The inserted end of the tube shall remain below the level of the grout in the hole to effect a continuous air free column as the grout level rises. Grout shall be placed quickly and continuously to avoid overworking, segregation, bleeding and disturbance of initial set. Grout that has stiffened due to delay in placing shall not be used in the work and shall be disposed of at an authorized location.
- .6 Rock Face Preparation - The bearing surface shall be prepared to allow the faceplate to be oriented within the limits recommended by the anchor manufacturer. If necessary, rock shall be chipped from around the face plate contact area.
- .7 Mortar Pad Construction - Mortar pads shall be constructed as required to ensure the bar is within 20° of a line perpendicular to the faceplate. The pad shall not crack or deform when loaded. Sufficient time shall be provided to allow pads to achieve sufficient bearing capacity prior to test-tensioning.
- .8 End Hardware Installation
- Nuts shall bear uniformly against the faceplate.
 - The bolt extension beyond the nut shall be 100 mm +/-10 mm.

3.5

TENSIONING

- .1 All rock bolts shall be test tensioned and locked off following set-up (or curing) of the anchorage. Prior to testing, the grout and resin shall meet the strength specified by the anchor manufacturer. The following procedure applies to 22 mm diameter bars. An alternative procedure may be specified for different bar sizes.
- .2 Equipment - Equipment required for tensioning shall be supplied by the Contractor and shall be of a size adequate to provide the required tension. A torque wrench shall not be used for tensioning.
- .3 Test-Tensioning and Creep Test - Rock bolts shall be test-tensioned to 139 kN (31,000 lb). This load shall be held for 10 minutes for the creep test.

- .4 Lock-Off Tension - Rock bolts shall be locked-off to a tension of 111 kN (25,000 lb) after testing.
- .5 Acceptance Criteria - During the creep test a load loss of greater than 10% of the load applied shall be indicative of anchorage failure. Creep movement at the anchor head shall not exceed 2 mm during the creep test. A replacement rock bolt shall be installed at the Contractor's expense where these criteria are not met.

3.6**ROCK BOLT EVALUATION**

- .1 The Department Representative will implement a program of evaluation of rock bolts installed. After locking off the anchor, the load shall be re-applied to determine the lift-off load. The lift-off load shall be the tension level at which the anchor nut can be loosened by hand. Lift-off tests shall be performed on rock bolts chosen by the Department Representative to a minimum of 5% of the total number of rock bolts. One additional lift-off test on a different bolt shall be performed for each bolt whose lift-off load is not within 10% of the specified lock-off load. Following lift-off testing, all bolts shall be locked off as specified.

SEE TABLE NEXT PAGE

“Contractors Daily Rock Bolt Testing and Tensioning Record”

END OF SECTION

*Adapted from BC MOTH specifications

CONTRACTOR'S DAILY ROCK BOLT TESTING AND TENSIONING RECORD

File # _____

PROJECT NO. _____

(TO BE SUBMITTED WITHIN 1 DAY AFTER EACH DAY'S ROCK BOLTING OPERATION)

Contractor Name _____

Bolt Type _____ Size _____

Resin/GROUT Type _____ Bond Zone Length _____ m

Test Jack Number(s) _____

Sample calculation for this grout:

Weight of each bag of grout (M) _____ kg

Volume of water added for each bag (V) _____ L

Actual Water/Cement Ratio (V/M) _____

Date _____

Weather _____

Temperature _____ °C

Bond Zone Type: (circle) **RESIN** **GROUT**

Free Stressing Length Type: (circle)

[illegible]

Certified Correct: _____
(Contractor's Superintendent)

PART 1 **GENERAL****1.1** **SECTION INCLUDES**

- .1 This Section applies to slope mesh structures which are installed to provide rock fall protection.

1.2 **PRECEDENCE**

- .1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 **SITE STORAGE/LOADING**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber or make road side site unsafe with products in any manner.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.4 **CONSTRUCTION PARKING**

- .1 Provide and maintain adequate access and parking at the project site in areas approved by the Departmental Representative.
- .2 Build and maintain temporary roads and provide snow removal during period of Work.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.5 **SECURITY**

- .1 If required by the Contractor, provide and pay for responsible security/traffic security personnel to keep the site safe and guard site contents of site after working hours and during holidays. For extended shut-downs, the Contractor shall provide the level of security as required to protect the Work. .

1.6 **EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.7 **CONFORMANCE DOCUMENTS**

- .1 Prior to installation the contractor shall supply documents of conformance to project specifications of all materials upon request.

1.8 MEASUREMENT AND PAYMENT

- .1 Slope Mesh - Slope mesh shall be measured by the SQUARE METRE of slope meshed area.
- .2 Slope Mesh - Payment for SLOPE MESH will be at the Contract Unit Price per square metre. The Unit Price will be full compensation for all requirements in this specification. Partial payment may be authorized where all components have been installed in a portion of the designated slope meshing area. No separate payment will be made for mesh overlap. Slope meshed area will be calculated by measuring the length of mesh installed at 15 metre intervals on baseline as indicated on drawing SK#5306.00 Rev.1.
- .3 Rock slope scaling and tree removal shall be paid by hour.

PART 2 PRODUCTS**2.1 SLOPE MESHING MATERIALS**

- .1 Unless otherwise specified, preparation and installation of materials shall be according to manufacturer's recommendations. All components shall be hot-dip galvanized conforming to ASTM A 123 or ASTM A 153 or CSA G164 where appropriate. Damaged galvanizing shall be re-galvanized at the contractor's expense.
- .2 Mesh shall be 11 gauge (2.95 mm dia.) hexagonal triple twist gabion type mesh. Mesh wire shall meet federal specification QQ-W-461g, possess soft tensile strength with a finish 5 class 3 zinc coating of not less than 260 g/m². The weight of zinc coating shall be determined by ASTM A 90. The coating shall withstand four one minute dips by the preece test, ASTM A 239. Mesh opening shall be hexagonal in shape and uniform in size measuring 80 mm by 100 mm.
- .3 Threadbar shall conform to CSA G30.18, grade 400 steel, manufactured by Dywidag Systems Int. (DSI) or authorized equivalent.
- .4 Alternatives to the threadbar maybe considered such as Dywidag Systems Int. (DSI) Drill Hollow Bar or authorized equivalent. These IBO anchors shall be galvanized R32N anchor in lieu of the #7 auxiliary anchors for tie backs, and galvanized R51N anchors in lieu of the #14 main anchors in areas of overburden. The anchors would be installed in 3m lengths in areas to be determined in conjunction with PWGSC. The R32N anchor would use a 64mm – 76mm diameter drill hole and be installed to ground level with enough bar “stick up” that the applicable eye and cable hardware can be attached. The R51N anchor would use an 89mm drill hole and be installed to ground level with enough bar “stick up” that the applicable eye, cable hardware and mesh can be properly installed along the meshing area.
- .5 Eye nuts - Eye nuts shall be cast or manufactured eye nuts by DSI or authorized equivalent.
- .6 All cables shall be fibre core conforming to CSA G4. Cables shall be unspliced.
- .7 Thimbles shall meet FF-T-276B Type III (extra heavy G-414).
- .8 Clips shall meet FF-C-450 Type 1, Class 1 (G450 Crosby clip or authorized equivalent).

2.2 GROUT

- .1 Grout for main anchors shall be Celtite Anchortite. Grout for auxiliary anchors shall be Celtite Lokset cartridges, cement grout or authorized equivalent.
- .2 Cement grout shall be Target 1118 or Ocean Microsil anchor grout or equivalent with W/C=0.35. Grout minimum 3 day and 28 day compressive strengths shall be 20 MPa and 40 MPa respectively, tested in accordance with CSA A23.2-1B.

PART 3 EXECUTION**3.1 INSTALLATION**

- .1 Rock slope scaling and tree removal, performed in conjunction with slope mesh installation, shall be considered incidental to slope meshing. Rock slope scaling and tree removal shall be completed before the mesh support system is installed unless otherwise authorized by the Department Representative. Trees to be removed will be detailed by the Department Representative.
- .2 Discarded mesh components, scaled rock, trees and debris generated by the slope meshing work shall be removed from the ditches and disposed of by the Contractor. Temporary storage of felled trees in ditches will not be permitted.
- .3 The contractor shall layout in the field all anchor and suspension cable locations for each section. Each section will be reviewed by the Department Representative prior to installation.
- .4 Field conditions may require final anchor, cable and mesh configurations to vary from the contract drawings. All variations must be authorized by the Department Representative
- .5 The area to be provided with slope mesh protection shall be divided into sections with a maximum width of 24 m. Each section shall have a separate suspension cable, end main anchors and end anchors. End main anchors of adjacent sections shall be positioned 200 mm apart. The gap between sections shall be closed with mesh.
- .6 The maximum mesh length shall be 80 m.
- .7 The maximum rock impact energies shall be as follows:
 - 3 kJ above cut crest
 - 30 kJ below cut crest
- .8 Overburden thickness may range from zero to over 1.5 m.

3.2 ANCHOR INSTALLATION

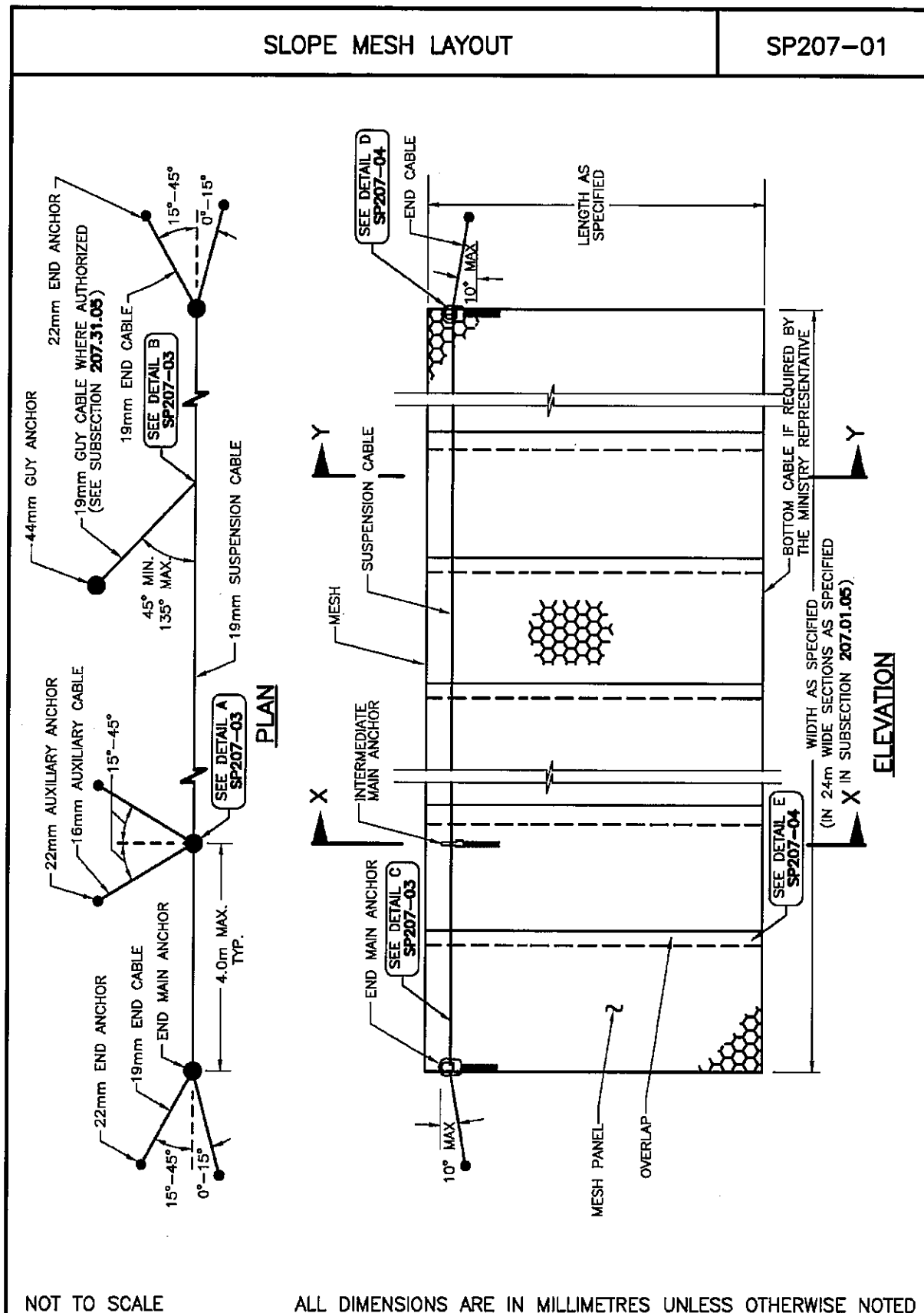
- .1 Overburden shall be excavated to rock at anchor locations unless specified otherwise. The Contractor shall minimize disturbance of surrounding soil and rock when excavating. Cables shall not contact ground surface.

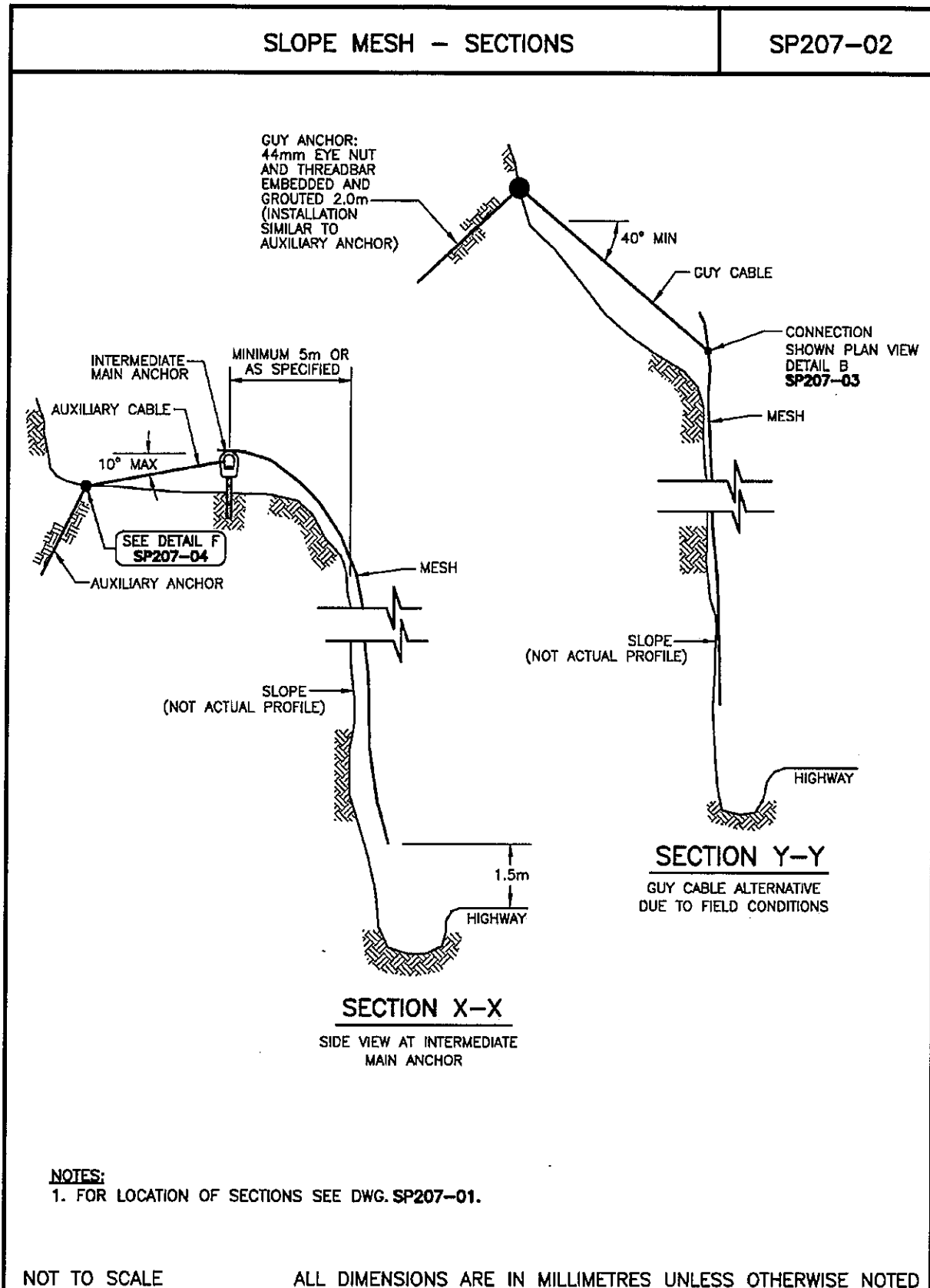
- .2 Anchor holes shall be a minimum of 1.5 times anchor diameter and in strong, competent rock. Anchors shall be centered in the hole and grouted. Anchors shall not be loaded within 3 days of grouting.
- .3 Main anchors shall be located at local high points where practicable to maximize clearance between suspension cable and ground surface. Main anchors shall be vertical and centered in the hole unless otherwise authorized by the Department Representative. Main anchor height above ground surface may be reduced where authorized by the Department Representative for field conditions.
- .4 Auxiliary anchors shall be located to minimize potential for main anchor bending.
- .5 Main anchors may be substituted, where authorized by the Department Representative, with a limited number of guy cables directly connected to the suspension cable where no suitable main anchor locations can be found. Guy cable anchors shall be located to maximize suspension cable elevation. See Section Y-Y, on Drawing SP207-02 and Detail B on Drawing SP207-03.
- .6 Auxiliary or guy anchor embedded length may require extension if weak rock conditions are encountered.
- .7 Soil Anchors - Soil anchors shall be used where required or as ordered by the Department Representative. For soil anchor details see Drawings SP207-04 and SP207-05. Concrete requirements for soil anchors:
 - minimum compressive strength at 28 days = 30 MPa
 - maximum nominal size of aggregate = 28 mm
 - air content = +/- 1%
 - slump = +/- 20 mm
 - maximum w/c ratio by mass = 0.45Upon request by the Department Representative, the contractor shall load test one overburden soil anchor to 10 kN to verify capacity.
- .8 Cable and Mesh Installation - Suspension, auxiliary, end, and guy cables shall be installed to nominal tension to remove slack before and after installing mesh. A maximum of two horizontal mesh seams (200 mm overlap) shall be permitted along the entire mesh height. The upper mesh portion shall be between the slope and lower mesh at the overlap. The horizontal seam connections shall be similar to the vertical seams. The mesh shall terminate 1500 mm above the highway edge of pavement elevation. The bottom of the mesh shall be evenly trimmed parallel with the highway elevation. The bottom of the mesh shall be bent to remove the curl.
- .9 There shall be no blasting utilized in this project without prior written approval.

3.3

CLEANUP

- .1 Clean out and trim all ditches at end of the project.





SLOPE MESH - DETAILS

SP207-03

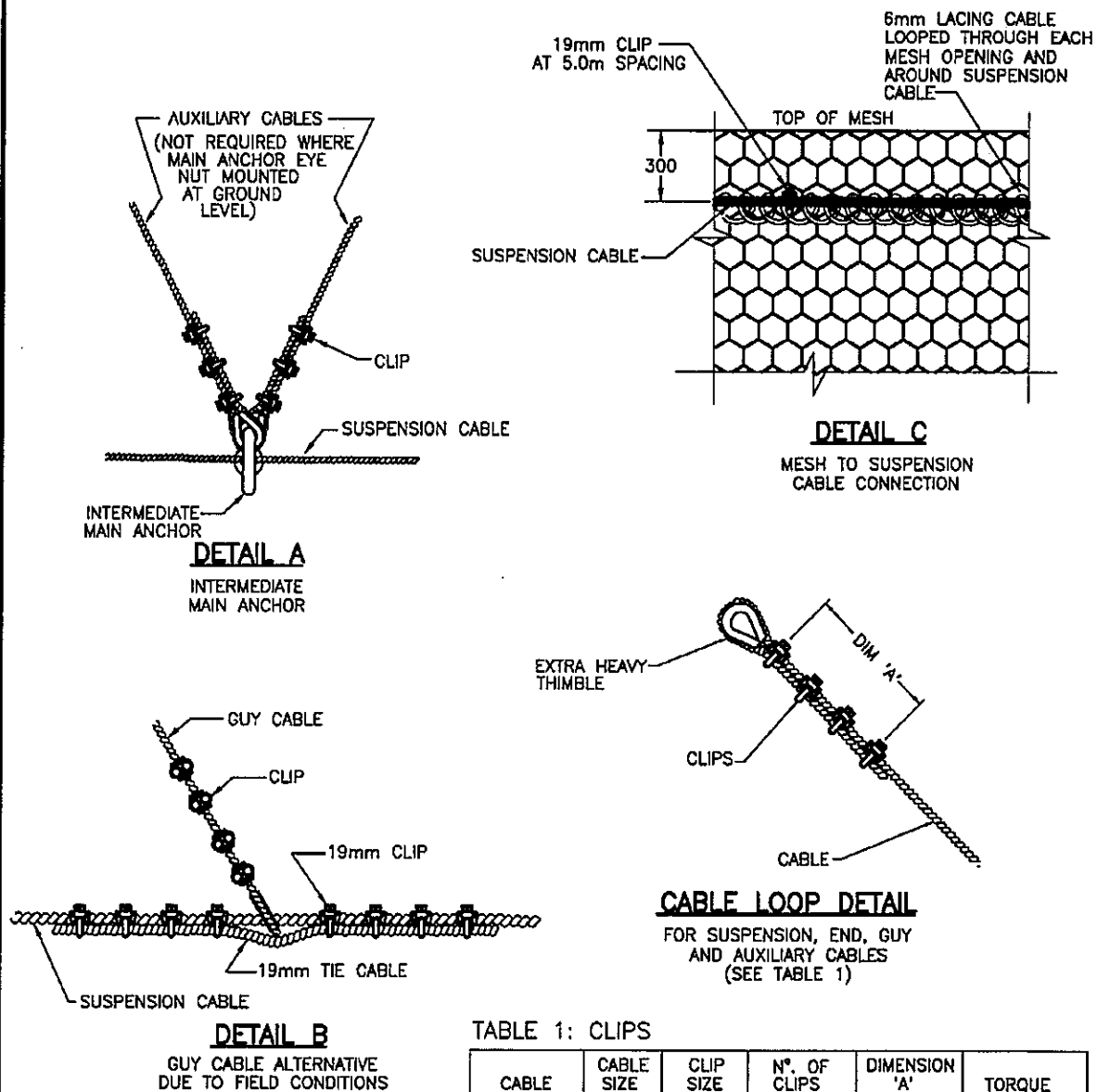


TABLE 1: CLIPS

CABLE TYPE	CABLE SIZE (mm)	CLIP SIZE (mm)	N°. OF CLIPS FOR LOOP	DIMENSION 'A' (mm)	TORQUE Nm (ft. lbs)
Suspension, End, Guy	19	19	4	460	175 (130)
Auxiliary	16	16	3	300	113 (95)
Lacing	6	19	(varies)	N/A	54 (45)

NOTES:

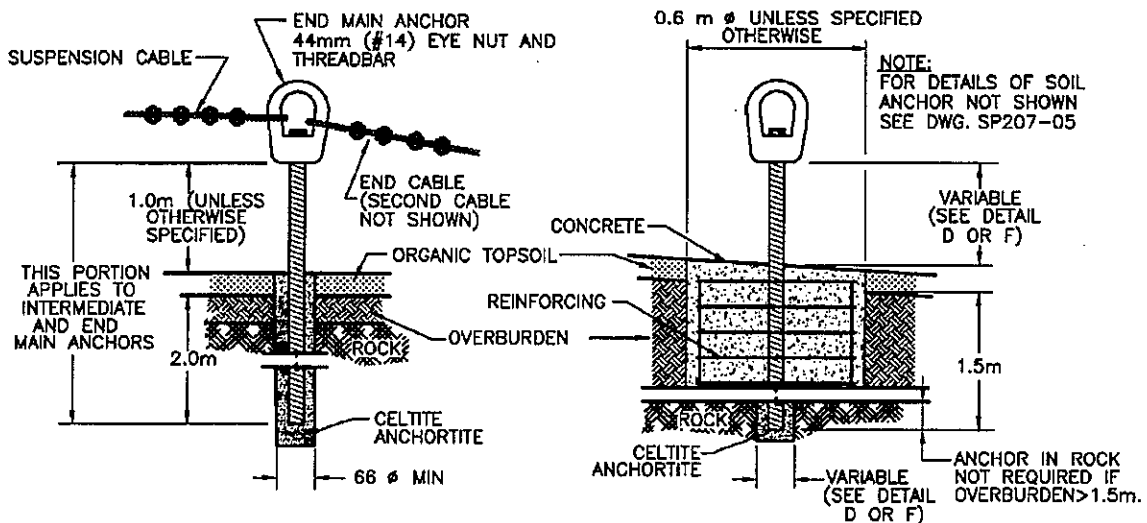
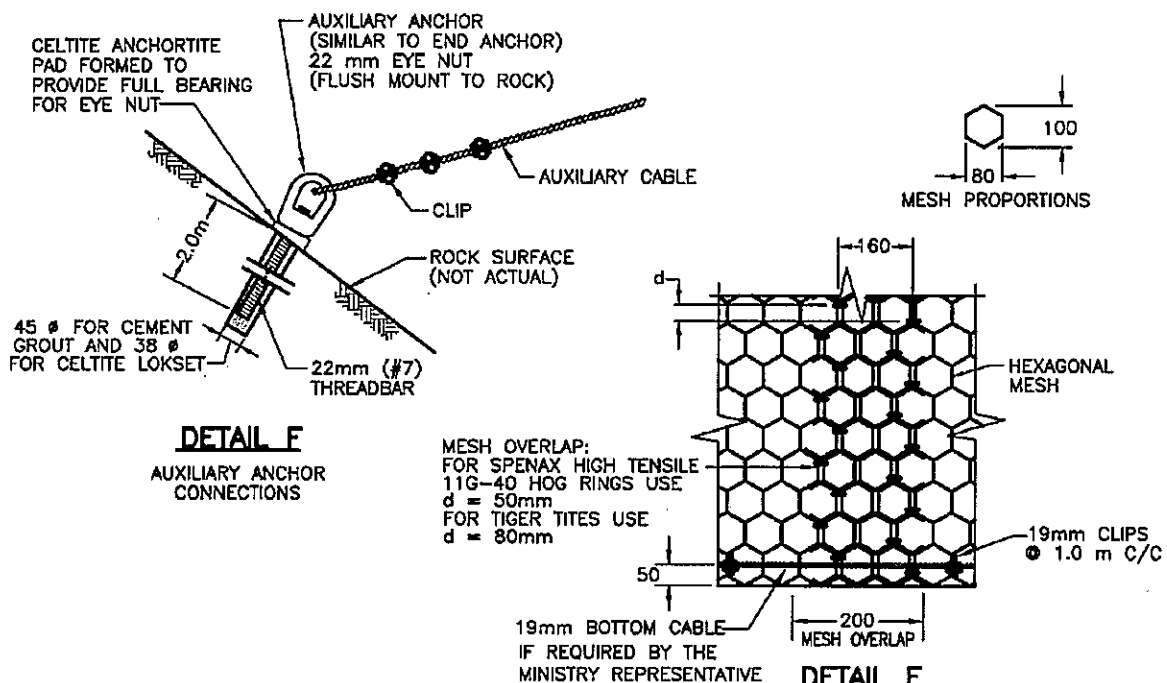
1. FOR LOCATION OF DETAILS SEE DWG. SP207-01.

NOT TO SCALE

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

SLOPE MESH - DETAILS

SP207-04

**DETAIL D**END MAIN ANCHOR CONNECTIONS
(MESH OMITTED FOR CLARITY)**SOIL ANCHOR DETAIL**ALTERNATE ANCHOR DETAIL IN OVERBURDEN.
FOR OVERBURDEN THICKNESS GREATER
THAN 0.6m.**DETAIL F**AUXILIARY ANCHOR
CONNECTIONS**DETAIL E**

MESH SEAM CONNECTIONS AND BOTTOM CABLE

NOTES:

1. FOR LOCATION OF DETAILS SEE DWGS. SP207-01 & 02.

NOT TO SCALE

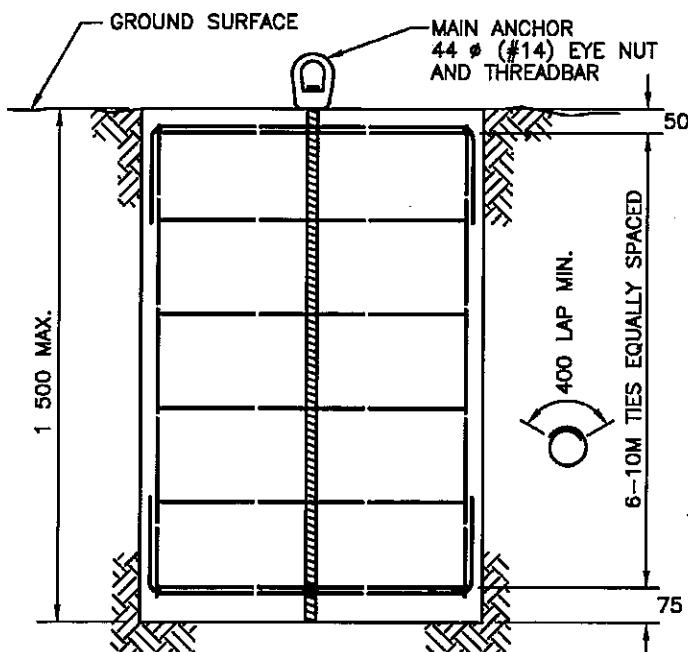
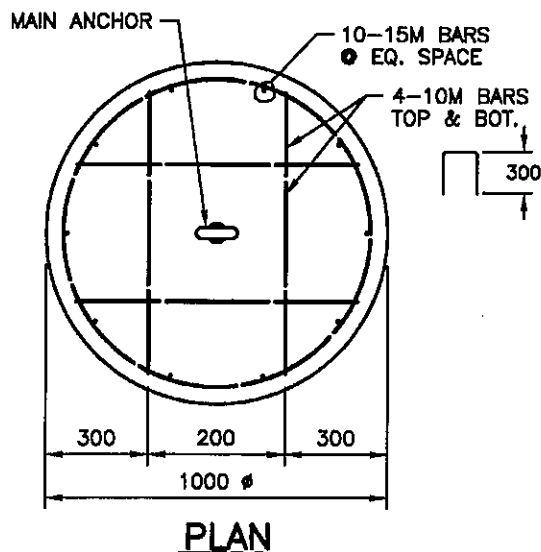
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

SOIL ANCHOR CONCRETE AND REINFORCEMENT FOR SLOPE MESH INSTALLATIONS

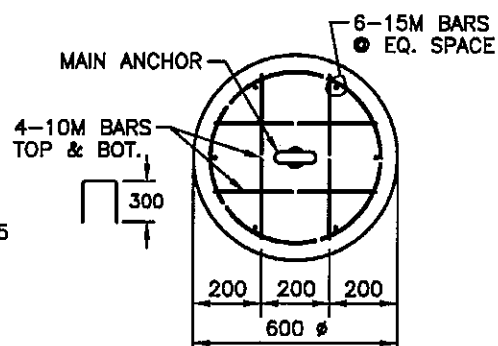
SP207-05

NOTES:

1. INSTALL 600 OR 1000mm ϕ SOIL ANCHORS AS REQUIRED.
2. REDUCE SOIL ANCHOR DEPTH WHERE ROCK IS ENCOUNTERED, AND INSTALL MAIN ANCHOR INTO ROCK TO PROVIDE TOTAL 1.5m EMBEDDED LENGTH.
3. CONCRETE REQUIREMENTS SHOWN ON SLOPE MESH DRAWING.
4. ALL REINFORCING STEEL TO MEET C.S.A. SPECIFICATION G30.18-M, GRADE 400R.
5. ALL REINFORCING STEEL TO HAVE 50mm COVER UNLESS SPECIFIED OTHERWISE.
6. PLACE REINFORCING BARS IN ACCORDANCE WITH RECOMMENDED PRACTISES OF THE CONCRETE REINFORCING STEEL INSTITUTE (C.R.S.I.)
7. CONCRETE AND REINFORCING STEEL TO MEET STANDARD SPECIFICATION SECTIONS 412 AND 218 UNLESS SPECIFIED OTHERWISE.

**1000 ϕ SOIL ANCHOR**

(MAY BE REQUIRED FOR MULTIPLE ANCHOR LOCATIONS WHERE AUTHORIZED BY THE MINISTRY REPRESENTATIVE.)

**600 ϕ SOIL ANCHOR**

(ALL NOT SHOWN SIMILAR TO 1000 ϕ SOIL ANCHOR)

NOT TO SCALE

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

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END OF SECTION

*Adapted from BC MOTH specifications

- 1.0 Description
- .1 Trimming means to complete removal of designated rock material by appropriate drilling and blasting methods to produce a sound rock surface. Methods of blasting used shall ensure that there is no significant rock damage or overbreak behind required backslope of excavation, and no disturbance to rock in remainder of slope. Supply, loading and detonation of explosives and secondary breakage of rocks shall be included as trimming.
- 2.0 Quality Control
- .1 Contractor shall provide blast designs certified by a registered blaster and approved by Departmental Representative for all blasts in designated trim areas.
- 3.0 Drilling
- .1 Employ only drillers completely conversant with drills and drilling at heights.
- 4.0 Blasting
- .1 All blasting shall be carried out by experienced blasters, licensed in accordance with Worker's Compensation Board requirements.
- .2 In general, perform blasting operations for designated trim zones during approved road closures. Blasting operations may be performed during 20 minute scheduled delays, where authorized in writing by Departmental Representative.
- .3 Within entire work site, Contractor to take complete and continuous precautions to prevent damage to persons, vehicles, utility service structures, or other installations by reason of concussion, vibration or flying material due to blasting. Such precautions shall be taken at Contractor's expense.
- 5.0 Scaling after Blasting
- .1 Scale slope to remove all blasted and loose rock or debris caused by blasting operation. Scaling of adjacent parts of slope disturbed by blasting shall be considered incidental to trimming.
- 6.0 Payment
- .1 Payment for trimming/scaling shall be on basis of bid price per hour. All material from scaling and trimming shall be hauled to a designated location at km 262 Pit.

END OF SECTION